
	<p>MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL.</p> <hr/> <p>TERMINAL AUTOMATION PACKAGE ON COMPOSITE WORKS WITH PRE-FILLED SOR FOR MRPL MARKETING TERMINAL PROJECT, DEVANGONTHI, BANGALORE ADDENDUM 02</p>	
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ADDENDUM 02

To

MRPL Tender No. 3200000560 dated 24.05.2022

TENDER FOR: TERMINAL AUTOMATION PACKAGE ON COMPOSITE WORKS WITH PRE-FILLED SOR FOR MRPL MARKETING TERMINAL PROJECT, DEVANGONTHI, BANGALORE MARKETING INFRASTRUCTURE PROJECTS, MRPL

With reference to the above tender, Bidders are requested to note the following:



The items, conditions, specification and stipulations of the Bidding Documents are modified to the extent indicated as follows

- a. **Annexure 01 - Commercial Addendum.**
- b. **Annexure 02 – Technical Addendum**
- c. **Annexure 03 – Reply to Pre-Bid Queries**

The implications of the same, elsewhere in the tender shall be taken care of appropriately by the bidders. All other terms and conditions, stipulations and specifications of tender shall remain unaltered.



Note:

Bidders shall upload the copy of these documents along with the technical- commercial bid, **Digitally Signed**, as a token of having read and understood the same.



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ANNEXURE 01 – COMMERCIAL ADDENDUM

Sl. No.	Volume	Section No./Clause No.	Page No.	Existing Tender Clause	Addition / Deletion / Modification
1.	Volume_I_Co mmercial_Sec tion	Part I – Techno- Commercial Part Notice Inviting Tender (NIT), Sl.No. 8 : Last Date and time of Online submission of Bids (Bid Due Date)	7 of 1818	Up to 1500 Hrs. (IST) on 22.06.2022	Modification Up to 1500 Hrs. (IST) on 29.06.2022
2.	Volume_I_Co mmercial_Sec tion	Part I – Techno- Commercial Part, Notice Inviting Tender (NIT), Sl.No. 9 : Online Opening of Techno- commercial Unpriced Bid.	7 of 1818	Up to 1530 Hrs. (IST) on 22.06.2022	Modification 1530 Hrs. (IST) on 29.06.2022
3.	Volume_I_Co mmercial_Sec tion	Part I – Techno- Commercial Part, Instructions to Bidders	44 of 1818	A. Clause 12. BID CURRENCY AND BID VALIDITY B. Clause 13. EARNEST MONEY DEPOSIT (EMD)	Modification: Clause 12 & 13. are modified as per Attachment -01.



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Sl. No.	Volume	Section No./Clause No.	Page No.	Existing Tender Clause	Addition / Deletion / Modification
4.	Volume_I_Co mmercial_Sec tion	Annexure XIII to Special Conditions of Contract	-	-	Addition "IQC (Industry Quality Control Manual) for Storage" is included as Annexure XIV to Special Conditions of Contract.
5.	Volume_I_Co mmercial_Sec tion	Annexure XIV to Special Conditions of Contract	-	-	Addition "Occurrence of Pandemic(S)" is included as Annexure XV to Special Conditions of Contract.
6.	Volume 1 - Commercial Section	Price BID excel sheet	-	-	Price BID excel sheet is replaced in the portal.
7.	Volume_I_Co mmercial_Sec tion	SP-01: Pre-Filled Schedule of Rates , Sl. No 8.28	618 of 1818	8.28.. Supply of Scope of Work detailed in Tender Document.	Deleted, Accordingly SP-01(SOR) and SP-0 value revised to Rs. 254486703/-.
8.	Volume_I_Co mmercial_Sec tion	SP-01: Pre-Filled Schedule of Rates , Sl. No 8.3	628 of 1818	8.3 Installation, Integration, Configuration..... per Scope of Work detailed in Tender Document	Deleted, Accordingly SP-01(SOR) and SP-0 value revised to Rs. 254486703/-.



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ANNEXURE 02 – TECHNICAL ADDENDUM



Sl. No.	Volume	Section No./Clause No.	Page No.	Existing Tender Clause	Addition / Deletion / Modification/Clarification
1.	Volume_II_Technical_Section_Part_1	Sec 27.17, B – Integration of DBBV's / MOV's at PMHBL end	Page 779 of 1818	a. All DBBV's/MOVs shall be connected & integrated to existing PMHBL PLC and also to MRPL DCS on Modbus RS485. All Cabling work along with tray work shall be in Bidder's scope.	Modified As All DBBV's/MOVs shall be connected to existing PMHBL PLC cabinet and also to MRPL DCS on Modbus RS485. All Cabling work along with tray work shall be in Bidder's scope.
2.	Volume_II_Technical_Section_Part_1	Sec 27.17, B – Integration of DBBV's / MOV's at PMHBL end	Page 779 of 1818	B – Integration of DBBV's / MOV's at PMHBL end Section “b to d”	Deleted
3.	Volume_II_Technical_Section_Part_1	Sec 27.17, A. Data Sharing Between MRPL and PHMBL	Page 778 of 1818	c. Establishment of redundant link on OFC shall be in Bidder Scope. Establishment of redundant link on OFC shall be in Bidder Scope. All GUI development and logic development at MRPL end and PMHBL end is in scope of Contractor.	Modified As c. Establishment of redundant link on OFC shall be in Bidder Scope. All GUI development and logic development at MRPL end is in scope of Contractor.
4.	Volume_II_Technical_Section_Part_1	New/Addition	--	--	Attachment -02 : Hook-up Drawings Attachment -03 : I/O List for DCS and PLC

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Sl. No.	Volume	Section No./Clause No.	Page No.	Existing Tender Clause	Addition / Deletion / Modification/Clarification
	ction_Part-1/2				Attachment -04 : Data sheet for LT(for water service) Attachment -05 : Data sheet for Mass Flowmeter Attachment -06 : Control Room Layout Attachment -07 : Data sheet for Rack Monitor Attachment -08 : Data sheet for Seal Entry Device Attachment -10 : Data sheet for RO Attachment -11 : Data sheet for Level Gauges Attachment -12 : Data sheet for IS Detector
5.	Volume_II_Technical_Section_Part-2	Table -1	1495 of 1818	Process Parameters	Addition Temperature : Ambient: 40 °C, Design: 55°C Pressure Design : 22.5 kg/cm2
6.	Volume_II_Technical_Section_Part-2	19. Density Meter	1530 of 1818	Data sheet for Density Meter	Modified as Attachment -09 : Modified Data sheet for Density Meter
7.	Volume_II_Technical_Section_Part-2	17, Commissioning Spares	1244 of 1818	Commissioning Spares	Deleted
8.	Volume_II_Technical_Section_Part-2	18, Installed Spares	1245 of 1818	Installed Spares	Deleted
9.	Volume_II_Technical_Section_Part-2	41 Data Sheet for TAS Server	1557 of 1818	Data Sheet for TAS Server	Modified as



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Sl. No.	Volume	Section No./Clause No.	Page No.	Existing Tender Clause	Addition / Deletion / Modification/Clarification
					7.Processor : Intel Xeon Silver-4100, 2.10GHz or higher 10.RAM : Minimum 16 GB 30.Hard Disk: HDD
10.	Volume_II_Technical_Section_Part-2	43 Data Sheet OIC/TTES	1561 of 1818	Data Sheet for OIC/TTES	Modified as 7.Processor : Intel 3.6 GHz or higher 12.Hard Disk: HDD – 1TB 21. Floppy Drive : Not Applicable
11.	Volume_II_Technical_Section_Part-2	3.5	1249 of 1818	3.5 All Intrinsically.....	Clarification 1 in 2 out barrier shall be used.
12.	Volume_II_Technical_Section_Part-2	5.2	1236 of 1818	5.2 The communication.....	Clarification Cross redundancy implies failure of single component shall not lead to stoppage/failure of system
13.	Volume_II_Technical_Section_Part-2	5.2	1291 of 1818	5.2 Fire Alarm Panel	Addition CPU shall have built in Degraded mode operation.



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ANNEXURE 03 – REPLY TO PRE- BID QUERIES



Sr. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	PMC/OWNER'S REPLY
	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
1.	Volume_I_Commercial_ Section Page 8,	Clause 17	Item(s) Splitable - NO	We understand that supply services will be separate line item as indicated in 612 onward of Volume_I. The same will be used for billing & invoicing purpose.	Bidder to quote for ALL supply and Installation Service items with no deviation.
2.	Volume_I_Commercial_ Section_ Page 107 to 115	DEPLOYMENT SCHEDULE OF SUPERVISORY PERSONNEL	DEPLOYMENT SCHEDULE OF SUPERVISORY PERSONNEL	We understand that mentioned list of manpower during execution are typical one, vendor may decide as per their inhouse / site requirement. Also manpower related to Civil, Mechanical, Piping, Structural etc. will not be applicable for us.	Bidder to follow Tender requirement.
3.	Volume_I_Commercial_ Section_ Page 218	5.6.0.0 DEFECT LIABILITY	The Defect Liability Period for the works (including the materials incorporated therein within the CONTRACTOR's scope of supply) shall unless otherwise specified be 12 (twelve) months from the date of issue of the	Request M/s. MRPL to confirm defect liability / warranty as 18 months from the date of supply or 12 months from the date of commissioning whichever is earlier.	Defects Liability as per Article 30.0 of Special Conditions of Contract (page 446 of 1818)

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	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
			Completion Certificate		
4.	Volume_I_Commercial_Section_Page 434	6.15	Firm price	Request M/s. MRPL to note that in current scenario the pricing for various items are continuously changing in very high range specially for the commodity related items. Hence we sincerely request M/s. MRPL to accept price variation based on the LME, PVC pricing and US\$ Price variation.	Bidder to follow Tender documents
5.	Volume_I_Commercial_Section_Page 434	6.15	Firm price	Request M/s. MRPL to note that in case of increase in the qty. of cables, cable trays, steel structure and other commodity related items the same shall be supplied by MRPL.	Bidder to follow tender conditions

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	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
6.	Volume_I_Commercial_ Section_Page 434	6.15	Firm price	Request M/s. MRPL to note that subsequent to order finalization within 1 month time we will be sharing list of items for which the given budget is low, the additional qty. order for such items will not be accepted.	Bidder to follow tender conditions
7.	Volume_I_Commercial_ Section_Page 480	43.0 LIMITATION OF LIABILITY	LIMITATION OF LIABILITY	In any event the maximum liability of the contractor will not exceed 100% of contract value, also the contractor will not be liable for any indirect or consequential losses.	Please refer to Article 8.7.0.0 of General Conditions of Contract (Page 257 of 1818).
8.	Volume_I_Commercial_ Section_Page 495	3.1, SUPPLY PAYMENT TERMS	a) 10% (ten percent) of supply value on pro-rata basis on submission of engineering deliverables of supply items and their approval under Code 2 against the CONTRACTOR's certified Running Account Bill(s).	Request M/s. MRPL to provide list of engineering doc. / deliverables of supply items for mentioned 10% payment.	DCI to be finalized & approved by PMC within 45 days from LOA

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	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
9.	Volume_I_Commercial_Section_Page 495	3.1, SUPPLY PAYMENT TERMS	b) 10% (ten percent) of supply value on placement of Purchase Order/ sub orders for supply items on pro-rata basis.	We understand that the order placement of purchase order will be for key items like flow metering instruments, TFMS instruments, DCS & Safety PLC along with IT hardware. Please confirm.	Bidder to follow tender conditions
10.	Volume_I_Commercial_Section_Page 495	3.1, SUPPLY PAYMENT TERMS	d) 10% (ten percent) of supply value shall be released on installation, testing and completion of all works on pro-rata basis against CONTRACTOR's certified running Accounts Bill(s).	In case of delay in installation beyond 30 days from the date of supply for the reason which are not attributable to vendor, mentioned 10% payment will be released against equivalent amount of BG. Please confirm.	Bidder to follow tender conditions
11.	Volume_I_Commercial_Section_Page 496	3.1, SUPPLY PAYMENT TERMS	e) 5% (five percent) of supply value on issue of Mechanical Completion Certificate against CONTRACTOR's certified running Accounts Bill(s).	In case of delay in mechanical completion beyond 60 days from the date of supply of material for the reasons which are not attributable to vendor. Mentioned 5% payment shall be released against equivalent amount of BG. Please confirm.	Bidder to follow tender conditions

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	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
12.	Volume_I_Commercial_Section_Page 496	3.1, SUPPLY PAYMENT TERMS	f) 5% (five percent) of supply value on commissioning, completion of all jobs and submission and acceptance of Final "As built" Drawings along with Electronic native files for all documents as per PMC/OWNER Documentation Procedure, against the CONTRACTOR's certified Final Bill.	in case of delay in commissioning & completion of all jobs / submission & acceptance of As built drawings, beyond 90 days from the date of supply, mentioned 5% payment will be released against equivalent amount of BG. Please confirm.	Bidder to follow Tender requirement.
13.	Volume_I_Commercial_Section, Page 505	CONTRACT WORKER'S SAFETY POLICY	CONTRACT WORKER'S SAFETY POLICY	We understand that mentioned list of manpower for safety will not be applicable for this job. We will have to depute only 1 no. safety supervisor at site during project execution, after receipt of material at site. Please confirm.	Bidder to follow tender conditions
14.	Volume_I_Commercial_Section Page 594	APPROVED MAKES / BRANDS / VENDORS	BATCH CONTROLLER - DANIEL (EMERSON PROCESS CONTROLS)	Request M/s. MRPL to kindly note that the Batch Controller make will be Emerson, not Emerson Process Controls). Please do necessary modification in the make name.	Noted and accepted.

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	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
15.	Volume_I_Commercial_ Section Page 594	APPROVED MAKES / BRANDS / VENDORS	PD METER WITH PULSE TRANSMITTER	Request M/s. MRPL to also approve M/s. Toshniwal Make PD Meter.	Bidder to follow Tender requirement.
16.	Volume_I_Commercial_ Section Page 594	APPROVED MAKES / BRANDS / VENDORS	PNEUMATIC CONTROL VALVE / SHUTDOWN VALVE (GLOBE TYPE	Request M/s. MRPL to approve M/s. Technik and M/s. Aira Make control valves also.	Bidder to follow Tender requirement.
17.	Volume_I_Commercial_ Section Page 594	APPROVED MAKES / BRANDS / VENDORS	DIGITAL CONTROL VALVE	Request M/s. MRPL to note that Liquid Controls & IDEX are same. Hence we sincerely request to approve M/s. Darling Muesco make DCV also.	Bidder to follow Tender requirement.
18.	Volume_I_Commercial_ Section Page 595	APPROVED MAKES / BRANDS / VENDORS	PRESSURE GAUGE / DIFFERENTIAL PRESSURE GAUGE	Request M/s. MRPL to approve M/s. Baumer make PG & DPGs	Addition M/s. Baumer is added under Approved Makes/Vendor/ Brand
19.	Volume_I_Commercial_ Section Page 595	APPROVED MAKES / BRANDS / VENDORS	LOADING ARM (BOTTOM) FOR PRODUCT & VAPOUR	Request M/s. MRPL to approve M/s. Woodfield also for bottom loading arm and vapour recovery arm.	Addition M/s. Woodfield is added under Approved Makes/Vendor/ Brand

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	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
20.	Volume_I_Commercial_ Section Page 595	APPROVED MAKES / BRANDS / VENDORS	PROXIMITY CARD READER	Request M/s. MRPL to also approve M/s. Unitech make proximity type card readers.	Bidder to follow Tender requirement.
21.	Volume_I_Commercial_ Section Page 595	APPROVED MAKES / BRANDS / VENDORS	SIGNAL CABLE	Request M/s. MRPL to also approve M/s. Avocab make cables.	Bidder to follow Tender requirement.
22.	Volume_I_Commercial_ Section Page 596	APPROVED MAKES / BRANDS / VENDORS	CONTROI CABLE & POWER CABLE	Request M/s. MRPL to also approve M/s. Cords make cables.	Addition M/s. Cords is added under Approved Makes/Vendor/ Brand.
23.	Volume_I_Commercial_ Section Page 596	APPROVED MAKES / BRANDS / VENDORS	CONTROI CABLE & POWER CABLE	Request M/s. MRPL to also approve M/s. Avocab make cables.	Bidder to follow Tender requirement.
24.	Volume_I_Commercial_ Section Page 596	APPROVED MAKES / BRANDS / VENDORS	BARRIER GATE	Request M/s. MRPL to also approve M/s. Motwane Make barrier gates	Addition

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					M/s. Motwane is added under Approved Makes/Vendor/ Brand
25.	Volume_I_Commercial_ Section Page 597	APPROVED MAKES / BRANDS / VENDORS	TFMS SOFTWARE - SAAB	Request M/s. MRPL to note that SAAB is currently Emerson. Kindly do necessary modification.	Noted and accepted.
26.	Volume_I_Commercial_ Section Page 597	APPROVED MAKES / BRANDS / VENDORS	CABLE TRAYS	Request M/s. MRPL to approve M/s. Rukmani Make Cable trays	Addition M/s.Rukmani is added under Approved Makes/Vendor/ Brand
27.	Volume_I_Commercial_ Section Page 597	APPROVED MAKES / BRANDS / VENDORS	ORIFICE PLATE & FLANGES ASSEMBLY	Request M/s. MRPL to approve M/s. Aditya make Orifice Flange Assembly	Bidder to follow Tender requirement.
28.	Volume_I_Commercial_ Section Page 598	APPROVED MAKES / BRANDS / VENDORS	GAS DETECTORS	Request M/s. MRPL to accept M/s. Emerson make Gas Detectors also.	Addition M/s. Emerson is added under Approved Makes/Vendor/ Brand

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29.	Volume_I_Commercial_ Section Page 598	APPROVED MAKES / BRANDS / VENDORS	INSTRUMENT AIR MANIFOLD(SS)	Request M/s. MRPL to approve M/s. Aditya make Manifolds	Bidder to follow Tender requirement.
30.	Volume_I_Commercial_ Section Page 603	APPROVED MAKES / BRANDS / VENDORS	CABLE TRAYS - for CCTV & other Package items	Request M/s. MRPL to approve M/s. Rukmani Make Cable trays	Addition M/s. Rukmani is added under Approved Makes/Vendor/ Brand .
31.	Volume_I_Commercial_ Section Page 603	APPROVED MAKES / BRANDS / VENDORS	CABLES	Request M/s. MRPL to also approve M/s. Avocab make cables.	Bidder to follow Tender requirement.
32.	Volume_I_Commercial_ Section Page 612	PRICE SCHEDULE	GANTRY INSTRUMENTATION-TANK LORRY FILLING - Item no. 1, PD Meters with 2400 LPM	Request M/s. MRPL to alternatively accept Mass Flow Meter of suitable size which is better technology and having no rotating part so very low maintenance.	Bidder to follow Tender requirement.
33.	Volume_I_Commercial_ Section Page 612	PRICE SCHEDULE - Item 1.3	Supply of Multistage Digital Control Valve (DCV)	Request M/s. MRPL to confirm whether DCV will be diaphragm type / Piston type?	DCV shall be Diaphragm type.

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	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
34.	Volume_I_Commercial_ Section Page 612	PRICE SCHEDULE - Item 1.4	Supply of Pneumatic operated ON/OFF valves as shut down valves for top loading/bottom loading	We understand that necessary instrument air will be provided within 5 meters of On-Off valve with isolation arrangement. Please confirm.	Bidder to note the tentative distance shall be 10m, the actual shall be decided by Bidder during detail engineering.
35.	Volume_I_Commercial_ Section Page 612	PRICE SCHEDULE - Item 1.4	Supply of Pneumatic operated ON/OFF valves as shut down valves for top loading/bottom loading	We understand that mentioned Pneumatic Operated on/off valve will be used for the selection of loading arm (either top / bottom). Please confirm whether our understanding is correct?	Separate ON/OFF valves shall be provided for Top loading & Bottom loading arm as per P&ID and SOR.
36.	Volume_I_Commercial_ Section Page 612	PRICE SCHEDULE - Item 1.8	...associated piping for connecting loading arm with the metering skid	Request M/s. MRPL to confirm whether flow metering instruments will be mounted on pre fabricated SKID or the same to be installed & assembled at site?	Bidder can opt for either of the options based on site conditions.
37.	Volume_I_Commercial_ Section Page 612	PRICE SCHEDULE - Item 1.16	Supply of intrinsically safe / flameproof type proximity card reader	Request M/s. MRPL to note that we could not find any line item for proximity cards, request you to please confirm the qty. for proximity cards. Also add separate line item in given BOQ.	Bidder to note that the each proximity card reader shall be supplied with 50 Nos. of Proximity Cards and same shall be considered in SOR 1.16.

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38.	Volume_I_Commercial_ Section Page 612	PRICE SCHEDULE - Item 2.1	Supply of Double case PD Meter with dual Pulse transmitter	Request M/s. MRPL to also accept Turbine Meter for this reuirement.	Bidder to follow Tender requirement.
39.	Volume_I_Commercial_ Section Page 612	PRICE SCHEDULE - Item 2.3	Supply of Multistage Digital Control Valve (DCV)	Request M/s. MRPL to confirm whether DCV will be diaphragm type / Piston type?	DCV shall be Diaphragm type.
40.	Volume_I_Commercial_ Section Page 614	PRICE SCHEDULE - Item 3.9	Supply of trolley mounted Mobile Master meter proving system master PD meter (double case), strainer cum air eliminator with integral TSV, Digital Control Valve, Master Batch Controller, Duplex RTD with thermowell ,Piping Valves and associated hardwares in gantry for line size 100mm . Job includes W&M stamping & providing necessary connection points & accessories	Request M/s. MRPL to note that only Master Meter required, mentioned other items like strainer cum air eliminator, TSV, DCV, Batch Controller, RTD with TW etc. will not be applicable. Kindly accept the same.	Bidder to follow Tender requirement.

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41.	Volume_I_Commercial_ Section Page 157 to 162	7.2	MINIMUM LIST OF SPARES TO BE KEPT AT SITE DURING WARRANTY & COMPREHENSIVE ANNUAL MAINTENANCE PERIOD	We understand that we have to consider spares which are applicable for mentioned items.	Bidder to Follow Minimum list of Spares to be kept at site during Warranty & Comprehensive annual maintenance period as given in Cl.7.2 Page 791-796 of 1818.
42.	Due Date for Bid submission			Request M/s. MRPL to extend the due date for bid submission for min. 2 week time from current due date.	Bidder to refer to Addendum-2.
43.	Volume_I_Commercial_ Section - Clause No. 4 Bid Qualification Criteria, pg 13 of 634	4.1.b	Technical Criteria - Bidder shall be the original equipment manufacturer (OEM) of Distributed Control System (DCS) offered for this project and shall have Terminal automation software with further development, customization and maintenance rights for the same.	We would like to highlight that the scope of work of MRPL TAS is similar to TAS orders won by AST. Where Scope is design, supply, installation, testing and commissioning of DCS based Terminal Automation System comprising of Tank Truck Loading System, Tank Farm Management System, Photo Pass Management System, Access Control System, Fire Alarm System, Hydrocarbon	Bidder to follow Tender requirement.

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				<p>Vapours Detection System, Fire Fighting Automation System etc along with associated works (IOCL Baitalpur, IOCL Malkarpur, IOCL Ahmednagar and BPCL Krishnapatnam PO attached) You would observe that the qualification criteria in all these tenders is exactly as asked in the MRPL Devangonhi TAS tender to the last detail, except that you have asked for the bidder to be an OEM of DCS system. We would like to confirm that we are meeting all the technical and commercial qualification criterion given in NIT except bidder being a DCS OEM. In all earlier tenders, even in the tender for TAS at MRPL, nowhere it is indicated that the vendor has to be an OEM of DCS.</p>	

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				The current tender seems to be biased towards DCS OEM and wants to exclude most eligible bidders Like Advanced Sys-tek Pvt Ltd. We request you to look into the matter. Hence we request you to exempt DCS OEM clause form the BQC enabling us to participate in your prestigious project.	
44.	Volume_I_Commercial_Section - Vendor List, pg 595 of 634		UPS	Request to kindly accept Fuji make UPS.	Addition M/s. Fuji is added under Approved Makes/Vendor/ Brand
45.	Volume_I_Commercial_Section - Vendor List, pg 596 of 634		SIL 3 PLC	Request to kindly accept Rockwell make SIL 3 PLC System.	Bidder to follow Tender requirement.

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46.	Volume_I_Commercial_Section - Vendor List, pg 596 of 634		DCS	Request to kindly accept Rockwell make DCS System.	Bidder to follow Tender requirement.
47.	Volume_I_Commercial_Section - Vendor List, pg 596 of 634		Thermal Relief Valve	Request to kindly accept Darling Muesco make TRV.	Bidder to follow Tender requirement.
48.	Volume_I_Commercial_Section - Vendor List, pg 597 of 634		Overspill Detector, Loading Arm Position Sensor for Top Loading	Request to kindly accept AST make for stated items.	Bidder to follow Tender requirement.
49.	Volume_I_Commercial_Section - Vendor List, pg 597 of 634		Electronic Display Unit	Request to kindly accept Team Power make for EDU.	Addition M/s. Team Power is added under Approved Makes/Vendor/Brand
50.	Volume_I_Commercial_Section - Vendor List, pg 597 of 634		Cable Trays	Request to kindly accept MM Engineering & Globe Electrical make for Cable Trays.	Bidder to follow Tender requirement.

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51.	Volume_I_Commercial_Section - Vendor List, pg 598 of 634		Gas Detectors	Request to kindly accept ESP Safety & Draeger make for Gas Detectors.	Bidder to follow Tender requirement.
52.	Volume_I_Commercial_Section - Vendor List, pg 598 of 634		Hooters, Beacons	Request to kindly share approved makes for Hooters & Beacons as same is not available in vendor list.	Bidder to refer Serial no. 84 for approved makes of Hooters and beacons (Page 598 of 1818).
53.	Volume_I_Commercial_Section - Vendor List, pg 602 of 634		Access Control System	Request to kindly accept Viridi make for Access Control System.	Bidder to follow Tender requirement.
54.	Volume_II_Technical_Section_Part_1 - Bidder's Scope of Work, pg 107 of 594	Clause 8.22	Maintenance of Free Issued Items	Request to kindly share details of all the free issued items as mentioned in stated clause.	Bidder to follow Tender requirement.
55.	Volume_II_Technical_Section_Part_1 - Scope of Work, pg 144 of 594	Clause 27.17	INTEGRATION WITH PMHBL TERMINAL	We request owner/PMC to kindly share details - make, model of existing PMHBL PLC and MRPL DCS.	Bidder to refer Addendum-2 for details / clarification

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56.	Volume_II_Technical_Section_Part_1 - Scope of Work, pg 144 of 594	Clause 27.17 -	INTEGRATION WITH PMHBL TERMINAL	<p>As per mentioned clause,</p> <p>1) we understand that spare ports/modules shall be available in free issued PMHBL PLC for integration of DBBV/MOC. Kindly confirm.</p> <p>2) If spare ports/modules are available, confirm whether bidder can use those spare ports/modules. Also confirm whether 20% spares are still to be maintained after usage of existing spare ports/modules.</p> <p>3) If spare ports/modules are not available, then confirm availability of space in PLC panel for new additional modules.</p> <p>4) Also confirm whether the existing PLC shall be compatible for expansion.</p>	Bidder to refer Addendum-2 for details / clarification

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57.	Volume_II_Technical_Section_Part_1 - Scope of Work, pg 145 of 594	Clause 28	PMC/MRPL RESPONSIBILITY	We understand that point no. 28.1 to 28.19 shall be owner/PMC scope.	Bidder's understanding is correct.
58.	Volume_II_Technical_Section_Part_1 - pg 157/466 of 594		Site Stock List/ Spare Philosophy	We request to kindly clarify which spare list to be followed - site stock list given on pg 157 or spare philosophy Ann 2 given on pg 466.	Bidder to follow Site stock list given in Scope of Work / Annexure I Clause 7.2 on Page 791-796 of 1818.
59.	Volume_II_Technical_Section_Part_2 - Process Parameters, pg 267 of 418		Note: As minimum all inline field instruments connection shall be rated for #300	Looking at the process parameters and process fluids, we understand that 150# rating shall be suitable for field instruments.	Bidder to follow Tender requirement.
60.	Volume_II_Technical_Section_Part_2 - pg 273 of 418		Thermal Relief Valve	Pressure class mentioned in specifications is 150# whereas all other inline instruments are required with 300# ratings. Kindly reconfirm pressure class for TRV.	Thermal Relief valve shall be 300# pressure rating.

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61.	Volume_II_Technical_Section_Part_2 - pg 278 of 418	Pt. no. 11	Pulse Input - Batch Controller	Kindly accept Dual Pulse Quadrature Input from Pulse Transmitter as per Level B .	Noted & Accepted
62.	Volume_II_Technical_Section_Part_2 - pg 278 of 418	Pt. no. 17	IO Summary - Batch Controller	IO's shall be as per OEM standard	IO's given in the Batch Controller Datasheet is minimum and indicative. However If any additional IO is required to meet the functionality then same shall be provide by Bidder.
63.	Volume_II_Technical_Section_Part_2 - pg 278 of 418	Pt. no. 20	Memory capacity & backup - Batch Controller	Shall be as per OEM standard	Bidder shall decide the memory capacity based on the functionality requirement of the Batch Controller.
64.	Volume_II_Technical_Section_Part_2 - pg 278 of 418	Pt. no. 51	Manual to auto switch over once communication is re established shall be automatic without any manual intervention - Batch Controller	Manual Intervention shall be required	Manual intervention is acceptable as per loading philosophy.

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65.	Volume_II_Technical_Section_Part_2 - pg 297 of 418	Pt. no. 11	Function - Earthing Relay	Request to kindly clarify whether monitoring for loading arm bonding is required or not.	Bidder to follow Tender requirement
66.	Volume_II_Technical_Section_Part_2 - pg 354 of 418		Rack Monitor	Request you to kindly recheck specifications for Rack Monitor as provided specifications does not seem of Rack Monitor.	Bidder to refer Addendum-2, Attachment - 07
67.	General		IO Counts	Request to kindly share IO counts for DCS and Safety PLC System.	Bidder to refer Addendum-2, Attachment - 03
68.	Free Issue Items		Free Issue Items	We understand free issued Items to bidder shall be in working condition. Any kind of OEM support/visit, software and hardware support required for free issued items shall be arranged by IOCL.	Bidder's query is not relevant for this Tender.

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69.	Free Issue Items		Free Issue Items	For all free issue Items, MRPL will arrange the Protocol documents while integration. Please confirm.	Bidder's understanding is correct.
70.	General		Bid submission due date	Looking at the broad scope of work, we request MRPL to extend bid submission due date for atleast three weeks after replying the pre-bid queries.	Bidder to refer Addendum-2 for Bid submission due date.
71.	Price_Bid_32_560 Page 1	-	Estimated Cost of CAMC Line Item	The value mentioned against the CAMC Line item is same as that of main job. It looks like there is some typographical error. Request to kindly correct the same.	Bidder has to quote for CAMC for the entire five-year duration as a percent of the derived total quoted estimated Contract Price in SP-0 form. However actual awarded CAMC order value shall be the actual executed contract value for the Terminal Automation System, multiplied by the percent quoted in SP-0 form against CAMC line item. The actual executed contract

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					value is obtained at the end of the TAS project after approval of material reconciliation and excess saving statement of the SOR.
72.	Volume_I_Commercial_ Section Page 41	11.5	Bidder shall quote for all the items of 'Schedule of Price' price bid after careful analysis of cost involved for the performance of the completed item(s) considering all parts of the Tender document. In case any activity though specifically not covered in description of item under 'Schedule of Price/ price bid' but is required to complete the work as per Scope of Work, Scope of Supply, Specifications,	This clause is open ended as it specifies that even if the work is not specified in the description then also bidder has to consider the same. Request MRPL to amend this clause and limit the scope to that as defined in the SOR.	Bidder to follow Tender documents.

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			Standards, Drawings, General Conditions of Contract, Special Condition of Contract or any other part of Tender document, the item(s) quoted price will deemed to be inclusive of cost incurred for such activity.		
73.	Volume_I_Commercial_ Section Page 142	2.1.0.0	The CONTRACTOR shall furnish Security Deposit in the amount equivalent to 3% (three percent) of the total contract value. Such Security Deposit is to be held by the OWNER as security for the due performance of the Contractor's	Kindly confirm that whether the total contract value is inclusive of tax or only the basic value.	Total Contract value (basic) to be considered for the Security Deposit

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			obligations under the contract.		
74.	Volume_I_Commercial_ Section Page 149	2.4.0.0	ALTERATIONS IN DESIGNS, PLANS, DRAWINGS, SPECIFICATIONS, ORDERS AND INSTRUCTIONS	Bidder request MRPL to quantify/limit the quantity variation at the quoted rates that can be done for the items which are already there in SOR.	Bidder to follow Tender conditions.
75.	Volume_I_Commercial_ Section Page 189/190	4.4.0.0	PRICE ADJUSTMENT FOR DELAY IN COMPLETION	This clause limits the max. price reduction as 10% of total contract value wherea in page 244 clause 7.0.7.0 the maximum liquidated damages mentioned is 5% of Total contract value. Pls confirm which clause will prevail.	Max Price reduction shall be as per Article 27.0 of SCC (page 443 of 1818)
76.	Volume_I_Commercial_ Section Page 492	ANNEXURE I	The Time of completion shall be reckoned from the date of award of Contract, which shall be the date of issue of Letter of	Bidder request MRPL to calculate the completion time from the date of PO since LOA is not a bookable document and hence it is difficult	Letter of Award (with reference number and date) to be the milestone document.

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			Acceptance (LOA)/Purchase Order(PO).	to start work without a valid booking reference.	
77.	Volume_I_Commercial_ Section Page 495	3.1	60% (sixty percent) of the supply value on receipt of material at site and inspection and acceptance of the same on pro-rata basis against CONTRACTOR's certified running Accounts Bill(s).	This milestone payment is against the supply and receipt of material at site hence we understand that we need to provide Tax invoice at this stage of 100% supply value and payment will be made as per the milestone with 100% GST. Please confirm our understanding.	Bidder understating is correct , however GST amount will be reimbursed upon reflection of same on GST portal
78.	Volume_I_Commercial_ Section Page 592	3	PMC/OWNER RESERVE THE RIGHT TO CHOOSE ANY OF THE APPROVED PRODUCT/ BRAND/ MANUFACTURER AS PER THIS LIST.	Bidder will be supplying products as per the approved vendor list. There shall not be any condition of choice by owner.	Noted and Accepted
79.	Volume_I_Commercial_ Section Page 594	Approved Vendors	PD METER WITH PULSE TRANSMITTER	Request M/s MRPL to include M/s Toshniwal as an approved vendor of PD Meter. They have supplied PD meters at	Bidder to follow Tender requirement.

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				various Oil and Gas terminals. Attached is the List of HPCL locations where they have supplied their Meters.	
80.	Volume_I_Commercial_ Section Page 594	Approved Vendors	DIGITAL CONTROL VALVE	Request M/s MRPL to include Darling Muesco as an approved vendor for DCV.	Bidder to follow Tender requirement.
81.	Volume_I_Commercial_ Section Page 594	Approved Vendors	PNEUMATIC ON OFF BUTTERFLY VALVE / TRIPPLE OFFSET BUTTERFLY VALVE	Request M/s MRPL to include L&T valves as an approved vendor for TOBV.	Addition M/s. L&T is added under Approved Makes/Vendor/ Brand
82.	Volume_I_Commercial_ Section Page 594	Approved Vendors	SIL VERIFICATION /VALIDATION/CERTIFICATION AGENCIES	Request MRPL to include M/s DNV as approved SIL Verification agency.	Addition M/s. DNV is added under Approved Makes/Vendor/ Brand

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83.	Volume_I_Commercial_ Section Page 594	Approved Vendors	PRESSURE GAUGE/DIFFERENTIAL PRESSURE GAUGE	Request MRPL to include M/s Altop in approved list	Addition M/s. Altop is added under Approved Makes/Vendor/ Brand
84.	Volume_I_Commercial_ Section Page 594	Approved Vendors	SOLENOID VALVE	Request MRPL to include M/s Rotex in approved list	Bidder to follow Tender requirement.
85.	Volume_I_Commercial_ Section Page 594	Approved Vendors	UPS	Request MRPL to include M/s Fuji in approved list	Addition M/s. Fuji is added under Approved Makes/Vendor/ Brand
86.	Volume_I_Commercial_ Section Page 594	Approved Vendors	REMOTE INTERACTION TERMINAL (RIT)/DRIVER ACK, JUNCTION BOX & CABLE GLAND, ESD PUSH BUTTON, MCP	Request MRPL to include M/s Activa Controls (also known as Shyam Switch Gear) in approved list	Bidder to follow Tender requirement.

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87.	Volume_I_Commercial_ Section Page 594	Approved Vendors	Control and Power Cable	Request MRPL to include M/s Cords Cables in approved list	Addition M/s. Cords Cables is added under Approved Makes/Vendor/ Brand
88.	Volume_I_Commercial_ Section Page 594	Approved Vendors	Computers and Monitors	Request MRPL to include M/s Lenovo in approved list	Bidder to follow Tender requirement.
89.	Volume_I_Commercial_ Section Page 594	Approved Vendors	SURGE SUPPRESSION DEVICES	Request MRPL to include M/s DEHN in approved list	Addition M/s. DEHN is added under Approved Makes/Vendor/ Brand
90.	Volume_I_Commercial_ Section Page 594	Approved Vendors	ETHERNET SWITCHES	Request MRPL to include M/s D Link in approved list	Bidder to follow Tender requirement.

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91.	Volume_I_Commercial_ Section Page 594	Approved Vendors	ELECTRONIC DISPLAY UNIT	Request MRPL to include M/s Team Power in approved list	Addition M/s. Team Power is added under Approved Makes/Vendor/ Brand
92.	Volume_I_Commercial_ Section Page 594	Approved Vendors	SEAL ENTRY DEVICE	Request MRPL to include M/s Bartec in approved list	Addition M/s. Bartec is added under Approved Makes/Vendor/ Brand
93.	Volume_I_Commercial_ Section Page 594	Approved Vendors	SERVER/WORKSTATION & COMPUTER MONITORS	Request MRPL to include M/s Lenovo in approved list	Bidder to follow Tender requirement.
94.	Volume_I_Commercial_ Section Page 594	Approved Vendors	LCD/LED DISPLAYSCREENS- INDUSTRIAL GRADE/ SUITABLE FOR 24 X 7 OPERATION	Request MRPL to include M/s Panasonic in approved list	Addition M/s. Panasonic is added under Approved Makes/Vendor/ Brand

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95.	Volume_II_Technical_Section_Part_1 Page 108	9.1.6	Supply, fabrication, welding, laying, testing of required MS pipes (Min schedule 40 or higher if required), bends, elbow, Tee, spool piece, WNRF flanges, SS spiral gasket, SS nuts bolts, studs, copper flat jumpers, structural support etc for metering assembly and between metering assembly, loading arm and TLF Header.	Bidder request MRPL to confirm that first Isolation valve for each loading point will be provided by MRPL. Bidder need not do any modification in gantry header.	Bidder's understanding is correct.
96.	Volume_II_Technical_Section_Part_1 Page 111	10.1	Note1: Mass flow meter shall be of same make and model as installed in PMHBL Devangonhi	Bidder request MRPL to provide Datasheet for MFM	Bidder to refer Addendum-2, Attachment- 05.

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			terminal, details of MFM are given in Specificalton.		
97.	Volume_II_Technical_Section_Part_1 Page 117	18.2	Fire alarm system to be interfaced with PA paging system for Auto announcement of prerecorded messages with respect to the location from where fire is detected or MCP has been pressed.PA paging system will be supplied by OTHERS, However Integration of PA system to TAS is in Bidder Scope.	Bidder understand that all modification required at PA system end to initiate announcement of pre recorded messages will be in PA system vendor scope. Bidder will provide the trigger points over MODBUS. Please confirm.	Bidder to note that the PA Paging system is interfaced with SIL3 PLC System through Hardwired. General Announcement shall be based on System Vendor Protocol.
98.	Volume_II_Technical_Section_Part_1 Page 119	21.5	Integration of Vapour Recovery Unit system with TAS along with signal interface, logics, interlocks & GUI	Kindly confirm whther this signal exchange will take place over I/O of DCS or over MODBUS and	Relevant IO count has been considered for integration of VRU.

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			development for sharing of following signal :	accordingly whether the relevant I/O has been considered or not.	
99.	Volume_II_Technical_Section_Part_1 Page 119	21.9	Supply, Installation, Testing and Commissioning of PMHBL side PLC I/O Cards along with complete accessories, fully wired for connecting/Integrating the MOVs/DBVs.Total I/O Count is 48 nos.Existing PLC details of PMHBL is given in Specification chapter.	Bidder request MRPL to provide details of existing PLC system at PMHBL	Bidder to refer Addendum-2 for clarification
100.	Volume_II_Technical_Section_Part_1 Page 145	b	Graphics development and logic development at both ends shall be in Bidder's scope.	Bidder request MRPL to remove the scope of doing Logic modification at existing PMHBL PLC end. Doing modification in some one else SCADA might void the warranty conditions.	Bidder to refer Addendum-2 for clarification

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101.	Volume_II_Technical_Section_Part_1 Page 149	3.1	For emergencies and breakdowns during silent hours, weekly offs and holidays, the Resident engineer and Technicians shall also be available at site. If work extends beyond the normal loading hours of 8 to 10 hours per day & also on other Weekly off days, as required for any regular/other maintenance activities then Resident engineer and technicians shall be available for at site.	Bidder request MRPL to include separate line items for extended hours of working and for working on Sunday/holidays since there is no quantification as to how many times this situation can occur.	Bidder to follow Tender requirement.
102.	Volume_II_Technical_Section_Part_1 Page 149	3.2	During warranty & CAMC period, all software updates/ minor program modification/graphics	Bidder request MRPL to quantify/limit the modification to be covered under Warranty/CAMC.	Bidder to follow Tender requirement.

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			modification / other changes will be provided free of charge, also all repairs/ comprehensive maintenance (including supply of all spares & consumables, breakdown visits by various OEMs) will be ensured by the Contractor for the complete package supplied to MRPL by TAS.		
103.	Volume_II_Technical_Section_Part_1 Page 150	3.12	Development & Implementation of any software interface driver in TAS, required for existing as well as new field instrumentation (eg: Batch Controllers/ CIU/ Card Reader/ PLCs etc;)	Bidder request MRPL to quantify/limit the third party interface drivers to be developed under Warranty/CAMC.	Bidder to follow Tender requirement.

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			<p>having open protocols is to be carried out by TAS Contractor as part of Job. In addition to this, any new field / control room instrumentation of OEMs own/Third party make (part of the original TAS package supplied to MRPL) having proprietary protocols (if any) is also to be interfaced with their TAS by way of developing and implementing software interface driver required for the purpose</p>		
104.	Volume_II_Technical_Section_Part_2 Page 314	28	Accuracy:+/- 0.5 mm or better	Please confirm whether the stated accuracy is Instrument accuracy OR Installed Accuracy.	Bidder to note this shall be Instrument accuracy.

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	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
105.	Volume_II_Technical_Section_Part_2 Page 354/418	61	RACK MONITOR	Requesting M/s Nautava & M/s MRPL to provide the Rack Monitor Specification.	Bidder to refer Addendum-2, Attachment- 07.
106.	Volume_II_Technical_Section_Part_2 Page 276/418	7.1	BATCH CONTROLLER - Each loading point shall be provided with Single Arm Electronic Batch Controller Unit	As per clause 7.1 of specification dual arm batch controller is also acceptable, thus please confirm which type of BCU and how many number of BCU are required.	Each loading point shall have one Batch Control Unit which shall be able to handle at least one main product, one blend product and 2 additives. BCU quantity shall be as per SOR
107.	Volume_II_Technical_Section_Part_2 Page 306 & 326/418	15	Prassure Transmitter - Transmitter type	We request M/s Nautava & M/s MRPL to accept OEM standard Silicon resonant type Transmitter.	Noted and Accepted
108.	Volume_II_Technical_Section_Part_2 Page 314/418	2	RADAR GAUGE FOR PRIMARY & SECONDARY RADAR	We understand that Stillwell is not in bidder's scope. Requesting M/s Nautava & M/s MRPL to confirm our understanding.	Bidder's understanding is correct.

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109.	Volume_II_Technical_Section_Part_2 Page 314/418	17	RADAR GAUGE FOR PRIMARY & SECONDARY RADAR Measuring principle - FMCW	Requesting M/s Nautava & M/s MRPL to accept Transit Time Radar principle For Radar Gauges.	Bidder to follow Tender requirement.
110.	Volume_I_Commercial_Section Page 612/634	1.16	Intrinsically safe / flameproof type proximity card reader	We understand that Quantity of the card reader mentioned in the BOM is inclusive of card readers required for Main gate and Licensed gate entry and exit. Please confirm.	Bidder to follow Tender requirement.
111.	Volume_I_Commercial_Section Page 613/634	3.6. 3.7	1 no. of Level gauge ,2 no. Pressure gauge,	We understand that we need to refer the specification given in Page No. 321 of 418 for level gauge and Page No. 306 of 418 for pressure gauge. Requesting M/s Nautava & M/s MRPL to confirm our understanding.	Bidder to refer Addendum-2, Attachment- 11 for Level gauge, For Pressure gauge data sheet given on page Page No. 1534 of 1818.

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112.	Volume_I_Commercial_ Section Page 615/634	5.3	Densitometer - Restriction Orifice suitable for pipe for limiting the product flow	We request M/s Nautava & M/s MRPL to provide the specification for Orifice Plate.	Bidder to refer Addendum-2, Attachment- 10.
113.	Volume_I_Commercial_ Section Page 619/634	10.6	IS Detectors	Requesting M/s Nautava & M/s MRPL to provide the IS Detectors Specification.	Bidder to refer Addendum-2, Attachment- 12.
114.	Volume_I_Commercial_ Section Page 620/634	12.8	48 port Industrial grade layer 2 Managed POE based Ethernet Switch	We understand that in 48 port PoE switch 48 nos. of RJ copper ports are required and additionally 02 nos. fibre ports are to be provided instead of 04 nos. of J copper ports(as mentioned in line decription). Please confirm	Bidder to follow Tender requirement.
115.	Volume_I_Commercial_ Section Page 620/634	13.1	Flameproof cum weather proof to IP 65 or better SIL 2 smart pressure transmitter.	We understand that specification given for header line PT are to be followed for this line item also. Please confirm our understanding.	Bidders understanding is correct

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116.	Volume_I_Commercial_ Section Page 621/634	13.3	Level Transmitter	We understand that we need to refer the specification given in Page No. 320 of 418 for level transmitter. Requesting M/s Nautava & M/s MRPL to confirm our understanding.	Bidder to refer Addendum-2, Attachment -04
117.	Volume_I_Commercial_ Section Page 623/634	14.11	Cable Trays	As per Datasheet given in tender document, edge height is 25mm till 150mm & 50mm for above 150mm, but as per SOR 25mm for all the given width. Requesting M/s Nautava & M/s MRPL to clarify which one to be referred.	Bidder to follow Tender datasheet for cable Tray Edge height.
118.	Volume_I_Commercial_ Section Page 594/634	7	PNEUMATIC CONTROL VALVE / SHUTDOWN VALVE (BALL TYPE)	Requesting M/s Nautava & M/s MRPL to approve M/s Rotork, M/s L&T Valves Limited as an approved make for Ball Valve.	Addition M/s. Rotork and M/S L & T are added under Approved Makes/Vendor/ Brand

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119.	Volume_I_Commercial_ Section Page 594/634	7	PNEUMATIC CONTROL VALVE / SHUTDOWN VALVE (BALL TYPE)	Requesting M/s Nautava & M/s MRPL to approve M/s Microfinish, M/s KSB Limited, as an approved make for Ball Valve.	Bidder to follow Tender requirement.
120.	Volume_I_Commercial_ Section Page 595/634	19	LOADING ARM (TOP)	Requesting M/s Nautava & M/s MRPL to approve M/s Ferro Tubes as an approved make for Top Loading Arm.	Bidder to follow Tender requirement.
121.	Volume_I_Commercial_ Section Page 595/634	20	LOADING ARM (BOTTOM) FOR PRODUCT & VAPOUR	Requesting M/s Nautava & M/s MRPL to approve M/s Woodfield as an approved make for Bottom & Vapour Loading Arm.	Addition M/s. Woodfield is added under Approved Makes/Vendor/ Brand
122.	Volume_I_Commercial_ Section Page 595/634	24	TT MOUNTED OVERSPILL SENSOR/PROBE	Requesting M/s Nautava & M/s MRPL to approve M/s. Technika, & M/s Ferro tubes as an approved make for Bottom & Vapour Loading Arm.	Bidder to follow Tender requirement.
123.	Volume_I_Commercial_ Section Page 595/634	26	PROVER TANK	Requesting M/s Nautava & M/s MRPL to approve M/s. Toshniwal Hyvac Pvt. Ltd. as an approved make for Prover Tank.	Addition

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					M/s. Toshniwal Hyvac is added under Approved Makes/Vendor/ Brand
124.	Volume_I_Commercial_ Section Page 595/634	31	DENSITY METER	Requesting M/s Nautava & M/s MRPL to approve M/s. Anton Par. as an approved make for Density Meter.	Addition M/s. Anton Par is added under Approved Makes/Vendor/ Brand
125.	Volume_I_Commercial_ Section Page 596/634	35 & 36	Control and Power Cable	Requesting M/s Nautava & M/s MRPL to approve M/s Cords Cables as an approved make for Signal & Power Cables.	Addition M/s. Cord Cables is added under Approved Makes/Vendor/ Brand
126.	Volume_I_Commercial_ Section Page 596/634	35 & 36	Control and Power Cable	Requesting M/s Nautava & M/s MRPL to approve M/s. tc Communication Pvt. Ltdes as an approved make for Signal & Power Cables.	Addition M/s. TC Communication Pvt Ltd is added under Approved Makes/Vendor/ Brand

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127.	Volume_I_Commercial_ Section Page 596/634	54	THERMAL RELIEF VALVE	Requesting M/s Nautava & M/s MRPL to approve M/s. Darling Meusco as an approved make for Thermal Relief Valve.	Bidder to follow Tender requirement.
128.	Volume_I_Commercial_ Section Page 597 & 600/634	60 & 12	ETHERNET SWITCHES	Requesting M/s Nautava & M/s MRPL to approve M/s. D link for Ethernet Switches.	Bidder to follow Tender requirement.
129.	Volume_I_Commercial_ Section Page 597/634	68	ADDITIVE INJECTION SKID & PANEL FOR BLUE DYE / MARKER / POWER / TURBO	Requesting M/s Nautava & M/s MRPL to approve M/s. Toshniwal Hyvac Pvt. Ltd. as an approved make for Additive Injection skid.	Addition M/s. Toshniwal Hyvac is added under Approved Makes/Vendor/ Brand
130.	Volume_I_Commercial_ Section Page 599/634	97	INSTRUMENT CABLE TRAYS / DUCT(GI)	Requesting M/s Nautava & M/s MRPL to approve M/s. Premier Power Products, M/s Calcutta Manufacturers, M/s MM Engineering Industries Pvt. Ltd., M/s Rukmani engineers as an approved make for Additive Injection skid.	Bidder to follow Tender requirement
131.	Volume_I_Commercial_ Section Page 602/634	1 & 3	ACCESS CONTROL SYSTEM, PROXIMITY CARD	Requesting M/s Nautava & M/s MRPL to approve M/s. Virdi as an approved make for Access Control System.	Bidder to follow Tender requirement.

