
	MRPL Marketing Terminal Project at Devangonhi, Bangalore Marketing Infrastructure Projects, MRPL.	
LSTK-A PACKAGE : TANKAGE AND ASSOCIATED CIVIL, MECHANICAL, PIPING, ELECTRICAL, INSTRUMENTATION & FIRE FIGHTING WORKS ADDENDUM 02		

ADDENDUM 02

To

MRPL Tender No. 3200000495 dated 26.03.2021

**TENDER FOR: TANKAGE AND ASSOCIATED CIVIL, MECHANICAL, PIPING, ELECTRICAL, INSTRUMENTATION & FIRE FIGHTING
WORKS(LSTK-A PACKAGE)MRPL MARKETING TERMINAL PROJECT
AT DEVANGONTHI, BANGALOREMARKETING INFRASTRUCTURE PROJECTS, MRPL**

With reference to the above tender and Addendum 1, 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 – Replies 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_C ommercial_ Section	Part I – Techno- Commercial Part Notice Inviting Tender (NIT), Sl.No. 8 : Last Date and time of Online submission of Bids (Bid Due Date)	13 of 3638	Up to 1500 Hrs. (IST) on 27.04.2021	Modification Up to 1500 Hrs. (IST) on 11.05.2021
2.	Volume_I_C ommercial_ Section	Part I – Techno- Commercial Part, Notice Inviting Tender (NIT), Sl.No. 9 : Online Opening of Techno-commercial Unpriced Bid.	13 of 3638	1530 Hrs. (IST) on 27.04.2021	Modification 1530 Hrs. (IST) on 11.05.2021
3.	Volume_I_C ommercial_ Section	9.2 Vendor list, Point 60, APPROVED MAKES/ BRANDS/VENDORS for : Additive Injection Skid & Panel for Blue Dye / Marker / Power / Turbo	707 of 3638	-	Addition “Cryogenic / Dencil / Toshniwal” are added under APPROVED MAKES/VENDORS/BRANDS
4.	Volume_I_C ommercial_ Section	9.2 Vendor list, Structutral, SL NO.3 – Paint	696 of 3638	-	Addition “7. Carboline India Private Limited” Is added under APPROVED MAKES/VENDORS/BRANDS



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Sl. No.	Volume	Section No./Clause No.	Page No.	Existing Tender Clause	Addition / Deletion / Modification
5.	Volume_I_C ommercial_ Section	9.2 Vendor list, CIVIL & ARCHITECTURAL, SL NO.13 - Paint	701 of 3638	-	Addition “ Carboline India Private Limited ” is added under APPROVED MAKES/VENDORS/BRANDS
6.	Volume_I_C ommercial_ Section	9.2 Vendor list	688 to 713 of 3638	-	Modification “ Vendor List ” mentioned in Header to be read as “ Approved Vendor List ”.
7.	Volume_I_C ommercial_ Section	Annexure XV to Special Conditions of Contract	-	-	Addition “ GUARANTEES FOR LSTK PACKAGE ” is included as Annexure XV to Special Conditions of Contract.
8.	Volume_I_C ommercial_ Section	Annexure XVI to Special Conditions of Contract	-	-	Addition “ IQCM (Industry Quality Control Manual) for Storage ” is included as Annexure XVI to Special Conditions of Contract.
9.	Volume_I_C ommercial_ Section	Annexure XVII to Special Conditions of Contract	-	-	Addition “ Occurrence of Pandemic(S) ” is included as Annexure XVII to Special Conditions of Contract.
10.	Volume_I_C ommercial_ Section	Annexure XII to Special Conditions of Contract / LIST OF THIRD PARTY INSPECTION AGENCIES (TPI)	Page 657 of 3638	-	Addition “ 12. M/s. Competent Inspectorate and Consultants LLP ” is included under THIRD PARTY INSPECTION (TPI) agencies for the inspection of supplies.



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ANNEXURE 02 –TECHNICAL ADDENDUM

Sl. No.	Volume	Section No./Clause No.	Page No.	Existing Tender Clause	Addition / Deletion / Modification
1.	Volume_II_Technical_Section_Part_30	Drawings, D.23	3252 of 3638	20005-GEN-M-DW-4100 Rev0	REPLACED WITH REV 01 DRAWING NO: 20005-GEN-M-DW-4100 -Rev 01
2.	Volume_II_Technical_Section_Part_30	Drawings, D.35	3264 of 3638	20005-GEN-PL-SK-0001 Rev0	REPLACED WITH REV 01 DRAWING NO: 20005-GEN-PL-SK-0001 Rev 01
3.	Volume_II_Technical_Section_Part_30	Drawings, D.51	3280 of 3638	20005-GEN-P-PID-1011-001 Rev1	REPLACED WITH REV 02 DRAWING NO: 20005-GEN-P-PID-1011-001 Rev 2
4.	Volume_II_Technical_Section_Part_30	Drawings, D.54	3283 of 3638	20005-GEN-P-PID-1013-001 Rev0	REPLACED WITH REV 01 DRAWING NO: 20005-GEN-P-PID-1013-001 Rev 1
5.	Volume_II_Technical_Section_Part_30	Drawings, D.55	3284 of 3638	20005-GEN-P-PID-1013-002 Rev1	REPLACED WITH REV 02 DRAWING NO: 20005-GEN-P-PID-1013-002 Rev 2
6.	Volume_II_Technical_Section_Part_1	Part-B, 20005-GEN-G-DOC-9125, Table 5.3	1104 of 3638	No. of Tanks for HSD 03+1*	Addition * Shall be read as future.



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Sl. No.	Volume	Section No./Clause No.	Page No.	Existing Tender Clause	Addition / Deletion / Modification
7.	Volume_II_Technical_Section_Part_1	Part-C, Section-C1, 20005-GEN-S-SOW-2015 / Clause No. 24.31.	1456 of 3638	Product tanks (MS, HSD, ATF, ETHANOL, BIO-DIESEL, INTERPHASE AND FIRE WATER) Instruments and their Integration with DCS/PLC.	Modification Shall be read as “Product tanks (MS, HSD, ATF, ETHANOL, BIO-DIESEL and INTERPHASE) Instruments and their Integration with DCS/PLC”.
8.	Volume_II_Technical_Section_Part_1	Part-C, Section-C1, 20005-GEN-S-SOW-2015 / Clause No. 5.31.	1336 of 3638	CONTRACTOR shall provide all Engineering inputs which are required for execution the scope of work of other contractors through PMC.	Modification: Shall be read as “CONTRACTOR shall provide all Engineering inputs which are required for execution of the scope of work under other contractors through PMC”.



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ANNEXURE 03 – REPLIES TO PRE-BID QUERIES



Sl. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	REPLY
	PAGE No.	CLAUSE No.			
1.	236 of 3638	4.9.7.1	Residual Process Design and detailed Engineering shall be done by the CONTRACTOR or specified Engineering Subcontractor identified by the CONTRACTOR in his Bid and approved by the OWNER. No other or further Subcontracting shall be permitted.	The Residual Process design as envisaged by the client are not elaborated in the package/scope of work. Please elaborate.	Bidder to note that Residual process design refers to any design if not done during Basic design but requires to complete the scope of work shall be done during detailed engineering.
2.	1363 of 3638	20005-GEN-S-SOW-2015 Rev 0 Clause 15.2.18.	Below, is the list of minimum documents/sizing calculations / drawings which shall be submitted by CONTRACTOR, for review and/ or approval –	1. The listed documents as per this clause has not been provided in bid except for those listed in c), d), e) 2. We presume all process documents listed in this clause, will be provided to successful bidder and that the detailed Engg contractor shall update it, for any changes, as required. Any fresh generation of these documents during detailed engineering stage is not envisaged. Please confirm.	1) Bidder to note that documents attached along with the tender package are for bidding purpose. 2) Bidder's understanding is incorrect. Bidder to follow tender conditions as mentioned in Cl no 15.2.18
3.	1365 of 3638	20005-GEN-S-SOW-2015 Rev 0	One horizontal Underground tank each for MS, HSD & SLOP system. All the	Recognized tank software (latest version As per 20005-GEN-S-SOW-2015 Rev 0 Clause	Bidder understanding is correct, for underground tank, in-house / spread sheet calculations are

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Sl. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	REPLY
	PAGE No.	CLAUSE No.			
		Clause 16.1.1.b)	horizontal tanks shall be designed and constructed as per IS 10987, OISD-108/244/117, specifications, scope of work and other related documents attached or referred.	16.1.3.7., "Tank design calculation shall be performed by internationally". However for this underground tank constructed as per IS 10987 there is no commercial software available and hence the above clause is not applicable. Please confirm. In general, where commercial software's are not available client to accept the In-house or spreadsheet calculations.	acceptable. However bidder shall submit manual calculation for validation and approval of excel spread sheet by the PMC.
4.	1436 of 3638	20005-GEN-S-SOW-2015 Rev.0 Section-20.2.1	Design, Engineering, Supply, Installation and Commissioning of ROSOV with associated piping, air tubing, fitting, Outside Dyke Push button station, etc. (Note : Supply of Cables for ROSOV and Integration with DCS/PLC shall be done by Others CONTRACTORS.	Company to confirm that Contractor scope of I&C is limited to supply & installation of ROSOV. Also the tank gauges, TFMS and associated cabling will be provided others.	1) I&C Scope for RSOV is Design, Engineering, Supply, Installation and Commissioning of ROSOV with associated piping, air tubing, fitting, Outside Dyke Push button station, etc. However Supply of Cables and Integration with DCS/PLC is in scope of Others 2) Tank Gauges, TFMS and associated cables is not in scope of Contractor and will be supplied by Others. 3) Contractor shall provide all inputs required for Integration of these items to DCS/PLC.
5.	1436 of 3638	20005-GEN-S-SOW-2015 Rev.0	All the instruments such as Level transmitter, Pressure	Company to confirm that this kind of requirement is applicable to contractor supplied packages such as Vapor Recovery Unit, etc. In	All Instruments which are part of Package system are in Scope of Contractor and related

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Sl. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	REPLY
	PAGE No.	CLAUSE No.			
		Section-20.2.8	transmitter, Temperature transmitter, LG, PG which are part of Package system shall be supplied by Contractor.	this regard Company to clarify and confirm that design, supply & installation of all field instrumentation, installation hardware and Plant DCS/ESD/FGS for non-package equipment's will be provided by others including cabling between control room and battery limit of package equipment skid.	instrumentation works as mentioned in of Scope of work document (Part C, Section C-1) is in Contractor scope, However Plant DCS/PLC/F&G system will be provided by Others including cable between control room and battery limit of package equipment skid.
6.	1437 of 3638	20005-GEN-S-SOW-2015 Rev.0 Section-20.2.11	Wiring, Termination and Commissioning of Package items shall be in scope of Contractor.	Company to confirm that this requirement is applicable with in the battery limit of packages.	Bidder's understanding is correct
7.	Page-1436 of 3638 Page-32 Of 61 Tender 1850/51 of 3638	20005-GEN-S-SOW-2015 Rev.0 Section-20.2 Volume-II Technical Section Part-1 Engineering Design Basis	Scope of work for Instrumentation does not specify requirement of F&G detectors applicable to contractor scope of work area (Tank Farm area) to be supplied by Contractor whereas F&G design requirements are specified in I&C design basis. Same is applicable to CCTV.	F&G detectors & CCTV cameras for tank farm area will be supplied & installed by others. Supply & installation of F&G detectors & CCTV cameras are not applicable to this tender document. Company to confirm.	Bidder's understanding is correct.

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		For Instrumentation			
8.	Page-16~27, 29, 31 Page-556	Volume_II_Technical_Section_Part_30, P&IDs, Document No. 20005-GEN-S-SOW-2015 Rev.0 Section-20.2 Part of Volume-II Technical Section Part-1	<p>P&ID Requirements: All instrumentation shown in this P&IDs (Excluding inline instruments like ROSOV, MOV & DBBV) are in LSTK-C Contractor Scope.</p> <p>I&C-SOW: Package: Design, Engineering, Supply, & Installation of ROSOV. Supply and Laying of OFC (12 Fiber) from MRPL CR to PMHBL CR. All the instruments such as Level transmitter, Pressure transmitter, Temperature transmitter, LG, PG which are part of Package system shall be supplied by Contractor.</p> <p>SOW-Major Exclusion: Complete Instrumentation system including DCS, SIL3 PLC, CCTV system, Field</p>	<p>As per P&ID, SOW-I&C and SOW-Major exclusions, all field instrumentation including integration with Integrated Control & Safety shutdown system (ICSS) are in LSTK-C Contractor Scope other than Packaged skid instrumentation. In this regard company to clarify and confirm the following.</p> <p>i) Contractor scope is limited to design, supply & installation of ROSOV, MOV & DBBV. Inline instruments and valves such as control valves, on-off valves, PSV, inline flow meters are excluded from LSTK-A Contractor scope.</p> <p>ii) Contractor scope is limited to design, supply & installation of ROSOV, MOV & DBBV. Design, Supply, laying of cables/JB/Trays and integration of these items with ICSS are in other scope.</p> <p>iii) Design, supply & installation of all field instrumentation including cabling (cables/JB/Trays) are provided by others other than inside Package Equipment's. i.e. Excluded from LSTK-A Contractor Scope.</p>	<p>i) Bidder Scope for inline instrument includes ROSOV, MOV & DBBV also Inline PSV and TSV are in scope of Contractor, for details please refer to Scope of work given in tender document,</p> <p>ii) Bidders Understanding is correct However commissioning of these items shall be in Bidder scope.</p> <p>iii) Please refer to clarification given in point number 5</p>
	Page-575	Document No. 20005-GEN-S-SOW-2015 Rev.0 Section-24.7 Part of Volume-II			

