



Pre bid Queries & Clarifications

Name of the “MECHANICAL EQUIPMENT ERECTION AND PIPING WORKS etc.” FOR IOCL PARADIP-STANDBY SRU (525TPD) TRAIN PROJECT”

Tender Ref. No.:T0AUX00060

Customer : Indian Oil Corporation Limited

Query raised by the bidder: M/s.Chatterjee Engineering

Date	Sl.No.	Reference clause of Tender Document	Existing provision	Bidder's query	BHEL's clarification
7/10/2021	1			Jacketed Piping quantity (IND & INM for core & jacket seperately)	The jacketed piping shall be coming in the fabricated condition .Contractor need to erect the same similar to a flanged spool . However the complete steam & condensate connection Shall be site routed. The details of the Complete Jacketed BOQ is attached in file PBQ BOQ to vendor.
	2			Requirement of internal epoxy coating (Size & Quantity)	The internal epoxy to be done by the erection agency .Detailed spec is not available. However the details of the glass flake coating are as per the addendum # 04 Point 17.The BOQ is already indicated in the PBQ BOQ file (refer the epoxy coated/ int epoxy coated BOQ in the description).
	3			Project Bill og materials (BOM) for pipe, fittings, flanges, valves, etc. (Excel copy required)	Attached.
	4			Form of Spools(Already welded spools will be issued or edge prepared loose materials?)	These details are already part of the erection input . Refer to the important points in the document PY-AE-4-M170-2001-01_PIPING Erection Inputs R00.

	PE&SD, BHEL.R.C. Puram, Hyderabad	Dt: 12.10.2021
PE&SD	Tender ref no.: TOAUX00060_NIT-60557 in (www.bhel.com), dated: 22.09.2021 Tender id in https://eprocurebhel.co.in : 2021_BHEL_5396_1	Rev 00 Page 1 of 1

Corrigendum 03

Name of the Work: MECHANICAL EQUIPMENT ERECTION AND PIPING WORKS etc FOR IOCL PARADIP STANDBY SRU 525TPD TRAIN PROJECT.

With reference to above tender, following corrigendum –3 is released.

Sl. No.	Document No./Title/Reference	As Published	Should be read as/Amended to
1.	NIT- SI.No.1(V) DUE DATE & TIME OF OFFER SUBMISSION	<i>Date: 12/10/2021, Time :16:00Hrs</i>	<i>Date: 19/10/2021, Time :16:00Hrs</i>
2.	NIT- SI.No.1(VI) OPENING OF TENDER	<i>Date: 13/10/2021, Time :15:00Hrs</i>	<i>Date: 20/10/2021, Time :15:00Hrs</i>
3.	Pre bid reply	NA	<i>BHEL reply to Pre bid query are also attached to all the bidder for information.</i>

Note:

1. All other terms & conditions of the tender will remain unchanged.
2. Bidders are requested to submit a copy of this corrigendum (as part of technical bid) duly signed by the authorized signatory & stamped with official seal as a token of Bidder's unqualified acceptance to this corrigendum.

Sd/-

Imran Javed
 PE & SD, BHEL, R.C. PURAM
 HYDERABAD- 502 032
 Ph. 040-23185003/4915,
 E-mail: imran@bhel.in

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	BIDDING DOCUMENT NO: 080557C/T/SRU/LSTK-1	
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The terms, conditions and specifications of Bidding Document stand modified to the extent indicated under column “**Amendment**”. All other terms & conditions, stipulations, specifications etc. of Bidding Document issued earlier shall remain unaltered.

Bidder is advised to visit the IOCL e-Tendering portal <https://iocletenders.gov.in> regularly for further updates. Bidder to ensure that bid shall be submitted as stated above and uploaded in e-tendering portal.

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B	<u>TECHNICAL PROCESS</u>				
1.	PART_III-TECHNICAL	-	-	-	<u>The following drawings / documents are attached with Addendum and replace the earlier revisions as follows,</u> <u>Rev B is replaced with Rev C</u> 1) Process datasheet for Incinerator package (Doc. No. 080557C-090-PDS-0100-001, Rev C) <u>Rev A is replaced with Rev B</u> 2) Utility Summary for SRU / TGTU Incinerator (Doc no. 080557C-088-NM-0003-001_B)
2.	PART_III-TECHNICAL	-	-	Circulating cooling water quality for	The file “SRU Circulating water quality.pdf” attached to Addendum provides the circulating cooling water quality for new

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				standby SRU / TGTU Incinerator	Standby SRU and TGTU Incinerator.
3.	Part III/Section 2 PIDs PDRP4220-8110-25-090-0022_Rev_AX			P&IDs	Following P&ID in tender shall be replaced with the P&ID attached to Addendum, - PDRP4220-8110-25-090-0022_Rev_AX
4.	Part-III-Section-2 SRU Equipment List (Doc no. 080557C-088-EL-001_C)	Page 11/11	-	Incinerator package HP Steam Desuperheater, 090-DS-002	Material of Construction of Incinerator HP steam desuperheater shall be read as 9Cr 1.0Mo-V, with 3 mm Corrosion allowance instead of 1.25Cr-0.5Mo, with 3 mm corrosion allowance.
5.	Part III-Section 2 Process Package	-	-	088-C-001, Degassing Contactor	Design details for demister on 088-C-001, Degassing Contactor shall be developed by Contractor based on information provided in Standard drawing PDRP-8430-SP-0033 in 080557C-088-STC-0490-001

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6.	PART-III Technical/Section 2 Process package			New 48" tail gas Line from existing Amine Absorber 089-C-002 to new Incinerator	48" Tail gas Line from existing Amine Absorber 089-C-002 to new Incinerator shall be routed with "No pockets"
7.	PART-III Technical Process Engineering in Contractor's scope for Sulphur recovery unit (Doc no. 080557C-SOW-LSTK1-001_B)	Page 19/52	New Clause 3.12.10	Heat exchangers	The Following new Clause 3.12.10 shall be included in the Process Engineering scope of work document, " For Fixed tube sheet heat exchangers, fixed tube sheet mechanical design conditions shall be arrived upon by Contractor, by considering all possible start-up, shutdown and upset scenarios for each heat exchanger. The guidelines provided in 080557C-JSD-0400-0001 are indicative; the responsibility of designing the fixed tube heat exchanger suitably to meet the start-up, shut down and upset scenarios shall lie with Contractor."
8.	PART_III-TECHNICAL Process package - PIDs	-	-	OWS P&IDs for Unit 088 & 090	The following Piping and Instrumentation drawings for Oily water sewer underground details in Unit 088 and Unit 090 are attached

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					with Addendum, 1.) Unit 088 – OWS PID - 080557C-088-PID-0021-9900-Rev A 2.) Unit 090 – OWS PID - 080557C-090-PID-0021-9900-Rev A
9.	PART_III-TECHNICAL Section 2 – Instrument Process datasheet (Doc No. 080557C-088-PDS-1500-001_A)	Page 35/507	-	Maximum flowrate of 088-TV-0202	Maximum flowrate of 088-TV-0202 shall be read as 10.2 m3/hr instead of 5.82 m3/hr. Contractor shall verify and confirm the pressure drop and hydraulic calculations during detailed engineering. Control valve service name shall be “088-E-009 BFW INLET”.
	<u>CIVIL</u>				
10.	Part III / section 3.2 080557C-088-JSD-1700-001	15 of 136	2.1.4	Binding Wire	“18-gauge black soft annealed SWG wire shall be used for binding of reinforcement bars.” The above paragraph shall be replaces as “16-gauge black soft annealed SWG wire

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					shall be used for binding of reinforcement bars.”
11.	Part III / section 4.4 080557C-SOW-LSTK1-003			Contractor's Scope of Work & Supply for standby SRU Civil, Structural & UG works	Refer Addendum for revised scope of work and supply document <u>080557C-SOW-LSTK1-003</u>
12.	Existing Drawing				The following available existing Drawings are attached in Addendum 1. UG Cable trench drawing. 2. UG paving, U/G service schematic drawing. 3. Civil drawings of TGTU pipe rack.(Piling, foundation and Steel drawing) Civil drawings of Interconnecting Pipe rack. .(Piling, foundation and Steel drawing)

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	<u>PIPING</u>				
13.	Part III/Sec.5.3 080557C-000-JSD-1300-002_D Job Specification for Design - Piping Material Specification	25 of 255	Appendix – A	Changes in Piping Specification	Refer <u>Attached Markup</u> (with cloud markups) on the applicable pages of <u>Appendix – A</u> for the changes in piping specifications.
14.	Part III/Sec.5.3 080557C-000-JSD-1300-002_D Job Specification for Design - Piping Material Specification	21 of 192 (Appendix-B)	Spec: A15A (A2AF)	Specification for Plug Valves	For the Piping Material Specification A15A (A2AF), following option for Jacketed plug valve is additionally added. <i>For Size Range: 2" to 12"</i> Fully jacketed Non-Lubricated Regular Pattern PTFE Sleeved Plug valve, 150 rating, Raised face, flanged to ASME B 16.5, Body/Bonnet, material: A216 Gr WCB, Plug : 13% Cr, Seat: RPTFE (suitable for service conditions), Stem packing: Low emission Graphite stem packing, Bolt material: A193 Grade B7 / A194 Grade 2H, Service: Liquid Sulphur and Steam Jacketed, Lever or Gear operated

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					<i>according to JSS for Valves</i>
15.	Part III/Sec.6.3 080557C-088-DW-0052-001 Piping Tie-in Drawing	All	--	Revision of Drawing	Rev. C of document <u>080557C-088-DW-0052-001</u> is attached with this Addendum-04
16.	Part III/Sec.5.3 080557C-000-JSS-1300-001 Job Supply Specification for 3 Layer Polyethylene Coating	All	--	Revision of Document	Rev. B of document <u>080557C-000-JSS-1300-001</u> is attached with this Addendum-04

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17.	Part III/Sec.5.3 080557C-000-JSS-1300-002_A Job Supply Specification for Internal Coating	All	5 & related	Material for Internal Coating – Alternate to “Heat Cured Phenol Formaldehyde” (Baked Phenolic)	Following Material specification can be used as alternate to the material specified in Clause 5 - <i>Ambient temperature curable solvent free glass flake reinforced, solvent free, two pack thermosetting liquid epoxy cured with polyamine adduct hardener.</i> - <i>Service: Continuous immersion service to firewater with TDS of 2300 ppm and chlorides of 1200 ppm.</i> - <i>Total Dry film thickness coat of maximum 1000 microns with minimum of 250 microns DFT per coat.</i> - <i>Operating range of firewater system: 25degc to 60 degc</i> - <i>Relevant ASTM methods to be followed for testing of physical and</i>

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					<i>chemical resistant properties of coating materials.</i> - <i>SSPC surface preparation standards for blast cleaning: SSPC-SP10 or NACE No.2.</i> - <i>Pipe sections cut back length: 50mm on both ends, cut back area to be applied with one coat of welding grade Zinc Silicate Primer(two pack) at 20 microns DFT/Coat at shop.</i> <i>-After completion of welding at site, internal coating on field joints and repair work to be done by Robot crawler method with minimum DFT:1000 microns of Glass flaked epoxy and maximum DFT:1200 microns of glass flaked epoxy.</i> Successful bidder to get written approval from OWNER/PMC for the revised specification using the above alternate material before implementation.

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18.	Part I/Sec.11.2 Document Requirement and Review Procedure	13 of 17	8.1	Software for Surge analysis	Proposed software for detail engineering to be utilized by Contractor: Following additional item is added: Surge Analysis - Transient module of PIPENET Vision software
	<u>INSTRUMENTATION</u>				
19.	Part III/Sec.3.5 080557C-088-JSD-1540-002_C Design Basis - Instrumentation	7 of 83	5	Reference Project Standard	Document “Job Specification of Cable Trays and Ducts - 080557C-000-JSS-1591-001” is removed from the reference list.
20.	Part III/Sec.3.5 080557C-088-JSD-1540-002_C	19 of 83	7.8	Accuracy of Differential pressure & Pressure transmitter –	<u>Accuracy of Differential Pressure & Pressure transmitter is modified and the same shall be read as give below:</u> i) For transmitter ranges of 760 mm WC

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	Design Basis - Instrumentation			SMART (HART/ FF)	and above, the accuracy shall be equal to or better than 0.075% within a turndown of 1:10 of the offered span. ii) For transmitters with ranges less than 760 mm WC the accuracy shall be equal to or better than 0.15% within a turndown of 1:10 of the offered span.
21.	Part III/Sec. 4.7 080557C-SOW-LSTK1-005_B Instrumentation Scope of Supply & Works				Document No. 080557C-SOW-LSTK1-005 is revised and revision C of the document attached with Addendum-04.
22.	Part III/Sec.5.5 080557C-000-JSS-1541-001_B Job Specification for Control Valves	20 of 29	9.12.1.5	Positioner Enclosure	<u>Clause 9.12.1.5 is modified and the same shall be read as give below:</u> “All positioners shall have epoxy coated Aluminium enclosure suitable for hazardous area classification specified in the data sheet.”

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23.	Part III/Sec.5.5 080557C-000-JSS-1531-001_A Job Specification for CCTV System	12 of 21	3.1	Existing CCTV camera details	Following Para is deleted from clause 3.1 “This design includes 136 PTZ Cameras on the Paradip Refinery Complex; a small addition may be required at the Marketing Terminal Loading Area and at the Jetty. The number of Cameras is preliminary quantity and may change as a part of detailed design.”
24.	Part III/Sec.5.5 080557C-000-JSS-1511-001_D Distributed Control System Specification				Document No. <u>080557C-000-JSS-1511-001</u> is revised and revision E of the document is attached with Addendum-04.
25.	Part III/Sec.5.5 080557C-000-JSS-1511-002_C Emergency Shutdown System Specification				Document No. <u>080557C-000-JSS-1511-002</u> is revised and revision D of the document is attached with Addendum-04.

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26.	Part III/Sec.5.5 080557C-000-JSS-1511-004_C Job Specification for Fire Detection System				Document No. 080557C-000-JSS-1511-004 is revised and revision D of the document is attached with Addendum-04.
27.	Part III/Sec.9.2 080557C-000-JSS-1590-001_D Instrument Installation Specification	17 of 31	11.7	Cable Duct material & support interval	<u>3rd Para under clause 11.7 is modified and the same shall be read as give below:</u> “Overhead ducts/trunking shall be used for routing of multicore cables within Process Units. The duct/trunking shall be constructed from G.I. sheets and Epoxy painted. For all cable ducts routed through pipe racks, walk-way along with access should be provided for cable laying, pulling and maintenance activities.it shall be suitably supported to ensure when duct/trunking is fully loaded there is no sagging or distortion. Cable duct/trunking shall be supported every 2 meters interval. The duct/trunking shall be designed such that it is filled to a maximum of 65% of its overall capacity at the completion of detailed design. The

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					duct/trunking shall be fabricated in accordance with detailed design and fabrication drawings. The duct/trunking shall have removable covers to allow for new cables to be installed and pulled.”
28.	Part III/Sec.7.4 080557C-000-STC-1590-001_A Instrument Installation Standards	39 of 149	Note-5	Cable Tray support intervals	<u>General Note No. 5 is modified and the same shall be read as given below</u> 5. “Cable Trays shall be suitable for a cable weight of 75 Kg per meter of Running Length of Tray and shall be supported at every 2 meter intervals. In addition, Trays shall be suitable for a point load of 75 Kg (Equivalent weight of a Man working on the Cable Tray).”
29.	Part I/Sec. 11.5 080557C-088-NM-1500-001_A Technical Compliance Checklist – Instrumentation				Document No. 080557C-088-NM-1500-001 is revised and revision B of the document is attached with Addendum-04.