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			READER/BIOMETRIC READER		
132.	Volume_I_Commercial_Section Page 602/634	1	CCTV CAMERAS	Requesting M/s Nautava & M/s MRPL to approve M/s. Hikvision & Dahua as an approved make for CCTV Cameras.	Bidder to follow Tender requirement.
133.	Volume_I_Commercial_Section Page 602/634	2	Video Monitoring System.	Requesting M/s Nautava & M/s MRPL to approve M/s. Algovision as an approved make for VMS System.	Bidder to follow Tender requirement.
134.	Volume_II_Technical_Section_Part_1 Page 110/594	10	Note1: Mass flow meter shall be of same make and model as installed in PMHBL Devangonhi terminal, details of MFM are given in Specificaliton.	The specified Data is available in the tender document. Requesting M/s Nautava & M/s MRPL to provide the specification, Make and Model of MFM.	Bidder to refer Addendum-2, Attachment -05
135.	Volume_I_Commercial_Section Page 7	8	Bid Due Date	We request you to kindly provide extension of 2 weeks from current due date.	Bidder to refer Addendum-2 for Bid submission due date.

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136.	Volume_II_Technical_Section_Part_2.pdf Page 2 of 418	1.0 DESIGN AND CONSTRUCTION	1.7 Safety barriers shall be active type and certified by statutory authority like BASEEFA, CENELEC, FM, CMRI etc. for the use in Zone 1, Group II A, II B, and T3. SIL Relays & Barriers can be from other equivalent SIL 3 certifying agency.	We understand that SIL2 relays/Barriers shall be used as the end elements shall be SIL2 certified and overall loop shall be SIL2 compliant. M/s Nauvata and M/s MRPL to kindly confirm.	Bidder to follow Tender requirement.
137.	Volume_II_Technical_Section_Part_2.pdf Page 5 of 418	2.2	d. Mandatory spare shall be EDB005. However each type of hardware (where electronic type, converter type etc) shall be included.	Requesting M/s Nauvata and M/s MRPL to kindly take a note that EDB-005 (Engineering Design Basis) is not available in any tender document and spare list is covered in section 7.2 (Site Stock List) in Part I of tender document and Annexure-2 - SPARE PHILOSOPHY on page 1100 of 1818 in Part-I of Tender document. Kindly specify which list needs to	Refer page No. 1035 of 1818 for Instrumentation Engineering Design Basis (EDB) , Document No. 20005-GEN-I-EDB-6009 For Site stock list Bidder to refer Clause No 7.2, Page no.791-796 of 1818.

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				be followed or provide a specific list to be provided as Mandatory spares which needs to be supplied before SAT and shall be maintained during warranty and CAMC	For DCS Mandatory spares Refer Clause No. 2.4 on page no. 1248 of 1818. For PLC Mandatory spares shall be as per Instrumentation EDB (20005-GEN-I-EDB-6009).
138.	Volume_II_Technical_Section_Part_2.pdf Page 6 of 418	3.0 SYSTEM CONFIGURATION	Processor System g. IO Redundancy shall be as per requirements stated under SIL-3 Certification. j. Redundancy should be extended to include power supply, communications and I/O cards.	Requesting M/s Nauvata and M/s MRPL to kindly confirm whether IO redundancy needs to be considered or not. Point g. and point j. contradicts each other. As per our TUV certificate, Single CPU and Single IO also meets SIL3 requirements.	Bidder to consider I/O redundancy
139.	Volume_II_Technical_Section_Part_2.pdf Page 7 of 418	3.0 SYSTEM CONFIGURATION	m. RS 485 Serial Interface : Serial Interfaces shall have capability to interface with the following, if	Requesting M/s MRPL and M/s Nauvata to provide IO list, the same is not provided as a part of Tender.	Please refer to Addendum-2, Attachment- 03

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			required : a. Fire Alarm Panel b. Clean Agent Panel c. Control Panels of Fire Fighting Engines d. MOVs/ MCS for firefighting system etc	We would also request that Serial communication shall be moved out of SIL3 PLC to DCS or to Terminal Server as SIL3 PLC is not the right device to process serial data.	
140.	Volume_II_Technical_Section_Part_2.pdf Page 9 of 418	5.0 COMMUNICATION SUBSYSTEM	In case if Safety PLC and DCS are from same manufacturer, interface of PLC with DCS sub-system shall be through OEM proprietary redundant communication interface to achieve seamless data transfer with DCS. If not then how of what is the true limit for data uploading	We understand that the red highlighted text as indicated in the paragraph holds no meaning and shall ignore the same. " If not then how of what is the true limit for data uploading"	Bidder's understanding is correct.

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141.	Volume_II_Technical_Section_Part_2.pdf Page 17 of 418	18 Installed Spares:	1) System end ((DCS / PLC / CCTV / TFMS / Gas Detection System Any other Automation System / Hard Wired Console) – incl in packages & brought-out's - 25% (min)	Requesting M/s Nauvata and M/s MRPL to clarify as the statement is contradictory to statements in other sections where 20% installed spares have been asked.	Bidder to refer Addendum-2 for clarification. It shall be 20% as per Engineering Design basis ,page 1102 of 1818.
142.	Volume_II_Technical_Section_Part_2.pdf Page 17 of 418	18 Installed Spares:	1) System end ((DCS / PLC / CCTV / TFMS / Gas Detection System Any other Automation System / Hard Wired Console) – incl in packages & brought-out's - 25% (min)	We understand from BOQ and Tender document that Hardwired Panel or Alarm Annunciator Panel is not envisaged in the tender. Requesting M/s Nauvata and M/s MRPL to confirm the same. If required, please specify the number of windows and push buttons etc. required for the same.	Bidder to follow tender conditions and to refer Addendum-2 for clarification.

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143.	Volume_II_Technical_Section_Part_2.pdf Page 20 of 418	2.0 SPARES PHILOSOPHY 2.2 e) 2.4	2.2 e) PSU,DOU,MCB,TB PSU,DOU,MCB,TB etc in future 2.4DOUDOU's prefab cables, switches, lamps and MCBs. spare modules for hardwired instruments like barriers	Requesting M/s Nauvata and M/s MRPL to elaborate on the meaning of DOU. DOU is used multiple times in the section and provides no specific meaning.	DOU- Diode O-ring unit
144.	Volume_II_Technical_Section_Part_2.pdf Page 20 of 418	2.0 SPARES PHILOSOPHY 2.4	Mandatory spare module of minimum 10% or one module of each type, whichever is higher must be supplied for each type of modules being used.	Requesting M/s Nauvata and M/s MRPL to kindly take a note that this statement is contradictory w.r.t to Annexure-2 on page 1101 section 12 on Technical Section part-I which specifies mandatory spares as 5%. Requesting M/s Nauvata and M/s MRPL to kindly provide us a clear guideline of spares as per following: 1. Installed Spares 2. Mandatory Spares	For Site stock list Bidder to refer Clause No 7.2, Page no.791-796 of 1818. For DCS Mandatory spares Refer Clause No. 2.4 on page no. 1248 of 1818. For PLC Mandatory spares shall be as per Instrumentation EDB (20005-GEN-I-EDB-6009).

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				3. Two Years O/M spares is required or not	
145.	Volume_II_Technical_Section_Part_2.pdf Page 20 of 418	2.0 SPARES PHILOSOPHY 2.5	2.5 Consumable Spares Any paper, ribbon, printer heads and ink required for printers, assignable recorders, video copier or any other consumable items shall be supplied along with system required for minimum of six months duration after system acceptance.	Requesting M/s Nauvata and M/s MRPL to quantify the requirement or remove the requirement as it is not possible to estimate usage of such kind.	Bidder to follow Tender Conditions.
146.	Volume_II_Technical_Section_Part_2.pdf Page 21 of 418	4.0 POWER SUPPLIES AND DISTRIBUTION 4.2	It shall be in the scope of bidder to size /Procure and install the UPS system for 110VAC power supply and further distribution of power to	We understand that cable shall be considered from BOQ and shall be billable as per requirement. If not: a) Requesting M/s Nauvata and M/s MRPL to specify the distance between UPS room and Panel	Bidder to refer the Addendum-2, Attachment-06 for Control room layout for cable estimation. (a) Payment is based on measured actuals.

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			the DCS cabinets and field instruments shall be by Bidder. 110 VAC UPS Power supply shall be made available at PDB which shall be dedicated for redundant and non-redundant loads.	room where Internal PDB cabinet will be installed b.) Requesting M/s Nauvata and M/s MRPL to clarify that If the required cable required for incoming power to PDB is not included/listed in BOQ, then how shall the bidder make a claim against the supply, I & C of such item.	(b) If any special cable is required, then same shall be part of System supplied cable.
147.	Volume_II_Technical_Section_Part_2.pdf Page 22 of 418	5.0 ENVIRONMENT ALLY CONTROLLED LOCATION INSTALLATION:	5.2 In addition to above, all such sub-systems shall also be able to operate satisfactorily in case of air conditioning failure with ambient temperature of 50°C and 90%RH noncondensing humidity until the system safe	We understand that same is applicable for DCS modules only and IT H/W is not required to meet such conditions. We cannot confirm the correct operability of IT H/W under extreme temperature beyond 35 Deg. C. Requesting M/s Nauvata and M/s MRPL to exclude the requirement for IT H/W.	Bidder to follow Tender conditions.

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			operating limits are exceeded.		
148.	Volume_II_Technical_Section_Part_2.pdf Page 22 of 418	5.0 ENVIRONMENT ALLY CONTROLLED LOCATION INSTALLATION:	5.3 Vendor shall provide continuous corrosion monitoring system consisting of transmitter with 4– 20mA output and switch unit in Rack room (2nos each & 1no in blast proof room –with copper and silver sensors)/also 2 nos in console room/1 no in engineering room & 1 no in blast proof room and with setting as per contaminant level exceeding limits mentioned above. 1 no. of RTD shall be provided in rack room with transmitter Pest repellent	Requesting M/s Nauvata and M/s MRPL to clarify the following: 1. Once supplied, Cu and Silver Sensors or coupons needs to be replaced every year - we understand that Bidder's responsibility shall include supply of these sensors one time only. 2. If Bidder is supposed to supply sensor based on their use, kindly specify the number of years this needs to be replenished.	1. Bidder to evaluate the replacement tenure based on OEM recommendations. 2. The same shall be considered / followed during CAMC period

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			system (ultrasonic) required in cable vault, all other cable entry points & different corners of Rack room/console room/eng room & temperature indication in OICOIC.		
149.	Volume_II_Technical_Section_Part_2.pdf Page 23 of 418	7.0 SYSTEM SIZING / LOADING CRITERIA	SYSTEM FURNITURE - All system furniture required for mounting of Server stations and other PCs shall be CRCA based console type with closed facility for CPU, keyboard, tray, monitor mount etc. The typical drawing showing all the required dimensions & mounting arrangement shall be submitted by the	Requesting M/s Nauvata and M/s MRPL to provide the count of the Furniture required as the servers listed in BOQ and Specifications are Rack Mounter and doesn't require furniture of any kind.	Bidder to provide the required furniture as applicable

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			bidder.chairs (atleast 1 chair per console) to be supplied by vendor.		
150.	Volume_II_Technical_Section_Part_2.pdf Page 33 of 418	8.6 ENGINEER INTERFACE SYSTEM	8.6.7 All detailed diagnostics of the system shall appear on the engineering console with a print out on the configuration and maintenance (C & M) printer.	Requesting M/s Nauvata and M/s MRPL to confirm the C & M printer is a part of BOQ Line item or shall be supplied as a part of DCS.	Bidder to note, printer shall be supplied as per SOR line item 8.20 Page 617 of 1818.
151.	Volume_II_Technical_Section_Part_2.pdf Page 34 of 418	8.7 COMMUNICATION SYSTEM	8.7.12 System Back-up and Re-initialization a. The entire control software including control database (application program), system software, source code, schematics etc shall	We understand that System back-up shall be maintained in Engineering Station with Hard disk capacity as per specifications, separate NAS/SAN is not to be supplied.	Bidder to follow Tender requirement.

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			be backed up on system hard disc/NAS/NAS automatically at a regular interval.	Requesting M/s Nauvata and M/s MRPL to confirm the same.	
152.	Volume_II_Technical_Section_Part_2 Page 333 of 418	43. OPERATOR INTERFACE CONSOLE (OIC) / TFMS PC / ACS PC / EWS / TTES / ALARM DISPLAY PC	Form Factor Tower/ Mini Tower Note 2: All Work Stations such as OIC/TTES shall be Rack Mounted type and shall be supplied with KVM Switch.	Requesting M/s Nauvata & M/s MRPL to take a note of contradictory information given in specifications. We understand that all client machines shall be Tower type which is also indicated in system Architecture drawing. KVM switch is also not applicable for the client machines. Please confirm.	Bidder to refer point 23.12 of Scope of Work on page 757 of 1818.
153.	Volume_II_Technical_Section_Part_2 Page 336 of 418	44.TERMINAL SERVER	9. Power 24V DC or 110 V AC. AC Model should have Dual Power input	Requesting M/s Nauvata & M/s MRPL to kindly accept single power input as the source is UPS backed. Even for 24VDC, it shall be through redundant BPS however AC source	Bidder to follow Tender requirement.

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				shall remain single source of UPS backed power.	
154.	Volume_II_Technical_Section_Part_2 Page 339 of 418	46. LASER PRINTER	16. Networking Ethernet – 2nos.	Network Printers comes with Single Ethernet connectivity, hence requesting M/s Nauvata and M/s MRPL to accept the same.	Single Ethernet Port is acceptable.
155.	Volume_I_Commercial_Section Page 594 of 634	Approved Vendor List	14 SIL VERIFICATION /VALIDATION/CERTIFICATION AGENCIES TUV/HIMA/CHOLA MANDALAM / EXIDA	Requesting M/s Nauvata and M/s MRPL to accept M/s DNV for SIL Verification/Validation	Addition M/s. DNV is added under Approved Makes/Vendor/ Brand
156.	Volume_I_Commercial_Section Page 595 of 634	Approved Vendor List	17 UPS EMERSON-VERTIV/ APC/SCHNEIDER /GUTOR/ CHLORIDE/ HITACHI-HIREL	Requesting M/s Nauvata and M/s MRPL to accept FUJI ELECTRIC CONSUL NEOWATT as approved vendor for UPS.	Addition M/s. Fuji Electric Consul Neowatt is added under Approved Makes/Vendor/ Brand

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157.	Volume_I_Commercial_ Section Page 596 of 634	Approved Vendor List	44 COMPUTER HP/ DELL / IBM 45 MONITORS HP/ DELL / IBM 46 SERVER DELL/ HP/ IBM	Requesting M/s Nauvata and M/s MRPL to take a note that IBM IT H/W machines are now a part of Lenovo and the same shall be acceptable	Acceptable subject to Bidder submission of supporting documents
158.	Volume_I_Commercial_ Section Page 596 of 634	Approved Vendor List	45 MONITORS HP/ DELL / IBM	Requesting M/s MRPL and M/s Nauvata to accept LG/Samsung/Sony and Toshiba as approved vendor for Monitors.	Bidder to follow Tender requirement.
159.	Volume_I_Commercial_ Section Page 596 of 634	Approved Vendor List	38 SIL CERTIFIED RELAYS PHOENIX/ GM/ P&F	Requesting to accept MTL for SIL certified Relays	Bidder to follow Tender requirement.
160.	Volume_I_Commercial_ Section Page 598 of 634	Approved Vendor List	92 MEDIA CONVERTER (OFC TO RS485 AND SERIAL TO ETHERNET) PHOENIX/ATOP/CISCO/PER LE/BLACKBOX	Requesting M/s Nauvata and M/s MRPL to accept DLINK and MOXA make as well. PTR shall be submitted, if required.	Addition M/s. D-Link & M/s MOXA is added under Approved Makes/Vendor/ Brand

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161.	Volume_I_Commercial_ Section Page 602 of 634	Approved Vendor List	1. ACCESS CONTROL SYSTEM: HONEYWELL/ JOHNSON CONTROLS/SIEMENS/CARD KEY/ USA/BOSCH/EDWARDS / SCHNEIDER / CARDAX/ HID/GALLAGHER 3. PROXIMITY CARD READER/BIOMETRIC READER: HONEYWELL/SIEMENS/BOSCH/GALLAGHER/HID/SCHNEIDER/JOHNSON CONTROLS	Requesting M/s Nauvata and M/s MRPL to accept VIRDI Make (Manufactured in Korea) in AVL. We have supplied the same in past to IOCL and BPCL sites in the past.	Bidder to follow Tender requirement.
162.	Volume_I_Commercial_ Section Page 602 of 634	Approved Vendor List	5 NETWORK SWITCHES/ MEDIA CONVERTERS (OUTDOOR INDUSTRIAL GRADE) RUGGEDCOM/ MOXA/	Requesting M/s Nauvata and M/s MRPL to accept DLINK make switches as well subject to meeting specifications.	Bidder to follow Tender requirement.

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			HIRSCHMANN/ PHONIEX/ N- TRON/ HP/ CISCO/ MOXA/ ALLIED TELESYS/ JUNIPER/ COMNET/ BROCADE 6 NETWORK SWITCHES/ MEDIA CONVERTERS (INDOOR) NORTEL/CISCO/ ALLIED TELSUN/BROCADE/ HP/ MOXA/ JUNIPER/ HIRSCHMANN//COMNET/P HOENIX/		
163.	Volume_I_Commercial_ Section Page 616 of 634	DOCUMENT DESCRIPTION : SP-01 : PRE- FILLED SCHEDULE OF RATES (SOR)	8.4 Supply of redundant hot standby TAS Management Server (Rack type mountable in 19" rack) along with LED monitor of minimum size of 22" suitable for 24x7 operation along with High availability	Based on SOR Line item 8.2 on TAS S/W, it is understood that TAS S/W or SCADA platform based redundancy is applicable for the TAS Servers i.e. SCADA S/W based redundancy which ensures more than 99% availability shall be provided for TAS Servers which	Bidder to follow Tender requirement.

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			<p>redundancy software working on redundant (Primary and Secondary) hot standby mode , keyboard, optical mouse and combo 4 port KVM switch, OS, Antivirus, SQL, oracle, RDBMS (license copy,) suitable for Rack Enclosure cabinet/System cabinet etc complete as per specifications and Tender Document.</p>	<p>shall maintain the Server redundancy. Requesting M/s Nauvata and M/s MRPL to kindly confirm.</p>	
164.	Volume_I_Commercial_Section Page 616 of 634	DOCUMENT DESCRIPTION : SP-01 : PRE-FILLED SCHEDULE OF RATES (SOR)	<p>8.2 Supply of Terminal Automation Software (with Redundancy) with necessary user license for entire automation system as specified in the Tender Document (TAS shall include tailor made</p>	<p>Based on SOR and Technical Section Part II.pdf section 1.5.5. it is understood that Network Management system needs to be supplied. Requesting M/s MRPL and M/s Nauvata to provide a detailed requirement document. Also, elaborate on Backup Software</p>	<p>Bidder to follow Tender requirement.</p>

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			application software ,RDBMS suitable for OS, Asymmetric Hi availability software, Tailor made application package with LRCS,TTES, Perpetual PDF licence for invoice generation of TAS, Firewalls for thrid party interface with TAS, TFMS etc. backup software, Network Management software, PLT planning facility, etc.Bidder to provide the required software, liscence.key for Task management server, DCS,OIC,Engineering Station,OPC server, Fire OIC etc, all other required HMI graphics(Like Process,	mentioned in the line item. We understand that separate back-up S/W is not applicable. Requesting M/s MRPL and M/s Nauvata to kindly confirm	

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			First event, MBS, MIS, Maintenance etc). License shall be suitable for a further addition of 6 bays or 12 more loading points.		
165.	Volume_I_Commercial_Section Page 617 of 634	DOCUMENT DESCRIPTION : SP-01 : PRE-FILLED SCHEDULE OF RATES (SOR)	8.14 Supply of 24 port Terminal servers (rack mounted) with inbuilt/externally mounted lightening and Surge Protection Device Type (1+2) at all Serial ports, for interfacing and integration of field devices (Indoor & outdoor) complete as per specification and tender document. Note: Terminal Servers to	Requesting M/s Nauvata and M/s MRPL to accept standard port configuration of 16 port per Terminal Server. 24 Port Terminal Server is not offered by OEM's.	Bidder to follow Tender requirement.

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			be configured in Redundant mode.		
166.	Page		General Query - Not related to any specific section	Requesting M/s Nauvata and M/s MRPL to take a note that temprature range given for instruments in different even if they are placed nearby. For some instruments -5 to +55 Deg C is mentioned, for some 60 Deg. And for some 80 deg c is mentioned. The Flameproof certification shall cover the temperature range for which devices shall be certified hence requesting customer to clearly indicate the requirement so that instrument certification shall be reviewed before offering.	Bidder to refer Addendum-2 for Process data

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167.	Page		General Query - Not related to any specific section	Kindly confirm the pressure rating or Flange rating which needs to be considered while considering the field components. In some sections 300# is mentioned whereas in some instruments 150# is mentioned. Requesting M/s MRPL and M/s Nauvata to confirm.	300# Pressure Rating shall be Considered for all field instruments.
168.	Volume_II_Technical_Section_Part_1 Page 107 of 594	9.0 GANTRY AUTOMATION 9.1 TLF GANTRY EQUIPMENTS	9.1.11 Tuning/Calibration of all Bay instruments to achieve the desired batch accuracy of 0.1% (±5L in a batch of 5KL) for top and bottom loading.	Kindly confirm the Batch accuracy %, as the same is contradicting with other given specifications. We understand that Scope of work shall supercede the specifications here. Please confirm.	Bidder to note all Instrument shall meet accuracy as per Data sheet and specification
169.	Volume_II_Technical_Section_Part_1 Page 125 of 594	23.0 CONTROL ROOM EQUIPMENTS	23.27 SMS/Email Functionality:	For SMS functionality, GSM shall be considered, however for Email, Server, Gateway, hostname etc. needs to be provided by M/s MRPL, without the same Email functionality is not possible. Also,	Gateway Details will be shared with the successful Bidder during detail engineering

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				Email format would be required with detailed configuration to achieve functionality. Requesting M/s Nauvata and M/s MRPL to relook into the requirement.	
170.	Volume_II_Technical_Section_Part_1 Page 125 of 594	23.0 CONTROL ROOM EQUIPMENTS	23.28 Supply, installation, testing and commissioning of firefighting OIC along with LED display screen. Integration with client's SAP system/ software including and gateway servers, networking components and cables. Bidder's scope shall also include development of SAP-TAS interface requirements jointly with MRPL.	Requesting M/s Nauvata and M/s MRPL to provide ERP-TAS interface details as per below: 1. Please confirm the protocol and type of data exchange i.e. how the data exchange shall be carried out? 2. When will be the details and exchange information made available to bidder/L1 Bidder?	SAP Protocol will be shared with Successful Bidder during detail Engineering

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171.	Volume_II_Technical_Section_Part_1 Page 149 of 418	1.2.15 Confirmation on the following shall be furnished by the vendor on the technical bid for evaluation of the offered software:	L 1. 4. Details on custody transfer system (LRC Application)	Requesting M/s Nauvata and M/s MRPL to kindly take a note that LRC application is not a custody transfer system.	Noted and Accepted.
172.	Volume_II_Technical_Section_Part_2 Page 126 of 418	3.5.12 NETWORK ATTACHED STORAGE (NAS) / STORAGE AREA NETWORK (SAN)	14 Storage Management Should have Single Graphic Use Interface (GUI) for both File and Block as well as command line interfacing. Must include real time performance monitoring tools giving information on CPU utilization, volume	Requesting M/s Nauvata and M/s MRPL to take a note that this specifications are not met by suppliers from AVL and is met by one of the chinese OEM's (Huawei) which is now banned worldwide. We request to kindly change either or both of the following points so that suppliers from AVL can meet requirements: 1. We request to remove "Single	Bidder to follow Tender requirement

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			throughput, I/O rate and latency etc.	GUI" requirement from here. 2. Instead of Both File and Block, we request to accept File OR Block.	
173.	Volume_II_Technical_Section_Part_2 Page 192 of 418	1.5.6 TAILOR-MADE APPLICATION SOFTWARE	12 The fronted of the application package shall be developed using any popular Visual RAD Tools (viz. Visual Basic 6.0, Visual C ++ etc.)	Requesting M/s Nauvata and M/s MRPL to take a note that based on our S/W platform we use latest technology based on ANGULAR for front end development. This is as per OEM standards.	Noted and Accepted.
174.	Volume_II_Technical_Section_Part_2 Page 142 of 594 & 115 of 594	27.16.2.3 RO SOV INTEGRATION & 15.0 VALVE CONTROL SYSTEM	e. RO SOV will be provided with FLP double compression glands of standard size by OTHERS.. 15.4 Supply and installation of cable glands and reducers for all cable of complete RO SOVs, DBBVs and MOVs . Bidder to note that the cable glands and reducers are to be	Requesting M/s Nauvata and M/s MRPL to take a note of the contradiction related to scope of Glands/Plugs for free issue items like RO SOV, MOV etc. We request M/s MRPL to provide Glands and Plugs for all Free Issue items which needs to be integrated with new supplied system. This will save a lot of time and confusion during site execution.	Bidder shall provide the cable glands for Control side panel and for Battery limit JB(for main cable only) of RO SOV/MOV/DBBV.

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			procured considering the cable entry size and type of cable to be used	Bidder shall select the cable type based on gland size.	
175.	Volume_II_Technical_Section_Part_2 Page 147 of 594	28.0 PMC/MRPL RESPONSIBILITY	28.19 Cable route diagram. a. Wherever RCC trenches are required will be provided by EPMC/MRPL.	We understand that for installation of cables for Perimeter camera's, cable trench/RCC trench shall be provided by M/s MRPL. Please confirm.	Bidder understanding is correct.
176.	General Page NA	General	Type of Glands	We have observed that there is a contradiction in MOC for Glands/Plugs. We request M/s Nauvata and M/s MRPL to accept Nickel Plated Brass Glands and Plugs to be supplied as a part of scope by bidder,	Bidder to follow Specification given on page 1605 of 1818 for Cable Glands.
177.	General Page NA	General	Type of Monitor	We understand that Monitors shall be installed on Console/Table Top and not inside the 19" rack on panels.	Bidder's understanding is correct. Monitors are to be installed on Table top.

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				Please specify the same and the specifications are not clear for Monitor installation in various sections like for LRC Servers, TFMS Servers, OIC, TFMS PC's, Client PC's.	
178.	General Page NA	General	Driver Acknowledgement Push Button	We understand from SOR that Driver Acknowledgement is not required separately. "ACK" push button on RIT (Remote Interaction Terminal) would confirm that Driver has followed Safety guidelines. This is related to workflow implementation as well. Clarity from M/s Nauvata and M/s MRPL would ensure that necessary hardware is supplied as per requirements.	Bidder to follow Tender requirement.

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179.	Volume_I_Commercial_ Section Page 434 of 634	6.0 PRICE, TAXES AND DUTIES	6.15 FIRM PRICES The quoted price shall remain firm and fixed and valid until completion of the contract and any extension thereof and shall not be subject to escalation for any reason what so ever. Quantities in the SOR are indicative and all-inclusive unit-rates are independent of final measured quantities.	Requesting M/s Nauvata and M/s MRPL to kindly make the following considerations: "If due to no fault of bidder, the project/Contract completion period is extended, then price validity shall be limited to original contract period only" This clause modification request is in terms of highly volatile prices of Cables, Cable trays, Steel etc. It is very difficult to maintain firm price for longer duration due to current global scenario.	Bidder to follow Tender conditions.
180.	Volume_I_Commercial_ Section Page 613 of 634	SP-01 : PRE-FILLED SCHEDULE OF RATES (SOR)	3.8 Proving tanks of capacity 1no. of 5000L , 2000 L, 1000L, 500L pump & exproof motor (2nos.), piping network from water sump to prover tank, hoses and necessary accessories	Requesting M/s MRPL and M/s Nauvata to kindly share the length of Piping Network from Water Sump to prover tank. Requesting M/s MRPL to consider	Bidder to follow Tender conditions.

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			for tank truck calibration with W & M stamping as marked in P & ID (along with necessary isolation & filling provisions)	supply of Piping if required. Bidder shall supply required Hose.	
181.	Volume_I_Commercial_Section Page 615 of 634	SP-01 : PRE-FILLED SCHEDULE OF RATES (SOR)	6.0 TANK FARM MANAGEMENT SYSTEM	Requesting M/s Nauvata and M/s MRPL to kindly recheck the quantity of Tank Side Indicator (TSI), overall radar gauge and TSI quantity are not matching. Kindly advise.	Bidder to follow Tender requirement.
182.	Volume_I_Commercial_Section Page 619 of 634	SP-01 : PRE-FILLED SCHEDULE OF RATES (SOR)	12 IP BASED CCTV SURVEILLANCE SYSTEM 12.8 Supply of 48 port Industrial grade layer 2 Managed POE based Ethernet Switch for connecting Cameras with 4 Nos. RJ copper port and 2 Nos. optical fibre ports	Requesting M/s Nauvata and M/s MRPL to kindly take a note that for Camera connectivity to control room, L2 Switch in Junction box is not covered in SOR. In 12.7 Line item JB is considered however it is without L2 Switch. Requesting to kindly clarify and specify under which line item L2	Bidder to follow Tender requirement. Bidder to note the L2 switches are placed inside the Control room

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			with inbuilt/external surge protector (Type 1+2) at the input power supply as per specifications and Tender Document.	switch shall be quoted and how would Addition/Deletion be managed during detail engineering stage.	
183.	Volume_II_Technical_Section_Part_3 Page 30 of 39	Overall Plot Plan	Pipe Rack shown in Plot Plan	Bidder understand that all cables from control room till gantry & allied facilities will be laid on the pipe rack. Though pipe rack is shown in P&ID however, in scope of work it is not mentioned as bidder's scope. Hence, we understand that Pipe rack required anywhere for cable / Tray laying will be provided by M/s MRPL. Kindly confirm.	Bidder's understanding is correct.
184.	495 of 1818	3.1	Payment Terms	Honeywell is requesting for 20% advance	Bidder to follow tender conditions

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185.	495 of 1818	3.1	Payment Terms – For Supply	<p>Honeywell is requesting for the below payment terms:</p> <ul style="list-style-type: none"> - 20% advance along with purchase order - 10% (ten percent) of supply value on pro-rata basis on submission of engineering deliverables of supply items and their approval under Code 2 against the CONTRACTOR's certified Running Account Bill(s) - 10% (ten percent) of supply value on placement of Purchase Order/ sub orders for supply items on pro-rata basis. - 60% (sixty percent) of the supply value on receipt of material at site and inspection and acceptance of the same on pro-rata basis against CONTRACTOR's certified running Accounts Bill(s). 	Bidder to follow tender conditions

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186.	496 of 1818	3.2	Payment Terms for Service/Installation	<ul style="list-style-type: none"> - 40% on mobilization - 60% (eighty percent) on erection/installation/configuration/calibration etc. on prorate basis against the CONTRACTOR's certified Running Account Bill(s). 	Bidder to follow tender conditions
187.	243/244 of 1818	7.0.7.0	Liquidated Damages	Honeywell request MRPL to frame the LD clause as .5% per week upto maximum 5% of the undelivered part	Bidder to follow tender conditions
188.	446 of 1818	30.0	Warranty	Honeywell requests MRPL to reframe the warranty clause to 18 months from the date of supply or 12 months from the date of commissioning – whichever comes earlier	Bidder to follow tender conditions
189.	General		Terms and Conditions	Honeywell requests MRPL for acceptance of Honeywell Standard Terms and Conditions	Bidder to follow tender conditions
190.	595 of 1818		Approved vendor list	Request Customer to accept M/s Dragger as part of approved list for Gas detectors and Flame detectors	Addition M/s. Dragger is added under Approved Makes/Vendor/ Brand

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191.	595 of 1818		Approved vendor list	Request Customer to accept M/s Calcutta Manufacturer as part of approved list for Gas detectors and Flame detectors	Bidder to follow Tender Conditions
192.	595 of 1818		Approved vendor list	Request Customer to accept Woodfield, techinka for bottom loading arm	ADDITION M/s Woodfield is added under Approved Vendor List for bottom loading arm.
193.	614 of 1818	3.12	Supply of weather proof two/three line coloured LED display board with scroll and flash effects (Each line of min. 25 mm Character height x 11 characters per line) for outdoor application along with mounting structure, canopy/ sunshade,	We request customer to confirm the requirement of display if 2/3/1 line display is required. Pls note that specification shared is for single linge display .	Bidder to refer the tender Specification for BAY QUEUING DISPLAY BOARD (OUTDOOR) Page No. 1580 of 1818.

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			accessories etc complete as per specifications		
194.	614 of 1818	3.12	and tender document for displaying the TT Registration no. in bilingual (English + local language) of reported TT whose proximity card has been shown on the PCR adjacent to the display board for TT reporting as per Tender Document Note : 1 line for display in English & 2 lines for displaying in local language	We request customer to share specification for the Bilingual Language. The current requirement of 8 row and 25 mm will not be sufficient to accommodate both Local+English language	Bidder to refer the tender Specification for SINGLE LINE LED DISPLAY BOARD Page No. 1581 of 1818. Bidder also to meet the requirement stated as per SOR 3.13.
195.	744 of 1818	9.1.24	The output of Master PDM provided on mobile skid is to be transmitted to Control room	We request Customer to accept transmission via Master BCU which will be part of Master Meter	Bidder understanding is correct

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				system for connectivity with control room.	
196.	744 of 1818	10.1	Mass flow meter shall be of same make and model as installed in PMHBL Devangonhi terminal, details of MFM are given in Specificalton	We request Customer to share the Model no and make of Mass flow meter. Also we request Customer to share the specification of MFM required.	Bidder to refer Addendum-2, Attachment – 05.
197.	746 of 1818	13.1	The job for external modifications (Hot and cold work) required on tank's manhole cover plate and blind flange plate for installation of Radar Gauges, MSTW, AOPS, pressure transmitter, TSI, level switches, level transmitters etc along with	We request Customer to keep the same in their scope as the same involves mechanical modification of Tanks. Required drawing for the mounting arrangment can be shared by Honeywell.	Bidder's scope includes installation of Tank instruments. However, Tank modification work is not in Bidders scope. Bidder shall share the relevant drawings with Tank Contractor for mounting of instruments.

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			all accessories is included in the respective item.		
198.	751 of 1818	18.2	PA paging system will be supplied by OTHERS, However Integration of PA system to TAS is in Bidder Scope.	We request Customer to share the interface protocol required to be considered for this interface. However we understand that required hardware in PA side will be in customer scope.	Bidder to note that the PA Paging system is interfaced with SIL3 PLC System through Hardwired signal. General Announcement shall be based on System Vendor Protocol.
199.	754 of 1818	22.4	Supply, installation, integration, testing and commissioning of One CCTV for Main gate entry, One CCTV camera for TT registration number recognition	We have considered supply of CCTV system as per the SOR only.	Bidder to consider the CCTV Quantity as per SOR.
200.	755 of 1818	22.15	Supply and Installation of Seal entry device as per	We request customer to share specification of seal entry device	Bidder to refer Addendum-2 , Attachment-08

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			specification shall be in contractor scope.		
201.	755 of 1818	23.1	Note-1: Asset management System with Plug- in License for all field devices and PST	The asset management system shall be limited to HART type devices	Bidder to follow Tender requirement.
202.	755 of 1818	23.2	SOE package along with SOE station	Pls note that SOE shall be part of Safety PLC software. Customer to share the required SOE tags for license configuration. Further the no of station shall be as per the SOR count for workstations.	Bidder to consider the SOE Tags for all the PLC Tags. SOE workstations shall be supplied as part of SOR 8.3.
203.	757 of 1818	23.12	All Stations shall be Rack Mounted	We request customer to accept Tower mounted stations as separate operator console is also requested in the SOR.	Bidder to follow Tender requirement

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204.	755 of 1818	23.20.	<p>Fault detection module software to be kept in the TAS Software which will be able to provide system generated Down Time calculation for a stipulated period as detailed in tender document.</p>	<p>Request customer to share detailed philosophy required as part of this module. The details are not available in the tender document</p>	<p>Fault detection module to be kept in the TAS-MS/TAS software which will be able to provide system generated Down time calculation for individual Instruments/ equipment's/ skids and sub system/ System as a whole. Also, Fault register for mechanical equipment's/ instruments (fault and rectification reporting for which can be made only in off line mode) to be developed in an application software where user can log fault and can acknowledge fault rectification after updation of fault rectification by TAS vendor.</p> <p>Following reports to be generated</p>

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					-System/ Sub system (TLF/TFMS/ etc) complete Down time -Equipment/ Instrument wise Down Time Calculation
205.	760 of 1818	23.34	NAS/SAN along with associated rack mounted Monitor	We request customer to share NAS/SAN specifications if same to be supplied	Bidder to refer the tender documents for NAS Specifications/Datasheets Page no.1352 of 1818.
206.	761 of 1818	23.42	Supply and laying of OFC along with OFC terminating components from Control room to planning building and security rooms(2 nos.) for establishing TAS LAN connectivity from Control Room to respective building wherever TAS equipments are to be connected in TAS LAN.	We have considered supply & laying of OFC as per the SOR only.	Bidder's understanding is correct . However, Bidder to estimate the OFC (SM) cable length requirement as part of detail engineering.

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207.	761 of 1818	23.48	Supply of 2 sets of Intrinsically Safe Hand held Communicator & Configurator (HART) with complete license & upgrade package along with Carrycase & 2 Sets of additional connecting cables.	We understand that there is no separate line item for the HART configurator. Hence pls confirm if the same is to be considered. If so pls share the SOR line item	Bidder to include HART Communicator & configurator as per SOR line no. 8.1 as part of Control Room Equipment's.
208.	767 of 1818	27	Integration with TAS	We request customer to mention the interface protocol for the interface of all items mentioned in this section	Bidder's query shall be addressed during detail engineering. Bidder to refer the System architecture for preliminary information of third party interfaces.
209.	1233 of 1818	1.25	Interposing relays for DI/DO shall be considered. The coil and contact ratings shall be complied as per	We request customer to accept SIL2 certified relays as we understand for devices such as	Bidder to follow Tender requirement.

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			requirement. The same shall be SIL3 certified.	ROSOV the contact rating as mentioned in the document is SIL2.	
210.	1234 of 1818	4.2	All digital input and output to PLC shall be through SIL3 Relays.	We request customer to accept SIL2 certified relays as we understand for field level contact rating for devices are SIL2 only.	Bidder to follow Tender requirement.
211.	1234 of 1818	4.3	All analog inputs to PLC shall be through SIL3 barriers.	We request customer to accept SIL2 certified barriers also as we understand for field level contact rating for devices are SIL2 only.	Bidder to follow Tender requirement.
212.	1235 of 1818	4.4	I/O devices interface with PLC shall be at I/O racks only. The I/O modules shall be mounted in the I/O racks	As per OEM Design safety system design is based on IOTA where IO module is directly mounted on individual IOTA .	Bidder to note that system shall meet the requirement as per safety certification. Card segregation shall be maintained as per signal type as detailed in Tender document.

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213.	1235 of 1818	4.6	<p>The maximum number of input / outputs per module shall be limited to the following :-</p> <p>i. Digital Input ☐ 16 points per module.</p> <p>ii. Digital Output ☐ 16 points per module.</p> <p>iii. Analog Input ☐ 16 points per module</p>	<p>We propose 32 channel per module as per OEM design.we request Customer to accept the same.</p>	<p>Bidder to Note the number of Channels per card shall be as per safety certification.</p>
214.	1235 of 1818	4.8	<p>I/O channel status LED is to be provided for all I/O modules</p>	<p>As per OEM design the Channel level indication will be available in the operator station.</p>	<p>For Universal card, channel level indication at operation station is acceptable.</p>
215.	1236 of 1818	4.2	<p>Each I/O rack shall be provided with it's own redundant Power Supply Modules.</p>	<p>Offered system power supply will be redundant and SIL-3 certified which will be common for controller as well as all IO racks as per our standard system design which is SIL-3 certified by TUV.</p>	<p>Bidder to note that system shall meet the requirement as per safety certification and Bidder to comply to redundancy as detailed in the Tender document.</p>

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216.	1243 of 1818	13.2	1 msec SOE resolution for digital I/Os shall be considered at I/O card level.	We request customer to share the Tags for which SOE is required. We recommend customer to accept at system level.	Bidder to follow Tender requirement.
217.	1248 of 1818	1.1	all electronic modules / equipments shall meet the environmental classification class G3 as per ISAS71.04	Pls note that Controller,IO modules of Safety ,DCS system are G3 conformal coated.	Bidder to follow Tender requirement.
218.	1249 of 1818	3.2	Safety barriers selection shall be done basedon the type of transmitter or E/P positioners and shall be certified intrinsically safe byany of the above statutory bodies.It should also have the valid approval of Petroleum and Explosive safety Organization (PESO) /Chief	Pls note that safety barriers if required as per IO count shall be installed in safe control room area. Hence PESO certification shall not be applicable.	Bidder to follow Tender requirement.

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			Controller of Explosive (CCOE),Nagpur.		
219.	1250 of 1818	5.2	Vendor, therefore, shall provide continuous temperature monitoring in Rack room through thermostat for temperature monitoring also provide alarm for operator alert.	Kindly note that Continuous temperature monitoring shall be offered in the cabinet being provided for the control system.	Bidder understanding is correct.
220.	1250 of 1818	5.3	Vendor shall provide continuous corrosion monitoring system consisting of transmitter with 4– 20mA output and switch unit in Rack room (2nos each & 1no in blast proof room –with copper and silver sensors)/also 2 nos in	We understand that there is no separate line item for the Corrosion monitoring system and separate specification for the same. We request Customer to share the same	Bidder to consider Corrosion monitoring system in SOR line no. 8.1 of supply and services as part of Control Room Equipment's.

 <p>ONGC एमआरपीएल MRPL</p>	<p>MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL.</p>	 <p>nauvata ENGINEERING & CONSULTING</p>
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			<p>console room/1 no in engineering room & 1 no in blast proof room and with setting as per contaminant level exceeding limits mentioned above. 1 no. of RTD shall be provided in rack room with transmitter Pest repellent system (ultrasonic) required in cable vault, all other cable entry points & different corners of Rack room/console room/eng room & temperature indication in OIC</p>		

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221.	1528 of 1818	18.12	Motor Weather Protection: weatherproof to IP55 or better	As per OEM design Kindly note that for the required Supply voltage there is no IP certification . The 230V Motor shall be certified for IP44.	Bidder to follow Tender Requirement.
222.	1528 of 1818	18.3	Operating Time : Closing/opening operation within maximum 5 secs with adjustable closing time	As per OEM design the maximum time will be 10 sec	Bidder to follow Tender Requirement.
223.	1253 of 1818	8.3.3	The processor shall be able to scan critical close loop (Pressure & Flow) in less than 250 msec and non-critical close loops in less than 500 ms.	we propose scan time for critical and non critical loop to be 500 ms	Bidder to follow Tender Requirement.

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224.	1254 of 1818	8.4.2	The minimum isolation level between I/O and logic circuit shall be 1000 volts DC.	We understand the isolation level stated is 1000VAC	Bidder understanding is correct.
225.	1254 of 1818	8.4.4	Each digital I/O module shall have a LED per channel to indicate the status of each Input / output	As per OEM design the Channel level indication will be available in the operator station.	Bidder to refer response for Serial no.214.
226.	1265 of 1818	8.10.5	The software supplied shall have valid license for unlimited tags be compatible with the specified transmitter protocol	As per the OEM design the Software shall be tag based.hence the software shall be supplied with suitable tags as per the analog HART inputs mentioned in the IO count.	Bidder to provide licenses for all the Analog HART inputs as mentioned in IO Count along with 50% spares tags.
227.	1265 of 1818	8.11	Cabinets	We request Customer to allow segregation of Signals using the front and rear of cabinet also so	Bidder to follow Tender requirement.

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				that optimised space can be utilised for cabinets	
228.	1265 of 1818	8.11.4	Cabinets shall be fabricated from cold rolled steel sheet of minimum 2 mm thickness suitably reinforced to prevent warping and buckling. Doors shall be fabricated from cold rolled steel sheet of minimum 1.6 mm thickness.	As per OEM design the cabinet shall be fabricated from CRCA sheet of 1.5 thickness. However door shall be offered with 2mm thickness	Bidder to follow Tender requirement.
229.	1266 of 1818	8.11.5	Cabinet doors shall be transparent to facilitate viewing system status without opening the doors.	We understand the same is applicable only for System cabinet.	Bidder's understanding is correct.

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230.	1266 of 1818	8.11.6	Cabinet finish shall include sand blasting, grinding, chemical cleaning, surface finishing by suitable filler and two coats of high grade lacquer with wet sanding between coats. Two coats of paint in the panel colour and final coat shall be given after assembly at site for non-glossy high satin finish	Pls note that cabinet finish shall be per as cabinet OEM Design standard.	Bidder to follow Tender requirement.
231.	1407 of 1818	10.8 b	The systems shall be capable of storing unique volume tables and correction factors, with at least 100000 strapping points for each tank	As per oEM design the FCU shall contain 5000 strapping points per tank and same is provided at many similar application and found to be working satisfactoraly	Bidder to note 5000 strapping points per tank is acceptable

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232.	1496 of 1818	7	Tubing:SS 316, 9.5mm OD, 1.62 mm	As per OEM Design the Tube size for 2" DCV will be 1/4" and 4"DCV will be 3/8"	Standard Tube size of 1/2", 3/8",1/4" are acceptable.
233.	1496 of 1818	9	Strainer at inlet of NO solenoid valve:Y-type Strainer with minimum 100 mesh	As per OEM design the Mesh shall be 40 and same is provided and working satisfactorily in many similar Locations	Bidder to follow Tender documents.
234.	1496 of 1818	10	End Connection:2"/4" 300#, RF serrated as per ANSI B 16.5 as per line size	We understand that generally the white oil application the Process connection rating shall be 150# which shall be suitable to cater the process. Request Customer to review the same	Bidder to follow Tender requirement.
235.	1496 of 1818	17	Packing: PTFE, Line loadable Type	As per OEM Design packing shall be Viton/Buna N	Noted and Accepted
236.	1497 of 1818	25	1 No. Normally Open (NO) & 1 No. Normally Close	Pls note the solenoid valve shall be as per OEM design. There is no	Bidder to follow Tender requirement.

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			(NC) as per Datasheet for solenoid valve attached	datasheet for solenoid valve available in the document.	
237.	1498 of 1818	2.9	Flow rate for meter selection:Min/Nor/Max:100 LPM / 2000 / 2400 LPM	As per OEM design we propose 24/2000/2400 LPM. The same is provided at similar location and found to be working satisfactorily	Noted and Accepted
238.	1498 of 1818	2.17	Design Pressure:30 Kg/cm2	As per OEM design the design pressure shall be 28.5 Kg/cm2	Bidder to refer Addendum-2
239.	1498 of 1818	2.26	Wetted parts:SS316	As per OEM design the wetted parts shall be Anodized Al same is installed and working satisfactorily in similar application across country	Bidder to follow Tender requirement.
240.	1505 of 1818	7	Capable of accepting the meter factor from LRC (Proving module) during calibration of PD meter	As per OEM design & W&M practise the any change of Meter factor shall be available in the BCU	W & M guidelines shall Prevail.

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				Only along with password protection.	
241.	1506 of 1818	14 m	Product overflow (w.r.t preset qty) due to DCV failure shall be registered as an event & displayed as alarm at BC / LRC	As per OEM design the product overflow with respect to the preset shall be available.	Product overflow shall be registered as an event and displayed as alarm at LRC.
242.	1506 of 1818	21	BC front panel shall have status LED's for indicating alarm, operation mode and permissive status etc	Kindly note the requested status shall be available in the front panel as per OEM design.i.e via message	BC front panel shall have LED Status/Via message for indicating alarm, operation mode & permissive status.
243.	1510 of 1818	33	Operating Temperature-0-80 Deg C	As per OEM design operating temperature is 0-60 Deg C same is installed and working satisfactorily in similar application across country	Bidder to refer Addendum-2 for Process conditions.

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244.	1510 of 1818	41	Totaliser Reset: Required from LRC through Serial Communication when BC is in Remote Mode/Automatically when BC operates in Local mode/serial communication link	As per OEM Design the Totaliser Reset provision shall be available from the BCU side with suitable password to avoid unnecessary tampering of data at control room end	Totalizer Reset provision shall be made available from BCU.
245.	1510 of 1818	46	Meter Factor shall be updated from LRC: Required during calibration of PD Meter	As per OEM design & W&M practise the any change of Meter factor shall be availble in the BCU Only along with password protection.	W & M guidelines shall Prevail.
246.	1511 of 1818	52	Batch controller shall automatic update the K-factor after meter proving through software	As per OEM design & W&M practise the updation of K factor shall be availble in the BCU Only along with password protection.	W & M guidelines shall Prevail.

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247.	1515 of 1818	11.9	Flow rate for meter selection:Min/Nor/Max:10 LPM / 300 / 500 LPM	As per OEM design we propose 33/300/330 LPM. The same is provided at similar location and found to be working satisfactorily	Bidder to follow Tender requirement.
248.	1516 of 1818	11.16	Design Pressure:30 Kg/cm2	As per OEM design the design pressure shall be 28.5 Kg/cm2	Bidder to refer Addendum-2 for Process conditions.
249.	1516 of 1818	11.25	Wetted parts:SS316	As per OEM design the wetted parts shall be Anodized Al for Biodiesel & SS316 for Ethanol same is installed and working satisfactorily in similar application across country	Bidder to follow Tender requirement.
250.	1516 of 1818	11.28	End connection:2" ANSI B 16.5 300# SORF Serrated Face Finish 125- 250 AARH	We understand that generally the white oil application the Process connection rating shall be 150# which shall be suitable to cater the process. Request Customer to review the same	Bidder to follow Tender requirement.

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251.	1525 of 1818	16.7	Storage Temperature-15-70 Deg C	As per OEM design the maximum Ambient temperature shall be 55 deg C	Bidder to refer Addendum-2 for Process conditions.
252.	1525 of 1818	16.8	Operating Temperature-15-70 Deg C	As per OEM design the maximum Ambient temperature shall be 55 deg C	Bidder to refer Addendum-2 for Process conditions.
253.	1525 of 1818	16.12	Signal input:Through earth point at loading area. 1. Probe from body of an earthed tank truck 2. probe from loading arm 3. Manual earth	As per OEM design Point no 1,Point no 3 shall be provided. Point no 2 shall not be applicable as the relay is capacitance type and loading arm being continous earthed structure the measurement of capacitance may be erreneous	Bidder to follow Tender requirement.
254.	1526 of 1818	17.7	Operating temperature: 80 deg C	As per OEM design the temperature supported is 0-66 Deg C	Bidder to refer Addendum-2 for Process conditions.

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255.	1527 of 1818	17.15	Communication: Dual redundant RS 485,	As per OEM Design the communication shall be single RS485	Single RS-485 Communication is acceptable.
256.	1527 of 1818	17.26	Card: RFID tags shall be part of Access Card	As we understand the requirement is proximity card RFID Tags shall not be applicable	Bidder's to note that there is no requirement of RFID Tags in this Tender.
257.	1542 of 1818	28.14	Process connection: 8" flanged, 300#RF	We understand that generally the white oil application the Process connection rating shall be 150# which shall be suitable to cater the process. Request Customer to review the same	Bidder to follow Tender requirement.
258.	1542 of 1818	28.21	Oring : Viton	As per OEM design the O ring shall be NBR 70 and same is installed and working satisfactorily in similar application across country	Noted and Accepted
259.	1542 of 1818	28.23	Alarm contact : 2 No. of programmable for overflow protection and dry running	As we understand Secondary Gauge shall be associated with Alarm Contact and safety purpose	Bidder to follow Tender requirement.