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Sl. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	REPLY
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		Technical Section Part-1	Instruments, Meter provers, etc. Sizing of Control Room for TFMS, LRCS, Terminal Automation System—TAS. (By Other CONTRACTOR). However, design, procurement, supply, installation, testing and commissioning of instrumented valves like MOVs, DBBVs, and ROSOVs, Dyke drain valves with proximity switch/sensor, and all Instruments and controls for package units, firewater & foam systems are in CONTRACTOR scope.		
9.	Page-32~35 & 43 Page-556	Volume_II_Technical_Section_Part_30, P&IDs, Document No. 20005-GEN-S-SOW-2015 Rev.0 Section-20.2	P&ID Requirements: It appears that All instrumentation shown in this P&IDs are in LSTK-A Contractor Scope. I&C-SOW: Package: Design, Engineering, Supply, & Installation of ROSOV.	All field instrumentation shown in these P&IDs for firefighting system appears to be Part of LSTK-A Contractor Scope. In this regard company to clarify and confirm the following. i) The design, supply & installation of all field instrumentation are in LSTK-A Contractor scope. ii) Supply, installation, laying of cables/JB/Trays and integration of these items	i) All Instruments shown in P&ID 20005-GEN-P-PID-1013_1, 20005-GEN-P-PID-1013_2 and 20005-GEN-P-PID-1014_1 (Pg no 3283 of 3638, 3284 of 3638 & 3285 of 3638) are in Scope of LSTK A Contractor. ii) (a) : Supply , installation, laying of cable /JB/Tray is in Scope of Contractor, However

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Sl. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	REPLY
	PAGE No.	CLAUSE No.			
	Page-575	Part of Volume-II Technical Section Part-1 Document No. 20005-GEN-S-SOW-2015 Rev.0 Section-24.7 Part of Volume-II Technical Section Part-1	Supply and Laying of OFC (12 Fiber) from MRPL CR to PMHBL CR. All the instruments such as Level transmitter, Pressure transmitter, Temperature transmitter, LG, PG which are part of Package system shall be supplied by Contractor. SOW-Major Exclusion: Complete Instrumentation system including DCS, SIL3 PLC, CCTV system, Field Instruments, Meter provers, etc. Sizing of Control Room for TFMS, LRCS, Terminal Automation System—TAS. (By Other CONTRACTOR). However, design, procurement, supply, installation, testing and commissioning of instrumented valves like MOVs, DBBVs, and ROSOVs, Dyke drain valves with proximity switch/sensor,	with F&G system and fire station are in LSTK-A Contractor scope	Integration to DCS/F&G System is in Scope of Others, (b) : Fire and Gas Panel will be supplied by Others, (c) : All LTs and PTs shown in the P&IDs shall be wired till battery Limit JB and from Battery limit to Control PLC is in scope of Others, (d): Local control panel for fire water system is in Scope of Bidder including control system up to Battery Limit. Integration of field Panels to DCS is in scope of Others. All necessary support required for integration shall be provided by Contractor.

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			and all Instruments and controls for package units, firewater & foam systems are in CONTRACTOR scope.		
10.	2671 of 3638	Engineering design basis –Pipeline 20005-GENPL-EDB-7010 Cl.no.6.4	Recommendation of Seismic Analysis Report should be considered for seismic prone area	Seismic zone is given as zone II (Low risk zone). Also pipeline is not passing through any fault crossings. Hence please clarify the requirement of seismic analysis for the pipeline	Bidder understanding is correct, Seismic analysis is not required.
11.	13 of 3638	NIT table, point 8	Last date of Bid Submission - 27th April 2021	Apart from Tankages, the Bid has 29 API Pumps, 6 Fire Water Pumps and 10 Various packages and other major mechanical equipment's, for which engineering has to be carried out, enquiries to be floated, offers to be received and evaluated. Further due to prevailing pandemic which is again increased substantially leading to adverse effect on normal working of most organizations. Therefore Bidder is requesting to extend the deadline of bid submission to 24th May 2021.	Refer Annexure 01 – Commercial Addendum.
12.	173 of 3638	2.1	Work front	Bidder has requested to client/PMC to provide the sequential, priority of works as per scope of work	Bidder to follow the milestone provided in NIT, Bidder is responsible to complete all the activities to cover the defined scope of work within the time

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					frame. Bidder to schedule the activities accordingly.
13.	1432 of 3638	19.21	Restricted ROU for Pipeline 14" feed pipeline from PMHB to PLT exchange manifold	Bidder's understand that the necessary statutory approvals and all types of clearances to lay the pipeline along the road shall be provided by Client/PMC	Bidder's understanding is not correct. Refer to Pipeline Scope of work clause No. 19.2.14 to 19.2.16, Page No.1419 of 3638.
14.	1546 of 3638	3.3.6	Tanks having less than 10 mtr dia shall be provided with anchor bolts and shall be spaced approx 1.8 mtr of circumference	Please clarify regarding anchor bolts for tanks having sizes more than 10 mtr dia	Bidder to refer to tank foundation drawing attached with tender from page 3224 to 3235 of 3638.
15.	3253 of 3638	Tank GA Drgs	As shown in the GA Drgs, The plate width is 1500 mm	Please clarify the plate width shall be restricted to 1500 mm only or we can proceed with plate width 2000 mm	Bidder to note that minimum plate width shall be 1500mm and bidder can proceed with 2000mm plate width.
16.	3224 of 3638	Tank GA Drgs - Foundation Drawings	Sand filling in the foundation	Can any type of sand be used Please clarify if M sand or robo sand can be used for the foundation works and filling. Please also clarify type of sand to be used for concreting works and plastering works	1) Bidder to follow NOTES of tank foundation drawings attached from page number 3224 to 3239 of 3638 and Other relevant documents included in the tender. Bidder to make sure the sand selected shall meet the requirements. 2) For concreting and plastering works, bidder to follow tender document.

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17.	-	-	Piping/ Fire Fighting Work 1. Complete product piping associated with tankages, pumps, truck filling facility. 2. Piping associated with ethanol dosing, tanker unloading facility, OWS system, Instrumentation Air supply system 3. Complete Fire Water Network & Foam Network Piping 4. 14" New Feed Pipeline from PMHBL Terminal to PLT Manifold (Approx 1km length)	1. As per EDB for Fire Fighting we understand that main FW Network around the tank dyke area will be underground, FW Network in off-site area/ green field area will be aboveground and run over the independent pipe supports and FW Network in RCC Paved areas will be laid in RCC trenches with sand filling. Please obtain the confirmation regarding our understanding from client/ consultant. 2. In P&IDs some pipes are marked as dotted lines but meaning of dotted pipelines is not clear, whether dotted line pipes will be in LSTK A Contractor's scope or in other's scope. Please obtain the clarification regarding this from client/ consultant. 3. As per tender scope of work we understand that complete piping from tanks to TLF Bays is in LSTK A Contractor's scope but piping within the TLF Bays is in LSTK C Contractor's scope. Please obtain the confirmation regarding this from client/ consultant.	1. Bidder to note that the Fire water network will be above ground all around the tanks and dyke area. In Offsite area / Green belt area (non-paved area) fire water piping shall be underground with coating and wrapping. In paved areas and accessible areas the fire water pipe shall be routed in RCC trenches with removable covers. 2. Bidder to note that the dotted lines indicated in following P&IDs are referring to future scope, 20005-GEN-P-PID-1006_2, 20005-GEN-P-PID-1007_2, 20005-GEN-P-PID-1008_2, 3. Bidder understanding is correct. However the bidder's scope shall be as per scope demarcations on the P&IDs in the tender document.

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				<p>4. According to P&ID 20005-GEN-P-PID-1013-1, Note-9, "The tie in location is outside the terminal at about 600m. LSTK A Contactor shall check & update the same during detailed Engineering." Considering this Note Supply & Design of this 600m pipe upto tie-in location with IOCL/BPCL FW line is not clear. Please obtain the clarification regarding this from client/ consultant.</p> <p>5. In P&ID MVWS System and Foam System is shown for only MS/ATF/HSD Tanks. Please obtain the clarification from client/ consultant regarding the scope of same for Ethanol. Biodiesel & Interface Tanks.</p>	<p>4. Bidder to hook-up with existing fire water network of IOCL/BPCL FW line. The Survey, Design, material supply, construction / erection and commissioning upto tie-in location with IOCL/BPCL FW line is the scope of bidder.</p> <p>5. Bidder to note that MVWS is required for the bio-diesel, interface and ethanol storage tanks. Bidder to refer updated P&ID attached part of Addendum 2. Fixed foams system is not required for bio-diesel, interface and ethanol storage tanks.</p>
18.	-	-	<p>Tankage Works</p> <ol style="list-style-type: none"> 1. 3 Nos. MS Tanks 2. 3Nos. HSD Tanks 3. 3Nos. ATF Tanks 4. 2Nos. Biodiesel Tanks 5. 1 No. Interface Tank 6. 2 Nos. Ethanol Tanks 7. 2 Nos. Fire Water Tanks 8. 1 no. MS U/G Tank 	<ol style="list-style-type: none"> 1. In foam tank we have noted in the design data section of GAD against no. of tanks indicated as one whereas in MDS, no. of tanks indicated as two. Please confirm number of tanks to be considered in our BOM. 2. As per Cl. No. 9 of EDB for static equipment, "Earthquake loads shall be 	<ol style="list-style-type: none"> 1. Bidder to note that the number of foam tanks shall be 2 as defined in MDS. Updated Tank GAD is attached part of Addendum 2. 2. Bidder to refer to Code IS 1893 (part1): 2016 for seismic analysis. Reference shall be made to site

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Sl. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	REPLY
	PAGE No.	CLAUSE No.			
			9. 1 No. HSD U/G tank 10. 1 No. SLOP U/G Tank 11. Foam Tanks	calculated in accordance with site spectra curve using response spectra method with 2 % damping". In this regard kindly note that we have not received any site spectra document along with the tender. Kindly arrange to furnish the same.	specific spectra in the code and normalize the spectra for given location for carrying out design.
19.	-	-	General Clarification on LSTK A Package Scope	We understand that the scope of this tender is limited to Civil, mechanical, firefighting works, electrical and instrumentation for tankages. The Terminal automation system, Balance of plant Instrumentation and Electrical packages will be covered under LSTK-C Package. Please confirm our understanding.	Bidder to note that Scope of Work is clearly defined in the tender document no: 3200000495
20.	704 of 3638	5	Approved Vender Make / DIGITAL CONTROL VALVE	Kindly accept Darling Muesco as Approved make for DIGITAL CONTROL VALVE .	Bidder to follow Vendor list attached with tender
21.	704 of 3638	6	Approved Vender Make /PNEUMATIC CONTROL VALVE / SHUTDOWN VALVE (BALL TYPE)	Kindly accept Microfinish and 2L as Approved make for PNEUMATIC CONTROL VALVE / SHUTDOWN VALVE (BALL TYPE).	Bidder to follow Vendor list attached with tender
22.	704 of 3638	8	Approved Vender Make / ACTUATORS (PNEUMATIC) – FOR SHUTDOWN SERVICES	Kindly accept Teratork(Microfinish) as Approved make for ACTUATORS (PNEUMATIC) – FOR SHUTDOWN SERVICES	Bidder to follow Vendor list attached with tender
23.	705 of 3638	14	Approved Vendor Make / TRUCK PROVING TANK	Kindly accept Cryogenic and Toshniwal as Approved make for TRUCK PROVING TANK	Bidder to follow Vendor list attached with tender
24.	705 of 3638	15	Approved Vendor Make /PD METER PROVING TANK	Kindly accept Cryogenic and Toshniwal as Approved make for PD METER PROVING TANK	Bidder to follow Vendor list attached with tender
25.	705 of 3638	16	Approved Vender Make / UPS	Kindly accept Hirel and Fuji Electric as Approved make for UPS.	Bidder to follow Vendor list attached with tender

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Sl. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	REPLY
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26.	705 of 3638	17	Approved Vender Make / BATTERIES	Kindly accept EXIDE as Approved make for BATTERIES.	Bidder to follow Vendor list attached with tender
27.	705 of 3638	19	Approved Vender Make / LOADING ARM (BOTTOM) FOR PRODUCT & VAPOUR	Kindly accept TECHNICA, WOODFIELD, SUN PACIFIC as Approved make for LOADING ARM (BOTTOM) FOR PRODUCT & VAPOUR	Bidder to follow Vendor list attached with tender
28.	705 of 3638	20	Approved Vender Make / API COUPLER / DRY BREAK COUPLERS	Kindly accept TECHNICA, WOODFILED as Approved make for API COUPLER / DRY BREAK COUPLERS	Bidder to follow Vendor list attached with tender
29.	705 of 3638	22	Approved Vender Make / PROXIMITY CARD READER	Kindly accept AST as Approved make for PROXIMITY CARD READER	Bidder to follow Vendor list attached with tender
30.	705 of 3638	20	Approved Vender Make / REMOTE INTERACTION TERMINAL (RIT)	Kindly accept FLEXPOR ELECTRICALS (P) LTD and SHYAM SWITCHGEAR as Approved make for REMOTE INTERACTION TERMINAL (RIT)	Bidder to follow Vendor list attached with tender
31.	705 of 3638	24	Approved Vender Make / DENSITY METER	Kindly accept LEMIS as Approved make for DENSITY METER	Bidder to follow Vendor list attached with tender
32.	706 of 3638	43 & 6.1	Approved Vender Make / PROXIMITY SWITCHES/LOADING ARM POSITION SENSOR	Kindly accept OSNA, TECHNICA as Approved make for PROXIMITY SWITCHES/LOADING ARM POSITION SENSOR	Bidder to follow Vendor list attached with tender
33.	706 of 3638	46	Approved Vender Make / THERMAL RELIEF VALVE	Kindly accept NIRMAL INDUSTRIAL CONTROLS PVT LTD as Approved make for THERMAL RELIEF VALVE	Bidder to follow Vendor list attached with tender
34.	706 of 3638	47	Approved Vender Make / CHECK VALVES/NON RETURN VALVE	Kindly accept MICROFINISH, FLOWCHEM, ADVANCE VALVES as Approved make for CHECK VALVES/NON RETURN VALVE	Bidder to follow Vendor list attached with tender
35.	707 of 3638	56	Approved Vender Make / ELECTRONIC DISPLAY UNIT	Kindly accept TEAM POWER as Approved make for ELECTRONIC DISPLAY UNIT	Bidder to follow Vendor list attached with tender
36.	707 of 3638	58	Approved Vender Make / MANUAL CALL POINTS	Kindly accept FCG/ FLEXPOR/ EX-PROTECTA and SHYAM SWITCHGEAR as Approved make for MANUAL CALL POINTS	Bidder to follow Vendor list attached with tender