	LSTK-1 PACKAGE: PROJECT MANAGEMENT, RESIDUAL PROCESS DESIGN, DETAILED ENGINEERING (INCLUDING HAZOP STUDY), PROCUREMENT, FABRICATION, INSPECTION, TRANSPORTATION, STORAGE, ASSEMBLY, ERECTION, INSTALLATION, CONSTRUCTION, TESTING, STATUTORY APPROVALS, MECHANICAL COMPLETION, PRECOMMISSIONING, COMMISSIONING, PERFORMANCE GUARANTEE TEST RUN (PGTR) OF STANDBY SULPHUR RECOVERY UNIT (SRU) ALONG WITH INCINERATOR, WASTE HEAT EXCHANGER, STACK AND INTERCONNECTING WORKS FOR IOCL PARADIP REFINERY, ODISHA, INDIA	
	BIDDING DOCUMENT NO: 080557C/T/SRU/LSTK-1	
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SR. NO	CHAPTER NO.	PAGE NO.	REFERENCE CLAUSE NO.	SUBJECT	AMENDMENT
30.	Part I / Sec. 11.2 080557C-088-NM-1500-002_A Document Requirement and Review Procedure for Standby SRU - Instrumentation				Document No. <u>080557C-088-NM-1500-002</u> is revised and revision B of the document is attached with Addendum-04.
31.	Part III / Sec. 6.5 080557C-088-DW-1512-001_D System Architecture Diagram				Document No. <u>080557C-088-DW-1512-001</u> is revised and revision E of the document is attached with Addendum-04.
	<u>ELECTRICAL</u>				
32.	PART_III-TECHNICAL	-	-	-	<u>The following dwg. / doc are attached with Addendum</u> <u>Rev B is replaced with Rev C</u> 3) Job Specification for Electrical Power & Control Cables (Doc. No. <u>080557C-000-JSS-1621-001, Rev C</u>) <u>Rev A is replaced with Rev B</u> 4) Data Sheet for HV cables (Doc. No. <u>080557C-000-SP-1621-001, Rev B</u>)

	LSTK-1 PACKAGE: PROJECT MANAGEMENT, RESIDUAL PROCESS DESIGN, DETAILED ENGINEERING (INCLUDING HAZOP STUDY), PROCUREMENT, FABRICATION, INSPECTION, TRANSPORTATION, STORAGE, ASSEMBLY, ERECTION, INSTALLATION, CONSTRUCTION, TESTING, STATUTORY APPROVALS, MECHANICAL COMPLETION, PRECOMMISSIONING, COMMISSIONING, PERFORMANCE GUARANTEE TEST RUN (PGTR) OF STANDBY SULPHUR RECOVERY UNIT (SRU) ALONG WITH INCINERATOR, WASTE HEAT EXCHANGER, STACK AND INTERCONNECTING WORKS FOR IOCL PARADIP REFINERY, ODISHA, INDIA	
	BIDDING DOCUMENT NO: 080557C/T/SRU/LSTK-1	
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SR. NO	CHAPTER NO.	PAGE NO.	REFERENCE CLAUSE NO.	SUBJECT	AMENDMENT
					5) Data Sheet for MV cables (Doc. No. <u>080557C-000-SP-1621-002, Rev B</u>) Inspection Test Plan for Electrical Power & Control Cables (Doc. No. <u>080557C-000-ITP-1621-001, Rev B</u>)
33.	PART_III-TECHNICAL 080557C-088-DW-1652-001	-	-	-	The Notes referred in the drawing as 11 & 12 shall be read as 6 & 7 respectively.
34.	Part-III-Section-6-Engineering Drawings / 6.4 - Electrical CONCEPTUAL ELECTRICAL MAIN CABLE ROUTING GUIDE DRAWING [SRU - 3, WHB & INCINERATOR OF TGTU - 2] (UNIT -088 & 090) Doc No : 080557C-088-DW-1622-002_A		Note - 4		<u>Note No. 4 is modified and the same shall be read as given below</u> Cables shall run through duct banks at road crossings and RCC Pull Pits of suitable sizes shall be provided on either sides of the ERC to ensure smooth pulling of cables and laying of the same in the cable trench.

	LSTK-1 PACKAGE: PROJECT MANAGEMENT, RESIDUAL PROCESS DESIGN, DETAILED ENGINEERING (INCLUDING HAZOP STUDY), PROCUREMENT, FABRICATION, INSPECTION, TRANSPORTATION, STORAGE, ASSEMBLY, ERECTION, INSTALLATION, CONSTRUCTION, TESTING, STATUTORY APPROVALS, MECHANICAL COMPLETION, PRECOMMISSIONING, COMMISSIONING, PERFORMANCE GUARANTEE TEST RUN (PGTR) OF STANDBY SULPHUR RECOVERY UNIT (SRU) ALONG WITH INCINERATOR, WASTE HEAT EXCHANGER, STACK AND INTERCONNECTING WORKS FOR IOCL PARADIP REFINERY, ODISHA, INDIA	
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SR. NO	CHAPTER NO.	PAGE NO.	REFERENCE CLAUSE NO.	SUBJECT	AMENDMENT
35.	Existing Drawings			Existing Drawings for HVAC System.	<u>The following Existing Drawings for HVAC system are attached as Addendum-04.</u> ➤ CODE-4-REV-3 ➤ Data Sheet ➤ Electrical Load List ➤ P & I Diagram of Chilled Water Line - Bldg 811 ➤ Screw Chiller Bldg 811 ➤ IOCL AC DUCT 14(331 S) R-03 ➤ IOCL VENT DUCT (331S) SHT 1 OF 2 ➤ IOCL VENT DUCT (331S) SHT 2 OF 2 REV-1 ➤ VENTILATION_FIRST FLR ➤ VENTILATION_GROUND FLR

	LSTK-1 PACKAGE: PROJECT MANAGEMENT, RESIDUAL PROCESS DESIGN, DETAILED ENGINEERING (INCLUDING HAZOP STUDY), PROCUREMENT, FABRICATION, INSPECTION, TRANSPORTATION, STORAGE, ASSEMBLY, ERECTION, INSTALLATION, CONSTRUCTION, TESTING, STATUTORY APPROVALS, MECHANICAL COMPLETION, PRECOMMISSIONING, COMMISSIONING, PERFORMANCE GUARANTEE TEST RUN (PGTR) OF STANDBY SULPHUR RECOVERY UNIT (SRU) ALONG WITH INCINERATOR, WASTE HEAT EXCHANGER, STACK AND INTERCONNECTING WORKS FOR IOCL PARADIP REFINERY, ODISHA, INDIA	
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	<u>MECHANICAL</u>				
36.	PART_III-TECHNICAL	-	-	-	<u>The following drawings / documents are attached with Addendum and replace the earlier revisions as follows.</u> <u>Rev E is replaced with Rev F</u> Mechanical Data Sheet for Incinerator Package (Doc. No. <u>080557C-090-SP-0100-001, Rev F</u>).
37.	PART_I-TECHNO-COMMERICAL, Section 11, 11.2,	-	-	DOCUMENT REQUIREMENTS AND REVIEW PROCEDURE	080557C-088-NM-0400-003, 080557C-088-NM-0110-003 updated to Rev-B to indicate Licensor document submission requirements for LSTK Contractor.
	<u>MACHINERY</u>				
38.	Part-3 Doc No. 080557C-000-JSS-0910-001_B	8 of 24	7.1.22	Maximum Allowable Working Pressure (MAWP) of Pump Casing	First sentence of Clause 7.1.22 shall be read as follows: The pressure casing shall be designed to at least 42.2 kg/cm² g at 38 °C and have a corrosion allowance of 3 mm.

 IndianOil	LSTK-1 PACKAGE: PROJECT MANAGEMENT, RESIDUAL PROCESS DESIGN, DETAILED ENGINEERING (INCLUDING HAZOP STUDY), PROCUREMENT, FABRICATION, INSPECTION, TRANSPORTATION, STORAGE, ASSEMBLY, ERECTION, INSTALLATION, CONSTRUCTION, TESTING, STATUTORY APPROVALS, MECHANICAL COMPLETION, PRECOMMISSIONING, COMMISSIONING, PERFORMANCE GUARANTEE TEST RUN (PGTR) OF STANDBY SULPHUR RECOVERY UNIT (SRU) ALONG WITH INCINERATOR, WASTE HEAT EXCHANGER, STACK AND INTERCONNECTING WORKS FOR IOCL PARADIP REFINERY, ODISHA, INDIA	
	BIDDING DOCUMENT NO: 080557C/T/SRU/LSTK-1	
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SR. NO	CHAPTER NO.	PAGE NO.	REFERENCE CLAUSE NO.	SUBJECT	AMENDMENT
	<u>HSE</u>				
39.	Part_I_and_II_Technocommercial	498 of 1155	5.6	Rest Shelters cum Lunch Room	Clause 5.6 shall be read as “CONTRACTOR shall provide Adequate rest shelter cum lunch room for the workers. The rest shelter shall be well illuminated and ventilated by providing sufficient lights, fans & windows. The rest shelters shall have sufficient numbers of tables and chairs and drinking water facility etc.”



Ref: CCPL/RSK/0132/2122

Date: 20 August 2021

Mr. V. Uday Kumar
Manager
ENGINEERING/PE & SD
BHEL/R.C PURAM, HYDERABAD
Mobile: +91 9297456928
udaykumarv@bhel.in

THIS OFFER IS ONLY FOR PIPE & FITTING
INTERNAL COATING WITH EPOXY GLASS
FLAKE LINING

3LPE Lining Rates **NOT** included in this

Dear Sir,

Sub: Offer for Internal Glass Flake Epoxy Coating on Piping Spools for IOCL – Paradeep SRU Project,

Ref: Your enquiry dated 18.8.21

We thank you for your valued enquiry. Clean Coat has a good track record for **Manufacture, Supply, Apply, Guarantee of Glass Flake Lining in pipe internal & External.**

We are enclosing the following our offer herewith: Techno Commercial Offer

We assure you of our best services at all times. We look forward to work with you in this project.

Thanks & Regards

For Clean Coats Private Limited

R.Suresh Kumar
General Manager- Business Development
Clean Coats Limited – Mumbai
Mobile: 8657503263 /Email: suresh@cleancoats.com

CLEAN COATS PVT. LTD.

OFFICE : G Wing, Unit No. 437, 4th Floor, Kanakia Zillion, LBS Marg,
Kurla (West), Mumbai- 400 070, India.
Tel: +91 22 2650 5576, 2650 3468, 2650 0846/ 47/48
E-mail: mktg@cleancoats.com • Website: www.cleancoats.com

REGD. OFFICE : K30/1, Additional Ambarnath
Ind. Area, M. I. D. C., Anand Nagar, Ambarnath (E),
Dist. Thane, Maharashtra - 421 508.
Company Identification No. : U28920MH1996PTC123428

AN ISO 14001:2005 CERTIFIED COMPANY



AN ISO 9001:2008 CERTIFIED COMPANY



ANNEXURE- I: Techno Commercial Offer

A. TECHNICAL OFFER:

- ❖ Equipment to be coated : Pipe & fitting Internal
- ❖ BOQ : As provided by you in enquiry with quantity
Variation of +/- 10%; Refer table below
- ❖ Duration of Execution : 3 months for shop lining at site
- ❖ Location of Job : At our designated facility in Mumbai (or) at site
- ❖ **Lining Specification & BOQ**

No	Specification	Area m2
1	Pipe Internal Lining is as per specification 080557C-000-JSS-1300-002 Using Clean Coats make CORRO TECH GF 500 – Glass Flake Coating Coating Thickness: 1000 microns with negative tolerance of 10%	As per Annexure A

Note:

1. Pipes requiring internal lining shall have internal longitudinal weld seal less than 1mm or be seamless. In case seam height is more than the cost of removing it or covering it with additional material will be extra.
2. All Weld finish shall be smooth; spatters shall be ground off; All hot works to be completed before handing over for work.
3. All Flanges shall be rebated. Drawing shall be provided during negotiation
4. Spool fabrication –except in case of road crossings shall be as per Annexure 8 of IOCL enclosed herewith

B. COMMERCIAL OFFER :

1. Pricing
REFER ANNEXURE A of this offer for PRICE & BOQ

Abrasive to be used as per specification is “suitable Expendable Grits”. We have considered copper slag in the above rates. In case there is any change in the abrasive to be used from Copper slag at any stage of this project there will be additional cost implications

1. Abrasive: The specification mentions “ expendable Grits” which is known as one time use grits. Copper Slag which is used only once is also an expendable grit. Nowhere in the specification is it specified as “ metallic grit” or “iron grit” or “steel grit”. The same process is followed in other IOCL projects of L&T etc.. Our rates are considering Copper slag. If metallic grits are to be used then the additional rates shall be 15% higher than quoted unit rates.

If job done at site -Client To Provide:

1. Dedicated hydra with operator & diesel for shop lining. Hydra shall be used for unloading, loading & shifting of CCPL Plant & machinery also. Quantity of hydra & trailer required will depend upon productivity required & will be indicated during discussions.
2. Providing levelled clear land of size indicated by CCPL
3. Old pipes / structural member / concrete pipe cut offs on returnable basis of minimum 300mm height for use as pipe beds for coating.
4. Cement flooring for blasting yard & 3 side GI Sheet covering. Blasting yard size : 15m x 15m

3. Payment Terms:

If job done at site;

- a. 20% of total order value as Interest Free Advance to be adjusted proportionately against each running bill.
- b. 50% of per lot of coating material against proforma for lot wise invoice prior to dispatch or at 30th day from date of material gate entry at site discountable LC; LC opening charges to your account & discounting charges to our account
- c. 30% upon monthly completion of work on RA Bill basis against 30 day discountable LC; LC opening charges to your account & discounting charges to our account submission.

If job done our designated facility in Mumbai;

- a. 20% of total order value as Interest Free Advance to be adjusted proportionately against each running bill.
- b. 80% prior to dispatch of the pipes from our yard- after work completion & dispatch.

I. COMPOSITE ORDER

1. Order to be placed on M/s. Clean Coats Pvt. Ltd
2. **Validity:** Our quotation is valid till 30.9.21 for order finalization and validity thereof is subject to our final confirmation. The prices are valid for project execution completion by 30.6.2022
3. We will provide all skilled manpower and machinery with required PPE
4. **Water, Electricity and other amenities:** Necessary construction water and power, and workers stay in the site required for execution of our work should be provided free of cost by you. If necessary scaffolding also will be provided by you.
5. **Humidity :** The work will be done under naturally permissible- acceptable humidity conditions only. When humidity is high (>85%), no work (blasting & coating) will be carried out. The rates do not include dehumidifier charges
6. **Taxes and Duties:** Order should be placed as indicated in the quotation in the name
☐ **GST @18% will be charged extra**

☐ In case Government introduces any further tax or levy the same will be borne by you.
☐ Clean Coats GST No. is 27AABCC2231K1ZX
7. The rates quoted are FOR Site.
8. The excess material at site is our property and we shall take back the same, once, the proportionate work is completed, and freight will be to your account.
9. **Idle Charges:** We would be establishing the complete set up – men, material & machinery for the coating in the yard and we cannot afford any idle time. Due to non-availability of work front or other reasons which are not attributed to us, we will be charging Idle Charges @ Rs. 75000/- per week to you.
10. **Price Escalation:** The firm prices could be offered only for the quantities ordered by you and any increase or decrease in the ordered quantity the prices for the same shall be revised subject to our confirmation at prices ruling at that time.

- 11.**We may require a split order, the break up for which will be indicated during finalization. Application order, in such a case to be placed in the name of our authorized applicator whose name will be intimated at the time of order placement.
- 12.Prices:** The schedule of work / quantities indicates our quoted rates against each item of work as per our offer and approximate quantities.
- 13.**We need minimum 2-3 weeks intimation for every mobilization. Clean Coats should be free to take out their materials whenever there is no work front.
- 14.**We are a SME registered with District Industries Centre, Konkan Region, Thane.
- 15.**Our standard terms & conditions in our invoice will be applicable.
- 16.**Jurisdiction will be Mumbai.

We hope that the above offer is in line with your requirement and will favour us with your valued order. Please feel free to call in case of any query.

Thanking you
For Clean Coats Private Limited



R.Suresh Kumar
General Manager- Business Development
Clean Coats Limited – Mumbai
Email: suresh@cleancoats.com
Mobile: 8657503263

IOCL -SRU U/G piping Package. Budgetary quotation**Item: Underground Coated piping****RATES ARE FOR INTERNAL COATING ONLY**