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			protection, shall be hardwired to SAFETY PLC.	the mentioned contact shall be offered for secondary Gauge only.	
260.	1542 of 1818	28.24	Interface:Water bottom Sensor, Temperature sensor and pressure transmitter	Since the quantity of mentioned interface is equivalent to 1 Set of Gauges we understand the Input will be applicable for primary gauge only.	Bidder understanding is correct.
261.	1543 of 1818	28.33	SIL Certification	We propose SIL Certification for the secondary gauges.	Bidder to follow Tender requirement.
262.	1543 of 1818	28.37	Cable Entry	The Cable Entry shall be as per OEM Design i.e. M20	Bidder to follow Standard Cable entry sizes.
263.	1544 of 1818	29.17	Sensor interval:2 M 1st Pt 100 shall be 500 mm from the Bottom	As per OEM Design the Sensor shall be distributed across the total length of the probe.	Bidder understanding is correct.
264.	1544 of 1818	29.22	Process connection:3" flanged, 300#RF	We understand that generally the white oil application the Process connection rating shall be 150#	Bidder to follow Tender requirement.

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				which shall be suitable to cater the process. Request Customer to review the same	
265.	1544 of 1818	29.16	No of elements : 8 Nos for above Ground: 2 Nos for Underground	As per OEM Design there shall be 9 Nos for above ground & Underground	Bidder to note, No of elements shall be min 8 nos. for above ground and min 2 nos for underground.
266.	1545 of 1818	29.1	Protection: Probe IP68 & WIP converter IP65	As per OEM Design the Probe shall be IP67 standard and same is installed and working satisfactorily in similar application across country	IP67 is acceptable.
267.	1545 of 1818	30.9	Display:LED, min 2 lines, 16 characters per line, scrolling	As per OEM Design the display shall be LCD graphic display 64 x 128 dots	LED/ LCD Display for Tank side indicator are acceptable.
268.	1546 of 1818	30.10.	Display Data:Level Product temperature – individual sensor Product temperature –	As per OEM Design Level, Product temperature(average) status signal in case of error in gauge cards shall be available in the TSI.	Bidder to note, Product Level Temperature , water interface Level and alarms , other diagnostic information etc (as

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			average Level rate Gauge status Signal strength Pressure	The level rate gauge shall be available in the TFMS software in the control room.	applicable) shall be available at TSI
269.	1555 of 1818	Notes 9	All transmitters shall be able to calibrate through HART calibrator and all diagnostics shall also be available in the supplied HART make universal calibrator	The transmitter shall be calibrated through HART calibrator. However we understand separate HART calibrator is not required as the same is not part of SOR.	Bidder to consider the HART Calibrator as stated in SOR line no.8.1 as part of Control room equipment's.
270.	1565 of 1818	45.7	8 nos. 1000 Mbps Fiber and Ethernet uplinks (dual purpose port).	We propose 4 Nos of uplink ports and understand same shall be suitable for this application. We request customer to review the same	Bidder to follow Tender requirement.
271.	1566 of 1818	45.21	Operating Temperature: -5 degC -55degC	As per OEM Design the operating temperature shall be -5 deg C to 40 deg C	Bidder to refer Addendum-2 for Process conditions.

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272.	1567 of 1818	Note	Power adaptors wherever used for Layer 2 Switches for TAS LAN shall be of Industrial Grade.	Offered network switches, are commercial grade suitable to install in control room environment	Bidder to follow Tender requirement.
273.	1567 of 1818	46.16	Networking-Ethernet-2Nos	As per OEM Design the Ethernet port shall be 1 Nos	Noted and Accepted
274.	1567 of 1818	46.22	Power Supply-110VAC, 50 Hz UPS	As per OEM Design the Power supply shall be 230VAC	Bidder to follow Tender requirement.
275.	1572 of 1818	51.7	the design of such loops in safety PLC are to be done by certified Safety engineers considering such loops as SIL loops only	Kindly note that the loop shall be Non SIL as per the offered specification. Request customer to clarify if SIL contact ESD Pushbutton to be offered.	Bidder to follow Tender requirement.
276.	1582 of 1818	61	Rack monitor	We understand the menitoned specification are not equivalent to the Rack monitor requested in the SOR. We understand Rack montior	Bidder to refer the Addendum-2, Attachment-07

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				are required at the Gantry . Request Customer to share specification.	
277.	1606 of 1818	10	Surface Coating:Anodized: 8 to 10 microns as per IS1868	As we understand requirement is for GI type cable tray the same shall be not applicable	Bidder understanding is correct.
278.	1606 of 1818	5	SS-316 machined bolts, nuts and washers.	We request customer to accept SS304 Nut and bots as clamps requiremnt as per specs are SS304	Bidder to follow Tender requirement.
279.	1606 of 1818	6	The covers shall be fabricated out of 2.5mm thick sheet steel. The tray covers shall be plain type. The width of the covers shall be 5mm more than the width of the tray and the collar height of the cover shall be 20mm	As per OEM design the Cover shall be made out of 1.5mm sheet with cover height of 10mm	Bidder to follow Tender requirement.

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280.	General			We request customer to share IO list for both DCS and Safety PLC. Also Details of IS and Non IS MCC signals to be shared as Cabinet segregation is dependent on the same.	Bidder to refer the Addendum-2, Attachemnt-03
281.	1557 of 1818	41	Datasheet of TAS Server	The TAS server shall be provided with latest hardware for the OEM software which has been tested and qualified for performance of system	Bidder to follow tender conditions and shall refer to Addendum-2 for clarification.
282.	1561 of 1818	43	Datasheet of Operator Interface Console	The OIC shall be provided with latest hardware for the OEM software which has been tested and qualified for performance of system	Bidder to follow tender conditions and shall refer to Addendum-2 for clarification.
283.	General	P&ID		we understand that the bidder scope of supply shall be limited to the SOR items mentioned in the	Bidder to follow Tender requirement

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				tender and Bidder Supply items from the P&ID is covered in SOR	
284.	Volume_I_Commercial_Section, Page 257 of 634	Clause 8.7.0.0	Limitation of Liability of GCC	Following portion of Clause 8.7.0.0 of GCC as not applicable to Bidder "provided that no such limit shall apply in respect of 8.7.0.0(i) + 8.7.0.0(iv) + AND provided always that such limitation shall exclude any amounts recovered under any policy (ies) of insurance taken out and/or maintained by the CONTRACTOR pursuant to the provisions of the Contract; are not applicable to Bidder under this Contract.	Bidder to follow Tender condition
285.	Volume_I_Commercial_Section, Page 87 of 634	Clause 27.0 PRICE ADJUSTMENT FOR SLIPPAGE IN MECHANICAL		Liquidated Damages: Any delay attributed to the Bidder beyond agreed date of delivery will attract Liquidated Damage (LD), as a genuine pre-estimated losses and not as penalty, at 0.5% per week or	Bidder to follow Tender condition

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		COMPLETION of SCC + Clause 4.4.0.0 PRICE ADJUSTMENT FOR DELAY IN COMPLETION of GCC		part thereof on the value of the undelivered portion only, subject to maximum 5% on the total value of the undelivered portion of supply or services, as applicable. However, in case of any delay for the reason not attributable to the Bidder or due to force majeure conditions, the provision of liquidated damages shall not apply. Liquidated Damages shall be the exclusive and the sole remedy available to the Purchaser under this Contract (or Order), tort or any other law applicable for the time being in force.	
286.		Force Majeure		Either Party shall not be liable to the other Party (except for responsibility to pay seller/supplier) for any force majeure event under this Contract.	Bidder to follow Tender condition

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287.		Covid19 Clause		<p>Covid19 Clause: In India, according to the Office Memorandum on Force Majeure Clause ("FMC") issued by Ministry of Finance No.F.18/4/2020-PPD dt. Feb 19, 2020 disruption of supply chains due to spread of corona virus in China or any other country will be covered in the Force Majeure Clause. Further in March, 2020 Government of India has declared Covid19 as a "notified disaster" and World Health Organization (WHO) has categorized Covid19 as a pandemic situation. The Parties [i.e. Purchaser and Seller] are aware of the current outbreak of the Covid19 worldwide which impacts or may impact the normal business and execution of this Contract. The Parties agree that Bidder is entitled to any potential cost compensation, time extension, or other reasonably</p>	Bidder to follow Tender condition

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				required adjustments in the Contract, if any consequences, whether directly or indirectly resulting out of, or in connection with the Covid19 outbreak, lead to delays in delivery of goods or provision of services, supplies or otherwise affect Bidder's contractual obligations and/or duties.	
288.	Volume_I_Commercial_Section ,Page 130 of 634	Clause 2.10.0.0	Work Front of GCC	In case Bidder's performance is delayed due to any act of omission on the part of Purchaser or any third party engaged by Purchaser or the end customer then the Bidder shall be given due extension of time for the completion of the scope, for a period not less than the duration of the resultant delay in the Bidder's performance of the Contract. Purchaser shall grant appropriate	Bidder to follow Tender condition

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				cost compensation along with time extension to the Bidder.	
289.	Volume_I_Commercial_Section, Page 238 of 634	Clause 2.7.0.0 Cancellation of Contract + Clause 2.8.0.0 SUSPENSION OF WORK AND SUPPLIES + SECTION – 7 TERMINATION of GCC		Bidder shall be entitled to claim payments from Purchaser for all supplies and/or services completed including work in progress till the date of any termination /expiry /cancel /suspension of this Contract. Bidder shall be entitled to claim applicable interest rate from Purchaser for any delayed payments to Bidder under this Contract.	Bidder to follow Tender condition
290.	Volume_I_Commercial_Section ,Page 446 of 634	Clause 5.6.0.0 DEFECT LIABILITY PERIOD (DLP) of GCC + Clause 30.0 DEFECT		the DLP period shall be twelve (12) months from the date of commissioning or 18 months from the date of supply whichever is earlier under this Contract	Bidder to follow Tender condition

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		LIABILITY of SCC			
291.	Volume_I_Commercial_Section, Page 149 of 634	Clause 2.4.0.0 ALTERATION S IN DESIGNS, PLANS, DRAWINGS, SPECIFICATIONS, ORDERS AND INSTRUCTION S + Clause 2.5.0.0 ALTERATION IN THE SCOPE OF WORK OR SUPPLY + Clause 2.6.0.0 QUANTITIES OF WORK + Section		Scope of Work shall be as per mutually agreed BOQ between the Parties and any additional scope will entitle Bidder additional costs from Purchaser Care of facilities and storage responsibility costs and scope shall be fully in Purchaser scope under this Contract.	Bidder to follow Tender condition

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		SECTION-3 MATERIALS, LABOUR, EQUIPMENT & FACILITIES + SECTION – 4 PERFORMANCE OF WORKS of GCC			
292.	Volume_I_Commercial_Section, Page 263 of 634	Clause 8.16.0.0 CONFIDENTIAL HANDLING OF INFORMATION of GCC		Either Party shall protect the confidential information disclosed by the other party provided under this Contract	Bidder to follow Tender condition
293.	Volume_I_Commercial_Section, Page 259 of 634	Clause 8.10.0.0 PATENTS AND		It is clarified that all intellectual property rights under this Contract is limited and restricted to the right to use by the Purchaser for the	Bidder to follow Tender condition

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		ROYALTIES of GCC		limited purpose of this Contract only. all and any pre-existing intellectual property rights of Bidder are not transferred under this Contract and Bidder shall be exclusive owner and title holder for Bidder pre-existing intellectual property rights and similarly for any third party owned pre-existing intellectual property rights will be exclusively owned by such third party/ies.	
294.	Volume_I_Commercial_Section, Page 255 of 634	Clause 8.5.0.0 INDEMNITY AND INSURANCE of GCC + Clause 33.0 INSURANCE of SCC		Purchaser shall indemnify Bidder from any third party claims if the reasons for the claim(s) are not solely attributable to Bidder under this Contract. Transit insurance will be in Purchaser scope. There are no insurances in Bidder scope.	Bidder to follow Tender condition

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295.	Volume_I_Commercial_ Section	Raw Material, Commodities, Transportation and Other Critical Components		<p>Raw Material, Commodities, Transportation and Other Critical Components</p> <p>The Parties hereby recognize the existence of a global severe shortage of electronic components (including, but not limited to, semiconductors), as well of market volatility in the availability and cost of other raw materials, commodities, transportation, and other critical components and/or elements, for an unpredictable period of time, which may impact normal business and the execution of the scope of delivery in a way and with a timing beyond Bidder's control (hereinafter "Excusable Event").</p> <p>Notwithstanding anything in the contract/terms and conditions/purchase order to the contrary, if after the date of</p>	Bidder to follow the Tender Conditions.

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				<p>Bidder's proposal or order confirmation or during the term of the performance of the contract/purchase order/confirmed purchase order an Excusable Event occurs, so that the costs of the Bidder's performance increase or Bidder's performance obligations are materially adversely affected, temporarily or permanently prevented or delayed, Bidder shall be relieved of any affected obligations and the Parties shall negotiate in good faith equitable adjustments of the Bidder's obligations in terms of:</p> <p>a. reasonable extensions of the original date of delivery or completion;</p> <p>b. equitable adjustments in the price, to compensate Bidder for any documented increase in components, raw materials,</p>	

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				<p>commodity and/or transportation costs;</p> <p>c. possible reductions of the contractually owed quantity of the goods to be delivered to the Customer, with a view to employing reasonable efforts to ensure that the contract/purchase order/confirmed purchase order can at least be filled in part.</p> <p>Agreed liquidated damages, any actual damages, penalties or other fines, otherwise payable by Bidder shall not apply for delays directly or indirectly caused by the Excusable Event. Customer cannot invoke such a delay as a cause for termination/cancellation of the Contract/Order, unless otherwise agreed between the Parties. In the event of a prolonged Excusable Event, Bidder retains the ability to terminate any affected agreement</p>	

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				<p>for convenience, by servicing notice to Customer to this effect. In case of termination/cancellation of the contract/purchase order/confirmed purchase order directly or indirectly caused by the Excusable Event, each Party waives any claim against the other Party either for direct damages and/or loss of profits and/or indirect and/or intermediate damages, penalties and/or liquidated damages If any dispute or difference arises between the Parties, the Parties hereto shall endeavor to settle such dispute amicably. Any contract, order acceptance or order confirmation by Bidder is entered into and made subject and conditioned to the above terms, which the Parties recognize as fundamental</p>	

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				conditions of any such agreement within the Parties	
296.	Volume_I_Commercial_Section,Page 432 of 634	Clause 6.12 STATUTORY VARIATIONS of SCC		Statutory variation: Any increase in duties, taxes/levy of new duties/taxes under existing or future laws of State/Central Government including GST & any cost implication on account of change in law shall be paid / reimbursed extra by the Purchaser to Bidder which includes for the supply, services of both Bidder & its vendor/sub-vendor directly to the end customer.	Bidder to follow Tender Conditions
297.	Volume_I_Commercial_Section,Page 434 of 634	price escalation		The price as set forth in this Contract has been calculated based on the current prices for the component(s), part(s) and raw material(s) (the "Parts") required to manufacture the products. However, due to the volatility of the prices of the Parts, Seller may	Bidder to follow Tender Conditions

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				encounter significant and potentially unanticipated increases in Parts pricing. Seller agrees to employ its reasonable commercial efforts to maintain the Parts pricing used to determine the price of Products as set forth in this Contract]. However, in the event of an increase in Parts pricing, Seller shall notify Purchaser thereof, and Purchaser shall pay the relevant increased pricing.	
298.	Volume_I_Commercial_Section, Page 392 of 634	Governing law and dispute resolution		This Contract (or Order) shall be governed by and construed in accordance with the laws of India. Any dispute or difference arising out of or in connection with this Contract (or Order), which cannot be settled amicably within thirty (30) calendar days from the notification of such dispute by one Party to the other Party, shall be	Bidder to follow Tender Conditions

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				finally settled under the Arbitration and Conciliation Act, 1996 by sole arbitrator appointed in accordance with the said law. The place of arbitration shall be Bengaluru, India. The language of the arbitration shall be English. The final award shall be binding on the Parties.	
299.	Volume_I_Commercial_ SectionPage 454 of 634	Clause 37.0 CORRUPT AND FRAUDULENT PRACTICES of SCC		it is clarified that Bidder has its own Code of Conduct and Bidder shall strictly adhere with the Bidder Code of Conduct	Bidder to follow Tender Conditions
300.		Entire Agreement		Entire Agreement: This Contract constitutes the entire agreement between the Parties with respect to the subject matter of this Contract and supersedes all communications, negotiations and agreements	Bidder to follow Tender Conditions

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				(whether written or oral) of Parties with respect thereto made prior to the date of this Contract.	
301.	Volume_I_Commercial_Section, Page 141 of 634	Clauses 2.0.14.0, 2.0.15.0 of GCC + Clause 1.0 GENERAL of SCC		All deviations mentioend in this document shall be integral part and parcel of the Contract and shall supersede and prevail over any other T&Cs of the Contract	Bidder to follow Tender Conditions
302.	Volume_I_Commercial_Section, Page 169 of 634	3.3.0.0 POWER, WATER & OTHER FACILITIES		Owner shall provide provision for Power and construction and drinking water on chargeable basis.	Bidder to follow Tender Conditions
303.	Volume_I_Commercial_Section, Page 497 of 634	Comprehensive Annual Maintenance Contract (Five Years) – CAMC – Payment		We request MRPL / NEPL to cap the minimum percenatge of CAMC to be quoted, as this will enable genuinity and practicality of pricing in the bid.	Bidder to follow Tender Conditions

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304.	Volume_I_Commercial_Section,Page 495 of 634	Clause 3.1 For Supply		We request MRPL / NEPL to cap the number of days within which the payment shall be released for milestone d,e,f for supply of items.	Bidder to follow Tender Conditions
305.	Volume_I_Commercial_Section,Page 592 of 634	S.No.3 PMC/OWNER RESERVE THE RIGHT TO CHOOSE ANY OF THE APPROVED PRODUCT/ BRAND/ MANUFACTURER AS PER THIS LIST.		We request MRPL / NEPL to allow the bidder to choose a vendor from approved vendor list who is meeting tender specification.	Noted and Accepted
306.	Volume_I_Commercial_Section ,Page 434 of 634	Payment terms		payment terms are not capped for installation portion. We request MRPL / NEPL to add the clause that in the event of any delay more than X number of days, not	Bidder to follow Tender Conditions

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				attributable to vendor, the payment can be claimed by bidder.	
307.	Volume_I_Commercial_ SectionPage 255 of 634	INDEMNITY AND INSURANCE		(b) Third party Insurance for body injury and property damage to the limit of not less than Rs.10,00,000 (Rupees one Million only) in each accident at each job site and to a limit of not less than Rs.100,00,000 (Rupees Ten Million only) for all accidents at all job sites for every year. Provided that the limits specified above shall operate only as a specification of minimum limits for insurance purposes, but shall not anyway limit the CONTRACTOR's liability in terms of this clause or otherwise to their limit(s) specified.	Bidder to follow Tender Conditions

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308.	Volume_I_Commercial_ Section, Page 256 / 257 of 634	Clause 8.5.1.1		Since standard insurance is already in scope as per Clause 8.5.1.0, Clause 8.5.1.1 Clause 8.5.2.0 a,b,c,d and Clause 8.6.0.0 is not applicable to bidder.	Bidder to follow Tender Conditions
309.	Volume_I_Commercial_ Section,Page 450 of 634	Clause 33.0		Within 30 days of placement of Letter of Acceptance by the OWNER, the CONTRACTOR without restricting in any manner any other provisions of the Contract, and in particular any such provision pertaining to his obligation, liability or responsibility shall take out and keep in force at his expenses the various insurance policies specified herein for the benefit of and in the joint names of the OWNER and the CONTRACTOR against all risks for physical losses or damages suffered by Works and Temporary works or part of the Works up to	Bidder to follow Tender Conditions

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				<p>the Contract Value thereof or such additional sum as may be specified in the Contract in such a manner that the OWNER and the CONTRACTOR are covered. CONTRACTOR shall at his own cost and expense take out from a suitable insurance company acceptable to OWNER and maintain for the entire period until ACCEPTANCE OF WORKS or until such time thereafter as the CONTRACTOR may consider appropriate Insurances as described under this Clause below and quoted unit-rate price (Automation BOQ Form) shall be inclusive of the same.</p>	
310.	Volume_I_Commercial_Section,Page 451 of 634	Clause 33.0 (2)		<p>All workers whose salary is more than Rs 21,000/ per month (Prevailing rate as per the act) need not to be covered by ESI. However,</p>	Bidder to follow Tender Conditions

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				CONTRACTOR to take insurance policy to cover the risk towards temporary disablement and permanent disablement for the workmen.	
311.	Volume_I_Commercial_Section,Page 452 of 634	Clause 33.0 (8)		Group term Life insurance cover to be taken having a risk coverage 24X7 death coverage (Natural/Accidental death) with a sum assured of atleast Rs. 10,00,000/- (Rs. Ten lakh) per person by the CONTRACTOR.	Bidder to follow Tender Conditions
312.	Volume_I_Commercial_Section,Page 452 of 634	Clause 33.0 (9)		Other insurance which shall be necessary or which the CONTRACTOR deems necessary for proper performance of the WORK, e.g : <ul style="list-style-type: none"> • Overseas (and/or Domestic) Travellers' accident Insurance. • Burglary Insurance • All Risks marine cargo Insurance 	Bidder to follow Tender Conditions

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				for the CONTRACTOR's construction Equipment, tools and machinery, and for equipment and materials that the CONTRACTOR's TEMPORARY WORKS and that the CONTRACTOR under the CONTRACT may supply for the WORKS and/or the PERMANENT WORK and Transit • Fidelity Guarantee Insurance.	
313.	Volume_I_Commercial_ Section Page 594 of 634	S.No.3	STRAINER & AIR ELIMINATOR	Request you to accept Sungov as an approved vendor.	Bidder to follow Tender Requirement
314.	Volume_I_Commercial_ Section Page 594 of 634	S.No.4	PNEUMATIC CONTROL VALVE / SHUTDOWN VALVE (GLOBE TYPE)	Request you to accept Micropneumatic as an approved vendor.	Bidder to follow Tender Requirement
315.	Volume_I_Commercial_ Section Page 594 of 634	S.No.4	PNEUMATIC CONTROL VALVE / SHUTDOWN VALVE (GLOBE TYPE)	Request you to accept Hawa Valve as an approved vendor.	Bidder to follow Tender Requirement

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316.	Volume_I_Commercial_ Section Page 594 of 634	S.No.5	DIGITAL CONTROL VALVE	Request you to accept Darling Muesco as an approved vendor.	Bidder to follow Tender Requirement
317.	Volume_I_Commercial_ Section Page 594 of 634	S.No.6	NEEDLE LOCK WITH MAGNETIC DEVICE	Request you to accept OEM recommended makes as there is only one make.	Noted and Accepted
318.	Volume_I_Commercial_ Section Page 594 of 634	S.No.7	PNEUMATIC CONTROL VALVE / SHUTDOWN VALVE (BALL TYPE)	Request you to accept Micropneumatic as an approved vendor.	Bidder to follow Tender Requirement
319.	Volume_I_Commercial_ Section Page 594 of 634	S.No.7	PNEUMATIC CONTROL VALVE / SHUTDOWN VALVE (BALL TYPE)	Request you to accept Microfinish as an approved vendor.	Bidder to follow Tender Requirement
320.	Volume_I_Commercial_ Section Page 594 of 634	S.No.7	PNEUMATIC CONTROL VALVE / SHUTDOWN VALVE (BALL TYPE)	Request you to accept Hawa Valve as an approved vendor.	Bidder to follow Tender Requirement

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321.	Volume_I_Commercial_ Section Page 594 of 634	S.no.8	PNEUMATIC ON OFF BUTTERFLY VALVE / TRIPPLE OFFSET BUTTERFLY VALVE	Request you to accept Hawa Valve as an approved vendor.	Bidder to follow Tender Requirement
322.	Volume_I_Commercial_ Section Page 594 of 634	S.no.8	PNEUMATIC ON OFF BUTTERFLY VALVE / TRIPPLE OFFSET BUTTERFLY VALVE	Request you to accept Advance Valve as an approved vendor.	Bidder to follow Tender Requirement
323.	Volume_I_Commercial_ Section Page 594 of 634	S.no.9	ACTUATORS (PNEUMATIC) FOR SHUTDOWN SERVICES	Request you to approve Airo Euro as approved make	Bidder to follow Tender Requirement
324.	Volume_I_Commercial_ Section Page 594 of 634	S.no.9	ACTUATORS (PNEUMATIC) FOR SHUTDOWN SERVICES	Request you to approve Kitz as approved make	Bidder to follow Tender Requirement
325.	Volume_I_Commercial_ Section Page 594 of 634	S.no.9	ACTUATORS (PNEUMATIC) FOR SHUTDOWN SERVICES	Request you to approve Teratork as approved make	Bidder to follow Tender Requirement

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326.	Volume_I_Commercial_ Section Page 594 of 634	S.no.10	SELF ACTUATED PCV	Request you to accept Darling Muesco as an approved vendor.	Bidder to follow Tender Requirement
327.	Volume_I_Commercial_ Section Page 595 of 634	S.no.16	SOLENOID VALVE	Request you to accept Rotex as an approved vendor.	Bidder to follow Tender Requirement
328.	Volume_I_Commercial_ Section Page 595 of 634	S.no.17	UPS	Request you to accept ABB as an approved make.	Bidder to follow Tender Requirement
329.	Volume_I_Commercial_ Section Page 595 of 634	S.no.19	LOADING ARM (TOP)	Request you to accept Ferrotube as an approved make.	Bidder to follow Tender Requirement
330.	Volume_I_Commercial_ Section Page 595 of 634	S.no.20	LOADING ARM (BOTTOM) FOR PRODUCT & VAPOUR	Request you to accept Ferrotube as an approved make.	Bidder to follow Tender Requirement
331.	Volume_I_Commercial_ Section Page 595 of 634	S.no.26	PROVER TANK	Request you to accept Toshniwal as an approved make.	Addition M/s. Toshniwal is added under Approved Makes/Vendor/ Brand

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332.	Volume_I_Commercial_ Section Page 595 of 634	S.no.32	RTD/ THERMOWELLS	Request you to accept H Guru as an approved make.	Bidder to follow Tender Requirement
333.	Volume_I_Commercial_ Section Page 596 of 634	S.no.53	SURGE SUPPRESSION DEVICES	Request you to accept Dehn as an approved make.	Addition M/s. DEHN is added under Approved Makes/Vendor/ Brand
334.	Volume_I_Commercial_ Section Page 596 of 634	S.no.53	SURGE SUPPRESSION DEVICES	Request you to accept Phoenix as an approved make.	Addition M/s. Pheonix is added under Approved Makes/Vendor/ Brand
335.	Volume_I_Commercial_ Section Page 597 of 634	S.no.63	UNIVERSAL HAND HELD CALIBRATOR(HART PROTOCOL	Request you to accept ABB as an approved make.	Addition M/s. ABB is added under Approved Makes/Vendor/ Brand
336.	Volume_I_Commercial_ Section Page 597 of 634	S.no.63	UNIVERSAL HAND HELD CALIBRATOR(HART PROTOCOL	Request you to accept Fluke as an approved make.	Bidder to follow Tender Requirement

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337.	Volume_I_Commercial_ Section Page 597 of 634	S.no.64	ELECTRONIC DISPLAY UNIT	Request you to accept Teampower as an approved make.	Addition M/s. Team Power is added under Approved Makes/Vendor/ Brand
338.	Volume_I_Commercial_ Section Page 597 of 634	S.no.66	MANUAL CALL POINTS	Request you to accept FCG as an approved make.	Bidder to follow Tender Requirement
339.	Volume_I_Commercial_ Section Page 597 of 634	S.no.68	ADDITIVE INJECTION SKID & PANEL FOR BLUE DYE / MARKER / POWER / TURBO	Request you to accept Toshniwal as an approved make.	Bidder to follow Tender Requirement
340.	Volume_I_Commercial_ Section Page 597 of 634	S.no.70	BULK POWER SUPPLY	Request you to accept ABB as an approved make.	Addition M/s. ABB is added under Approved Makes/Vendor/ Brand
341.	Volume_I_Commercial_ Section Page 597 of 634	S.no.71	LARGE VDU	Request you to accept Panasonic as an approved make.	Addition M/s. Panasonic is added under Approved Makes/Vendor/ Brand

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342.	Volume_I_Commercial_ Section Page 597 of 634	S.no.71	LARGE VDU	Request you to accept Vu as an approved make.	Bidder to follow Tender Requirement
343.	Volume_I_Commercial_ Section Page 597 of 634	S.no.72	SEAL ENTRY DEVICE	Request you to accept i-safe as an approved make.	Bidder to follow Tender Requirement
344.	Volume_I_Commercial_ Section Page 597 of 634	S.no.76	CABLE TRAYS	Request you to accept Rukmani as an approved make.	Addition M/s. Rukamnai is added under Approved Makes/Vendor/ Brand
345.	Volume_I_Commercial_ Section Page 598 of 634	S.no.77	GAS DETECTORS	Request you to accept ESP Safety as an approved make.	Bidder to follow Tender Requirement
346.	Volume_I_Commercial_ Section Page 598 of 634	S.no.77	GAS DETECTORS	Request you to accept Uniphoss as an approved make.	Bidder to follow Tender Requirement
347.	Volume_I_Commercial_ Section Page 598 of 634	S.no.80	INSTRUMENT AIR MANIFOLD(SS)	Request you to accept Valtex as an approved make.	Bidder to follow Tender Requirement

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348.	Volume_I_Commercial_ Section Page 598 of 634	S.no.81	INSTRUMENT TUBING AND FITTINGS(SS)	Request you to accept Valtex as an approved make.	Bidder to follow Tender Requirement
349.	Volume_I_Commercial_ Section Page 601 of 634	S.no.2	FIRE ALARM CONTROL PANELS	Request you to accept Appollo as an approved make.	Bidder to follow Tender Requirement
350.	Volume_I_Commercial_ Section Page 601 of 634	S.no.1	DETECTORS AND DEVICES	Request you to accept Edwards as an approved make.	Bidder to follow Tender Requirement
351.	Volume_I_Commercial_ Section Page 602 of 634	S.no.1	ACCESS CONTROL SYSTEM	Request you to accept RBH as an approved make.	Bidder to follow Tender Requirement
352.	Volume_I_Commercial_ Section Page 602 of 634	S.no.1	ACCESS CONTROL SYSTEM	Request you to accept Viridi as an approved make.	Bidder to follow Tender Requirement
353.	Volume_I_Commercial_ Section Page 602 of 634	S.no.3	PROXIMITY CARD READER/BIO-METRIC READER	Request you to accept Viridi as an approved make.	Bidder to follow Tender Requirement

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354.	Volume_I_Commercial_Section Page 602 of 634	S.no.3	PROXIMITY CARD READER/BIO-METRIC READER	Request you to accept RBH as an approved make.	Bidder to follow Tender Requirement
355.	Volume_I_Commercial_Section Page 602 of 634	S.no.1	CCTV CAMERAS	Request you to accept Hikvision as an approved make.	Bidder to follow Tender Requirement
356.	Volume_I_Commercial_Section Page 602 of 634	S.no.1	CCTV CAMERAS	Request you to accept CP Plus as an approved make.	Bidder to follow Tender Requirement
357.	Volume_I_Commercial_Section Page 602 of 634	S.no.2	VIDEO MONITORING SOFTWARE	Request you to accept OEM make same as of camera as an approved make.	Bidder to follow Tender requirement
358.	Volume_I_Commercial_Section Page 602 of 634	S.no.4	LCD/LED DISPLAYSCREENS-INDUSTRIAL GRADE/ SUITABLE FOR 24 X 7 OPERATION	Request you to accept Panasonic as an approved make.	Addition M/s. Panasonic is added under Approved Makes/Vendor/ Brand
359.	Volume_II_Technical_Section_Part_1 Page 109 of 594	9.1.15	Supply, laying and connection of SS Tubing & Tube Fittings for air supply	Please confirm the distance from air header to SDV. Please confirm	Bidder to note the tentative distance shall be 10m, the actual shall be decided by Bidder

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			to ON-OFF (SDVs) from TLF air header to gantry ON-OFF Valves. Tubing work shall include all type of connector, elbow, tees etc. Air Compressor package along with air header upto TLF gantry is in scope of others.	the Manifold will be in bidders scope?	during detail engineering. Bidder understanding is correct on Manifold scope
360.	Volume_II_Technical_Section_Part_1 Page 109 of 594	9.1.17	BCU Communication shall have redundant communication link to terminal server (TAS) and No multidropping is allowed while communicating to terminal server. Card reader at TLF gantry can be connected to BCU directly over Serial interface.	Individual looping of all BCU s are required, which means that for 15 BCU s 15 ports are to be utilised. Please confirm understanding.	Maximum 2 Nos of batch Controller to be Multi dropped per serial communication link , refer point 18 , page 1509 of 1818

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361.	Volume_II_Technical_Section_Part_1 Page 110 of 594	9.1.22	Design, engineering, supply, erection, testing and commissioning of Trolley mounted Master Meter Proving system consisting of Master PD meter, Digital Control Valve, strainer cum air eliminator along with DPG, master batch controller, RTD, cabling, SS corrugated flexible hose, piping as required and mechanical hardware. Scope also includes calibration & W&M stamping of PD Meters during commissioning, Warranty and CAMC period.	We understand that Master Meter skid shall not have separate Strainer cum air eliminator, DCV as the prover tapping is after strainer on the skid.	Bidder to follow Tender requirement

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	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
362.	Volume_II_Technical_Section_Part_1 Page 110 of 594	10.1	Note1: Mass flow meter shall be of same make and model as installed in PMHBL Devangonhi terminal, details of MFM are given in Specificalton.	Make and model of MFM to be shared	Bidder to refer Addendum-2, Attachment -05 for MFM Data sheet
363.	Volume_II_Technical_Section_Part_1 Page 111 of 594	11.1	Supply, installation, integration, calibration, testing and commissioning of Pressure Transmitter, Pressure Gauge along with manifold, isolation valves & accessories etc on each main and blend product header line. Real time pressure reading of header line should be displayed in TAS GUI and readings to be stored in TAS for future analysis. If	please confirm if first isolation valve shall be provided by MRPL	Bidder to refer Addendum-2, Attachment -02 for hook-up drawings , root valve shall be in scope of others however isolation and drain valve are part of Bidder scope

	MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL.	
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Sr. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	PMC/OWNER'S REPLY
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			pressure in the delivery pipeline header exceeds specified value (say 8 kg/cm ²) or reduced below specified value (say 1 kg/cm ²), an audio-visual alarm should be generated in TAS.		
364.	Volume_II_Technical_Section_Part_1 Page 112 of 594	13.11	The job for external modifications (Hot and cold work) required on tank's manhole cover plate and blind flange plate for installation of Radar Gauges, MSTW, AOPS, pressure transmitter, TSI, level switches, level transmitters etc along with all accessories is included in the respective item.	Bidder shall procure instruments based on tank drawings/GAD as provided by MRPL / NEPL	Tank GAD and associated documents shall be shared during detail engineering

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Sr. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	PMC/OWNER'S REPLY
	DOCUMENT NAME AND PAGE No.	CLAUSE No.			
365.	Volume_II_Technical_Section_Part_1 Page 116 of 594	17.1	Bidder is required to conduct Fire and Hydrocarbon Vapour Mapping study (Dispersion Modelling Study) through reputed agencies having proven track Record of conducting similar studies for oil Installations across the globe, using standard licensed software as a part of Quantative research Analysis (QRA) for selection of type of detectors and correct positioning of detectors as detailed in the tender document.	For gas dispersion study, a minimum of following documents are required : plot plan, Unit PID, PFD, stream data, operational data, Hazardous area classification, meteorological data, Elevation details, QRA report. Kindly confirm availability before execution.	Bidder required documents will be shared during detail engineering
366.	Volume_II_Technical_Section_Part_1 Page 119 of 594	21.7	All Cable tray work/Cable duct work for Integrating the package items from battery limit JB to Control	Please clarify who will be doing the cable engineering for those	Bidder scope (cable routing, tray sizing &selection etc.) shall be from field/ skid JB/panel to

	MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL.	
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Sr. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	PMC/OWNER'S REPLY
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			room shall be in Bidder Scope	packages. What engineering is expected from Bidder's end?	System cabinet as detailed in SOW
367.	Volume_II_Technical_Section_Part_1 Page 119 of 594	21.9	Supply, Installation, Testing and Commissioning of PMHBL side PLC I/O Cards along with complete accessories, fully wired for connecting/Integrating the MOVs/DBBs.Total I/O Count is 48 nos.Existing PLC details of PMHBL is given in Specification chapter.	we request to remove the integration scope from Bidder's responsibilities as working on third party systems shall void the warranty on that system.	Bidder to refer Addendum-2 for clarification
368.	Volume_II_Technical_Section_Part_1 Page 120 of 594	22.4	Supply, installation, integration, testing and commissioning of One CCTV for Main gate entry, One CCTV camera for TT registration number recognition, One Proximity card reader, One Barrier	we understand that the number plate recognition cameras are also included in the SOR.	Bidder to follow SOR

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Sr. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	PMC/OWNER'S REPLY
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			gate along with traffic lights, infrared sensor at security main entry Gate, One no. of BQD.		
369.	Volume_II_Technical_Section_Part_1 Page 123 of 594	23.14	TAS software shall be interfaced with following but not limited to major sub-systems / equipments alongwith GUI development for monitoring, logging, reporting and Controls-Interlocks etc as per specification and tender document. 5) ROSOVs, MOVs, DBBV, SOVs, etc	we understand these valves shall be terminated at DCS / PLC. Please clarify whose scope shall be the wiring , ferruling, termination of these cables.	Bidder shall be responsible for cable laying, ferruling, termination etc. from field/ skid JB/panel to DCS /PLC system

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Sr. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	PMC/OWNER'S REPLY
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370.	Volume_II_Technical_Section_Part_1 Page 123 of 594	23.14	TAS software shall be interfaced with following but not limited to major sub-systems / equipments alongwith GUI development for monitoring , logging, reporting and Controls-Interlocks etc as per specification and tender document. 11) Vapour Recovery System	we understand this system shall be terminated at DCS / PLC. Please clarify whose scope shall be the wiring , ferruling, termination of these cables.	Bidder shall be responsible for cable laying, ferruling , termination etc. from field/ skid JB/panel to DCS /PLC system
371.	Volume_II_Technical_Section_Part_1 Page 127 of 594	23.44	Supply and installation of Multi Cable Transit (MCT) Blocks at the Automation cable Entry point to control room, security room (2 nos.) and Planning Building for proper sealing of the cable entry point. All works	MCT is to be sized for cables part of the system supplied by bidder. Please confirm understanding.	Bidder understating is correct

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			relating to the sizing, designing and installation of MCT Blocks is within the scope of the Bidder.		
372.	Volume_II_Technical_Section_Part_1 Page 133 of 594	27.1	INTEGRATION OF PACKAGE ITEMS: ii. All cabling & tray work from Battery limit JB of package item to Control room shall be in Contractor scope.	Please confirm if the layout drawing of these instruments shall be in bidders scope?	Bidder to note Layout drawings of package Items by others
373.	Volume_II_Technical_Section_Part_1 Page 157 of 594	7.2	SITE STOCK LIST	We understand that for items where spares are not mentioned shall follow OEM recommendation.	Bidder understanding is correct
374.	Volume_II_Technical_Section_Part_1 Page 411 of 594	d (ii)	PLC's which are for Interlocks execution shall have redundant processor, redundant I/O and redundant communication	We understand that the loading shall be 40% in Safety PLC and upto 50% in DCS. Please confirm understanding.	Bidder to follow Tender requirement

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			as a minimum (control processor & resource loading shall be limited to 40%).		
375.	Volume_II_Technical_Section_Part_2 Page 3 of 418	1.11	The system shall be modular in construction and expandable in future by adding additional modules which shall be easily accessible for maintenance and repair. The modules shall preferably be suitable for inserting in 19" rack. The types of modules shall be kept to minimum possible in order to have interchangeability and low spares inventory.	We request you to accept DIN rail mounted modules.	Bidder to note DIN rail module may also be considered

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376.	Volume_II_Technical_Section_Part_2 Page 8 of 418	4.16	SOVs are considered driven using SIL3 DO relays. For critical shutdown valves, ROSOVs which are piloted using dual SOVs, such relays shall have line monitoring capability which shall be wired up as DI to PLC for monitoring.	As per "1.16 Instrumentation shutdown and interlock shall be de-energizing to trip.", we understand that line monitoring shall not be applicable since fail safe logic is required.	Bidder understanding is correct , All safety valves shall be de-energized to trip
377.	Volume_II_Technical_Section_Part_2 Page 17 of 418	18 (1)	System end ((DCS / PLC / CCTV / TFMS / Gas Detection System Any other Automation System / Hard Wired Console) – incl in packages & brought-out's - 25% (min)	Please confirm if we have to maintain 20% or 25% spares in control system.	Bidder to refer Addendum-2 for clarification.It shall be 20% as per Engineering Design basis ,page 1102 of 1818.
378.	Volume_II_Technical_Section_Part_2 Page 249 of 418	1.0	TOP LOADING ARM	We request MRPL / NEPL to provide Truck GADs for proper selection of loading arms (applicable for both top loading as	GAD and associated documents shall be shared during detail engineering

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				well as bottom loading). If not available right now, same shall be required before detailed engineering starts.	
379.	Volume_II_Technical_Section_Part_2 Page 254 of 418	5	API Coupler vi) Automatic push and latch type dry break coupler as per API RP 1004 type.	API RP 1004 is for Bottom loading. However if dry disconnect coupling is required for top loading, then over-spill sensor cannot be accommodated as it will be closed loop.	Bidder understanding is correct.
380.	Volume_II_Technical_Section_Part_2 Page 291 of 418	14	ADDITIVE INJECTION PANEL	Please confirm the distance between additive injection skid to metering skid. Also the piping requirement for the same.	Bidder to refer to Plot Plan.
381.	Volume_II_Technical_Section_Part_2 Page 306 of 133	9	PRESSURE TRANSMITTER FOR TANK DENSITY MEASUREMENT 9) Sensor Type	Please accept Resonant inductance as sensor type as ABB OEM manufacturing standard.	Noted and Accepted

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382.	Volume_II_Technical_Section_Part_4 Page 121 of 133	3.13.3	On / Off or shutdown valves (in fire prone Area / As per Licensor's guidelines / HAZOP) shall have external Flexible protective jacketed enclosure, as per Design Basis for actuator & valve assembly.	Please confirm if fire jacket is also required for the On-Off valve on skid.	Bidder to note fire jacket for On-Off valve at skid not required
383.	Volume_II_Technical_Section_Part_4 Page 128 of 133	3.22	PARTIAL STROKE TESTING (PST)	PST is asked for ON-OFF valves, incase if required please confirm for valve signature software supply scope	Bidder to follow Tender requirement
384.	General	-	-	we understand that all components for ESD PLC shall be redundant and SIL3 certified even barrier and relays. Please confirm understanding.	Bidder understanding is correct



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385.	General	-	-	We request MRPL / NEPL to provide the third party interface list with communication protocols along with the IO List so that same can be considered correctly in the control system sizing.	Interface List, communication protocol , etc. shall be developed by Bidder, the required inputs shall be shared during detail engineering.

	<p style="text-align: center;">Marketing Terminal Project at Devangonithi, Bangalore</p> <hr/> <p style="text-align: center;">DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF TERMINAL AUTOMATION PACKAGE FOR MRPL MARKETING TERMINAL PROJECT, DEVANGONTHI, BANGALORE VOLUME I : COMMERCIAL</p>	
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OCCURRENCE OF PANDEMIC(S)

[ANNEXURE XIV TO SPECIAL CONDITIONS OF CONTRACT]

	Marketing Terminal Project at Devangonhi, Bangalore	
DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF TERMINAL AUTOMATION PACKAGE FOR MRPL MARKETING TERMINAL PROJECT, DEVANGONTHI, BANGALORE VOLUME I : COMMERCIAL		

OCCURRENCE OF PANDEMIC(S)

1. In the event of an outbreak of COVID-19 or any declaration of pandemic occurs during the course of execution of the contract, the Contractor shall strictly adhere to all directives from Health Authorities/ Government departments including but not limited to health & safety of all concerned; as if such directives are incorporated herein.
2. However, it is an expressed term of this contract that any such declaration of pandemic shall not impact on the schedule of execution of the project under this contract. It is expected that by taking all necessary actions for smooth execution of the contract without any delay, the Contractor shall ensure that the performance of his contractual obligations are not affected by the pandemic, such that the execution commences as scheduled and progresses as planned.
3. In any case of delay after the commencement of work, due to reasons related to COVID-19 or any other declared pandemic; beyond the control of the Contractor, the Contractor immediately on becoming aware of the anticipated delay, shall issue a notice (Pandemic Notice) citing such reasons to MRPL attaching sufficient documentary testimonials. No such notice issued after ten (10) calendar days of declaration of pandemic or without providing sufficient evidence shall be considered by MRPL.
4. The Engineer In charge on receipt of the Pandemic Notice received on time, may, after detailed examination of the matter, adjust the Work schedule, including the duration mentioned in the tender, to reflect the delays accepted due to pandemic (as per Government directives, if any).
5. However, it is agreed by the Contractor, that he shall not claim any additional payment to either local or HO staff associated with this work in view of the work stoppage due to COVID-19 Pandemic or any other pandemic and the Contractor further agrees that MRPL will not be under any obligation to make any enhanced or additional payment on this account for whatsoever reason.
6. In the case of a pandemic related embargo, the Contractor shall continue all jobs related to documentation included in Detail Engineering, Procurement, etc. either by allowing his staff to work from their office or from home as may be found feasible, but without any interruption. The Contractor agrees that MRPL is not liable to accept any delay for non-field jobs under the contract or related thereto.
7. Any delay as a result of COVID-19 or any other pandemic and in accordance with the above, as confirmed by the Engineer In charge, shall be properly documented.

INDUSTRY QUALITY CONTROL MANUAL

For Non-Aviation Petroleum Products

Effective From: April 2019



INDUSTRY QUALITY CONTROL MANUAL

गैर विमानन पेट्रोलियम उत्पादों हेतु
उद्योग गुणवत्ता नियंत्रण मैनुअल

INDUSTRY QUALITY CONTROL MANUAL FOR NON-AVIATION PETROLEUM PRODUCTS

चौथा संशोधन
FOURTH REVISION

अप्रैल 2019 से प्रभावी
EFFECTIVE – April-2019

(सिर्फ आंतरिक परिचालन हेतु)
(*For Internal Circulation Only*)

INDUSTRY QUALITY CONTROL MANUAL

PREFACE

Industry Quality Control Manual for Non-Aviation Petroleum Products (Fourth Revision) is released in accordance with letter reference number R-12042(11)/146/2017-OR-II (P-29296) dated 9th April 2019 issued by Ministry of Petroleum & Natural Gas, Government of India, New Delhi.

IQCM-2019 is applicable to the entire Oil Industry (Refineries, Pipelines and Marketing Companies) in Public and Private Sectors and any outsourcing arrangement for Marketing and/or Distribution of Petroleum Products by the oil companies with other agencies covering the existing as well as future such networks.

INDUSTRY QUALITY CONTROL MANUAL

INDUSTRY QUALITY CONTROL WORKING GROUP

Sr. No.	Name	Designation	Company
1.	Shri S. Bhattacharjee	ED (QC)	IOCL Marketing
2.	Shri P. D. Dusane	GM (QC)	IOCL Marketing
3.	Shri A. Debnath	DGM (QA)	BPCL Marketing
4.	Smt. Shilpa Jamadar	Manager (QA)	BPCL Marketing
5.	Shri Sunny C M	GM (QC)	HPCL Marketing
6.	Shri S. W. Khadilkar	DGM (QC)	HPCL Marketing

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SECTION – 1

Introduction

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1.0 INTRODUCTION

1.1 OBJECTIVE

To evolve a uniform Quality Control procedure for handling of the Non-Aviation Petroleum Products viz. Naphtha, Motor Gasoline and its variants, Kerosene, Automotive Diesel Fuel and its variants, High Flash Diesel, Light Diesel Oil, Fuel Oils & its variants and other products applicable to the entire Oil Industry (including Refineries, Pipelines and Marketing Companies) in Public and Private Sectors and any outsourcing arrangement for marketing and / or distribution made by the oil companies with other agencies covering the existing as well as future such networks.

Motor Gasoline (IS 2796) is referred in this manual as MS and Automotive Diesel Fuel (IS 1460) is referred as HSD.

However, for special petroleum products like Special Boiling Petroleum Product (SBP), MTO, Hexane etc., the oil marketing companies shall prepare their own standard operating procedures with regard to storage, handling and distribution system along with its quality monitoring and shall ensure that the laid down procedures are also being followed.

1.2 PURPOSE

The purpose of procedures outlined in this manual is to ensure that;

- 1.2.1 All non-aviation petroleum products, whether indigenously produced in Indian refineries or imported, are received in accordance with the respective specifications laid down from time to time and they enter the marketing and distribution system in 'refinery good condition'.
- 1.2.2 They are stored and handled with due care so as to keep them 'on-specification' at all times.
- 1.2.3 They are delivered from various storage points by different modes of transportation in good condition and conforming to respective specifications laid down from time to time.
- 1.2.4 A well-defined system of quality control checks and documentation exists to achieve this purpose.

1.3 SCOPE

- 1.3.1 The procedures outlined in this manual are only the minimum requirements in order to ensure product quality of the non-aviation petroleum products. Therefore, the standard operating procedures with due regard to the safety in handling of petroleum products in general, have to be followed as laid down in the respective "**Safety and Operations Manuals**" and also in the "**Industry Manual on Acceptance of Product by Marketing Companies and Related Issues**". It is expected that such standard procedures will be followed at all times in addition to the instructions contained in the following pages which are with reference to quality aspects only.

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The procedures outlined in this manual are applicable to the entire Oil Industry (including Refineries, Pipelines and Marketing Companies) in Public Sector Undertakings, Joint Ventures and Private Sector, covering existing as well as future such networks

With the introduction of Bio Fuels i.e. Ethanol & Ethanol blended Motor Gasoline, Bio-Diesel and Bio-Diesel blended HSD etc., standard operating procedures as laid down in the respective manuals have to be followed to ensure that the product of requisite quality as per the laid down standards is delivered.

Similarly, the respective oil companies shall prepare the standard operating procedures with regard to their branded fuel storage, handling and distribution system for quality monitoring and shall ensure that the laid down procedure are also being followed.

The committee comprising "PSU Industry QC group" shall develop, update, and review the Industry Quality Control Manual as per the requirements under intimation to MOP&NG.

- 1.3.2** Any changes in the laid down procedures, before inclusion in the manual, shall be forwarded to MOP&NG for their advice / notice. Such changes shall be issued in the form of amendments, with serial number and the same shall be recorded in the amendment record of this manual.

1.4 QUALITY CONTROL ORGANIZATION

- 1.4.1** All those associated with the handling of petroleum products bear the responsibility to ensure that the product delivered is in a clean and good condition, meeting the relevant quality standards. Consequences of delivering "off-specification, contaminated and wrong product" are extremely serious.

1.5 QUALITY CONTROL RESPONSIBILITIES

- 1.5.1** Refinery shall carryout full specification test for all products as per BIS specification / contractual specification as applicable before release of the product. Subsequently during supply chain management, critical tests will be carried out by Marketing QC as specified in this manual to ensure product quality at every stage and before delivery to end user.
- 1.5.2** The responsibility for ensuring proper quality control at various Terminals, Installations, Depots etc., rests with the Operations Department. While the primary responsibility for implementation of quality control practices rests with the concerned officers of each location, the overall responsibility for quality control implementation will be that of the Location-In-charge. Each Terminal & Installation shall identify an officer as Quality Control Co-ordinator. In case of Depots; the Depot In-charge shall be the Quality Control Co-ordinator. Operations department shall maintain the list of such Quality Control Co-ordinator duly updated from time to time. Operations department shall ensure that adequate training is imparted to personnel handling petroleum products during receipt, storage and dispatch.
- 1.5.3** Operations Department / Controlling office, shall carry out Audits to ensure implementation of the laid down Quality Control procedures. Such Audits shall be carried out at least once in a year at each location and observations shall be recorded in Inspection guide covering the major areas of activities at the location. (**Appendix 17**).

