Oil and Natural Gas Corporation Ltd
Materials Management Intelligence & Design (MIND)
2nd Floor, Tower-A, Deendayal Urja Bhawan,
5, Nelson Mandela Marg, Vasant Kunj,
New Delhi -110 070 Tel – (011)-26754012

Ref: MIND/TIB/EOI/JMD/2025 Dated: 29 April 2025

Expression of Interest(EOI) Notification

Supply, Installation & Commissioning of Jet Mixing Devices in oil storage tanks, Uran Plant ONGC

1. Introduction:

Oil and Natural Gas Corporation Limited (ONGC)' s Uran Plant processes crude oil produced from Western Offshore through Crude Stabilization Units (CSU) with a total capacity of 20 MMTPA. This crude oil is stabilized at Uran Plant to meet quality requirements before being dispatched. The processed oil is stored in the main crude oil storage tanks before dispatching it to consumers. Over continuous usage, sludge accumulates at the bottom of the storage tanks, reducing tank ullage over time. It is estimated that approximately 15,000 m^3 of sludge is generated in each tank after 10 years of operation. Further, as per statutory norms, storage tanks is required to undergo maintenance every 10 years. Currently, the total time required to complete the maintenance of a storage tank is about three years, which includes De-sludging, HC freeing, inspection, and maintenance. Even with two tanks being taken for maintenance simultaneously, meeting this timeline is challenging, resulting in delays in initiating maintenance and inspection (M&I) for other tanks. This delay poses ongoing safety concerns.

During IEW 2025, ONGC derived availability of new technology of Jet Mixing Device (JMD). This device, which when installed inside the oil storage tank helps to prevent the regular sludge accumulation and thus over a period, there is a significant reduction (up to about 95%) in sludge accumulation. In this system, specially designed nozzles, flow distribution unit, ejector nozzles and mixing chamber etc. will be installed at the time of M&I. This system will be attached to the receipt line of the tank. Now after the tank is taken in line, during normal receipt cycle, the storing liquid (crude oil) will enter at high velocities into the tank due to JMD in different directions, stirring the oil while filling, resulting in minimal sludge formation inside the tank in its 10-year cycle of operation. Due to minimal sludge formation, the preparation time of the tank for M&I will drop considerably. Rolling plans which requires M&I of each tank after every 10 years can be maintained.

ONGC hereby invites expressions of interest (EOI) from capable and experienced parties / vendors for Supply, Installation & Commissioning of Jet Mixing Devices in oil storage tanks at ONGC's Uran Plant.

2. Objective

The primary objective of this Expression of Interest (EOI) is to identify and collaborate with qualified partners who possess the expertise and experience in Jet Mixing Device (JMD)

technology which can be installed in oil storage tanks. ONGC aims to implement this innovative technology to significantly reduce the downtime of main storage tanks at the Uran Plant by minimizing sludge generation, while ensuring the availability of maximum ullage during the 10-year operational period of the storage tank.

The proposed pilot project seeks to assess the feasibility of integrating the JMD system within the storage tanks. A successful pilot phase could pave the way for widespread adoption of this technology across various ONGC storage locations.

3. Scope of Work

Under the proposed project, the selected technology provider(s) will be required to **design, build, and install Jet mixing device inside the DD EFR (Double Deck External Floating Roof) type crude oil storage tanks.** The technology provider shall undertake, but not be limited to, the following activities:

1. **Designing, engineering, production, supply, and commissioning of the JMD system –** The contractor shall provide all necessary supporting and mounting parts, as well as essential pipelines required for the installation of nozzles inside the tank shell.
2. **Design using CFD –** designing of JMD for storage tank has to be done exclusively for the individual tank as per the requirements. The JMD system provided should consider the placement of each equipment like supporting legs and roof drain system etc. inside the tank during the design phase of mixing devices. The GA of tank shell nozzles and tank internals are appended down below **for ready reference**.
3. **Sharing of CFD and Drawings -** All the installation drawings with necessary detailed information for all the equipment to be provided. The CFD and digital model developed for tank to be shared with ONGC.
4. **Integration with ONGC's Existing motive power** – No additional motive power is sought after. The proposed JMD system provided should work with the motive power available at the site. The Data containing current crude oil storage system and crude oil properties are appended below for reference.
5. **Integration of JMD with existing receipt header for the tank –** The JMD system designed shall be used during receipt of crude oil in storage tanks. **No recirculation** of stored crude oil even with existing pumping system is to be looked into, to avoid undue complications and to meet OISD guidelines.
6. **Compliance with API 650** – JMD system shall adhere to API standard 650.

4. Submission Details

Interested parties/ bidders are invited to submit their EOI proposals electronically (PDF format) within 21 calendar days from publication of this notification in Newspapers, encompassing following:

- **Executive Summary**: A concise overview of the proposal.
- **Detailed Proposal**: Comprehensive responses to the information requirements outlined in evaluation criteria listed below.
- **Supporting Documents**: Relevant cases, applications in oil tanks, certifications, and any other pertinent documentation.

- **Contact Information:** Interested parties / bidders to submit their EOI, including any details / queries /clarification required on the objectives and scope of the work projected in the subject EOI to:

  Head MIND, ONGC
  Deendayal Urja Bhawan,
  5, Nelson Mandela Marg, Vasant Kunj,
  New Delhi -110 070 Tel – (011)-26754012
  Email: sanghi_sanjiv@ongc.co.in

5. Evaluation Criteria

Interested parties/bidders shall be asked to present a proposal/submission before a committee. Submissions will be assessed based on:

- **Technical Competence**: Proven capability and completed jobs in JMD technology.
- **Regulatory Acumen**: Understanding of and experience in HC industry and storage tanks.