Sl.no	Description	Coating	Qty (M/No's)	Unit price
1	PIPE, B-36.10, ASTM A106GR.B(EXT:3LPE COATED), BE, SEAMLESS, 6.0 INCH, STD	External 3LPE coated	160 M	0
2	PIPE, B-36.10, API 5L GR.B PSL2 (PE COATED), BE, E.FS.W, 16.0 INCH, XS	External 3LPE coated	200 M	0
3	PIPE, B-36.10, API 5L GR.B PSL2 (PE COATED), BE, E.FS.W, 20.0 INCH, XS	External 3LPE coated	100 M	0
4	PIPE, B-36.10, API 5L GR.B PSL2(EPOXY COATED), BE, E.FS.W, 20.0 INCH, STD	Internal glass flaked epoxy lined	1 M	2983
5	PIPE, B-36.10, API 5L GR.B PSL2(EPOXY COATED), BE, E.FS.W, 24.0 INCH, STD	Internal glass flaked epoxy lined	1 M	3580
6	PIPE, B-36.10, ASTM A 106 GR.B (PE COATED), BE, SEAMLESS, 4.0 INCH, S120	External 3LPE coated	650 M	0
7	PIPE, B-36.10, ASTM A 106 GR.B (PE COATED), BE, SEAMLESS, 6.0 INCH, XS	External 3LPE coated	170 M	0
8	PIPE, B-36.10, ASTM A 106 GR.B (PE COATED), BE, SEAMLESS, 8.0 INCH, XS	External 3LPE coated	435 M	0
9	PIPE, B-36.10, ASTM A 106 GR.B (PE COATED), BE, SEAMLESS, 12.0 INCH, XS	External 3LPE coated	80 M	0
10	PIPE, B-36.10, ASTM A106 GR.B(PE&EPOXY COATD), BE, SEAMLESS, 4.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	101 M	600
11	PIPE, B-36.10, ASTM A106 GR.B(PE&EPOXY COATD), BE, SEAMLESS, 6.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	125 M	900
12	PIPE, B-36.10, ASTM A106 GR.B(PE&EPOXY COATD), BE, SEAMLESS, 10.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	200 M	1500
13	PIPE, B-36.10, ASTM A106GR.B(INT EPOXY COATD), BE, SEAMLESS, 4.0 INCH, STD	Internal glass flaked epoxy lined	25 M	600
14	PIPE, B-36.10, ASTM A106GR.B(INT EPOXY COATD), BE, SEAMLESS, 6.0 INCH, STD	Internal glass flaked epoxy lined	150 M	900
15	PIPE, B-36.10, ASTM A106GR.B(INT EPOXY COATD), BE, SEAMLESS, 10.0 INCH, STD	Internal glass flaked epoxy lined	400 M	1500
16	FLNG.WN, B-16.5, ASTM A105 N (EPOXY COATED), 150, RF/125AARH, 4.0 INCH, STD	Internal glass flaked epoxy lined	68 Nos.	50
17	FLNG.WN, B-16.5, ASTM A105 N (EPOXY COATED), 150, RF/125AARH, 6.0 INCH, STD	Internal glass flaked epoxy lined	21 Nos.	100
18	FLNG.WN, B-16.5, ASTM A105 N (EPOXY COATED), 150, RF/125AARH, 10.0 INCH, STD	Internal glass flaked epoxy lined	16 Nos.	150
19	FLNG.BLIND, B-16.5, ASTM A105 N (EPOXY COATED), 150, RF/125AARH, 4.0 INCH	Internal glass flaked epoxy lined	1 Nos.	50
20	FLNG.FIG.8, ASME-B16.48, ASTM A516GR.70 N(EPOXY COATED), 150, FF/125AARH, 4.0 INCH	Internal glass flaked epoxy lined	1 Nos.	50
21	ELBOW.90, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 1.5D, 4.0 INCH, STD	Internal glass flaked epoxy lined	18 Nos.	208
22	ELBOW.90, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 1.5D, 6.0 INCH, STD	Internal glass flaked epoxy lined	20 Nos.	450
23	ELBOW.90, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 1.5D, 10.0 INCH, STD	Internal glass flaked epoxy lined	18 Nos.	1180
24	ELBOW.90, B-16.9, A234GR.WPB(I:EPOXY,E:PE COATD), BW, 1.5D, 4.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	20 Nos.	208
25	ELBOW.90, B-16.9, A234GR.WPB(I:EPOXY,E:PE COATD), BW, 1.5D, 6.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	15 Nos.	450
26	ELBOW.90, B-16.9, A234GR.WPB(I:EPOXY,E:PE COATD), BW, 1.5D, 10.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	17 Nos.	1180
27	ELBOW.90, B-16.9, ASTM A234GR.WPB(EXT:3LPE C'TD), BW, 1.5D, 6.0 INCH, STD	External 3LPE coated	10 Nos.	0
28	ELBOW.90, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 1.5D, 4.0 INCH, S120	External 3LPE coated	150 Nos.	0
29	ELBOW.90, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 1.5D, 6.0 INCH, XS	External 3LPE coated	10 Nos.	0
30	ELBOW.90, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 1.5D, 8.0 INCH, XS	External 3LPE coated	1 Nos.	0

31	ELBOW.45, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 1.5D, 4.0 INCH, STD	Internal glass flaked epoxy lined	5 Nos.	208
32	ELBOW.45, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 1.5D, 6.0 INCH, STD	Internal glass flaked epoxy lined	7 Nos.	450
33	ELBOW.45, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 1.5D, 10.0 INCH, STD	Internal glass flaked epoxy lined	2 Nos.	1180
34	ELBOW.45, B-16.9, A234GR.WPB(I:EPOXY,E:PE COATD), BW, 1.5D, 4.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	22 Nos.	208
35	ELBOW.45, B-16.9, A234GR.WPB(I:EPOXY,E:PE COATD), BW, 1.5D, 6.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	5 Nos.	450
36	ELBOW.45, B-16.9, A234GR.WPB(I:EPOXY,E:PE COATD), BW, 1.5D, 10.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	2 Nos.	1180
37	ELBOW.45, B-16.9, ASTM A234GR.WPB(EXT:3LPE C'TD), BW, 1.5D, 6.0 INCH, STD	External 3LPE coated	10 Nos.	0
38	ELBOW.45, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 1.5D, 4.0 INCH, S120	External 3LPE coated	80 Nos.	0
39	ELBOW.45, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 1.5D, 6.0 INCH, XS	External 3LPE coated	15 Nos.	0
40	ELBOW.45, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 1.5D, 8.0 INCH, XS	External 3LPE coated	2 Nos.	0
41	T.EQUAL, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 10.0 INCH, STD	Internal glass flaked epoxy lined	3 Nos.	1000
42	T.EQUAL, B-16.9, A234GR.WPB(I:EPOXY,E:PE COATD), BW, 4.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	10 Nos.	175
43	T.EQUAL, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 4.0 INCH, S120	External 3LPE coated	30 Nos.	0
44	T.EQUAL, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 6.0 INCH, XS	External 3LPE coated	5 Nos.	0
45	T.EQUAL, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 8.0 INCH, XS	External 3LPE coated	2 Nos.	0
46	REDUC.CONC, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 6.0 INCH, STD, 4.0 INCH, STD	Internal glass flaked epoxy lined	6 Nos.	70
47	REDUC.CONC, B-16.9, A234GR.WPB(I:EPOXY,E:PE COATD), BW, 6.0 INCH, STD, 4.0 INCH, STD	External 3LPE coated and Internal glass flaked epoxy lined	10 Nos.	200
48	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 6.0 INCH, XS, 4.0 INCH, S120	External 3LPE coated	85 Nos.	0
49	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 8.0 INCH, XS, 6.0 INCH, XS	External 3LPE coated	5 Nos.	0
50	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 12.0 INCH, XS, 8.0 INCH, XS	External 3LPE coated	1 Nos.	0
51	REDUC.ECC, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 6.0 INCH, STD, 4.0 INCH, STD	Internal glass flaked epoxy lined	2 Nos.	70
52	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB (PE COATED), BW, 6.0 INCH, XS, 4.0 INCH, S120	External 3LPE coated	25 Nos.	0

CORRO TECH GF 500

High Build Glass Flake Epoxy Coating

Selection & Specification Data

Description

CORRO TECH GF 500 is a two pack, specially formulated for a high performance glass filled Epoxy Finish Coating . It provides outstanding corrosion resistance in highly humid, saline and chemical environment. The product is idle for Tank roof and pipeline external surfaces.

Advantages

- Tough abrasion resistant film
- Excellent resistance to corrosion in saline environment.
- Excellent resistance to chemicals
- Good adhesion to metal surfaces

Areas of Applications

CORRO TECH GF 500 has recommended for new or existing steel for onshore as well as offshore installations. It is recommended for use on exteriors of Tank and Pipelines in

- Refineries
- Petrochemicals
- Chemical units
- Furnaces, Kilns, Ovens

General Properties

Colour Grey

Finish Smooth and Glossy

Dry Film Thickness 300 - 500 microns

Theoretical Coverage 2.50 sq. m/ lit at 400 microns

Temp. Resistance -15°C to 120°C

Physical Properties

Type Two pack epoxy cured with amine

Mixing Ratio A : B = 4 : 1 by vol.

Mixed Density 1.40 kg/lit

Volume Solids (%) 99 minimum

Pot life at 30°C 30 minutes

Recoat ability After 16 hrs. Max 4 days

Performance Data

Tests	Standards	Results
Abrasion Resistance	ASTM D4060	0.30 gm weight loss per 5000 cycles , 1 kg load
Salt Fog Resistance	ASTM B117	Unaffected after 5000 hrs
Dry Heat Resistance	ASTM D2485	120°C
Cathodic Disbondment	ASTM G8	Less than 6 mm (30 days exposure)
Share Adhesion on steel	ASTM D1002	260 kg /cm ²
Immersion Test at 23°C (water)	ISO 2812 part -2	No film defects (For 3 years)
Impact Resistance (min)	ASTM G 14	0.3 kg . m
Surface Hardness (Shore D)	ASTM D2240	80
Water Absorption 30 days	ASTM D 570	0.7 gm/m ² (in immersion)
Weatherometer 1000 hrs	ASTM E 42	No Failure , slight chalking

CORRO TECH GF 500

High Build Glass Flake Epoxy Coating

Surface Preparation

To ensure optimum long-term coating system performance, surfaces must be clean, dry and free from dirt, oil, grease, salts, welding flux, mill scale, rust, oxides, old paint, corrosion products or other foreign matter.

Blast cleaning to SA 2.5 Swedish specifications. In case it is not feasible, then manual cleaning by mechanical methods like wire brush, emery paper can be done. The surface should be free from moisture, oil, dust and should be dry before painting.

Application Method

CORRO TECH GF 500 can be applied by brush or airless spray.

Mix Comp A and Comp B Separately. If settling is observed in both the containers use Pneumatic stirrer and mix as per ratio. Then apply uniformly over the surface.

If required use CLEAN TECH Epoxy Thinner 101.

All Equipments Should be cleaned only by CLEAN TECH Epoxy Thinner 101.

Environmental Conditions

Do not apply when temperature are below 7°C or when the Relative humidity exceeds 85% or the Surface temperature is less than 3°C above the dew point. Do not apply during rain, fog or mist.

Air temperature : 10 - 40°C

Surface temperature : 5 - 50°C

Drying & Curing Schedule

DRYING TIME at 30°C

Touch Dry : 4 Hrs

Hard Dry : 16 Hrs

Full Cure : 4 days

Health & Safety

In case of solvent based coating, care to be taken for proper ventilation, shutdown since the odour is harmful in nature. Always use protective gloves, respiratory mask, goggles and impervious protective clothing during use. Use skin cream.

As it is a Flammable Liquid and Vapor, Keep away from heat, sparks and flame.

See Material Safety Data Sheet (MSDS) for complete precautionary and disposal information.

For further details please contact our technical services department.

Special Notes

This product is to be applied directly over the metal.

Practical coverage achieving capacity depends upon Application techniques, surface preparation, wastages, and ambient conditions.

Shelf Life

One-year in original unopened containers. Do not expose to direct sunlight.

Packaging

Supplied in 20 lit packs.

Special packs may be available on request.

Safety Instructions

Please refer our Material Safety Data Sheet.

For Further Information, please Contact

Clean Coats Private Limited
K 30/1, Additional Ambernath Ind. Area
M.I.D.C, Anand Nagar, Ambernath (E),
Dist. Thane, Maharashtra - 421506
Corporate Office Tel.:- +91 22 2650 5576
+91 22 2650 0846/ 47/ 48
Email : secretary@cleancoats.com
Website : www.cleancoats.com

CCPL/TDS/HPCC/SPL/IOCL/17-18/11/B/R1

The information provided in this product data sheet is intended as a general guide only based on our understanding and experience of the products when properly used under normal conditions. The information is given in good faith and owing to variations in actual site conditions which are beyond the control of the company, no liability can be inferred from the information given. Users should determine the suitability of the product for their own particular purpose by their own tests.

SL.No	ITEM DESCRIPTION	QTY
1	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, 0.75 INCH, XS	213
2	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 2.0 INCH, XS	14
3	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 3.0 INCH, STD	37
4	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 4.0 INCH, STD	101
5	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 6.0 INCH, STD	365
6	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 8.0 INCH, STD	499
7	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 10.0 INCH, STD	431
8	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 12.0 INCH, STD	260
9	NIPPLE, B-36.10, ASTM A 106 GR.B, TOE, SEAMLESS, 1.0 INCH, S160, 100 MM	162
10	NIPPLE, B-36.10, ASTM A 106 GR.B, TOE, SEAMLESS, 2.0 INCH, XS, 150 MM	322
11	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 0.75 INCH, XS	8
12	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 0.75 INCH, XS	590
13	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 3.0 INCH, 2.0 INCH	2
14	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 3.0 INCH, 1.5 INCH	8
15	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 3.0 INCH, 2.0 INCH	27
16	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 4.0 INCH, 3.0 INCH	2
17	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 4.0 INCH, 3.0 INCH	42
18	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 6.0 INCH, 4.0 INCH	148
19	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 8.0 INCH, 6.0 INCH	7
20	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 8.0 INCH, 6.0 INCH	262
21	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 10.0 INCH, 8.0 INCH	214
22	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 10.0 INCH, 8.0 INCH	2
23	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 12.0 INCH, 10.0 INCH	4
24	FLNG.RED. SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 12.0 INCH, 10.0 INCH	146
25	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 3.0 INCH, 2.0 INCH	4
26	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 4.0 INCH, 2.0 INCH	14
27	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 6.0 INCH, 2.0 INCH	37
28	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 8.0 INCH, 2.0 INCH	54
29	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 10.0 INCH, 2.0 INCH	79
30	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 12.0 INCH, 2.0 INCH	54
31	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 6.0 INCH	3
32	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 8.0 INCH	5
33	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 10.0 INCH	1
34	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 12.0 INCH	3
35	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 0.75 INCH	1030
36	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 3.0 INCH, STD, 2.0 INCH, XS	1
37	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD, 2.0 INCH, XS	3
38	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD, 3.0 INCH, STD	3
39	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD, 3.0 INCH, STD	1
40	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD, 4.0 INCH, STD	3
41	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 8.0 INCH, STD, 6.0 INCH, STD	3
42	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 8.0 INCH, STD, 4.0 INCH, STD	2
43	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 10.0 INCH, STD, 8.0 INCH, STD	2

44	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 10.0 INCH, STD, 6.0 INCH, STD	1
45	CAP, B-16.11, ASTM A 105 (NORMALISED), SCRF, 3000, 1.0 INCH	156
46	CAP, B-16.11, ASTM A 105 (NORMALISED), SCRF, 3000, 2.0 INCH	156
47	CAP, B-16.11, ASTM A 105 (NORMALISED), SCRF, 3000, 2.0 INCH, 1.0 INCH	156
48	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 2.0 INCH, XS	4
49	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 3.0 INCH, STD	7
50	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD	25
51	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD	54
52	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 8.0 INCH, STD	41
53	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 10.0 INCH, STD	28
54	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 3.0 INCH, 0.75 INCH	16
55	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 4.0 INCH, 0.75 INCH	27
56	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 4.0 INCH, 1.5 INCH	2
57	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 6.0 INCH, 0.75 INCH	107
58	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 6.0 INCH, 1.5 INCH	3
59	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 8.0 INCH, 0.75 INCH	100
60	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 8.0 INCH, 1.5 INCH	3
61	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 10.0 INCH, 0.75 INCH	179
62	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 12.0 INCH, 0.75 INCH	80
63	VLV.CHECK, SHEET 533BD, 6.0 INCH	1
64	VLV.PLUG, SHEET 553CD, 2.0 INCH	2
65	VLV.PLUG, SHEET 553CD, 3.0 INCH	1
66	VLV.PLUG, SHEET 553CD, 4.0 INCH, LOCK OPEN	4
67	VLV.PLUG, SHEET 553CD, 4.0 INCH	4
68	VLV.PLUG, SHEET 553CD, 6.0 INCH, LOCK OPEN	4
69	VLV.PLUG, SHEET 553CD, 6.0 INCH	9
70	VLV.PLUG, SHEET 553CD, 8.0 INCH	1
71	VLV.PLUG, SHEET 553DD, 3.0 INCH, LOCK OPEN	1
72	VLV.PLUG, SHEET 553DD, 8.0 INCH	4
73	VLV.PLUG, SHEET 553DD, 10.0 INCH, LOCK OPEN	2
74	VLV.PLUG, SHEET 553DD, 10.0 INCH	5
75	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.5 INCH X 2.5 INCH	1188
76	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.625 INCH X 3 INCH	32
77	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.625 INCH X 3.75 INCH	324
78	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 4 INCH	848
79	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 4.25 INCH	1128
80	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 4.5 INCH	16
81	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 4.75 INCH	16
82	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 5 INCH	8
83	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.875 INCH X 4.75 INCH	2676
84	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.875 INCH X 5.5 INCH	84

85	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.0 INCH X 7.25 INCH	32
86	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.125 INCH X 8 INCH	96
87	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 0.75 INCH	8
88	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 3.0 INCH	10
89	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 4.0 INCH	2
90	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 8.0 INCH	6
91	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 10.0 INCH	2
92	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 12.0 INCH	6
93	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 0.75 INCH	297
94	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 3.0 INCH	21
95	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 4.0 INCH	30
96	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 6.0 INCH	110
97	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 8.0 INCH	133
98	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 10.0 INCH	137
99	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 12.0 INCH	88
100	SPLIT TEE, B-16.9, ASTM A 234 GR.WPB, BW, 3.0 INCH, STD, (NOTE-A)	8
101	SPLIT TEE, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD, (NOTE-A)	14
102	SPLIT TEE, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD, (NOTE-A)	50
103	SPLIT TEE, B-16.9, ASTM A 234 GR.WPB, BW, 8.0 INCH, STD, (NOTE-A)	108
104	SPLIT TEE, B-16.9, ASTM A 234 GR.WPB, BW, 10.0 INCH, STD, (NOTE-A)	82
105	SPLIT TEE, B-16.9, ASTM A 234 GR.WPB, BW, 12.0 INCH, STD, (NOTE-A)	56