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The audit team shall obtain status of compliance report / corrective action taken on the last QC inspection from the location and if not complied, record any impediments in carrying out compliance / corrective action as per the manualized QC procedures.

1.6 ROLE OF QUALITY CONTROL DEPARTMENT AND QUALITY AUDIT INSPECTIONS

The quality control department shall formulate quality control guidelines / policies required under **Clause 1.3** in coordination with the requirement of operations, sales department, etc.

Officers of the Quality Control department shall carry out quality control audit of storage points.

Such audits shall be carried out at least once in a year, and observations recorded in Quality Control Inspection guide covering the major areas of activities at the location. **(Appendix 17)**.

Location In-charge in association with QC Co-ordinator shall ensure to enlist location-specific quality procedures as applicable. Location In-charge and QC Co-ordinator shall also carry out self-Audit on half-yearly basis **(Appendix-17)** and shall ensure that suitable corrective actions are taken on the observed lapses.

Minimum 10% of locations shall be audited jointly once in a year on surprise basis by Operations Department and Quality Control department (Head Office) officials for better implementation of quality control procedures at the location.

The audit team shall obtain status of compliance report / corrective action taken on the last QC inspection from the location and if not complied, record any impediments in carrying out compliance / corrective action as per the manualized QC procedures.

In case of Common User Terminals (CUT), QC audit shall be conducted jointly once in a year by Industry QC team.

1.7 PRODUCT SPECIFICATION

1.7.1 Most of the Non-Aviation Petroleum products covered in this Manual are marketed to current BIS Specification **(Appendix 1)** and / or as per the requirements of the Gazette Notification issued by Government of India from time to time and / or guidelines issued by MOP&NG / Regulatory authorities from time to time.

In case of branded automotive fuels supplied by Oil companies, the fuel shall also meet the relevant BIS Specification.

1.8 DOCUMENTATION

1.8.1 All Quality control activities shall be duly documented in standard formats. The documents under normal circumstances shall be preserved for minimum three years.

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- 1.8.2** In case of any product quality failure, the relevant QC documents, test reports & failure investigation report shall be retained for five years or till the completion of the investigation /arbitration of the case whichever is later and shall be dispose-off only after the necessary approval from controlling department. Such documents shall be maintained in a separate file for records. The documents shall ensure the traceability to the relevant batch of the product for investigation in case of any deviation observed or for product failure. The samples shall be retained as per **Appendix 2A**.
- 1.8.3** Any amendments issued to Industry Quality Control Manual (IQCM) shall be incorporated in the IQCM and implemented by the location In-Charge.
- 1.8.4** All QC Circulars / Bulletins, IQCM, Industry Manual on Acceptance of Product, Industry Manual on Operations, Quality & Safety on Anhydrous Ethanol for automotive fuel, Biodiesel, Branded fuels, Special Products, etc. shall be available at Location.

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SECTION – 2

Product Quality and Specifications

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2.0 PRODUCT QUALITY AND SPECIFICATIONS

2.1 MANUFACTURING SPECIFICATIONS

- 2.1.1** All products mentioned in this manual are either manufactured in PSU / Private / JV Refineries or imported from foreign sources. It is therefore of utmost importance to ensure that all products enter the marketing system from indigenous refineries or from import sources with a quality level within the specification limits and / or as per the requirements of the Gazette Notification issued by Government of India and / or guidelines issued by MOP&NG / Regulatory Authorities from time to time. The concerned Location-in-charge shall be responsible for ensuring this.
- 2.1.2** Marketing Companies / Parallel Marketers shall keep sufficient margin in respect of sensitive characteristics of the product specifications while procuring product from Indian Refineries (PSU / Private / JV) or through import. This is in order to meet the required specifications of products on receipt at marketing storage and at final consumers' end as the product moves through different modes of transportation. Accordingly manufacturing specification shall be worked out separately for rail, road, sea and pipeline transportation.
- 2.1.3** Manufacturing Specification shall be worked out considering the various factors that include mode of transport, batch size, stringency of specifications, requirement for doping the bio-fuels, ageing and special customer requirements etc. Reproducibility of the test method or **ISO 4259** may also be considered for arriving at the manufacturing specifications. However, the requirements in **Appendix 19** shall be maintained at the manufacturing end for the products mentioned therein. Manufacturing specifications for the existing pipelines that are not covered in Appendix 19 and new upcoming pipelines shall be finalized on case to case basis to ensure quality of product at the receiving location. In absence of study, the quality cushion parameters will be the value having the highest cushion as per appendix 19.
- 2.1.4** In view of marketing of E-10 (10 % Ethanol Blended MS), the oil companies may be allowed the necessary adjustment for RON and other parameters like Distillation, Sulphur, Olefins, Aromatics & Benzene at the refinery end. The product (E-10) while leaving the terminal should be in line with the BIS specifications. Suitable modalities for such adjustments between Refineries and Marketing Terminals may be worked out by the Oil Industry.

2.2 MARKETING SPECIFICATIONS

- 2.2.1** Release of products from the storage point shall conform to the latest BIS specifications (**Appendix 1**) and / or Gazette Notification issued by Government of India / Regulatory Authorities from time to time.
- 2.2.2** Wherever BIS specifications do not exist for a product (for example Naphtha); respective Oil Marketing Company in consultation with the consumer shall draw the guaranteed specification.

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SECTION – 3

Receipt

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3.0 RECEIPT

3.0.1 RESPONSIBILITIES

Responsibilities for maintaining the quality of products are as given in **Appendix 18** of this Manual and in "Industry Manual on Acceptance of Product by Marketing Companies and Related Issues".

3.1 SAMPLING OF TANKS NOMINATED FOR RECEIVING PRODUCT

The sampling of tanks nominated for receiving product through various modes is described in respective clauses of this section.

3.2 RECEIPT BY OCEAN TANKERS - INDIGENOUS / IMPORTED

3.2.1 When a common line is used for receiving products, all tanks except the tank receiving the product, shall be positively segregated by suitable devices like DBBV (Double Blocked Bleed Valve) or by dropping spool pieces etc.

Before receipt of product is effected through ocean tanker, it shall be ensured that upper, middle & lower samples are drawn (jointly with surveyor/OMC wherever applicable) from the individual tank/s nominated for receipt. Density of UML samples shall be measured separately and record shall be maintained. If the densities of the UML samples are within $\pm 3.0 \text{ Kg/m}^3$ between the layers a composite sample shall be retained (**Appendix 2A**) till the post-receipt batch is established.

In case variation in density observed is beyond $\pm 3.0 \text{ Kg/m}^3$, Upper/Middle/Lower (UML) samples shall be individually drawn, labeled, sealed and retained (**Appendix 2A**) till the post-receipt batch is established.

In case of SKO if there is no fresh receipt in the tank for 7 days or more the top sample shall be tested for Flash Point and Density.

If a common line is used for receiving two different products where pigging is not resorted to, a suitable PCK plug shall be provided. The interface shall be handled in consultation with QC department.

If a common line is used for receiving two different grades of the same product, the interface shall be accommodated into the lower grade in line with **clause 3.3.5**.

3.2.2 Load port test report and after loading vessel composite test report shall be checked to ensure conformity to the required specifications. Load port shore tank(s) and tanker tank(s) samples (**Appendix 2A**) shall be collected from the master, and retained. The density recorded on the label shall be verified with the observed density at 15°C for the tanker tank samples. Discharge arrangements shall be adjusted so as to avoid any possible contamination.

3.2.3 Tanker tank ullages shall be taken. An all-level sample (bottom sample on need basis) from individual tanker tanks shall be checked for test A (**Appendix 2**) for conformity with load port shore tank/s and tanker tank/s densities. In the event the observations (**as per Test-A**) are found unsatisfactory concerned department shall be informed for further advice.

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Two sets of individual tanker tank samples shall be drawn and one set to be sent to laboratory for Pre-Discharge Test along with ullage report and load-port test report. The second set shall be retained as per **Appendix 2A**.

In case of multi-product receipt through Ocean tanker, the ullages shall be taken once again before the commencement of pumping of the next product and verified with the earlier recorded ullages to ensure that there is no inter tank migration / leakage.

3.2.4 PRE-DISCHARGE TESTS

If the above (**Clause 3.2.3**) observations are satisfactory, a proportionate (on volumetric ratio) composite of the tanker tank samples shall be prepared at laboratory and shall be tested for the relevant Pre-Discharge tests (**Appendix 3**). In case of imported cargo it shall be tested for batch formation test parameters at first port of call (unless specified otherwise in contract) and Pre-Discharge test at subsequent port/s. Discharge shall commence if the test results are satisfactory.

3.2.5 If the composite sample prepared at lab fails, then individual tanker tank samples shall be checked for the failing quality parameter/s. The individual tanker tanks for which the sample does not meet specification shall be isolated and only those tanks that meet the Pre-Discharge test requirements shall be declared fit for discharge. Discharge shall commence from the passing tanks, only after obtaining vessel's confirmation on positive segregation of the failed cargo tanks. Repeat joint samples for failed tanker tank/s may be tested to check any possibility of sampling error. The concerned department shall be intimated of the failure immediately.

3.2.5.1 In the event of any product quality failure noted, it shall be investigated immediately as per the procedure laid down in the Industry Manual on Acceptance of Products by Marketing Companies and in line with **Clause 4.6** of the IQCM.

In case of re-berthing (moving to outer anchorage and coming back) of vessel, PD Test shall be conducted again and the procedure as outlined in clause **3.2** shall be followed.

In case of change of jetty within the same port area, PD test need not be carried out again.

3.2.6 INTERFACE ACCOMMODATION

In case of Tanker receipt through MPPL, the limits given for interface accommodation in clause 3.3.5 shall be followed.

3.2.7 Before commencement of discharge, ship's manifold and line content shall be identified. In case of a product different from that to be discharged, the same shall be drained out in to slop tank of the tanker.

3.2.7.1 The product lying in the pipeline shall be verified for dormancy of more than one month. In case the product lying in the pipeline is dormant for a month or more, samples shall be drawn from both the ends of line and shall be subjected to monthly monitoring tests as per (**Appendix 2**). Additionally, copper corrosion test shall be carried out for MS, Naphtha and HFHSD. The records shall be maintained for earlier product in the line, line quantity and its density for the last operation.

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- 3.2.7.2** For the first half an hour, the tanker discharge shall be closely monitored for Test 'A' at jetty end / ship's manifold, to ensure the quality of product that is being discharged and record maintained.
- 3.2.7.3** During the first half an hour of product pumping, samples (white oils only) shall be taken from sampling cocks at jetty end / Ship's manifold every 10 minutes (at 00-10-20-30 Minutes) and Test 'A' (**Appendix 2**) done. From the shore end, immediately on pumping of product, running samples from the pipeline shall be tested for Test 'A' (**Appendix 2**) and compare with the density of previous line content. On completion of displacement of earlier line content, samples drawn for next half an hour (every ten minutes at 00-10-20-30 Minutes) to be subjected to Test 'A' (**Appendix 2**) and recorded. If this test is unsatisfactory (the variation in density is beyond $\pm 3.0 \text{ Kg/m}^3$ for white oil and $\pm 4.0 \text{ Kg/m}^3$ for black oils) at 15°C compared to batch/tanker tank], action to be taken as per **clause 3.2.7.5**. In case individual tanker tanks are having different densities, then the jetty end / shore end sample shall have a density of within (+) 3.0 Kg/m^3 ($+4.0 \text{ Kg/m}^3$ for black oils) of the highest and (-) 3.0 Kg/m^3 (-4.0 Kg/m^3 for black oils) of the lowest density of the tanker tank(s).
- 3.2.7.4** These checks shall be chronologically recorded in the shore end and jetty end tanker log book (**Appendix 9**). Test 'A' (**Appendix 2**) shall be done every hour during the pumping and chronologically recorded thereafter.
- 3.2.7.5** The pumping shall be stopped if density variation is found beyond the limit mentioned in **Clause 3.2.7.3**. The pumping shall be resumed only after the reason for the variation has been established and necessary corrective action taken.
- 3.2.8** Two liters retention sample each shall be taken both from jetty end and shore end during commencement, middle and end of the discharge, sealed, labeled, time of sampling recorded on label and retained until quality of the product after receipt is established (**Appendix 2A**). In case of density variation, **Clause 3.2.7.3** shall be followed.
- 3.2.8.1** For Black oil products, test A shall be done every hour during pumping and shall be chronologically recorded in the shore end and jetty end tanker log book (Appendix 9). If this test is unsatisfactory [the variation in density is beyond $\pm 4.0 \text{ Kg/m}^3$ at 15°C compared to batch/tanker tank], action to be taken as per **clause 3.2.7.5**. Samples shall be retained as per **clause 3.2.8**.
- 3.2.9** Sampling facility on receipt pipeline shall be so located that the samples can be drawn from the same location of the pipeline. Facility to collect sample from the pipeline / pipeline manifold shall be available at the jetty end and inside installation premises.
- 3.2.10** On completion of transfer and after allowing a minimum settling time of one hour, a Top, Upper, Middle, Lower and Bottom samples shall be drawn from tank and retained (**Appendix 2A**). T/U/M/L/B samples to be tested individually for Test 'A' (**Appendix 2**) and recorded in the respective log book. The above samples shall be sent separately along with Test 'A' observations to the laboratory. The Laboratory shall also carry out Test 'A' and a composite of Upper, Middle and Lower samples shall be subjected to batch formation test (**Appendix 15**). If the density variation of UML is more than $\pm 3.0 \text{ Kg/m}^3$ ($\pm 4.0 \text{ Kg/m}^3$ for black oils) between any two layers, batch formation test shall be carried out individually layer-wise. The product from the tank shall be released only if the laboratory confirms that the product meets specification requirement in respect of the tests carried out.

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In case of Kerosene, additionally Flash Point test also shall be carried out on top sample. A composite sample of Kerosene shall be retained for three months and record maintained as per **Appendix 12**.

In case of multi product discharge of tanker through a single pipeline, for Motor Gasoline, additional Test 'J' (**Appendix 2**) shall be carried out on Bottom sample of tank and for HSD, additional Test 'K' (**Appendix 2**) shall be carried out on Top sample of tank.

3.2.11 RECEIPT BY BARGE

3.2.11.1 If dedicated/Single product barges are used for product receipt, following QC procedure shall be followed:

Before receipt from barge, a UML composite sample from tank identified for receipt shall be collected and retained till quality of the product in the tank after receipt from barge is established.

Before commencement of discharge, 2 litres of composite of all level samples from all barge tanks shall be jointly drawn by all the stake holders, sealed, labeled and retained.

During receipt from Barge, 2 litres each of initial and final line samples at Barge end and receiving location end shall be jointly collected and retained by all the stake holders.

Above samples shall be retained (**Appendix 2A**) till the product quality is established after unloading of Barge in the receiving tank. After receipt, the corresponding storage tank Upper, Middle and Lower samples shall be individually subjected to Test 'A' (**Appendix 2**) and the observations recorded before commencement of delivery.

3.2.11.2 In case of receipt by non-dedicated barges carrying multiple products, procedure given in **clause 3.2.1 to 3.2.10** as applicable shall be followed.

3.3 RECEIPT BY PIPELINES TRANSFERS

3.3.1 SAMPLING AND QUALITY CERTIFICATION / CHECKS

3.3.1.1 At the dispatching location, before a product transfer is effected through a multi-product pipeline or a dedicated pipeline / local dedicated pipeline, it shall be ensured that the tank nominated for transfer is having homogeneous product, meeting manufacturing specifications in case of transfer from refinery to multi product pipeline and BIS specification for others. For specific instances wherein product pumped through multi product pipelines is required to be moved by coastal or other mode as an input to other pipeline origin, manufacturing specification will be mutually decided amongst refinery pipeline and marketing. Test Report of the nominated tank for the dispatch shall contain UML density separately. Upper, Middle and Lower samples from the individual tank/s nominated for transfer shall be jointly drawn by Refinery/ Marketing/ Pipeline as applicable as per **Clause A-2 of Appendix 18**.

Density of UML samples shall be checked separately and recorded for the tank/s. If the densities of the samples are within the tolerance limits a composite sample shall be retained (**Appendix 2A**) till the batch is established by the receiving location.

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In case density variation between any two layers is beyond (+/-) 3.0 Kg/m³ (± 4.0 Kg/m³ for black oils), layer wise test reports shall be made available. Upper, Middle and Lower (UML) sample shall be individually drawn (as applicable), labeled, sealed and retained (**Appendix 2A**) till the post-receipt batch is established.

3.3.1.2 At the receiving location, before receipt of product is effected through a multi-product pipeline or a dedicated pipeline / local dedicated pipeline, it is to be ensured that Upper, Middle and Lower samples are jointly drawn by Refinery/Marketing/Pipeline (as applicable) from the individual tank/s nominated for receipt. (**Clause A-4 of Appendix 18**). Density of UML samples shall be checked separately and recorded for the tank/s. If the densities of the samples are within ± 3.0 Kg/m³ (± 4.0 Kg/m³ for black oils) between the layers, a composite sample shall be retained (**Appendix 2A**) till the batch is established by the receiving location.

In case variation in density observed is beyond ± 3.0 Kg/m³ (± 4.0 Kg/m³ for black oils) in such cases, Upper/Middle/Lower (UML) sample shall be individually, labeled, sealed and retained (**Appendix 2A**) till the post receipt batch is established.

In case of SKO if there is no fresh receipt in the nominated tank for 7 days or more ensure that the top sample is tested for Flash Point and Density.

3.3.1.3. Details of the earlier product in pipeline shall be maintained with respect to type of product, its density and line quantity. The product lying in the pipeline shall be verified for dormancy of more than one month. In case the product lying in the pipeline is dormant for a month or more, samples shall be drawn from both the ends of line and shall be subjected to monthly monitoring tests as per (**Appendix 2**). Additionally, copper corrosion test shall be carried out for MS, Naphtha and HFHSD.

3.3.2 For the first half an hour of each product being pumped through a multi-product pipeline or a dedicated pipeline / local dedicated pipeline, samples shall be drawn from the pipeline near the manifold at intervals of ten minutes (at 00-10-20-30 Minutes) and subjected to Test 'A' (**Appendix 2**) for each batch / tank and recorded (**Appendix 10**). If the test results are satisfactory (**Clause 3.2.7.3**) then, the interval of sampling shall be every hour after that. In case, the density variation is outside the permissible limits, then the pumping shall be stopped, reasons for the variation established, corrective action taken and then pumping could be resumed.

Whenever pumping of the product is stopped for more than one hour, and then restarted, the procedure of the sampling during the first half an hour and then hourly sampling shall be followed.

Two litres retention sample shall be taken, both from dispatching end and receiving end, during commencement, middle and end of the product transfer for each batch / tank, sealed, labeled and retained (**Appendix 2A**) until quality of the product after receipt is established and record maintained. The sampling points shall be as per **Clause A-6 of Appendix 18**.

3.3.3 Sampling and confirming product quality of nominated tank/s for transfer of product is described in **clause no. 3.3.1.1**.

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3.3.4 When a transfer takes place from a Refinery to Marketing tank(s) through dedicated pipeline, after receipt Batch Formation tests (excluding RON of MS) shall be carried out before release of product. Before receipt tank samples shall be retained (**Appendix 2A**). Any deviation with respect to carrying out Batch Formation tests or in case of frequent no. of receipts in a day, the requirement of Batch formation test shall be decided by concerned Oil Company, in consultation with Quality Control Department.

3.3.5 When transfers take place through a multi-product pipeline, care has to be exercised for correct interface cutting and accommodation of interface as per following table.

Serial Number	The interface of	Product tank to Accommodate Interface	Interface Quantity (Front + Rear) Acceptable (%) of product received in the tank *
1.	MS BS IV & NAPHTHA	MS BS IV	0.5
2.	MS BS VI & NAPHTHA	MS BS VI	0.5
3.	NAPHTHA & SKO/PCK @	NAPHTHA	3.0
4.	MS BS IV & PCK@	MS BS IV	1.0 2.0 (See Note-1)
5.	MS BS VI & PCK @	MS BS VI	1.0 2.0 (See Note-1)
6.	MS/PCK (Rich mixture of PCK preferably 90 - 95 % by Vol. of PCK) **	HSD BS IV/ VI **	++
7.	SKO/PCK & ATF	SKO/PCK	\$
8.	HSD BS IV & PCK@	HSD BS IV	4.0
9.	HSD BS VI & PCK @	HSD BS VI	4.0
10.	HFHSD & SKO/PCK	HFHSD	\$
11.	HSD BS IV/ BS VI & HFHSD	HFHSD	\$
12.	LDO & FO	FO	3.0
13.	MS BS VI & MS BS IV	MS BS IV	No limit
14.	HSD BS VI & HSD BS IV	HSD IV	5 **
15.	MS BS IV/VI & NAPHTHA	NAPHTHA	\$

* The figures indicated, as interface percentage acceptable grade wise, are directional. The interface is approximately equal proportion of both the products. The product earmarked for multi-product pipeline transfer shall meet manufacturing specification wherever applicable.

** Subject to both the grades meeting manufacturing specification with respect to density.

@ Pipeline Compatible Kerosene (PCK) to have 42 ppm max Sulphur for BS-IV & 9 ppm max for BS-VI grade products.

++ Based on report of Task Force 5 appointed by MOP&NG. The interface generated can be temporarily stored in pipeline locations in separate Interface tanks. The content from this interface storage tank can be transferred to marketing storage tanks by maintaining the following:

- QC advice based on Lab Blend on case to case basis.
- Appropriate online dosing facility should be available for injection from interface tank.

\$ Case to case basis in consultation with QC Department.

Note-1: Subject to 91.6 min. RON in MS and 230°C max FBP of PCK.
In case of higher FBP of PCK, respective pipelines/QC dept. will be consulted.
However, refineries shall offer PCK of 230°C max FBP and 9 ppm max Sulphur by 01.01.2020 (BS VI scenario)
The record of all the Interface disposals / management shall be maintained.

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3.3.6 On completion of transfer the procedure given in **Clause 3.3.6.1** for MPPL, **Clause 3.3.8** for dedicated/local dedicated and **Clause 3.3.9** for SKO shall be adopted and samples shall be retained (**Appendix 2A**).

3.3.6.1 Tanks in which product/s along with interface is accommodated, a sample shall be drawn from Top, Middle and Bottom (Bottom sample to be drawn from a height of 15 cms from the bottom of the tank or above the level of water that may be present in the tank) after receipt and tested for density individually to check homogeneity of the product. If the densities are within permissible limit $\pm 3.0 \text{ kg/m}^3$ ($\pm 4.0 \text{ Kg/m}^3$ for black oils) a TMB composite sample shall be prepared by lab and tested for batch formation test. If density variation is more than $\pm 3.0 \text{ Kg/m}^3$ ($\pm 4.0 \text{ Kg/m}^3$ for black oils) at 15°C between any two layers, it shall be investigated and reasons for density variation to be recorded in batch control Log book and layer-wise sample shall be subjected to batch formation test. The product from the tank shall be released only if individual layer samples meet the Batch Formation test requirement.

In case of Kerosene, additionally Flash Point test shall also be carried out on top sample & recorded in BF test report. A composite sample of Kerosene shall be retained for three months and record maintained as per **Appendix 12**.

For Motor Gasoline, additional **Test 'J' (Appendix 2)** shall be carried out on Bottom sample from tank and for HSD, additional **Test 'K' (Appendix 2)** shall be carried out on Top sample. Test results of 'J' and 'K' shall be recorded in BF test report.

3.3.7 During receipt through Local dedicated / dedicated pipelines, samples from the pipeline near the manifold shall be drawn and observations recorded as per **Clause 3.3.2**.

3.3.8 When a transfer takes place between Marketing Divisions of OMC through dedicated/local dedicated pipeline, representative sample from the tank(s) shall be jointly drawn as per **clause 3.3.1.1**, sealed and retained as per **Appendix 2A**. A valid test report from the Marketing certified tank(s) with UML densities shall be obtained for support before commencement of transfer. After receipt of the product, a batch control log shall be maintained as per **Appendix 13**. After allowing minimum settling time of one hour, UML samples shall be checked for Test A and records maintained. The product shall be released if individual UML densities are within $\pm 3.0 \text{ Kg/m}^3$ ($\pm 4.0 \text{ Kg/m}^3$ for black oils).

However, if product is transferred from tank/s having different densities, the density range shall be (+) 3.0 Kg/m^3 ($+4.0 \text{ Kg/m}^3$ for black oils) of the highest density and (-) 3.0 Kg/m^3 (-4.0 Kg/m^3 for black oils) of the lowest density, subject to meeting BIS specifications in all cases. If density variation is more than $\pm 3.0 \text{ Kg/m}^3$ ($\pm 4.0 \text{ Kg/m}^3$ for black oils) between any two layers, the composite sample of UML shall be subjected to batch formation test. The product from the tank shall be released only if sample meets Batch formation test requirement.

3.3.9 In case of Kerosene receipt, additionally flash point test also shall be carried out on top sample. A composite sample of Kerosene shall be retained for three months and record maintained as per **Appendix 12**.

3.3.10 When stock transfer is effected from Other Oil Marketing Company through local dedicated pipelines, such transfers shall commence from certified stock with any one of the following QC certificates.

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- i. Batch formation test certificate of the dispatching tank where the receipt in tank is through Ocean tankers or multi product pipeline.
- ii. Batch formation test certificate of the Source location from where the receipt in tank is through TW/TT/dedicated/local dedicated pipeline.
- iii. Refinery test report if the dispatching location is receiving product directly from the Refinery through dedicated line.

UML samples shall be jointly taken from the nominated dispatching tanks & receiving tanks, Test 'A' carried out and record maintained. Samples shall be retained as per **Appendix 2A**. The density variation of such stock during transfer shall not be beyond ± 3.0 Kg/m³ (± 4.0 Kg/m³ for black oils) at 15°C at any time with reference to the density range of the dispatching tank. Samples shall be drawn and observations recorded as applicable in **Clause 3.3.2**.

3.3.11 In case Inter tank, product transfer is effected due to operational reasons, after completion of the transfer, an Upper, Middle and Lower (UML) sample shall be drawn (from receiving tank and individually subjected to Test 'A' (**Appendix 2**) and record to be maintained. UML composite sample shall be retained (**Appendix 2A**). The batch control log shall be maintained (**Appendix 13**).

In case of Kerosene receipt, additionally Flash Point test also shall be carried out on top sample. A composite sample of Kerosene shall be retained for three months and record maintained as per **Appendix 12**.

The product from the tank shall be released based on the tests carried out at receiving location (i.e. Test A for all products and additionally Flash Point in case of SKO).

3.3.12 In case of product quality failure, **Clause 4.6** and **Annexure 1** shall be applicable.

3.3.13 Locations using same line for receipt of different generations of fuel (i.e. BS IV & BS VI) of the same grade should take care for proper displacement of the line content and the interface generated to be accommodated in lower generation of product (i.e. BS VI line content shall be downgraded into BS IV). Necessary record of such operation to be maintained. Generation of interfaces will depend on various factors like line pressure, flow rate, pipeline diameter, tank head as well as trapping of some intermediate product in lines. Since these factors will vary from location to location, there is a need to develop location specific SOP for handling different product grades through common facilities and disposal of interface. Wherever required, QC group may render necessary assistance for preparing such SOPs.

3.4 RECEIPTS BY TANK-WAGONS

3.4.1 The seals of the tank-wagon shall be ensured to be intact. **Clause no. 3.3.13** is applicable in case common decantation line is used for BS IV and BS VI grade fuel at location.

3.4.2 A sample from individual white Oil tank-wagons shall be drawn and checked for colour visual for grade identification. However, Test 'A' (**Appendix 2**) to be carried out for every fifth tank wagon. It shall be ensured that the relevant batch formation test report (**Appendix 15**) shall be obtained for support and batch control log shall be maintained (**Appendix 13**).

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The density recorded shall not vary by more than $\pm 3.0 \text{ Kg /m}^3$ ($\pm 4.0 \text{ Kg/m}^3$ for black oils) from the batch formation report density of the storage tank from which the tank wagon has been filled.

For SKO receipts, it shall be ensured that the relevant Flash Point information from the loading location is available before commencement of discharge. The density of the top sample of the individual tank-wagon shall be checked and compared with the dispatch density at 15°C and recorded. If variation is beyond permissible limits the product shall be segregated and concerned department shall be informed.

- 3.4.3** When taking the dip, presence of water shall be checked and recorded.
- 3.4.4** After T/W receipt, corresponding storage tank Upper, Middle and Lower samples shall be individually subjected to Test 'A' (**Appendix 2**) and the observations recorded before commencement of delivery. Simultaneous receipt and dispatch from the same tank is not permitted. If the density variation of UML is more than $\pm 3.0 \text{ Kg/m}^3$ between any two layers, density shall be closely monitored at filling point during dispatches and record maintained.
- 3.4.4.1** Location receiving Kerosene by Rail / Road shall carry out flash point & density tests on top sample of the tank after each receipt. Subsequently density & flash point test shall be carried out in line with **Clause 4.1.5** and record shall be maintained. A composite sample from this kerosene tank shall be retained for a period of one month (**Appendix 2A**). In the event the flash point does not meet the specification requirement, concerned department and / or controlling office shall be intimated immediately for further necessary action.
- 3.4.5** Records shall be maintained for observations and corrective actions on **Clauses 3.4.1, 3.4.2, 3.4.3** and **3.4.4**.
- 3.4.6** When 3 or more T/W of each grade are received, sample should be drawn from initial, middle and last wagons. When less than 3 T/Ws of each grade are received, sampling are to be done from individual wagons. Such samples shall be retained for a period of 15 days (**Appendix 2A**) and record to be maintained.
- 3.4.7** Decantation Hoses shall be colour coded suitably for class A & class B product for identification.

3.5 RECEIPT BY UNCONNECTED TANK-WAGONS

- 3.5.1** On receipt of an unconnected tank-wagon, representative samples shall be taken and sent to the nearest laboratory of the Industry for batch formation tests for identification of the product.
- 3.5.2** The laboratory will advise the test results to the controlling office and location. The location will then, depending upon the test result, decant the product if facilities are available for storing it. In case, facilities are not available for storing it, then they shall await instructions from the controlling office.

3.6 RECEIPT BY TANK TRUCKS

- 3.6.1** The locks of the tank-truck shall be ensured to be intact.

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3.6.2 Procedure given in **Clauses 3.4.2, 3.4.4 and 3.4.5** is applicable with the need to check each compartment for presence of water while taking the dip. After draining sufficient quantity (approx. 20 lit) of the product from the pipeline of all compartments of each tank truck, a bottom sample from all compartments shall be drawn and Test 'A' shall be carried out. The density variation shall be within $\pm 3.0 \text{ Kg/m}^3$ ($\pm 4.0 \text{ Kg/m}^3$ for black oils) of the dispatch density. All these checks are to be recorded (**Appendix 4**). If variation is beyond permissible limits the product shall be segregated and concerned department shall be informed.

3.7 RECEIPT BY BARRELS

3.7.1 The seals on each barrel shall be checked.

3.7.2 Any sweating / leaking barrels shall be identified and action taken to transfer the product into sound barrels.

3.7.3 Samples on cube root basis shall be drawn. (For e.g. if there are 20 barrels, samples from randomly selected 3 barrels shall be taken) and subjected to Test 'C' (**Appendix 2**). The result of the observations and the corrective action taken shall be recorded in a register as per format given in (**Appendix 5**).

3.7.4 In case the result is unsatisfactory, individual barrels shall be subjected to Test 'C' (**Appendix 2**).

3.7.5 Barrels shall be kept on wooden planks in a covered under shed with proper ventilation. Barrels shall be stored horizontally with bungs at 3 o'clock - 9 o'clock position.

3.8 RECEIPT OF ADDITIVES / DYE / MARKER FROM VENDOR

3.8.1 Receipt of the barrels of Additive / dye / marker consignment from vendor at primary location shall be accepted in conformity with the supplier test report against tender / agreed technical specification. All level random samples on cube root basis from the barrels shall be drawn and checked for density. It shall be compared with technical specification / supplier's batch test report of the additive / dye / marker. Any variation beyond 2.0 Kg/m^3 at 15°C shall be investigated before acceptance of the consignment.

3.8.2 Samples drawn as per **Clause 3.8.1** shall be made composite (3 x 1 litre) properly labeled, jointly signed with representative of the vendor and sealed. One sample will be retained by location, second sample shall be handed over to the vendor and the third sample shall be subjected to laboratory test against the technical specification of the additive. Any deviation on observations as per **Clauses 3.8.1 and 3.8.2** shall be dealt as per tender condition. On conformity with the requirement the retained samples shall be bulked with the same batch of additive in barrels for use.

3.8.3 Onward dispatches to upcountry locations from the certified batch (**Clause 3.8.2**) shall be accompanied by both the test reports. Receiving location shall accept the barrels after checking the seals. Location shall segregate the batch and use on "first in first out" basis.

3.8.4 The barrel shall be handled in line with the standard laid down practice for handling barrels.

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3.8.5 Location shall maintain daily stock logbook for additive / dye / markers. It shall be reviewed along with the stock loss by the location in-charge.

3.9 BATCH NUMBER

3.9.1 A Batch Number shall be assigned for traceability of each receipt of product through multi-product pipeline / dedicated pipeline /local dedicated pipeline/ Ocean tanker /Barges/ Tank Wagons / Tank Trucks /Inter Tank Transfer in a location.

Batch formation test (**Appendix-15**) shall be carried out after each receipt of product through multi-product pipeline and ocean tanker.

In case of the receipt through dedicated pipeline/local dedicated pipeline /Barges / tank wagon / tank truck/inter tank transfer, batch formation test is not mandatory.

In case of the receipt of more than one tank truck/tank wagon in a particular storage tank, batch number shall be assigned combining all receipts but before delivery. There is no need of assigning separate batch number for every tank truck/tank wagon receipt without any delivery from the storage tank.

3.9.2 The cases, where post receipt batch formation test is not mandatory, the receiving location will maintain the batch control log book, with batch formation test report of the dispatching location for reference (**Appendix-13**).

3.9.3 Batch number shall consist of Product Code/ Mode of receipt (Ocean Tanker/ PL/ TW/ TL/ BR/ etc.)/ Name of the Organization/ Code letter of location originating the Batch/ Tank Number/ Serial Number of the batch established in the tank since last cleaning.

Example-1) The batch number **HSD/TW/IOC/TAH/3/2** shall indicate that **HSD** of **IOC** received through Tank Wagon has been stored in Allahabad Terminal tank number 3 as the second batch after tank cleaning.

Example-2) In-case of inter tank transfer from tank no.3 to tank no.7, the batch number of tank no. 7 shall be **HSD/TW/IOC/TAH/3/2-7/4**.

3.9.4 After every tank cleaning, the batch number shall revert to 1 (One).

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Storage

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Disposal of Product used for Grade change over	9
Product Quality Failures	9

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4.0 STORAGE

4.1 FACILITIES (MAIN)

4.1.1 Above ground tanks with saucer bottom shall have minimum 25 mm diameter water draw off line at the lowest portion of the tank.

4.1.2 All white oil tanks may be provided with 100 mesh filter strainers before inlet of the tank. In case of black oil tanks inlet may be provided with 60 mesh filter strainers. **(Clause 4.2.1)**

Sampling facility shall be provided on the receiving line, before the receiving tank valve, to draw line samples at locations receiving product by tanker and / or pipeline. Sampling facility shall be provided at the pipeline manifold at the dispatch end (i.e. jetty / delivery manifold / custody transfer point at refinery / pipeline transfer) as well as the receipt end.

Utilization of same line for different generations of fuel of the same grade should be avoided. In case of the operational constraint, proper SOP should be developed for carrying out such type of operation in consultation with QC department to maintain the quality of product. The interface shall be downgraded into lower generation of the grade and records are to be maintained.

4.1.3 Positive segregation shall be ensured using appropriate devices in the pipelines whenever a common manifold is used. The efficacy of such devices shall be periodically checked.

4.1.4 Storage tanks shall be cleaned once in every five years or more frequently, depending on the need, like change of product, sludge formation etc. However, with the specific approval of Quality Control Department, cleaning of the tank may be initially extended for a maximum period of three years and subsequently by another two years. During the extension period tank suction level sample shall be checked for **Test –B** and datum plate sample for appearance on monthly basis and records shall be maintained.

4.1.5 After completion of second extension, the tank shall not be operated until it is cleaned. Storage tank cleaning data as per **Appendix-8** shall be maintained. Date of tank commissioning / cleaning and the due date of next cleaning shall be painted on or near the manhole cover along with the information on the extensions obtained. The date of final boxing up of the tank shall be taken as the Tank Cleaning Date. However, in case of any time lag between the date of completion of physical cleaning and date of boxing up, the physical verification of the tank must be conducted just before boxing up.

For Under-ground tanks, details of tank cleaning shall be displayed on a suitable display board near the tank. UML samples in case of vertical tanks or all level samples in case of horizontal tank drawn after receipt of first parcel in a newly commissioned tank / after Tank cleaning / after grade change over shall be sent to the laboratory for batch formation test **(Appendix-15)**. Copper corrosion test shall be carried out additionally on a bottom sample of HFHSD storage tanks after cleaning.

The product from the tank shall be released only after the product meets specification requirement in respect of recommended parameters.

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- 4.1.6** The flash point monitoring of SKO tanks shall be done as per **clause 4.4.3**.
- 4.1.7** FO / LDO shall be circulated within the tanks fortnightly for at least two hours to ensure the homogeneity of the product, when there is no fresh receipt into the tanks during this period. At the Locations where MS / HSD along with any interface is being received through multi-product pipeline, it shall be ensured that the product in the tank is made homogeneous by providing adequate facility. Such operations shall be recorded in a register.
- 4.1.8** For bunker fuels storage and product certification MARPOL, DG Shipping and other applicable guidelines in vogue shall be followed.
- 4.1.9** In case of In-tank blending of Ethanol in MG and Bio-Diesels in HSD, storage tank shall have proper circulation facility. Homogeneity of product shall be ensured by checking density of TMB sample. The density variation shall not be more than $\pm 3.0 \text{ kg/m}^3$ between any two layers.

4.2 OTHER FACILITIES

- 4.2.1 Strainers:** All box strainers / line strainers shall be opened at least once in three months and internally cleaned. The date on which the strainer had been last cleaned shall be painted on the body of the strainer and record of cleaning shall be maintained.
- 4.2.2 Hoses:** Hoses when not in use shall be properly stored, with their ends blanked. Hoses on black oil service shall be earmarked and shall not be used for white oils.

4.3 COLOUR CODING

- 4.3.1** The pipelines in Marketing Locations (Including marketing set-up inside Refinery) shall be colour coded at definite interval to indicate the product being carried.

The colour coding shall constitute the name of the product written in between two bands of 100 mm width on each side preceded by an arrow along the flow direction. Band with product name shall be painted at a gap of every 20 meters for the pipeline length up to 1 KM, gap of every 50 meters for pipeline length up to 2 KM and gap of every 100 meter for pipeline length beyond 2 KM. The band shall also be painted on both sides of the valves. The colour coding of Band & arrow shall be **as per clause 4.3.2 & 4.3.3**.

The base colour of the white oil tanks, pipelines shall be of Aluminum or off white or as per M&I / Operation guideline/ Defence requirement. Black oil tanks, pipelines shall be preferably painted black or as per M&I/Operation Guidelines/ Defence requirement.

The name of the product carried shall be written between the two bands in **white letters** for black oils and **black letters** for white oils lines along the direction of flow. A gap of approximately two letter size shall be maintained between the band & product name at both ends as well as between band and start of arrow. 300 mm (12 inches) long arrow shall be painted after each band on the pipeline with respective colour code in the direction of flow.

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The size of letters for product name, width and length of arrow for various diameter pipelines shall be as under:

Pipeline Diameter (inch)	Letter Size of Product Name (inch)	Width of the Arrow (inch)	Length of Arrow (inch)
Up to 6	2	2	12
Above 6 up to 15	4	2	12
Above 15	6	4	12

In case of HFHSD, additional Blue Band of 100 mm shall be painted near the arrow. The distance of Blue Band shall be 100 mm from existing Band towards arrow side.

Whenever a stretch of pipeline is carrying different grades of the same products (e.g. MS BS IV & BS VI) the same shall be suitably identified on the pipeline as shown in **clause 4.3.3.**

The entire stand point (in tank wagon gantry) and entire loading arm (in case of tank lorry filling gantry) shall be painted with color code of the respective product, instead of color bands to ensure better visibility and avoid wrong loading/decantation.

The colour code for branded fuel shall be decided by respective oil companies for suitable identification of the pipelines.

In case of any change in use of pipeline with respect to product, relevant colour coding shall be changed immediately.

4.3.2 The recommended colour coding for band and arrow shall be: -

PRODUCT	COLOUR OF BANDS	COLOUR OF ARROW	ISC NO.*
MS 91 BS IV	DEEP ORANGE	BRILLIANT GREEN**	591
MS 95 BS IV	SIGNAL RED	BRILLIANT GREEN**	537
MS 91 BS VI	DEEP ORANGE	DEEP ORANGE	591
MS 95 BS VI	SIGNAL RED	SIGNAL RED	537
ETHANOL	DARK VIOLET	DARK VIOLET	796
HSD BS IV	OXFORD BLUE	BRILLIANT GREEN**	105
HSD BS VI	OXFORD BLUE	OXFORD BLUE	105
SKO	GOLDEN YELLOW	GOLDEN YELLOW	356
HFHSD	OXFORD BLUE	OXFORD BLUE	105
FO, LDO	ALUMINUM / OFF WHITE	ALUMINUM / OFF WHITE	---
NAPHTHA	DARK BROWN	DARK BROWN	412
BIO DIESEL	TURQUOISE BLUE	TURQUOISE BLUE	102

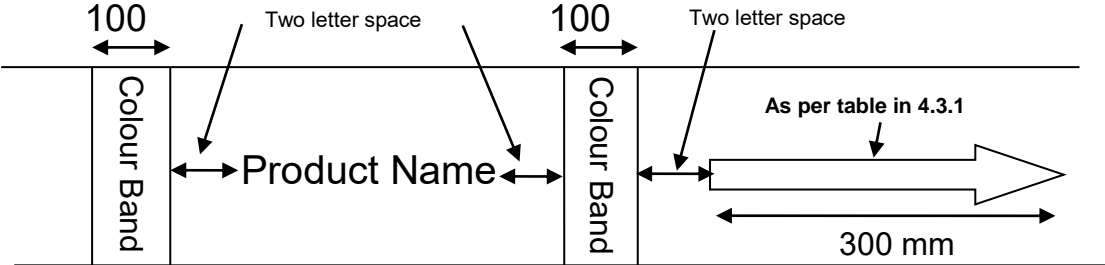
* Refer - Indian Standard Colour No. of IS 5:2007

** IS Colour Code No. for Brilliant Green is 221 as per IS 5:2007.

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4.3.3 TYPICAL PIPELINE COLOUR CODING

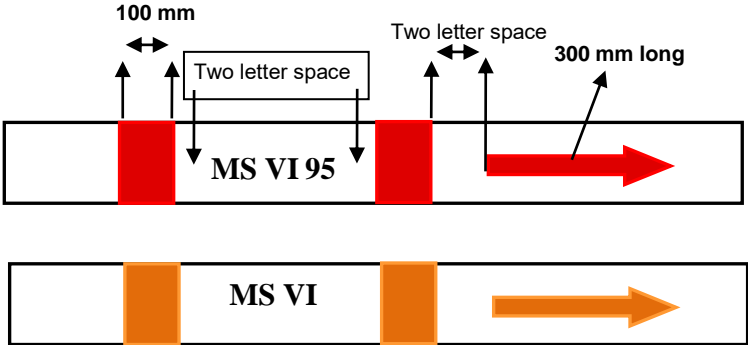


(All dimensions in mm)

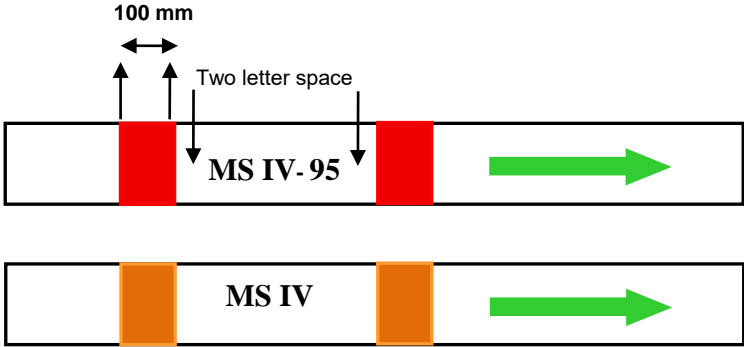
The locations where camouflage of product pipelines is required, same shall be done as per statutory guidelines with bands, arrow etc. as per **Clause 4.3.3**.

Colour coding chart for different generation grades of MS/HSD are illustrated in the section.

MS Bharat Stage VI



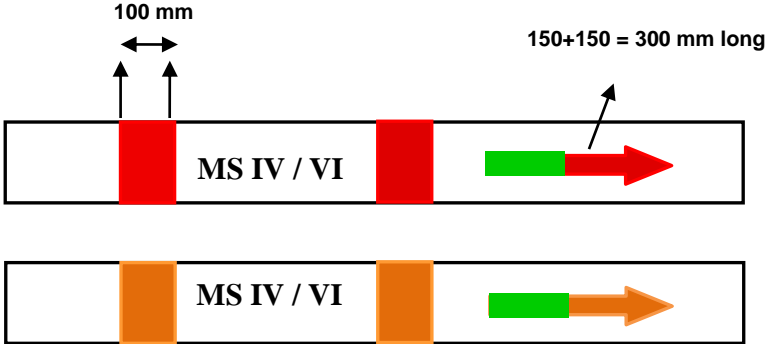
MS Bharat Stage IV



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MS BS IV & BS VI Common line



HSD Bharat Stage VI



HSD Bharat Stage IV



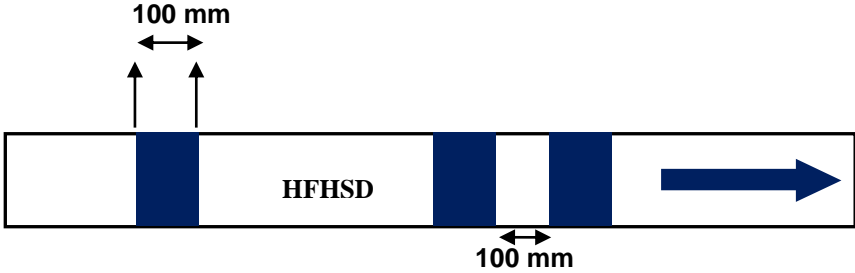
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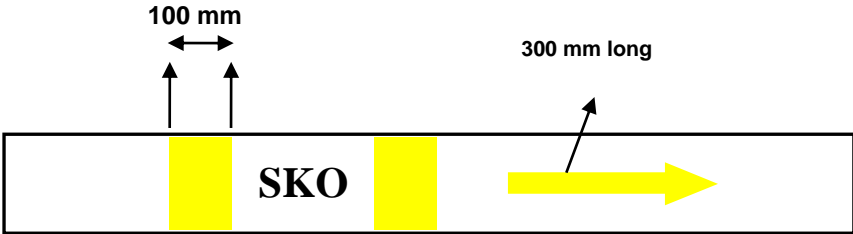
HSD BS IV & BS VI Common line



HFHSD



SKO



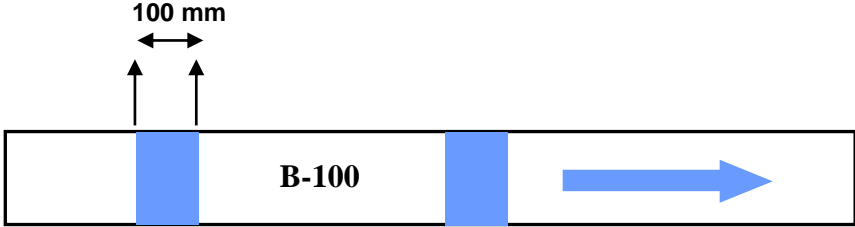
Ethanol



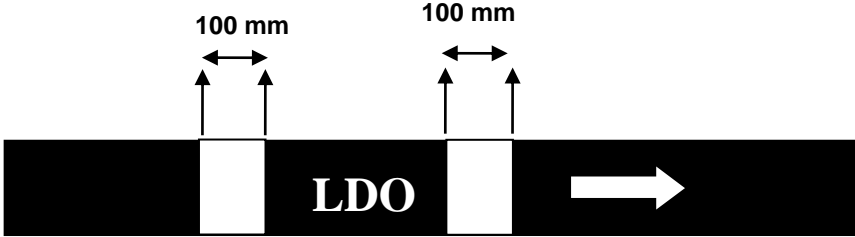
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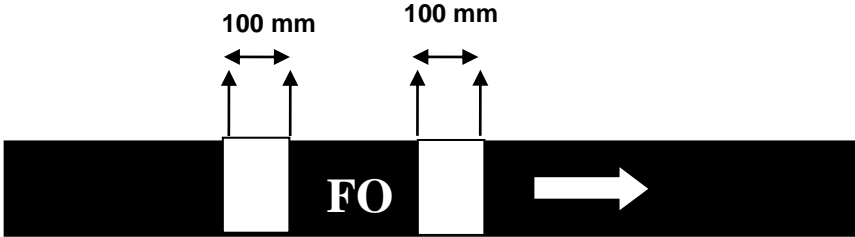
Bio-Diesel (B-100)



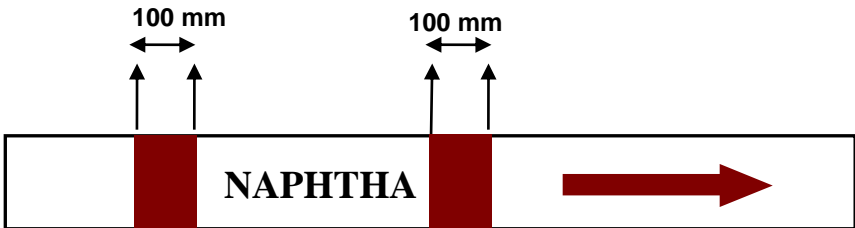
LDO



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NAPHTHA



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4.4 QUALITY MONITORING

4.4.1 MONTHLY MONITORING

At locations where tank sample is not tested for batch formation test (as it depends on mode of receipt and not mandatory) a composite sample (UML composite sample from the vertical tank / an all-level sample from the horizontal tank) drawn from the stock of all tanks shall be subjected to monthly monitoring tests.

The locations while sending the samples shall indicate density at 15°C for all products and also flash point for SKO tank-wise.

MS all grades shall be tested for Test 'D', Naphtha for Test 'F', SKO for Test 'G', HSD all grades and LDO for Test 'H' and FO for Test 'I' (**Appendix 2**). Copper strip corrosion test shall be carried out fortnightly on a bottom sample from HFHSD tanks. (With introduction of HFHSD, the nomenclature Navy HSD is no longer in use.)

Monthly Quality Monitoring test is also applicable for Ethanol and Bio-Diesel tanks, Ethanol Blended MS, Bio-Diesel blended HSD and Branded fuels. Supplies can be continued from the tank under monthly monitoring.

In case of locations where tank samples are tested for batch formation test, if there is no fresh receipt in a particular storage tank for 30 days, sample from such tank shall be sent for monthly monitoring tests and records maintained.

Similarly, In case the product lying in the pipeline is dormant for 30 days or more, samples such drawn shall be subjected to monthly monitoring tests (**Appendix 2**). For cross country pipelines, samples shall be taken at a suitable place or on commencement of pumping of product. Suitable decision shall be taken based on test results.

A corresponding set of the monthly monitoring samples shall be retained till receipt of the test report and record maintained (**Appendix 2A**). All the monthly monitoring test reports shall be obtained as early as possible and retained.

4.4.2 PRODUCT RECERTIFICATION

When no fresh product is received for three months into a tank, UML composite sample from the vertical tank / an all-level sample from the horizontal tank shall be sent for batch formation tests (**Appendix 15**). Inter tank transfer to avoid this is not permitted.