6. Confidentiality

All information received by ONGC as part of this EOI, will be ONGC's property and will be kept strictly confidential and utilized for its internal purposes only.

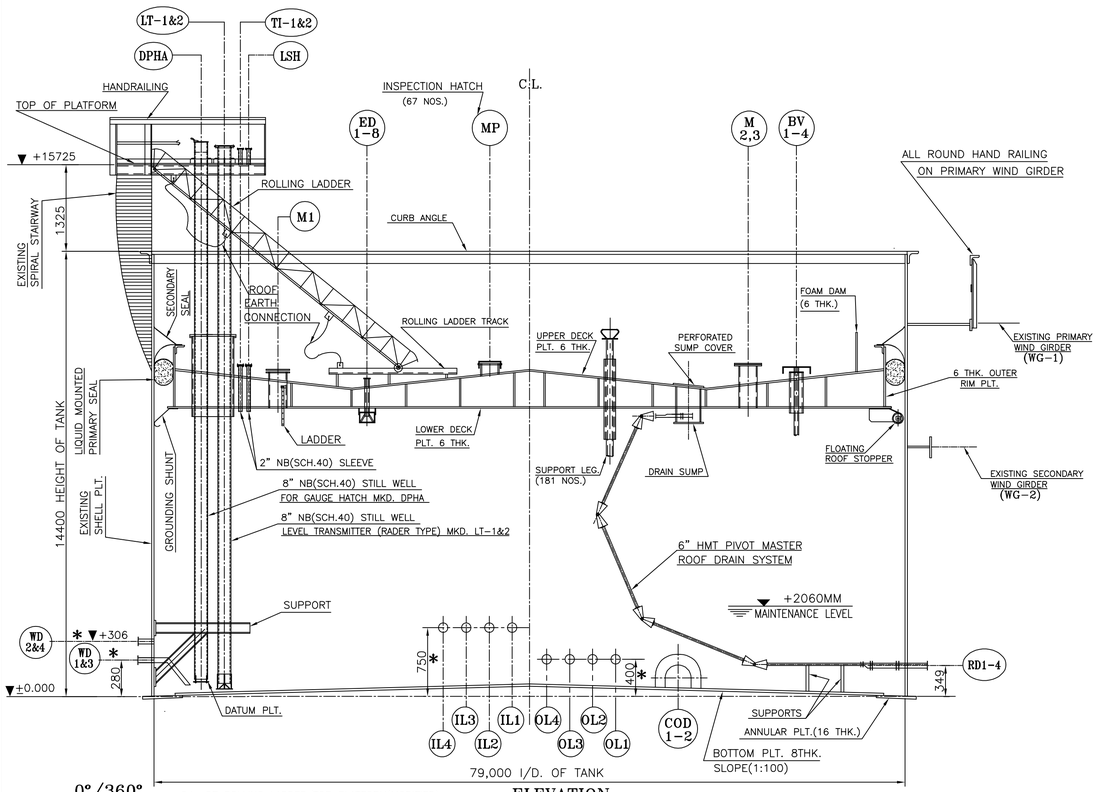
7. Disclaimer

ONGC reserves the right to alter the scope or terms as needed. This EOI is an exploratory exercise and does not constitute a commitment to award a contract.