PIPING 1st MTO SUMMARY_SRU PARADIP_B366_2021-07-05

SR NO	ITEM DESCRIPTION	QTY
1	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, 0.5 INCH, S160	26
2	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, 0.5 INCH, XS	6000
3	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, 0.75 INCH, S160	438
4	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, 0.75 INCH, XS	1993
5	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, 0.75 INCH, XXS	1
6	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, 1.0 INCH, XS	222
7	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, 1.5 INCH, XXS	0.4
8	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, 1.5 INCH, XS	110
9	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 2.0 INCH, S160	86
10	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 2.0 INCH, XS	151
11	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 3.0 INCH, STD	216
12	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 3.0 INCH, XS	1
13	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 4.0 INCH, STD	424
14	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 6.0 INCH, STD	720
15	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 8.0 INCH, STD	569
16	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 10.0 INCH, STD	278
17	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 12.0 INCH, STD	100
18	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, 14.0 INCH, STD	23
19	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, IBR, 0.5 INCH, S160	3
20	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, IBR, 0.75 INCH, S160	623
21	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, IBR, 1.0 INCH, S160	3
22	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, IBR, 1.0 INCH, XS	157
23	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, IBR, 1.5 INCH, XS	847
24	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, IBR, 1.5 INCH, S160	18
25	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 2.0 INCH, S160	50
26	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 2.0 INCH, XS	617
27	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 3.0 INCH, S160	39
28	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 3.0 INCH, STD	210
29	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 3.0 INCH, XS	165
30	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 4.0 INCH, S120	442
31	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 4.0 INCH, STD	154
32	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 4.0 INCH, XS	2
33	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 6.0 INCH, XS	75
34	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 6.0 INCH, S120	224
35	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 6.0 INCH, STD	75
36	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 8.0 INCH, XS	48
37	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 8.0 INCH, STD	127
38	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 8.0 INCH, S100	30
39	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 10.0 INCH, STD	187
40	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 10.0 INCH, XS	97
41	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 12.0 INCH, XS	109

42	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, IBR, 12.0 INCH, STD	105
43	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NACE, 2.0 INCH, XS	1
44	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NACE, 3.0 INCH, STD	628
45	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NACE, 4.0 INCH, STD	56
46	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NACE, 6.0 INCH, STD	7
47	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, NAC6, 0.5 INCH, XXS	14
48	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, NAC6, 0.75 INCH, XXS	88
49	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, NAC6, 0.75 INCH, S160	66
50	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, NAC6, 1.0 INCH, XXS	14
51	PIPE, B-36.10, ASTM A 106 GR.B, PE, SEAMLESS, NAC6, 1.5 INCH, XS	1
52	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 2.0 INCH, XS	9
53	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 2.0 INCH, S160	71
54	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 3.0 INCH, S160	213
55	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 3.0 INCH, STD	25
56	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 4.0 INCH, STD	171
57	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 4.0 INCH, XS	1
58	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 6.0 INCH, STD	40
59	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 6.0 INCH, XS	63
60	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 8.0 INCH, XS	1
61	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 10.0 INCH, XS	3
62	PIPE, B-36.10, ASTM A 106 GR.B, BE, SEAMLESS, NAC6, 10.0 INCH, STD	96
63	PIPE, B-36.10, ASTM A 106 GR.B(GALV), SCRM, SEAMLESS, 0.5 INCH, S160	2
64	PIPE, B-36.10, ASTM A 106 GR.B(GALV), SCRM, SEAMLESS, 0.75 INCH, S160	13
65	PIPE, B-36.10, ASTM A 106 GR.B(GALV), SCRM, SEAMLESS, 1.0 INCH, XS	271
66	PIPE, B-36.10, ASTM A 106 GR.B(GALV), SCRM, SEAMLESS, 1.5 INCH, XS	145
67	PIPE, B-36.10, ASTM A 106 GR.B(GALV), BE, SEAMLESS, 2.0 INCH, XS	208
68	PIPE, B-36.10, ASTM A 106 GR.B(GALV), BE, SEAMLESS, 3.0 INCH, STD	228
69	PIPE, B-36.10, ASTM A 106 GR.B(GALV), BE, SEAMLESS, 4.0 INCH, STD	75
70	PIPE, B-36.19, ASTM A 312 TP304L, PE, SEAMLESS, 1.5 INCH, 40S	10
71	PIPE, B-36.19, ASTM A 312 TP316L, PE, SEAMLESS, 0.75 INCH, 80S	3
72	PIPE, B-36.19, ASTM A 312 TP316L, PE, SEAMLESS, 1.5 INCH, 40S	0.2
73	PIPE, B-36.19, ASTM A 312 TP316L, BE, SEAMLESS, 2.0 INCH, 40S	1
74	PIPE, B-36.10, ASTM A 335 GR.P11, PE, SEAMLESS, IBR, 0.5 INCH, S160	2
75	PIPE, B-36.10, ASTM A 335 GR.P11, PE, SEAMLESS, IBR, 1.5 INCH, XS	8
76	PIPE, B-36.10, ASTM A 335 GR.P11, BE, SEAMLESS, IBR, 2.0 INCH, XS	9
77	PIPE, B-36.10, ASTM A 335 GR.P11, BE, SEAMLESS, IBR, 10.0 INCH, XS	21
78	PIPE, B-36.19, ASTM A 358 TP316L CL.1, BE, E.FS.W, 10.0 INCH, 6.35 MM THK	86
79	PIPE, B-36.10, ASTM A 671 GR.CC60 CL.32, BE, E.FS.W, NACE, 24.0 INCH, STD	6
80	PIPE, B-36.10, ASTM A 671 GR.CC60 CL.32, BE, E.FS.W, NACE, 48.0 INCH, XS	271
81	PIPE, B-36.10, ASTM A 671 GR.CC60 CL.32, BE, E.FS.W, NAC6, 24.0 INCH, XS	41
82	PIPE, B-36.10, ASTM A671GR.CC60 CL.32 (S2,S3), BE, E.FS.W, NAC6, 16.0 INCH, STD	269
83	PIPE, B-36.10, ASTM A671GR.CC60 CL.32 (S2,S3), BE, E.FS.W, NAC6, 20.0 INCH, STD	129
84	PIPE, B-36.10, ASTM A671GR.CC60 CL.32 (S2,S3), BE, E.FS.W, NAC6, 24.0 INCH, STD	24
85	PIPE, B-36.10, ASTM A671GR.CC60 CL.32 (S2,S3), BE, E.FS.W, NAC6, 28.0 INCH, XS	53
86	PIPE, B-36.10, ASTM A671GR.CC60 CL.32 (S2,S3), BE, E.FS.W, NAC6, 36.0 INCH, XS	63
87	PIPE, B-36.10, ASTM A 672 GR.B60 CL.32, BE, E.FS.W, 30.0 INCH, XS	130
88	PIPE, B-36.10, ASTM A 672 GR.B60 CL.32, BE, E.FS.W, 36.0 INCH, XS	204
89	PIPE, B-36.10, ASTM A 672 GR.B60 CL.32, BE, E.FS.W, 44.0 INCH, XS	97
90	PIPE, B-36.10, ASTM A 672 GR.B60 CL.32, BE, E.FS.W, 48.0 INCH, XS	143
91	PIPE, B-36.10, ASTM A 672 GR.B60 CL.32, BE, E.FS.W, IBR, 16.0 INCH, STD	36
92	PIPE, B-36.10, ASTM A 672 GR.B60 CL.32, BE, E.FS.W, IBR, 18.0 INCH, STD	147
93	PIPE, B-36.10, ASTM A 672 GR.B60 CL.32, BE, E.FS.W, IBR, 18.0 INCH, 16.0 MM THK	62
94	PIPE, B-36.10, ASTM A 672 GR.B60 CL.32, BE, E.FS.W, IBR, 20.0 INCH, STD	49
95	PIPE, B-36.10, ASTM A 672 GR.B60 CL.32, BE, E.FS.W, IBR, 24.0 INCH, STD	122
96	PIPE, B-36.10, ASTM A106GR.B(INT EPOXY COATD), BE, SEAMLESS, 4.0 INCH, STD	56
97	PIPE, B-36.10, ASTM A106GR.B(INT EPOXY COATD), BE, SEAMLESS, 6.0 INCH, STD	40
98	PIPE, B-36.10, ASTM A106GR.B(INT EPOXY COATD), BE, SEAMLESS, 10.0 INCH, STD	115
99	NIPPLE, B-36.10, ASTM A 106 GR.B, TOE, SEAMLESS, 0.75 INCH, XXS, 80 MM	4
100	NIPPLE, B-36.10, ASTM A 106 GR.B, TOE, SEAMLESS, 1.0 INCH, S160, 100 MM	130
101	NIPPLE, B-36.10, ASTM A 106 GR.B, TOE, SEAMLESS, 1.0 INCH, S160, 80 MM	2
102	NIPPLE, B-36.10, ASTM A 106 GR.B, TOE, SEAMLESS, 2.0 INCH, XS, 150 MM	261
103	NIPPLE, B-36.10, ASTM A 106 GR.B, TOE, SEAMLESS, IBR, 0.5 INCH, XXS, 80 MM	90
104	NIPPLE, B-36.10, ASTM A 106 GR.B, TOE, SEAMLESS, IBR, 0.75 INCH, XXS, 80 MM	34
105	NIPPLE, B-36.10, ASTM A 106 GR.B, TOE, SEAMLESS, NAC6, 0.5 INCH, XXS, 80 MM	2

106	REINF.PAD, ASTM A 672 GR.B60 CL.32, 30.0 INCH, XS, 14.0 INCH	2
107	REINF.PAD, ASTM A 672 GR.B60 CL.32, 30.0 INCH, XS, 2.0 INCH	1
108	REINF.PAD, ASTM A 672 GR.B60 CL.32, 30.0 INCH, XS, 6.0 INCH	2
109	REINF.PAD, ASTM A 672 GR.B60 CL.32, 36.0 INCH, XS, 2.0 INCH	2
110	REINF.PAD, ASTM A 672 GR.B60 CL.32, 36.0 INCH, XS, 10.0 INCH	2
111	REINF.PAD, ASTM A 672 GR.B60 CL.32, 36.0 INCH, XS, 3.0 INCH	5
112	REINF.PAD, ASTM A 672 GR.B60 CL.32, 44.0 INCH, XS, 30.0 INCH	1
113	REINF.PAD, ASTM A 672 GR.B60 CL.32, 48.0 INCH, XS, 36.0 INCH	3
114	REINF.PAD, ASTM A 672 GR.B60 CL.32, IBR, 18.0 INCH, 16.0 MM THK, 12.0 INCH	4
115	REINF.PAD, ASTM A 672 GR.B60 CL.32, IBR, 18.0 INCH, 16.0 MM THK, 10.0 INCH	1
116	REINF.PAD, ASTM A 672 GR.B60 CL.32, IBR, 18.0 INCH, 16.0 MM THK, 8.0 INCH	1
117	REINF.PAD, ASTM A 672 GR.B60 CL.32, IBR, 18.0 INCH, 16.0 MM THK, 2.0 INCH	2
118	REINF.PAD, ASTM A 672 GR.B60 CL.32, IBR, 18.0 INCH, 16.0 MM THK, 3.0 INCH	3
119	REINF.PAD, ASTM A 672 GR.B60 CL.32, IBR, 18.0 INCH, 16.0 MM THK, 6.0 INCH	1
120	REINF.PAD, ASTM A 671 GR.CC60 CL.32, NACE, 48.0 INCH, XS, 2.0 INCH	1
121	REINF.PAD, ASTM A 671 GR.CC60 CL.32, NACE, 48.0 INCH, XS, 16.0 INCH	1
122	REINF.PAD, ASTM A 671 GR.CC60 CL.32, NAC6, 24.0 INCH, XS, 3.0 INCH	1
123	REINF.PAD, ASTM A 671 GR.CC60 CL.32, NAC6, 24.0 INCH, XS, 2.0 INCH	5
124	REINF.PAD, ASTM A 358 TP316L CL.1, 10.0 INCH, 6.35 MM THK, 2.0 INCH	1
125	REINF.PAD, ASTM A 106 GR.B, IBR, 6.0 INCH, S120, 2.0 INCH	4
126	REINF.PAD, ASTM A 335 GR.P11, IBR, 10.0 INCH, XS, 3.0 INCH	1
127	REINF.PAD, ASTM A671GR.CC60 CL.32 (S2,S3), NAC6, 20.0 INCH, STD, 10.0 INCH	1
128	REINF.PAD, ASTM A671GR.CC60 CL.32 (S2,S3), NAC6, 24.0 INCH, STD, 2.0 INCH	1
129	REINF.PAD, ASTM A671GR.CC60 CL.32 (S2,S3), NAC6, 28.0 INCH, XS, 2.0 INCH	2
130	REINF.PAD, ASTM A671GR.CC60 CL.32 (S2,S3), NAC6, 28.0 INCH, XS, 10.0 INCH	1
131	REINF.PAD, ASTM A671GR.CC60 CL.32 (S2,S3), NAC6, 28.0 INCH, XS, 6.0 INCH	2
132	REINF.PAD, ASTM A671GR.CC60 CL.32 (S2,S3), NAC6, 28.0 INCH, XS, 20.0 INCH	1
133	REINF.PAD, ASTM A671GR.CC60 CL.32 (S2,S3), NAC6, 36.0 INCH, XS, 20.0 INCH	1
134	FLNG.SCRD, B-16.5, ASTM A 105 N (GALV.), 150, FF/125AARH, 1.0 INCH	1
135	FLNG.SCRD, B-16.5, ASTM A 105 N (GALV.), 300, FF/125AARH, 1.5 INCH	8
136	FLNG.SCRD, B-16.5, ASTM A 105 N (GALV.), 150, FF/125AARH, 1.5 INCH	6
137	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 0.75 INCH, XS	551
138	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 0.75 INCH, S160	16
139	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 0.75 INCH, XS	8
140	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 1.5 INCH, XS	22
141	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 1.5 INCH, XXS	2
142	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 0.75 INCH, S160	18
143	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 1.0 INCH, S160	3
144	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 1.0 INCH, XS	1
145	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 1.5 INCH, XS	5
146	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 1.5 INCH, S160	7
147	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 1.5 INCH, XS	2
148	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 0.5 INCH, XXS	4
149	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 0.75 INCH, XXS	36
150	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 1.5 INCH, XXS	4
151	FLNG.SW, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 1.5 INCH, XS	5
152	FLNG.SW, B-16.5, ASTM A 182 GR.F11 CL.2, 600, RF/125AARH, IBR, 1.5 INCH, XS	5
153	FLNG.SW, B-16.5, ASTM A 182 GR.F316L, 300, RF/125AARH, 1.5 INCH, 40S	1
154	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 0.5 INCH, S160	8
155	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 0.75 INCH, S160	89
156	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 0.75 INCH, XXS	3
157	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 1.0 INCH, XS	11
158	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 1.5 INCH, XS	5
159	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 2.0 INCH, S160	2
160	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 2.0 INCH, XS	43
161	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, 2.0 INCH, S160	7
162	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 2.0 INCH, XS	4
163	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 3.0 INCH, STD	76
164	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 3.0 INCH, XS	2
165	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 3.0 INCH, XS	1
166	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 3.0 INCH, STD	24
167	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 4.0 INCH, STD	8
168	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 4.0 INCH, STD	65
169	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 6.0 INCH, STD	10

170	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 6.0 INCH, STD	50
171	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 8.0 INCH, STD	14
172	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 10.0 INCH, STD	8
173	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 14.0 INCH, STD	2
174	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 18.0 INCH, STD	2
175	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 300, RF/125AARH, 30.0 INCH, XS	7
176	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, 30.0 INCH, XS	10
177	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 300, RF/125AARH, 36.0 INCH, XS	6
178	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, 36.0 INCH, XS	54
179	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, 44.0 INCH, XS	2
180	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, 48.0 INCH, XS	3
181	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 0.75 INCH, S160	6
182	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 0.75 INCH, S160	23
183	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 1.5 INCH, XS	13
184	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 1.5 INCH, XS	3
185	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 2.0 INCH, S160	22
186	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 2.0 INCH, XS	38
187	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 2.0 INCH, XS	26
188	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 2.0 INCH, XS	100
189	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 3.0 INCH, STD	27
190	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 3.0 INCH, STD	2
191	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 3.0 INCH, XS	60
192	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 3.0 INCH, S160	42
193	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 3.0 INCH, XS	6
194	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 4.0 INCH, S120	44
195	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 4.0 INCH, STD	2
196	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 4.0 INCH, STD	10
197	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 4.0 INCH, XS	2
198	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 4.0 INCH, STD	37
199	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 6.0 INCH, S120	43
200	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 6.0 INCH, STD	9
201	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 6.0 INCH, XS	15
202	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 6.0 INCH, STD	21
203	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 8.0 INCH, S100	6
204	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 8.0 INCH, XS	7
205	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 8.0 INCH, STD	26
206	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 8.0 INCH, STD	8
207	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 10.0 INCH, STD	6
208	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 10.0 INCH, XS	15
209	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 10.0 INCH, STD	1
210	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 10.0 INCH, STD	18
211	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 12.0 INCH, STD	1
212	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 12.0 INCH, XS	5
213	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 12.0 INCH, STD	5
214	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 16.0 INCH, STD	4
215	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 18.0 INCH, STD	7
216	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 24.0 INCH, STD	2
217	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NACE, 2.0 INCH, XS	3
218	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NACE, 3.0 INCH, STD	4
219	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NACE, 3.0 INCH, STD	20
220	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NACE, 4.0 INCH, STD	1
221	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NACE, 4.0 INCH, STD	2
222	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NACE, 6.0 INCH, STD	4
223	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NACE, 24.0 INCH, STD	2
224	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, NACE, 48.0 INCH, XS	14
225	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 300, RF/125AARH, NACE, 48.0 INCH, XS	2
226	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 0.75 INCH, S160	34
227	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 0.75 INCH, XXS	26
228	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 2.0 INCH, S160	25
229	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 2.0 INCH, XS	20
230	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 2.0 INCH, XS	9
231	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 2.0 INCH, S160	44
232	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 3.0 INCH, STD	2
233	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 3.0 INCH, S160	9