4.4.3 SKO TANK FLASH POINT

When there is no fresh receipt into a Kerosene tank for 7 days, a top sample shall be drawn and tested for Density and Flash Point Test. This shall be continued subsequently on every 7th day till fresh receipt. If the flash point is lower than the specification requirements dispatches from this tank shall be suspended and the concerned department shall be informed immediately. If the flash point is meeting specification but is lower by more than 1.5⁰C than the previous observed flash point, dispatches from this tank shall be suspended and resumed only after ascertaining and recording the reason for drop in flash point.

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In case of operational requirement if inter tank transfer or acceptance of pipeline content is necessary, SKO shall be released based on the flash point and density test of receipt tank. The observations shall be recorded.

4.4.4 TANK BOTTOM WATER

If for operational reason, water is maintained in the tank, Test 'E' (**Appendix 2**) shall be carried out on the water sample on monthly basis. In case the test indicates presence of Sulphide, water shall be replaced. The record shall be maintained.

4.5 DISPOSAL OF PRODUCT USED FOR GRADE CHANGE OVER

4.5.1 The "On specification" product used for grade washing of tank-wagons or tank trucks shall be dispose-off in line with **Appendix 16** and record shall be maintained.

4.6 PRODUCT QUALITY FAILURES

- 4.6.1 In case any stock fails to meet the specification during monitoring or otherwise, the stocks shall be frozen and the concerned departments suitably intimated immediately. Failure shall be investigated immediately as per the procedure laid down in the Industry Manual on Acceptance of Products by Marketing Companies as well as directionally in line with **Annexure 1**. Sampling & testing as part of the investigation shall be done jointly by investigating team.
- 4.6.2 Corrective action to salvage the product shall be initiated by the concerned department in consultation with Quality Control Department and appropriate instructions issued. The record of product salvaged and corrective action shall be chronologically maintained.
- 4.6.3 Under no circumstance shall a location on their own attempt to correct the product by mixing in storage tank, ocean tankers, tank trucks etc. for releasing the stocks.
- 4.6.4 Any suspected quality failure during receipt, storage and dispatches has to be investigated in detail as per **Annexure 1**.
- 4.6.5 The record of the Interface if segregated in an isolated tank and its disposal shall be maintained.

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SECTION – 5

Dispatch

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Tank-Wagon dispatches	3-4
Tank-Truck dispatches	4-6
Barrels dispatches	6
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5.0 DISPATCH

5.0.1 Tank(s) nominated for dispatch shall as far as possible, be free of water. If for operational reasons, water bottom is being maintained, adequate care shall be exercised to ensure that this water does not enter the delivery stream. UML composite samples from individual tanks, nominated for dispatching the product, shall be jointly taken by representative of Refinery / Marketing / Pipeline Divisions (as applicable), labeled, sealed and retained (**Appendix 2A**). Receiving tank should preferably be free from water. However, if water bottom is maintained for operational reason, water dip shall be measured and recorded.

5.0.2 In case of dispatch by tank trucks/tank wagons/through dedicated pipe line from Refinery, the certified tank sample shall be retained as per **Appendix 2A**.

5.1 LOADING OCEAN TANKER / BARGE DISPATCH AND BUNKER SUPPLY

5.1.1 The tanker on black oil service shall not be used on white oil service. Product doped with marker for the purpose of checking the adulteration and SKO doped with Blue dye shall not be transported through tanker.

5.1.2 The product previously carried in the tanker tanks shall be known to decide the type of cleaning. Looking into the history of the earlier voyages, the grades of the products carried by the tanker in previous three voyages to be recorded in tanker logbook.

5.1.3 Tanker tanks, depending on the product previously carried, and the proposed product to be loaded, shall be cleaned as indicated in **Appendix 6**. Similarly, the connecting pipelines and pumps are also to be cleaned and flushed out. All these activities shall be recorded in tanker log book.

5.1.4 A certificate as given in **Appendix 7** shall be obtained from the Master / Surveyor, confirming that the nominated tanks are clean, dry and fit to carry the product.

5.1.5 Product in the shore tank earmarked for loading shall have a valid test report. Adequate sets of UML composite sample of storage tank/s shall be drawn and retained under the custody of all concerned (**Appendix 2A**).

5.1.6 Details of earlier product in the pipeline, date of completion of last receipt, pipeline quantity and its density of last PLT operation shall be collected. In case the product lying in the pipeline is dormant for a month or more, samples shall be drawn from both the ends of line and shall be subjected to monthly monitoring tests as per **Appendix 2**. Additionally Copper strip corrosion test to be carried out for Motor Spirit, Naphtha & HFHSD.

If a common line is used for loading two different products where pigging is not resorted to suitable PCK plug shall be provided and the product being loaded shall meet manufacturing spec as per **Appendix 19**. The interface quantity shall be received in an isolated tanker tank/slop tank. This product shall be handled while unloading the tanker at disport in consultation with QC department. The Tanker shall carry adequate quantity of PCK as plug to be used in case of product unloading through common line.

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For the first half an hour of product pumping, running samples from the pipeline shall be taken from shore end at every ten minutes (at 00-10-20-30 Minutes) and subjected to Test 'A' (**Appendix 2**). These checks shall be chronologically recorded in the shore end tanker logbooks (**Appendix 9**).

At jetty end / ship's manifold, running samples from the pipeline shall be tested for Test 'A' (**Appendix 2**) immediately on pumping of product and compared with the density of previous line content. On completion of displacement of earlier line content, samples shall be drawn every ten minutes (at 00-10-20-30 Minutes) then subsequently at every one hour and subjected to Test 'A' (**Appendix 2**). The records shall be maintained (**Appendix 9**).

If test "A" is unsatisfactory at Jetty end (the variation in density is beyond $\pm 3.0 \text{ Kg/m}^3$ at 15°C compared to earlier line product density or $+ 3.0 \text{ Kg/m}^3$ of the highest density and $- 3.0 \text{ Kg/m}^3$ of the lowest density of the shore tank), the pumping shall be stopped.

The pumping shall be resumed only after the reason for density variation has been established and necessary corrective action taken. Line sample monitoring at every 10 minutes and subsequently for every one hour shall be repeated again for test 'A' (**Appendix 2**) at both ends. The record shall be maintained (**Appendix 9**). Joint samples (at Jetty end/ship's manifold as well as shore end) of 2 litres each shall be drawn at the commencement, middle and end of the pumping. The samples shall be sealed and retained (**Appendix 2A**).

5.1.7 On completion of loading, adequate sets of composite samples of tanker tanks shall be drawn (**Appendix 2A**). One set of sample per disport and one set for the ship shall be handed over to the master. One set shall be retained at the loading location till satisfactory completion of discharge and one set shall be sent to the lab at the loading location for batch formation test (**Appendix 15**). Disport shall be advised test results by quickest mode of communication. Tanker may be allowed to sail and need not wait for this test report.

5.1.8 **Clause 4.6** shall be applicable in case of product failure.

5.1.9 BARGE DISPATCH

If dedicated barges are used for product transportation, following QC procedure shall be followed for Barge loading from Refinery and Terminal:

2x2 litres of UML composite sample from Refinery/Terminal Tank shall be jointly drawn by all the stake holders, sealed, labeled and retained. During loading of Barge, initial and final line samples at Barge end, 2x1 litre each, shall be jointly collected and retained by all the stake holders. (Initial represents line content product quality and final represents Refinery/Terminal Tank product quality).

After barge loading, all level composite representative sample from the barge (2 X 2 Litres) shall be jointly collected and retained by all the stakeholders.

Above samples shall be retained (**Appendix 2A**) till the product quality is established after unloading of Barge in the receiving tank.

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5.1.10 BUNKER SUPPLIES

For bunker fuels supplies MARPOL, DG Shipping and other applicable guidelines in vogue shall be followed.

5.2 PIPELINE DISPATCHES

5.2.1 The tank nominated for transferring the product shall have a valid test report as per clause **3.3.1.1**

5.2.2 The **Clauses 3.3.1 to 3.3.5 and 3.3.7 to 3.3.10** are applicable while transferring the product through a pipeline (**Appendix 2A**). Product doped with marker for the purpose of checking the adulteration and SKO doped with Blue dye shall not be transported through Dedicated / local dedicated/Multi product pipeline.

5.3 TANK-WAGON DISPATCHES

5.3.1 The selection of a suitable tank-wagon for loading is important. Tank wagon earmarked for loading shall be as far as possible on same grade of product. However, any change of grade of product, the same shall be done only after following grade change over procedure given in **Appendix 16**. In case of changeover of grade, the bottom valves shall be opened completely to ensure tank wagon is free from earlier product. Record the same in the log book.

The black oil tank wagon shall not be used for loading white oil product.

Product doped with marker for the purpose of checking the adulteration and SKO doped with Blue dye shall not be transported through tank wagons.

5.3.2 Care shall be taken to ensure that the fittings of a tank-wagon are in serviceable condition and that the tank-wagon is completely empty before loading.

5.3.3 A sample, product wise (including Black Oil products), shall be drawn from the tank-wagon filling line at the commencement of loading and subsequently after displacement of the earlier line content and whenever there is a switchover of tank and subjected to Test 'A' (**Appendix 2**). In case of white oil, the density observed shall not vary by more than ± 3.0 Kg /m³ from the density range of the storage tank from which the tank wagon has been filled. For Black oil, density range shall be within ± 4.0 Kg /m³

5.3.4 The observation shall be logged as per **Appendix 4** and samples collected during commencement of loading and tank changeover to be retained as per **Appendix 2A**.

Whenever there is a switch over of tanks, care must be exercised to ensure that the entire quantity of the previous product in the pipeline has been displaced.

Utilization of same line for handling different generations of same product (BS IV/BS VI) should be avoided. In case of operational constraint, such type of operation shall be carried out in consultation with QC department and the line content shall be properly displaced and the interface shall be downgraded into lower generation of the product and record to be maintained.

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For automated / semi-automated locations, the sample shall be drawn from the delivery line at a point closer to tank wagon filling gantry after displacement of previous product in the line.

- 5.3.5** After filling of the tank-wagon, presence of water shall be checked while taking the dip. If presence of water is observed, the water shall be drained out before sealing. A sample shall be drawn from individual T/W and tested for colour visual for grade identification. If results are satisfactory, the tank-wagon shall be sealed and dispatched. All the observations shall be logged as per **Appendix 4**.
- 5.3.6** In case of SKO dispatch, the density shall be checked for individual tank wagons after loading and recorded in **Appendix 4**.
- 5.3.7** Flash point of SKO from the dispatch tanks and density at 15°C of SKO of the individual tank wagons shall be documented and intimated to receiving locations.
- 5.3.8** In addition to the above, batch formation test report of the said product shall be sent to respective receiving locations and record maintained.

5.4 TANK TRUCK DISPATCHES

- 5.4.1** Tank truck shall as far as possible be on one grade of product. However, any change of grade, shall be done only after following procedure given at **Appendix 16**. The tank truck shall be cleaned and calibrated once in a year and record maintained (**Appendix 8**).
- 5.4.2** Mixed loading shall not be done in a tank truck having common manifold. Mixed load of different generations of the same product should be avoided.
- 5.4.3** Before commencement of operation, the TLF officer shall collect the batch test details (UML/TMB density range) and water dip of operating tank(s) and maintain the "Density board" in TLF along with batch no. The pipeline quantity from the pump house to the TLF gantry for each of the product shall also be displayed on the density board.

A sample, product wise (only white Oil products), shall be drawn from the tank-lorry filling line on commencement of loading at a 2 hours interval or more frequently (in case of product layering in tank) and any tank switchover (after displacement of earlier line content) during the tank truck filling operation in each day and subjected to **Test 'A'** (**Appendix 2**).

The density observed shall not vary by more than $\pm 3.0 \text{ Kg /m}^3$ from the density range of the storage tank from which the tank lorry has been filled. The observation shall be logged as per **Appendix 4** and samples collected during commencement of loading and tank changeover to be retained as per **Appendix 2A**.

In case the density variation within the operating tank (during 2 hours interval density check) is more than $\pm 3.0 \text{ Kg /m}^3$ due to layering, additional sample shall be retained as per **Appendix 2A** mentioning the time of collection.

In case of SKO, a sample from tank truck filling line shall be tested for flash point on daily basis after displacement of line content and whenever there is a tank change over.

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In case of black oils, a sample, product wise, shall be drawn from the tank-lorry filling line on commencement of loading in each shift and shall be tested for appearance and density.

The density observed shall be compared with the density range of the storage tank from which the tank lorry has been filled. The observation shall be logged as per **Appendix 4**. In case of delivered supply, sample representing the product dispatched from the tank shall be taken, sealed, labeled & retained as per **Appendix 2 A**.

For automated / semi-automated locations the sample shall be drawn from the delivery line at a point closer to tank truck filling bay after displacement of previous product in the line. It shall be ensured that the product loaded in TT is free from water. Quality Assurance system including monitoring of 2 hourly sample on TLF, checking of TT etc. in fully automated locations will be applicable only after validation of all automated system and relevant SOP duly approved by competent authority of the concerned user department. Efficacy of the automatic devices used for Quality Assurance process shall be periodically checked & calibrated. Observations to this effect shall be recorded as per SOP.

In fully automated locations where advanced Mass Flow Meters (MFMs) / other automatic density measurement devices are provided, checking bi-hourly density may be dispensed with. However, **Test 'A'** (appearance, colour, density by hydrometer) shall be carried out at the commencement of each shift after displacement of line quantity, if required and after tank change-over. Density recording on the invoices can be carried out through the values generated through MFMs/ other automatic density measurement devices. However, accuracy of such devices shall be checked monthly and records maintained. The density of the tank mentioned above shall be used as reference and variation beyond $\pm 3.0 \text{ kg/m}^3$ from this shall be investigated. In case of EBMS/Biodiesel HSD blend, suitable precautions shall be taken to capture the accurate density of blended product, on the invoice/challan.

For all products, the density at 15°C, tank number, batch number/particular number and bay number shall be recorded in the challan / delivery documents. Additionally, challan / delivery documents of SKO shall carry the flash point of tank truck filling line sample and branded MS / HSD challan / delivery document shall carry an endorsement that requisite doses of additive have been added.

- 5.4.4** Whenever there is a switch over of tank (may be at commencement of loading or any time during the day), care must be exercised, to ensure that the entire quantity of the previous product in the pipeline has been displaced. Incorporate the correct density in delivery challan.

Sampling shall be done immediately after ensuring that line content has been displaced and **Clause 5.4.3** shall be followed for testing and retention of the sample.

Locations using a particular stretch of pipeline for delivery of different generations of fuel (i.e. BS IV & BS VI) of the same grade shall take care for proper displacement of the line content and the interface generated shall be accommodated in lower generation of product (i.e. BS VI line content shall be downgraded into BS IV). The same shall also be suitably identified on the pipeline.

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5.4.5 The quantity of samples drawn for retention during commencement of loading, after tank changeover or whenever there is a change in density beyond $\pm 3.0 \text{ Kg/m}^3$ due to layering shall be as follows: -

- 1) MS and its variants (including ethanol blended MS & branded MS) - 4 x 1 litre each.
- 2) HSD and its variants (including biodiesel blended HSD and branded HSD) - 2 x1 litre each
- 3) SKO - 1 x 1 litre each.
- 4) LDO, FO – 1 X 1 litre each in case of delivered supply only.

Locations using doping facility for blending of ethanol in MS, additives in branded fuels, biodiesel in HSD etc. should ensure that adequate care is taken to collect representative sample of respective blended products for retention purpose.

5.4.6 The efficacy of ethanol, biodiesel, branded fuels dosing system in right proportion shall be ensured in each shift.

5.4.7 At bridging locations, in case of diversion of tank truck due to operational reasons, the TT sample shall be checked for test 'A' compartment wise and diverted only if the density is within $\pm 3.0 \text{ kg/m}^3$ from the dispatch density. If density is beyond the permissible limit, the matter shall be investigated as per **Annexure-1**

5.5 BARREL DISPATCHES

5.5.1 Clean, grade flushed and leak free barrels shall be used for filling the product. The bungs shall have washer so that when fully tight even sweating is eliminated.

5.5.2 After all the barrels have been filled; samples on cube root basis shall be drawn and subjected to Test 'C' (**Appendix 2**). The observations and corrective action shall be recorded in the filling register as per format given in **Appendix 5**.

5.5.3 The grade of product, Batch no., date of filling and the serial no. of the barrel shall be painted on the top of the barrel. The barrel shall then be sealed.

5.5.4 If the barrels are to be stored before dispatch, they shall be stored as given in **Clause 3.7.5**.

5.6 RETENTION OF SAMPLES (AT TLF & TWF)

5.6.1 MS, SKO, HSD & Black Oil samples shall be collected from the tank truck filling line and tank wagon filling line as per **Clauses 5.3.3 & 5.4.3**.

5.6.2 These samples shall be retained for a period of 30 days (**Appendix 2A**)

5.6.3 Samples shall be collected in Aluminum containers of 1 litre capacity, closed, sealed, labeled and signed with the details as per **Appendix 11** for tank wagon filling (TWF) point samples and **Appendix 11A** for tank lorry filling (TLF) point samples. Such Aluminum sample containers shall be properly sealed, labeled and retained as per guidelines / statutory requirements.

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- 5.6.4** Samples shall be retained date-wise for a period of 30 days at a safe place in the location in a suitably fabricated rack to hold the sample containers and record maintained as per **Appendix 12**.
- 5.6.5** At all hospitality locations the assisting company shall make available TLF / TWF retention samples or corresponding test reports to assisted company as and when required.
- 5.6.6** At all bridging locations the corresponding TLF retention sample of dispatching location shall be considered as supply location reference sample for retention.

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SECTION –6

Additional Controls for Highly Quality Sensitive Products

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Naphtha	1
HFHSD	2

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6.0 ADDITIONAL CONTROLS FOR HIGHLY QUALITY SENSITIVE PRODUCTS

6.1 NAPHTHA

6.1.1 Naphtha is used mainly as a fertilizer & petrochemicals feed stock and is a highly quality sensitive product. Even contamination in traces with other products is likely to lead to process problems in utilization as a feedstock. Therefore, following special attention, right from product receipt from refinery / import till delivery to the customer(s), shall be taken.

6.1.2 BATCH NUMBER

Naphtha receipt shall be assigned batch number for identification as per **clause 3.9**. All subsequent reports and checks shall refer to the product by the batch number that will trace the entire history of control exercised on the subject batch.

6.1.3 BATCH CERTIFICATION

Each new cargo receipt by all modes of transport shall be assigned with a new batch number and receiving tank sample shall be tested for batch formation test as per **Appendix 15**.

6.1.4 Whenever tank-to-tank transfer of two approved batches of the same grade takes place, the batch number of the product in the receiving tank shall be changed. A Batch Control Logbook as per **Appendix 13** shall be maintained in the location. This Batch Control Logbook shall be maintained tank-wise. In this Batch Control Logbook the name of the originating refinery or vessel from which the product is received shall be indicated in Column No.1, in Column No. 2 the date of receipt shall be given, in Column Nos. 3 & 4 the batch number and test report number respectively of the originating refinery or the vessel which has brought the product shall be indicated and in Column Nos. 5 & 6 the batch number established by the location and test report number shall be indicated.

6.1.5 USE OF TANK WAGAONS AND TANK TRUCKS

Tank-wagons & Tank Trucks, which has previously carried Naphtha, shall be preferred. In case of grade change over, the procedure given in **Appendix 16** shall be followed, for loading Naphtha.

At Refinery, for TW loading, the Naphtha test certificate must include Copper strip corrosion test.

6.1.6 USE OF TANKERS

Tanker tank cleaning key shall be followed (**Appendix 6**) for loading Naphtha. The Naphtha in the shore tank, nominated for loading a tanker, shall have a valid test report. After loading one-meter product in a tanker, tank samples shall be drawn and tested for **Test 'F' (Appendix 2)** while pumping need not be stopped. If the results are unsatisfactory the pumping shall be stopped and controlling office informed for further advice.

The clauses in **Section 5** in regard to loading of ocean tankers shall be followed.

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6.1.7 The clauses in **Section no. 3** and **Section no. 5** in regard to receipts and dispatches shall be followed respectively.

6.2 HFHSD FOR NAVAL APPLICATIONS

6.2.1 HFHSD is used in the High Speed Coast Guard Boats and other sensitive Marine Vessels and therefore, extra precaution in quality maintenance is essential. Tanks storing HFHSD shall be drained daily to remove any water/sediments present.

In the Batch formation and Monthly Monitoring test report, ASTM Colour (D 1500) shall be reported. Copper corrosion test on a bottom sample of the product shall be carried out on a fortnightly basis. In case a water bottom is being maintained in the tank for operational reasons, a sample from a height of 15 cms from the top of the water level shall be tested for Copper corrosion test.

6.2.2 If for operational convenience, a water bottom is being maintained, Sulphide test (**Test E**) shall be done on the bottom water sample on a fortnightly basis (**Appendix 2**).

6.2.3 In case the test indicates presence of Sulphide, water shall be replaced.

6.2.4 All observations on samples drawn as per the **Clauses 6.2.1 and 6.2.2** and operations as per **Clause 6.2.3** shall be documented.

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SECTION – 7

Sampling

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Types of Samples	2-3
Sampling Procedure	3-4
Retention of Sample	4
Sample Label	4
Sealing of Sample Container	4

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7.0 SAMPLING FACILITIES AT STORAGE LOCATIONS

7.1 PURPOSE

- 7.1.1 Sampling is a very important aid to Quality Control. Samples are drawn for the purpose of ascertaining the conformity of the stock to the relevant specifications.
- 7.1.2 Various methods for obtaining different types of samples have been stipulated in **IS-1447** (Methods of sampling of petroleum and its products).

7.2 SAMPLING AIDS

- 7.2.1 Weighted sampling Cage, Can, Sampling thief, Sampling facility, etc. are the aids / devices to enable proper sampling.

The sampling devices shall be clean, dry and free of all substances that might contaminate the product being sampled. Diameter of opening of weighted Sampling can/cage (for running/all level sample) shall be 20 mm for MS/HSD /SKO and 38 mm in case of Fuel Oil and with proper chain or rope.

Sample thief (for bottom sample) shall be used for drawing bottom samples.

7.3 SAMPLE CONTAINER

- 7.3.1 Stainless steel / aluminum / glass containers of one/two litre capacity (preferably cylindrical) shall be used for all white oils. For the purpose of air freighting, it is necessary to use aluminum containers meeting **IS 733 / IS 737** latest version for 'Aluminum' alloy specifications, with wooden box to ensure that the sample reaches safely.

The sample container should be large enough to contain the required sample volume without exceeding 85% of the container capacity. The additional capacity is required for thermal expansion of the sample and enhances sample mixing.

Glass container may be used, under specified conditions, as required by specific test, with new cork, or good quality metal screw caps.

For black oils, any clean metal/glass container may be used. However, container made of aluminum is preferable.

Use Glass or stainless steel sample container in case of anhydrous Ethanol sample.

- 7.3.2 Sealing wax and paraffin wax shall not be used for sealing the sample containers.

7.4 TYPES OF SAMPLES

- 7.4.1 The prescribed methods for obtaining an average / representative sample for purpose of tests or examinations have been spelt out in **IS 1447 (Part 1)**.

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7.4.2 ALL LEVEL SAMPLE

A sample obtained by submerging a closed sampler to a point as near as possible to the draw off level, then opening the sampler and raising it at a uniform rate such that it is nearly, but not quite full as it emerges from the liquid.

7.4.3 TOP SAMPLE

A sample taken at a specific location / point in tank, 15 cm below the top surface of the liquid.

7.4.4 UPPER SAMPLE

An upper sample is one taken at a level of $1/6^{\text{th}}$ of the depth of product below the top surface in a tank.

7.4.5 MIDDLE SAMPLE

Sample taken at a level of $1/2$ of the depth of product below the top surface in a tank.

7.4.6 LOWER SAMPLE

Sample taken at a level of $5/6^{\text{th}}$ of the depth of product below the top surface in a tank.

7.4.7 COMPOSITE SAMPLE

For a vertical tank, the composite sample shall be a mixture of an equal quantity of

- a) Upper, middle and lower samples or Top, middle, bottom samples (as per the case) for product depth above 4 meters.
- b) Upper and lower samples or top and bottom samples – for product depth between 2 meters to 4 meters.
- c) Middle sample - for product depth below 2 meters.

For a horizontal tank, composite sample shall be an all-level sample.

For tanker tanks composite sample, an all-level sample from each tanker tank shall be drawn and mixed in amounts proportional to the quantity of the product in each of the tanker tank sampled.

For certification of tank product quality, the homogeneity of product is vital. As **per IS 1447 (Part-I)** homogeneity of product is confirmed when Top, Upper, Middle and Lower samples agree within the tolerance limit of the Density test i.e. $\pm 3.0 \text{ Kg /m}^3$ for white oils and $\pm 4.0 \text{ Kg /m}^3$ for black oils.

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7.4.8 BOTTOM SAMPLE

Sample taken with the aid of sampling thief from the bottom of a tank. This sample is usually taken to check the presence of any extraneous matter such as water, sediments etc.

In case of presence of water in the tank, the bottom sample of product is to be drawn from a height of 15 cms above the level of water present in the tank for quality check of the product.

7.4.9 DRAIN SAMPLE

A drain sample is one taken from the drain cock or valve or water draw-off line.

7.4.10 DRIP SAMPLE/DIPPER SAMPLE

A sample obtained by placing a dipper or other collecting vessel into the path of a free flowing stream so as to collect a definite volume from the full cross section of the stream at regular time intervals for a constant rate of flow, or at time, intervals varied in proportion to the rate of flow.

7.4.11 SPOT SAMPLE

A sample taken at a specific location in tank or from pipe at a specific time during a pumping operation

7.5 SAMPLING PROCEDURE

Observance of correct sampling procedure is of utmost importance since the quality of the product stock is very much dependent on the test results of the representative sample. Incorrect sampling procedure could therefore result in costly repercussions like down-grading, non-availability of product, loss of customers' confidence and unnecessary worry all around. The following minimum precautions shall be sincerely followed at the time of sampling:

- 7.5.1 The sampling bottle and sample containers shall always be kept clean.
- 7.5.2 Before use, sample containers and sampling apparatus shall be rinsed with the product under sampling.
- 7.5.3 Only the type of sample required for the relevant specification to be tested, shall be taken.
- 7.5.4 The sample quantity collected shall be sufficient for carrying out the relevant tests.
- 7.5.5 Sample shall be taken preferably during the cooler part of the day and under shade.
- 7.5.6 The sample container shall be filled maximum 85% of the container capacity, properly closed and it shall be ensured that there are no leaks.
- 7.5.7 Sample details shall be entered in the format (**Appendix 11 / 11A / 11B**) and fixed to the container.
- 7.5.8 A person well conversant with the procedures shall supervise sampling and filling of the sample container.

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7.5.9 In case of specific requirement, the sample container may be resealed / relabeled / codified and proper record shall be maintained. A separate guideline shall be prepared in this regard by concerned departments.

7.6 RETENTION OF SAMPLES

7.6.1 It becomes necessary to retain samples for a specific period for reference purpose.

7.6.2 Sample(s) and documents shall be retained only at specific stages that are mentioned in **Appendix 2A** and in case of product failure observed.

7.6.3 The samples meant for retention shall be properly sealed and identified so that there is no doubt about the authenticity of the sample at a later stage. All the relevant details of the sample shall be mentioned in the sample label and attached to the container. Sample container shall be checked for leaks if any.

7.6.4 The retention samples shall be properly stored in the location premises and records shall be maintained.

7.6.5 The retention period shall be strictly adhered to.

7.6.6 Details of samples retained shall be recorded as per **Appendix 12**.

7.7 SAMPLE LABEL

Formats for labeling samples shall be as per **Appendix 11/ Appendix 11A /Appendix 11B**. Whenever joint sampling is being carried out, the sample label shall be signed jointly. This activity is normally carried out at the time of transfer of custody of consignment viz. among refineries / pipelines / tanker / marketing / OMCs etc. as the case may be.

7.8 SEALING OF SAMPLE CONTAINER

Unique random numbered tamper-proof plastic seals, sealing wire, pliers shall be used for sealing of sample containers. Proper record shall be maintained about the inventory and issuance of seals.

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SECTION – 8

Laboratory Support

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8.0 LABORATORY SUPPORT

8.1 PURPOSE

8.1.1 Quality Control Laboratories are conveniently located at the field level for tests to be carried out on various types of samples as required. These laboratories shall be manned by qualified Laboratory Officers who are familiar with standard procedures of testing of petroleum products. The laboratories shall be properly equipped with standard apparatus in line with the relevant specifications. Laboratory shall issue suitable laboratory reports for samples tested.

8.1.2 Test Certificates issued by all the OMC PSU Laboratories and Laboratories mentioned in 8.2.1 D & 8.2.2 D shall be acceptable for the purpose of this manual.

8.2 LABORATORIES

8.2.1 REFINERY LABORATORIES:

The laboratories of the Refinery Division are situated at the following Refinery locations:

East	West	North	South	Total
A): IOC				
Barauni	Koyali	Mathura		
Guwahati		Panipat		
Haldia				
Digboi				
Paradeep				
Boingaigaon				
06	01	02	00	09
B): BPC				
	Mumbai		Cochin	
00	01	00	01	02
C): HPC				
	Mumbai		Visakha	
00	01	00	01	02
D) Others				
NRL Numaligarh	RIL Jamnagar	HMEL Bhatinda	CPCL Chennai	
	Nayara, Vadinar		CBRL, Narimanam	
	BORL, Bina		MRPL, Mangalore	
01	03	01	03	08
GRAND TOTAL				
07	06	03	05	21

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8.2.2 MARKETING LABORATORIES:

The Field Laboratories of the Marketing Division are situated at the following locations:

East		West		North		South		Total
A): IOC	Lab Code		Lab Code		Lab Code		Lab Code	
Barauni	LBN	Ahmedabad	LAM	Agra	LAG	Bangalore	LBL	
Betkuchi	LNE	Hazira	LHR	Allahabad	LAH	Chittoor	LCR	
Budge Budge	LBB	Kandla	LKD	Ambala	LAB	Cochin	LKC	
Gouripur	LCC	Nagpur	LKH	Bharatpur	LBP	Hyderabad	LHY	
Haldia	LHA	Bhopal	LNP	Bhatinda	LBT	Korukkupet	LKK	
Jasidih	LJS	Ratlam	LRL	Chittorgarh	LCG	Madurai	LMD	
Mourigram	LMM	Sewree	LSE	Delhi	LDI	Mangalore	LMG	
Paradeep	LPD	Vasco (Goa)	LVS	Jaipur	LJP	Nagapattinam	LNM	
Patna	LPA	Korba	LKB	Jalandhar	LJL	Sankari	LSK	
Port Blair	LPB	JNPT	LJN	Jodhpur	LJD	Trichy	LTY	
Rajbandh	LRB			Kanpur	LKP	Tuticorin	LTC	
Siliguri	LSG			Lucknow	LAS	Vijayawada	LVJ	
Jharsuguda	LJG			Mathura	LMA	Visakha	LVZ	
Bhubaneswar (Jatni)	LBR			Mughalsarai	LMS			
Khunti	LKT			Panipat	LPP			
				Partapur	LPR			
				Rewari	LRW			
				Roorkee	LRK			
				Sangrur	LSA			
				Tikri Kalan	LTK			
15		10		20		13		58
B): BPC	Lab Code		Lab Code		Lab Code		Lab Code	
Budge Budge	BGB	Kandla	KAN	Kanpur	KAN	Tondiarpet	TNP	
Patna	PAT	Manmad	MAN	Kota	KOT	Vizag	VZG	
Haldia	HLD	Sewree	SEW	Jalandhar	JAL	Irumpanam, Kochi	IPN	
Paradeep	PDP	Borkhedi	BOR	Bijwasan	BIJ	Devangonthi (Bangalore)	DVG	
Ennore Costal Installation	ECI	Manglia	IND	Loni	LON	Mangalore	MCI	
		Navegaon	NAV	Piyala	PIY	Cherlapalli (Hyderabad)	CHP	
				Jobner	JOB	Irugur (Coimbatore)	IRG	
						Karur	KRT	
05		06		07		08		26

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East		West		North		South		Total
C): HPC	Lab Code		Lab Code		Lab Code		Lab Code	
Kolkata	HKML	Pune (Loni)	HLNI	Delhi	HDLI	Bengaluru	HBLR	
Paradeep	HPDP	Vasco (Goa)	HGOA	Mathura	HMTR	Irumpanam, Kochi	HIPM	
Haldia	HHLI	Vashi, Navi Mumbai	HVSH	Bahadurgarh	HBHG	Secunderabad	HSCB	
Guwahati	HGHY	Kandla	KKAN	Ajmer	HAJR	Mangalore	HMLR	
Barauni	HBRN	Sewree, Mumbai	HSWR	Jaipur	HJPR	Chennai (Ennore)	HENR	
Bokaro	HBKR	Indore	HIND	Mughalsarai	HMGS	Vijayawada	HVJW	
Raipur	HRPR	Miraj	HMRJ	Rewari	HRWR	Visakhapatnam	HVZG	
		Solapur	HSOL	Bhatinda	HBTN	Hassan	HHSN	
		Mundra	HMND	Kanpur	HKNP	Rajahmundry	HRJY	
		Palanpur	HPLP	Jodhpur	HJDH	Suryapet	HSPT	
		Mahul	HMHL			Coimbatore	HCBE	
		Jawahar Dweep	HMOT					
		Jabalpur	HHBP					
		Vadodara	HVDD					
07		14		10		11		42
D) Others								
Haldia - RIL		Bhopal - RIL		Rewari - RIL		Chennai - RIL		
		Hazira - RIL		Kanpur - RIL		Kakinada-RIL		
		JNPT-RIL				Mangalore-RIL		
		Hazira-ONGC				Kochy-RIL		
Rangapani - NRL		Uran-ONGC						
02		05		02		04		13

8.3 The list of laboratories shall be updated as and when required.

8.4 The Lab In-charge shall be an adequately qualified and trained Officer.

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ANNEXURE – 1

Product Quality Failure Investigation

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1.1 INTRODUCTION:

Reference **Clauses 3.2.5.1, 3.3.11 and 4.6** of IQCM and **Section 6 & 7** of “Industry Manual on Acceptance of Product by Marketing Companies and Related Issues”, any suspected quality failure during receipt, storage or dispatch shall be investigated in detail.

1.2 INVESTIGATION TEAM:

The investigation shall be conducted by a team consisting of the following:-

- a) **Tanker Failures:** Representatives from Operations and QC Dept. of the concerned Oil Companies, Surveyors and Tanker Owner or his representative.
- b) **Pipeline Failures:** Representatives from Operations, QC Dept. of Concerned Oil Companies, Refinery & Pipelines.
- c) **Tank Wagon / Tank Truck Failures:** Representatives from Operations and QC Dept. of concerned oil Companies.
- d) **Failures during Storage:** Representatives from Operations and QC Dept. of concerned oil Companies.

1.2.1 The investigating team, as part of the investigation, shall collect / draw all relevant samples as detailed below and get them tested at the Laboratory in their presence. Team shall also examine the load-port / loading location test reports for the product used for loading. The test report for tanker tanks after loading shall also be collected in case of tanker failures.

1.2.2 The tests shall be conducted in an approved and mutually agreed Laboratory.

1.2.3 The investigating team shall examine all relevant documents during the investigation.

1.3 TANKER OPERATIONS (FAILURE IN PRE-DISCHARGE TESTS)

1.3.1 Load-port samples of individual nominated shore tanks and load-port samples from tanker tanks shall be collected (**Appendix 2A**) and retained.

1.3.2 Retention samples drawn from jetty end manifold and ship's manifold during loading of the tanker shall be collected.

1.4 TANKER OPERATIONS (FAILURE AFTER RECEIPT)

1.4.1 Samples as in **Clause 1.3** above shall be collected.

1.4.2 The retention samples from the nominated tanks drawn before receipt of the product (**Appendix 2A**) shall be collected.

1.4.3 The retention samples drawn for pre-discharge tests (**Appendix 2A**) shall be collected.

1.4.4 All level samples from the individual tanker tanks drawn in case of quality failure noticed during the discharge shall be collected.

1.4.5 Retention samples drawn from pipeline manifolds at shore / jetty end drawn during tanker receipt (**Appendix 2A**) shall be collected.

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1.4.6 Top, upper, middle, lower, bottom samples as appropriate from the suspected contaminated stock received in the tank shall be drawn.

1.5 PIPELINE OPERATIONS (FAILURE AFTER RECEIPT)

1.5.1 Retention samples drawn from dispatch storage tanks shall be collected. **(Appendix 2A)**

1.5.2 Retention samples drawn from the manifolds at dispatching end shall be collected **(Appendix 2A)**.

1.5.3 Retention samples drawn from receiving end manifolds shall be collected. **(Appendix 2A)**

1.5.4 Retention samples drawn from the receiving tanks before receipt of the product shall be collected **(Appendix 2A)**.

1.5.5 Top, upper, middle, lower, bottom samples, as per the requirement, from the suspected stock shall be drawn.

1.6 TANK WAGON / TANK TRUCK OPERATIONS

1.6.1 Retention samples from loading location's Tank-Wagon / Tank Truck filling point for the date of loading. **(Appendix 2A)** shall be collected.

1.6.2 All level sample from the suspected stock in tank wagon / tank truck shall be drawn.

1.6.3 The retention sample of the dispatch Tank(s) shall be collected **(Appendix 2A)**.

1.6.4 In case of Tank Truck, the sample from the individual compartments shall be drawn.

1.7 RECOMMENDATION ON DISPOSAL OF OFF-SPECIFICATION PRODUCTS

The investigation team shall recommend the disposal of the product and the disposal shall be done only after approval of the competent authority. Relevant QC Documents, test reports, failure investigation report etc. shall be retained for minimum period of five years or till arbitration / case is closed whichever is later.

1.8 DISPOSAL OF OFF-SPEC MS / HSD AT RETAIL OUTLETS / TT:

1.8.1 As per the directive from Deputy Secretary to Govt. of India, MOP&NG [Ref. No. P-21027/29/2001-Dist.dated 21st December 2001, MS and HSD found off-spec at Retail Outlets shall be sent to the nearest Refinery location for re-processing.

1.8.2 In case of product failure due to contamination/adulteration in tank trucks, outside of Depot / Terminal, the same shall not be corrected at locations and shall be sent to the nearest Refinery for re-processing.

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APPENDIX – 1

Specifications

SUBJECT	PAGE NO.
Naphtha	1
Motor Gasoline	2-4
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Automotive Diesel	12-13
Biodiesel, Diesel Fuel Blend (B6 To B20)	14-15
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Light Diesel Oil	17
Fuel Oil	18

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TYPICAL SPECIFICATION FOR NAPHTHA

Sr. No.	Characteristic	General Requirement ^{\$}	Test Method IS 1448:
1	Appearance	Clear & Bright	Visual
2	Colour Visual	Colourless	Visual
3	Density @ 15 °C, kg/m ³	Report	P: 16
4	Distillation:		P: 18
	a) Initial Boiling Point, °C	Report	
	b) 50% Recovered @ °C	130 Max.	
	c) Final Boiling Point, °C	180 Max.	
5	Reid Vapour Pressure (RVP) at 37.8 °C, kg/cm ²	0.7 Max.	P : 39
6	Residue on evaporation mg/100 ml,	5.0 Max	P : 29
7	Non-Volatile Matter mg/100 ml,	5.0 Max.	P : 64
8	Sulphur, Total % by mass,	0.15 Max.	ASTM D 4294
9	Aromatic, % by Volume	20.0 Max.	P : 23
10	Olefins, % by Volume	1.0 Max.	P : 23
11	Calorific Value (Calculated) BTU/lb (Gross)	18,360 Min.	P : 7
12	Carbon and Hydrogen Ratio (Calculated),	6.5 Max.	*
13	Lead Content, ppb	200 Max.	IP-224

Notes:

^{\$} All the specification requirements shall be subject to the agreement between the Purchaser /consumer and supplier.

* Estimated by using the following formula:

$$\text{Wt. \% Hydrogen} = 26 - (15 \times \text{Density @ } 15 \text{ } ^\circ\text{C})$$

$$\text{Wt. \% Carbon} = 100 - (\text{Weight \% Hydrogen} + \text{Weight \% Sulphur})$$

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INDIAN STANDARD SPECIFICATION FOR MOTOR GASOLINES (Sixth Revision) IS 2796:2017

MOTOR GASOLINE BS IV & BS VI GRADES

Sr. No.	Characteristic	Requirements		Test Method Refer to [P:] of IS 1448/ ISO/ASTM/IP/ Annex of IS 2796
		MG BS IV	MG BSVI	
01	Appearance	Clear and bright. Free from un-dissolved water, foreign matter and other visible impurities		Visual
02	Colour a) MG 91 b) MG 95	Orange Red		Visual
03	Density at 15°C, Kg/m ³	720 - 775		[P:16] ⁹⁾ / ISO 3675 / ASTM D 4052/ ISO 12185/ ASTM D1298/ IP160
04	Distillation:			[P:18] ⁹⁾ / ISO 3405 / ASTM D86
	a) percent evaporated at 70°C (E 70°C), percent v/v 1) Motor Gasoline 2) E 10	10 – 45 10- 55 (Summer) 10- 58 (Other Months)		(See Note 1)
	b) percent evaporated at 100°C (E 100 °C), percent v/v	40 – 70		
	c) percent evaporated at 150°C (E 150 °C), percent v/v, Min	75		
	d) Final Boiling Point °C, Max.	210		
	e) Residue, percent by Volume Max.	2.0		
05	Research Octane Number (RON), Min. a) MG 91 b) MG 95	91.0 95.0		
06	Motor Octane Number (MON), Min. a) MG 91 b) MG 95	81.0 85.0		[P26] ⁹⁾ / ASTM D 2700
07	Gum content (Solvent Washed), g/m ³ , Max.	40		[P: 29] ⁹⁾ / ASTM D 381
08	Total Sulphur mg/Kg, Max.	50	10	[P: 34]/ P: 153/ ISO 20847 / ISO 20846 ⁹⁾ / ISO 13032 ⁹⁾ / ASTM D 2622/ D 3120/ D 5453/ D 7220
09	Lead Content (as Pb), g/l, Max	0.005		ASTM D 5059 ⁹⁾ / IP 224
10	Reid Vapour Pressure (RVP) at 38°C, kPa Max. a) MG (without Ethanol)	60		[P: 39] / ASTM D 323 (wet methods)/ D 5191(dry method)/ASTM D6378/ EN 13016/ Annex A9) (dry method) (See Note 2)
	b) Ethanol Blended MG	67		

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11	Vapour Lock Index (VLI) Max.	Summer / (Other Months)	See Note 1 Calculation, (VLI = 10 RVP + 7 E 70)
	a) MG (without ethanol)	750 / (950)	
	b) MG (with 5 percent v/v ethanol)	900 / (1050)	
	c) E10	1050 / (1100)	
12	Benzene content, percent by Volume Max.	1	ASTM D 3606 (see Note 3) /ASTM D5580 ⁹⁾ /D6277/D 6730/ D 6839 /ISO 22854
13	Copper Strip Corrosion, (for 3 hrs at 50°C) Max.	Not more than No. 1	[P:15] ⁹⁾ / ASTM D 130
14	Water tolerance of Motor Gasoline -Alcohol blends, Temperature for phase separation, °C, Max.		Annex-B (see Note 4)
	a) Winter	0	
	b) Other Months	10	
15	Engine intake system cleanliness	Report MFA used	(See Note 5)
16	Olefin content, percent by Volume. Max.		[P: 23] ⁹⁾ / ASTM D 1319 / D 6730/ D 6839/ ISO 22854
	a) MG 91	21	
	b) MG 95	18	
17	Oxidation Stability, Minutes, Min	360	[P:28] ⁹⁾ / ASTM D 525 / IP 40
18	Aromatics Content, Percent by volume, Max.	35 ⁶⁾	[P:23] ⁹⁾ /ASTM D 1319 / D 5580/ D 6730 /D 6839 / ISO 22854
19	Oxygen Content, percent by Mass, Max.	3.7	EN 1601/ IP 408/ ASTM D 4815 ⁹⁾ /D 5599 / D 6839
20	Ethanol Content, percent by volume.		(See Notes 7 and 8)
	a) Motor Gasoline	5.0	ASTM D 4815 ⁹⁾ / D 5599 / Annex C (Water extraction)
	b) E10	10	
21	Oxygenates % By Vol. Max.		ASTM D4815
	a) Ethers containing 5 or more 'C' atoms per molecules such as MTBE, ETBE or TAME	15	
	b) Any other oxygenates	Not Permitted	

Notes:

- 1) Summer shall be the period from April to July.
- 2) For the motor gasoline-alcohol blends, the dry vapour test method given in Annex A shall be followed.
- 3) It is applicable only for non-alcoholic motor gasoline.
- 4) In winter (Nov to Feb) it is expected that temperature may be lower than 0°C in the northern hilly region and hence phase separation shall not take place till -10 °C
- 5) Use of multifunctional additives (MFA) is a requirement for assuring adequate fuel system and intake system cleanliness performance in engines. Refiners/Marketers of motor gasoline have to ensure the MFA has proper credentials from internationally accepted test laboratories/ authorities, of having passed a minimum of one of the tests in each of the two categories of deposit control performance indicated below.

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Deposit Type	Test No.	Test Equipment	Test Method	Pass Limit (Average IVD) (weight)
a) Intake Valve Deposit (IVD)	1	BMW IVD Test	ASTM D 5500-98	100 mg / valve, <i>Max.</i>
	2	MB M102E IVD	CEC F-05-A-93	50 mg / valve, <i>Max.</i>
	3	FORD 2.3 Litre IVD	ASTM D 6201	90 mg / valve, <i>Max.</i>
	4	MB M111-IVD Test	CEC F-20-A-98	50 mg / valve, <i>Max.</i>
b) Port Fuel Injector deposit (PFI)				Pass Limit (percent Injector Flow Loss)
	1	Chrysler PFI Test	ASTM D 5598 -01	5 percent, <i>Max.</i>
	2	PFI Deposit Rig	ASTM D 6421	10 percent, <i>Max.</i>

Other performance tests may be added as and when they reach qualified/standard test status. MFAs which are certified against National Generic Certification Option as per US EPA-97 final Rule (40 CFR Part 80 Certification Standards for Deposit Control Additives) can also be used by fuel refiners/Marketers at treatment levels not less than the Lower Additives Concentration (LAC) limits, as these MFAs meet the criteria for acceptance mentioned above.

- 6) Aromatic content relaxation and time frame, if any, for fuel processed from Assam Crude, may be guided by the notifications issued by Government of India, from time to time.
- 7) Corrosion inhibitors and/or stabilizing agents shall be added in case of 10 percent ethanol blended motor gasoline.
- 8) For routine analysis of ethanol content - ASTM D 5845 (FTIR) or Water extraction method shall be employed (see Annex C). Blending of ethanol shall be carried out at supply point of Oil Marketing Company's Depot / Terminal as per the directives of Ministry of Petroleum and Natural Gas (MOP & NG) from time to time. OMC shall ensure homogeneous blending of ethanol in motor gasoline in the range 4.5 to 5.0 percent by volume and 9.5 to 10.0 percent by volume for 5 percent and 10 percent ethanol blended motor gasoline respectively. In case ethanol is not blended, Sr. no (20) is not applicable.
- 9) In case of dispute, this method shall be the referee method.
- 10) No external addition of silicon, chlorine-based materials and metallic additives are allowed.
- 11) The colour of the branded motor gasoline can be decided by OMC, subject to such fuel meets all other requirements of the respective motor gasoline grade defined in the table.
- 12) All the test methods referred to in this standard include a precision statement. The Interpretation of results shall be based on test method and precision data of test method whenever applicable. In case of dispute the procedure described in ISO 4259 shall be used.

Note: For authentic and detailed information latest version of BIS specification shall be referred.

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INDIAN STANDARD SPECIFICATION FOR E 20 FUEL Admixture of Anhydrous Ethanol and Gasoline IS 17021:2018

Sr. No.	Characteristics	Requirements		Ref to Test Method as Part of IS 1448/ASTM/ISO/EN
		MG BS IV grade	MG BS VI Grade	
1	2	3	4	5
i)	Appearance	Clear & Bright, Free from un-dissolved water, foreign matter and other visual impurities		Visual
ii)	Colour,	Red (MG 95)		Visual Inspection
		Green (MG 98)		
iii)	Density @ 15°C, kg/m ³	720 – 775		[P: 16] ⁸⁾ / ISO 12185/ ASTM D 4052/ D1298/ IP 160
iv)	Distillation			[P : 18] ⁸⁾ /ISO 3405/ ASTM D 86
	a) Percent evaporated at 70 °C (E-70), percent v/v	10 - 55 (Summer) 10 – 58 (Other Months)		
	b) Percent evaporated at 100 °C (E-100), percent v/v	45 - 78		
	c) Percent evaporated at 150 °C (E-150), percent v/v , Min	85		
	d) Final Boiling Point °C Max	210		
	e) Residue, percent by volume, Max	2		
v)	Research Octane Number (RON), Min	95(MG95) 98(MG98)		[P : 27] ⁸⁾ /ASTM D 2699
vi)	Motor Octane Number (MON), Min	83(MG95) 86(MG98)		[P : 26] ⁸⁾ /ASTM D 2700
vii)	Gum Content (solvent Washed), g/m ³ , Max	40		[P : 29] ⁸⁾ /ASTM D 381
viii)	Sulphur, total, mg/kg, Max,	50	10	ASTM D 2622 ⁸⁾ / D 5453/ D 3120/D 7039/ D 7220
ix)	Lead Content (as Pb), g/l, Max	0.005		IP 224/ASTM D 5059 ⁸⁾ / D 3237
x)	Reid Vapour pressure at 38°C, kPa, Max	70		ASTM D 5191(Dry method) / EN 13016/ Annex A ⁹⁾ (Dry method)/ D 4953/ (see Note 1)

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xi)	Vapour Lock Index (VLI), <i>Max</i> a) Summer ²⁾ b) <i>Other Months</i>	1050 1100	Calculation (VLI= 10RVP+ 7E 70)
xii)	Benzene content, percent by volume, <i>Max</i>	1	ASTM D 5580/D 2677/ D 6730/D3606/D6839/ ISO 22854 ⁸⁾
xiii)	Copper strip corrosion (3 h @ 50 °C), <i>Max</i>	Class 1	P-15 ⁸⁾ /D-130
xiv)	Water tolerance of gasoline-alcohol blends, temperature for phase separation, °C, <i>Max</i> : a) <i>Other Months</i> b) <i>Winter</i> ³⁾	10 0	Annex B
xv)	Engine intake system cleanliness	Report-MFA Used	(see Note 4)
xvi)	Olefin content, percent by volume, <i>Max</i>	18	[P : 23] ⁸⁾ /ASTM D 1319/D6730/D 6839
xvii)	Oxidation stability, minutes, <i>Min</i>	360	[P : 28] ⁸⁾ /ASTM D 525/ IP 40
xviii)	Aromatic content ⁵⁾ , percent by volume, <i>Max</i>	35	[P : 23] ⁸⁾ /ASTM D 1319 / D 6730/D 5580/ D6839
xix)	Oxygen content, percent by mass, <i>Max</i>	7.4	EN 1601/EN 13132 ⁸⁾
xx)	Ethanol Content ⁶⁾ percent , v/v	20	Annex C ⁸⁾ / EN 1601/ (See Note 7)
xxi)	Oxygenates percent by Volume, <i>Max</i> a) Ethers containing 5 or more "C" atoms per molecules such as MTBE,ETBE or TAME b) Any Other oxygenates	15 Not permitted	ASTM D 4815
xxii)	Motor Gasoline Content, percent by v/v	(100 – Ethanol Content)	(100 – Ethanol Content and stabilizing agents/ additives) By Calculation

Notes:

- 1) The dry vapour test method given in Annex A shall be followed.
- 2) Summer shall be the period from April to July.
- 3) In winter (Nov to Feb) it is expected that temperature may be lower than 0°C in the northern hilly region and hence phase separation shall not take place till -10°C.
- 4) Use of multifunctional additives (MFA) is a requirement for assuring adequate fuel system and intake system cleanliness performance in engines. Refiners/Marketers of motor gasoline have to ensure the MFA has proper credentials from internationally accepted test laboratories/authorities, of having passed a minimum of one of the tests in each of the two categories of deposit control performance indicated below:

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Deposit Type	Test No.	Test Equipment	Test Method	Pass Limit (Average IVD) (weight)
a) Intake Valve Deposit (IVD)	1	BMW IVD Test	ASTM D 5500-98	100 mg / valve, <i>Max.</i>
	2	MB M102E IVD	CEC F-05-A-93	50 mg / valve, <i>Max.</i>
	3	FORD 2.3 Litre IVD	ASTM D 6201	90 mg / valve, <i>Max.</i>
	4	MB M111-IVD Test	CEC F-20-A-98	50 mg / valve, <i>Max.</i>
b) Port Fuel Injector deposit (PFI)				Pass Limit (percent Injector Flow Loss)
	1	Chrysler PFI Test	ASTM D 5598 -01	5 percent, <i>Max.</i>
	2	PFI Deposit Rig	ASTM D 6421	10 percent, <i>Max.</i>

Other performance tests may be added as and when they reach qualified/standard test status.

