OIL INDIA LIMITED

(A Government of India Enterprise)
P.O. Duliajan, Pin – 786602
Dist.-Dibrugarh, Assam

AMENDMENT NO. 4 DATED 03.05.2019 TO TENDER NO. SDG9939P19/07

1.0 This Amendment No. 4 dated 03.05.2019 to Tender No. SDG9939P19/07 (for Supply, Installation and Commissioning of Oil Field Truck Mounted Nitrogen Pumping Units) is issued to amend clauses of Technical Specifications (Annexure-A; of the tender document), Bid Evaluation Criteria (BEC) / Bid Rejection Criteria (BRC) (Annexure-B; of the tender document); to be read in place of existing and also to extend the Bid Closing date, Technical Bid Opening date as per following details:

(A) Amendment in Technical Specifications (Annexure-A of the tender document) & Bid Evaluation Criteria (BEC) / Bid Rejection Criteria (Annexure-B of the tender document); is enclosed vide **Annexure-1** to this document.

(B) Extended Bid Closing date and Technical Bid Opening date are as under:

i) Bid Closing Date & Time : 06.06.2019 at 11:00 (IST)

ii) Technical Bid Opening Date & Time : 06.06.2019 at 14:00 (IST)

2.0 Bidders are advised to take a note of this amendment while preparing and submitting their offer.

3.0 All other terms and condition of the tender remain unchanged.

Sd/-

(KRISHNA MOHAN KUMAR)
SMM-FD
FOR GM-FP
FOR GM- MATERIALS(HOD)
FOR RESIDENT CHIEF EXECUTIVE

Annexure-1 to
Amendment No. 4 dated 03.05.2019

(i) Amendment in Technical Specifications (Annexure-A):

Clause No.	Existing Clause	Amended Clause
SCOPE OF SUPPLY:	Self-contained **Non-fired** Nitrogen pumping Unit (NPU) mounted on a Oil field truck capable of pumping and vaporizing 1, 80,000 SCFH (maximum) along with a storage tank of capacity 2000 US gallons of liquid nitrogen. The design/ selection of engine and transmission should be such that the same engine is used for haulage as well as for pumping. A smaller sized deck engine may be used exclusively for vaporizer system. The unit shall have nitrogen pumping vaporizing system capable of pumping up to 1, 80,000 SCFH of gaseous nitrogen and pressure up to 10,000 psi. Nitrogen pumping system shall have liquid nitrogen storage tank to feed the liquid nitrogen through a boost pump with valve Manifold system. The nitrogen pumping system should have a triplex pump, high pressure-piping Manifold, **Non-fired vaporization system** and control system mounted on truck chassis as detailed below:	Self-contained **Non-fired** Nitrogen pumping Unit (NPU) mounted on a Oil field truck capable of pumping and vaporizing 1, 80,000 SCFH (maximum) along with a storage tank of capacity 2000 US gallons of liquid nitrogen. The design/ selection of engine and transmission should be such that the same engine is used for haulage as well as for pumping. The unit shall have nitrogen pumping vaporizing system capable of pumping up to 1, 80,000 SCFH of gaseous nitrogen and pressure up to 10,000 psi. Nitrogen pumping system shall have liquid nitrogen storage tank to feed the liquid nitrogen through a boost pump with valve Manifold system. The nitrogen pumping system should have a triplex pump, high pressure-piping Manifold, **Non-fired vaporization system** and control system mounted on truck chassis as detailed below: (Refer Clause No. 2.1.2 Engine.)
2.1. TRUCK CHASSIS AND PLATFORM:	Brand New Truck chassis manufactured not prior to six months from the date of issuance of Letter of Intent (LOI). The truck chassis must be of **Kenworth/ International/ Peterbilt** and shall be suitable for operation in rough terrain, typical oil field roads and desert environment. The platform where the Nitrogen Pumping Unit equipment shall be mounted should be robust in design and capable of withstanding and transmitting static as well as dynamic loads uniformly to the chassis. The bidder shall take special care in selecting and designing the platform considering the unit's application in rough terrain and typical oilfield roads. The offered model shall be latest and conforming to international quality standard norms, having specifications, fittings, accessories, etc. as under - **Note: The Technical leaflets/brochure of the offered model truck chassis shall be submitted along with bid.**	Brand New Truck chassis manufactured not prior to six months from the date of issuance of Letter of Intent (LOI). The truck chassis must be of **Kenworth/ International/ Peterbilt/Volvo/ Mercedes Benz** and shall be suitable for operation in rough terrain, typical oil field roads and desert environment. The platform where the Nitrogen Pumping Unit equipment shall be mounted should be robust in design and capable of withstanding and transmitting static as well as dynamic loads uniformly to the chassis. The bidder shall take special care in selecting and designing the platform considering the unit's application in rough terrain and typical oilfield roads. The offered model shall be latest and conforming to international quality standard norms, having specifications, fittings, accessories, etc. as under - **Note:** **1. The Technical leaflets/brochure of the offered model truck chassis shall be submitted along with bid.** **2. The bidder is to ensure that the Truck Chassis shall be of SFC type as mentioned in Clause No. 2.1.4 (DRIVE & STEERING) irrespective of the Manufacturer.**
2.1.1 DIMENSION (COMPLETE UNIT) :	Overall Width - Should not exceed 2.6 meter Overall Height - Should not exceed 3.5 meter Overall Length - Should not exceed 13.0 meter Ground Clearance - Not less than 30.0 cm. It shall be bidder's endeavor to mount subsequently fitted undercarriage components (i.e. other than originally mounted components) at maximum possible height.	Overall Width - Should not exceed 2.6 meter Overall Height - Should not exceed 4.0 meter Overall Length - Should not exceed 14.0 meter Ground Clearance - Not less than 30.0 cm. It shall be bidder's endeavor to mount subsequently fitted undercarriage components (i.e. other than originally mounted components) at maximum possible height.