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Sl. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	REPLY
	PAGE No.	CLAUSE No.			
37.	707 of 3638	60	Approved Vender Make / ADDITIVE INJECTION SKID & PANEL FOR BLUE DYE / MARKER / POWER / TURBO	Kindly accept TOSHNIWAL / CRYOGENIC as Approved make for ADDITIVE INJECTION SKID & PANEL FOR BLUE DYE / MARKER / POWER / TURBO	Bidder to follow Vendor list attached with tender
38.	707 of 3638	61	Approved Vender Make / PROXIMITY CARDS	Kindly accept AST as Approved make for PROXIMITY CARDS	Bidder to follow Vendor list attached with tender
39.	707 of 3638	66 & 6.9	Approved Vender Make / MAGNETIC LEVEL GAUGE/INDICATOR	Kindly accept V AUTOMAT as Approved make for MAGNETIC LEVEL GAUGE/INDICATOR	Bidder to follow Vendor list attached with tender
40.	708 of 3638	69	Approved Vender Make / GAS DETECTOR	Kindly accept ESP SAFETY as Approved make for GAS DETECTOR	Bidder to follow Vendor list attached with tender
41.	708 of 3638	73	Approved Vender Make / INSTRUMENT TUBING AND FITTINGS(SS)	Kindly accept RELIANCE ENGG. /EXCEL HYDRO-PNEUMATICS/ BALDOTA VALVE & FITTINGS /ARYA CRAFTS/ PANAM ENGINEERS/ PRECISION ENGINEERING INDUSTRIES as Approved make for INSTRUMENT TUBING AND FITTINGS(SS)	Bidder to follow Vendor list attached with tender
42.	708 of 3638	76, 77 & 78	Approved Vender Make /PUSHBUTTONS – RESET PB'S FOR HOOTERS, BEACON'S, HOOTERS.	Kindly accept FLEXPPO ELECTRICALS (P) LTD and SHYAM SWITCHGEAR as Approved make for PUSHBUTTONS – RESET PB'S FOR HOOTERS, BEACON'S, HOOTERS.	Bidder to follow Vendor list attached with tender
43.	-	1.155	Approved Vender Make/ 3 WAY VALVE	Kindly accept MICROFINISH and 2L as Approved make for 3 WAY VALVE	Bidder to follow Vendor list attached with tender
44.	-	6.8	Approved Vender Make/ TERMINAL AUTOMATION SYSTEM	Kindly accept ABB INDIA LIMITED as Approved make for TERMINAL AUTOMATION SYSTEM	Bidder to follow Vendor list attached with tender
45.	-	6.8	Approved Vender Make/ LIQUID METERING SYSTEM (MASS FLOW METER)	Kindly accept ABB INDIA LIMITED as Approved make for LIQUID METERING SYSTEM (MASS FLOW METER)	Bidder to follow Vendor list attached with tender
46.	-	6.1	Approved Vender Make/ ACCESS CONTROL SYSTEM	Kindly accept VIRDI, RBH as Approved make for ACCESS CONTROL SYSTEM	Bidder to follow Vendor list attached with tender

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Sl. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	REPLY
	PAGE No.	CLAUSE No.			
47.	-	6.1	Approved Vender Make/ MOTOR OPERATED VALVES	Kindly accept MICROFINISH as Approved make for MOTOR OPERATED VALVES	Bidder to follow Vendor list attached with tender
48.	-	6.2	Approved Vender Make/ GAUGE GLASSES & COCKS	Kindly accept V-AUTOMAT as Approved make for GAUGE GLASSES & COCKS	Bidder to follow Vendor list attached with tender
49.	-	26.0	Approved Vender Make/ JUNCTION BOX & CABLE GLAND	Kindly accept SHYAM SWITCHGEAR as Approved make for JB and GLANDs	Bidder to follow Vendor list attached with tender
50.	-	5.0	Approved Vender Make/ DISTRIBUTION TRANSFORMER (OIL IMMERSED)	Kindly accept RAYCHEM/Indcoil make for DISTRIBUTION TRANSFORMER (OIL IMMERSED)	Bidder to follow Vendor list attached with tender
51.	-	6.0	Approved Vender Make/ DISTRIBUTION TRANSFORMER (DRY TYPE)	Kindly accept RAYCHEM/Indcoil make for DISTRIBUTION TRANSFORMER (DRY TYPE)	Bidder to follow Vendor list attached with tender
52.	-	11.0	Approved Vender Make/LDB / SDB / ACDB / PDB (LIGHTING).	Kindly accept ABB/C&S make for LDB / SDB / ACDB / PDB (LIGHTING).	Bidder to follow Vendor list attached with tender
53.	-	13.0	Approved Vender Make/HT CABLES	Kindly accept AVOCAB/RHINO CABLE/GEMS CABLE make for HT CABLES	Bidder to follow Vendor list attached with tender
54.	-	14.0	Approved Vender Make/LV CABLES	Kindly accept AVOCAB/RHINO CABLE make for LV CABLES	Bidder to follow Vendor list attached with tender
55.	-	14.0	Approved Vender Make/LT CONTROL CABLES	Kindly accept AVOCAB/RHINO CABLE make for LT CONTROL CABLES	Bidder to follow Vendor list attached with tender
56.	-	14.0	Approved Vender Make/FLAMEPROOF EQUIPMENT	Kindly accept FCG Flame proof control gears/FCG Power/Prompt Engineering works/Volt tech make for FLAMEPROOF EQUIPMENT	Bidder to follow Vendor list attached with tender
57.	-	19.0	Approved Vender Make/HIGH MAST	Kindly accept Utkarsh India LTD/SURYA/ make for HIGH MAST	Bidder to follow Vendor list attached with tender



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Sl. No.	BIDDING DOCUMENT		SUBJECT	BIDDER'S QUERY	REPLY
	PAGE No.	CLAUSE No.			
58.	-	28.0	Approved Vender Make/CABLE TRAY	Kindly accept DMP/RABI Enginnering/Mahaveer/Elcon/Rukmani/ make for Cable tray	Bidder to follow Vendor list attached with tender
59.	-	44.0	Approved Vender Make/STREET LIGHTING POLES	Kindly accept Calcutta Pole/Surya/Utkarsh India LTD/ India Pole make for STREET LIGHTING POLES	Bidder to follow Vendor list attached with tender
60.	-	54.0	Approved Vender Make/LED LIGHT FIXTURES	Kindly accept SURYA/ Havells/OSRAM make for LED LIGHT FIXTURES	Bidder to follow Vendor list attached with tender
61.	-	9.2	Approved Vendor Make COMMUNICATION/ IT INFRASTRUCTURE AND ACS SYSTEMS - Telephone / IP-PBX	Kindly accept CORAL make of IP PBX, ALCATEL & PANASONIC make of Telephone/IP PBX as well.	Bidder to follow Vendor list attached with tender
62.	-	23	Approved Vendor Make for PLANT COMMUNICATION SYSTEMS	Kindly accept ARMTEL & ZENITEL for this category	Bidder to follow Vendor list attached with tender
63.	-	25	Approved Vendor Make for WIRELESS TETRA COMMUNICATION SYSTEMS	Kindly accept Motorola make of wireless tetra solution and Sheetal wireless.	Bidder to follow Vendor list attached with tender
64.	-	1	Approved Vendor Make for ACCESS CONTROL SYSTEMS	Kindly accept Virdi & HIK Vision makes for this category	Bidder to follow Vendor list attached with tender
65.	-	2	Approved Vendor Make for TURNSTILE	Kindly accept Perto make for this category	Bidder to follow Vendor list attached with tender
66.	-	1 & 2	Approved Vendor Make for CCTV CAMERAS & VIDEO MONITORING SOFTWARES	Kindly accept HIK Vision, Panasonic & Sparsh make for this category.	Bidder to follow Vendor list attached with tender

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GUARANTEES FOR LSTK PACKAGE

[ANNEXURE XV TO SPECIAL CONDITIONS OF CONTRACT]



	Marketing Terminal Project at Devangonhi, Bangalore	
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GUARANTEES

1.0 GENERAL

- 1.1 This document describes the guarantee requirements, which the CONTRACTOR must fulfil to meet the contractual obligations. The price reduction criteria for shortfall in the guarantee parameters and the rejection criteria of the various facilities being supplied by the CONTRACTOR under this Tender are outlined in this document.
- 1.2 Guarantee requirements as spelt out in this document shall have to be demonstrated by the CONTRACTOR for acceptance of the various facilities of the Tender by the OWNER.
- 1.3 The guarantee parameters as outlined in this document shall be adjusted suitably in the event of variation in the ambient conditions as specified in the bid document. CONTRACTOR shall furnish all calculations as may be required for this purpose.
- 1.4 CONTRACTOR shall arrange all necessary tools, tackles, instruments and facilities as may be required to establish the guarantee parameters during the performance tests.
- 1.5 CONTRACTOR shall guarantee the equipment / complete system for the design, materials, workmanship, size, capacity, performance and compliance with various technical requirements forming the part of the CONTRACTOR'S scope and outlined variously in the bid document. This guarantee shall also include the sub ordered/bought out items forming a part of the CONTRACTOR's supplies.
- 1.6 The CONTRACTOR shall repair / replace any part of equipment / component / sub system / complete system free of cost and without loss of time if:
 - a) There is fault in design or
 - b) There is defect in material or workmanship and / or it does not comply with fabrication requirements or a wrong selection of material for the process requirements as established, or
 - c) It fails to meet the size, capacity, performance requirements or it is identified that the material /equipment supplied is faulty, or
 - d) It does not comply with requirements of the bid package / Contract, or
 - e) The material supplied is damaged during transit or during execution of the work.
- 1.7 OWNER's / PMC's inspection or review/approval of the CONTRACTOR's design /documents / drawing shall in no way absolve the CONTRACTOR from his responsibilities towards meeting the guarantees for the various systems outlined in this document.

2.0 GUARANTEES

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These guarantees are in addition to and without derogation from the responsibilities, liabilities and guarantees of the CONTRACTOR specified elsewhere in the Bidding Documents. For the purpose of this Clause, Guarantees means:

- i. Engineering Guarantee.
- ii. Workmanship Guarantee.
- iii. Performance Guarantee.

The CONTRACTOR shall be responsible within the scope of work of the Tender the aforesaid guarantees as herein more specifically set out and detailed.

2.1 ENGINEERING GUARANTEE.

2.1.1 As design and engineering is in the CONTRACTOR's scope of work and the project shall be executed based on the engineering performed, it shall be the prime responsibility of the CONTRACTOR to carry out such design and engineering in accordance with good and sound engineering practices and standard codes applicable to such design and/or engineering.



2.1.2 In case any error or omission in such design or engineering requires reengineering which results in any new requirements for systems/equipment/materials, the same shall be supplied and/or carried by the CONTRACTOR within the scope of work and within the contractual period without extra cost to the OWNER or entitlement of extension of time.

2.1.3 The CONTRACTOR shall guarantee that the system design shall meet and comply with the Tender Document and:

- i. The equipment selected
- ii. The Site Criteria
- iii. The Data sheets, Engineering specifications, Standards, Design guidelines and other documents attached with Bidding document.
- iv. Statutory regulations and requirements.

2.1.4 The CONTRACTOR shall check the technical portion of the Bidding Document for its accuracy to meet the proposed guarantees and in case of deficiency shall inform PMC/OWNER immediately and take necessary rectification action. Further, if any changes are required in sizing of piping, pumps capacity, Diesel engines, Firefighting/protection system etc., to meet the guarantees for achieving the desired throughput of the Marketing Terminal as defined elsewhere in the Bidding Document then CONTRACTOR shall inform the PMC/OWNER immediately & rectify the same at no extra cost to owner or extension of time.

2.2 WORKMANSHIP GUARANTEE

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- 2.2.1 Workmanship for construction shall be carried out in accordance with the stipulations of the Bidding Documents. Any rectification of any defective material supply or work done shall be made good in accordance with the instructions of Engineer-in-Charge without any extra cost or entitlement of extension of time to the CONTRACTOR or shall, if so, considered by the PMC/OWNER, be replaced by new equipment within the relative scope of work.
- 2.2.2 The CONTRACTOR shall guarantee and accept full responsibility for all materials (including equipment and all components/parts) and works within the CONTRACTOR's scope of supply and/or works with regard to:
- i. Selection of materials;
 - ii. Material specifications and metallurgy as per Biding Documents;
 - iii. Fabrication workmanship;
 - iv. Work specifications as per Bidding Documents;
 - v. Engagement of highly experienced, reliable and qualified suppliers, and/or sub-Contractors.