Data containing current crude oil storage system and crude oil properties

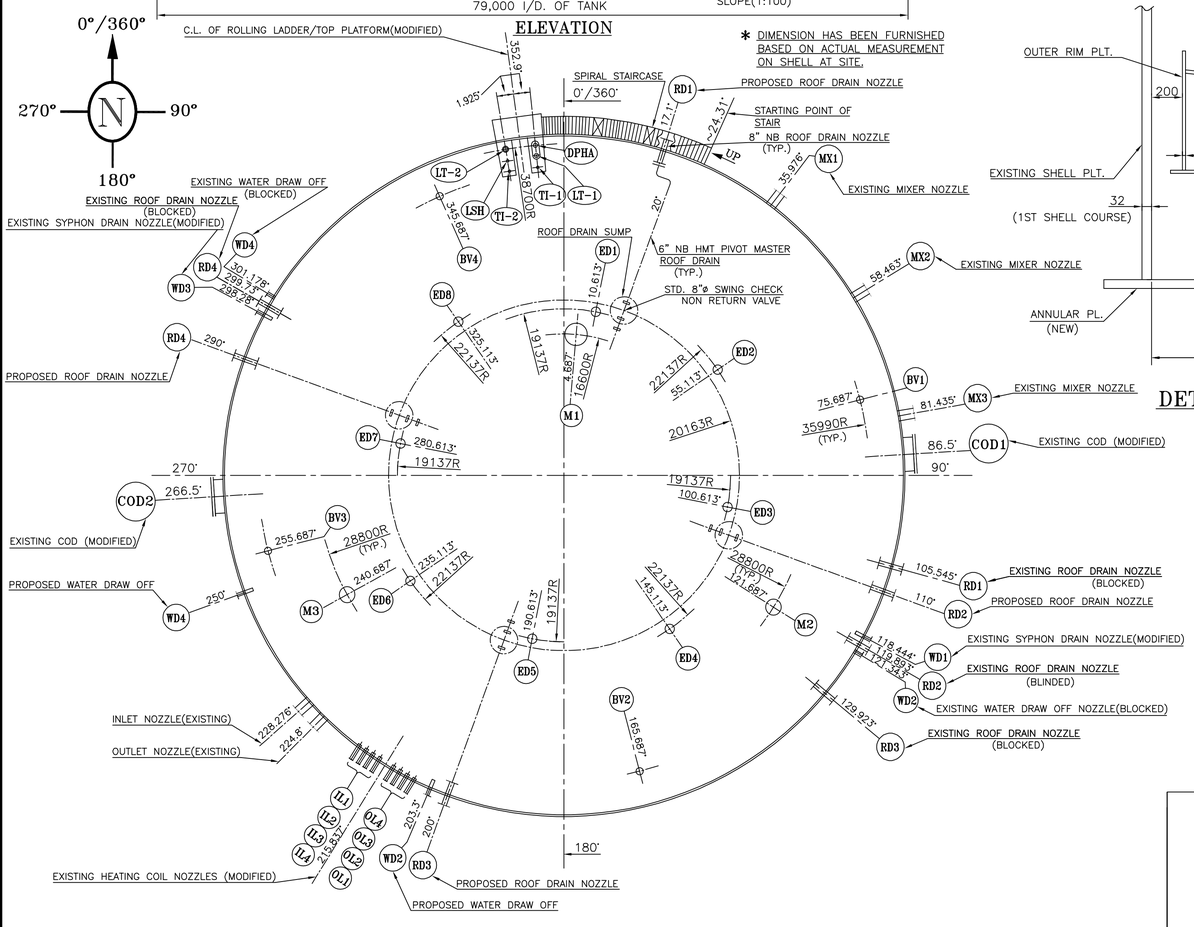
#	**Characteristic**	**Description and values**
1	Type of Storage Tank	DD Externally Floated Roof Type
2	Total nominal capacity, m^3	60,000 M3 (EACH)
3	Height, mm	14,400 mm
4	Diameter, mm	79,000 mm
5	Levels of liquid product intake: max/min, mm	12400/2000 MM
6	Capacities of the pumps: inflow / outflow	Inflow 750 M3/HR (Each Pump) / Outflow 2000 M3/HR (Each Pump)
7	Pumps type	CENTRIFUGAL
8.1	Max volumetric flow rate, Q_{MAX} m^3/hour	1500 m3/hr (inflow)
8.2	Min volumetric flow rate, Q_{MIN} m^3/hour	750 m3/hr (inflow)
9.1	Pump head/discharge pr. When filling the storage tank, m	54m-90m(max.)
9.2	Length of Reciept headers to tanks	500m-750m
9.3	Elevation of pipelines	10 m
10	Name / type of liquid products stored	CRUDE OIL
11	Liquid product density, kg/m^3 at temperature, T°C	0.8310/15°C
12	Liquid product viscosity, Pa* at temperature, t°C	3.45 cSt @ 40 °C
13	Temperature of products stored, $t_{working}$ °C	Ambient, Max 45 °C if steam heating done
14	Blending.	No blending of products.
15	Diameter of supply nozzle, mm	500 mm

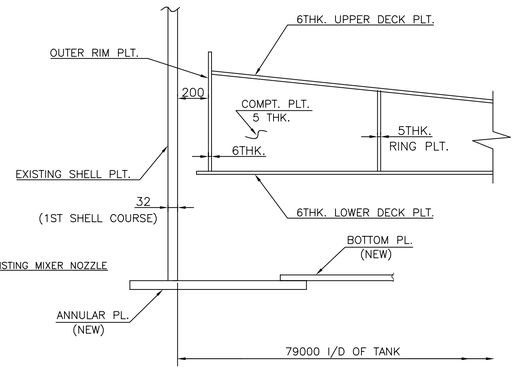
16	Material type of supply nozzle	CS
17	Wall thickness at inlet nozzle, mm	Tank Wall thickness 32mm
18	Diameter (mm) and shape (round/oval) of storage tank side hatch	COD Size: 900x1200mm Shape: Oval
19	Number of supporting legs inside for floating Roof	Approx..-180 legs, sized 3”-4” dia
20	Number of roof drains	4 Nos.



ELEVATION

* DIMENSION HAS BEEN FURNISHED BASED ON ACTUAL MEASUREMENT ON SHELL AT SITE.





DETAIL OF DOUBLE DECK

RECEIVED
16 AUG 2021
KEASPL

Kavin Engineering And Services Pvt. Ltd.,	
1	Approved
2	Approved With Minor Comments, Work may Proceed With Comments incorporated and resubmit within 7 days
3	Revise and Resubmit Before Proceed with Work
R	Rejected
I	Retained for Information
SIGN	28/9/21

SHELL APPURTENANCES

MARK	SIZE (NB.)	DESCRIPTION	NOS.	PROJ.	RAT. TYPE	SCH./THK.
RD1-4	8"	ROOF DRAIN	4	200	150 # S.O.R.F.	80
WD1&3	6"	DRAIN SYPHON	2	200	150 # S.O.R.F.	80
WD2&4	6"	WATER DRAW OFF	2	200	150 # S.O.R.F.	80
COD1-2	900X1200	CLEAN OUT DOOR	2	AS PER STD.		32THK.
OL1-4	2"	STEAM OUTLET	4	200	150 # S.O.R.F.	80
IL1-4	2"	STEAM INLET	4	200	150 # S.O.R.F.	80