MFAs which are certified against National Generic Certification Option as per US EPA-97 final Rule (40 CFR Part 80 Certification Standards for Deposit Control Additives) can also be used by fuel refiners/Marketers at treatment levels not less than the Lower Additives Concentration (LAC) limits, as these MFAs meet the criteria for acceptance mentioned above.

- 5) Aromatic content relaxation and time frame, if any, for fuel processed from Assam Crude, may be guided by the notifications issued by Government of India, from time to time.
- 6) Blending of Ethanol shall be carried out at supply point of Oil Marketing Company's Depot / Terminal as per the directives of MOP&NG from time to time. OMC shall ensure homogeneous blending of ethanol in motor gasoline in the range 19 to 20 percent for E20 fuel.
- 7) For routine analysis of ethanol content ASTM D 5845 (FTIR) or Water extraction method shall be employed (See Annex C).
- 8) In case of dispute, this method shall be the referee method
- 9) No external addition of silicon, chlorine-based materials and metallic additives are allowed.
- 10) All the test methods referred to in this standard include a precision statement. The Interpretation of results shall be based on test method & precision data of test method whenever applicable. In case of dispute the procedure described in ISO 4259 shall be used.

Note: For authentic and detailed information latest version of BIS specification shall be referred.

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INDIAN STANDARD SPECIFICATION FOR M 15 FUEL Admixture of Anhydrous Methanol and Motor Gasoline IS 17076:2019

Sr. no.	Characteristics	Requirements		Ref to Test Method as Part of IS 1448/ASTM/ISO/EN
		BS IV	BS VI	
1	2	3	4	5
i)	Appearance	Clear & Bright, Free from un-dissolved water, foreign matter and other visual impurities		Visual
ii)	Colour	Purple ¹⁾		Visual Inspection
iii)	Density at 15°C, kg/m ³	720-775		[P: 16] ⁹⁾ / ISO 12185/ ASTM D 4052 / D 1298/ IP 160
iv)	Distillation			[P : 18] ⁹⁾ /ISO 3405/ ASTM D 86
	a) percent evaporated at 70 °C (E70 °C), percent v/v	10 - 55 (Summer) 10 – 60 (other months)		
	b) percent evaporated at 100 °C (E100 °C), percent v/v	45 – 78		
	c) percent evaporated at 150 °C (E150 °C), percent v/v, <i>Min</i>	85		
	d) Final Boiling Point, °C, <i>Max</i>	210		
	e) Residue, percent by v/v, <i>Max</i>	2		
v)	Research Octane Number (RON), <i>Min</i> Regular grade Premium High Octane grade	95 98		[P : 27] ⁹⁾ / ASTM D 2699
vi)	Motor Octane Number (MON), <i>Min</i> Regular grade Premium High Octane grade	83 86		[P : 26] ⁹⁾ /ASTM D 2700]
vii)	Gum content (Solvent washed), g/m ³ , <i>Max</i>	40		[P: 29] / ASTM D 381 ⁹⁾
viii)	Total Sulphur, mg/kg, <i>Max</i>	50	10	ASTM D 2622 / D 5453 ⁹⁾ / D 3120 / D 7039 / D 7220
ix)	Lead Content (as Pb), mg / kg, <i>Max</i>	5		IP 224/ASTM D 5059 ⁹⁾ / ASTM D3237
x)	Reid vapour pressure at 38°C,kPa,Max	70		ASTM D 5191 (Dry method)/ EN13016/ Annex A ⁹⁾ (Dry Method) (See Note 2)

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xi)	Vapour Lock Index (VLI), <i>Max</i> a) Summer ³⁾ b) Other Months	1050 1100	Calculation (VLI = 10 RVP + 7E 70)
xii)	Benzene content, percent by <i>v/v</i> , <i>Max</i>	1	ASTM D 5580 / D 6277 / D 6839 / ISO 22854 ⁹⁾
xiii)	Copper strip corrosion (3 h at 50 °C), <i>Max</i>	Class 1	[P:15] ⁹⁾ / ISO 2160 / D130
xiv)	Water tolerance of gasoline-alcohol blends, temperature for phase separation, °C, <i>Max</i> : a) Winter ⁴⁾ b) other months	-10 10	Annex B
xv)	Engine intake system cleanliness	Report- MFA Used	(see Note 5)
xvi)	Olefin content, percent by volume, <i>Max</i>	18	[P : 23] ⁹⁾ /ISO 3837/ ASTM D 1319/D 6730/ D 6839
xvii)	Oxidation stability, minutes, <i>Min</i>	360	[P : 28] ⁹⁾ /ISO 7536/ ASTM D 525/IP 40
xviii)	Aromatic content ⁶⁾ , percent by volume, <i>Max</i>	35	[P : 23] ⁹⁾ /ISO 3837/ASTM D 1319/D 6730/ D 5580/ D6839
xix)	Oxygen content ⁸⁾ , percent by mass, <i>Max</i>	10	EN 1601/EN 13132/ ISO 22854 ⁹⁾ /ASTM D6839
xx)	Methanol content, percent, <i>v/v</i> ^{7) 8)}	15	ASTM D 6839 / IP 566 / EN 13132 / EN 1601
xxi)	Co-Solvent (C3,C4 alcohols) content percent by <i>v/v</i> ⁸⁾ , <i>Max</i>	Report ¹⁰⁾	ASTM D 4815/D 6839 ⁹⁾
xxii)	Motor Gasoline Content, percent, <i>v/v</i>	100 – (Methanol + Co-solvents Content)	By Calculation
xxiii)	Water Content, mg / kg, <i>Max</i>	500	ASTM D6304 ⁹⁾ / ASTM E1064

Notes:

- 1) The colour of the M15 fuel was decided by Oil manufactures after due testing, and no change was observed in the properties of M 15fuel as defined in the Table.
- 2) The dry vapour test method given in Annex A shall be followed. RVP limit mentioned is specified based on the available data on fuel testing, limitation and constraints of vehicle emission, performance and drive ability. The studies with higher RVP fuel are in progress. The outcome of this study will be reviewed for revision, if any.
- 3) Summer shall be the period from April to July.

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- 4) In winter (November to February) it is expected that temperature may go up to -10°C in the northern hilly region. Phase separation shall not take place till -10°C with the recommended co-solvents dosage of 3 to 5 percent. Further it is observed during laboratory testing phase separation does not take place till -20°C, up to 500 mg/kg in M15 Fuel and with the above co-solvents in recommended dosage.
- 5) Use of multifunctional additives (MFA) is a requirement for assuring adequate fuel system and intake system cleanliness performance in engines. Refiners/Marketers of motor gasoline have to ensure the MFA has proper credentials from internationally accepted test laboratories/authorities, of having passed a minimum of one of the tests in each of the two categories of deposit control performance indicated below:

Deposit Type	Test No.	Test Equipment	Test Method	Pass Limit (Average IVD) (weight)
a) Intake Valve Deposit (IVD)	1	BMW IVD Test	ASTM D 5500-16	100 mg / valve, <i>Max.</i>
	2	MB M102E IVD	CEC F-05-A-93	50 mg / valve, <i>Max.</i>
	3	FORD 2.3 Litre IVD	ASTM D 6201	90 mg / valve, <i>Max.</i>
	4	MB M111-IVD Test	CEC F-20-A-98	50 mg / valve, <i>Max.</i>
b) Port Fuel Injector deposit (PFI)				Pass Limit (percent Injector Flow Loss)
	1	Chrysler PFI Test	ASTM D 5598 - 01(2012)	5, <i>Max.</i>
	2	PFI Deposit Rig	ASTM D 6421	10 percent, <i>Max.</i>

Other performance tests may be added as and when they reach qualified/standard test status.

MFAs which are certified against National Generic Certification Option as per US EPA-97 final Rule (40 CFR Part 80 Certification Standards for Deposit Control Additives) can also be used by fuel refiners/Marketers at treatment levels not less than the Lower Additives Concentration (LAC) limits, as these MFAs meet the criteria for acceptance mentioned above.

- 6) Aromatic content relaxation and time frame, if any, for fuel processed from Assam Crude, may be guided by the notifications issued by Government of India, from time to time.
- 7) Blending of Methanol shall be carried out at supply point of Oil Marketing Company's Depot / Terminal as per the directives of MOP&NG from time to time. OMC shall ensure homogeneous blending of Methanol in motor gasoline in the range 14 to 15 percent for M 15 fuel.
- 8) In the M15 fuel, 5 percent, Max permissible soluble stabilizers/stabilizing agents/ co-solvents may be added. The oxygen content in M 15 shall be maximum 10 percent m/m.
- 9) In case of dispute, this method shall be the referee method.
- 10) The name and percentage of co-solvent shall be reported.
- 11) No external addition of silicon, chlorine-based materials and metallic additives are allowed.
- 12) All the test methods referred to in this standard include a precision statement. The Interpretation of results shall be based on test method & precision data of test method whenever applicable. In case of dispute the procedure described in ISO 4259 shall be used.

Note: For authentic and detailed information latest version of BIS specification shall be referred.

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INDIAN STANDARD SPECIFICATION FOR KEROSENE

(Fourth Revision) IS 1459:2018

Sr. No.	Characteristic	Requirements		Test Method Refer to [P:] of IS 1448/ ISO/ASTM/IP/ Annex IS 1459
		Grade A	Grade B	
i)	Appearance	Clear and bright. Free from un-dissolved water, foreign matter and other visible impurities		Visual
ii)	Acidity, Inorganic	Nil		ISO 6618/ASTM D974 ¹⁾ / IP 139
iii)	Burning Quality ²⁾			[P: 5] ¹⁾ /IP 10
	a) Char Value, mg/kg of oil consumed, Max	20		
	b) Bloom on glass chimney	Not darker than grey		
iv)	Colour			
	a) Saybolt (in case of un-dyed Kerosene) ³⁾ , Min.	10		P: 14 ¹⁾ / ASTM D 156
	b) Visual (in case of dyed Kerosene)	Blue		Visual / Annexure A ¹⁾
v)	Copper Strip Corrosion for 3 hrs at 50 °C	Not worse than No. 1		[P: 15] ¹⁾ / ASTM D 130 / IP 154
vi)	Density at 15°C, kg/m ³	Not limited, but to be reported		[P: 16] ¹⁾ /ISO 12185/ASTM D 1298/ ASTM D 4052
vii)	Distillation			[P: 18] ¹⁾ /ISO 3405/ ASTM D 86
	a) Percent recovered below 200 °C, percent (v/v), Min.	20		
	b) Final Boiling Point °C, Max.	300		
viii)	Flash Point (Abel), °C, Min.	35		[P: 20] ¹⁾ /ISO 13736/IP 170
ix)	Smoke point ⁴⁾ , mm, Min	18		P :31/ISO 3014 ¹⁾ /ASTM D1322/IP 598
x)	Total sulphur ⁵⁾ content, percent, m/m, Max	0.10	0.20	[P: 34]/ISO 8754 ¹⁾ /ASTM D4294/ASTM D 2622/ASTM D 5453

Notes:

- 1) In case of dispute, this shall be the referee method.
- 2) This test is to be done at refinery end.
- 3) Where Saybolt chromo meter is not available, Lovibond colour of the sample kept in an 18" cell may be measured according to IS 1448: [P-13] in which case the colour shall not be deeper than standard white (IP 4.0). However, in case of dispute [P: 14] shall be referee method.
- 4) For supplies to Defence and Railways signal lamps the smoke point of the product shall be 22 mm, Min
- 5) **Vide MOP&NG notification no. F No.-R-29011/27/2015-OR-I dtd.16.Oct-2018 Grade-A Kerosene supply shall be effective from 1stApril-2020.**

Note: For authentic and detailed information latest version of BIS specification shall be referred.

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INDIAN STANDARD SPECIFICATION FOR AUTOMOTIVE DIESEL FUEL

(Sixth Revision) IS 1460:2017

Sr. No.	Characteristics	Bharat Stage IV	Bharat Stage VI	Test Method Refer to [P:] of IS 1448/ ISO/ASTM/IP/ Annex of IS 1460
i)	Appearance	Clear, bright and free from sediments, suspended matter and undissolved water at normal ambient fuel temperature	Clear, bright and free from sediments, suspended matter and undissolved water at normal ambient fuel temperature	Visual
ii)	Acidity, Inorganic, mg of KOH/g	Nil	Nil	ISO 6618/ASTM D974 ⁹⁾ / IP 139
iii)	Acidity, Total, mg of KOH/g, Max.	0.20	0.20	[P : 2] ⁹⁾ /ASTM D664/ ASTM D974 / IP 139
iv)	Ash, % by Mass, Max.	0.01	0.01	[P : 4] ⁹⁾ / ASTM D 482/IP 4
v)	Carbon Residue (Ramsbottom or micro) on 10 percent residue ¹⁾ , Percent by mass, Max.	0.30	0.30	P : 8 ⁹⁾ / ISO 10370/ASTM D 524/IP 14/ASTM D 4530
vi)	Cetane Number, Min	51 ²⁾	51 ²⁾	[P : 9] ⁹⁾ /ASTM D 613
vii)	Cetane Index, Min.	46 ²⁾	46 ²⁾	ISO 4264 ⁹⁾ /ASTM D4737 /IP 380
viii)	Pour Point, ³⁾ °C, Max			[P : 10] ⁹⁾ ASTM D 5949/ ASTM D5950/ ASTM D5985/ ASTM D97/ASTM D7346/IP 15
	a) winter	3°C	3°C	
	b) summer	15°C	15°C	
ix)	Copper Strip Corrosion for 3 hrs @ 50 °C	Not worse than No.1	Not worse than No.1	P : 15 ⁹⁾ / ASTM D 130/IP 154
x)	Distillation, 95 percent (v/v), recovery, °C, Max	360	360	[P : 18] ⁹⁾ /ISO 3405/ ASTM D 86/ ASTM D 7345/ IP 123
xi)	Flash Point Abel ⁴⁾ , °C, Min	35	35	[P : 20] ⁹⁾ /ISO 3679/ IP170/IP523/ EN13736
xii)	Kinematic Viscosity, cSt at 40 °C	2.0 to 4.5	2.0 to 4.5	[P : 25] ⁹⁾ /ISO 3104/ ASTM D445/ASTM D 7042/IP 71
xiii)	Total contamination, mg/kg, Max	24	24	EN 12662 ⁹⁾ /IP 440
xiv)	Density @ 15 °C , Kg/m ³	815 – 845 ⁵⁾	810 – 845 ⁵⁾	[P : 16] ⁹⁾ / [P : 32] / ISO 12185/ASTM D 4052/ ASTM D1298/IP 160
xv)	Total Sulphur, mg/kg, Max	50	10	ISO 13032 ⁹⁾ / ISO 20884/ ISO 20846 ⁹⁾ /ASTM D 5453/ASTM D 2622 /ASTM D 7220/[P : 34] For Bharat Stage IV grade only [P : 153] ⁹⁾ /ASTM D 4294
xvi)	Water Content, mg / kg, max.	200	200	ISO 12937/ASTM D 6304

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xvii)	Cold Filter Plugging Point, (CFPP) ³⁾ , Max			[P: 110] ⁹⁾ /ASTM D 6371 / IP 309
	a. Winter	6 °C	6 °C	
	b. Summer	18 °C	18 °C	
xviii)	Oxidation Stability ⁶⁾ , g/m ³ , Max.	25	25	[P: 154] ⁹⁾ /ASTM D2274 / IP 388
	b) Oxidation stability by Rancidity meter ⁷⁾ , hours, Min	20	20	EN 15751
xix)	Polycyclic Aromatic Hydrocarbon (PAH), percent by mass, Max.	8	8	EN 12916 ⁹⁾ /IP 391/ ASTM D 6591
xx)	Lubricity corrected Wear Scar Diameter (w.s.d 1.4) at 60°C, microns, Max.	460	460	P 149/ISO 12156-1/Cor 1
xxi)	FAME content ⁸⁾ , % v/v, Max	7.0	7.0	Annex A ⁹⁾ /ASTM D7371/ EN14078

Notes:

- 1) This limit is applicable prior to addition of ignition improvers, if used. In case a value exceeding the limit is obtained on finished fuels in the market, ASTM D 4046/ISO 13759 shall be used to establish the presence of nitrate containing compound. In such case the present limit for carbon residue cannot be applied. However, the use of ignition improver does not exempt the manufacturer from meeting this requirement prior to the addition of additives.
- 2) Cetane number and Cetane index relaxation and time frame, if any, for fuel processed from Assam Crude, may be guided by the notifications issued by Government of India, from time to time.
- 3) Winter shall be the period from November to February (both months inclusive) and rest of the months of the year shall be called as summer.
- 4) Whenever Abel flash point exceeds 66°C by IS 1448 [P: 20]/ISO 3679/IP170/IP523, PMCC flash point by IS 1448 [P: 21]⁹⁾ is to be used.
- 5) Density range relaxation and time frame, if any, for fuel processed from Assam Crude, may be guided by the notifications issued by Government of India, from time to time.
- 6) This test shall be carried out only at the refinery or manufacturer's end.
- 7) This test is applicable for diesel fuel having FAME content of above 2 percent v/v.
- 8) Bio-diesel shall conform to IS 15607 & may be blended up to 7 % max v/v with HSD.
- 9) In case of dispute, this test shall be the referee test method.
- 10) No external addition of chlorine-based materials and metallic additives are allowed.
- 11) All test methods referred to in this standard include a precision statement. The interpretation of results based on test method/ precision shall be used whenever applicable. In case of dispute the procedure described in ISO 4259 shall be used.

Note: For authentic and detailed information latest version of BIS specification shall be referred.

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INDIAN STANDARD SPECIFICATION FOR BIODIESEL, DIESEL FUEL BLEND B6 to B20 IS 16531: 2016

Sr. No.	Characteristics	Requirements	Method of Test, Ref to	
			ISO/ASTM D/ IP/EN	[P:] of 1448/ /Annex
i)	Density ¹⁾ at 15°C (kg/m ³)	820-860	ISO12185/3675 /D 4052	[P:16]/[P:32]
ii)	Kinematic viscosity@ 40°C (cSt)	2.0 -4.62	ISO3104	[P:25]
iii)	Flash point, Abel (°C) <i>Min</i>	35		[P:20]
iv)	Sulphur ²⁾ (mg/kg), <i>Max</i>		D 4294/D 5453/ISO 20846/ ISO 20884/ISO 13032	
	a) BS III	350		
	b) BS IV	50		
v)	Carbon Residue (Ramsbottom) ³⁾ on 10% residue ,Percent by mass, <i>Max</i>	0.3	D 4530/ ISO 10370	[P:8]
vi)	Ash content (Percent by mass) <i>Max</i>	0.01	ISO 6245	[P:4/Sec 1]
vii)	Water , ppm, <i>Max</i>	260	ISO 6296 /ISO 12937	
viii)	Cu corrosion, 3h, <i>Max</i>		ISO 2160	[P:15]
	a) BS III at 100°C	1		
	b) BS IV at 50°C	1		
ix)	Cetane No ⁴⁾ , <i>Min</i>	51	ISO 5165	[P:9]
x)	Cetane index ⁴⁾ , <i>Min</i>	46	ISO 4264/D4737	
xi)	PAH, m/m <i>Max</i>	11	EN 12916/ IP391	
xii)	Lubricity , wear scar Diameter(wsd1.4) at 60° C, micron, <i>Max</i>	460	ISO12156-1	
xiii)	Acid No ⁵⁾ , mg of KOH/gm <i>Max</i>	0.2	ISO 7537/ASTM D 974	[P:1/Sec1]
xiv)	Oxidation stability , at 110°C, h, <i>Min</i>	20	EN15751	
xv)	Distillation , percent recovery at 360 °C <i>Min</i> .	95	ISO 3405	P:18
xvi)	Biodiesel Content , percent, v/v	6-20	EN 14078	Annex B
xvii)	Pour point ⁶⁾ , <i>Max</i>		D5949 / D5950/ D5985/ ISO 3016	[P:10/Sec 2]
	a)Winter	3°C		
	b)Summer	15°C		

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xviii)	Cold filter plugging point(CFPP) ⁶⁾ <i>Max</i>		EN 16329/D6371	[P:110]
	a)Winter	6°C		
	b)Summer	18°C		
xix)	Total contamination, mg/kg <i>Max</i>	24	EN12662	

Notes:

- 1) In case of dispute ISO 12185 shall be the referee method.
- 2) In case of dispute, ASTM D 4294 shall be the referee method.
- 3) The limit is applicable prior to addition of ignition improvers, if used. In case a value exceeding limit is obtained on finished fuels in the market, ASTM D 4046, ISO 13759 shall be used to establish the presence of nitrate containing compound. In such case the present limit of carbon residue cannot be applied. However the use or ignition improver does not exempt the manufacturer from meeting this requirement prior to the addition or additives.
- 4) For Fuels processed from Assam crude, Cetane number and Cetane index is relaxed by 3 units.
- 5) In case of dispute, ASTM D 974 shall be the referee method.
- 6) Winter shall be period of November to February in central and northern plains of India (both months inclusive) and rest of the months of the year shall be called as summer.

Note: For authentic and detailed information latest version of BIS specification shall be referred.

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INDIAN STANDARD SPECIFICATION FOR HIGH FLASH HIGH SPEED DIESEL (HFHSD)

IS 16861: 2018

Sr. No.	Characteristics	Requirement	Test Method Refer to [P:] of IS 1448/ ISO/ASTM/IP/ Annex IS 16861
(i)	Appearance	Clear & Bright	Visual
(ii)	Acid Number, mg KOH/g, <i>Max</i>	0.5	[P: 2] ⁷⁾ / D 664/D 974
(iii)	Ash, percent by mass, <i>Max</i>	0.01	[P: 4] ⁷⁾ /ISO 6245/ D 482
(iv)	Carbon residue on the 10 percent Volume Distillation Residue, mass %, <i>Max</i>	0.3	[P: 8] ⁷⁾ / ISO-10370/D 4530/ D 524
(v)	Cetane index ¹⁾ , <i>Min</i>	45	ISO 4264 ⁷⁾ / D 4737
(vi)	Pour Point ²⁾ , <i>Max</i> . a) Winter b) Summer	3°C 15°C	[P: 10] ⁷⁾ / ISO 3016/ D 97
(vii)	Copper strip Corrosion for 3 h at 100°C	Not worse than No.1	[P:15] ⁷⁾ /ISO 2160/ D 130
(viii)	Distillation, percent (v/v), recovered a) at 350°C, <i>Min</i> b) at 370°C <i>Min</i>	85 95	[P: 18] ⁷⁾ /ISO 3405/D 86
(ix)	Flash Point Pensky Martens closed cup °C, <i>Min</i>	66	[P: 21] ⁷⁾ / ISO 2719/ D 93
(x)	Kinematic viscosity, cSt, at 40°C	2.0 to 5.0	[P: 25] ⁷⁾ /ISO 3104/ D 445/ D 7042
(xi)	Density ³⁾ at 15°C, kg/m ³ , <i>Max</i>	860	[P:16] ⁷⁾ / ISO 3675 / ISO 12185 / D 4052
(xii)	Total sulphur ⁴⁾ , % by mass, <i>Max</i>	0.20	D 4294 ⁷⁾ /ISO 14596/ D 2622/ISO 8754
(xiii)	Water content, ppm, <i>max</i> .	500	ISO 12937 ⁷⁾ /ISO 6296/D 6304
(xiv)	Cold filter plugging point (CFPP), °C	To report	[P: 110] ⁷⁾ /D 6371/ IP 309
(xv)	Oxidation Stability ⁵⁾ , g/m ³ , <i>Max</i>	25	[P :154] ⁷⁾ /D 2274 /IP 388
(xvi)	Lubricity ⁶⁾ , Corrected WSD at 60°C, microns <i>max</i>	520	ISO 12156-1/D 6079

Notes:

- 1) Cetane Index relaxation and time frame, if any, for fuel processed from Assam crude may be guided by the notification issued by Government of India, from time to time.
- 2) Winter shall be the period from November to March (both months inclusive) and rest of the months of the year shall be called as summer.
- 3) Density range relaxation and time frame, if any, for fuel processed from Assam crude may be guided by the notification issued by Government of India, from time to time.
- 4) For supplies to Indian Navy, the limit of Sulphur shall be in agreement between the buyer and the supplier.
- 5) This test shall be carried out at the manufacturer's end only.
- 6) This requirement is applicable to fuels with sulfur content below 500 ppm.
- 7) In case of dispute, this method shall be the referee method

Note: For authentic and detailed information latest version of BIS specification shall be referred.

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INDIAN STANDARD SPECIFICATION FOR LIGHT DIESEL OIL (LDO)

IS: 15770-2008 (Reaffirmed 2014)

Sl. No.	Characteristic	Requirements	Test Method Refer to [P:] of IS 1448/ ISO/ASTM/IP/ Annex of IS:15770
i)	Acidity, Inorganic	Nil	P: 2
ii)	Ash, % by Mass, Max.	0.02	P: 4
iii)	Carbon Residue (Ramsbottom) percent by mass, Max. (On whole sample).	1.5	P: 8
iv)	Pour Point, ¹⁾ °C, Max.		P: 10
	winter	12	
	summer	21	
v)	Copper Strip Corrosion for 3 h at 100 °C	Not worse than No. 2	P: 15
vi)	Flash Point		
	Pensky Martens Closed Cup °C, Min	66	P: 21
vii)	Kinematic Viscosity, cSt at 40 °C	2.5 to 15.0	P: 25
viii)	Sediments, percent by mass, Max.	0.10	P: 30
ix)	Density at 15 °C, Kg/m ³	To be reported	P: 16 / P-32 ²⁾
x)	Water Content, percent by Vol., Max	0.25	P: 40
xi)	Total Sulphur, percent by mass., Max	1.5 ³⁾	P:33/ D:4294

Notes:

- 1) Winter shall be the period from November to February (both months inclusive) and rest of the month of the year shall be called as summer.
- 2) In case of dispute [P-32] shall be the referee test method.
- 3) The stringent limits are applicable in certain areas as notified by the competent authority from time-to-time.

Note: For authentic and detailed information latest version of BIS specification shall be referred.

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INDIAN STANDARD SPECIFICATION FOR FUEL OILS (Third Revision) IS 1593: 2018

Sr. No.	Characteristic	LV Grade	MV1 Grade	MV2 Grade	HV Grade	Test Method Refer to [P:] of IS 1448/ISO/ASTM/IP/Annex IS 1593
1	Acidity, Inorganic	Nil	Nil	Nil	Nil	ASTM D-974 ³⁾ IP-139
2	Ash, percent by mass, Max.	0.1	0.1	0.1	0.1	P: 4
3	Carbon residue, Mass%, Max.	14	16	18	20	P;122/ ISO10370 ³⁾
4	Gross, calorific value	Not limited, but to be reported ¹⁾				P: 6 ³⁾ / P: 7
5	Density at 15°C kg/cm ³ or Relative Density at 15.6/15.6 °C	Not limited, but to be reported				P: 16 or P: 32
6	Flash Point, [Pensky Martens (Closed)], °C/Min.	66	66	66	66	P: 21
7	Kinematic Viscosity in centistokes at 50 °C	80 Max.	80-125	125-180	180-380	P: 25/ ISO-3104
8	Sediments, percent by mass, Max.	0.25	0.25	0.25	0.25	P:30
9	Sulphur, Total percent by mass. Max ²⁾	3.5	4.0	4.0	4.5	P:33/ ISO-8754 ³⁾ / ASTM D 4294
10	Water Content, percent by Vol., Max	1.0	1.0	1.0	1.0	P:40/ISO-3733

Notes:

- 1) Normally gross calorific value is of the order of 10,000cal/g.
- 2) Recognizing the necessity for low Sulphur fuel oil in some specialized user, a lower limit may be specified by mutual agreement between purchaser and the supplier.
- 3) In case of dispute, this method shall be referee method.
- 4) All the test method referred to in this standard method include precision statement. The interpretation of test results based on test method precision shall be used wherever applicable. In case of dispute the procedure described in ISO4259 shall be used.

Note: For authentic and detailed information latest version of BIS specification shall be referred.

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APPENDIX – 2

QUALITY CONTROL CHECKS

SUBJECT	PAGE NO.
Test Category for each product	1

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QUALITY CONTROL CHECKS

Sr. No.	Test Category	Check	Quantity of sample required, Minimum
1	A	Appearance, Density @ 15°C, Colour -Visual (White Oils Only.)	500 ml
2.	B	Batch formation test – As per Appendix 15	One litre (2 x 1 Litre for MS)
3	C	Appearance Presence of water, Colour –Visual (White Oils Only)	500 ml.
4	D * (MS and its variants)	Appearance Density Distillation, Colour, Gum content (Solvent washed) Sulphur RON Copper strip corrosion	(2 x 1) Litre
5	E	Sulphide on water	500 ml.
6.	F * (Naphtha)	Appearance Density, Distillation, Colour, NVM (P:64)	One litre
7.	G * (SKO)	Appearance Density, Colour, Distillation, Flash Point Sulphur Content	One litre
8.	H * (HSD/ HFHSD, LDO)	Appearance Density, Colour ASTM (for HFHSD) Flash Point, Kinematic Viscosity Sulphur In addition to above for HSD/HFHSD- Pour point, Distillation, Cetane Index and Copper strip corrosion test	One litre
9.	I * (FO)	Appearance Density Flash Point Kinematic Viscosity Water Sediments	One litre
10	J	Density, Distillation, Sulphur	500 ml
11	K	Density, Kinematic Viscosity, Sulphur	500 ml

* Under Monthly Monitoring Tests (Clause No. 4.4.1)

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APPENDIX – 2A

Activities & Retention Of Samples

SUBJECT	PAGE NO.
Tanker Operations	1
Pipeline Operations	1-2
Tank Wagon/Tank Truck/Barge Operations	3

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SR. NO.	EVENT/ ACTIVITIES	SOURCE OF SAMPLE	QUANTITY OF SAMPLE	TYPE OF SAMPLE	SAMPLES TO BE DRAWN BY	IQCM REFERENCE CLAUSE NUMBER	RETENTION PERIOD
1	Before receipt	Individual Nominated tanks	2X2 litre	UML Composite	Marketing Co.	3.2.1, 3.3.1.2	Till batch established and/or next receipt
2	Pre Discharge test	Individual tanker tanks	1x1 litre	All level (bottom sample on need basis)	Marketing Co.	3.2.3	Till batch established
3	During tanker receipt	Manifold at shore end	2x1 litre 2x1 litre 2x1 litre	Initial Middle & End of product pumping	Marketing Cos.	3.2.8	Till batch established,
4	During tanker receipt	Manifold at jetty end	2x1 litre 2x1 litre 2x1 litre	Initial Middle & End of product pumping	Marketing Cos.	3.2.8	Till batch established,
5	Batch formation after tanker receipt	Storage tanks	1x1 litre 1x1 litre 1x1 litre	Top Upper Middle Lower Bottom	Marketing Cos.	3.2.10	Till batch established, For SKO 3 months after batch estd.
6	Before Tanker loading	Nominated individual tanks at Refinery	(No. of disports+3) x 2 litres	UML Composite	Refinery & Mktng. Co.	5.1.5 3.2.2	Till batch established at disport
7	Before tanker loading	Nominated Individual tanks at Marketing Terminals	(No. of disports+3) x 2 litres	UML Composite	Mktng. Co.	5.1.5 3.2.2	Till batch established at disport
8	During Tanker loading	Manifolds at shore end	2X1 litre 2X1 litre 2X1 litre	Initial Middle & End of product pumping	Refinery & Mktng Co. OR Marketing Co.	5.1.6	Till batch established at disport
9	During Tanker loading / dispatching	Manifolds at jetty end	2X1 litre 2X1 litre 2X1 litre	Initial Middle & End of product pumping	Marketing Co./ Ships Represent- ative	5.1.6	Till batch established at disport
10	After tanker loading	Tanker tanks	(No. of disports+3) x 2 litres	All Level Composite	Master of tanker/ oil Co./ surveyor	5.1.7	Till batch established at disport
11	Before receipt through multi-product pipeline	Individual Nominated tanks	2X2 litres	UML composite	Pipeline & Mktng. Co.	3.3.1.1, 3.3.1.2	Till batch established

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SR. NO.	EVENT/ ACTIVITIES	SOURCE OF SAMPLE	QUANTITY OF SAMPLE	TYPE OF SAMPLE	SAMPLES TO BE DRAWN BY	IQCM REFERENCE CLAUSE NUMBER	RETENTION PERIOD
12	Before transfer through multi-product pipeline	Individual tanks Nominated for transfer	2X2 litre	UML Composite	Marketing / Refinery / Pipeline Divn. (as applicable)	5.2.2	Till batch established
13	Refinery batch certification before dispatch by TW/TT/ Dedicated PL	Refinery storage tanks	2X2 litre	UML Composite	Refinery	5.0.2	30 days
14	PLT Between Marketing divisions of OMC	Individual Tanks nominated for Receipt	2X2 litre	UML Composite	Marketing companies	3.3.8	Till batch established
15	Transfer through MPPL/Dedicated Pipeline ex a) Mktng. Terminal b) Refinery	Manifold at dispatching end	2x1 litre 2x1 litre 2x1 litre	Initial Middle End of product pumping	a) Pipeline/ Marketing. Division b) Refinery & Pipeline/ Marketing Division	3.3.2 & 5.2.2	Till batch established
16	Transfer through Multi-product pipeline /Dedicated Pipeline/Local Dedicated Pipeline	Manifold at receiving end	2x1 litre 2x1 litre 2x1 litre	Initial Middle End of product pumping	Pipeline Divn. & Marketing Division (as applicable)	3.3.2 & 5.2.2	Till batch established
17	After receipt through Multi-product pipeline	Tanks at receiving locations	1x1 litre 1x1 litre 1x1 litre	Top, Middle Bottom	Pipeline Divn. & Marketing Division	3.3.6	Till batch established, (For SKO 3 months after batch established.)
18	Transfer between Marketing division of OMC through dedicated / local dedicated pipe line	Dispatching tanks	2x2 litres	UML Composite	Marketing Cos.	3.3.8	Till quality established
19	Transfer from Refinery to Marketing tanks through dedicated pipeline	Receiving tanks	1x1 litre 1x1 litre 1x1 litre	Upper, Middle Lower	Marketing Cos.	3.3.4	Till quality established.
20	Transfer through local dedicated pipelines	Nominated tanks at a) Receiving locations. b) Transferring locations	2x2 litres	UML Composite	Marketing Cos.	3.3.10	Till quality established.

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SR. NO.	EVENT/ ACTIVITIES	SOURCE OF SAMPLE	QUANTITY OF SAMPLE	TYPE OF SAMPLE	SAMPLES TO BE DRAWN BY	IQCM REFERENCE CLAUSE NUMBER	RETENTION PERIOD
21	SKO after tank wagon/ tank truck receipt	Storage tanks	1x1 litre	Composite	Marketing Co.	3.4.4.1	One month/ till Investigation in case of failure.
22	Tank wagon loading	Tank Wagon filling point	2x1 litre (MS) 1x1 litre (SKO, HSD, FO, LDO)	Spot (Running)	Refinery/ Marketing Co.	5.3.4	30 Days/ in case of failure, till investigation is over.
23	Tank truck loading (White Oil)	Tank truck filling point	4x1 litre (MS) 1x1 litre (SKO) 2x1 litre (HSD)	Spot (Running)	Refinery/ Marketing Co.	5.4.3 .5.4.5	30 Days/ in case of failure, till investigation is over
24	Tank truck loading (Black oil)	TLF - Pipeline	1x1 litre FO, LDO (delivered supply only)	Spot (Running)	Refinery/ Marketing Co.	5.4.3 5.4.5	15 Days/ in case of failure, till investigation is over
25	Monthly Monitoring	Storage tanks	4x1 litre (MS) 2x1 litre (Others)	UML Composite (Vertical) /All level (Horizontal)	Marketing Co.	4.4.1	One month/ till Receipt of test report
26	Tank wagon receipt	Tank Wagon	2x1 litre (MS) 1x1 litre (SKO HSD, FO, LDO)	All level	Marketing Co.	3.4.6	15 Days/ in case of failure till investigation is over.
27	Before receipt by Barge	Receiving Location	2 X 1 Litre	Composite	Marketing Co	3.2.11	Till Quality Established in receiving tank
28	Before Barge Loading	Refinery Tank/Terminal Tank	2 X 2 Litres Each	UML composite	Refinery/ Marketing Co	5.1.9	Till Quality established at disport
29	During Barge Loading	Manifold at Jetty End/Barge End	2 X 1 Litre	Initial & Final	Stakeholders	5.1.9	Till Quality established
30	During Barge Unloading	Manifold at Shore end	2 X 1 Litre	Initial & Final	Stakeholders	3.2.11	Till Quality established
31	After Barge loading	Barge tanks	2 X 2 Litre	All Level Composite	Master of Barge/oil Co./ surveyor	5.1.9	Till batch established at disport
32	Inter-tank product transfer	Receiving tank after ITT	2 X 1 Litre	UML composite	Location	3.3.11	15 days/For SKO 3 months

* MPPL = Multi Product Pipeline

** UML Composite Sample = Composite Of Upper, Middle & Lower Samples (Refer Section - 7)

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 3

Pre-Discharge Tests for Ocean Tankers / Barges

INDUSTRY QUALITY CONTROL MANUAL

Appendix 3	Section Name: Pre-discharge Tests for Ocean Tankers / Barges	Page 1 of 1
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PREDISCHARGE TESTS APPLICABLE FOR OCEAN TANKERS/BARGES

PRODUCT	TESTS FOR INDIGENOUS PRODUCTS	TESTS FOR IMPORTED PRODUCTS *
Naphtha (All grades)	a) Appearance b) Colour (Visual) c) Density d) Distillation e) NVM (only for feed stock) - P:64	a) Appearance b) Colour (Visual) c) Density d) Distillation e) NVM (only for feed stock) - P:64
MS (All grades)	a) Appearance b) Colour (Visual) c) Density d) Distillation e) Sulphur	a) Appearance b) Colour (Visual) c) Density d) Distillation e) Sulphur f) Copper strip corrosion 3h/50°C
SKO	a) Appearance b) Colour (Saybolt / Lovibond) c) Density d) Flash Point e) Distillation	a) Appearance b) Colour (Saybolt / Lovibond) c) Density d) Flash Point e) Distillation
HSD (All grades)	a) Appearance b) Colour (Visual) c) Density d) Flash Point e) Kinematic Viscosity f) Sulphur g) Distillation h) Cetane Index	a) Appearance b) Colour (Visual) c) Density d) Flash Point e) Kinematic Viscosity f) Sulphur g) Distillation h) Cetane Index i) Pour Point
LDO	a) Density b) Flash Point c) Kinematic Viscosity	a) Density b) Flash Point c) Kinematic Viscosity d) Water Content
FO	a) Density b) Flash Point c) Kinematic Viscosity d) Water Content	a) Density b) Flash Point c) Kinematic Viscosity d) Water Content e) Ash Content

* In case of imported cargo, sample shall be tested for Batch Formation Test parameters at first port of call. Load port test report shall meet the full contractual specification of the product.

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 4

Quality Control Checks for Tank Wagon and Tank Truck Operations

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 5

Quality Control Checks for Barrels (Other than Lubes)

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 6

Tanker Tanks Cleaning Key

INDUSTRY QUALITY CONTROL MANUAL

Appendix 6

Section Name: Tanker Tanks Cleaning Key

Page 1 of 1

TANKER TANKS CLEANING KEY

TO LOAD	LAST SERVICE											
	AV GAS	ATF	NAP	MS	SKO	HSD	HFHSD	LDO	FO	CRUDE	LSHS	LUBES
NAPHTHA	3	2	1	1	2	4	4	X	X	X	X	X
MS	1	2	1	1	2	2	2	X	X	X	X	X
SKO	2	1	3	3	1	1	1	X	X	X	X	4
HSD	2	1	2	2	1	1	1	X	X	X	X	2
HFHSD	2	2	2	2	1	1	1	X	X	X	X	2
LDO	2	1	2	2	1	1	1	1	1	2	1	1
FO	2	1	2	2	1	1	1	1	1	2	1	1
CRUDE	1	1	1	1	1	1	1	1	1	1	1	1
LSHS	2	1	2	2	1	1	1	1	1	2	1	1
LUBES	3	3	3	3	3	3	3	X	X	X	X	1

- Code** :
1. Tanks, Pumps and Pipelines to be well drained.
 2. Flush pipelines, pumps and tank bottom with water and drain well, gas free if last service was crude, AVGAS, Naphtha or MS.
 - 3 (a) Cold water butter-worthing for 4 Hrs. (2Hrs. when the tanks are painted).
 - 3 (b) Flush lines, pumps and tank bottoms with water and drain well.
 4. Carry out item 3(a) & 3(b) but use hot water @ 60°C instead of cold water for butter - worthing.
 - X. Loading not permitted without special cleaning instructions/ clearance from HO-Shipping and QC Dept.

- Note** :
- I. Previous three cargoes
 - a) Black oils, lube oils and vegetable oils should not have been carried in previous three voyages by the vessels nominated for loading Naphtha.
 - b) At least three voyages of HSD should be carried by a vessel, which was on LDO service before loading SKO.

- Note** :
- II. Choice of last service
 - a) For loading Naphtha: Vessels with last service on AVGAS, HSD & LSHFHSD shall be avoided as far as possible.
 - b) Tankers carrying vegetables oils in their previous load shall not be used for white oils loading.

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 7

Tanker Tanks Fitness Certificate

INDUSTRY QUALITY CONTROL MANUAL

Appendix 7	Section Name: Tanker Tanks Fitness Certificate	Page 1 of 1
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TANKER TANKS FITNESS CERTIFICATE*

The tanker tanks _____ nominated to carry the product(s) bulk heads/manifolds, etc., has/have been jointly inspected and it is certified that the tanks(s), bulk heads/manifolds, etc., are clean, dry and fit to carry the product to be loaded into the tanker tank.

SIGNATURE:

SIGNATURE:

NAME:

NAME:

SURVEYOUR:

MASTER:

* Tanker tank fitness certificate to be issued either by the master or jointly by the master and surveyor, wherever surveyor has been appointed.

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 8

Storage Tanks / Tank Truck Cleaning Data

INDUSTRY QUALITY CONTROL MANUAL

Appendix 8	Section Name: Storage Tanks / TT Cleaning Data	Page 1 of 1
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STORAGE TANKS CLEANING DATA

LOCATION:

Tank No.	Capacity (KL)	Grade	Date of Last Cleaning	Extension Approval If any	Tank Cleaning			After Tank Cleaning		Signature of	
					Cleaning was due on	Emptied on	Boxed up on	1 st Parcel Received on	BF Test Report No. / Date *	Supervisor	Location In-Charge
1	2	3	4	5	6	7	8	9	10	11	12

* Attach copy for each storage tank.

TANK-TRUCK CLEANING DATA

LOCATION:

TT No	Capacity (KL)	Date Of Last Cleaning	Cleaning due on	Cleaned on	Location In-charge

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 9

Log Book – Tanker / PLT Operations

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 10

Inland Pipeline Transfer Log Book

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 11

Sample Label

(Tank Wagon/Monthly Monitoring/Batch Formation)

INDUSTRY QUALITY CONTROL MANUAL

Appendix 11	Section Name: Sample Label Tank Wagon / Monthly Monitoring / Batch Formation	Page 1 of 1
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SAMPLE LABEL

Location:	Testing Lab:
Product:	Date Of Sampling:
Tank No./ Source Of Sample:	Time Of Sampling (In Hrs.):
Quantity In Tank (In Kl):	Type Of Sample:
Batch No.: Seal Number: - Aluminum Container: - Wooden Box: Density At 15°C: Flash Point (For SKO):	Reasons For Testing:
Sample Drawn By: NAME:	Sample Supervised By: Name: Signature:

Note:

The sample label should have minimum above details pasted on sample container. In case of bar coding / any other coding system, the details of sample label given above should be provided in the decoding system.

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 11A

Sample Label

(Tank Truck Filling Point)

INDUSTRY QUALITY CONTROL MANUAL

Appendix 11A	Section Name: Sample Label Tank Truck Filling Point	Page 1 of 1
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SAMPLE LABEL – TANK TRUCK FILLING POINT

Location:	Sample Drawn On:
Product:	Time Of Sampling (In Hrs.):
Storage Tank No. _____ Tank lorry Filling Bay No./ TLF Header _____ Batch No./Particular No. _____	
Quantity Of Sample : 4X 1 litre for MS , 2X1 litre for HSD and 1x1 litre of SKO	Density at 15°C: _____ Kg/m3 or gm/cc
Seal Number: - Aluminum Container: _____ - Wooden Box: _____	
CERTIFIED THAT EMPTY CONTAINERS HAVE BEEN RINSED WITH THE SAME PRODUCT BEFORE DRAWING OF SAMPLES	
Signature..... Name Designation.....	

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 11B

Sample Label

(Bunker Filling Point)

INDUSTRY QUALITY CONTROL MANUAL

Appendix 11B	Section Name: Sample Label Bunker Filling Point	Page 1 of 1
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SAMPLE LABEL (BUNKER)

SAMPLE LABEL – BUNKER FILLING POINT (Jetty End / Shore End)

The name & IMO number of the receiving vessel:	The port of bunkering:
Date of commencement of bunkering:	The name, address and telephone number of the bunker supplier:
The bunker/s name/s:	Quantity of bunker/s delivered in metric tons:
Sulphur content in % m/m:	Density At 15°C:
Name of bunker tanker / bunker installation:	Testing Lab:
Product:	Date of Sampling:
Tank No/ Source of Sample:	Time of Sampling (In Hrs.)
Quantity In Tank (KL):	Type of Sample: BDN number:
Batch No.: Seal Number: - Aluminum Container: - Wooden Box:	Reasons for Testing:
Certified that Empty Containers have been rinsed with the same product before drawing of Samples	
Declaration to the effect that the supplied bunker meets Sulphur limit regulations and fuel quality requirements of Annex VI of MARPOL 73/78	
Sample Drawn By : Name	Sample Supervised By: Name: Signature Signature of the vessel's chief engineer

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 12

Record of Samples Retained / Disposed

INDUSTRY QUALITY CONTROL MANUAL

Appendix 12	Section Name: Record of Samples Retained / Disposed	Page 1 of 1
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RECORD OF SAMPLES RETAINED / DISPOSED

The details of retention samples collected during receipt, storage and dispatch operations as described in the manual (Ref: **Appendix 2 & 2A**) are to be recorded in the following format.

LOCATION

Sr. No	Date & Time Of Sample Drawn	Source *	Product	Purpose **	Density At 15°C	Batch No. (If Any)	Seal Number	Sample Drawn By	Sign	Disposed On	Sign

* Indicate name of Tanker and Tanker Tank No. / Storage Tank No. /TLF /TWF/ pipeline transfer etc. as applicable.