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<td>2.1.2
ENGINE</td>
<td>Water-cooled diesel engine of adequate power (within the range 425 - 500 HP at around 2100 RPM) suitable for road drive as well as Nitrogen Pumping operation. The offered engine shall comply with emission norms EURO - IV or Higher. If the offered Engine is of higher Emission Norms than EURO - IV then the offered engine shall be compatible with the Fuel as applicable in the state of Assam in India at the time of delivery. The make of the engine shall be of Caterpillar/International/Cummins only.</td>
<td>Water-cooled diesel engine of adequate power (within the range 500 - 600 HP at around 2100 RPM) suitable for road drive as well as Nitrogen Pumping operation. The offered engine shall comply with emission norms EURO - IV or Higher. If the offered Engine is of higher Emission Norms than EURO - IV then the offered engine shall be compatible with the Fuel as applicable in the state of Assam in India at the time of delivery. The make of the engine shall be of Caterpillar/ International/ Cummins/Volvo/Mercedes only.

Note: The specification of HSD available in Assam is attached herewith. Engine manufacturer should submit fuel compatibility certificate along with the bid based on the HSD specification provided.</td>
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<td>2.1.4 DRIVE & STEERING:</td>
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<tr><td>Drive</td><td>Semi Forward Control (SFC) – 6X4 Drive (Single non powered front axle & two Powered rear axles).</td></tr>
<tr><td>Minimum Turning Circle Radius</td><td>Minimum Turning Circle Radius (MTC) not more than 16.00 meters.</td></tr>
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</td>
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<table>
<tr><td>Drive</td><td>Semi Forward Control (SFC) – 6X4 Drive (Single non powered front axle & two Powered rear axles). Drop axle is accepted (As additional fitment).</td></tr>
<tr><td>Minimum Turning Circle Radius</td><td>Minimum Turning Circle Radius (MTC) not more than 18.00 meters.</td></tr>
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<td>2.1.10
OTHER FITTINGS & ACCESSORIES</td>
<td>(D) Gauges & meters including Engine Tachometer & Hour meter as per standard inside driver’s cabin. Speedometer & Odometer with metric KM calibration only. Two Nos. fans inside driver’s cabin.

(J) Electrical equipment like starter, alternator, etc. shall be of Lucas or Delco Remy make.

(O) Suitable spark arrestor for engine exhaust for operation in oilfield area</td>
<td>(D) Gauges & meters including Engine Tachometer & Hour meter as per standard inside driver’s cabin. Speedometer & Odometer should have metric KM calibration. Two Nos. fans inside driver’s cabin.

(J) Electrical equipment like starter, alternator, etc. shall be of Lucas/Delco Remy/Paccar/ Mitsubishi make or OEM Standard. However, in case of Mitsubishi or OEM Standard starter the bidder should ensure that authorised dealer/service provider of the offered starter is available in India and has to submit certificate of authorised dealership /service provider located in India with full contact details.