2.3 PERFORMANCE GUARANTEE

- 2.3.1 The CONTRACTOR shall submit the Performance Guarantee Test Procedure for all the Performance Tests to be carried-out for all the equipment/systems/package skids, for the approval of the PMC/OWNER prior to actual conduction of the tests.
- 2.3.2 The CONTRACTOR shall be responsible for the performance, capacities, sizing criteria of the systems /equipment/materials /package skids supplied by them in terms of the guaranteed operational or functional performance for every systems/ equipment/package skids as laid down in Tender document. System/equipment / materials /package skids which does not perform/meet to /the guarantees shall either be replaced or altered, repaired or replaced in parts or components (including dismantling, transportation, erection, hook-up, commissioning etc.) by the CONTRACTOR in consultation with the PMC within the scope of work at no extra cost to the OWNER and without entitlement of extension of time to the CONTRACTOR.
- 2.3.3 All major equipment tabulated below in Table 1 shall be individually performance tested to demonstrate sustained MCR operation and guaranteed parameters w.r.t the design parameters and other major parameters/data sheet incorporated in the Bidding document. If the performance of these equipment is below the design limits during PGTR tests, then para 2.3.4 shall be applicable.

Table 1: List of major equipment for which PGTR is applicable

SLNO	EQUIPMENT	PRODUCT	QTY (NOS)
1	TLF PUMP	MS	02
2	TLF PUMP	HSD	03
3	TLF PUMP	ATF	02
4	DIESEL ENGINE PUMP	FIRE WATER	06
5	JOCKEY PUMP	FIRE WATER	02

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6	AIR COMPRESSOR	INSTRUMENT AIR	02
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2.3.4 In case equipment capacities and performance are found to be below the guaranteed parameters during performance test run, CONTRACTOR will be required to replace or carry out rectification/remedial measure as required in each equipment/ system to achieve guaranteed figures. The replacement/rectification/modification/remedial action shall be carried out by CONTRACTOR without any commercial implication with respect to time and cost to the OWNER. In case CONTRACTOR fails to achieve guaranteed figure even after rectification/modification/remedial action, price adjustment/penalty as per para no. 2.5 shall be applicable. In case of the Performance of the equipment beyond the price adjustment/penalty, the equipment shall be rejected.

2.3.5 HYDRAULIC GUARANTEE:



Contractor in coordination and jointly with the Loading Arm/ terminal automation system Contractor shall demonstrate the Hydraulic Guarantee of the Terminal as follows:

- 2.3.5.1 **MS Truck Loading:** Loading of one compartment of 5KL capacity in four separate trucks (Each of 5KL capacity compartment) “simultaneously” using four different loading bays/arms (top loading arms) with two pumps in operation, within a time duration of less than or equal to 4 minutes (Excluding truck parking time and connection setup time).
- 2.3.5.2 **HSD Truck Loading:** Loading of one compartment of 5KL capacity in eight separate trucks (Each of 5KL capacity compartment) “simultaneously” using eight different loading bays/arms (top loading arms) with two pumps in operation, within a time duration of less than or equal to 4 minutes (Excluding truck parking time and connection setup time)
- 2.3.5.3 **ATF Truck Loading:** Loading of one compartment of 5KL capacity in two separate trucks (Each of 5KL capacity compartment) “simultaneously” using two different loading bays/arms (top loading arms) with one pump in operation, within a time duration of less than or equal to 4 minutes (Excluding truck parking and connection set up time).
- 2.3.5.4 The above guarantees shall be demonstrated for four times for each product.
- 2.3.5.5 Combination of all pumps operation for the above shall also be demonstrated.

PMC/OWNER shall witness all the Guarantee tests as mentioned above.

2.3.6 GUARANTEE ON DIFFERENTIAL SETTLEMENT OF TANK

Contractor shall demonstrate the guarantee of differential settlement of each Tank of the Terminal as follows:

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2.3.6.1 Any differential settlement of tank during hydro test shall not be greater than 13 mm per 10 meters of circumference of the tank or a uniform settlement of maximum 50 mm. If the settlement is above these permissible limits then para 2.4 shall be applicable

2.3.6.2 Hydro test procedure shall be as per API- 653.

PMC/OWNER shall witness all the Guarantee tests as mentioned above.

2.4 REPAIR / RECTIFICATION / MODIFICATION/ REPLACEMENT



In case if the CONTRACTOR fails to meet and/or shortfall in the guarantees requirement during the testing or demonstration of guarantees then CONTRACTOR shall carry out within a maximum period of three months' necessary repair / rectification / modification / replacement at his own cost and through his own agency to improve the supplied systems and/or works to prove the guaranteed parameters in the final performance guarantee test. Should the systems continue to underperform and not meet the guarantee requirements, price adjustment towards the same as detailed in para no: 2.5 shall be applicable.

2.5 PRICE ADJUSTMENT/PENALTY TOWARDS NOT MEETING THE GUARANTEE PARAMETERS

2.5.1 OWNER shall be entitled for price adjustment/ penalty, limited to percentage of the Overall Contract value as tabulated below in Table 2 on account of not meeting the specified Guarantees and the same shall not be paid to the CONTRACTOR. The price adjustment/penalty as specified against each Guarantee shall be recovered / deducted from the CONTRACTOR'S RA/FINAL bills. Owner may without prejudice to any methods of recovery, deduct the amount of such price adjustment from any money due or which may at any time become due to CONTRACTOR from its obligations and liabilities under the contract.

Table 2:

SI. No	Guarantee	Price adjustment/penalty amount as % (percentage) of Total Contract Value (SP 0)
A	Performance Guarantee	0.1% per equipment as per Table1: List of Major equipment in para 2.3.3
B	Hydraulic Guarantee as specified in para 2.3.5 above	
B.1	MS Truck Loading	
a	If the TLF loading duration is above	

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	4 minutes	1%
B.2	HSD Truck Loading	
a	If the TLF loading duration is above 4 minutes	1%
B.3	ATF Truck Loading	
a	If the TLF loading duration is above 4 minutes	1%
C	Guarantee on Differential settlement of Tank beyond the limits as detailed in para 2.3.6.1 above	
C.1	MS/HSD/ATF tanks	1% per tank
C.2	Balance A/G tanks	0.1% per tank

2.5.2 These Price Adjustment/penalties for not meeting the Guarantees are over and above the Price adjustment towards slippage in mechanical completion as detailed in SCC clause 27.0 and any other penalties mentioned in the Bidding Document. Both these clauses are independent and shall be imposed/recovered as applicable as the case may be.

2.5.3 The total discount on account of price adjustment/penalties for not meeting the guarantees as specified above in Table 2 and Price Adjustment for slippage in mechanical completion as specified in clause 27 of SCC shall be limited to 10% (Ten percent) of Total Contract value.

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

INDUSTRY QUALITY CONTROL MANUAL

INDUSTRY QUALITY CONTROL MANUAL FOR NON-AVIATION PETROLEUM PRODUCTS

AMENDMENT RECORD				
Amendments		Section / (Page No.)	Embodied By	Date
Revision No.	Revision Date			

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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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Marketing Specifications	1

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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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Quality Monitoring	8
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

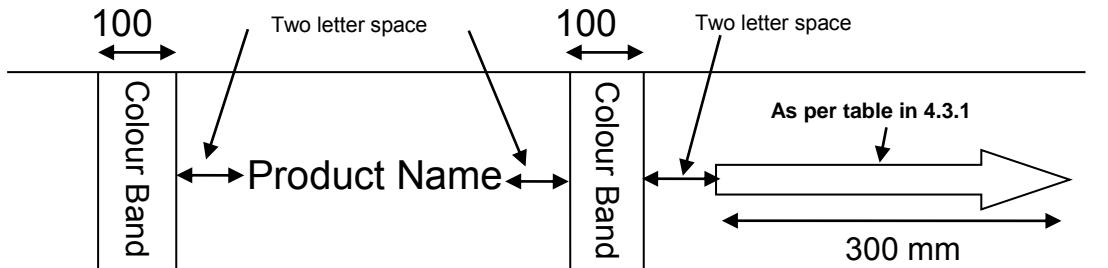
* Refer - Indian Standard Colour No. of IS 5:2007

** 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

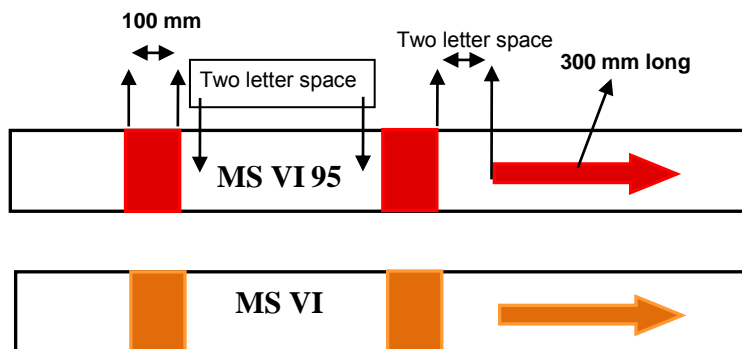


(All dimensions in mm)

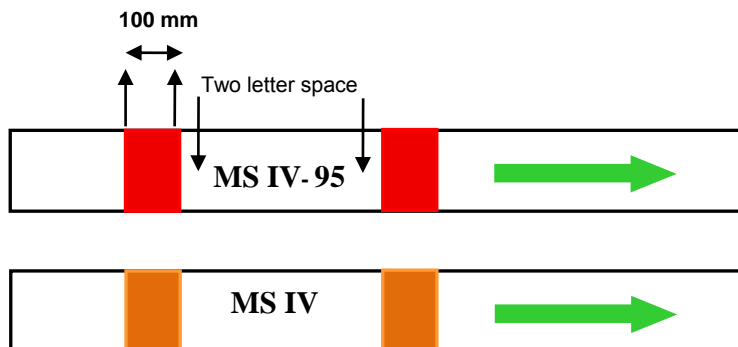
The locations where camouflage of product pipelines is required, same shall be done as per statutory guidelines with bands, arrow etc. as per **Clause 4.3.3**.

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



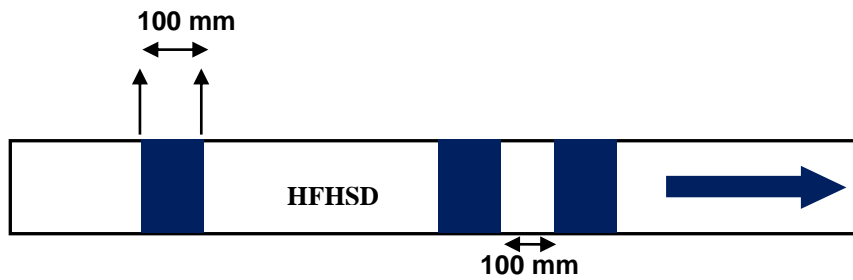
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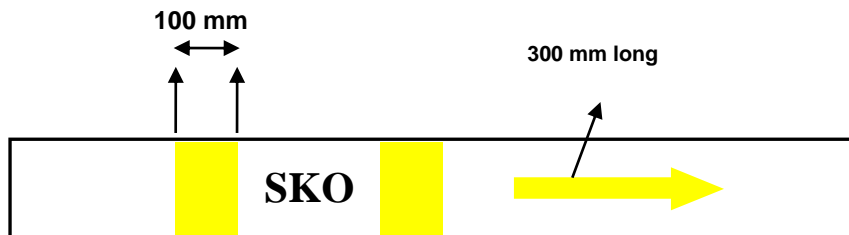
HSD BS IV & BS VI Common line



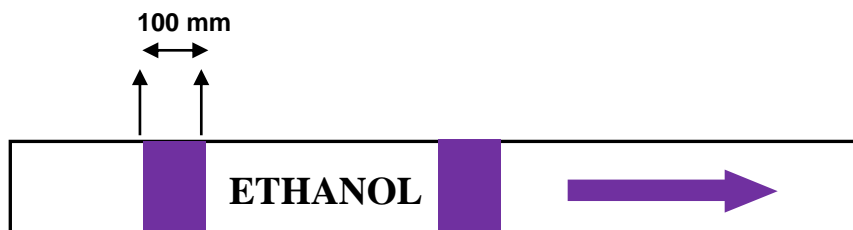
HFHSD



SKO



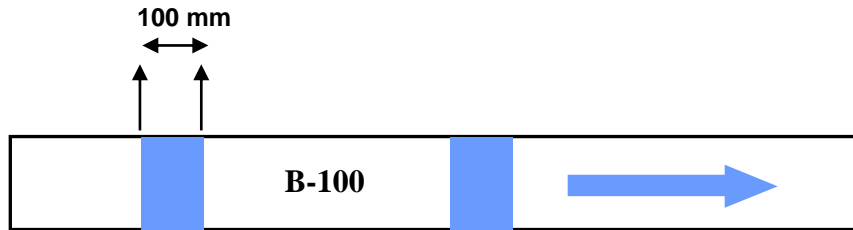
Ethanol



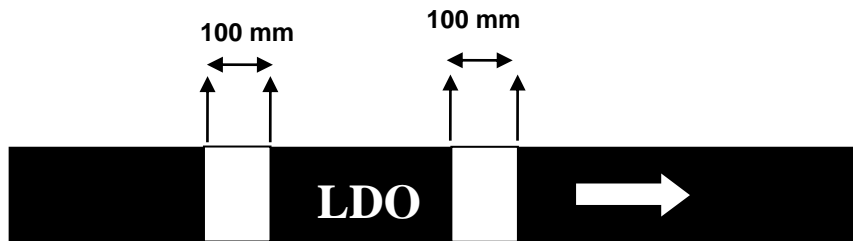
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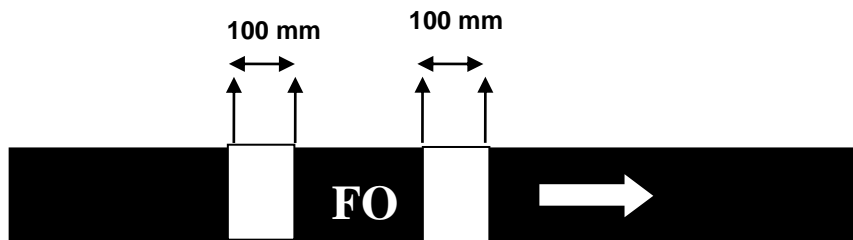
Bio-Diesel (B-100)