** For Purpose, refer **Appendix 2** and **2A**.

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 13

Batch Control Log Book

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 14

Code Letters of Refineries / Terminals / Installations / Depots

INDUSTRY QUALITY CONTROL MANUAL

Appendix 14	Section Name: Code Letters for Refineries / Terminals / Installations / Depots	Page 1 of 7
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Refineries:

East		West		North		South	
Location / Code Letters		Location / Code Letters		Location / Code Letters		Location / Code Letters	
A) IOCL							
Haldia	HR	Koyali	JR	Panipat	PR	Chennai	CPCL
Barauni	BR			Mathura	MR	Narimanam	CBR
Guwahati	GR						
Bongaigaon	BGR						
Digboi	DR						
Paradeep	PDR						
B) BPCL							
		Mumbai	BPCR			Kochi	KRL
C) HPCL							
		Mumbai	HRM			Vizag	HRVZ
D) Others:							
Numaligarh	NRL			Bina	BORL	Mangalore	MRPL
		Jamnagar	RIL				
		Vadinar	Nayara	Bhatinda	HMEL		
Total	7		5		4		5

INDUSTRY QUALITY CONTROL MANUAL

Appendix 14	Section Name: Code Letters for Refineries / Terminals / Installations / Depots	Page 2 of 7
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IOCL Terminals / Installations:

East		West		North		South	
Location / Code Letters		Location / Code Letters		Location / Code Letters		Location / Code Letters	
Barauni	TBN	Ahmedabad	TAB	Agra	TAG	Bangalore	TBL
Bhubhaneshwar(Jatni)	TBB	Asoj	TAJ	Allahabad	TAH	Chennai, FST	TCHF
Betkutchi	TBC	Dumad	TMD	Ambala	TAB	Chittoor Terminal	TCR
Bongaigaon	TBG	Hazira	THR	Amousi (Lucknow)	TAS	Coimbatore	TCM
Budge Budge	TBB	JNPT	TJP	Bharatpur	TBP	Ernakulam	TGK
Digboi	TDG	Indore (Mangliagaon)	TMG	Bhatinda	TBD	Hyderabad Terminal	THY
Guwahati	TGH	Kandla (FST/NFST)	TFST	Chittorgarh	TCG	Kakinada	TKD
Haldia-A	THA	Kandla (Main)	TKD	Delhi	TDI	Karwar	TKR
Haldia-B	THB	Loni	TLN	Jaipur	TJP	Kochi (Irunpanam)	TKC
Jasidih	TJS	Panewadi (Manmad)	TPW	Jalandhar	TJL	Korukkupet	TKK
Jharsuguda	TJG	Ratlam	TRL	Jodhpur	TJD	Madurai	TMD
Khunti	TKH	Sewree I	TSE	Kanpur	TKP	Mangalore	TMG
Mourigram	TMM	Sewree II	TTI	Najibabad	TNJ	Narimanam	TNM
Paradeep	TPD	Sidhpur	TSD	Mathura	TMA	Rajahmundry	TRJ
Patna	TPA	Vasco	TVS	Mughalsarai	TMS	Sankari TOP	TSK
Port Blair	TPB	Vashi	TVI	Meerut	TMR	Tondiarpet	TTP
Rajbandh	TRB	Wadala	TWD	Panipat	TPP	Trichy	TTY
Siliguri	TSG	Korba	TKB	Rewari	TRW	Tuticorin	TTC
Lumding	TLD	Dumad	TMD	Roorkee	TRK	Vijayawada	TVJ
				Sangrur	TSA	Vishaka FHI	TVZ
				Tikrikalan TOP	TTK	Wellington Island	TWI
Total	19		18		21		21

INDUSTRY QUALITY CONTROL MANUAL

Appendix 14	Section Name: Code Letters for Refineries / Terminals / Installations / Depots	Page 3 of 7
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IOCL Depots:

East		West		North		South	
Location / Code Letters		Location / Code Letters		Location / Code Letters		Location / Code Letters	
Bhubaneshwar	DBB	Akolner	DAN	Ambabai (Zhansi)	DAB	Belgam	DBE
Dharmanagar (MD)	DDN	Jabalpur (Bhitoni)	DBH	Aonla	DAL	Bijapur	DBJ
Dharmanagar (AOD)	DDA	Bishrampur	DBM	Baitalpur	DBR	Gulbarga	DGL
Dimapur	DDM	Gaigaon	DGG	Banthara	DBT	Guntakkal	DGL
Doimukh	DMK	Itarsi	DIT R	Gonda	DGD	Hubli Depot	DHL
Imphal	DIH	Jayant	DJY	Jammu	DJU	Kozhikode	DKZ
Malda	DMD	Khapri (Nagpur)	DKH	Kargil	DKG	Mysore	DMS
Missamari	DMI	Miraj	DMJ	Kullu	DKL	Ongole Depot	DOL
Rangpo	DRG	Pakni	DPI	Lalkauan	DLK	Ramagundam	DRM
Raxaul	DRX	Gwalior (Rairu)	DRR	Leh	DLH	Visakha Fishing	DVF
Silchar (Ramnagar)	DSR	Rajkot	DRA	Parwanoo	DPW		
Somnathpur (Balasore)	DSN	Sagar	DSG	Srinagar	DSN		
Vairengte	DVN	Shirud	DSD				
		Tadalli (Chandrapur)	DTI				
Total	13		14		12		10

INDUSTRY QUALITY CONTROL MANUAL

Appendix 14	Section Name: Code Letters for Refineries / Terminals / Installations / Depots	Page 4 of 7
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BPCL Terminals, Installations, Tops, Depots:

East		West		North		South	
Location / Code Letters		Location / Code Letters		Location / Code Letters		Location / Code Letters	
BPCL Terminals, Installations, Tops:							
Barauni	BNI	Kandla	KAN	Bijwasan	BJW	Cherlapally	CHP
Budge Budge	BGB	Koyali	KOY	Bharatpur	BTR	Devangunthi	DKN
Haldia	HLD	Manglia	MRT	Bhatinda	BTI	Irugur	IGU
Paradeep	PDP	Manmad	MAN	Jalandhar	JAL	Irumpanam	IPN
Patna	PAT	Navegaon	NAV	JOBNER	JBN	Kakinada	KKD
Rajbandh	RBJ	Pakni	PAK	Kota	KTT	Karur	KAR
		Sewree	SEW	Mathura	MTR	Kondapalli	KON
		Sidhpur	SID	Mughalsarai	MGS	Mangalore	MCI
				Piyala	PYL	Tondiarpet	TNP
				Panipat	PNP	Vizag	VIZ
				Rewari	REW	Ennore Costal Installation	ECI
				Salawas	SAL		
				Sangrur	SNG		
Total	6		8		13		11
BPCL Depot:							
Balasore	BLS	Akolner	AKO	Aonla	ANL	Cannanore	CAN
Berhampur	BAM	Bakania	BAK	Baitalpur	BTL	Desur	DES
Dhanbad	DHN	Bhitoni	BHT	Gonda	GND	Gooty	GOT
Malda	MLD	Borkhedi	BOR	Haridwar	HAR	Mysore	MYS
Muzaffarpur	MZP	Gaigaon	GAI	Jammu	JMU	Ongole	OGL
NJP	NJP	Hazira	HAZ	Kanpur	KNP	Peelamedu	PLU
Ranchi	RNC	Manglia	MGL	Karari	KRR	Raichur	RCT
Rangpoo	RGP	Miraj	MRJ	Kathgodam	KTH	Sankari	SAN
Tatanagar	TAT	Rairu	RRU	Lalru	LRU	Tada	TAD
				Meerut	MER	Tirunelveli	TEN
				Najibabad	NJB	Warangal	WGL
				Sahajahanpur	BAN		
				Srinagar	SNG		
Total	9		9		13		11

INDUSTRY QUALITY CONTROL MANUAL

Appendix 14	Section Name: Code Letters for Refineries / Terminals / Installations / Depots	Page 5 of 7
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HPCL Terminals:

East Zone		West Zone		North West Zone	
Location / Code Letters		Location / Code Letters		Location / Code Letters	
Kolkata I	HTBB1	Mahul	HTMH	Bharatpur	HTBHT
Haldia	HTH	Sewree I	HTS I	Jaipur	HTJA
Paradeep	HTP	Sewree II	HTS II	Ajmer	HTAJ
		Wadala	HTWD	Palanpur	HTPL
		Vashi White oil	HTVW	Mundra	HTMU
		Vashi Black oil	HTVB	Kandla	HTKD
		Loni	HTLN	Jodhpur	HTJDH
		Vasco	HTVS	Vadodara	HTVD
		Miraj	HTMRJ		
		Sholapur	HTSOL		
Total	3		10		8

North Zone		North Central Zone		South Zone		South Central Zone	
Location / Code Letters		Location / Code Letters		Location / Code Letters		Location / Code Letters	
Bahadurgarh	HTBH	Mathura	HTMTH	Cochin	HTCO	Visakha New Terminal	HTVZW
Delhi	HTDL	Kanpur	HTKNP	Irumpanam	HTIRPM	Visakha New Black oil	HTVZB
Bhatinda	HTBTD			Cassimode	HTCSMD	Kakinada	HTKKN
Rewari	HTR			Chennai New Terminal	HTCNT	Rajahmundry	HTRJMD
Bhatinda – HPCL-MKT-HMEL	HTHML					Vijayawada	HTVW
HMEL Bitumen Terminal	HTHBT					Suryapet	HTSYP
						Secunderabad	HTSEC
						Bengaluru	HTBLR
						Hassan	HTHSN
						Mangalore	HTMN
Total	6		2		4		10

INDUSTRY QUALITY CONTROL MANUAL

Appendix 14	Section Name: Code Letters for Refineries / Terminals / Installations / Depots	Page 6 of 7
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HPCL Depots:

East Zone		West Zone		North West Zone	
Location / Code Letters		Location / Code Letters		Location / Code Letters	
Raipur	HDRPR	Manmad	HDMNM	Hazira	HDHZR
Balasore	HDBLS	Jabalpur	HDJBP		
Durgapur	HDDUR	Gwalior	HDGWL		
Guwahati	HDGW	Sagar	HDSGR		
Bokaro	HDBKR	Indore	HDIND		
Surinam (MINI)	HDSU	Akola	HDAKL		
		Nagpur	HDNGP		
Total	6		7		1

North Zone		North Central Zone		South Zone		South Central Zone	
Location / Code Letters		Location / Code Letters		Location / Code Letters		Location / Code Letters	
Sangrur	HDSRG	Meerut	HDMRT	Coimbatore	HDCBE	Gulbarga	HDGBR
Nalagarh	HDNGR	Najibabad	HDNBD	Madurai	HDMDU	Hubli	HDHUB
Jalandhar	HDJLD	Haldwani	HDHLD	Tirunelveli	HDTEN	Guntakkal	HDGNTL
Jammu	HDJMU	Roorkee	HDRKE	Kozhikode	HDKZH	Ramagundam	HDRGTM
Srinagar	HDSRN	Bareilly	HDBRL			Kadapa	HDKDP
Leh	HDLEH	Lucknow	HDLKO			Visakha Fishing Harbour	HDVFH
		Baitalpur	HDBTP				
		Mughalsarai	HDMGS				
		Barauni	HDBRN				
		Patna	HDPTN				
Total	6		10		4		6

INDUSTRY QUALITY CONTROL MANUAL

Appendix 14	Section Name: Code Letters for Refineries / Terminals / Installations / Depots	Page 7 of 7
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Others – Depot / Terminals:

East		West		North		South	
Location / Code Letters		Location / Code Letters		Location / Code Letters		Location / Code Letters	
NAYARA							
		Vadinar	VAD				
		Wardha	WAD				
		Sirohi	SRH				
ONGC							
		Hazira					
		Uran					
RIL							
Haldia	T207	Bhopal	T206	Rewari	T204	Chennai	T205
		Hazira	T203	Kanpur	T213		
NRL							
Siliguri Marketing Terminal (Rangapani)	SMT						
ETTPL							
(Ennore Tanker Terminal Pvt Ltd.)						Ennore	ENR
ZIOTL							
(Zuari Indian Oil Tanking Ltd.)		Goa (Vasco)	ZIOL				
IOTL Raipur							
		Raipur	IOTL-R				
Total	02		09	02		02	

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 15

Batch Formation Tests

INDUSTRY QUALITY CONTROL MANUAL

Appendix 15	Section Name: Batch Formation Tests	Page 1 of 1
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BATCH FORMATION TESTS

Sr. No.	Characteristic	NAPHTHA	MS	SKO	HSD/HFHSD	LDO	FO
1	Appearance	√	√	√	√	√	√
2	Colour (Visual)	√	√		√		
3	Colour (Visual) for Blue dyed / Saybolt			√			
4	Density @ 15°C	√	√	√	√	√	√
5	Flash Point			√	√	√	√
6	Smoke Point			√			
7	Kinematic Viscosity @ 40°C				√	√	√ @ 50°C
8	Pour Point				√	√	
9	Distillation	√	√	√	√		
10	Cetane Index				√		
11	Gum content (solvent washed)		√				
12	RVP @ 37.8°C.	√					
13	Copper Strip Corrosion for 3 hrs. @ 50°C	√	√	√	√ / @100°C for HFHSD		
14	NVM / ROE	√					
15	Total Sulphur	√	√	√	√	√	√
16	Water content					√	√
17	Aromatics Content	√					
18	Olefins Content	√					
19	Gross Calorific Value	√					
20	C/H ratio (calculated)	√					
21	RON		√				
22	Sediments by extraction						√

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 16

Procedure for Tank Truck & Tank Wagon Grade Change Over

INDUSTRY QUALITY CONTROL MANUAL

Appendix 16	Section Name: Procedure For TT/TW Grade Changeover	Page 1 of 1
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PROCEDURE FOR TANK TRUCK & TANK WAGON GRADE CHANGE OVER

Sr. No.	From	To	Tank-Wagon	Tank Truck
1	Naphtha	MS	A	A
2	Naphtha	SKO*	A	C
3	Naphtha	HSD	A	A
4	Naphtha	ATF	E	Not Permitted
5	MS	SKO*	A	C
6	MS	HSD	A	A
7	SKO	MS / HSD	F	F / D
8	SKO	Naphtha	A	A / D
9	HSD	MS	A	A
10	HSD	SKO*	A	A
11	HSD	Naphtha	B	B
12	ATF	MS / HSD	F	F
13	HSD	HFHSD	A	A
14	HFHSD	HSD	A	A

CODES FOR CHANGEOVER PROCEDURE

- A) Empty out the previous contents completely by opening bottom valves. Inspect from top manhole as well as bottom manifold for complete emptiness and record it.

* SKO doped with marker / blue dye shall not be loaded in T/Ws. **(Clause 5.3.1)**

- B) The previous contents shall be drained out completely. Grade flush shall be carryout from top through each manhole with 200 (TW) / 20 (TT) litres of Naphtha. Flushed product shall be drained out completely and shall be checked for visual colour.

In case the flushed Naphtha sample is not clear and dis-colored, flushing procedure shall be repeated till the bottom drained sample is clear and colorless. Thereafter, the tank wagon or tank truck can be filled with Naphtha.

In Refinery Terminals where SKO is not doped with Marker, instead of Naphtha, SKO may be used for flushing.

- C) The previous product from each compartment of Tank Truck, lines, manifold etc shall be completely drain out to ensure TT is bone dry. Each compartment shall be filled with 50 litres of HSD and shall be allowed to stand for 15 minutes. Flushed HSD shall be drained out completely from each compartment, lines, manifold etc. before loading SKO. The flushed HSD shall be tested for Flash Point and can be put back into HSD storage tank if it meets the HSD specification. In the event the Flash Point does not meet the requirement, concerned department shall be intimated for advice regarding disposal.
- D) In case of marked SKO, guideline and approval is to be obtained from QC department on case-to-case basis.
- E) The previous contents shall be drained out completely. T/W shall be flushed with a minimum quantity of 200 liters each of aviation fuel to be filled from each manhole covers of BTPN rakes before loading Aviation Fuels. Disposal action for flushed product shall be taken on the basis of test result of same.
- F) Changeover of grade shall be avoided in BS VI scenario. However, in exigency it shall be carried by emptying out the previous contents completely by opening bottom valves. Grade flush shall be carryout from top through each manhole with 100 (TW) / 10 (TT) litres of respective product. Flushed product shall be drained out completely before loading.

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APPENDIX – 17

Inspection Guide for Non-Aviation Products Storage Points

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TERMINAL / DEPOT STORING NON-AVIATION PRODUCTS

Name of Location / Region	
Products Handled	
Name of Location's QC Coordinator	
Date of Inspection	
Inspected by	
Last Inspected by & on..... QC	
Last Inspected by & on.....Ops	

FM: Fully Met

PM: Partially Met

NC: Not Complied

No	QC Requirement	FM	PM	NC	Remarks
1	QC RECORDS/MANUALS/CIRCULARS/SOPs etc.				
A	Is Industry QC Manual (updated with incorporation of all amendments) on Non-Aviation Petroleum Product available?				
B	Is "Industry Manual on Acceptance of Product by marketing Companies and Related Issues", MDG, TDG available?				
C	Are all QC Circulars/Bulletins available and filed in separate indexed file? Record the ref no of the latest circular.				
D	Is Location specific Work Instruction/SOPs available and being followed?				
E	Is Ethanol Manual available?				
F	Are the Manuals on Bio-diesel, Branded Fuels, and Special Products (as applicable) available at Locations?				
G	Is QC audit/self-audit of Location conducted as per defined frequency and records available?				
H	Are all the QC records maintained as per the format of the IQCM with proper identification?				
2	SAMPLING AIDS & QC FACILITIES :				
A	Is Sampling Bottle / grabber / Thief / Can / SS Chain/ Bottom Sampler (Minimum 2 sets) available?				
B	Is adequate number of Hydrometers / Thermometers/ Alcoholmeters available?				
C	Is Aluminum/Glass/SS Sample containers available as per requirement?				
D	Is 500 ml Glass Cylinder available for density check and for alcohol content in Ethanol?				
E	Is adequate no. of A-Class 150 ml graduated glass cylinders with stopper, 10 ml graduated pipette available for ethanol test?				
F	Is Flash Point Apparatus available and in working condition? Confirm the working of apparatus by-testing sample.				
G	Is Marker test kit (wherever applicable) available and segregated?				

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No	QC Requirement	FM	PM	NC	Remarks
H	Are Master Hydrometers (Preferably L-50) / Thermometers/ Alcoholmeters available with valid Calibration certificate?				
I	Are in use Hydrometers / Thermometer/ Alcoholmeters verified against the masters on yearly basis and records available?				
J	Is there any trained person (at least one) for performing verification of QC equipment?				
K	Are the SOP for various QC tests (Density, Flash Point etc.) available at point of conducting the test?				
L	Check availability of ASTM 53B (Density conversion) and specific gravity conversion charts.				
3	STORAGE FACILITIES				
A	In case of common manifold is positive segregation ensured by use of appropriate devices?				
B	Do all above ground tanks have minimum 25 mm diameter water draw-off line?				
C	Are all storage tanks cleaned as per stipulated frequency?				
D	If not, has approval been obtained from QC dept. for any extensions? Enter approval details in Annexure.				
E	Are records maintained for tank cleaning as per Appendix 8?				
F	Are the date of commissioning / last date of cleaning /next due date of cleaning/ extended date of cleaning painted on / near the manhole cover of each above ground tank?				
G	For underground tanks, are the details of tank cleaning as in (f) displayed suitably?				
H	Are samples after receipt of the first parcel in the newly commissioned tanks, after tank cleaning & grade change over sent to lab for batch formation testing and test reports maintained?				
I	Is Copper corrosion test carried out additionally on a bottom sample of HFHSD storage tanks after cleaning?				
J	Do all FO & LDO tanks have product circulation facility?				
K	In absence of any fresh receipt in FO / LDO tank for 15 days or more, is the product circulated within the tank for at least 2 hours and every 15 days thereafter and operation recorded?				
L	Is adequate circulation facility for MS / HSD in storage tanks available at Tap-off-points where interface is accommodated?				
M	Are all strainers opened once in 3 months and cleaned internally?				
N	Is the last cleaning date painted on the casing body? Are the cleaning records maintained?				

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No	QC Requirement	FM	PM	NC	Remarks
O	Are hoses stored with their ends blanked when not in use?				
P	Is colour coding of pipeline & loading points done as per Manual?				
4	QUALITY MONITORING				
A	Location where tank sample is not tested for batch formation test, is a composite sample drawn from such product tank & tested under monthly monitoring tests?				
B	Is sample of Ethanol tank and ethanol blended Motor Gasoline tested under monthly monitoring test?				
C	Is copper strip corrosion test carried out fortnightly on a bottom sample from HFHSD tanks?				
D	Location where tank sample is tested for batch formation test, but if there is no fresh receipt in a particular storage tank for 30 days, are samples from such tank sent for monthly monitoring tests and records maintained?				
E	In case the product lying in the pipeline is dormant for 30 days or more, are samples from the line subjected to monthly monitoring tests?				
F	Is corresponding set of the samples drawn under monthly monitoring retained till receipt of the test report and record maintained?				
G	When no fresh product is received for three months into a tank, is sample from the tank sent for batch formation tests and record maintained?				
H	When there is no fresh receipt into a Kerosene tank for 7 days, is a Top sample tested for Density and Flash Point?				
I	If for operational reason, water is maintained in the tank, is Test 'E' (Sulphide) carried out on the water sample on monthly basis?				
J	In case the test E indicates presence of Sulphide, is water replaced and record maintained.				
5	FAILURE & OFF SPEC PRODUCT DISPOSAL				
A	Is there any Product Quality Failure at Location Yes / No				
B	In case any stock fails to meet the specification during monitoring or otherwise, are the stocks frozen, reason for failure investigated as per the procedure laid down in IQCM & Industry Manual on Acceptance of Products as well as directionally in line with Annexure 1?				
C	Is the failure due to non-compliance of IQCM / SOP by Location?				
D	Is corrective action to salvage the product taken in consultation with Quality Control Department?				
E	Is record of product salvaged and corrective action chronologically maintained and retained for 3 years or till completion of investigation?				
F	Are the failure investigation reports retained for five years?				

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No	QC Requirement	FM	PM	NC	Remarks
G	Is the record of the Interface (if segregated in an isolated tank) and its disposal maintained?				
H	Is the "On specification" product used for grade washing of tank-wagons or tank trucks disposed-off in line with Appendix 16 and record maintained?				
6	TANKER OPERATION				
6.1	RECEIPT BY OCEAN TANKERS				
A	Before receipt of product is effected through ocean tanker, are Upper, Middle and Lower samples drawn (jointly drawn with surveyor/OMC wherever applicable) from the individual tank/s nominated for receipt?				
B	In case density variation between any two layers is beyond (+/-) 3.0 Kg/m ³ , are Upper, Middle and Lower (UML) samples individually (as applicable) labeled, sealed and retained (Appendix 2A) till the post receipt batch is established?				
C	Are the load port test report and after loading vessel composite test report checked to ensure conformity to the required specifications?				
D	Are load port shore tank(s) and tanker tank(s) samples (Appendix 2A) collected from the master, and retained and density recorded on label verified with the observed density at 15°C for the tanker tank samples?				
E	Is an all-level sample (bottom sample on need basis) from individual tanker tanks checked for test A (Appendix 2) for conformity with load port shore tank/s and tanker tank/s densities?				
F	Are the Individual tanker tank samples sent to laboratory for Pre-Discharge Test along with ullage report and the tanker tanks samples retained as per Appendix 2A?				
G	Is the record for earlier product in the line, line quantity and its density for the last operation maintained in case of PLT operation as per Clause 4.4.1 (Appendix 2)?				
H	In case the product lying in the pipeline is dormant for a month or more, are samples drawn from both the ends of line subjected to monthly monitoring tests?				
I	Are samples drawn at jetty end /ship's manifold as per manualized procedure (during transfer operation) subjected to Test-A (Appendix 2) and recorded chronologically in tanker log book (Appendix 9)?				
J	Whenever pumping of the product is stopped, and then restarted, is the procedure of the sampling during the first half an hour and then hourly sampling followed?				
K	Is retention sample both from jetty end and shore end during commencement, middle and end of the discharge collected, sealed, labeled, time of sampling recorded on label and retained until quality of the product after receipt is established (Appendix 2A)?				
L	On completion of transfer is minimum one hour settling time given before sampling?				

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No	QC Requirement	FM	PM	NC	Remarks
M	After settling of product, are UML samples drawn from receipt tank and tested for test-A?				
N	Is batch control log book maintained as per Appendix 13 after receipt?				
O	In case of multi product tanker discharge through single pipeline, whether additional Test 'J' for MS and Test "K" for HSD (Appendix 2) conducted apart from the batch formation test and product is released after batch formation test?				
P	In case of Kerosene, is additionally Flash Point test also carried out on top sample & recorded along with Test A or batch formation test report?				
Q	Is a composite sample of Kerosene from receipt tank retained for three months and record maintained as per Appendix 12 ?				
R	In case of receipt of different generations of fuel (i.e. BS IV & BS VI) of the same grade in single line, are location specific SOP available and does the operation take place in line with SOP? Are the records of such operation maintained?				
6.2	OCEAN TANKER LOADING				
A	Are UML samples from the individual tank/s nominated for tanker loading jointly drawn by Refinery/ Marketing Department labeled, sealed and retained (Appendix 2A)?				
C	Is the record for earlier product in the line, line quantity for the last operation maintained?				
D	In case the product lying in the pipeline is dormant for a month or more, are samples drawn from both the ends of line subjected to monthly monitoring tests as per Clause 4.4.1 (Appendix 2) and additionally Copper strip corrosion test done for MS and Naphtha?				
E	Are samples drawn during tanker loading from the manifold at shore end and jetty end subjected to Test-A (Appendix 2) and records maintained (Appendix-9)?				
F	Whenever pumping of the product is stopped, and then restarted, is the procedure of the sampling during the first half an hour and then hourly sampling followed?				
G	Are retention samples taken, both from shore end and jetty end, during commencement, middle and end sealed, labeled and retained (Appendix 2A)				
H	On completion of loading, whether ship composite samples are drawn, distributed, retained, tested and records maintained (Appendix 2A)?				
J	Whether 1-meter loading sample from tanker tanks tested for critical parameters in case of Naphtha and records maintained?				
K	Is tanker log book maintained as per Appendix 9 ?				
N	In case of loading of different generations of fuel (i.e. BS IV & BS VI) of the same grade in single line, are location specific SOP available and does the operation take place in line with SOP? Are the records of such operation maintained?				

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No	QC Requirement	FM	PM	NC	Remarks
7	PLT OPERATION				
A	Are UML samples from the individual tank/s nominated for dispatch jointly drawn by Refinery/ Marketing/ Pipeline Department, labeled, sealed and retained (Appendix 2A) till the post receipt batch is established?				
B	In case density variation between any two layers is beyond (+/-) 3.0 Kg/m ³ , are Upper, Middle and Lower (UML) samples drawn individually, as applicable, labeled, sealed and retained (Appendix 2A) till the post receipt batch is established?				
C	Is the record for earlier product in the line, line quantity and its density for the last operation maintained in case of PLT operation?				
D	In case the product lying in the pipeline is dormant for a month or more, are samples drawn from both the ends of line subjected to monthly monitoring tests as per Clause 4.4.1 (Appendix 2) and additionally Copper strip corrosion test done for MS and Naphtha?				
E	Are pipeline samples drawn during PLT operation from the pipeline near the manifold subjected to Test-A (Appendix 2) for each batch / tank and recorded (Appendix 10)?				
F	Whenever pumping of the product is stopped, and then restarted, is the procedure of the sampling during the first half an hour and then hourly sampling followed?				
G	Are retention samples taken, both from dispatching end and receiving end, during commencement, middle and end of the product transfer for each batch / tank, sealed, labeled and retained (Appendix 2A) until quality of the product after receipt is established and record maintained?				
H	On completion of transfer is minimum one hour settling time given before sampling?				
I	After settling of product, are UML samples drawn from receipt tank & tested for test A?				
J	Is batch control log book maintained as per Appendix 13 after receipt?				
K	In case of multi product pipeline receipt, is additional Test 'J' for MS and Test "K" for HSD, (Appendix 2) conducted apart from the batch formation test and product is released after meeting the batch formation test?				
L	In case of Kerosene, is additionally Flash Point test also carried out on top sample & recorded along with Test A or batch formation test report?				
M	Is a composite sample of Kerosene retained for three months and record maintained as per Appendix 12 ?				
N	In case of receipt of different generations of fuel (i.e. BS IV & BS VI) of the same grade in single line, is location specific SOP available and does the operation take place in line with SOP? Are the records of such operation maintained?				

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No	QC Requirement	FM	PM	NC	Remarks
8	BARGE OPERATION				
A	Are all Level 2 litres sample from source Tank jointly drawn by all stake holders, sealed, labeled and retained				
B	During loading, whether Initial and Final line samples at Jetty end and shore end, (Appendix 2A) jointly collected & retained till establishment of product quality after unloading in receipt tank?				
C	Check whether after Barge receipt in location tank sampling, testing, assigning batch no. as per requirement before release of product done.				
9	TANK WAGON OPERATION				
A	Are product wise samples (including Black Oil products) drawn from the tank-wagon filling line at the commencement of loading and subsequently after displacement of the earlier line content in each shift and whenever there is a switchover of tank and subjected to Test 'A' (Appendix 2) & record maintained?				
B	Are these samples retained for 30 days?				
C	Is product doped with marker for the purpose of checking the adulteration and SKO doped with Blue dye being loaded in tank wagons?				
D	Is presence of water and colour visual checked after filling of the tank-wagon, before sealing and dispatch? Are all the observations logged as per Appendix 4 ?				
E	In case of SKO dispatch, is density checked for individual tank wagons after loading and recorded in Appendix 4 ?				
F	Is batch formation test report of the product sent to respective receiving locations and record maintained?				
G	Is flash point of the SKO of the dispatch tanks and density at 15°C of the SKO of the individual tank wagons documented and intimated to receiving locations?				
H	Is sample from individual white Oil tank-wagons drawn and checked for Colour visual for grade identification and Test 'A' (Appendix 2) conducted for every fifth tank wagon during receipt and record maintained?				
I	At T/W unloading location, is retention sample collected as per manual, sealed, labelled, signed and retained for 15 days (Appendix 2A)?				
J	Is colour visual & presence of water checked and recorded by unloading location?				
K	Are relevant batch formation test reports (Appendix 15) obtained for support and batch control log maintained (Appendix 13)?				
L	In case of SKO receipts, is relevant Flash Point information from the loading location is available before commencement of discharge?				
M	Is the density of the top sample of the individual SKO tank-wagon checked and compared with the dispatch density at 15°C and recorded?				

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No	QC Requirement	FM	PM	NC	Remarks
N	On completion of receipt, is minimum one hour settling time given before sampling?				
O	After settling of product, are UML samples drawn from receipt tank and tested for test A before release?				
P	Is a composite sample of Kerosene from receipt tank retained for one month and record maintained as per Appendix 12 ?				
Q	Are the decantation Hoses colour coded suitably for class A & class B product?				
R	On receipt of an unconnected tank-wagon, is representative sample taken and sent to the nearest laboratory for batch formation tests for identification of the product and further action and record maintained?				
S	In case of receipt/delivery of different generations of fuel (i.e. BS IV & BS VI) of the same grade in single line, is location specific SOP available and does the operation take place in line with SOP? Are the records of such operation maintained?				
10	TANK TRUCK OPERATION				
A	Before commencement of operation, is the Density board maintained at TLF with details of UML Density, water dip of operating tank(s) and batch no?				
B	Is the line content of tank/ manifold to TLF for each individual product line displayed at TLF? Is the record of product tank change-over maintained as & when done during day operation?				
C	Are the Tank Lorry Filling line samples (white oils only) drawn & checked for test "A" and retained during commencement of TT loading and after tank changeover as per Clause 5.4.5 of IQCM?				
D	In case the density variation within the operating tank is more than $\pm 3.0 \text{ Kg /m}^3$, is additional sample retained as per Appendix 2A mentioning the time of collection of samples?				
E	For non-automated locations, are the MS/SKO/HSD TLF line samples checked 2-hourly for density and recorded?				
F	For automated density monitoring locations, are the MS/SKO/HSD TLF line samples checked for density manually on commencement of shift and tank change over (after displacement of line content) and compared with density by automation device and records maintained?				
G	In case of automated locations, is it ensured that product loaded in TT is free from water? Is validated SOP to ensure Quality of product and record of checking efficacy of automated devices available?				
H	In case of Black Oil, is TLF line sample on commencement or sample from first TT loaded, checked for Density and appearance test & recorded in Appendix 4?				
I	Is the density at 15°C (for all products) and flash point (only in case of SKO) recorded in the challan / delivery documents? Do all TT challan carry storage tank & Bay no./ trails available?				

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No	QC Requirement	FM	PM	NC	Remarks
J	In case of SKO is sample from tank truck filling line tested for flash point on daily basis after displacement of line content & record maintained?				
K	On receipt of TT is sample from individual white Oil tank-truck chambers drawn and checked for test "A" before acceptance and record maintained (Appendix 4)?				
L	In case of SKO receipts, is relevant Flash Point information from the loading location available on invoice?				
M	Is batch control log book maintained as per Appendix 13 after receipt of TTs in storage tank?				
N	In case of receipt/delivery of different generations of fuel (i.e. BS IV & BS VI) of the same grade in single line, are location specific SOP available and does the operation take place in line with SOP? Are the records of such operation maintained?				
O	In case of on-line doping facility of Ethanol, Biodiesel, Branded fuel additive etc., is the location taking adequate care? Is the efficacy of dosing system in right proportion ensured?				
11	BARREL RECEIPT & DISPATCH				
A	Are the seals on each barrel checked during receipt?				
B	On receipt, are samples on cube root basis drawn from the barrels & subjected to Test 'C' (Appendix 2) and recorded in a register as per format given (Appendix 5)?				
C	After filling, are samples on cube root basis drawn from the barrels subjected to Test 'C' (Appendix 2) and recorded in a register as per format given (Appendix 5)?				
D	Are barrels kept on wooden planks with the bungs at 3 o'clock - 9 o'clock position in a covered godown with proper ventilation?				
E	Are the grade of product, Batch no., date of filling and the serial no. of the barrel painted on the top of the barrel before it is sealed for dispatch?				
12	RECEIPT OF ADDITIVES / DYE / MARKER				
A	Is receipt of the barrels of Additive / dye / marker consignment from vendor at primary location accepted in conformity with the supplier test report against tender / agreed technical specification?				
B	Are all level random samples on cube root basis from the barrels drawn & subjected to lab test against the technical specification of the additive at primary location?				
C	In case of density variation beyond $\pm 2.0 \text{ Kg /m}^3$ at 15°C, is investigation done as per agreed tender terms before acceptance of the consignment at primary location?				
D	In case of Locations receiving additive from certified batches, whether the consignment is accompanied with supplier certificate and batch report?				
E	Are the barrels accepted after checking the seals and record maintained?				

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No	QC Requirement	FM	PM	NC	Remarks
F	Is the location segregating the batches and using the same on "first in first out" (FIFO) basis?				
G	Is the location maintaining daily stock logbook for additive / dye / markers?				
H	Is the logbook reviewed along with the stock loss by the location in-charge?				
I	Are additives barrels stored under cover?				
J	Are MSDS of additives available?				
13	SAMPLE RETENTION				
A	Are the MS, SKO, HSD & Black Oil (only in TWF) collected from the tank truck filling and tank wagon filling line as per Clauses 5.3.3 & 5.4.3?				
B	Are the product samples collected during TWF, TLF, Ethanol receipt, Biodiesel receipt, Monthly Tank Monitoring, PLT/Tanker operation (line sample, Receipt tank samples), SKO tank sample, TW receipt sample etc. retained for defined period as per Appendix 2A?				
C	Are the product samples collected in Aluminum containers (for ethanol use glass/SS) of 1 Litre capacity, closed, sealed, labeled and signed with the details as per Appendix 11 for tank wagon filling (TWF) point samples and Appendix 11A for tank truck filling (TLF) point samples for retention?				
D	Are the retention samples duly protected and retained as per guidelines / statutory requirements and record maintained (Appendix 12)?				
E	Is Storage of retention samples standardized? Check for leaks/seal/label condition.				
F	At all hospitality locations, is the assisting company providing TLF / TWF retention samples or corresponding test reports to assisted company as and when required?				
G	At all bridging locations, is the corresponding TLF retention sample of dispatching location considered as supply location reference sample for retention?				
14	BRANDED FUELS MS & HSD				
A	Check the correctness of the system of doping the desired doses of additive in MS / HSD. Whether proper mixing and homogeneity with fuel is ensured?				
B	Check whether challans for branded MS / HSD carry a certification from TLF Officer that requisite doses of additive has been added.				
C	Check records of lab test report of Monthly Monitoring of branded fuel.				
D	Check density recorded in delivery challan of TTs for branded fuels.				
15	ETHANOL OPERATIONS				
15A	RECEIPT				
A	Whether Specific Gravity at 15 deg C of Ethanol received at location is within +/- 0.0005 of the dispatching location. Is record maintained?				

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No	QC Requirement	FM	PM	NC	Remarks
B	Check whether consignment of denatured Ethanol is accompanied with quality certificate as per IS 15464 which conforms to the tender requirement.				
C	Check records of tests carried out on top & bottom sample of each compartment of the TTs carrying Ethanol on receipt at location and whether the composite samples are tested for appearance, colour, density, ethanol content & hydrocarbon contamination checks before decantation into storage tank.				
D	Check whether the special Nitrile / Neoprene hoses are used for unloading operation of Ethanol & its quality & capping arrangement.				
E	Check the 80 mesh strainers provided before pump/tank inlet as the case may be.				
F	Check the batch control logbook and check whether records are maintained as per Ethanol manual.				
15B	STORAGE & HANDLING				
A	Check colour coding of Ethanol Facilities				
B	Check the condition of silica gel in the silica gel trap provided in the vent pipe of the storage tank. Whether regular fortnightly condition of silica gel checked & record maintained?				
C	Check the storage tanks and allied facilities for Ethanol for positive segregation.				
D	Check the storage tank openings/pipeline fittings for air tightness.				
E	Check presence of any water in Ethanol tanks by drawing tank bottom samples and testing for ethanol content.				
F	Check records of monthly monitoring tests carried out in lab for Ethanol drawn from storage tanks.				
G	Check whether samples for above are retained till receipt of lab test report.				
15C	DOPING IN MS				
A	Check the correctness of the system used for on-line doping of Ethanol in MS to ensure correct dosage.				
B	Check the 80-mesh filter provided on the delivery side of the storage tank of Ethanol.				
C	Check whether samples are tested for correctness of ethanol content after loading of TT every shift.				
D	Check records of monthly random monitoring tests carried out in lab for EBMS drawn from TLF.				
16	BIODIESEL OPERATIONS				
16A	RECEIPT				
A	Whether density at 15 deg C of Biodiesel received at location is within +/- 2.0 Kg/M3 of the dispatching location? Is record maintained?				
B	Check whether consignment of biodiesel B-100 is accompanied with quality certificate as per IS 15607/agreed specification.				
C	Check records of tests "A" carried out on top & bottom sample of each compartment of the TTs.				

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No	QC Requirement	FM	PM	NC	Remarks
D	Whether Lab test report available for testing sample as per QC guidelines?				
E	Check whether B-100 is handled through compatible hoses and not through Nitrile Rubber hoses.				
F	Check the 80 mesh strainers provided before pump/tank inlet as the case may be.				
G	Check the batch control logbook and check whether records are maintained as per Industry Biodiesel manual.				
16B	STORAGE & HANDLING				
A	Check colour coding of Biodiesel Facilities				
B	Check the storage tanks and allied facilities for Biodiesel for positive segregation.				
C	Check the storage tank openings/pipeline fittings for air tightness.				
D	Check records of monthly monitoring tests carried out in lab for Biodiesel sample drawn from storage tanks. Check whether counter sample is retained till receipt of test report.				
16C	DOPING IN HSD				
A	Check the system used for on-line doping of Biodiesel in HSD to ensure correct dosage.				
B	Check the 80-mesh filter provided on the delivery side of the storage tank of Bio-diesel.				
17	BUNKER PRODUCT QC ASPECTS				
A	Whether Sample label is as per Annexure 11 B				
B	Whether bunker product is tested against ISO 8217 specifications at an ISO 17025 accredited lab				
C	Whether drip sampling is used for collecting samples?				
D	Whether the distillate and residual marine fuel samples are retained for one year?				
E	Whether samples are collected and retained in HDPE containers				
18	GENERAL:				
A	Housekeeping – Comment on the conditions of hoses, manner in which the hoses have been kept, appearance of tank farm, T/W siding, T/T loading gantry, Product pump Houses, sample retention room , etc.				
B	Remarks on any QC activity witnessed during inspection.				
C	As per Location In-charge are there any impediments in carrying out the manualized QC procedures?				
D	Whether adequate training on QC is imparted to personnel handling petroleum products?				
E	Awareness of location staff on QC guidelines based on interaction during audit.				
F	Any suggestions for improvement.				

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No	QC Requirement	FM	PM	NC	Remarks
19	COMPLIANCE:				
A	What is the status of compliance to the last QC Inspection?				
B	Evidence of Compliance and/or Action Taken Report submission as per agreed target date.				

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APPENDIX – 18

Areas of Responsibility for Maintaining Quality of Products

SUBJECT	PAGE NO.
Cross Country Pipe Line transfer, Refinery to Marketing tap off point	1
Local Pipe Line transfer, Refinery to Marketing Company	2
Local Pipe Line transfer, Marketing company to Marketing Company	2
Tanker loading directly by Refinery	2
Tanker loading by other Marketing Company	2
Tanker Discharge	3
Tank Wagon/Tank Truck Operations	3

INDUSTRY QUALITY CONTROL MANUAL

Appendix 18	Section Name: Areas of Responsibility for Maintaining Quality of Product	Page 1 of 3
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AREAS OF RESPONSIBILITY FOR MAINTAINING THE QUALITY OF PRODUCTS

A. CROSS COUNTRY PIPELINE TRANSFERS FROM REFINERY TO TAP OFF POINT OF MARKETING COMPANY:

- 1) Refinery shall provide the test report(s) confirming that, the product in the tank(s) from which transfer is proposed meets specification, to the Marketing Company and Pipeline Division. Marketing company reserves the right to test product before accepting from Refinery as and when required.
- 2) Before each transfer Refinery shall, in the presence of Pipeline Division & Marketing Company, take separately an Upper, Middle and Lower sample, composite them, and retain in sealed containers. Out of three sets of samples, two sets should be made available to the Marketing Company and Pipeline Division. Refinery shall ensure homogeneity of the product in the tank before its dispatches.
- 3) The Pipeline Division will be responsible for adhering to the procedures to maintain the quality of product while pumping the product (**Clauses 3.3 & 5.2**) from the pipeline manifold to the Marketing Company Tank(s). In case the product lying in the pipeline is dormant for 30 days or more, it is the responsibility of pipeline division to test the sample drawn from the pipeline for monthly monitoring tests as per **Clause 4.4.1 (Appendix – 2)** and provide test report before transfer.
The refinery will be responsible for maintaining the product quality from refinery pump discharge manifold to the pipeline manifold.
- 4) At Tap-Off Points, Pipelines Division and Marketing Company shall jointly draw composite sample from the tank(s) nominated to receive the product, retain in sealed and labelled containers. One composite sample each shall be retained by the Marketing Company and Pipeline Division. The tank(s) shall then be handed over to the Pipeline Division for completing the transfer in accordance with the QC Procedures (**Clauses 3.3 & 5.2**).
- 5) At pipeline manifold and the receipt tank inlet, the Pipeline Division shall draw, seal and retain the initial, middle and final sample before switch over of the tank and check for Test 'A' (**Appendix 2**). The Marketing Company reserves the right to be present, while these samples are drawn.
- 6) The Marketing Company reserves the right to inspect the Inland Pipeline Transfer Log Book, associate with sampling during transfer, investigation for quality failures during pumping and after completion of transfer.
- 7) At locations where the tank is not handed over to the Pipelines Division, the receiving location shall carry out sampling as mentioned at '4' above. The receiving location will be responsible for the procedures inside their Terminals (**Clause 3.3**) and inform the Pipeline Division if there is a quality failure during pumping. Any quality failure to be investigated as per **ANNEXURE 1**.
- 8) Samples and documents shall be retained as per **Appendix 2A**.

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- 9) Product will be released from the Marketing Company tanks in accordance with the laid down procedure (**Clause 3.2.10**).

B. LOCAL PIPELINE TRANSFER FROM REFINERY TO MARKETING COMPANY:

- 1) The Clauses at A-1 & A-2 shall be followed.
- 2) At Refinery pump discharge manifold, the Refinery will draw the initial, middle and final samples and retain them separately (**Appendix 2A**). The Refinery will also follow the procedure for transfer of product by pipeline (**Clauses 3.3 & 5.2**). The Marketing Co. reserves the right to be present during sampling and to inspect the records of transfer.
- 3) Marketing Company will take a sample from the nominated receipt tank(s). The Refinery reserves the right to be present while sampling.
- 4) At the point where the Marketing Company's Tap off starts, an initial, middle and final sample shall be drawn by the Marketing Company, subjected to Test 'A' (**Appendix 2**) sealed and retained. The Refinery reserves the right to be associated with this exercise.
- 5) The Marketing Company shall be responsible for informing Refinery if there is any Quality Failure during / after transfer of product and investigating as per **ANNEXURE 1**.
- 6) All documents and samples shall be retained as per **Appendix 2A**.

C. LOCAL PIPELINE TRANSFER FROM MARKETING COMPANY TO MARKETING CO.:

- 1) Clauses 1 to 6 as in B are applicable.

D. TANKER OPERATIONS:

a) Tanker loading directly by a Refinery:

- 1) Clauses **A-1, A-2 & B-2** shall be followed.
- 2) The Marketing Company will ensure fitness of tanker tanks to load the product.
- 3) The refinery/loading company shall ensure the quality of product up to the ship manifold.
- 4) At jetty end and tanker end, the Marketing Company shall be responsible for the quality procedures (**Clause 5.1.6**).
- 5) The initial, middle and final sample from the tanker manifold shall be drawn by the Marketing Company in the presence of the ship's representative, subjected to Test 'A' (**Appendix 2**), sealed and retained (**Appendix 2A**).
- 6) On completion of loading, quality formalities (**Clause 5.1.7**) shall be completed by Marketing Company.
- 7) Refinery shall hand over test report(s) of each shore tank(s) used for loading the tanker and the shore tank(s) sample to the tanker for onward transmission/submission to the ship disport(s).
- 8) At load port ship's composite samples shall be drawn by cargo owner/ ship's representative/ Marketing Company and surveyor and signed/sealed (**Appendix 2A**). Sets of these samples shall be handed over to the ship for onward submission to disport(s).

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b) Tanker Loading directly by the other Marketing Companies:

- 1) Clauses 1 to 8 as in D - a) are applicable.

c) Tanker Discharge:

- 1) The Charterer of the tanker will be responsible for implementing the procedure (section 3) at the tanker and jetty end.
- 2) Subsequent receiving location of Marketing Company shall, after complying with all the clauses in **Section 3**, excepting **Clause 3.2.2**, accept the product for discharge.
- 3) When one Marketing Company transfers the product during tanker discharge, to another Marketing Company, then the Quality Control responsibilities are:
 - The first Marketing Company will ensure compliance of **Clauses 3.1, 3.2.2, 3.2.3 & 3.2.4** and maintaining relevant records.
 - The second Marketing Company will take over the quality responsibility from their tap off point, draw initial, middle and final samples during pumping and adhere to the quality procedures (**Clauses 3.2.6 to 3.2.10**).
- 4) In case of Other Marketing Company charter / Other Marketing Co's products, the joint sampling shall be done at disport. The representatives of the oil companies shall sign the test reports and send to desired location/s.
- 5) In the event of failure/disputed test results of first samples, the repeat samples from individual tanker tanks shall be jointly drawn and tested for the concerned parameter/s in presence of cargo owner or its representative, Surveyor and the receiving company. The test reports should be jointly signed.

E. Tank Wagon Operations:

The entire responsibility of product going off-spec in the tank wagon at any stage is of Refinery or loading company in case of loading from terminal, unless it is proved that loading Refinery or the loading location was not having off-spec product in their tank or the product did not get contaminated due to the migration at manifold, at pump house, tank-farm, loading points or any other location. Reason for Off-spec product / Failure shall be investigated as per **ANNEXURE 1**.

F. Tank Truck Operations:

The entire responsibility of product going off-spec in the tank truck is of Loading Company unless it is proved that loading location or the loading Refinery did not have off-spec product in their tank or the product did not get contaminated due to the migration at manifold, at pump house, tank-farm, loading points or any other location. Reason for Off-spec product / Failure shall be investigated as per **ANNEXURE 1**.

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APPENDIX 19

Product Acceptance Limits Ex Refineries

INDUSTRY QUALITY CONTROL MANUAL

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PRODUCT ACCEPTANCE LIMITS EX REFINERIES

1. SPECIFICATIONS FOR RAIL / ROAD / DEDICATED PIPELINES

For product movement ex-Refineries by rail or road or through local dedicated pipelines, Refineries shall provide product fully meeting minimum guaranteed BIS specifications except for Sulphur content of BS VI MG & HSD which shall be 8 ppm max. BIS specification also refers to ISO: 4259 and accordingly product suppliers and receivers shall supply and accept the product. After receipt, product quality at locations shall be closely monitored.

2. SPECIFICATIONS FOR MULTI PRODUCT PIPELINES

For products pumped through multi-product pipelines, suitable quality cushion shall be provided by Refineries for critical parameters which are affected at the receiving end because of interface absorption. Such cushion is also applicable for products being loaded in ocean tankers to be discharged at locations from where they are to be pumped into multi-product pipelines. The manufacturing specifications in such cases shall be worked out for each Refinery and marketing, considering various operating parameters like technique adopted for interface management, and also taking into account length of pipeline, gradient of pipeline, batch size, pipeline shutdowns etc.

Any change in the product acceptance limits ex refineries shall be made after trials, review and recommendation by committee comprising of all stake holders.

Product carrier shall be responsible for positioning the product as per required specification mutually agreed between the buyer and the seller. Table 1.0 and 2.0 given below depicts the values of Refinery Specification for critical parameters as worked out by Task Force-3 (set up by MOP&NG), further reviewed under convener ship of IOCL Director (Refinery) and submitted to CHT vide report dated 27.07.2013.

Table-1: RON for MS

Pipeline	Manufacturing Specification
	RON, min
	BS IV / BS VI
Mathura-Jalandhar (IOCL)	91.6/91.6
Panipat-Ambala-Jalandhar (IOCL)	91.7/91.7
Panipat-Ambala-Najibabad (IOCL)	91.8/91.8
Mathura-Delhi (IOCL)	91.6/91.6
Barauni-Kanpur (IOCL)	91.5/91.5
Haldia-Mourigram-Rajbandh (IOCL)	91.6/91.6
Koyali-Sanganer (IOCL)	91.6/91.6
Guwahati-Siliguri/BGR (IOCL)	91.6/91.6
Mumbai-Manmad-Bijwasan (BPCL)	91.7*/91.7*
Mumbai-Pune-Solapur (HPCL)	92.0/91.8
Mundra-Delhi (HPCL)	92.0/92.0
Cochin-Coimbatore-Karur (BPCL)	91.7/91.7

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Bongaigaon-Siliguri (IOCL)	91.7/91.7
Numaligarh-Siliguri (BPCL)	91.7/91.7*
Bina-Kota (BPCL)	91.7/91.7
Visakha-Vijayawada- Secunderabad (HPCL)	91.8/91.8
Ramanmandi - Bahadurgarh – Rewari-Kanpur (HPCL)	91.8/91.8
Chennai – Trichy – Madurai (IOCL)	91.6/91.6
Chennai – Bangalore (IOCL)	91.6/91.6
Paradeep – Raipur- Ranchi (IOCL)	91.8/91.8
Panipat – Bhatinda (IOCL)	91.7/91.7
Kota – Jobner – (Ex MR) (BPCL)	91.7/91.8
Kota – Jobner (Ex- BORL) (BPCL)	91.5/91.8
Koyali- Ratlam (IOCL)	91.7/91.7

* For Mumbai-Manmad and Numaligarh–Siliguri pipelines section the RON will be 91.5

Note: -

- Higher RON product may be provided to accommodate trans-mix product through mutual agreement between Refinery and Marketing on case to case basis.
- Whenever there will be different grade of MS pumping, one grade will be sandwiched between other grade on both side and RON of sandwiched grade shall be 91.2 min.

Table- 1.1: Other Manufacturing specifications for MS

	Density kg/m ³	% evaporated at 70 °C	FBP °C, max	Sulphur [§] , ppm., max
BIS MS IV	720.0-775.0	10-45%	210	50
Manufacturing MS IV	720.0-773.7* 720.0-772.0**	11-45%	200 #	46
BIS MS VI	720.0-775.0	10-45%	210	10
Manufacturing MS VI	720.0-773.7* 720.0-772.0**	11-45%	200 #	8

Note:

The below mentioned limits are essential for BS IV & BS VI for ensuring product on BIS specification at receiving end.

- *Applicable for Normal and 5% Ethanol blended MS
**Applicable for 10% Ethanol blended MS
Density: 720 to 773.7 Kg/m³ (Without ethanol blending)
- In respect of ethanol blended MS, the limit for % evaporated at 70 deg c. should be 38% maximum.
- # Specific deviation for HMR and Mughalsarai (IOCL) and MMBPL (beyond Manmad), Bina-Kota, Numaligarh – Siliguri and CCK (beyond Karur) of BPCL where the recommended FBP shall be 195 max., till such time a mutual agreement is arrived at by respective Refinery and Marketing groups for further correction.

§ Initially the manufacturing specifications shall be kept at 8 ppm max. However, based on the actual field experience of 6 months from implementation of BS VI, this value shall be reviewed and revised, if required.

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Table- 2.1: Manufacturing specifications for HSD

	Density kg/m ³	Cetane no. min.	Lubricity Microns max.	Viscosity at 40 °C, cSt	Sulphur\$\$, ppm., max	Flash Point °C, min
BIS HSD IV	815.0 - 845.0	51.0	460	2.0-4.5	50	35
Manufacturing HSD IV	817.0 - 845.0	51.4	420	2.15-4.5 \$	46	37
BIS HSD VI	810.0 - 845.0	51.0	460	2.0-4.5	10	35
Manufacturing HSD VI	812.0 - 845.0	51.4	420	2.15-4.5 \$	8	37

\$ In case higher viscosity is required at certain locations for compliance of BIS specifications, minimum viscosity of 2.15 cSt at 40°C may be increased based on mutual agreement between Refinery and Marketing on case to case basis.

\$\$ Initially the manufacturing specifications shall be kept at 8 ppm max. However, based on the actual field experience of 6 months from implementation of BS VI, this value shall be reviewed and revised, if required.

3. ADDITIONAL REQUIREMENTS FOR MEETING SPECIFIC NEEDS TO PROTECT PRODUCT QUALITY:

- a) SKO Flash Point should be 38°C minimum for Multi Product P/L, Ocean Tanker, T/Wagon and Road dispatches ex manufacturing end.
- b) Sulphur content of interface plug material shall be 9 ppm maximum for BS VI grade handling and the flash point shall be 38°C min.
- c) For Naphtha used as Feed Stock for Fertilizers Non-Volatile matter tested by IS: 1448 (P: 64) test method shall not be more than 5 mg/100 ml.
- d) Wherever fuels are blended with ethanol, bio-diesel etc. the manufacturing specification shall be controlled in such a way that final blended product shall meet the respective BIS specification.
- e) For disposal of transmix / segregated interface product in HSD, adequate additional cushion in flash point of HSD shall be provided as mutually agreed between Refineries and marketing on case to case basis.
- f) For transportation of Naphtha in multi production pipelines, copper corrosion rating of Naphtha should be ASTM 1 max.