ROOF APPURTENANCES

MARK	SIZE (NB.)	DESCRIPTION	NOS.	PROJ.	RAT. TYPE	SCH./THK.
M2&3	600	DECK MANHOLE WITH COVER	2	AS PER STD.		6 THK.
M1	750	DECK MANHOLE WITH COVER & LADDER	1	AS PER STD.		6 THK.
DPHA	200	GAUGE HATCH FOR MANUMAL GAUGING	1	AS PER STD.		40
MP	500	INSPECTION HATCH	67	AS PER STD.		6 THK.
BV1-4	250	BLEEDER VENT	4	AS PER STD.		40
ED1-8	150	EMERGENCY ROOF DRAIN	8	AS PER STD.		80
TI-1&2	50	TEMPERATURE INSTRUMENT	2	AS PER STD.		40
LT-1&2	200	LEVEL TRANSMITTER (RADER TYPE)	2	AS PER STD.		40
LSH	50	LEVEL SWITCH	1	AS PER STD.		40

MATERIAL SPECIFICATION

SHELL,ANNULAR,BOTTOM, ROOF.	:	IS: 2062 E250 GR.BR / IS:2062 GR.B
MANWAY NECKS	:	IS: 2062 E250 GR.BR
MANWAY FLANGES	:	IS: 2062 E250 GR.BR
NOZZLE NECKS	:	SA-106 GR.B
NOZZLE FLANGES	:	SA 105
GASKET FOR NOZZLES	:	SWMG B-16.20 FOR RAISED FLANGE BORE AS PER ASME B-16.5
GASKET FOR MANHOLES/COD	:	CAF IS: 2712
BOLT & NUTS FOR NOZZLES	:	A -193 GR. B7 & A-194 GR. 2H
EXTERNAL GUSSETS	:	IS: 2062 E250 GR.BR
STRUCTURALS	:	IS: 2062 GR. A/B
INTERNALS	:	SA-106 GR.B / IS:2062 E250 GR.BR
ROOF SUPPORTS, HEATING COIL	:	SA-106 GR.B
SURFACE PREPARATION, PRIMER & PAINTING	:	AS PER TENDER SPECIFICATION
STAIRWAY, PLATFORM & HAND RAIL	:	IS: 2062 E250 A/BR
BOLT & NUTS FOR STRUCTURE	:	IS: 1367 / 1363

DESIGN DATA

CODE : API-650, 12TH EDITION, 2013(ADD.-3 AUG-2018). APPENDIX-C (FOR FLOATING ROOF PORTION ONLY)	
DESIGN PRESSURE : FULL OF WATER.	
OPERATING PRESSURE : ATMOSPHERIC.	
DESIGN TEMPERATURE. : +65°C	OPERATING TEMPERATURE : +45°C
SP.GR. OF STORED PRODUCT, G : 0.830	DESIGN PRODUCT SP. GR. G : 0.830
WIND PRESSURE : AS PER IS: 875 .	
STORED PRODUCT : CRUDE OIL CLASS A	
CORROSION ALLOWANCE : 1.5 MM FOR BOTTOM PLATE, 1.0 MM FOR LOWER DECK, UPPER DECK & OUTER RIM PLT, OTHERS : NIL	
RADIOGRAPHY : AS PER CODE & TENDER SPECIFICATION	
HEAT TREATMENT : AS PER CODE.	
TESTING : AS PER CODE & TENDER SPECIFICATION.	
NOMINAL CAPACITY : 60,000 CU.M.	
FLASH POINT OF LIQUID : < 100°F	
TYPE OF ROOF : DOUBLE DECK FLOATING ROOF.	
QUANTITY. : 1 NO.	
DESIGN RAINFALL INTENSITY : 125 mm/HOUR (MAXM.).	
PUMP IN RATE(MAXM.) : 3000 CU.M./HOUR.	
PUMP OUT RATE (MAXM.) : 7000 CU.M./ HOUR.	
OPERATING LEVEL : 1860 MM.	
CLEAN OUT LEVEL : 2060 MM.	

LIST OF DRAWINGS

SL. NO.	DRG.NO.	D E S C R I P T I O N
1.	BR/71111/01	GENERAL ARRANGEMENT SHOWING ORIENTATION OF ROOF APPURTENANCES AND SHELL APPURTENANCES.
2.	BR/71111/02	DEVELOPMENT & DETAIL OF BOTTOM PLATE & PLATE CUTTING ARRANGEMENT.
3.	BR/71111/03	DETAIL OF PATCH PLATE ON BOTTOM SHELL COURSE.
4.	BR/71111/04	DETAIL OF MODIFIED AND NEW SHELL NOZZLE.
5.	BR/71111/05	ARRANGEMENT & DETAIL OF DOUBLE DECK FLOATING ROOF. (EXCLUDING UPPER & LOWER DECK PLATES.)
6.	BR/71111/06	DEVELOPMENT & DETAIL OF UPPER DECK PLT. WITH PLATE CUTTING ARRANGEMENT FOR DDFR.
7.	BR/71111/07	DETAIL OF LOWER DECK PLT. WITH PLATE CUTTING ARRANGEMENT FOR LOWER DECK PLT., RIM PLT., RING PLT., COMPT. PLT. & TRUSS PLATE FOR DDFR.
8.	BR/71111/08	ARRGT. AND DETAIL OF SPIRAL STAIRWAY.
9.	BR/71111/09	DETAIL OF SPIRAL STAIRWAY.
10.	BR/71111/10	DETAIL OF SPIRAL STAIRWAY AND GRATING.
11.	BR/71111/11	DETAIL OF FOAM DAM.
12.	BR/71111/12	DETAIL OF ROOF APPURTENANCES.
13.	BR/71111/13	DETAIL OF ROLLING LADDER & TRACK.
14.	BR/71111/14	DETAIL OF ROLLING LADDER.
15.	BR/71111/15	DETAIL OF COMBINED STILL-WELL FOR GAUGE HATCH MKD. DPHA LEVEL TRANSMITTER (RADER TYPE) MKD. LT-1 & TEMPERATURE INSTRUMENT MKD. TI-1.
16.	BR/71111/16	DETAIL OF STILL WELL FOR LEVEL TRANSMITTER (RADER TYPE)MKD. LT-2 LEVEL SWITCH MKD. LSH & TEMPERATURE INSTRUMENT MKD. TI-2.
17.	BR/71111/17	DETAIL OF SEAL ANGLE AND FLOATING ROOF STOPPER.
18.	BR/71111/18	DETAIL OF ROOF DRAIN SUMPS.
19.	BR/71111/19	DETAIL OF EARTH CONNECTIONS.
20.	BR/71111/20	ARRANGEMENT AND DETAIL OF HEATING COIL.
21.	BR/71111/21	DETAIL OF PRIMARY AND SECONDARY SEAL.