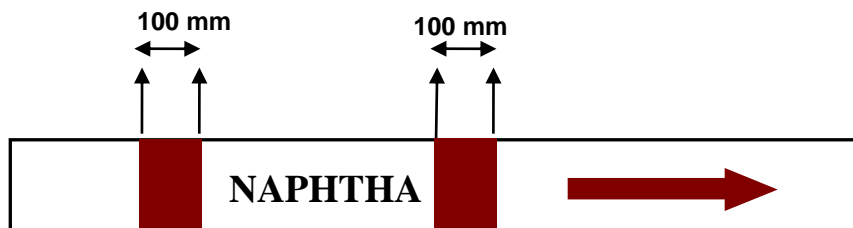
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4.4 QUALITY MONITORING

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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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 x 1 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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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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Sampling

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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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Section No.8	Section Name: Laboratory Support	Page 2 of 3
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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

SUBJECT	PAGE NO.
Introduction	1
Investigation Team	1
Tanker Operations (Failure in Pre-discharge Test)	1
Tanker Operations (Failure after Receipt)	1
Pipe Line Operations (Failure after Receipt)	2
Tank-Wagon/Tank-Truck Operations (In case of SKO Failure)	2
Recommendation on disposal of off-specification Products	2
Disposal of off-spec MS/ HSD at Retail Outlets	2

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Annexure - 1	Section Name: Product Quality Failure Investigation	Page 1 of 2
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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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Annexure - 1

Section Name: **Product Quality Failure Investigation**

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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
E 20 Motor Gasoline	5-7
M15 Motor Gasoline	8-10
SKO	11
Automotive Diesel	12-13
Biodiesel, Diesel Fuel Blend (B6 To B20)	14-15
HFHSD	16
Light Diesel Oil	17
Fuel Oil	18

INDUSTRY QUALITY CONTROL MANUAL

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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) Other Months b) Winter 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, <i>Max</i>	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, 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.

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 2

QUALITY CONTROL CHECKS

SUBJECT	PAGE NO.
Test Category for each product	1

INDUSTRY QUALITY CONTROL MANUAL

Appendix 2	Section Name: Quality Control Checks	Page 1 of 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)

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 2A

Activities & Retention Of Samples

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

INDUSTRY QUALITY CONTROL MANUAL

Appendix 2A	Section Name: Retention of Samples	Page 1 of 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- tative	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

INDUSTRY QUALITY CONTROL MANUAL

Appendix 2A		Section Name: Retention of Samples				Page 2 of 3	
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.

INDUSTRY QUALITY CONTROL MANUAL

Appendix 2A	Section Name: Retention of Samples	Page 3 of 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
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 4	Section Name: QC Checks for TW & TT Operations	Page 1 of 1
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QUALITY CONTROL CHECKS FOR TANK WAGON AND TANK TRUCK OPERATIONS

Date	Time	Source	Product	Appearance	Visual Colour	Observed Den. /Temp.	Density @ 15°C	Water	Remarks	Signature

Notes:

- 1) Source means – Tank Wagon/Tank Truck/TLF/TWF.
- 2) Presence of water shall be recorded by 'X' in relevant column.
- 3) Absence of water shall be recorded '√' in relevant column.
- 4) Corrective action shall be recorded under Remarks.
- 5) In case of T/T receipts, individual compartment's observation shall be recorded.

(Signature)
 Reviewed by
 Location I/C

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 5

Quality Control Checks for Barrels (Other than Lubes)

INDUSTRY QUALITY CONTROL MANUAL

Appendix 5

Section Name: **QC Checks for Barrels**

Page 1 of 1

QUALITY CONTROL CHECKS – BARRELS (OTHER THAN LUBES)

No. Of Barrels	No. Of Samples Drawn	Sr. No. Of Barrels from which Samples Drawn	Condition of Seals	Appearance	Colour	Water	Remarks	Signature

(Signature)

Reviewed by

Location I/C

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
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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

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

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 9	Section Name: Log Book Tanker / PLT Operations	Page 1 of 1
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LOG BOOK – TANKER / PLT OPERATIONS

Name of Tanker / PLT No.: _____ Date: _____

Product	Density at 15°C Tanker tank / Storage Tank		Density Range (Clause 3.2.7.3)	Signature
	Lowest	Highest		

Date	Time	Pipeline Manifold											Remarks If Any	Sign	
		Jetty End / Refinery / Pipeline						Shore End / Receiving Location							
		Qty.	Appearance	Colour (Visual)	Density			Qty	Appearan.	Colour (Visual)	Density				
					Nat	Temp °C	15° C				Nat	Temp °C			15° °C
First half an hour (00, 10, 20, 30 min.) / Hourly / Initial-Middle-Final sample (2 litres)															

Signature of Location In-Charge / Date

INDUSTRY QUALITY CONTROL MANUAL

APPENDIX – 10

Inland Pipeline Transfer Log Book

INDUSTRY QUALITY CONTROL MANUAL

Appendix 10	Section Name: Inland PLT Log Book	Page 1 of 1
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INLAND PIPELINE TRANSFER LOG BOOK

PLT Number: _____ **Date:** _____

Product	Density at 15°C Storage Tank		Density Range (Clause 3.2.7.3)	Signature
	Lowest	Highest		

Date	Time	Product	Pipeline Manifold										Remarks	Sign.
			Dispatching Location					Receiving Location						
			Appear- -ence	Colour Visual	Temp	Density		Appear- -ence	Colour Visual	Temp	Density			
						Nat	15° C				Nat	15° °C		
First half an hour (00, 10, 20, 30 min.)/ Hourly /Initial-Middle-Final sample (2 litres)														

(Signature)

**Reviewed by
Location I/C**

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

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 13	Section Name: Batch Control Log Book	Page 1 of 1
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BATCH CONTROL LOG BOOK

TANK NUMBER:		PRODUCT		REGION / TERRITORY:			LOC. I/C SIGN.
				LOCATION:			
NAME OF VESSEL/ ORIGINATING/ REFINERY TERMINAL / DEPOT	DATE OF RECEIPT	LAST LOADING POINT		RELEASED AGAINST			
		BATCH NO.	TEST REPORT NO.	BATCH NO.	TEST REPORT NO. **	DATE	

** : Test Report Number of the batch shall be mentioned. In case of locations where batch formation test is not mandatory as per IQCM, a copy of previous location's Test report number and date shall be entered.

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

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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

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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

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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

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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	

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APPENDIX – 15

Batch Formation Tests

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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						√

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APPENDIX – 16

Procedure for Tank Truck & Tank Wagon Grade Change Over

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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

INDUSTRY QUALITY CONTROL MANUAL

Appendix 17	Section Name: Inspection Guide for Non-Aviation Products Storage Points	Page 1 of 13
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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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Appendix 17	Section Name: Inspection Guide for Non-Aviation Products Storage Points	Page 2 of 13
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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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Appendix 17	Section Name: Inspection Guide for Non-Aviation Products Storage Points	Page 3 of 13
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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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Appendix 17	Section Name: Inspection Guide for Non-Aviation Products Storage Points	Page 4 of 13
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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 ± 3.0 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

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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

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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/m3	% 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.

INDUSTRY QUALITY CONTROL MANUAL

Appendix 20

Section Name: **Glossary of Terms**

Page 2 of 3

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.

INDUSTRY QUALITY CONTROL MANUAL

Appendix 20	Section Name: Glossary of Terms	Page 3 of 3
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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*****

	Marketing Terminal Project at Devangonhi, Bangalore	
	LSTK-A PACKAGE : TANKAGE AND ASSOCIATED CIVIL, MECHANICAL, PIPING, ELECTRICAL, INSTRUMENTATION & FIRE FIGHTING WORKS VOLUME I : COMMERCIAL	

OCCURRENCE OF PANDEMIC(S)

[ANNEXURE XVII TO SPECIAL CONDITIONS OF CONTRACT]

	Marketing Terminal Project at Devangonhi, Bangalore	
	LSTK-A PACKAGE : TANKAGE AND ASSOCIATED CIVIL, MECHANICAL, PIPING, ELECTRICAL, INSTRUMENTATION & FIRE FIGHTING WORKS VOLUME I : COMMERCIAL	

OCCURRENCE OF PANDEMIC(S)

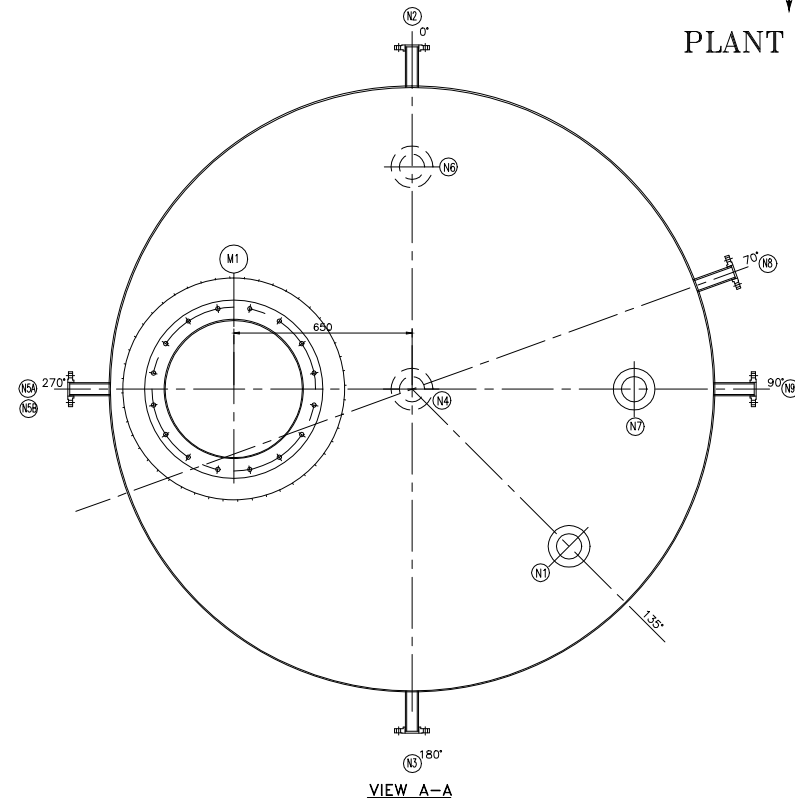
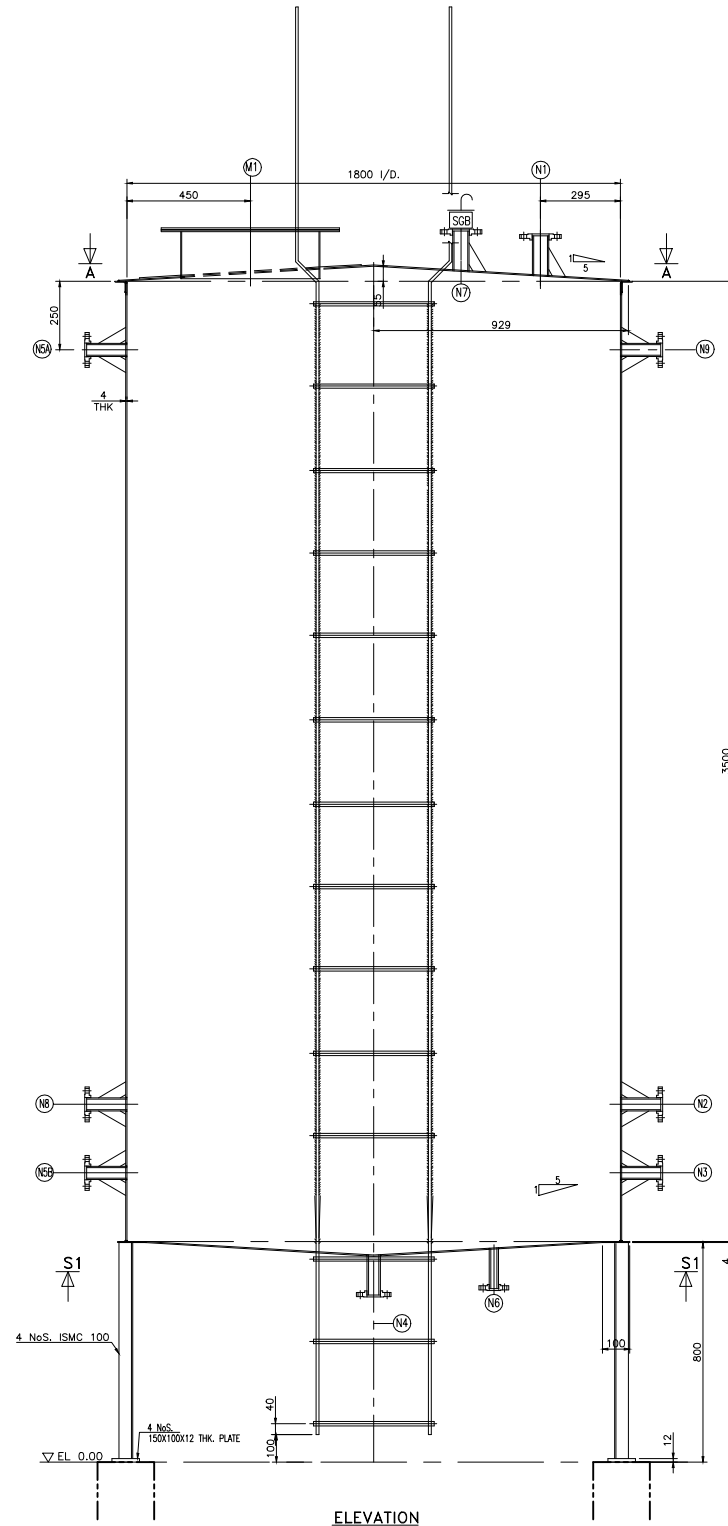
1. In the event of an outbreak of COVID-19 or any declaration of pandemic occurs during the course of execution of the contract, the Contractor shall strictly adhere to all directives from Health Authorities/ Government departments including but not limited to health & safety of all concerned; as if 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.