(O) Suitable spark arrestor for engine exhaust for operation in oilfield area (as an additional attachment)</td>
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<td>2.2.1 CRYOGENIC TRIPLEX PLUNGER PUMP:</td>
<td>The Cryogenic Triplex pump shall be installed on the truck chassis and shall be hydraulically powered. The pump should be capable of pumping liquid Nitrogen equivalent to 180,000 SCFH (85 m3 /min) of gaseous Nitrogen. The pump shall have the following specifications:

<table>
<tr><td>Max discharge Pressure</td><td>10,000 Psi</td></tr>
<tr><td>Bore size</td><td>1.625 inches</td></tr>
<tr><td>Stroke</td><td>1.38 inches</td></tr>
<tr><td>Lubrication</td><td>force feed suitably with a hydraulically
driven Lube pump</td></tr>
<tr><td colspan="2">Make of the pump shall be either CS&P or ACD</td></tr>
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</td>
<td>The Cryogenic Triplex pump shall be installed on the truck chassis and shall be hydraulically powered. The pump should be capable of pumping liquid Nitrogen equivalent to 180,000 SCFH (85 m3 /min) of gaseous Nitrogen at a maximum pressure of 10000 psi. The pump should be equipped with a forced feed lubrication system suitably with a hydraulically driven Lube pump with a lube oil pressure gauge mounted directly on the pump. Make of the pump shall be CS&P/ ACD/ NOV Hydra Rig.</td>
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<td>2.2.2 CRYOGENIC BOOST PUMP:</td>
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<table>
<tr><td>Make</td><td>CS&P or ACD</td></tr>
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<td>
<table>
<tr><td>Make</td><td>CS&P/ACD/ NOV HydraRig</td></tr>
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<td>2.2.3 VAPORIZER / HEAT EXCHANGER:</td>
<td>The vaporizer should be capable of handling Nitrogen Flow rate 180,000 SCFH (max) with Max. Working Pressure 10,000 psi to raise the temperature of the discharged Nitrogen up to 40deg C. Pressure drop between the inlet and the outlet of the vaporizer should not be more than 500 psi. The vaporizer could be of any one of the following operating principle:

Option 1
A) A water bath vaporizer would be the main source of vaporization utilizing the waste heat in the vehicle engine coolant, hydraulic oil and the lube oil system for heating up the Liquid Nitrogen coming out from the Triplex Pump for vaporization. A smaller sized deck engine may be used for vaporizer system.
</td>
<td>Vaporizer shall be designed to handle maximum pumping rate of 180000 SCFH of gaseous nitrogen and withstand Maximum Pressure of 10000 psi to raise the temperature of the discharged Nitrogen up to 40 deg C. Pressure drop between the inlet and the outlet of the vaporizer should not be more than 500 psi. The vaporizer could be of any one of the following operating principle:

Option 1
A) A water bath vaporizer would be the main source of vaporization utilizing the waste heat in the vehicle engine coolant (if required), hydraulic oil and the lube oil system for heating up the Liquid Nitrogen coming out from the Triplex Pump for vaporization.
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<td>2.2.4 LIQUID NITROGEN TANK:</td>
<td>(ii) 50 psi Maximum Allowable Working Pressure at maximum temperature – 320°F (minus 320°F).</td>
<td>(ii) 45 psi Maximum Allowable Working Pressure at maximum temperature – 320°F (minus 320°F).</td>
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<td>2.3 DISCHARGE MANIFOLD:</td>
<td>i. 2” full flow, spring loaded, reset Relief valve : 1 (One) no.</td>
<td>i. 1” - 2” full flow, spring loaded, reset Relief valve : 1 (One) no.</td>
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<td>3.1 CONTROL CABIN:</td>
<td>The control cabin should be designed for adequate space for a two-person operation. The cabin should be provided with hydraulically adjustable lifting mechanism. Cabin will have windows on all four sides for better visibility. Entry doors shall be present on both side of the cabin. One no. of 0.75 meter wide access ladder with handrails should be included. The cabin should be air-conditioned. Inside</td>
<td>The control cabin should be designed for adequate space for a two-person operation. The cabin should be provided with hydraulically adjustable lifting mechanism <u>of travel distance of 2.5 ft</u>. Cabin will have windows on all four sides for better visibility. Entry doors shall be present on both side of the cabin. One no. of 0.75 meter wide access ladder with handrails should be included. The cabin should be air-</td>
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	paneling to be done with Aluminum alloy riveting to the frame and cabin should have thermocol insulation. The design of the control cabin must be ergonomic for operational use as well as for easy evacuation in case of emergency.	conditioned. Inside panelling to be done with Aluminum alloy riveting to the frame and cabin should have thermocol insulation. The design of the control cabin must be ergonomic for operational use as well as for easy evacuation in case of emergency.
3.2 CONTROL PANEL:	xii) Triplex pump power end lube oil pressure gauge and additional pressure gauge with direct power end lube oil system xiii) Triplex pump rate and total pumped xxvii) Delivery line temperature gauge (Pyrometer)	xii) Triplex pump power end lube oil pressure gauge with direct power end lube oil system xiii) Triplex pump rate and total pumped shall be digitally displayed at the operator panel. xxvii) Delivery line temperature gauge. Type of sensor to be decided by the vendor.
3.3 FLOW METERING SYSTEM:	The unit must have provision for measuring and displaying pumping parameters such as fluid pumping rate, density and total flow data and provision for feeding the signal to standard data acquisition systems such as NOV CTES Orion or MEDCO DAS mounted on an allied unit such as Coiled Tubing Unit. The length of cables shall be 30 m and suitable to transmit all the above mentioned parameter to DAS.	The unit must have provision for measuring and displaying pumping parameters such as fluid pumping rate and total flow data and provision for feeding the signal to standard data acquisition systems such as NOV CTES Orion or MEDCO DAS mounted on an allied unit such as Coiled Tubing Unit. The length of cables shall be 30 m and suitable to transmit all the above mentioned parameter to DAS. Please refer to manuals of NOV CTES ORION & MEDCO DAS for available type of communication protocol.
4.0 HYDRAULIC SYSTEM:	3. Make of the hydraulic pump and motors shall be of Saur Danfoss / Sun Strand / Parker / Denison / Rexroth / Linde only. The following information shall be provided along-with the offer in a tabular form:	3. Make of the hydraulic pump and motors shall be of Saur Danfoss / Sun Strand / Parker / Denison / Rexroth / Linde only. The following information shall be provided along with the unit in a tabular form after receipt of Firm Order.
9.2 OPERATIONAL CRITICAL SPARES	**i) AUTOMOBILE SPARE PARTS LIST:** Following spares in specified quantity as indicated shall be supplied along with each unit. Specific description, part Nos., Make etc. & unit price of each & every spares shall clearly be indicated in the bid (in price bid only) for bid evaluation.	**i) AUTOMOBILE SPARE PARTS LIST:** Following each & every spares in specified quantity as indicated shall be supplied mentioning OEM Part Nos. Specific description, Make etc. in tabular form along with each unit after receipt of Firm Order. However the unit price of each & every spares & total price shall clearly be mentioned in the bid (in price bid only). **These quoted prices of each & every spares shall be considered for BID EVALUATION.** In case of any difference in spares for vehicle's left & right wheel studs, axle studs, etc., the specified quantities will be divided into 2 (two) equal parts.