NOTES :-

1. ALL DIMENSIONS ARE IN MM EXCEPT OTHERWISE NOTED.
2. ALL BOLT HOLES SHALL STRADDLE PRINCIPLE AXIS OF THE FLANGE.
3. REINFORCEMENT PLATE SHALL BE AS PER API-650.
4. PROJECTION OF NOZZLES SHALL BE MEASURED FROM INTERSECTION OF NOZZLE AXIS & OUTER SURFACE OF SHELL/ROOF.
5. ALL FLANGE GASKET FACE SHALL HAVE SERRATED FINISH WITH CONCENTRIC GROOVES.
6. FLANGE RATING & DRILLING SHALL BE AS PER ANSI B-16.5, CLASS 150# S.O.R.F. UNLESS OTHERWISE SPECIFIED.
7. ROOF PIPE SUPPORTS SHALL BE OF SCH. 80 (MINM.) AND SLEEVE PIPE SHALL BE OF SCH. 40 (MINM.)
8. ALL OPENING CONNECTIONS REQUIRING REINFORCEMENT PLATE IN A SHELL PLATE (IS:2062 GR.B) SHALL BE STRESS RELIEVED AS PER API-650.
9. SURFACE PREPARATION, PRIMER AND PAINTING SHALL BE CARRIED OUT AS PER TENDER SPECIFICATION FOR PAINTING SPEC (a)-M005.
10. FABRICATION/ERECTION, TESTING AND INPECTION SHALL BE AS PER API-650/653 & TENDER SPECIFICATION.
11. SHUNT FIXING BY 3/8" DIA. BOLTS, NUTS AND WASHER SHALL BE OF SS 304 MATERIAL.
12. CLEAN OUT DOOR MATERIAL SHALL BE IS:2062 GR.B AND SHALL BE STRESS RELIEVED AS PER API 650.

BOTTOM REINF. PAD	= 32MM
REINF. PAD	= 32MM
COVER FLANGE (INCLUDING 2MM MACHINING ALLOWANCE)	= 32MM
BOLTING FLANGE (INCLUDING 2MM MACHINING ALLOWANCE)	= 32MM