DRAWING NO.: 20005-PR-0001

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GENERAL NOTES {INDICATIVE ONLY ,TO BE CONFIRMED BY CONTRACTOR DURING DETAIL ENGINEERING}:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE NOTED.
2. BOLT HOLES SHALL STRADDLE CENTRE LINE.
3. FLANGE DIMENSION SHALL CONFORM TO ANSI B 16.5 UP TO 600 NB
4. ALL VERTICAL & HORIZONTAL SHELL WELD JOINTS SHALL BE FULL PENETRATION & FULL FUSION BUTT WELDS.
5. BOTTOM PLATES ARE OF SINGLE WELDED FILLET LAP JOINT CONSTRUCTION & SAME APPLIES TO ROOF PLATE JOINTS.
6. FLANGE GASKET FACE SHALL HAVE SERRATED FINISH WITH CONCENTRIC GROOVES.
7. THICKNESS OF GASKET SHALL BE 1.5 mm FOR NOZZLES UPTO 450 NB AND 3.0mm FOR NOZZLES ABOVE 450 NB.
8. STRAPPING & CALIBRATION SHALL BE DONE IN ACCORDANCE WITH IS.2007 & 2008(LATEST EDITION)
9. FOR WELDING E 308-16 ELECTRODE SHALL BE USED.
10. OPERATING CONDITIONS INDICATED ARE PRELIMINARY AND TO BE VERIFIED & UPDATED DURING DETAIL ENGINEERING.
11. WEIGHT INDICATED TO BE INDICATIVE ONLY. TO BE CONFIRMED BY CONTRACTOR DURING DETAIL ENGINEERING.
12. THIS DRAWING IS INDICATIVE ONLY. CONTRACTOR/VENDOR TO DEVELOP TANK GA FABRICATION DRAWING DURING DETAIL ENGINEERING & SUBMIT FOR PMC/COMPANY APPROVAL.
13. MOC INDICATED TO BE VERIFIED AND CONFIRMED BY CONTRACTOR DURING DETAIL ENGINEERING
14. DRAWING & DRAWING DETAILS ARE PRELIMINARY AND TO BE VERIFIED & UPDATED BY CONTRACTOR DURING DETAIL ENGINEERING.
15. RING BEAM DESIGN SHALL BE CHECKED FOR SLENDERNESS BY LSTK CONTRACTOR



DESIGN DATA {NOTE-10}

DESIGN CODE	GOOD ENGINEERING PRACTICE/AS PER SPEC
ITEM NO.	FA-A-11A/B
STORED PRODUCT	FOAM TANK
SIZE OF TANK	INSIDE DIAMETER-1,800 M & LENGTH-3,000 M
TYPE OF TANK	HORIZONTAL
DESIGN PRESSURE (INT./EXT.) (kg/cm ²)	ATMOSPHERIC + FULL OF LIQUID
OPERATING PRESSURE (kg/cm ²)	ATMOSPHERIC
CORROSION ALLOWANCE	-
DESIGN FILLING HEIGHT OF PRODUCT (m)	1,850
MAXIMUM FILLING HEIGHT OF PRODUCT (m)	1,850
SPECIFIC GRAVITY OF LIQUID	1.025 TO 1.045
NoS. OF TANKS	02
DESIGN TEMPERATURE (°C)	65
OPERATING TEMPERATURE (°C)	40
POST WELD HEAT TREATMENT	NIL
INSULATION/THK.	NIL
JOINT EFFICIENCY	AS PER CODE
RADIOGRAPHY	SPOT/SPOT
TESTINGS	AS PER CODE
NOMINAL CAPACITY (KL)	07
FLASH POINT	-
HYDROSTATIC PRESSURE (kg/cm ²)	AS PER CODE
WIND DESIGN	-
SEISMIC DESIGN	(REFER SPEC OF TANKS-20005-GEN-M-SPE-4005)
SURFACE PREPARATION & PAINTING	REFER PAINTING SPECIFICATION
INSPECTION	CLIENT/TPi
EMPTY WEIGHT (M.T.)	~1.71
OPERATING WEIGHT (M.T.)	~9.67
HYDROTEST WEIGHT (M.T.)	~11.14

NOZZLE SCHEDULE {INDICATIVE ONLY, TO BE CONFIRMED BY CONTRACTOR DURING DETAIL ENGINEERING}:-

NOZZLE MARK	SIZE NB	SCH.	THK.	QTY.	FLANGES RATING TYPE FACE	PROJ.	SERVICE	REM.
N1	50	SCH.40	01	150#	WN R.F	150	RECIRCULATION	
N2	50	SCH.40	01	150#	WN R.F	150	INLET	
N3	50	SCH.40	01	150#	WN R.F	150	OUTLET	
N4	50	SCH.40	01	150#	WN R.F	150	SPARE (OUTLET)	
NSA/B	50	SCH.40	02	300#	WN R.F	150	LEVEL INDICATOR	
N6	25	SCH.80	01	150#	WN R.F	150	DRAIN	
M1	500	6 THK	01	150#	WN R.F	150	SHELL MANHOLE WITH COVER	
N7	25	SCH.40	02	150#	WN R.F	150	VENT WITH SILICA GEL BREATHER	
N8	75	SCH.80	01	150#	WN R.F	150	SPARE	
N9	75	SCH.40	01	150#	WN R.F	150	OVERFLOW	


MATERIAL SPECIFICATION {NOTE 13}

DESCRIPTION	MATERIAL OF CONSTRUCTION
SHELL, END & REINFORCEMENT PLATE	SA240 TYP 304
MANWAY NECKS / FLANGE / COVER	SA240 TYP 304
NOZZLE NECKS UPTO 250 NB	SA 312 TP304
NOZZLE FLANGES	SA 182 F 304
BOLTING FOR NOZZLES & MANHOLE	SA 312 TP 304/SA 240 TYP 304/AS PER PMS
BOLTING FOR STRUCTURES	IS 1363/AS PER PMS
GASKETS	SS316 SPIRAL WOUND GRAPHITE FILLED/AS PER PMS
STRUCTURES	SA240 TYP 304/AS PER PMS
EXTERNALS GUSSET / PAD PLATE	SA240 TYP 304
FITTINGS	-
PAD FOR LIFTING LUG	SA240 TYP 304
LIFTING BOLT	IS 1363
WEAR PLATE	SA240 TYP 304
BRACKET	SA240 TYP 304
EARTHING CONNECTION	AS PER ELECTRICAL SPECIFICATION

REV.	DATE	DESCRIPTION	DRWN	CHKD	APPRD	MRPL
1	08-APR-21	RE-ISSUED FOR BID	YG	KSH	KSH	
0	20-JAN-21	ISSUE FOR BID	YG	KSH	KSH	
C1	21-DEC-20	ISSUE FOR REVIEW/COMMENTS	BN	YG	KSH	

CLIENT:
 **MANGALORE REFINERY AND PETROCHEMICALS LIMITED**
 (A subsidiary of Oil & Natural Gas Corp. Ltd - ONGC)

PROJECT:
CONSTRUCTION OF MARKETING TERMINAL PROJECT AT DEVANGONTHI, BANGALORE.