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APPENDIX 20

Glossary of Terms

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GLOSSARY OF TERMS

1. REFINERY GOOD CONDITION:

All products, after manufacture, are tested and certified by the refinery that it meets the required specifications. The QC System and procedures are outlined to maintain the products in the Refinery Good Condition by keeping the ingress of all extraneous matters (dust, dirt, water etc.) to the barest minimum and also to take immediate corrective action whenever such foreign matters are detected.

2. SAFETY AND OPERATIONS MANUAL:

Each Organization has outlined the manner in which safe operations are to be carried out, in the respective manuals. These manuals also have to be followed whenever implementing the Non-Aviation Quality Control Manual.

3. MULTIPRODUCT PIPELINE:

A common line used for transferring different grades of petroleum products. For e.g.

- a) Panipat – Ambala - Jalandhar (IOCL)
- b) Mundra - Delhi (HPCL)
- c) Mumbai – Manmad - Bijwasan (BPCL)

4. DEDICATED PIPELINE:

A totally segregated pipeline with no cross over connections, flange connections or any other connection with any other pipeline, used by an organization to transfer a single grade of petroleum product from their refinery to marketing storage tank for distribution, e.g. the pipeline from:

- d) HPC Refinery Mumbai to HPC Mahul Storage tanks
- e) IOC Mathura Refinery to HPC Mathura Installation
- f) IOC Koyali Refinery to HPC Nandesari Installation
- g) BPC Mumbai Refinery to BPC Sewree Installation

5. LOCAL DEDICATED PIPELINES:

A totally segregated pipeline with no cross over connections, flange connections or any other connections with any other product used by an Organization to transfer a single grade of Petroleum product from their locations to same or other Oil Company's locations separated by boundary/short distance.

6. UNCONNECTED TANK WAGONS:

A tank-wagon on which the paste-on label is not available, the Quality Control Release Certificate is not available, sick tank wagons transshipped by the Railways without supervision by Oil Marketing Companies etc.

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Appendix 20

Section Name: **Glossary of Terms**

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7. SAMPLING AIDS (IS-1447)

a) **Weighted Sampling Can:**

Metal sampling apparatus of such weight as to sink readily in the product to be sampled. The apparatus shall be provided with means to permit filling at any desired level and shall have attached a non-sparking chain or cord. Metal used to weigh the apparatus shall be fitted externally at the bottom or contained in an oil tight false bottom since irregularities in the metal may retain material which will contaminate the sample if the weight is fitted in the interior.

b) **Sampling Cage:**

A metal holder or cage suitably constructed to hold the appropriate bottles or cans. The combined apparatus shall be of such weight as to sink readily in the product to be sampled and provision shall be made to permit the bottle or can at any desired level.

c) **Sampling Thief:**

This is a metal sampling apparatus with an opening at the bottom and is actuated when the apparatus comes to rest on the tank bottom.

d) **Sampling Facility:**

Fitted on the pipeline by opening of which the pipeline contents can be drawn out.

e) **Automatic Sampler:**

A sampler used to draw a representative sample from the liquid storage tank. IS 1447 is also recommends automatic sampling for this purpose.

8. BONE DRY:

There should not be even traces of the previous product.

9. OMC – OIL MARKETING COMPANIES:

- 2) M/s. Indian Oil Corporation Limited
- 3) M/s. Bharat Petroleum Corporation Limited
- 4) M/s. Hindustan Petroleum Corporation Limited

10. INTERFACE:

In pipeline context, interface is a mixture of two compatible products. It is assumed that interface contains equal percentage of both the products.

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11. HFHSD:

Previously it was referred to as LSHFHSD or Navy HSD.

12. BRIDGING:

Stock transfer from one location to another location by tank trucks

*****END OF DOCUMENT*****

Attachment-01



- 13.1 Bidders shall submit Earnest Money Deposit (EMD) as mentioned above in the form of demand draft (in INR) or bank guarantee (as per Proforma provided in the Bidding Document) in favour of “Mangalore Refinery and Petrochemicals Limited (MRPL),Mangalore”. Issuance of Bank Guarantees shall be confirmed directly to the Owner /PMC. Bids not accompanied with EMD shall be rejected and bidder shall not be allowed to witness the tender opening.
- 13.2 Earnest Money Deposit (EMD) as mentioned above shall be submitted within the Bid Due Date. Earnest Money Deposit (EMD) if submitted in the form of Bank Guarantee, shall be valid for a period of **2 (Two) months** beyond the bid validity and shall be submitted from any Scheduled Bank (Including nationalized banks, other scheduled commercial banks, schedule cooperative banks and scheduled regional rural banks as appearing in the second Schedule to the RBI Act 1934.
- 13.3 Exemption of EMD will be applicable for Indian CPSUs and Micro or Small Enterprises (MSEs) registered with District Industries Centers or Khadi and Village Industries Commission or Khadi and Village Industries Board or Coir Board or National Small Industries Corporation for corresponding item/works or Directorate of Handicrafts and Handlooms, startups, Udyog Aadhar Memorandum or any other Body specified by Ministry of Micro, Small and Medium Enterprise provided that certificate issued by the relevant agency is valid on the date of Un-priced Bid Opening. The bidder shall submit Notary attested copy of the valid MSE registration certificate. Scanned copy of Notarized Registration certificate should be uploaded in the e-procurement website.
- a) Bidder claiming to be a Micro or Small Enterprises (MSEs) for the purpose of availing EMD Exemption for MSEs in the bidding document shall review and ensure their status as Micro or Small Enterprises as per Gazette Notification no. 2119(E) dated 26.06.2020 (enclosed as Annexure-III to ITB) and confirm specifically that:**
- “ They are Micro or Small Enterprises (as the case may be), as on the bid due date, as per the guidelines for re-classification of micro, small and medium enterprises notified by Ministry of MSME vide Gazette Notification no. 2119(E) dated 26.06.2020.”*
- With the confirmation as above by the bidder, documents submitted by the bidders (as were been submitted earlier like NSIC, UAM, EM-Part-II) will be considered acceptable upto 30.06.2022. However, post 30.06.2022, bidder will be required to submit the Udyam Registration Certificate or any other document permitted by GOI.**
- Financial statement of bidders shall not be referred for the above purpose.
- b) CPSU / CPSE shall submit declaration to this effect that being CPSU/ CPSE they are exempted from submitting Bid Security.
- 13.4 Bidders are required to submit the EMD (in the prescribed format) in original at the time of bid submission in sealed envelope and are required to upload the scanned copy of EMD on e-tender Portal along with e-Bid. EMD in original shall be submitted in a sealed envelope titled **“Earnest Money Deposit for Bidding Document No.:** ”. Bidder must upload the scanned copy of EMD (in the prescribed format) on e-tender Portal along with the e-bid. Swift message/Cheque/Cash shall not be acceptable. In

Attachment-01

case bidder fails to upload scanned copy of EMD on e-tender Portal by the bid due date & time, such bid shall not be considered for evaluation.

- 13.5 **Bidder shall be required to submit the copy of the bid security (or authenticated exemption certificate, wherever applicable) within the final extended bid due date and time on the e-tendering portal. In case of bid security in the form of BG/ DD, bidders shall also be required to submit the original DD/ BG to PMC , preferably before the final extended bid due date and time but not later than 7 (Seven) calendar days from final extended bid due date and time. If the Bidder fails to submit Bid Security (BG/ DD) physically in original within the above cutoff date, his bid shall be rejected and not considered for further evaluation, irrespective of their status/ ranking in tender and notwithstanding the fact that a copy of Bid Security was earlier uploaded by the bidder on the e-tendering portal.**

ATTACHMENT -02 ADDENDUM 2 to Tender 3200000560

REVISION	STATUS	DATE	DESCRIPTION	PERP.	CHKD.	APPD.
0	IFT	16/06/22	ISSUED FOR TENDER	VKN	APG	ASN
CLIENT:  MANGALORE REFINERY & PETROCHEMICALS LTD. (A subsidiary of Oil & Natural Gas Corp. Ltd – ONGC)						
PROJECT MANAGEMENT CONSULTANT  NAUVATA ENGINEERING PVT. LTD.						
TENDER NO 3200000560						
TITLE:			TYPICAL INSTRUMENT HOOK -UP DRAWINGS		DRAWING NO:	20005-GEN-I-DW-6003
PROJECT NO:			JBGC20005		REV NO:	0
					SHT NO:	1 OF 8

INDEX SHEET

SL NO.	DESCRIPTION	REVISION NO.	SHEET NO.
1	COVER SHEET	0	1 OF 8
2	INDEX SHEET	0	2 OF 8
3	GENERAL NOTES	0	3 OF 8
4	PRESSURE GAUGE	0	4 OF 8
5	PRESSURE TRANSMITTER	0	5 OF 8
6	DIFFERENTIAL PRESSURE TRANSMITTER	0	6 OF 8
7	DENSITOMETER	0	7 OF 8
8	AIR MANIFOLD	0	8 OF 8



TYPICAL INSTRUMENT HOOK-UP DRAWINGS

PROJECT NO:	JBGC20005
DRAWING NO:	20005-GEN-I-DW-6003
REV NO:	0
SHT NO:	2 OF 8



GENERAL NOTES:

1. IMPULSE LINE TUBING SHALL BE AS SHORT AS POSSIBLE AND THE NUMBER OF JOINTS SHALL BE KEPT TO A MINIMUM. HORIZONTAL LINES SHALL SLOPE AT A RATIO OF APPROXIMATELY 1:12.
2. RATING OF THE PIPE FITTINGS & TUBE FITTING SHALL BE AS PER RESPECTIVE PMS.
3. WHENEVER NEW HOOK-UPS ARE MADE THE HOOK-UP ALONG WITH EXISTING PIPING (BY OTHER CONTRACTOR) SHALL BE TESTED UP TO THE POINT OF CLOSET ISOLATION (E.G.: VALVE, SPECTACLE BLIND).
4. INDICATING INSTRUMENTS (SUCH AS PRESSURE GAUGES) MOUNTED ON OR CLOSE TO THE MEASURING POINTS SHALL BE READABLE FROM PLANT FLOORS, PLATFORMS, ETC. ALL OTHER INDICATING INSTRUMENTS SHALL BE INSTALLED WITH THE INSTRUMENT CENTER APPROXIMATELY 1.3m ABOVE FLOOR LEVEL AND SHALL BE VISIBLE FROM THE CORRESPONDING ELEMENTS, WHERE APPLICABLE.
5. ALL INSTRUMENTS SHALL BE INSTALLED IN SUCH A WAY THAT THEY ARE NOT SUBJECTED TO EXCESSIVE VIBRATION AND/OR EXTREME ENVIRONMENTAL CONDITIONS, AND DO NOT OBSTRUCT TRAFFIC OR THE PERIODIC MAINTENANCE OF ADJACENT EQUIPMENT. INSTRUMENTS SHALL NOT BE LOCATED UNDER PLACES WITH POTENTIAL LEAKAGES.
6. SUFFICIENT SPACE SHALL BE LEFT AROUND THE INSTRUMENT FOR MAINTENANCE COVER REMOVAL/WITHDRAWAL AND FOR REMOVAL OF PROTECTIVE SHADES. THE MINIMUM CLEARANCE BETWEEN ANY PART OF THE INSTRUMENT AND SURROUNDING STRUCTURES OR EQUIPMENT SHALL NOT BE LESS THAN 0.2m TO ALLOW FOR INSULATION, PAINTING, ETC.
7. ALL LIQUID SERVICE INSTRUMENTS IN DIFFERENTIAL PRESSURE FLOW MEASUREMENT APPLICATIONS SHALL BE MOUNTED BELOW THE MEASURING POINT. THE ISOLATE VENT BLOCK SHALL BE MOUNTED SO THE VENT PORT IS BELOW THE HP AND LP INLET.
8. ALL IMPULSE TUBINGS SHALL BE RUN WITH A SLOPE NOT LESS THAN 1:12 EXCEPT WHERE OTHERWISE SPECIFIED. DIRECTION OF THE SLOPE IS TO BE DOWNWARD FROM THE PROCESS FOR LIQUID SERVICE APPLICATIONS AND UPWARD FROM THE PROCESS FOR GAS SERVICE APPLICATION.
9. THE TUBING SHALL BE CUT DEAD SQUARE WITH A TUBE CUTTER, AND EDGES SHALL BE DEBURRED. THE TUBE END SHALL BE UNDAMAGED, ROUND AND WITHOUT SCRATCHES OVER.
10. TUBES SHALL BE BENT WITH A HIGH QUALITY TUBE BENDER WHICH SHALL HAVE A MINIMUM BENDING RADIUS AS SPECIFIED BY THE TUBING MANUFACTURER.
11. THIS DOCUMENT IS INDICATIVE ONLY. THE DETAILED DOCUMENT WILL BE DONE BY CONTRACTOR DURING DETAIL ENGINEERING.
12. ALL INSTRUMENTS FLANGES/SW RATINGS SHALL BE MIN 300#.

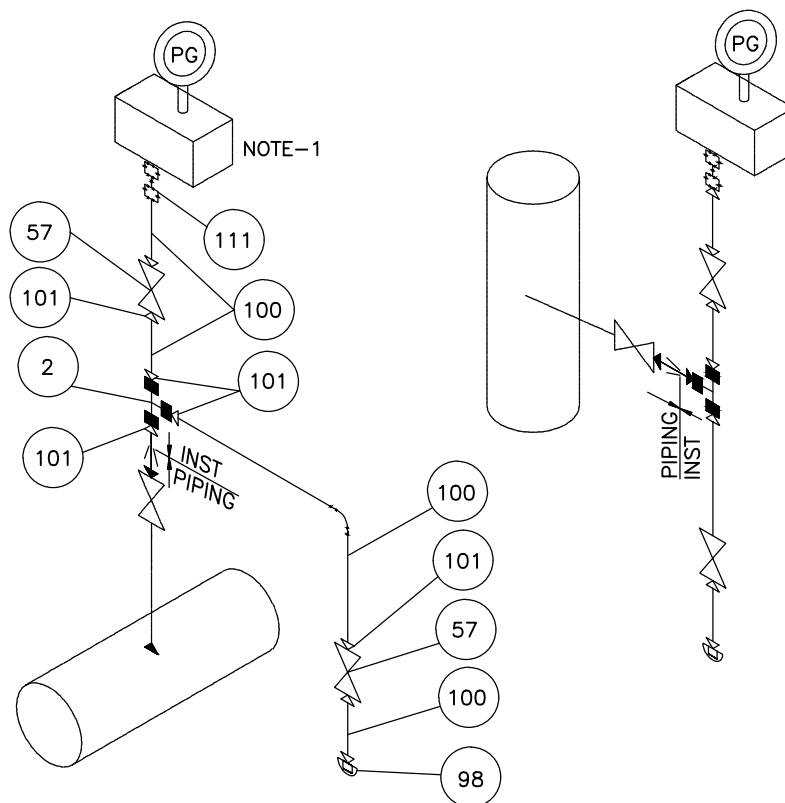


TYPICAL INSTRUMENT HOOK-UP DRAWINGS

PROJECT NO:	JBGC20005
DRAWING NO:	20005-GEN-I-DW-6003
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SHT NO:	3 OF 8



PRESSURE GAUGE



LIST OF MATERIALS

ITEM NO.	DESCRIPTION	MATERIAL	SIZE & END CONN.	QTY./TAG	T. QTY.
98	PIPE PLUG	SS 316	1/2"NPTM SCRD.	1	1
100	TUBING	SS 316L	1/2" OD X 0.065" THK	AS REQUIRED	AS REQUIRED
12	EQUAL TEE	SS 316	1/2"NPTF X 1/2"NPTF X 1/2"NPTF	1	1
57	GATE VALVE	SS 316	1/2"NPTF X 1/2"NPTF	2	2
111	MALE TUBING CONNECTOR	SS 316	1/4" NPTM X 1/2" OD	1	1
101	MALE CONNECTOR	SS 316	1/2" NPTM X 1/2" OD	7	7

NOTES:

- PRESSURE GAUGE AND 2-VALVE MANIFOLD BY INSTRUMENT VENDOR.

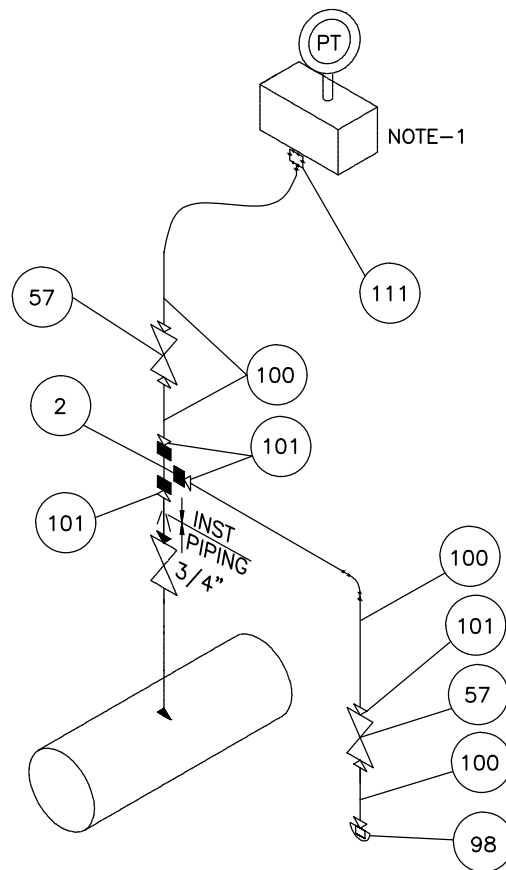


TYPICAL INSTRUMENT HOOK-UP DRAWINGS

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PRESSURE TRANSMITTER



LIST OF MATERIALS

ITEM NO.	DESCRIPTION	MATERIAL	SIZE & END CONN.	QTY./TAG	T. QTY.
98	PIPE PLUG	SS 316	1/2"NPTM SCRD.	1	1
100	TUBING	SS 316L	1/2" OD X 0.065" THK	AS REQUIRED	AS REQUIRED
12	EQUAL TEE	SS 316	1/2"NPTF X 1/2"NPTF X 1/2"NPTF	1	1
57	GATE VALVE	SS 316	1/2"NPTF X 1/2"NPTF	2	2
111	MALE TUBING CONNECTOR	SS 316	1/4" NPTM X 1/2" OD	1	1
101	MALE CONNECTOR	SS 316	1/2" NPTM X 1/2" OD	7	7

NOTES:

- PRESSURE TRANSMITTER AND 2-VALVE MANIFOLD BY INSTRUMENT VENDOR.
- PRESSURE TRANSMITTER INSTALL IN REMOTE MOUNTED WITH STANCHION.



TYPICAL INSTRUMENT HOOK-UP DRAWINGS

PROJECT NO: JBGC20005

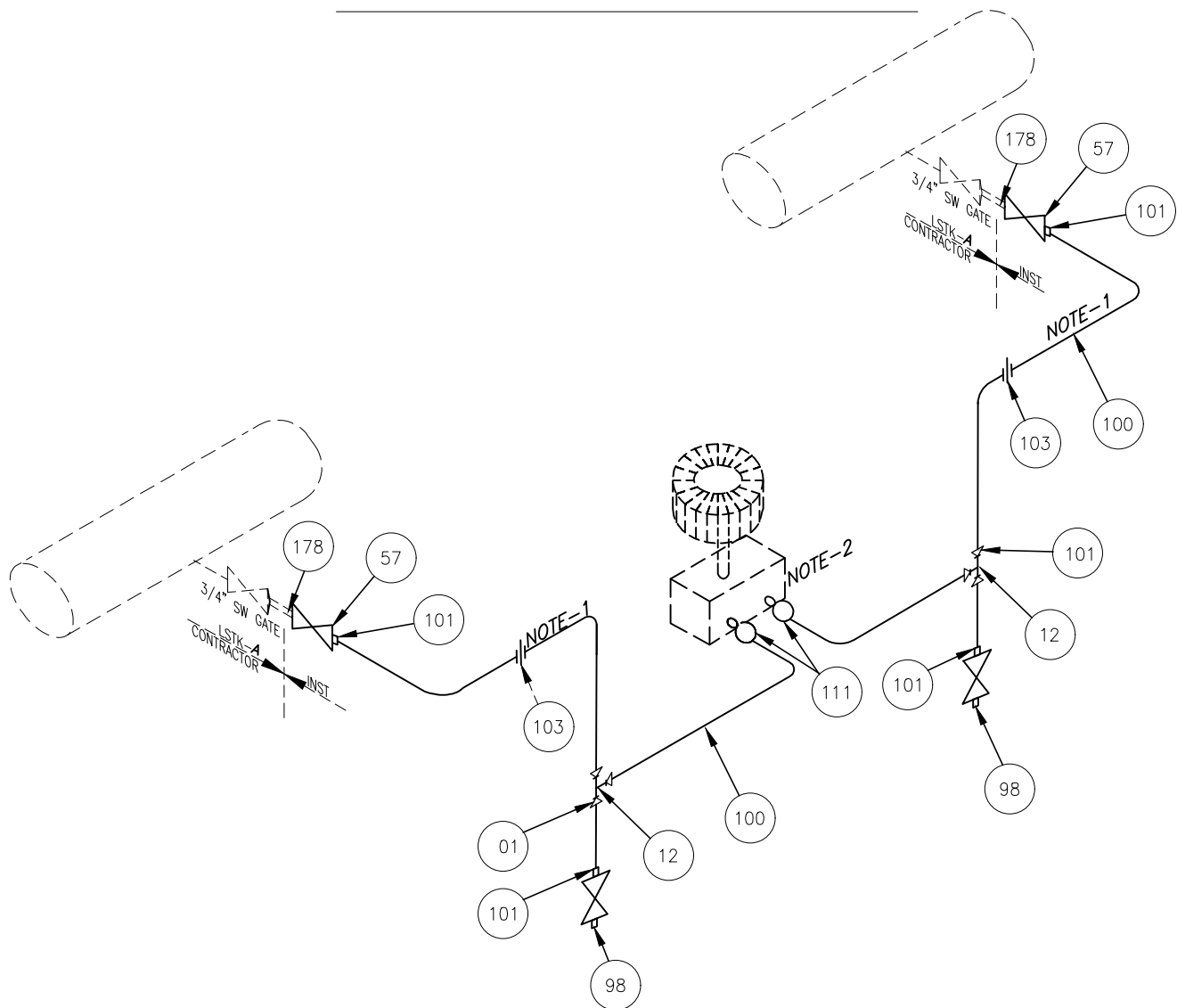
DRAWING NO: 20005-GEN-I-DW-6003

REV NO: 0

SHT NO: 5 OF 8



DIFFERENTIAL PRESSURE TRANSMITTER



LIST OF MATERIALS

ITEM NO.	DESCRIPTION	MATERIAL	SIZE & END CONN.	QTY./TAG	T. QTY.
57	GATE VALVE	SS 316	1/2"NPT(F)x1/2"NPT(F)	2	2
98	PIPE PLUG	SS 316	1/2"NPTM SCR.D.	2	2
178	STRAIGHT NIPPLE	SS 316	1/2"PL x 1/2"NPTM (3" LONG)	2	2
100	TUBING	SS 316	1/2"ODx0.065",THK	AS REQUIRED	AS REQUIRED
103	TUBE UNION	SS 316	1/2" OD	2	2
101	MALE TUBING CONNECTOR	SS 316	1/2"NPT(M)x1/2"OD	10	10
12	EQUAL TEE	SS 316	1/2" NPTF	2	2
111	MALE TUBING CONNECTOR	SS 316	1/4" NPTM X 1/2" OD	2	2

NOTES:

- DIFFERENTIAL PRESSURE TRANSMITTER SHALL BE REMOTE MOUNTED WITH STANCHION.
- 5-WAY MANIFOLD BY INSTRUMENT VENDOR.



TYPICAL INSTRUMENT HOOK-UP DRAWINGS

PROJECT NO: JBGC20005

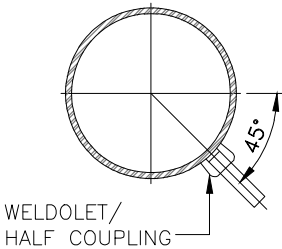
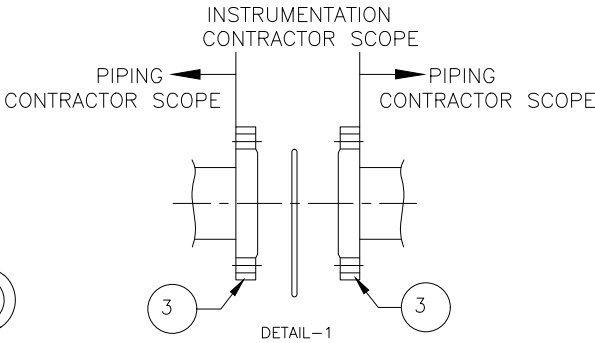
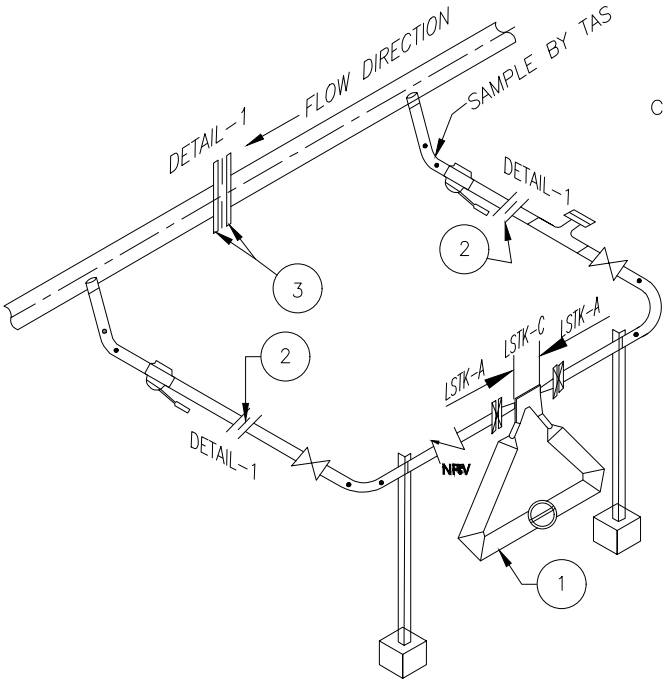
DRAWING NO: 20005-GEN-I-DW-6003

REV NO: 0

SHT NO: 6 OF 8



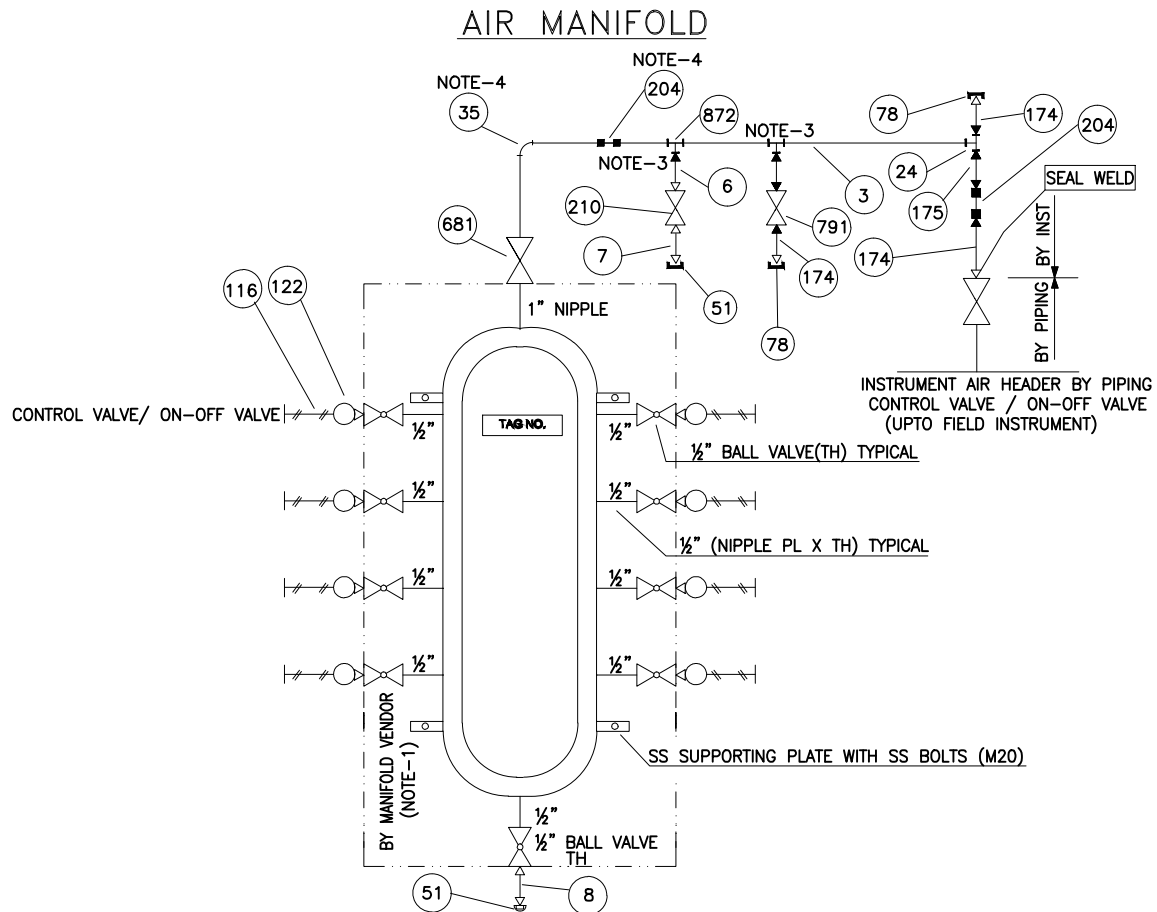
DENSITOMETER



TYPICAL INSTRUMENT HOOK-UP DRAWINGS

PROJECT NO:	JBGC20005
DRAWING NO:	20005-GEN-I-DW-6003
REV NO:	0
SHT NO:	7 OF 8







TYPICAL INSTRUMENT HOOK-UP DRAWINGS

PROJECT NO:	JBGC20005
DRAWING NO:	20005-GEN-I-DW-6003
REV NO:	0
SHT NO:	8 OF 8



 ONGC एन.ओ.एन.सी.एल. MRPL	MRPL Marketing Terminal Project at Devangonhi, Bangalore		 nauvata ENGINEERING CONSULTANTS	
	Marketing Infrastructure Projects, MRPL			
	IO COUNT	Tender No :		ADDENDUM 2 TO 320000560
		ATTACHMENT		3
	Rev :	0		



SIL-3 PLC I/O COUNT (Excluding Spares)				
S.No.	DI	DO	AI(HART Pass Through)	RS 485
1	800	500	200	10



DCS I/O COUNT (Excluding Spares)					
S.No.	DI	DO	AI	AO	RS485
1	400	230	250	120	30

Notes:

1. The above I/O count are for Process I/O's
2. I/O related to System (supplied by Bidder) shall be finalized during detail engineering by Bidder which shall be over and above Process I/O count mentioned in above Table
3. 20% spare I/O (fully wired) for each I/O type shall be provided.
4. Actual I/O count shall be worked out during detail Engineering



MRPL Marketing Terminal Project at Devangonhi, Bangalore				
Marketing Infrastructure Projects, MRPL				
DATASHEET FOR LEVEL TRANSMITTER	Tender No :	ADDENDUM 2 TO 3200000560		
	ATTACHMENT	04		
	Rev :	0		
Data Sheet For Level Transmitter for Water Tanks				
General	1	Tag Nos.	As per P&ID	
	2	Location	DMT	
	3	Tank MOC	Concrete, Metal, Rubber lined Metal & FRP Tanks.	
	4	Measurement Range	0 to 6 Mtrs programmable over the range	
Transmitter Details	5	Application	Water tanks level measurement.	
	6	Operating Principle	"Time of flight" by high frequency ultrasonic pulses using speed of sound OR Radar Integrated antenna system/PVDF encapsulated	
	7	MOC of Wetted parts	PVDF/Tefzel(ETFE)/KYNAR or equivalent	
	8	Sensor Connection	VTA	
	9	Ingress Protection - Sensor	Min IP65	
	10	Power Supply	+18~30 VDC, Two Wired	
	11	Input	Output/Communication	From sensor 4~20 mA DC, latest Hart protocol
	12	Analog Signal Isolation	Galvanic Isolation	
	13	Accuracy	±0.25% of measuring range or better	
	14	Temperature compensation	Built-in	
	15	Distance(Dead Zone)	VTA	
	16	Repeatability	+/- 0.25% of Full range	
	17	Resolution(dead band)	3 mm(0.1") or better	
18	Memory	Read & Write programmable		
19	Programming	Through Keypad/Buttons		
20	Local display	Integral, LCD with Back Light		
Electrical/Enclosure	21	Ingress Protection	Min IP65	
	22	Area classification	Hazardous area, Zone-1, Group II A/B	
	23	Certifications	Intrinsically safe	
	24	PESO approval	Required	
	25	Electromagnetic Compatibility	EN 61326-1:2006 or later	
	26	Termination	Terminal Block, 2.5mm ² Stranded(14AWG)	
	27	Electrical connection	1/2" NPT(F) - 2 Nos	
	28	MOC of Transmitter Enclosure	Die-cast Aluminium / Aluminium alloy powder coated epoxy painted,SS 316,Polypropylene (PP)or	
Service Conditions	29	Fluid Type	Liquid	
	30	Fluid Name	Water	
	31	Fluid Concentration	-NA-	
	32	Density	-	
	33	Operating Pressure	Atmospheric	
	34	Operating Temperature	+40~50 °C	
	35	Ambient Humidity	5 - 100% RH	
	36	Ambient Temperature	+20~50°C	
Additional details	37	Mounting Accessories	MOC SS316 accessories, to mount on 2" GI Pipe or directly on process flange with two Lock	
	38	Model No.	Vendor to specify	
	39	Quantity	Refer SOR	
Notes:	1	LT shall be highly resistant to Acid/Alkali environmental conditions.		
	2	Vendor shall submit the calibration & approval certificates along with the Transmitter.		
	3	Vendor shall submit 2 set hardcopies and 1 set softcopy of operation, installation and maintenance manuals for the instrument.		

		MRPL Marketing Terminal Project at Devangonhi, Bangalore		
		Marketing Infrastructure Projects, MRPL		
DATASHEET FOR MASS FLOW METER		Tender No :	ADDENDUM 2 TO 3200000560	
		ATTACHMENT	05	
		Rev :	0	
Data sheet For Mass flow meter				
1	Tag no.	AS PER P&ID		
2	Service	HSD / MS / ATF Custody transfer.		
3	Line size/ Schedule	AS PER P&ID		
4	Inlet Line No	Outlet Line No	AS PER P&ID	AS PER P&ID
5	Sensor Model	CMFHC3M818N2B6EZZXMCREHTCV01_30375		
6	Accuracy	0.05% Accuracy calibration on CMFHC3M		
7	Transmitter Model	2700R15ABFEAWZ.		
8	Make	Emerson		
9	Process Connection	Shall be supplied with 14" to 8" reducer and expander along with suitable counter flange.		
10	Fluid state	Liquid		
11	Min. Flow	Max. Flow	0 m3/hr	1350 m3/hr
12	Normal Flow	700 m3/hr		
13	Operating Pressure - inlet/max	kg/cm2 5.5/7		
14	Operating Temp - inlet/max	°C 40/80		
15	Specific gravity @operating	700-850		
16	Viscosity@operating (cst)	2 ~ 4.5		
17	ΔP at Normal flow	0.319 kg/cm2		
18	Calibration	Mass flow meter shall be FCRI calibrated with NABL Traceability & Calibration to be witnessed by PMC/MRPL		
19	Hydrotesting	Hydro-testing of all Components of mass Flow Meters to design Pressure.		
20	Radiography	Radiography for all welded parts required		
21	Mass Flow Meter performance curves	To be provided		
22	Documents	Product manuals, Operating / Maintenance manuals, Test certificates, Approvals, Calibration certificates..etc to be provided.		

	MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL			
	DATASHEET FOR RACK MONITOR	Tender No :		ADDENDUM 2 TO 3200000560
		ATTACHMENT		07
Rev :	0			

DATASHEET FOR RACK MONITOR

Sl.no	Description	Minimum Requirement
1.	Features	<ul style="list-style-type: none"> ○ Multipurpose monitoring and prevention of overfill in a tank truck with inbuilt bonding verification system. ○ Rack Monitor shall be compatible with Optical type overfill sensor both for 2 wire as well as 5 wire system as per API RP1004 & EN13922 ○ When Rack Monitor is connected to Tank truck (TT) through Optic socket, the system shall also detect sensor fault, overfill activation and also ensure proper bonding of the Tank truck. ○ It shall identify total nos. of healthy sensors connected over 2 wires as well as 5 wires and required LED indication for the same to be provided in the Rack Monitor and the data to be transmitted to TAS over Serial Interface. ○ Shall have Self diagnostic features and transmitted to Host system. ○ It shall support at least 8 nos. of probe irrespective of whether they are connected over 2 wires/ 5 wires.
2.	Output	<ul style="list-style-type: none"> ○ Relay contacts 2NO+2NC, 5A, 110VAC. (One set for bonding fault and one set for Overfill alarm) ○ Serial Interface: 1 no. for transmitting overfill alarm and status of all the connected sensors inside the TT.
3.	Indication lamp	Red & Green, cluster type LED type
4.	Power supply	110 VAC
5.	Enclosure material	Die Cast Aluminium
6.	Area Classification	Class 1, Div II, Group II A & B
7.	Enclosure Protection	IP 65 or better, Explosion proof with intrinsically safe output.
8.	Approvals	CCOE / PESO & ATEX
9.	Plug and Cord sets	<ul style="list-style-type: none"> ○ 10 pin gantry plug with min 3 bayonets, SS Stainless steel. ATC copper cable, coiled type of 8 m.

	MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL			
	DATASHEET FOR RACK MONITOR	Tender No :		ADDENDUM 2 TO 3200000560
		ATTACHMENT		07
Rev :	0			

		<ul style="list-style-type: none"> ○ Truck plug/ Optical socket fixed with Tank truck can be of 6/8/10 pins 3J as per API standard. Rack monitor shall be compatible with all the above mentioned Truck plug/ Optical socket.
10.	Accessories	<ul style="list-style-type: none"> ○ Lockable/Digital (5 number per location) by pass switch for loading during emergency to be provided. ○ Portable Truck (able to detect & display all the compartment health status) and Rack tester for verifying Rack monitor operability. The tester shall have inbuilt diagnostic feature and shall be able to identify nos. of healthy sensors connected to the respective TTs under testing. Minimum Two no. per location to be provided. ○ Storage hanger

Note:



1. Relay output of the Rack Monitor to be connected to BCU for interlock purpose. i.e. Loading should only commence or continue loading till the output of the Rack monitor is healthy.
2. Serial interface output (**Modbus**) of the Rack monitor is to be connected to TAS (DCS) for transmitting over fill alarm and status of all the connected overflow sensors inside the TT. In case of overflow alarm, safety PLC shall close the ON-OFF valve and the corresponding BCU shall close the DCV of the respective loading point.

Based on the shipment received from SAP, TAS shall internally check nos. of compartment of the TT and compare it with the nos of healthy sensor of respective TT as received from Rack Monitor through Serial Interface.

In case there is a mismatch (ie sensor bypassed/ faulty), system should generate an alarm and loading should not start. The required cabling and its interlock development are in the scope of the vendor.



Following (minimum) data to be shared over serial interface to TAS (DCS):-



1. Compartment wise status for overflow
 2. Number of healthy compartment
 3. Socket connected/Ready to load
 4. Ground error
 5. Vehicle identification
3. Vendor to ensure that earthing point of the optic socket is connected to TT body

	MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL			
	DATASHEET FOR RACK MONITOR	Tender No :		ADDENDUM 2 TO 3200000560
		ATTACHMENT		07
		Rev :		0

properly.



4. Installation drawing for mounting of the optic socket, bonding bolt, optic probes and its interconnection drawing on TT to be provided by the vendor for proper function of the overfill sensors.

	MRPL Marketing Terminal Project at Devangonthi, Bangalore				
	Marketing Infrastructure Projects, MRPL				
	DATASHEET FOR SEAL ENTRY DEVICE	Tender No :	ADDENDUM 2 TO 3200000560		
		ATTACHMENT	8		
Rev :		0			
DATASHEET FOR SEAL ENTRY DEVICE					
GENERAL	1	Tag No.	As per P&ID/SOR		
	2	Make	As per approved vendor list		
	3	Model	Vendor to specify		
	4	Quantity	As per SOR		
TECHNICAL SPECIFICATION FOR DATA & SEALING ENTRY DEVICE	5	Type	Intrinsically Safe Interactive		
	6	Location	PTB 01 ATEX 1001 - II 2G Ex ia IIC T4 Gb - II 2D Ex ibD bII IICP 6T51		
	7	Power Supply	24 VDC		
	8	Serial Interface	RS 422 / RS 485		
	9	Integral Keyboard Matrix	Function keys and Alpha numeric keys		
	10	Programmable Key Function			
	11	Display	LCD display with back light :8 rows with 40 characters		
	12	Function of Soft keys	8 Function keys and control keys		
	13	Housing front display	Aluminium with polyester membrane seal. IP 65 back : plastic with fastening / arrester plate		
	14	Ambient temperature (Storage/Operation)	5 TO 55 deg C		
	15	Protection Class	IP 65		
	16	Power Supply Module	24 VDC		
	17	Communication Module	RS 422 / RS 485 compatible		
	18	Configuration Software	VTS		
	19	Communication	YES		



	MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL			
	DATASHEET FOR DENSITY METER	Tender No :		ADDENDUM 2 TO 3200000560
		ATTACHMENT:		09
		Rev :		0

DATASHEET FOR DENSITY METER



DENSITY METER			
1.	Quantity	As per SOR	
2.	Area / Unit	TLF gantry	
3.	Location	Tank Truck loading	
4.	Make	As per approved vendor list	
5.	Model No.	VTs	
6.	Ordering Code	VTs	
7.	Flow	Min/Max	1.3 LPM / 18 LPM
8.	Density Range	Min/Max	0.25 to 1.5 gm/cc
9.	Allowable Pressure Drop	Min /Max	0.1 Kg/cm ²
10.	Velocity	Max 2 m/s	
11.	Ambient Temperature Limit	5-40 deg C	
12.	Relative humidity limit	95% non condensing	
13.	Type	True Density Meter for custody transfer application	
14.	Principle of operation	Coriolis mass flow / Direct measurement	
15.	Flow direction	Bi-directional flow	
16.	Transmitter type	Integral	
17.	Tube size (sensor)	VTs, Min 1" end connection	
18.	Tube	SS 316L	
19.	Wetted parts	SS 316L	
20.	Service	Density	
21.	Process connection	RF, ANSI 300 # B16.5	
22.	End connection Material	SS 316L	
23.	Transmitter Body Material	SS 304 fully welded/Cast Aluminum	
24.	Matching flanges	SS 316L- to be welded to main product pipeline, if required	
25.	Mounting accessories	Required	
26.	Micro strainer	Y type Strainer with SS internals.	
27.	NRV	1", lift check valve with SS internals	

	MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL			
	DATASHEET FOR DENSITY METER	Tender No :		ADDENDUM 2 TO 3200000560
		ATTACHMENT:		09
		Rev :		0



28.	Globe/Gate valve	1" required for regulating flow into main header
29.	Piping	1" of SS 304 pipeline
30.	Drain connection	Required with Gate valve of SS internals and shall be plugged or locked to avoid pilferage
31.	Accuracy	± 0.0005 gm/cc for density & $\pm 0.1\%$ for flow
32.	Linearity	+/- 0.0002 gm/cc of the reading
33.	Repeatability	+/- 0.0002 gm/cc
34.	Output	1 nos. of 4 – 20mA with HART API MPMS Ch 11.1 density, 1 no. RS485 MODBUS, The density details (real time density, temperature and corrected density to 15 C as per latest ASTM 54 B) shall be displayed in all Operator interface consoles and TTES.
35.	Input	RTD (duplex) input for external temperature sensor
36.	Connectivity	Maximum of 5 density meters shall be multi-dropped over RS 485 link and taken to the control room.
37.	Electrical Connection	1/2" NPT (F), double compression type
38.	Local display	2 line, 16 characters, scroll – touch screen preferred Data to be displayed – Volume flow (compensated) Mass flow Temperature, Density @ 15 Deg C Density @ ambient temperature
39.	Temperature Compensated output	Required for Density (local & remote) as per relevant API & ASTM tables
40.	Power supply	VTS
41.	Power consumption	VTS
42.	Cable Entry & Gland	1/2" NPT
43.	Area Classification	ZONE 1, GROUP IIA/IIB, TEMP T3,
44.	Enclosure Protection	IP65 or better & Exproof as per IEC 60529/60079
45.	Protection	Circuit protection against surges, lightning, reverse polarity & reverse insertion.
46.	Housing Protection	Weatherproof to IP67 & Explosion proof
47.	Approval	CCOE / PESO & CMRI
48.	Calibration	FCRI
49.	Mounting Arrangement	All mounting arrangement with valves, flanges, tee, strainer, blinds, orifice plate with match flanges for the header pipes complete set in contractor's scope. Return line to suction of pump.
50.	Accessories	Micro-strainer (80 mesh) to be provided on upstream side,



	MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL			
	DATASHEET FOR DENSITY METER	Tender No :		ADDENDUM 2 TO 3200000560
		ATTACHMENT:		09
		Rev :		0

		with 2 no. drain & isolation valves on upstream /downstream side and one NRV at downstream. 3 way manifold to be provided for calibration and sampling point.
	NOTES	
1.	VTS = Vendor to specify	
2.	SS tag plate with tag number, CCOE / PESO certificate no. process parameters and other relevant information shall be fixed on the instrument.	
3.	<u>Documents:</u> Specification with catalogue, GA drawing, Installation / Mounting drawing, test certificates, CCOE / PESO & CMRI certificates, calibration certificates, Operation & Installation manual.	
4.	Fittings & Accessories to be supplied along with instrument from OEM & part no / code to be indicated in datasheet.	

 MRPL	MRPL Marketing Terminal Project at Devangonhi, Bangalore		 nauvata <small>ENGINEERING CONSULTANTS</small>	
	Marketing Infrastructure Projects, MRPL			
	DATASHEET FOR RESTRICTION ORIFICE	Tender No : ATTACHMENT		ADDENDUM 2 TO 3200000560 10
		Rev :		0

	Sl. No	Description	Minimum requirement	
	GENERAL	1	SERVICE	DENSITY METER
2		INLET LINE OD (mm) OUTLET LINE OD (mm)	VTA	VTA
3		P&ID NO.	As per P&ID	
PLATE	4	TYPE	CONCENTRIC SQUARE EDGED	
	5	SINGLE STAGE PRESSURE REDUCTION	VTS	
	6	MULTIPLE STAGE PRESSURE REDUCTION	VTS	
	7	MATERIAL	SS316	
	8	PLATE THICKNESS "W" IN mm	VTS	
	9	BETA RATIO d/D	VTS	
	10	BORE DIA 'd'	VTS	
	11	VENT / DRAIN	REQUIRED	
	12	CENTER DISTANCE 'R'	VTA	
	13	NO. OF PLATES	VTS	
FLANGES	14	END CONNECTION: SIZE & RATING	DENSITY METER	
	15	LINE ID / OD (mm)	VTS	
	16	FLANGE FACING & MATERIAL	VTS	
OPTIONS	17	FLOW STRAIGHTNER	NA	
	18	ORIFICE FITTING TYPE	NA	
	19	SEALING UNIT	NA	
SERVICE CONDITIONS	20	FLUID/ STATE	INTEGRAL TO DENSITY METER	
	21	COMPRESSIBILITY FACTOR	TBC	
	22	PIPE REYNOLDS NUMBER	VTS	
	23	IBR CERTIFICATION	VTS	

	MRPL Marketing Terminal Project at Devangonhi, Bangalore			
	Marketing Infrastructure Projects, MRPL			
	DATASHEET FOR LEVEL GAUGE	Tender No :		ADDENDUM 2 TO 3200000560
		ATTACHMENT:		11
Rev :		0		
GENERAL	1	SERVICE	TROLLEY MOUNTED TT CALIBRATION	
	2	C TO C.DIMENSION(mm)	VTS	
	3	VISIBLE LENGTH (mm)	VTS	
	4	NUMBER OF SECTIONS	VTS	
	5	ORIENTATION	TOP/BOTTOM	
	6	GAUGE BODY MATERIAL	SS316	
	7	COVER MATERIAL	SS316	
	8	GASKET MATERIAL	VTS	
	9	RESOLUTION	VTS	
GAUGE COCK	10	VALVE TYPE	BALL CHECK AUTO SHUT OFF	
	11	GAUGE CONNECTION SIZE	VTS	
	12	CONNECTION SIZE & RATING	TBC	
	13	BODY MATERIAL	SS316	
	14	TRIM MATERIAL	SS316	
	15	ELETRICAL CLASS	ZONE 1, GROUP IIA&IIB, T3	
ACCESSORIES	16	ILLUMINATORS	REQUIRED	
	17	ILLUMINATOR WATTAGE/POWER SUPPLY	VTA	
	18	WEATHER PROOF RATING	IP65	
	19	FROST SHIELD	-	
	20	PROTECTIVE SHIELDS	-	
	21	INTERNAL HEAT TRACE/CONNECTION	-	
	22	STUD/BOLT MATERIAL	SS316	
	23	VENT	REQUIRED	
	24	PLUG/VALVE	PLUG,1/2" NPT	
	25	VALVE TYPE	-	
	26	MATERIAL BODY/TRIM	SS316	
	27	DRAIN	REQUIRED	
	28	PLUG/VALVE	VALVE,1/2" NPT	
	29	VALVE TYPE	GATE	
	30	MATERIAL BODY/TRIM	SS316	

	MRPL Marketing Terminal Project at Devangonhi, Bangalore			
	Marketing Infrastructure Projects, MRPL			
	DATASHEET FOR IS DETECTOR	Tender No :		ADDENDUM 2 TO 3200000560
		ATTACHMENT		12
	Rev :	0		

	1	Service	IS Detector
	2	Area Classification	Zone 1, Gas Group IIB, T3
	3	Ambient Temperature	-5°C to 55°C
	4	Design Relative Humidity	95% max non-condensing
DETECTOR	5	Type	Optical Type
	6	Mounting	Surface mounted with back box complete with base
	7	Ingress Protection	IP 55
	8	Enclosure Certification	Ex ' ia ' Zone 1, Gas Group IIB
	9	Power Supply	24 VDC
	10	Power Consumption	VTS
	11	Cable Entry Size	VTS
	12	Cable Entry Quantity	2 No's
	13	Resistor Value - Series	NA
	14	Resistor Value E.O.L	VTS
	15	Detection Range	VTS
	16	Addressable	Yes
	17	Integral Alarm Indication	Integral and remote alarm LED
	18	Standard	EN54, EN50130-4, EN61000-6-3
ALARM VALUES	19	Volt Free Contact	Output
	20	Static Current	VTS
	21	Alarm Current	VTS
	22	Reset Time	VTS
	23	Duct Mounting Kit	Required
	24	Test Gas	Yes
	25	Testing Material Certification	Required
	26	IS Barrier	Yes

VTS- Vendor To Supply

Notes:-

- Screw clamp terminals suitable for upto 2.5mm² conductors with 9 terminals
- Documentation required (minimum) : Material certificates EN 10204.3.1, dimensional drawings, Explosion proof, Weather proof, Calibration certificate ,Hazardous Area Register and Operating and Maintenance manual.
- All Spare entry shall be provided with Ex"de" certified plugs. Vendor shall provide adaptor if any required
- All Instrument shall be provided with SS 316 tag plate, inscribed with tag number engraved or embossed with white letters on red background. The tags shall be fixed with SS screws.