234	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 3.0 INCH, STD	1
235	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 3.0 INCH, S160	64
236	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 4.0 INCH, STD	16
237	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 4.0 INCH, XS	2
238	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 4.0 INCH, STD	4
239	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 4.0 INCH, XS	4
240	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 6.0 INCH, XS	5
241	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 6.0 INCH, STD	13
242	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 6.0 INCH, STD	4
243	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 6.0 INCH, STD	6
244	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 10.0 INCH, STD	4
245	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 16.0 INCH, STD	14
246	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 16.0 INCH, STD	2
247	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 20.0 INCH, STD	9
248	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 20.0 INCH, STD	3
249	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 24.0 INCH, XS	4
250	FLNG.WN, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 24.0 INCH, STD	2
251	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 28.0 INCH, XS	7
252	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 28.0 INCH, XS	5
253	FLNG.WN, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 36.0 INCH, XS	2
254	FLNG.WN, B-16.5, ASTM A 182 GR.F11 CL.2, 600, RF/125AARH, IBR, 2.0 INCH, XS	3
255	FLNG.WN, B-16.5, ASTM A 182 GR.F11 CL.2, 600, RF/125AARH, IBR, 10.0 INCH, XS	5
256	FLNG.WN, B-16.5, ASTM A 182 GR.F304L, 150, RF/125AARH, 1.5 INCH, 40S	1
257	FLNG.WN, B-16.5, ASTM A 182 GR.F316L, 150, RF/125AARH, 0.75 INCH, 80S	6
258	FLNG.WN, B-16.5, ASTM A 182 GR.F316L, 150, RF/125AARH, 2.0 INCH, 40S	2
259	FLNG.WN, B-16.5, ASTM A 182 GR.F316L, 300, RF/125AARH, 2.0 INCH, 40S	1
260	FLNG.WN, B-16.5, ASTM A 182 GR.F316L, 150, RF/125AARH, 10.0 INCH, 6.35 MM THK	6
261	FLNG.WN, B-16.5, ASTM A 182 GR.F316L, 300, RF/125AARH, 10.0 INCH, 6.35 MM THK	4
262	FLNG.WN, B-16.5, ASTM A 105 N (GALV.), 150, RF/125AARH, 2.0 INCH, XS	6
263	FLNG.WN, B-16.5, ASTM A105 N (EPOXY COATED), 150, RF/125AARH, 4.0 INCH, STD	19
264	FLNG.WN, B-16.5, ASTM A105 N (EPOXY COATED), 150, RF/125AARH, 6.0 INCH, STD	8
265	FLNG.WN, B-16.5, ASTM A105 N (EPOXY COATED), 150, RF/125AARH, 10.0 INCH, STD	4
266	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 3.0 INCH, 2.0 INCH	27
267	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 3.0 INCH, 2.0 INCH	2
268	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 3.0 INCH, 1.5 INCH	8
269	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 4.0 INCH, 3.0 INCH	42
270	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 4.0 INCH, 3.0 INCH	2
271	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 6.0 INCH	2
272	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 6.0 INCH, 4.0 INCH	146
273	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 8.0 INCH, 6.0 INCH	173
274	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 8.0 INCH, 6.0 INCH	4
275	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 10.0 INCH, 8.0 INCH	215
276	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 10.0 INCH, 8.0 INCH	2
277	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 10.0 INCH	2
278	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, 12.0 INCH, 10.0 INCH	2
279	FLNG.SO, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 12.0 INCH, 10.0 INCH	80
280	FLNG.SO, B-16.5, ASTM A 105 N (GALV.), 150, FF/125AARH, 2.0 INCH	16
281	FLNG.SO, B-16.5, ASTM A 105 N (GALV.), 150, FF/125AARH, 3.0 INCH	21
282	FLNG.SO, B-16.5, ASTM A 105 N (GALV.), 150, FF/125AARH, 4.0 INCH	7
283	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 0.75 INCH	28
284	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 1.5 INCH	5
285	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 2.0 INCH	10
286	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 3.0 INCH	4
287	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 3.0 INCH, 2.0 INCH	4
288	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 4.0 INCH	6
289	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 4.0 INCH, 2.0 INCH	14
290	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 6.0 INCH, 2.0 INCH	37
291	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 6.0 INCH	3
292	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 8.0 INCH, 2.0 INCH	28
293	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 8.0 INCH	1
294	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, 10.0 INCH, 2.0 INCH	88
295	FLNG.BLIND, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, 36.0 INCH	1
296	FLNG.BLIND, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, 44.0 INCH	1
297	FLNG.BLIND, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, 48.0 INCH	1

298	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 0.75 INCH	11
299	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 0.75 INCH	10
300	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 1.5 INCH	5
301	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 2.0 INCH	12
302	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 2.0 INCH	11
303	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 2.0 INCH	2
304	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, IBR, 3.0 INCH	1
305	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 3.0 INCH	1
306	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 4.0 INCH	1
307	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 4.0 INCH	2
308	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 6.0 INCH	1
309	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 10.0 INCH	1
310	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 12.0 INCH	2
311	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 600, RF/125AARH, IBR, 12.0 INCH	1
312	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 18.0 INCH	3
313	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, IBR, 24.0 INCH	1
314	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NACE, 2.0 INCH	3
315	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NACE, 3.0 INCH	2
316	FLNG.BLIND, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, NACE, 48.0 INCH	1
317	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 300, RF/125AARH, NAC6, 0.75 INCH	14
318	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 0.75 INCH	32
319	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 2.0 INCH	5
320	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 4.0 INCH	5
321	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 16.0 INCH	1
322	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 20.0 INCH	1
323	FLNG.BLIND, B-16.5, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 24.0 INCH	1
324	FLNG.BLIND, B-16.47-B, ASTM A 105 (NORMALISED), 150, RF/125AARH, NAC6, 36.0 INCH	1
325	FLNG.BLIND, B-16.5, ASTM A 182 GR.F316L, 150, RF/125AARH, 0.75 INCH	6
326	FLNG.BLIND, B-16.5, ASTM A 105 N (GALV.), 150, FF/125AARH, 1.5 INCH	6
327	FLNG.BLIND, B-16.5, ASTM A 105 N (GALV.), 150, FF/125AARH, 2.0 INCH	2
328	FLNG.BLIND, B-16.5, ASTM A 105 N (GALV.), 150, RF/125AARH, 2.0 INCH	6
329	FLNG.BLIND, B-16.5, ASTM A 105 N (GALV.), 150, FF/125AARH, 3.0 INCH	5
330	FLNG.BLIND, B-16.5, ASTM A 105 N (GALV.), 150, FF/125AARH, 4.0 INCH	2
331	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 0.75 INCH	4
332	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 2.0 INCH	8
333	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 3.0 INCH	4
334	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 300, FF/125AARH, 3.0 INCH	1
335	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 4.0 INCH	7
336	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 6.0 INCH	7
337	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 8.0 INCH	5
338	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 600, FF/125AARH, IBR, 1.0 INCH	2
339	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 300, FF/125AARH, IBR, 1.0 INCH	1
340	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, IBR, 1.5 INCH	1
341	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, IBR, 2.0 INCH	3
342	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 300, FF/125AARH, IBR, 2.0 INCH	2
343	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, IBR, 3.0 INCH	3
344	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 300, FF/125AARH, IBR, 3.0 INCH	1
345	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 600, FF/125AARH, IBR, 3.0 INCH	6
346	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, IBR, 4.0 INCH	5
347	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 600, FF/125AARH, IBR, 4.0 INCH	9
348	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 600, FF/125AARH, IBR, 6.0 INCH	8
349	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, IBR, 6.0 INCH	4
350	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, IBR, 8.0 INCH	6
351	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 600, FF/125AARH, IBR, 8.0 INCH	1
352	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NACE, 3.0 INCH	4
353	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NACE, 4.0 INCH	1
354	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NAC6, 0.75 INCH	9
355	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 300, FF/125AARH, NAC6, 0.75 INCH	4
356	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NAC6, 2.0 INCH	2
357	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 300, FF/125AARH, NAC6, 3.0 INCH	9
358	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NAC6, 3.0 INCH	2
359	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NAC6, 4.0 INCH	2
360	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NAC6, 6.0 INCH	2
361	FLNG.FIG.8, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 300, FF/125AARH, NAC6, 6.0 INCH	1

362	FLNG.FIG.8, ASME-B16.48, ASTM A 516N Gr.70 (GALV.), 150, FF/125AARH, 2.0 INCH	1
363	FLNG.FIG.8, ASME-B16.48, ASTM A 516N Gr.70 (GALV.), 150, FF/125AARH, 3.0 INCH	3
364	FLNG.FIG.8, ASME-B16.48, ASTM A 516N Gr.70 (GALV.), 150, FF/125AARH, 4.0 INCH	1
365	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 10.0 INCH	4
366	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 12.0 INCH	1
367	SPCR&BLND, ASME B16.47B/JOB'STD, ASTM A 516 GR.70(NORMALISED), 300, FF/125AARH, 30.0 INCH	3
368	SPCR&BLND, ASME B16.47B/JOB'STD, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 30.0 INCH	2
369	SPCR&BLND, ASME B16.47B/JOB'STD, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, 36.0 INCH	20
370	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 600, FF/125AARH, IBR, 10.0 INCH	2
371	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, IBR, 10.0 INCH	2
372	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, IBR, 12.0 INCH	1
373	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, IBR, 18.0 INCH	2
374	SPCR&BLND, ASME B16.47B/EIL'STD, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NACE, 48.0 INCH	2
375	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NAC6, 10.0 INCH	4
376	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NAC6, 16.0 INCH	2
377	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NAC6, 20.0 INCH	2
378	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 300, FF/125AARH, NAC6, 20.0 INCH	1
379	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NAC6, 24.0 INCH	1
380	SPCR&BLND, ASME B16.47B/JOB'STD, ASTM A 516 GR.70(NORMALISED), 150, FF/125AARH, NAC6, 28.0 INCH	1
381	SPCR&BLND, ASME-B16.48, ASTM A 516 GR.70(NORMALISED), 300, FF/125AARH, NAC6, 28.0 INCH	1
382	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 0.5 INCH	50
383	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 0.75 INCH	786
384	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 9000, 0.75 INCH	6
385	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, 0.75 INCH	213
386	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 1.0 INCH	104
387	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 1.5 INCH	34
388	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, IBR, 0.75 INCH	219
389	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, IBR, 1.0 INCH	3
390	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, IBR, 1.0 INCH	83
391	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, IBR, 1.5 INCH	6
392	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, IBR, 1.5 INCH	242
393	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 9000, NAC6, 0.5 INCH	8
394	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, NAC6, 0.75 INCH	24
395	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 9000, NAC6, 0.75 INCH	42
396	ELBOW.90, B-16.11, ASTM A 105 (NORMALISED), SW, 9000, NAC6, 1.0 INCH	10
397	ELBOW.90, B-16.11, ASTM A 182 GR.F11 CL.2, SW, 3000, IBR, 1.5 INCH	3
398	ELBOW.90, B-16.11, ASTM A 182 GR.F304L, SW, 3000, 1.5 INCH	2
399	ELBOW.90, B-16.9, ASTM A 234 GR.WP11 CL.1, BW, 1.5D, IBR, 2.0 INCH, XS	6
400	ELBOW.90, B-16.9, ASTM A 234 GR.WP11 CL.1, BW, 1.5D, IBR, 10.0 INCH, XS	3
401	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 2.0 INCH, S160	17
402	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 2.0 INCH, XS	41
403	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 3.0 INCH, STD	44
404	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 4.0 INCH, STD	45
405	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 6.0 INCH, STD	62
406	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 8.0 INCH, STD	18
407	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 10.0 INCH, STD	4
408	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 14.0 INCH, STD	8
409	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 2.0 INCH, S160	17
410	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 2.0 INCH, XS	188
411	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 3.0 INCH, S160	22
412	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 3.0 INCH, STD	57
413	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 3.0 INCH, XS	71
414	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 4.0 INCH, S120	62
415	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 4.0 INCH, STD	38
416	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 4.0 INCH, XS	2
417	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 6.0 INCH, S120	58
418	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 6.0 INCH, STD	31
419	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 6.0 INCH, XS	8
420	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 8.0 INCH, S100	9
421	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 8.0 INCH, STD	32
422	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 8.0 INCH, XS	11
423	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 10.0 INCH, STD	48
424	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 10.0 INCH, XS	17
425	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 12.0 INCH, STD	11

426	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 12.0 INCH, XS	9
427	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NACE, 3.0 INCH, STD	59
428	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NACE, 4.0 INCH, STD	10
429	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 2.0 INCH, S160	20
430	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 2.0 INCH, XS	2
431	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 3.0 INCH, S160	65
432	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 3.0 INCH, STD	5
433	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 4.0 INCH, STD	18
434	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 6.0 INCH, STD	18
435	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 6.0 INCH, XS	10
436	ELBOW.90, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 10.0 INCH, STD	20
437	ELBOW.90, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 1.5D, 2.0 INCH, XS	32
438	ELBOW.90, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 1.5D, 3.0 INCH, STD	8
439	ELBOW.90, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 1.5D, 4.0 INCH, STD	6
440	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, 30.0 INCH, XS	14
441	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, 36.0 INCH, XS	38
442	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, 44.0 INCH, XS	4
443	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, 48.0 INCH, XS	4
444	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, IBR, 16.0 INCH, STD	12
445	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, IBR, 18.0 INCH, 16.0 MM THK	1
446	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, IBR, 18.0 INCH, STD	9
447	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, IBR, 20.0 INCH, STD	2
448	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, IBR, 24.0 INCH, STD	6
449	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NACE, 48.0 INCH, XS	18
450	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NAC6, 16.0 INCH, STD	18
451	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NAC6, 20.0 INCH, STD	15
452	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NAC6, 24.0 INCH, XS	4
453	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NAC6, 24.0 INCH, STD	5
454	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NAC6, 28.0 INCH, XS	8
455	ELBOW.90, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NAC6, 36.0 INCH, XS	2
456	ELBOW.90, B-16.9, ASTM A 403 GR.WP316L-WX, BW, 1.5D, 10.0 INCH, 6.35 MM THK	11
457	ELBOW.90, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 1.5D, 4.0 INCH, STD	24
458	ELBOW.90, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 1.5D, 6.0 INCH, STD	8
459	ELBOW.90, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 1.5D, 10.0 INCH, STD	6
460	ELBOW.90, B-16.11, ASTM A 105 N (GALV.), SCRF, 2000, 1.0 INCH	99
461	ELBOW.90, B-16.11, ASTM A 105 N (GALV.), SCRF, 2000, 1.5 INCH	52
462	ELBOW.45, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, 0.75 INCH	3
463	ELBOW.45, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 1.0 INCH	27
464	ELBOW.45, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, IBR, 1.0 INCH	27
465	ELBOW.45, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, NAC6, 0.75 INCH	1
466	ELBOW.45, B-16.11, ASTM A 182 GR.F304L, SW, 3000, 1.5 INCH	1
467	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 2.0 INCH, S160	1
468	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 2.0 INCH, XS	1
469	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 3.0 INCH, STD	3
470	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 6.0 INCH, STD	1
471	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 8.0 INCH, STD	1
472	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 10.0 INCH, STD	2
473	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, 14.0 INCH, STD	1
474	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 2.0 INCH, XS	4
475	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 3.0 INCH, S160	2
476	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 3.0 INCH, XS	2
477	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 3.0 INCH, STD	2
478	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 4.0 INCH, S120	1
479	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, IBR, 10.0 INCH, STD	5
480	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 2.0 INCH, S160	1
481	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 3.0 INCH, S160	3
482	ELBOW.45, B-16.9, ASTM A 234 GR.WPB, BW, 1.5D, NAC6, 10.0 INCH, STD	1
483	ELBOW.45, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, 30.0 INCH, XS	2
484	ELBOW.45, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, 36.0 INCH, XS	2
485	ELBOW.45, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, IBR, 18.0 INCH, STD	1
486	ELBOW.45, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, IBR, 20.0 INCH, STD	3
487	ELBOW.45, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NACE, 48.0 INCH, XS	1
488	ELBOW.45, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NAC6, 16.0 INCH, STD	1
489	ELBOW.45, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NAC6, 20.0 INCH, STD	1