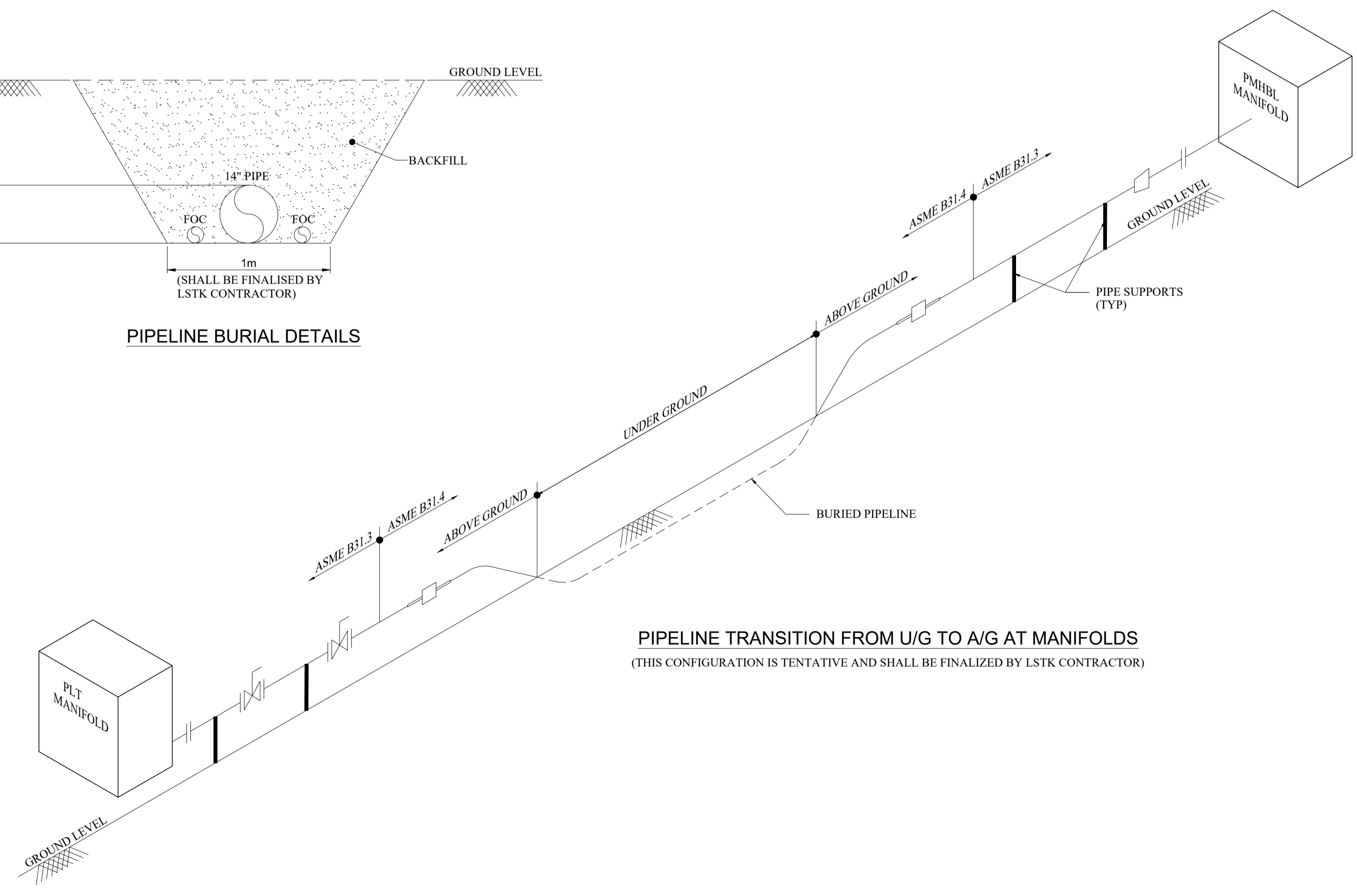
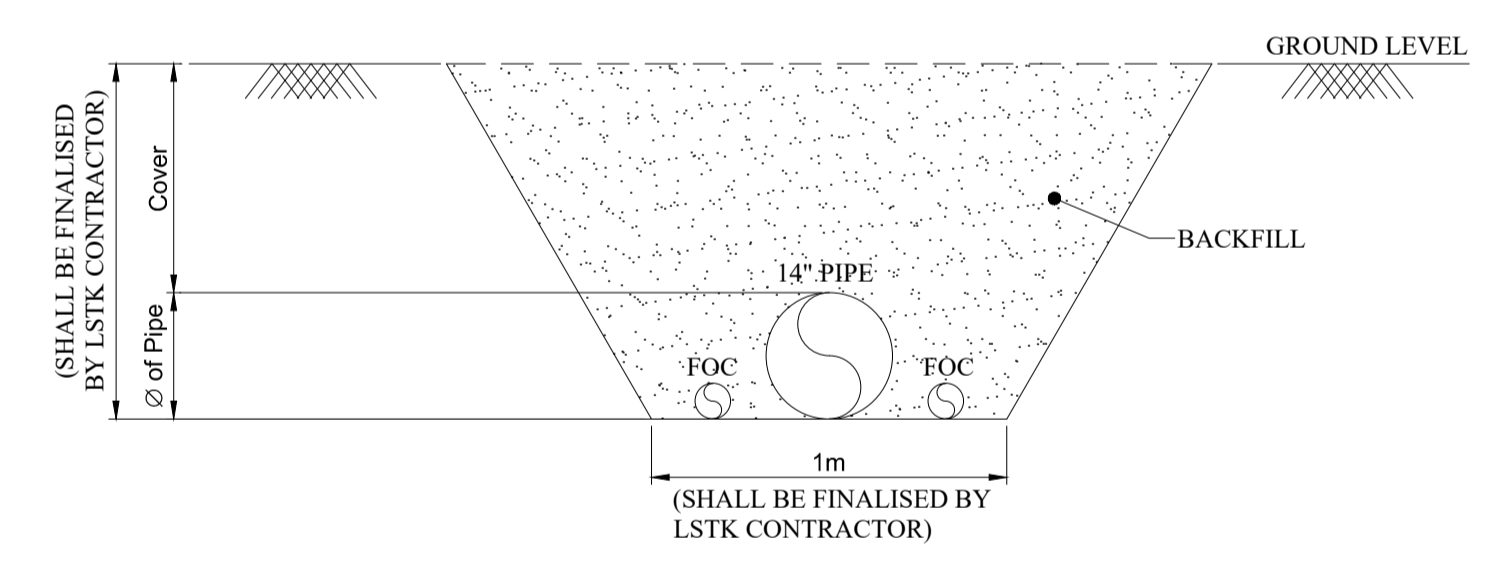
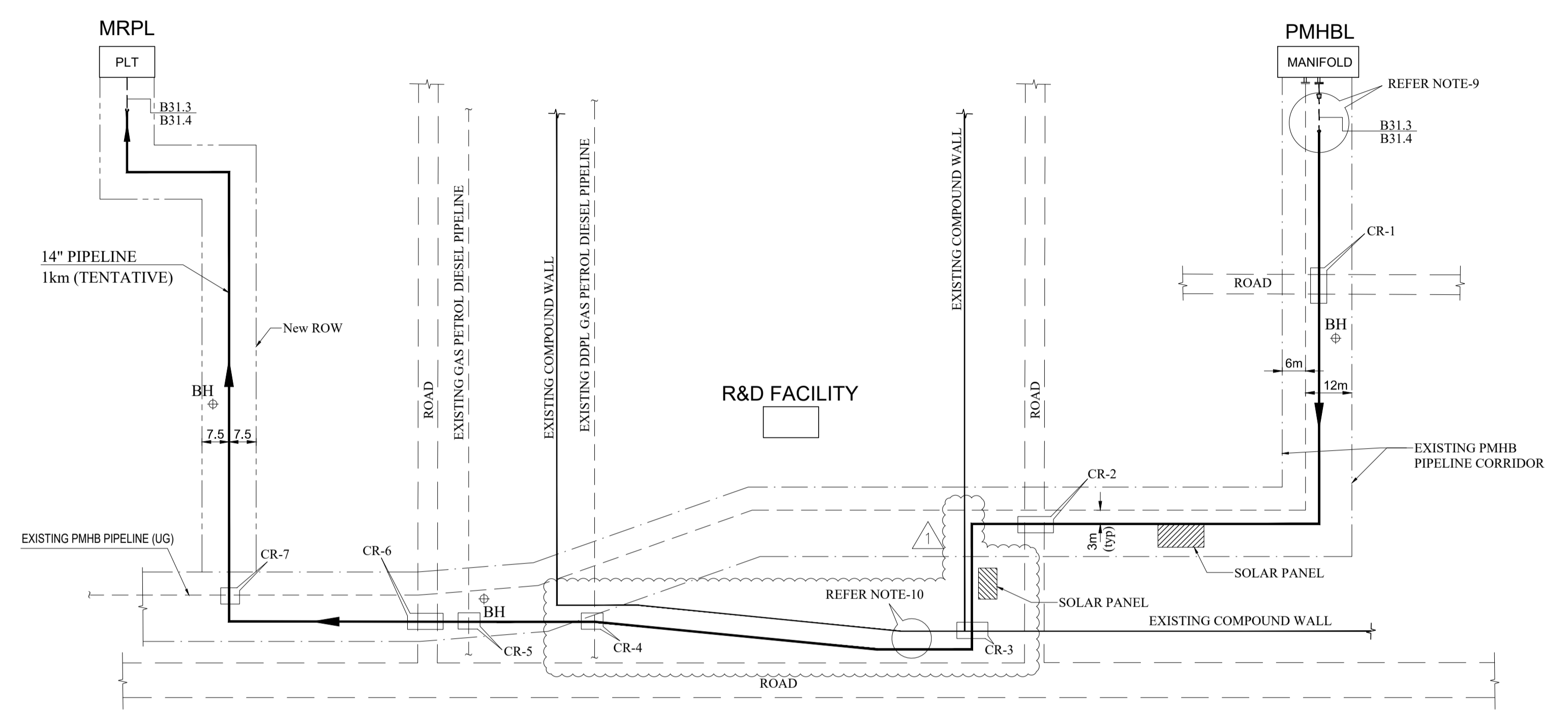
PROJECT MANAGEMENT CONSULTANT:
 **NAUVATA ENGINEERING PVT. LTD.**

DRAWING TITLE:
GENERAL ARRANGEMENT DRAWING FOR FOAM TANK

CLIENT TENDER No:	DRAWING No:	SHT NO.	REV	SCALE:
	20005-GEN-M-DW-4100	1 OF 1	1	1:1

DRAWING NO.: 20005-GEN-PL-SK-0001

SCHEMATIC SKETCH OF 14 INCH PIPELINE FROM MANIFOLD (AT PMHB TERMINAL) TO PLT (AT MRPL TERMINAL)



- NOTES
1. All dimensions are in meters unless noted otherwise.
 2. Existing facilities interfering with the Proposed 14" pipeline shall be reinstated to its original position by LSTK contractor.
 3. LSTK contractor to ensure the Proposed 14" pipeline is laid with clear distance of 3m from existing PMHB pipeline.
 4. LSTK contractor to ensure the Proposed 14" pipeline is laid to match burial depth of existing PMHB pipeline at crossing locations (CR-4 & CR-5), Crossing shall be designed and engineered by LSTK contractor based on actual survey.
 5. Pipeline route indicated is tentative, LSTK contractor to finalize the pipeline route during detailed engineering.
 6. LSTK contractor to obtain prior approval from PMC/MRPL, if increase in Pipeline length and number of crossings occurs during detailed engineering. Contractor should not claim for additional cost and time.
 7. 3 numbers of borehole data shall be collected along the pipeline route. However borehole locations indicated are tentative and shall be finalised during detailed engineering, by LSTK contractor.
 8. Wherever usage of 40D bends are not feasible during pipeline laying, 5D bends shall be used.
 9. Contractor shall firm up configuration of pipeline from PMHBL manifold tie-in point to PMHB pipeline's ROW during detailed engineering phase. Contractor shall obtain necessary approval by PMHB authorities for the same.
 10. Contractor to consider following for pipeline construction adjacent to HPCL R&D facility:
 1. Pipeline shall be laid at a clear distance of 2m from existing compound wall.
 2. Contractor shall obtain necessary statutory approvals from authorities.
 3. PMC/MRPL will assist in obtaining statutory approvals.

1	12-APR-21	RE-ISSUED FOR BID	PB	SW	SW	
0	12-MAR-21	ISSUED FOR BID	PB	SW	SW	
REV.	DATE	DESCRIPTION	DRWN	CHKD	APPRD	MRPL
			NAU			

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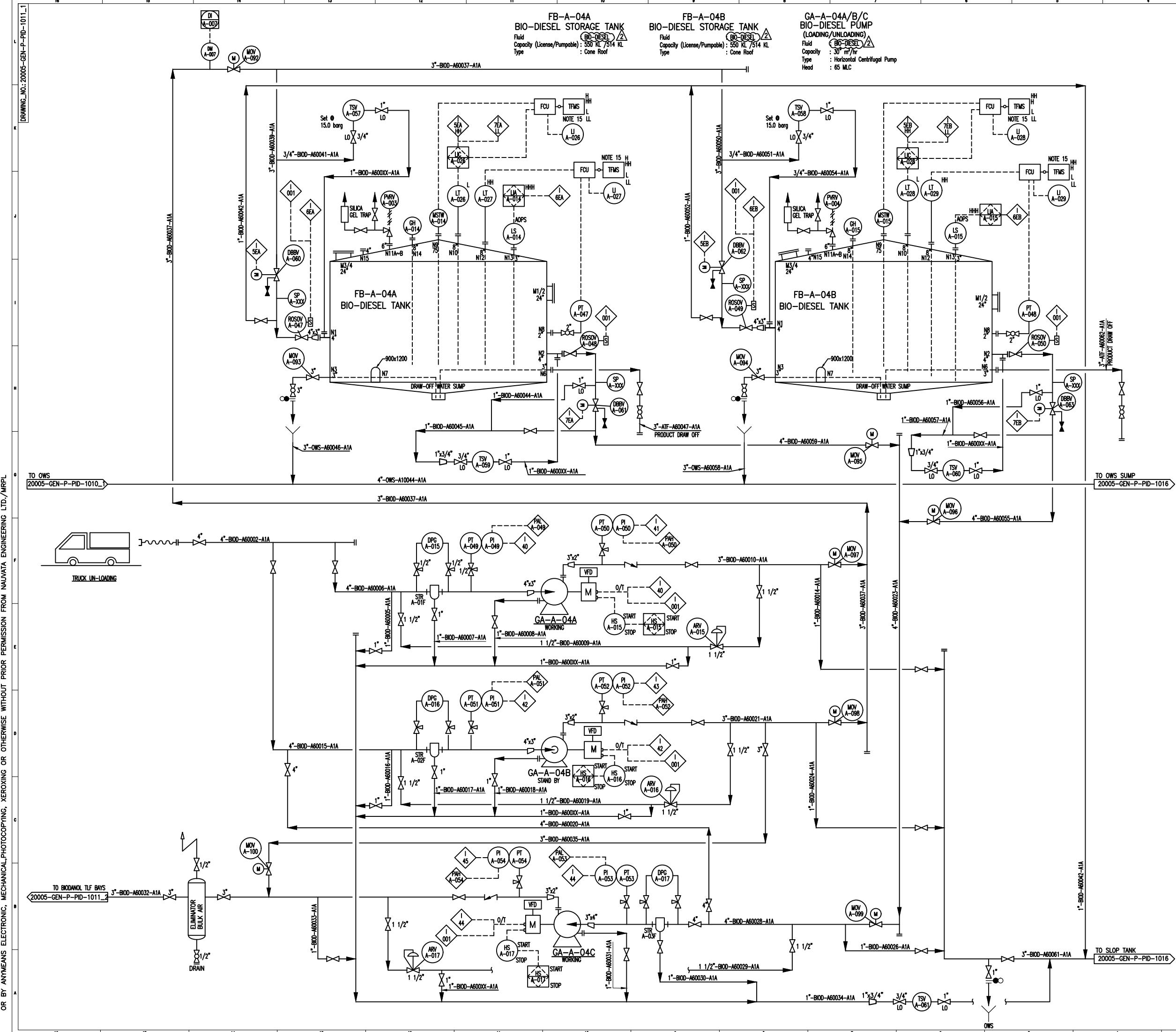
PROJECT:
CONSTRUCTION OF MARKETING TERMINAL PROJECT AT DEVANGONTHI, BANGALORE.

PROJECT MANAGEMENT CONSULTANT:
NAUVATA ENGINEERING PVT. LTD.

DRAWING TITLE:
SCHEMATIC OF PROPOSED 14 INCH PIPELINE

CLIENT TENDER No:	DRAWING No:	SHT NO.	REV	SCALE:
	20005-GEN-PL-SK-0001	1 OF 2	1	NTS

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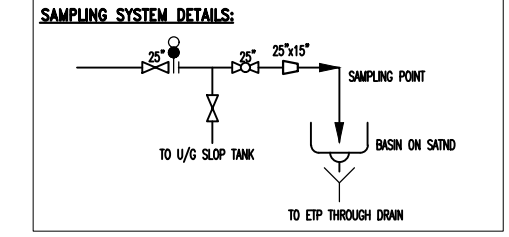


- NOTES**
1. ALL SIZES ARE IN INCH, UNLESS OTHERWISE SPECIFIED.
 2. DBBV VALVE WILL BE LOCATED OUTSIDE DYKE AREA.
 3. INTERLOCK I FOR TRIPPING PUMPS.
 4. ALL ROSOV PROVIDED INSIDE DYKE SHALL HAVE LOCAL PUSH BUTTON STATION (LPBS) OUTSIDE DYKE WALL.
 5. PUMP SUCTION AND DISCHARGE NOZZLE SIZES ARE TENTATIVE. ACTUAL SIZES WILL BE INCORPORATED AFTER 6. PROCUREMENT OF PUMPS.
 7. LOCAL / REMOTE SELECTION SWITCH SHALL BE PROVIDED IN PNMCC FEEDER.
 8. P & ID IS BASED ON DESIGN BASIS FOR DEVANGONTHI.
 9. ROSOV CAN BE OPERATED FROM CONTROL ROOM. (CLOSE ONLY)
 10. ROSOV IS FAILSAFE AND WILL ACTUATE CLOSURE ON POWER / SIGNAL FAILURE.
 11. ROSOV WILL BE FIRE SAFE.
 12. TWO RADAR GAUGE WILL BE PROVIDED.
 13. LEVEL SWITCH VIBRATION FORK WILL BE PROVIDED WHICH ACTUATE CLOSURE OF ROSOV ON ATTAINING HH LEVEL.
 14. DELETED.
 15. FOR DETAIL-D REFER DRAWING No. 20005-GEN-P-PID-1004_2.