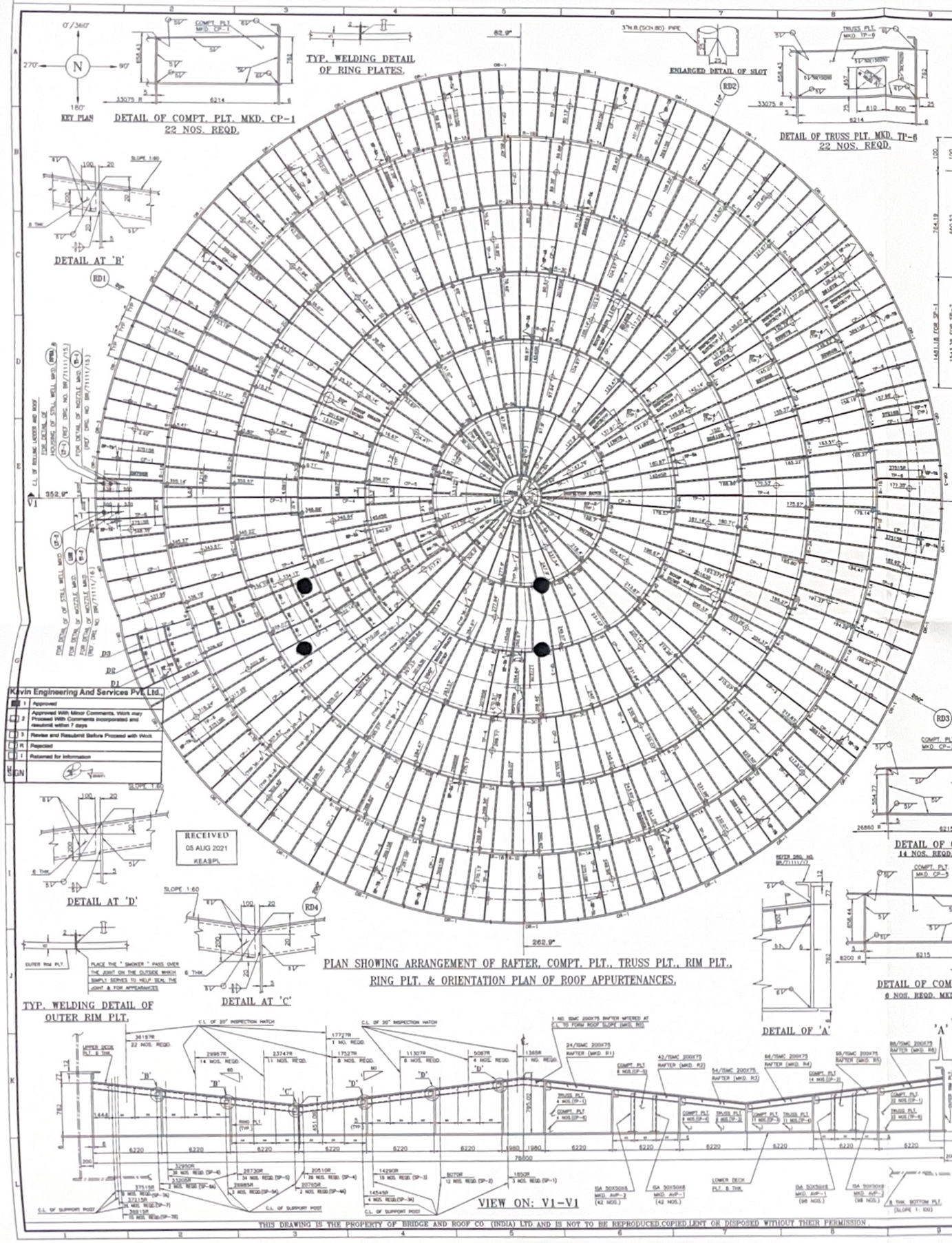
नंदु ना. पाटील
मुख्य अभियंता (उत्पादन)
ओ.एन.जी.सी., उरण संयंत्र, उरण
N. N. PATIL
Chief Engineer (Prodn.)
ONGC, Uran Plant, Uran

REFERENCE DRAWINGS OF B&R	NUMBER	REV.	DESCRIPTION	DRAWN BY	DRAWN ON	CHECKED BY	CHECKED ON	APPROVED BY	APPROVED ON
		0	ISSUED FOR APPROVAL	DKC	13.08.21	MBP	16.08.21	ST	16.08.21

ORIENTATION OF SHELL AND ROOF NOZZLES

THIS DRAWING IS THE PROPERTY OF BRIDGE & ROOF CO.(I) LTD. AND IS NOT TO BE REPRODUCED,COPIED,LENT OR DISPOSED WITHOUT THEIR PERMISSION.

बी एण्ड आर B AND R	BRIDGE AND ROOF CO. (INDIA) LTD. A GOVERNMENT OF INDIA ENTERPRISE. 427/1, GRAND TRUNK ROAD, HOWRAH-711101
PROJECT	CONVERSION OF FLOATING ROOF FROM SINGLE DECK BUOY ROOF TO DOUBLE DECK ROOF AT ONGC URAN.
CLIENT	ONGC, URAN
CONSULTANT	M/S. KAVIN ENGINEERING & SERVICE PRIVATE LTD., COIMBATORE.
TITLE	GENERAL ARRANGEMENT SHOWING ORIENTATION OF ROOF APPURTENANCES AND SHELL APPURTENANCES.
TANK SIZE	79.0 M. I/D. X 14.4 M. HT. DDFR TANKS
TANK NO.	T-202B
SCALE N.T.S.	ORDER NO. 71111 DRAWING NO. BR/71111/01 REV. 0



BILL OF MATERIALS
(FOR ONE TANK)