490	ELBOW.45, B-16.9, ASTM A 234 GR.WPB-W, BW, 1.5D, NAC6, 24.0 INCH, STD	2
491	ELBOW.45, B-16.11, ASTM A 105 N (GALV.), SCRF, 2000, 1.0 INCH	27
492	T.EQUAL, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 0.5 INCH	150
493	T.EQUAL, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 0.75 INCH	60
494	T.EQUAL, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, 0.75 INCH	20
495	T.EQUAL, B-16.11, ASTM A 105 (NORMALISED), SW, 9000, 0.75 INCH	1
496	T.EQUAL, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, IBR, 0.75 INCH	19
497	T.EQUAL, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, NAC6, 0.75 INCH	2
498	T.EQUAL, B-16.11, ASTM A 105 (NORMALISED), SW, 9000, NAC6, 0.75 INCH	6
499	T.EQUAL, B-16.9, ASTM A 234 GR.WP11 CL.1, BW, IBR, 2.0 INCH, XS	1
500	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, 2.0 INCH, XS	1
501	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, 3.0 INCH, STD	4
502	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD	2
503	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD	6
504	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 2.0 INCH, S160	7
505	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 2.0 INCH, XS	17
506	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 3.0 INCH, STD	2
507	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 3.0 INCH, XS	12
508	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, S120	5
509	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, STD	5
510	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, XS	1
511	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, S120	6
512	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, STD	3
513	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 8.0 INCH, S100	1
514	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 8.0 INCH, STD	1
515	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 8.0 INCH, XS	1
516	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 10.0 INCH, STD	3
517	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 10.0 INCH, XS	2
518	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 12.0 INCH, STD	2
519	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, NACE, 3.0 INCH, STD	3
520	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 2.0 INCH, S160	11
521	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 3.0 INCH, S160	13
522	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 4.0 INCH, STD	1
523	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 6.0 INCH, STD	1
524	T.EQUAL, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 6.0 INCH, XS	3
525	T.EQUAL, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 2.0 INCH, XS	1
526	T.EQUAL, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 3.0 INCH, STD	2
527	T.EQUAL, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 4.0 INCH, STD	1
528	T.EQUAL, B-16.9, ASTM A 234 GR.WPB-W, BW, 36.0 INCH, XS	6
529	T.EQUAL, B-16.9, ASTM A 234 GR.WPB-W, BW, IBR, 18.0 INCH, STD	1
530	T.EQUAL, B-16.9, ASTM A 234 GR.WPB-W, BW, IBR, 18.0 INCH, 16.0 MM THK	1
531	T.EQUAL, B-16.9, ASTM A 234 GR.WPB-W, BW, NACE, 48.0 INCH, XS	1
532	T.EQUAL, B-16.9, ASTM A 234 GR.WPB-W, BW, NAC6, 16.0 INCH, STD	1
533	T.EQUAL, B-16.9, ASTM A 234 GR.WPB-W, BW, NAC6, 24.0 INCH, XS	1
534	T.RED, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 1.0 INCH, 0.75 INCH	6
535	T.RED, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 1.5 INCH, 1.0 INCH	10
536	T.RED, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, IBR, 1.5 INCH, 0.75 INCH	1
537	T.RED, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, IBR, 1.5 INCH, 1.0 INCH	11
538	T.RED, B-16.11, ASTM A 105 (NORMALISED), SW, 9000, NAC6, 0.75 INCH, 0.5 INCH	4
539	T.RED, B-16.9, ASTM A 234 GR.WP11 CL.1, BW, IBR, 10.0 INCH, XS, 8.0 INCH, XS	1
540	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, 3.0 INCH, STD, 2.0 INCH, XS	4
541	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD, 3.0 INCH, STD	2
542	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD, 2.0 INCH, XS	3
543	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD, 3.0 INCH, STD	5
544	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD, 4.0 INCH, STD	4
545	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, 8.0 INCH, STD, 6.0 INCH, STD	2
546	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 3.0 INCH, XS, 2.0 INCH, XS	2
547	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 3.0 INCH, STD, 2.0 INCH, XS	4
548	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 3.0 INCH, S160, 2.0 INCH, S160	1
549	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, S120, 3.0 INCH, S160	1
550	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, STD, 3.0 INCH, STD	1
551	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, STD, 2.0 INCH, XS	1
552	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, S120, 2.0 INCH, S160	3
553	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, XS, 3.0 INCH, XS	1

554	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, STD, 4.0 INCH, STD	1
555	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, S120, 3.0 INCH, S160	4
556	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, S120, 4.0 INCH, S120	3
557	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 10.0 INCH, XS, 6.0 INCH, S120	1
558	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 10.0 INCH, XS, 8.0 INCH, XS	1
559	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 12.0 INCH, XS, 8.0 INCH, XS	1
560	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, NACE, 3.0 INCH, STD, 2.0 INCH, XS	2
561	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 3.0 INCH, S160, 2.0 INCH, S160	16
562	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 3.0 INCH, STD, 2.0 INCH, XS	4
563	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 6.0 INCH, XS, 3.0 INCH, S160	1
564	T.RED, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 8.0 INCH, XS, 6.0 INCH, XS	1
565	T.RED, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 3.0 INCH, STD, 2.0 INCH, XS	4
566	T.RED, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 4.0 INCH, STD, 2.0 INCH, XS	1
567	T.RED, B-16.9, ASTM A 234 GR.WPB-W, BW, IBR, 18.0 INCH, STD, 16.0 INCH, STD	2
568	T.RED, B-16.9, ASTM A 234 GR.WPB-W, BW, IBR, 24.0 INCH, STD, 18.0 INCH, STD	2
569	T.RED, B-16.11, ASTM A 105 N (GALV.), SCRF, 2000, 1.5 INCH, 1.0 INCH	10
570	T.RED, B-16.11, ASTM A 105 N (GALV.), SCRF, 2000, 1.5 INCH, 0.75 INCH	4
571	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 3.0 INCH, STD, 1.5 INCH, XS	2
572	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 3.0 INCH, STD, 2.0 INCH, XS	1
573	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD, 2.0 INCH, XS	3
574	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD, 3.0 INCH, STD	7
575	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD, 4.0 INCH, STD	3
576	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD, 3.0 INCH, STD	1
577	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 8.0 INCH, STD, 4.0 INCH, STD	2
578	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 8.0 INCH, STD, 6.0 INCH, STD	2
579	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 10.0 INCH, STD, 8.0 INCH, STD	1
580	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, 10.0 INCH, STD, 6.0 INCH, STD	1
581	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 3.0 INCH, XS, 2.0 INCH, XS	2
582	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, STD, 3.0 INCH, STD	1
583	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, XS, 3.0 INCH, XS	2
584	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, STD, 2.0 INCH, XS	1
585	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 8.0 INCH, STD, 4.0 INCH, STD	4
586	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 10.0 INCH, STD, 8.0 INCH, STD	3
587	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 10.0 INCH, STD, 4.0 INCH, STD	2
588	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 12.0 INCH, STD, 10.0 INCH, STD	1
589	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 3.0 INCH, STD, 2.0 INCH, XS	3
590	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 6.0 INCH, STD, 3.0 INCH, STD	2
591	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 10.0 INCH, XS, 6.0 INCH, XS	1
592	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 3.0 INCH, STD, 2.0 INCH, XS	1
593	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 4.0 INCH, STD, 2.0 INCH, XS	2
594	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB(GALV), BW, 4.0 INCH, STD, 3.0 INCH, STD	3
595	REDUC.CONC, B-16.9, ASTM A 234 GR.WPB-W, BW, IBR, 16.0 INCH, STD, 8.0 INCH, STD	2
596	REDUC.CONC, B-16.9, A 234 GR WPB(INT:EPOXY CTD), BW, 6.0 INCH, STD, 4.0 INCH, STD	4
597	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, 3.0 INCH, STD, 2.0 INCH, XS	1
598	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD, 2.0 INCH, XS	1
599	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD, 3.0 INCH, STD	2
600	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD, 4.0 INCH, STD	2
601	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 3.0 INCH, S160, 2.0 INCH, S160	1
602	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 3.0 INCH, STD, 2.0 INCH, XS	7
603	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, S120, 2.0 INCH, S160	5
604	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, XS, 3.0 INCH, XS	2
605	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, STD, 3.0 INCH, STD	4
606	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, S120, 3.0 INCH, S160	9
607	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, STD, 2.0 INCH, XS	1
608	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, S120, 4.0 INCH, S120	3
609	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, S120, 3.0 INCH, S160	4
610	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, STD, 4.0 INCH, STD	2
611	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 8.0 INCH, S100, 4.0 INCH, S120	4
612	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 8.0 INCH, STD, 4.0 INCH, STD	2
613	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 8.0 INCH, STD, 6.0 INCH, STD	2
614	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 10.0 INCH, STD, 4.0 INCH, STD	2
615	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 10.0 INCH, STD, 6.0 INCH, STD	4
616	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 10.0 INCH, XS, 8.0 INCH, S100	1
617	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 12.0 INCH, STD, 10.0 INCH, STD	4

618	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, NACE, 4.0 INCH, STD, 3.0 INCH, STD	1
619	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 3.0 INCH, S160, 2.0 INCH, S160	4
620	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 6.0 INCH, XS, 4.0 INCH, XS	2
621	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 8.0 INCH, XS, 6.0 INCH, XS	2
622	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB-W, BW, 24.0 INCH, STD, 18.0 INCH, STD	2
623	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB-W, BW, 30.0 INCH, XS, 24.0 INCH, STD	2
624	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB-W, BW, IBR, 16.0 INCH, STD, 8.0 INCH, STD	2
625	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB-W, BW, IBR, 20.0 INCH, STD, 12.0 INCH, STD	4
626	REDUC.ECC, B-16.9, ASTM A 234 GR.WPB-W, BW, NAC6, 24.0 INCH, STD, 20.0 INCH, STD	1
627	SWAGE.CONC, MSS-SP95, ASTM A 105 (NORMALISED), PBE, 0.75 INCH, S160, 0.5 INCH, S160	50
628	SWAGE.CONC, MSS-SP95, ASTM A 105 (NORMALISED), PBE, IBR, 1.5 INCH, XS, 0.75 INCH, S160	2
629	SWAGE.CONC, MSS-SP95, ASTM A 105 (NORMALISED), PBE, IBR, 2.0 INCH, XS, 1.5 INCH, XS	3
630	SWAGE.CONC, MSS-SP95, ASTM A 105 (NORMALISED), PBE, NAC6, 2.0 INCH, XS, 0.75 INCH, S160	2
631	SWAGE.CONC, BS-3799, ASTM A 105 N (GALV.), TBE, 1.5 INCH, XS, 0.75 INCH, S160	1
632	SWAGE.ECC, MSS-SP95, ASTM A 105 (NORMALISED), PBE, 2.0 INCH, XS, 1.0 INCH, XS	2
633	SWAGE.ECC, MSS-SP95, ASTM A 105 (NORMALISED), PBE, IBR, 2.0 INCH, XS, 1.5 INCH, XS	2
634	SWAGE.ECC, MSS-SP95, ASTM A 105 (NORMALISED), PBE, IBR, 2.0 INCH, XS, 0.75 INCH, S160	1
635	SWAGE.ECC, MSS-SP95, ASTM A 105 (NORMALISED), PBE, IBR, 3.0 INCH, STD, 1.5 INCH, XS	1
636	SWAGE.ECC, MSS-SP95, ASTM A 105 (NORMALISED), PBE, NAC6, 3.0 INCH, S160, 1.5 INCH, XXS	4
637	CAP, B-16.11, ASTM A 105 (NORMALISED), SCRF, 3000, 0.75 INCH	4
638	CAP, B-16.11, ASTM A 105 (NORMALISED), SCRF, 3000, 1.0 INCH	123
639	CAP, B-16.11, ASTM A 105 (NORMALISED), SCRF, 3000, 2.0 INCH, 1.0 INCH	235
640	CAP, B-16.11, ASTM A 105 (NORMALISED), SCRF, 3000, IBR, 0.5 INCH	90
641	CAP, B-16.11, ASTM A 105 (NORMALISED), SCRF, 3000, IBR, 0.75 INCH	100
642	CAP, B-16.11, ASTM A 105 (NORMALISED), SCRF, 3000, IBR, 1.5 INCH	25
643	CAP, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD	1
644	CAP, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 3.0 INCH, STD	1
645	CAP, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 3.0 INCH, XS	4
646	CAP, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 4.0 INCH, STD	1
647	CAP, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, S120	2
648	CAP, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, XS	1
649	CAP, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 6.0 INCH, STD	1
650	CAP, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 8.0 INCH, XS	1
651	CAP, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 10.0 INCH, XS	1
652	CAP, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 12.0 INCH, XS	3
653	CAP, B-16.9, ASTM A 234 GR.WPB, BW, IBR, 18.0 INCH, 16.0 MM THK	3
654	CAP, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 6.0 INCH, XS	1
655	CAP, B-16.9, ASTM A 234 GR.WPB, BW, NAC6, 10.0 INCH, XS	1
656	CAP, B-16.9, ASTM A 234 GR.WPB-W, BW, NAC6, 24.0 INCH, XS	1
657	PLUG, B-16.11, ASTM A 105 (NORMALISED), SCRM, 0.5 INCH	125
658	PLUG, B-16.11, ASTM A 105 (NORMALISED), SCRM, 0.75 INCH	60
659	CPLNG.FULL, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 0.5 INCH	1000
660	CPLNG.FULL, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, 0.75 INCH	200
661	CPLNG.FULL, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, 0.75 INCH	10
662	CPLNG.FULL, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, IBR, 0.75 INCH	28
663	CPLNG.FULL, B-16.11, ASTM A 105 (NORMALISED), SW, 3000, IBR, 1.5 INCH	6
664	CPLNG.FULL, B-16.11, ASTM A 105 (NORMALISED), SW, 6000, NAC6, 0.75 INCH	5
665	CPLNG.FULL, B-16.11, ASTM A 182 GR.F304L, SW, 3000, 1.5 INCH	2
666	CPLNG.FULL, B-16.11, ASTM A 105 N (GALV.), SCRF, 2000, 1.0 INCH	19
667	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 2.0 INCH, XS	4
668	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 3.0 INCH, STD	7
669	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 4.0 INCH, STD	25
670	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 6.0 INCH, STD	39
671	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 8.0 INCH, STD	45
672	CROSS, B-16.9, ASTM A 234 GR.WPB, BW, 10.0 INCH, STD	16
673	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 2.0 INCH, 1.0 INCH	12
674	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, 2.0 INCH, 0.75 INCH	3
675	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 3.0 INCH, 1.0 INCH	1
676	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 3.0 INCH, 0.75 INCH	16
677	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, 3.0 INCH, 0.75 INCH	6
678	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, 4.0 INCH, 0.75 INCH	37
679	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 4.0 INCH, 1.5 INCH	4
680	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 4.0 INCH, 0.75 INCH	27
681	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 4.0 INCH, 1.0 INCH	2

682	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 6.0 INCH, 0.75 INCH	107
683	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 6.0 INCH, 1.0 INCH	7
684	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 6.0 INCH, 1.5 INCH	5
685	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, 6.0 INCH, 0.75 INCH	14
686	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, 8.0 INCH, 0.75 INCH	1
687	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 8.0 INCH, 0.75 INCH	80
688	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 8.0 INCH, 1.5 INCH	3
689	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 10.0 INCH, 0.75 INCH	139
690	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 12.0 INCH, 0.75 INCH	40
691	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, 14.0 INCH, 0.75 INCH	1
692	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 30.0 INCH, 1.5 INCH	1
693	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, 30.0 INCH, 0.75 INCH	19
694	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 36.0 INCH, 1.0 INCH	4
695	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, 36.0 INCH, 0.75 INCH	9
696	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, 36.0 INCH, 1.5 INCH	14
697	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 2.0 INCH, 1.5 INCH	3
698	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 2.0 INCH, 0.75 INCH	13
699	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 3.0 INCH, 1.0 INCH	2
700	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 3.0 INCH, 0.75 INCH	5
701	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 4.0 INCH, 0.75 INCH	9
702	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 4.0 INCH, 1.5 INCH	2
703	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 4.0 INCH, 1.5 INCH	2
704	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 6.0 INCH, 1.0 INCH	2
705	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 6.0 INCH, 0.75 INCH	11
706	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 6.0 INCH, 1.0 INCH	3
707	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 6.0 INCH, 1.5 INCH	6
708	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 6.0 INCH, 1.5 INCH	3
709	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 8.0 INCH, 1.0 INCH	4
710	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 8.0 INCH, 1.5 INCH	27
711	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 8.0 INCH, 0.75 INCH	14
712	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 10.0 INCH, 1.5 INCH	1
713	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 10.0 INCH, 1.0 INCH	5
714	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 10.0 INCH, 0.75 INCH	3
715	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 12.0 INCH, 0.75 INCH	17
716	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 12.0 INCH, 1.5 INCH	4
717	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 16.0 INCH, 0.75 INCH	11
718	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 18.0 INCH, 1.0 INCH	3
719	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 3000, IBR, 18.0 INCH, 1.5 INCH	38
720	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 18.0 INCH, 0.75 INCH	2
721	SOCKOLET, MSS-SP97, ASTM A 105 (NORMALISED), SW, 6000, IBR, 20.0 INCH, 0.75 INCH	2
722	SOCKOLET, MSS-SP97, ASTM A 182 GR.F11 CL.2, SW, 3000, IBR, 2.0 INCH, 1.5 INCH	1
723	SOCKOLET, MSS-SP97, ASTM A 182 GR.F11 CL.2, SW, 3000, IBR, 10.0 INCH, 1.5 INCH	5
724	SOCKOLET, MSS-SP97, ASTM A 105 N (GALV.), SW, 3000, 4.0 INCH, 1.5 INCH	15
725	SOCKOLET, MSS-SP97, ASTM A182 GR.F316/316L DUAL, SW, 3000, 10.0 INCH, 0.75 INCH	8
726	SOCKOLET, MSS-SP97, ASTM A182 GR.F316/316L DUAL, SW, 3000, 10.0 INCH, 1.5 INCH	1
727	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, 36.0 INCH, XS, 0.75 INCH, XXS	1
728	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, 36.0 INCH, XS, 1.5 INCH, XXS	2
729	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NACE, 3.0 INCH, STD, 0.75 INCH, S160	4
730	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NACE, 48.0 INCH, XS, 0.75 INCH, S160	2
731	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 2.0 INCH, S160, 0.75 INCH, XXS	2
732	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 2.0 INCH, S160, 1.0 INCH, XXS	3
733	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 2.0 INCH, XS, 0.75 INCH, S160	2
734	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 3.0 INCH, S160, 0.75 INCH, XXS	18
735	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 3.0 INCH, STD, 0.75 INCH, S160	1
736	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 4.0 INCH, STD, 0.75 INCH, S160	5
737	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 6.0 INCH, STD, 0.75 INCH, S160	11
738	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 6.0 INCH, STD, 1.5 INCH, XS	3
739	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 6.0 INCH, XS, 0.75 INCH, XXS	2
740	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 6.0 INCH, XS, 1.0 INCH, XXS	1
741	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 10.0 INCH, STD, 0.75 INCH, S160	9
742	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 10.0 INCH, STD, 1.5 INCH, XS	1
743	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 16.0 INCH, STD, 0.75 INCH, S160	2
744	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 20.0 INCH, STD, 0.75 INCH, S160	8
745	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 24.0 INCH, STD, 0.75 INCH, S160	2