9.2 OPERATIONAL CRITICAL SPARES	**ii) SPARES FOR NITROGEN PUMPING UNIT (Per unit)** Note: a. All spares in specified quantity as indicated above shall be supplied along with the unit. b. Specific description, Part Nos., Make etc. and Unit Price (in price bid only) of each and every item shall clearly be indicated in the bid. c. In case of any difference in spares for vehicle's left & right wheel studs, axle studs, etc., the specified quantities will be divided into 2 (two) equal parts. d. Bidder shall also quote separately for any additional spares with similar details as felt necessary for 2 (two) years trouble free operation and maintenance but not covered in this list for future reference / procurement- HOWEVER, THE PRICE QUOTED FOR SAID ADDITIONAL SPARES WILL NOT BE TAKEN IN TO ACCOUNT FOR BID EVALUTION AND THE PRICES MUST BE MENTIONED ONLY IN THE PRICE BID.	**ii) SPARES FOR NITROGEN PUMPING UNIT (Per unit)** Note: Each & every spares in specified quantity as indicated above shall be supplied mentioning OEM Part Nos. Specific description, Make etc. in tabular form along with each unit after receipt of Firm Order. However the unit price of each & every spares & total price shall clearly be mentioned in the bid (in price bid only). **These quoted prices of each & every spares shall be considered for BID EVALUATION.**
10.0 UNITIZATION AND COMPLETION	viii) Noise level for the complete unit in running condition above 90.0 db is not acceptable.	viii) Noise level for the complete unit in running condition above 90.0 db measured at a distance of 1m. in all direction from the source is not acceptable
11.0 STANDARDS:	ii) ASME standards	ii) Both ASME (wherever applicable) and India Standards (wherever applicable)
13.0 INSPECTION CUM ACCEPTANCE:	1) Third Party inspection of the unit is to be carried out for all the component of the unit by OIL approved TPI agency (viz M/s Lloyds/ M/s Bureau Veritas/ M/s Tuboscope Vetco/ M/s IRS/ M/s Rites / M/s DNV only). Scope of 3rd party inspection: i) Witness the manufacturing and assembly	1) Third Party inspection of the unit is to be carried out for all the component of the unit by OIL approved TPI agency (viz M/s Lloyds / M/s Bureau Veritas/ M/s Tuboscope Vetco/ M/s IRS/ M/s Rites /M/s DNV only). Scope of 3rd party inspection: i) Review the manufacturing and assembly
13.0 INSPECTION CUM ACCEPTANCE:	2) Pre shipment inspection shall be carried out by OIL (by representatives of WSS & ALP section of OGPS Deptt., P&D Section of PSS Deptt., Instrumentation Deptt., Logistics Deptt., Field Engineering Deptt. etc.) at manufacturer's site. The supplier shall inform OIL at least 2 (two) months ahead for such inspection to enable OIL to send its inspectors. The supplier has to arrange to inspect the unit by a team of 5 (five) OIL's engineers. OIL will bear the expenses towards traveling and accommodation etc. of the OIL's inspection team. The Inspection cum Acceptance process would include the following minimum steps/tasks but not limited to -	2) Pre shipment inspection shall be carried out by OIL (by representatives of WSS & ALP section of OGPS Deptt., P&D Section of PSS Deptt., Instrumentation Deptt., Logistics Deptt., Field Engineering Deptt. etc.) at manufacturer's site. OIL will inspect the unit only after TPI inspection and bidder shall assure compliance of TPI's suggestion for rectification of any faults, if found before inspection by OIL. The supplier shall inform OIL at least 2 (two) months ahead for such inspection to enable OIL to send its inspectors. The supplier has to arrange to inspect the unit by a team of 5 (five) OIL's engineers. OIL will bear the expenses towards traveling and accommodation etc. of the OIL's inspection team. The Inspection cum Acceptance process would include the following minimum steps/tasks but not limited to -

18.0 BID SUBMISSION & DOCUMENTATIONS:	f) Specific description, Part Nos., Make, etc. of each and every spares to be supplied along with the unit (for bid evaluation) as detailed in the Operational Spares list provided in the NIT.	f) Specific description, Part Nos., Make, etc. of each and every spares to be supplied along with the unit as detailed in the Operational Critical Spares list Clause No. 9.2.
18.0 BID SUBMISSION & DOCUMENTATIONS:	g) List of additional spares, if any, as felt necessary but not covered in the Operational Spare list with Description, Part Nos., Make, etc. including Unit Rate (for future reference / procurement only; not for bid evaluation).	g) List of additional spares, if any, as felt necessary but not covered in the Operational Critical Spare list with Description, Part Nos., Make, etc. as detailed in the Recommended Spares list Clause No. 9.3.
18.0 BID SUBMISSION & DOCUMENTATIONS:	j) Oil India Purchase Order No. shall be engraved on the body of the item. Bidder must confirm the same categorically in their quotation.	j) Oil India Purchase Order No. shall be engraved on the body of the item by Alphanumeric Punch Only. Bidder must confirm the same categorically in their quotation.