MKD	NOS. REQD	SIZE IN MM	LENGTH IN METRE	MATERIAL SPECN.	WEIGHT IN M.T.	REMARKS
CP-1	23	PLT. 762 x 5 THK.	6.214	IS:2062 GR.A/B	3.612	
TP-6	22	PLT. 762 x 5 THK.	6.214	-- DO --	3.572	
R-6	88	ISMC 200 X 75	6.198	IS:2062 GR.A/B	13.163	
	88	PLT. 120 x 6 THK.	0.200	IS:2062 E250 GR.BR	0.269	
CP-2	14	PLT. 658 x 5 THK.	6.215	-- DO --	3.071	
P-6	88	ISMC 200 X 75	6.198	IS:2062 GR.A/B	13.347	
	88	PLT. 120 x 6 THK.	0.200	IS:2062 E250 GR.BR	0.111	
CP-3	11	PLT. 555 x 5 THK.	6.215	-- DO --	1.349	
TP-4	11	PLT. 555 x 5 THK.	6.215	-- DO --	1.224	(PART-4&5)
R-4	66	ISMC 200 X 75	6.198	IS:2062 GR.A/B	9.129	
	66	PLT. 120 x 6 THK.	0.200	IS:2062 E250 GR.BR	0.072	
CP-4	8	PLT. 555 x 5 THK.	6.215	-- DO --	1.104	
TP-3	9	PLT. 555 x 5 THK.	6.215	-- DO --	1.002	(PART-4&5)
R-5	54	ISMC 200 X 75	6.198	IS:2062 GR.A/B	7.465	
	54	PLT. 120 x 6 THK.	0.200	IS:2062 E250 GR.BR	0.041	
CP-5	6	PLT. 658 x 5 THK.	6.215	-- DO --	0.886	
R-2	42	ISMC 200 X 75	6.198	IS:2062 GR.A/B	5.806	
	42	PLT. 120 X 6 THK.	0.200	IS:2062 E250 GR.BR	0.047	
CP-6	4	PLT. 762 x 5 THK.	6.215	-- DO --	0.593	
CP-7	2	PLT. 762 x 5 THK.	6.215	-- DO --	0.648	
R-1	34	ISMC 200 X 75	6.198	IS:2062 GR.A/B	3.518	
	34	PLT. 120 X 6 THK.	0.200	IS:2062 E250 GR.BR	0.027	
R-0	1	ISMC 200 X 75	3.957	IS:2062 GR.A/B	0.068	
OR-1	29	PLT. 827 x 6 THK.	7.997	IS:2062 E250 GR.BR	8.533	
OR-2	1	PLT. 827 x 6 THK.	8.842	-- DO --	0.270	
OR-3	2	PLT. 827 x 6 THK.	3.662	-- DO --	0.311	
R-1A	17	PLT. 658 x 5 THK.	7.997	IS:2062 E250 GR.BR	3.511	
R-1B	13	PLT. 658 x 5 THK.	3.347	-- DO --	1.191	
R-1C	1	PLT. 658 x 5 THK.	2.631	-- DO --	0.069	
R-1D	13	PLT. 658 x 5 THK.	1.772	-- DO --	0.595	
R-3A	16	PLT. 555 x 5 THK.	7.997	IS:2062 E250 GR.BR	2.787	
R-3B	1	PLT. 555 x 5 THK.	5.288	-- DO --	0.114	
R-3C	3	PLT. 555 x 5 THK.	3.347	-- DO --	0.232	
R-3D	14	PLT. 555 x 5 THK.	1.772	-- DO --	0.840	
R-3A	10	PLT. 451 x 5 THK.	7.997	IS:2062 E250 GR.BR	1.418	
R-3B	1	PLT. 451 x 5 THK.	5.740	-- DO --	0.102	
R-3C	9	PLT. 451 x 5 THK.	4.436	-- DO --	0.707	
R-3D	1	PLT. 451 x 5 THK.	2.982	-- DO --	0.071	
R-4A	6	PLT. 555 x 5 THK.	7.997	IS:2062 E250 GR.BR	1.045	
R-4B	1	PLT. 555 x 5 THK.	7.104	-- DO --	0.155	
R-4C	5	PLT. 555 x 5 THK.	3.347	-- DO --	0.366	
R-4D	10	PLT. 555 x 5 THK.	1.772	-- DO --	0.386	
R-5A	3	PLT. 658 x 5 THK.	7.997	IS:2062 E250 GR.BR	0.620	
R-5B	3	PLT. 658 x 5 THK.	3.992	-- DO --	0.306	
R-5C	1	PLT. 658 x 5 THK.	3.110	-- DO --	0.080	
R-5D	7	PLT. 658 x 5 THK.	1.772	-- DO --	0.320	
R-6A	2	PLT. 762 x 5 THK.	6.217	IS:2062 GR.BR	0.373	
AM-1	132	ISMC 75 x 40	1.800(MAT.)	IS:2062 GR.A/B	1.696	
AM-1A	132	ISMC 75 x 40	1.687(MAT.)	IS:2062 GR.A/B	1.590	
AM-2	112	ISMC 75 x 40	1.739(MAT.)	IS:2062 GR.A/B	1.390	
AM-2A	112	ISMC 75 x 40	1.622(MAT.)	IS:2062 GR.A/B	1.297	
AM-3	88	ISMC 75 x 40	1.768(MAT.)	IS:2062 GR.A/B	1.111	
AM-3A	88	ISMC 75 x 40	1.621(MAT.)	IS:2062 GR.A/B	1.072	
AM-4	72	ISMC 75 x 40	1.819(MAT.)	IS:2062 GR.A/B	0.932	
AM-4A	72	ISMC 75 x 40	1.438(MAT.)	IS:2062 GR.A/B	0.738	
AM-5	48	ISMC 75 x 40	1.819(MAT.)	IS:2062 GR.A/B	0.553	
AM-5A	48	ISMC 75 x 40	1.343(MAT.)	IS:2062 GR.A/B	0.460	
AM-6	32	ISMC 75 x 40	1.355(MAT.)	IS:2062 GR.A/B	0.274	
AM-6A	32	ISMC 75 x 40	0.784(MAT.)	IS:2062 GR.A/B	0.181	
AP-1	140	ISA 50 X 50 X 6	0.596(MAT.)	IS:2062 GR.A/B	0.703	
	140	PLT. 100 x 6 THK.	0.100	IS:2062 E250 GR.BR	0.066	
AVP-2	140	ISA 50 X 50 X 6	0.596(MAT.)	IS:2062 GR.A/B	0.374	
	140	PLT. 100 x 6 THK.	0.100	IS:2062 E250 GR.BR	0.066	
	1812	1/2 DIA. ROUND	0.330	IS:2062 GR.A/B	0.098	
	1812	PLT. 120 DIA. X 6 THK.	--	IS:2062 E250 GR.BR	0.122	
	3612	PLT.BR (I/2)1111.2 (J/2)1111 THK.	--	IS:2062 E250 GR.BR	1.788	
	3612	PLT. BAR 2 1/2 THK.	0.305	IS:2062 E250 GR.BR	0.745	
	1181	PLT. 400 X 16 THK.	0.425	IS:2062 E250 GR.BR	0.863	
	1812	1/2 DIA. PIN	0.170	IS:2062 GR.A/B	0.169	
	3612	6 DIA. COTTER PIN	0.075	IS: 549	0.007	
SP-1	3	3" NB. (SCH.80) PIPE	3.631	SA-106 GR.B	0.121	
	3	4" NB. (SCH.40) PIPE	1.084	--DO--	0.053	
SP-2	12	3" NB. (SCH.80) PIPE	2.340	--DO--	0.478	
	12	4" NB. (SCH.40) PIPE	0.863	--DO--	0.191	
SP-3	16	3" NB. (SCH.80) PIPE	2.340	--DO--	0.623	
	16	4" NB. (SCH.40) PIPE	0.889	--DO--	0.236	
SP-3A	4	3" NB. (SCH.80) PIPE	2.347	--DO--	0.156	
	4	4" NB. (SCH.40) PIPE	0.888	--DO--	0.057	
SP-4	26	3" NB. (SCH.80) PIPE	2.407	--DO--	1.039	
	26	4" NB. (SCH.40) PIPE	0.885	--DO--	0.370	
SP-4A	2	3" NB. (SCH.80) PIPE	2.510	--DO--	0.080	
	2	4" NB. (SCH.40) PIPE	0.885	--DO--	0.028	
SP-5	34	3" NB. (SCH.80) PIPE	3.669	--DO--	1.388	
	34	4" NB. (SCH.40) PIPE	0.885	--DO--	0.484	
SP-5A	2	3" NB. (SCH.80) PIPE	3.675	--DO--	0.082	
	2	4" NB. (SCH.40) PIPE	0.888	--DO--	0.028	
SP-6	36	3" NB. (SCH.80) PIPE	3.834	--DO--	1.558	
	36	4" NB. (SCH.40) PIPE	0.888	--DO--	0.572	
SP-6A	2	3" NB. (SCH.80) PIPE	3.847	--DO--	0.087	
	2	4" NB. (SCH.40) PIPE	0.893	--DO--	0.032	
SP-7	28	3" NB. (SCH.80) PIPE	2.948	--DO--	1.170	
	28	4" NB. (SCH.40) PIPE	1.099	--DO--	0.443	
SP-7A	8	3" NB. (SCH.80) PIPE	3.959	--DO--	0.362	
	8	4" NB. (SCH.40) PIPE	1.094	--DO--	0.138	
SP-7B	10	3" NB. (SCH.80) PIPE	3.959	--DO--	0.452	
	10	4" NB. (SCH.40) PIPE	1.094	--DO--	0.170	