DESIGN AND CONSTRUCTION OF ALL PUMP FOUNDATIONS IN LSTK-B CONTRACTOR SCOPE.

ALL INSTRUMENTS AND CONTROLS SHOWN IN THIS P&ID, (EXCLUDING INLINE INSTRUMENTS LIKE ROSOV, MOV & DBBV) ARE IN LSTK-C CONTRACTOR SCOPE.

ALL SAMPLING SYSTEMS SHALL BE IN LSTK-A CONTRACTOR SCOPE.



- LEGENDS:**
- CHV
 - GATE VALVE
 - NEEDLE VALVE
 - BASKET STRAINER
 - BUTTERFLY VALVE
 - BALL VALVE
 - AUTO RECIRCULATION VALVE
 - DOUBLE BLOCK BLEED VALVE
 - OPEN DRAIN FUNNEL
 - FIELD INSTRUMENTS INDIVIDUALLY SPECIFIED
 - BLIND FLANGE
 - MOV (GATE VALVE)
 - MOTOR
 - INTERLOCK

SLNO	REV.	TITLE
REFERENCE DRAWINGS		
2	12-APR-21	RE-ISSUED FOR BID
1	02-MAR-21	RE-ISSUED FOR BID
0	12-FEB-21	ISSUED FOR BID
C1	14-DEC-20	ISSUED FOR APPROVAL

CLIENT:
MANGALORE REFINERY AND PETROCHEMICALS LIMITED
 (A subsidiary of Oil & Natural Gas Corp. Ltd - ONGC)

PROJECT:
CONSTRUCTION OF MARKETING TERMINAL PROJECT AT DEVANGONTHI, BANGALORE.

PROJECT MANAGEMENT CONSULTANT:
NAUVATA ENGINEERING PVT. LTD.

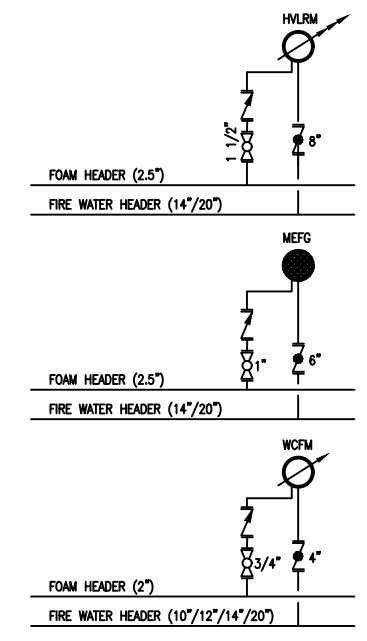
DRAWING TITLE:
PIPING AND INSTRUMENTATION DIAGRAM BIO-DIESEL STORAGE AND TLF PUMPS

CLIENT TENDER No:	DRAWING No:	SHT NO.	REV	SCALE:
20005-GEN-P-PID-1011_1	20005-GEN-P-PID-1011_1	1 OF 2	2	1:1

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DESIGN AND CONSTRUCTION OF ALL PUMP FOUNDATIONS IN LSTK-B CONTRACTOR SCOPE.

- NOTES**
1. ALL SIZES ARE IN INCH, UNLESS OTHERWISE SPECIFIED.
 2. ALL DRAINS ARE ROUTED TO STORM WATER DRAINS.
 3. ALL PUMPS SHALL HAVE LOCAL CONTROL PANEL LOCATED AT THE FIRE PUMP HOUSE.
 4. THE RING MAN SHOULD HAVE AT LEAST 1M EARTH CUSHION IN OPEN GROUND FOR UG LINE, 1.5M CUSHION UNDER THE ROAD CROSSING WITH CONCRETE/STEEL CASING WITH ENDS SEALED.
 5. UG LINE SHOULD BE WRAPPED/STEEL CASING AS PER STANDARDS.
 6. AG LINE TO BE SUPPORTED AT REGULAR INTERVALS NOT EXCEEDING 6M.
 7. AG LINE TO BE LAID AT LEAST 300MM ABOVE THE FINISHED G.L.
 8. THE PIPE SUPPORT SHALL HAVE ONLY POINT CONTACT.(POINT CONTACT WILL ENSURE TO PREVENT CORROSION OF BOTTOM OF PIPE)
 9. THE 'IN' LOCATION IS OUTSIDE THE TERMINAL AT ABOUT 600m LSTK-A CONTRACTOR SHALL CHECK AND UPDATE THE SAME DURING DETAIL ENGINEERING.



- LEGENDS.**
- CHV
 - GATE VALVE
 - NEEDLE VALVE
 - BASKET STRAINER
 - BUTTERFLY VALVE
 - BALL VALVE
 - AUTO RECIRCULATION VALVE
 - DOUBLE BLOCK BLEED VALVE
 - OPEN DRAIN FUNNEL
 - FIELD INSTRUMENTS INDIVIDUALLY SPECIFIED
 - BLIND FLANGE
 - MOV (GATE VALVE)
 - MOTOR
 - INTERLOCK

SL.NO	REV.	TITLE
REFERENCE DRAWINGS		
1	12-APR-21	RE-ISSUED FOR BID
0	12-FEB-21	ISSUED FOR BID
C1	18-DEC-20	ISSUED FOR REVIEW/COMMENTS
REV.	DATE	DESCRIPTION
		DRWN CHKD APPRD MRPL
		NAU

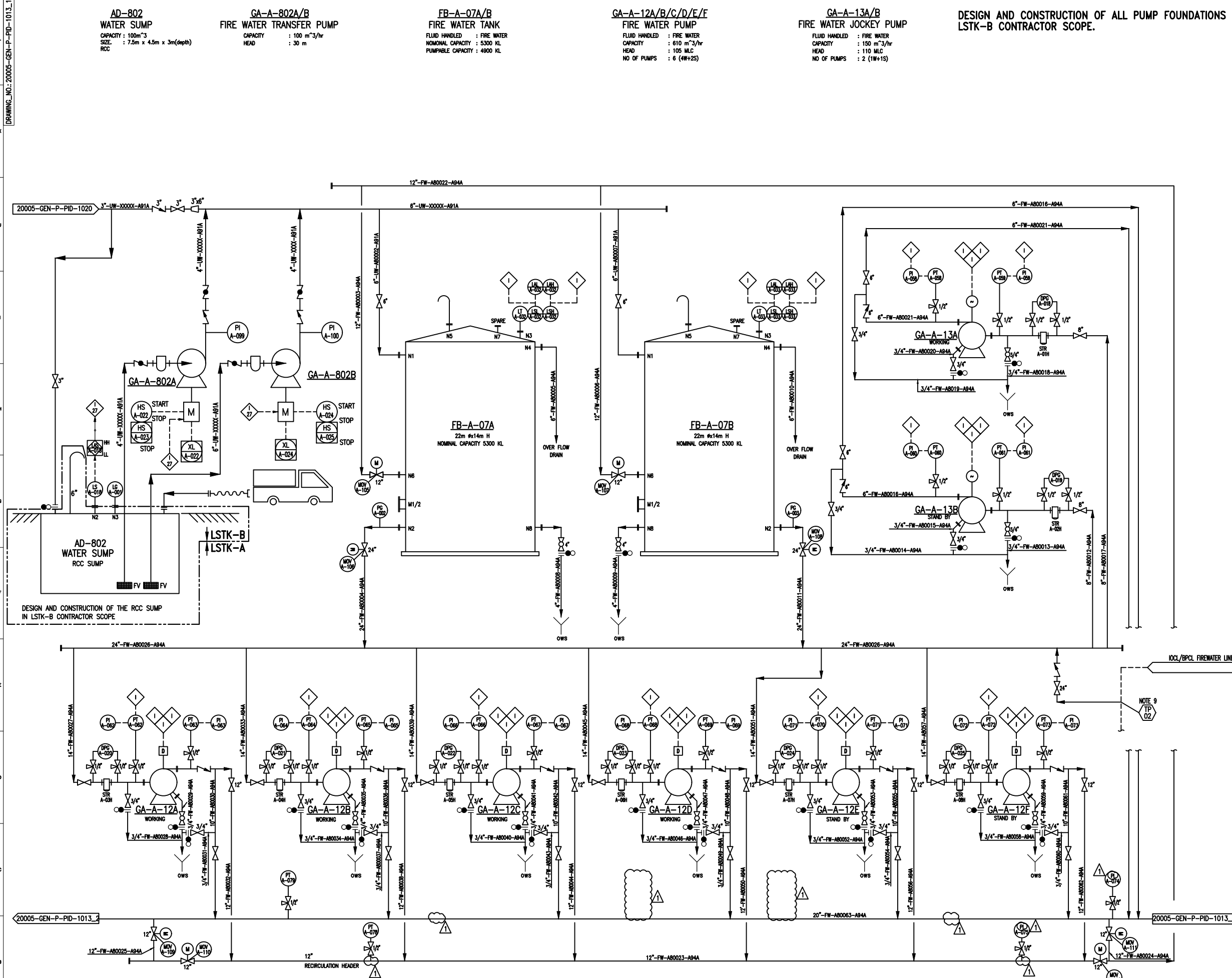
CLIENT:
MANGALORE REFINERY AND PETROCHEMICALS LIMITED
 (A subsidiary of Oil & Natural Gas Corp. Ltd - ONGC)

PROJECT:
CONSTRUCTION OF MARKETING TERMINAL PROJECT AT DEVANGONTHI, BANGALORE.

PROJECT MANAGEMENT CONSULTANT:
NAUVATA ENGINEERING PVT. LTD.

DRAWING TITLE:
PIPING AND INSTRUMENTATION DIAGRAM FOR FIRE WATER SYSTEM

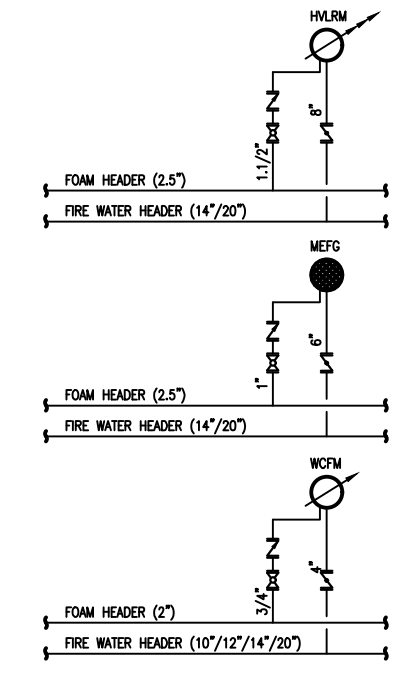
CLIENT TENDER No:	DRAWING No:	SHT NO.	REV	SCALE:
20005-GEN-P-PID-1013_1	20005-GEN-P-PID-1013_1	1 OF 2	1	1:1



DRAWING NO.: 20005-GEN-P-PID-1013_1

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- NOTES**
- ALL SIZES ARE IN INCH. UNLESS OTHERWISE SPECIFIED.
 - THIS P&ID IS ONLY CAPTURING PROCESS & FLOW OF FIRE WATER.
 - QUANTITY OF FIRE HYDRANTS & MONITORS SHALL BE AS PER REQUIREMENTS OF CODES OISD 244/117.
 - 50 NB DRAIN LINE PROVIDED TO AVOID INTERNAL CORROSION IN SPRINKLER LINE & CLOGGING OF NOZZLE.
 - THE PIPELINE INSIDE THE DYKE TO BE KEPT MINIMUM.



LEGENDS.

- | | | | |
|--|--------------------------|--|--|
| | CHV | | OPEN DRAIN FUNNEL |
| | GATE VALVE | | FIELD INSTRUMENTS INDIVIDUALLY SPECIFIED |
| | NEEDLE VALVE | | BLIND FLANGE |
| | BASKET STRAINER | | MOV (GATE VALVE) |
| | BUTTERFLY VALVE | | MOTOR |
| | BALL VALVE | | INTERLOCK |
| | AUTO RECIRCULATION VALVE | | |
| | DOUBLE BLOCK BLEED VALVE | | |

SL.NO	REV.	TITLE
REFERENCE DRAWINGS		

REV.	DATE	DESCRIPTION	DRWN	CHKD	APPRD	MRPL
2	12-APR-21	RE-ISSUED FOR BID	SPS	SK/PM	NSN	
1	02-MAR-21	RE-ISSUED FOR BID	SPS	SK/PM	NSN	
0	12-FEB-21	ISSUED FOR BID	SPS	SK/PM	NSN	
C1	18-DEC-20	ISSUED FOR REVIEW/COMMENTS	SPS	SK/PM	NSN	

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CONSTRUCTION OF MARKETING TERMINAL PROJECT AT DEVANGONTHI, BANGALORE.

PROJECT MANAGEMENT CONSULTANT:
NAUVATA ENGINEERING PVT. LTD.

DRAWING TITLE:
PIPING AND INSTRUMENTATION DIAGRAM FOR FIRE WATER SYSTEM

CLIENT TENDER No:	DRAWING No:	SHT NO.	REV	SCALE:
	20005-GEN-P-PID-1013_2	2 OF 2	2	1:1

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