(ii) Amendment in Bid Evaluation Criteria (BEC) / Bid Rejection Criteria(BRC) (Annexure-B):

Clause No.	Existing Clause	Amended Clause
TECHNICAL BEC/BRC Clause No. 2.3 (b) **(consequent Amendment in TECHNICAL EVALUATION MATRIX) (Annexure E) Clause No. 2.3 (b))**	(b) Any one or combination of the following documents that confirms the successful execution of each of the purchase order(s) / contract(s) - - Signed and sealed Completion report/performance certificate from the clients(in original on user's letter head) - Bill of lading - Consignee delivery receipt / challan - Central Excise Gate Pass / Tax Invoice issued under relevant rules of Central Excise / Vat / GST - Commercial Invoice / Payment Invoice - Any other documentary evidence that can substantiate the successful execution of each of the Purchase Order(s) /contract(s) cited above	(b) Any one or combination of the following documents that confirms the successful execution of each of the purchase order(s) / contract(s) – - Copies of Original Signed and sealed Completion report/performance certificate from the clients (written on Client's Letter Head). - Bill of lading - Consignee delivery receipt / challan - Central Excise Gate Pass / Tax Invoice issued under relevant rules of Central Excise / Vat / GST - Commercial Invoice / Payment Invoice - Any other documentary evidence that can substantiate the successful execution of each of the Purchase Order(s) /contract(s) cited above
BEC/BRC Clause No. 3.0 **(consequent Amendment in TECHNICAL EVALUATION MATRIX) (Annexure E) Clause No. 3.0)**	**Bidder should categorically confirm in the technical bid a delivery schedule within Twelve (12) months, FOB Port of dispatch, after establishment of letter of credit (in case of foreign bidder) or for dispatch of the equipment within Twelve (12) months after receipt of formal order (in case of indigenous bidder) failing which their offer will be rejected.**	**Bidder should categorically confirm in the technical bid a delivery schedule within Eighteen (18) months, FOB Port of dispatch, after establishment of letter of credit (in case of foreign bidder) or for dispatch of the equipment within Eighteen (18) months after receipt of formal order (in case of indigenous bidder) failing which their offer will be rejected.**

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Table 1 Requirement for Automotive Diesel Fuel

(Clauses 3.1.4 and 3.2)

Sl No.	Characteristic	Requirement		Method of Test, Ref to [P :] of IS 1448/ASTM/IP/ISO Annex
		Bharat Stage IV	Bharat Stage VI	
(1)	(2)	(3)	(4)	(5)
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 D9749)/ 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, percent 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 42649)/ASTM D4737/ IP 380
viii)	Pour point[3], *Max*:			[P : 10] 9)/ASTM D 5949/
	a) Winter	3°C	3°C	ASTM D 5950/ ASTM D
	b) Summer	15°C	15°C	5985/ASTM D97/ASTM D7346/IP 15
ix)	Copper strip corrosion for 3 h at 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 D 445/ASTM D 7042/IP 71
xiii)	Total contamination, mg/kg, *Max*	24	24	EN 126629)/IP 440
xiv)	Density at 15°C, kg/m^3	815–845[5]	810–845[5]	[P : 16] 9) /[P : 32] / ISO 12185/ ASTM D 4052/ ASTM D 1298/IP 160
xv)	Total sulphur, mg/kg, *Max*	50	10	ISO 13032 9)/ ISO 20884/ISO 208469)/ASTM D 5453/ASTM D 2622/ASTM D 7220/[P : 34] For Bharat Stage IVgrade only
xvi)	Water content, mg/kg, *Max*	200	200	[P : 153] 9)/ASTM D 4294
xvii)	Cold Filter Plugging Point (CFPP)[3], *Max*:			ISO 12937/ASTM D 6304
	a) Winter	6°C	6°C	[P : 110] 9)/ASTM D 6371/ IP 309
	b) Summer	18°C	18°C	
xviii)	a) Oxidation stability[6], g/m^3, *Max*	25	25	[P : 154] 9)/ASTM D 2274/ IP 388
	b) Oxidation stability by Rancidity meter[7], hours, *Min*	20	20	
xix)	Polycyclic Aromatic Hydrocarbon (PAH), percent by mass, *Max*	8	8	EN 15751 EN 129169)/IP 391 /ASTM D 6591
xx)	Lubricity corrected wear scar diameter (wsd 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 A9)/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.

Table 1 — (*Concluded*)

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]" 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.

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.

the appropriate batch certificate of quality. This requirement is not satisfied by averaging on-line analysis results.

6.4 The minimum requirements for information to be shown on the fuel's batch test certificate of quality at point of manufacture are as under:

a) Specification name, issue and any amendment number;
b) Name and address of testing laboratory;
c) Batch number or unique identifier;
d) Properties tested including specification limit, test method and result of test;
e) Identification of the signatory certifying the report; and
f) Date of certification.