TOTAL WEIGHT = 122.088 M.T.

NOTES :-
1. ALL DIMENSIONS ARE IN MM. EXCEPT OTHERWISE NOTED.
2. ALL WELDS ARE 5MM. CONTINUOUS FILLET WELD EXCEPT NOTED.
3. FLOATING ROOF HAVE BEEN DESIGNED AS PER API--650, APPENDIX 'C'.
4. BRAND NAME OF ELECTRODE TO BE USED AT SITE AS SHOWN BELOW.

GRADE OF MATERIAL	CLASS OF ELECTRODE	BRAND SUGGESTED
IS:2062 E250 GR.BR	E-6013	CLIENT'S APPROVED ELECTRODE TO BE USED.

5. THIS DRG. SHALL BE READ IN CONJUNCTION WITH BAR DRG. NO. BR/71111/06&07.
6. TESTING SHOULD BE AS PER API--650 APPENDIX 'C' & TENDER DOCUMENT.
7. FOR PLATE CUTTING ARRANGEMENT OF RIM PLT. , RING PLT. , COMPT. PLT. AND TRUSS PLT. REF. B & R DRG. NO. BR/71111/07.
8. PAINTING SHALL BE AS PER TENDER DOCUMENTS ANNEXURE '2' SECTION 3.3.17(a) & 3.3.17(b).
9. ORIENTATION OF ROOF NOZZLES REF. G. A. DRG. NO. BR/71111/01.

	BRIDGE AND ROOF CO. (INDIA) LTD. A GOVERNMENT OF INDIA ENTERPRISE. 627/1, GRAND TRUNK ROAD, HOWRAH-711101
PROJECT	CONVERSION OF FLOATING ROOF FROM SINGLE DECK BUOY ROOF TO DOUBLE DECK ROOF AT ONGC URAN.
CLIENT	ONGC, URAN
CONSULTANT	M/S. KAVIN ENGINEERING & SERVICE PRIVATE LTD., COIMBATORE.
TITLE	ARRANGEMENT & DETAIL OF DOUBLE DECK (EXCLUDING UPPER & LOWER DECK PLT.) FLOATING ROOF.
TANK SIZE	79.0 M. I/D. X 14.4 M. HT. DDFR TANKS
TANK NO.	T-2028
SCALE N.T.S.	ORDER NO. 71048 DRAWING NO. BR/71111/05 REV 0

REFERENCE DRAWINGS OF BAR	NUMBER	REV	DESCRIPTION	DR BY	CH BY	APPROVED
ROLLING LADDER	BR/71111/13&14					
SPIRAL STAIR CASE	BR/71111/08,09&10					
UPPER DECK PLT.	BR/71111/06	0				
LOWER DECK PLT.	BR/71111/07					
GENERAL ARRANGEMENT	BR/71111/01					

BAND R

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