746	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 28.0 INCH, XS, 0.75 INCH, S160	4
747	WELDOLET, MSS-SP97, ASTM A 105 (NORMALISED), BW, NAC6, 28.0 INCH, XS, 1.5 INCH, XS	2
748	THREDOLET, MSS-SP97, ASTM A 105 N (GALV.), SCRF, 3000, 2.0 INCH, 0.75 INCH	1
749	THREDOLET, MSS-SP97, ASTM A 105 N (GALV.), SCRF, 3000, 2.0 INCH, 1.0 INCH	7
750	THREDOLET, MSS-SP97, ASTM A 105 N (GALV.), SCRF, 3000, 3.0 INCH, 0.75 INCH	4
751	THREDOLET, MSS-SP97, ASTM A 105 N (GALV.), SCRF, 3000, 3.0 INCH, 1.0 INCH	5
752	THREDOLET, MSS-SP97, ASTM A 105 N (GALV.), SCRF, 3000, 3.0 INCH, 1.5 INCH	2
753	THREDOLET, MSS-SP97, ASTM A 105 N (GALV.), SCRF, 3000, 4.0 INCH, 0.75 INCH	1
754	THREDOLET, MSS-SP97, ASTM A 105 N (GALV.), SCRF, 3000, 4.0 INCH, 1.5 INCH	6
755	VLV.GATE, SHEET 510AA, 0.5 INCH	10
756	VLV.GATE, SHEET 510AA, 0.75 INCH	51
757	VLV.GATE, SHEET 510AA, 1.0 INCH	1
758	VLV.GATE, SHEET 513AA, 2.0 INCH	7
759	VLV.GATE, SHEET 513AA, 3.0 INCH, LOCK OPEN	2
760	VLV.GATE, SHEET 513AA, 3.0 INCH	9
761	VLV.GATE, SHEET 513AA, 6.0 INCH	4
762	VLV.GATE, SHEET 513AA, 10.0 INCH	2
763	VLV.GATE, SHEET 510AB, IBR, 0.5 INCH	8
764	VLV.GATE, SHEET 510AB, IBR, 0.75 INCH	124
765	VLV.GATE, SHEET 510AB, IBR, 1.5 INCH	76
766	VLV.GATE, SHEET 514AB, IBR, 2.0 INCH	21
767	VLV.GATE, SHEET 515AB, IBR, 2.0 INCH	46
768	VLV.GATE, SHEET 513AB, IBR, 2.0 INCH	37
769	VLV.GATE, SHEET 513AB, IBR, 2.0 INCH, LOCK OPEN	2
770	VLV.GATE, SHEET 515AB, IBR, 3.0 INCH	14
771	VLV.GATE, SHEET 514AB, IBR, 3.0 INCH	2
772	VLV.GATE, SHEET 513AB, IBR, 3.0 INCH	5
773	VLV.GATE, SHEET 513AB, IBR, 3.0 INCH, LOCK OPEN	1
774	VLV.GATE, SHEET 513AB, IBR, 4.0 INCH	12
775	VLV.GATE, SHEET 513AB, IBR, 4.0 INCH, LOCK OPEN	1
776	VLV.GATE, SHEET 515AB, IBR, 6.0 INCH	5
777	VLV.GATE, SHEET 513AB, IBR, 6.0 INCH	7
778	VLV.GATE, SHEET 515AB, IBR, 8.0 INCH	3
779	VLV.GATE, SHEET 513AB, IBR, 8.0 INCH	6
780	VLV.GATE, SHEET 513AB, IBR, 10.0 INCH, LOCK CLOSED	1
781	VLV.GATE, SHEET 513AB, IBR, 10.0 INCH, LOCK OPEN	5
782	VLV.GATE, SHEET 515AB, IBR, 10.0 INCH	4
783	VLV.GATE, SHEET 513AB, IBR, 12.0 INCH	1
784	VLV.GATE, SHEET 513AB, IBR, 12.0 INCH, LOCK OPEN	1
785	VLV.GATE, SHEET 515AB, IBR, 12.0 INCH	2
786	VLV.GATE, SHEET 513AB, IBR, 16.0 INCH, LOCK OPEN	2
787	VLV.GATE, SHEET 513AB, IBR, 18.0 INCH, LOCK OPEN	2
788	VLV.GATE, SHEET 513AE, 1.5 INCH	13
789	VLV.GATE, SHEET 510AF, IBR, 0.5 INCH	8
790	VLV.GATE, SHEET 510AF, IBR, 1.5 INCH	1
791	VLV.GATE, SHEET 515AF, IBR, 2.0 INCH	1
792	VLV.GATE, SHEET 515AF, IBR, 10.0 INCH	1
793	VLV.GATE, SHEET 510AM, 0.75 INCH	6
794	VLV.GATE, SHEET 513AM, 2.0 INCH	1
795	VLV.GATE, SHEET 513AM, 10.0 INCH	3
796	VLV.GATE, SHEET 510BB, IBR, 0.75 INCH	1
797	VLV.GATE, SHEET 510BB, IBR, 1.0 INCH	1
798	VLV.GATE, SHEET 513BE, 2.0 INCH	6
799	VLV.GATE, SHEET 510CB, IBR, 0.5 INCH	6
800	VLV.GATE, SHEET 510CB, IBR, 0.75 INCH	16
801	VLV.GATE, SHEET 510CB, IBR, 1.0 INCH	3
802	VLV.GATE, SHEET 510CB, IBR, 1.5 INCH	2
803	VLV.GATE, SHEET 513CE, 4.0 INCH	10
804	VLV.GATE, SHEET 513CE, 10.0 INCH	2
805	VLV.GATE, SHEET 510DA, 0.75 INCH	10
806	VLV.GATE, SHEET 510DA, 1.0 INCH	22
807	VLV.GATE, SHEET 513DA, 2.0 INCH	2
808	VLV.GATE, SHEET 513DA, 3.0 INCH	3
809	VLV.GATE, SHEET 513DA, 4.0 INCH	2

810	VLV.GATE, SHEET 510DB, IBR, 0.5 INCH	4
811	VLV.GATE, SHEET 510DB, IBR, 0.75 INCH	20
812	VLV.GATE, SHEET 510DB, IBR, 1.0 INCH	3
813	VLV.GATE, SHEET 510DB, IBR, 1.5 INCH	4
814	VLV.GATE, SHEET 515DB, IBR, 2.0 INCH	5
815	VLV.GATE, SHEET 515DB, IBR, 3.0 INCH	3
816	VLV.GATE, SHEET 515DB, IBR, 4.0 INCH	15
817	VLV.GATE, SHEET 515DB, IBR, 4.0 INCH, LOCK OPEN	1
818	VLV.GATE, SHEET 515DB, IBR, 6.0 INCH	14
819	VLV.GATE, SHEET 515DB, IBR, 8.0 INCH	3
820	VLV.GATE, SHEET 515DB, IBR, 10.0 INCH	1
821	VLV.GATE, SHEET 510FA, 0.5 INCH	4
822	VLV.GATE, SHEET 510FA, 0.75 INCH	38
823	VLV.GATE, SHEET 510FA, 1.0 INCH	5
824	VLV.GATE, SHEET 510FA, 1.5 INCH	2
825	VLV.GATE, SHEET 513FA, 2.0 INCH	3
826	VLV.GATE, SHEET 513FA, 3.0 INCH, LOCK OPEN	4
827	VLV.GATE, SHEET 513FA, 3.0 INCH	4
828	VLV.GATE, SHEET 513FA, 4.0 INCH	3
829	VLV.GATE, SHEET 513FA, 6.0 INCH, LOCK OPEN	4
830	VLV.GATE, SHEET 513FA, 6.0 INCH	1
831	VLV.GATE, SHEET 510FE, 0.75 INCH	5
832	VLV.GATE, SHEET 510FE, 1.0 INCH	21
833	VLV.GATE, SHEET 510FE, 1.5 INCH	8
834	VLV.GATE, SHEET 513FE, 2.0 INCH	6
835	VLV.GATE, SHEET 513FE, 3.0 INCH	5
836	VLV.GATE, SHEET 513FE, 3.0 INCH, LOCK OPEN	2
837	VLV.GATE, SHEET 513FE, 4.0 INCH, LOCK OPEN	2
838	VLV.GATE, SHEET 513FE, 4.0 INCH	1
839	VLV.GATE, SHEET 513HC, NACE, 2.0 INCH	3
840	VLV.GATE, SHEET 513HC, NACE, 3.0 INCH	8
841	VLV.GATE, SHEET 513HC, NACE, 4.0 INCH	1
842	VLV.GATE, SHEET 513HC, NACE, 6.0 INCH, LOCK OPEN	1
843	VLV.GATE, SHEET 510KA, 0.5 INCH	2
844	VLV.GATE, SHEET 510KA, 0.75 INCH	10
845	VLV.GATE, SHEET 513KA, 2.0 INCH	3
846	VLV.GATE, SHEET 513KA, 3.0 INCH	7
847	VLV.GATE, SHEET 513KA, 6.0 INCH	2
848	VLV.GATE, SHEET 513NA, 2.0 INCH	2
849	VLV.GATE, SHEET 513NA, 3.0 INCH	1
850	VLV.GATE, SHEET 515PA, 2.0 INCH	2
851	VLV.GATE, SHEET 510QA, 0.5 INCH	125
852	VLV.GATE, SHEET 510QA, 0.75 INCH	60
853	VLV.GATE, SHEET 510RA, 0.5 INCH	125
854	VLV.GATE, SHEET 510TC, NAC6, 0.5 INCH	2
855	VLV.GATE, SHEET 510TC, NAC6, 0.75 INCH	44
856	VLV.GATE, SHEET 513TC, NAC6, 2.0 INCH	8
857	VLV.GATE, SHEET 513TC, NAC6, 3.0 INCH, LOCK OPEN	1
858	VLV.GATE, SHEET 513TC, NAC6, 4.0 INCH	2
859	VLV.GATE, SHEET 513TC, NAC6, 6.0 INCH, LOCK OPEN	2
860	VLV.GATE, SHEET 513TC, NAC6, 6.0 INCH, LOCK OPEN	1
861	VLV.GATE, SHEET 513TC, NAC6, 6.0 INCH	1
862	VLV.GATE, SHEET 513TC, NAC6, 10.0 INCH	3
863	VLV.GATE, SHEET 513TC, NAC6, 20.0 INCH	4
864	VLV.GATE, SHEET 510VC, NAC6, 0.5 INCH	4
865	VLV.GATE, SHEET 510VC, NAC6, 0.75 INCH	56
866	VLV.GATE, SHEET 510VC, NAC6, 1.0 INCH	4
867	VLV.GATE, SHEET 513VC, NAC6, 2.0 INCH, LOCK CLOSED	3
868	VLV.GATE, SHEET 513VC, NAC6, 2.0 INCH	11
869	VLV.GATE, SHEET 514VC, NAC6, 2.0 INCH	30
870	VLV.GATE, SHEET 514VC, NAC6, 3.0 INCH	34
871	VLV.GATE, SHEET 513VC, NAC6, 3.0 INCH, LOCK OPEN	2
872	VLV.GATE, SHEET 513VC, NAC6, 3.0 INCH, LOCK OPEN	1
873	VLV.GATE, SHEET 513VC, NAC6, 4.0 INCH	4

874	VLV.GATE, SHEET 513VC, NAC6, 6.0 INCH, LOCK OPEN	2
875	VLV.GATE, SHEET 513VC, NAC6, 6.0 INCH, LOCK OPEN	1
876	VLV.GATE, SHEET 513VC, NAC6, 24.0 INCH	1
877	VLV.GATE, SHEET 513VC, NAC6, 24.0 INCH, LOCK OPEN	1
878	VLV.GLOBE, SHEET 523AA, 3.0 INCH	1
879	VLV.GLOBE, SHEET 523AA, 4.0 INCH	1
880	VLV.GLOBE, SHEET 520AB, IBR, 1.0 INCH	23
881	VLV.GLOBE, SHEET 523AB, IBR, 2.0 INCH	9
882	VLV.GLOBE, SHEET 525AB, IBR, 2.0 INCH	1
883	VLV.GLOBE, SHEET 525AB, IBR, 3.0 INCH	6
884	VLV.GLOBE, SHEET 523AB, IBR, 4.0 INCH	1
885	VLV.GLOBE, SHEET 520AF, IBR, 1.5 INCH	1
886	VLV.GLOBE, SHEET 525AF, IBR, 2.0 INCH	1
887	VLV.GLOBE, SHEET 525AF, IBR, 10.0 INCH	1
888	VLV.GLOBE, SHEET 520CB, IBR, 0.75 INCH	6
889	VLV.GLOBE, SHEET 520CB, IBR, 1.0 INCH	2
890	VLV.GLOBE, SHEET 520CB, IBR, 1.5 INCH	2
891	VLV.GLOBE, SHEET 520DA, 1.0 INCH	1
892	VLV.GLOBE, SHEET 525DB, IBR, 2.0 INCH	3
893	VLV.GLOBE, SHEET 525DB, IBR, 3.0 INCH	6
894	VLV.GLOBE, SHEET 525DB, IBR, 4.0 INCH	1
895	VLV.GLOBE, SHEET 525DB, IBR, 6.0 INCH	1
896	VLV.GLOBE, SHEET 520FA, 1.0 INCH	6
897	VLV.GLOBE, SHEET 520FE, 1.0 INCH	1
898	VLV.GLOBE, SHEET 523TC, NAC6, 2.0 INCH, LOCK CLOSED	2
899	VLV.GLOBE, SHEET 520VC, NAC6, 0.75 INCH	5
900	VLV.GLOBE, SHEET 524VC, NAC6, 3.0 INCH	2
901	VLV.CHECK, SHEET 533AA, 2.0 INCH	1
902	VLV.CHECK, SHEET 533AA, 3.0 INCH	4
903	VLV.CHECK, SHEET 533AA, 6.0 INCH	1
904	VLV.CHECK, SHEET 535AB, IBR, 2.0 INCH	1
905	VLV.CHECK, SHEET 533AB, IBR, 2.0 INCH	3
906	VLV.CHECK, SHEET 535AB, IBR, 3.0 INCH	1
907	VLV.CHECK, SHEET 533AB, IBR, 4.0 INCH	2
908	VLV.CHECK, SHEET 533AB, IBR, 6.0 INCH	2
909	VLV.CHECK, SHEET 535AB, IBR, 6.0 INCH	1
910	VLV.CHECK, SHEET 535AB, IBR, 8.0 INCH	1
911	VLV.CHECK, SHEET 533BD, 6.0 INCH	1
912	VLV.CHECK, SHEET 533DA, 4.0 INCH	1
913	VLV.CHECK, SHEET 530DB, IBR, 1.5 INCH	1
914	VLV.CHECK, SHEET 535DB, IBR, 4.0 INCH	1
915	VLV.CHECK, SHEET 535DB, IBR, 6.0 INCH	1
916	VLV.CHECK, SHEET 530FA, 0.5 INCH	23
917	VLV.CHECK, SHEET 530FA, 1.0 INCH	6
918	VLV.CHECK, SHEET 533FA, 2.0 INCH	1
919	VLV.CHECK, SHEET 533FA, 3.0 INCH	1
920	VLV.CHECK, SHEET 533FA, 4.0 INCH	1
921	VLV.CHECK, SHEET 533FA, 6.0 INCH	2
922	VLV.CHECK, SHEET 530FE, 0.5 INCH	2
923	VLV.CHECK, SHEET 530FE, 0.75 INCH	1
924	VLV.CHECK, SHEET 530FE, 1.5 INCH	2
925	VLV.CHECK, SHEET 530KA, 0.75 INCH	1
926	VLV.CHECK, SHEET 533KA, 4.0 INCH	2
927	VLV.CHECK, SHEET 533KA, 6.0 INCH	2
928	VLV.CHECK, SHEET 535PA, 2.0 INCH	1
929	VLV.CHECK, SHEET 530TC, NAC6, 0.75 INCH	2
930	VLV.CHECK, SHEET 533TC, NAC6, 6.0 INCH	2
931	VLV.CHECK, SHEET 530VC, NAC6, 0.75 INCH	2
932	VLV.CHECK, SHEET 530VC, NAC6, 1.0 INCH	3
933	VLV.CHECK, SHEET 533VC, NAC6, 2.0 INCH	1
934	VLV.CHECK, SHEET 534VC, NAC6, 3.0 INCH	4
935	VLV.BALL, SHEET 543BB, IBR, 2.0 INCH	1
936	VLV.BALL, SHEET 543FA, 6.0 INCH	1
937	VLV.BALL, SHEET 543KA, 0.75 INCH	18

938	VLV.BALL, SHEET 543KA, 1.0 INCH	3
939	VLV.BALL, SHEET 543LA, 2.0 INCH, LOCK CLOSED	1
940	VLV.BALL, SHEET 543LA, 2.0 INCH	3
941	VLV.BALL, SHEET 543LA, 3.0 INCH, LOCK OPEN	2
942	VLV.BALL, SHEET 543LA, 4.0 INCH	5
943	VLV.BALL, SHEET 543LA, 6.0 INCH	4
944	VLV.BALL, SHEET 543LA, 8.0 INCH	3
945	VLV.PLUG, SHEET 553BD, 2.0 INCH	2
946	VLV.PLUG, SHEET 553BD, 3.0 INCH	1
947	VLV.PLUG, SHEET 553BD, 3.0 INCH, LOCK OPEN	1
948	VLV.PLUG, SHEET 553BD, 4.0 INCH, LOCK OPEN	4
949	VLV.PLUG, SHEET 553BD, 4.0 INCH	4
950	VLV.PLUG, SHEET 553BD, 6.0 INCH, LOCK OPEN	2
951	VLV.PLUG, SHEET 553BD, 6.0 INCH	7
952	VLV.PLUG, SHEET 553BD, 8.0 INCH	6
953	VLV.PLUG, SHEET 553BD, 10.0 INCH	4
954	VLV.BTRFLY, SHEET 563BA, 30.0 INCH	1
955	VLV.BTRFLY, SHEET 563BA, 36.0 INCH	4
956	VLV.BTRFLY, SHEET 563BE, 4.0 INCH	3
957	VLV.BTRFLY, SHEET 563BE, 6.0 INCH	4
958	VLV.BTRFLY, SHEET 563DA, 4.0 INCH, LOCK OPEN	3
959	VLV.BTRFLY, SHEET 563DA, 4.0 INCH	6
960	VLV.BTRFLY, SHEET 563JC, NACE, 48.0 INCH	4
961	VLV.BTRFLY, SHEET 563UC, NAC6, 16.0 INCH	4
962	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B16, A194 GR.4, 0.625 INCH X 4.25 INCH	32
963	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B16, A194 GR.4, 0.75 INCH X 4.25 INCH	20
964	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B16, A194 GR.4, 1.25 INCH X 9.75 INCH	80
965	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.5 INCH X 2.75 INCH	84
966	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.5 INCH X 2.5 INCH	1728
967	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.5 INCH X 2.25 INCH	32
968	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.5 INCH X 3.25 INCH	4
969	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.625 INCH X 3 INCH	120
970	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.625 INCH X 3.25 INCH	740
971	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.625 INCH X 3.5 INCH	468
972	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.625 INCH X 3.75 INCH	1688
973	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.625 INCH X 4 INCH	52
974	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.625 INCH X 4.25 INCH	1080
975	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 3.5 INCH	112
976	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 7.5 INCH	88
977	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 6 INCH	24
978	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 5.75 INCH	316
979	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 5 INCH	1052
980	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 4.75 INCH	104
981	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 4 INCH	1432
982	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 4.25 INCH	1112
983	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.75 INCH X 4.5 INCH	176
984	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.875 INCH X 5.5 INCH	168
985	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.875 INCH X 4.75 INCH	2808
986	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.875 INCH X 6.75 INCH	1016
987	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.875 INCH X 6.5 INCH	72
988	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.875 INCH X 5.75 INCH	332
989	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 0.875 INCH X 8.75 INCH	880
990	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.0 INCH X 7.75 INCH	552
991	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.0 INCH X 7.25 INCH	160
992	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.0 INCH X 6.25 INCH	64
993	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.0 INCH X 8.25 INCH	32
994	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.0 INCH X 8.75 INCH	148
995	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.125 INCH X 7 INCH	96
996	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.125 INCH X 8 INCH	32
997	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.125 INCH X 8.25 INCH	72
998	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.125 INCH X 8.75 INCH	156
999	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.125 INCH X 9.5 INCH	44
1000	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.125 INCH X 10 INCH	12
1001	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.25 INCH X 8 INCH	20

1002	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.25 INCH X 11.25 INCH	32
1003	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.25 INCH X 10 INCH	120
1004	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.25 INCH X 9 INCH	48
1005	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.25 INCH X 9.75 INCH	208
1006	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.375 INCH X 15.5 INCH	36
1007	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.375 INCH X 12.75 INCH	288
1008	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7, A194 GR.2H, 1.625 INCH X 14 INCH	192
1009	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7(GALV), A194 2H(GALV), 0.5 INCH X 2.5 INCH	4
1010	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7(GALV), A194 2H(GALV), 0.5 INCH X 2.75 INCH	24
1011	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7(GALV), A194 2H(GALV), 0.625 INCH X 3.25 INCH	56
1012	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7(GALV), A194 2H(GALV), 0.625 INCH X 3.75 INCH	128
1013	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7(GALV), A194 2H(GALV), 0.625 INCH X 4.0 INCH	12
1014	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7(GALV), A194 2H(GALV), 0.625 INCH X 4.25 INCH	8
1015	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7(GALV), A194 2H(GALV), 0.75 INCH X 3.5 INCH	32
1016	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NACE, 0.625 INCH X 3.25 INCH	24
1017	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NACE, 0.625 INCH X 3.75 INCH	64
1018	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NACE, 0.625 INCH X 4.25 INCH	8
1019	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NACE, 0.625 INCH X 4.0 INCH	16
1020	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NACE, 0.75 INCH X 4.0 INCH	16
1021	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NACE, 0.75 INCH X 4.25 INCH	32
1022	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NACE, 0.75 INCH X 4.5 INCH	16
1023	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NACE, 1.125 INCH X 9.5 INCH	396
1024	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NACE, 1.125 INCH X 12.25 INCH	88
1025	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NACE, 1.875 INCH X 17.75 INCH	80
1026	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.5 INCH X 2.5 INCH	184
1027	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.5 INCH X 2.75 INCH	36
1028	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.625 INCH X 4.75 INCH	24
1029	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.625 INCH X 3.75 INCH	212
1030	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.625 INCH X 4.0 INCH	8
1031	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.625 INCH X 4.25 INCH	16
1032	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.625 INCH X 3.25 INCH	208
1033	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.625 INCH X 3.0 INCH	124
1034	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.625 INCH X 3.5 INCH	632
1035	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.75 INCH X 4.0 INCH	160
1036	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.75 INCH X 3.5 INCH	36
1037	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.75 INCH X 4.25 INCH	648
1038	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.75 INCH X 7.5 INCH	40
1039	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.75 INCH X 5.75 INCH	92
1040	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.75 INCH X 5.5 INCH	16
1041	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.75 INCH X 5.0 INCH	36
1042	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.75 INCH X 4.5 INCH	48
1043	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.75 INCH X 4.75 INCH	88
1044	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.875 INCH X 5.5 INCH	48
1045	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.875 INCH X 4.75 INCH	48
1046	BOLT.STUD WITH 2 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 0.875 INCH X 6.75 INCH	44
1047	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 1.0 INCH X 6.25 INCH	144
1048	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 1.0 INCH X 7.25 INCH	96
1049	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 1.125 INCH X 7.5 INCH	140
1050	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 1.125 INCH X 8.75 INCH	40
1051	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 1.25 INCH X 11.75 INCH	288
1052	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 1.25 INCH X 9.5 INCH	20
1053	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 1.25 INCH X 9.25 INCH	96
1054	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 1.25 INCH X 8.75 INCH	40
1055	BOLT.STUD WITH 3 NUTS, B-18.2, A193 GR.B7M, A194 GR.2HM, NAC6, 1.25 INCH X 8.0 INCH	100
1056	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL, SPIRAL, 300, NAC6, 0.5 INCH	4
1057	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL, SPIRAL, 300, NAC6, 0.75 INCH	30
1058	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL, SPIRAL, 300, NAC6, 1.5 INCH	4
1059	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL, SPIRAL, 300, NAC6, 2.0 INCH	68
1060	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL, SPIRAL, 300, NAC6, 3.0 INCH	97
1061	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 0.75 INCH	30
1062	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 1.0 INCH	2
1063	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 600, 1.5 INCH	5
1064	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 1.5 INCH	25
1065	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 2.0 INCH	52

1066	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 600, 2.0 INCH	14
1067	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 3.0 INCH	38
1068	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 600, 4.0 INCH	2
1069	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 4.0 INCH	26
1070	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 6.0 INCH	15
1071	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 8.0 INCH	12
1072	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 10.0 INCH	8
1073	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 600, 10.0 INCH	6
1074	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 600, 12.0 INCH	1
1075	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 12.0 INCH	2
1076	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 14.0 INCH	2
1077	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 18.0 INCH	2
1078	GASKET, B-16.20-ANSI B16.47B, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 30.0 INCH	10
1079	GASKET, B-16.20-ANSI B16.47B, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, 36.0 INCH	6
1080	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NACE, 3.0 INCH	4
1081	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NACE, 4.0 INCH	2
1082	GASKET, B-16.20-ANSI B16.47B, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NACE, 48.0 INCH	2
1083	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NAC6, 0.75 INCH	9
1084	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NAC6, 1.5 INCH	5
1085	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NAC6, 2.0 INCH	12
1086	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NAC6, 3.0 INCH	5
1087	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NAC6, 4.0 INCH	6
1088	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NAC6, 6.0 INCH	5
1089	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NAC6, 10.0 INCH	4
1090	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NAC6, 16.0 INCH	2
1091	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NAC6, 20.0 INCH	4
1092	GASKET, B-16.20-ANSI B16.47B, SP.WND SS316+GRAFIL+ I RING, SPIRAL, 300, NAC6, 28.0 INCH	8
1093	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 600, 0.75 INCH	18
1094	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 600, 1.0 INCH	4
1095	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 600, 1.5 INCH	12
1096	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 300, 1.5 INCH	1
1097	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 300, 2.0 INCH	1
1098	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 600, 2.0 INCH	113
1099	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 600, 3.0 INCH	109
1100	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 600, 4.0 INCH	57
1101	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 600, 6.0 INCH	65
1102	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 600, 8.0 INCH	15
1103	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 600, 10.0 INCH	17
1104	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 300, 10.0 INCH	4
1105	GASKET, B-16.20-ANSI B16.5, SP.WND SS316L+GRAFIL+ I RING, SPIRAL, 600, 12.0 INCH	6
1106	GASKET, B-16.21-ANSI B16.5, NONASB. SYN FIBRE+ RUBR BINDER, FULLFACE, 150, 1.0 INCH, 2 MM	1
1107	GASKET, B-16.21-ANSI B16.5, NONASB. SYN FIBRE+ RUBR BINDER, FULLFACE, 300, 1.5 INCH, 2 MM	8
1108	GASKET, B-16.21-ANSI B16.5, NONASB. SYN FIBRE+ RUBR BINDER, FULLFACE, 150, 1.5 INCH, 2 MM	6
1109	GASKET, B-16.21-ANSI B16.5, NONASB. SYN FIBRE+ RUBR BINDER, FULLFACE, 150, 2.0 INCH, 2 MM	18
1110	GASKET, B-16.21-ANSI B16.5, NONASB. SYN FIBRE+ RUBR BINDER, FULLFACE, 150, 3.0 INCH, 2 MM	25
1111	GASKET, B-16.21-ANSI B16.5, NONASB. SYN FIBRE+ RUBR BINDER, FULLFACE, 150, 4.0 INCH, 2 MM	10
1112	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFOIL+I RING, SPIRAL, 300, 1.5 INCH	4
1113	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFOIL+I RING, SPIRAL, 300, 4.0 INCH	2
1114	GASKET, B-16.20-ANSI B16.5, SP.WND SS316+GRAFOIL+I RING, SPIRAL, 300, 6.0 INCH	4
1115	GASKET, B-16.21-ANSI B16.5, NONASBESTOS BS7531 GR X, RING, 150, 0.75 INCH, 2 MM	306
1116	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 0.5 INCH	8
1117	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 0.75 INCH	119
1118	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 1.0 INCH	9
1119	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 1.5 INCH	19
1120	GASKET, B-16.21-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 2.0 INCH	12
1121	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 2.0 INCH	194
1122	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 3.0 INCH	136
1123	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 4.0 INCH	142
1124	GASKET, B-16.21-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 4.0 INCH	29
1125	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 6.0 INCH	192
1126	GASKET, B-16.21-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 6.0 INCH	8
1127	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 8.0 INCH	120
1128	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 10.0 INCH	174
1129	GASKET, B-16.21-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 10.0 INCH	4

1130	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 12.0 INCH	67
1131	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 16.0 INCH	4
1132	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 18.0 INCH	10
1133	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 24.0 INCH	2
1134	GASKET, B-16.20-ANSI B16.47B, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 30.0 INCH	9
1135	GASKET, B-16.20-ANSI B16.47B, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 36.0 INCH	63
1136	GASKET, B-16.20-ANSI B16.47B, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 44.0 INCH	2
1137	GASKET, B-16.20-ANSI B16.47B, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, 48.0 INCH	3
1138	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NACE, 2.0 INCH	6
1139	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NACE, 3.0 INCH	24
1140	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NACE, 4.0 INCH	3
1141	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NACE, 6.0 INCH	3
1142	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NACE, 24.0 INCH	1
1143	GASKET, B-16.20-ANSI B16.47B, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NACE, 48.0 INCH	14
1144	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 0.75 INCH	60
1145	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 2.0 INCH	56
1146	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 3.0 INCH	13
1147	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 4.0 INCH	26
1148	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 6.0 INCH	24
1149	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 10.0 INCH	12
1150	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 16.0 INCH	14
1151	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 20.0 INCH	12
1152	GASKET, B-16.20-ANSI B16.5, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 24.0 INCH	7
1153	GASKET, B-16.20-ANSI B16.47B, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 28.0 INCH	4
1154	GASKET, B-16.20-ANSI B16.47B, LS SP.WND SS316+FLEX GRAFIL+IR, SPIRAL, 150, NAC6, 36.0 INCH	2
1155	GASKET, B-16.20-ANSI B16.5, LS SPWND SS316L+FLEX GRAFIL+IR, SPIRAL, 150, 0.75 INCH	6
1156	GASKET, B-16.20-ANSI B16.5, LS SPWND SS316L+FLEX GRAFIL+IR, SPIRAL, 150, 2.0 INCH	2
1157	GASKET, B-16.20-ANSI B16.5, LS SPWND SS316L+FLEX GRAFIL+IR, SPIRAL, 150, 10.0 INCH	6
1158	SPLIT EQUAL TEE, B16.9, ASTM A234 WPB, BW, SP-1, 3.0 INCH, STD (EQUAL TEE TO BE IN TWO HALVES FOR USE IN JACK	11

PROJECT ENGINEERING & SYSTEMS DIVISION
LAYOUTS & PIPING ENGINEERING

INPUT TO E&C TENDER

PROJECT: IOCL PARADIP 525 TPD STANDBY SRU

PE&SD SCOPE OF PIPING ENGINEERING

(INCLUDES IBR PIPING BEING SUPPLIED BY BHEL-PC)

DOC NO: PY-AE-4-M 170-2001-01

REV: 00

DATE: 03.08.2021

INPUT DATA

TABLE-1

ESTIMATED WEIGHT OF PIPING SYSTEMS INCL VALVES (IN MT)
CONSOLIDATED SUMMARY

MATERIAL	IBR	NON IBR	TOTAL
Alloy Steel (P11)	5.17	-	5.17
Stainless Steel (304L, 316L)	-	5.78	5.78
Carbon Steel (Plain)	254.07	823.30	1,077.37
Carbon Steel (Galvanised)	-	11.62	11.62
Carbon Steel (Internal Epoxy Coated)	-	11.67	11.67
TOTAL	259.24	852.37	1,111.60

NON IBR BREAKUP	
NON IBR NACE (+HIC)	NON IBR NON NACE
-	-
-	5.78
347.26	476.04
-	11.62
-	11.67
347.26	505.11

TABLE-2

ESTIMATED WEIGHT OF PIPING SYSTEMS INCL VALVES (IN MT)
ITEM WISE SUMMARY

MATERIAL	IBR	NON IBR	TOTAL
PIPES			
Alloy Steel (P11)	2.19	-	2.19
Stainless Steel (304L, 316L)	-	4.38	4.38
Carbon Steel (Plain)	183.99	582.55	766.54
Carbon Steel (Galvanised)	-	8.45	8.45
Carbon Steel (Internal Epoxy Coated)	-	10.76	10.76
SUB TOTAL	186.18	606.14	792.32
FITTINGS (ELBOW, TEE, REDUCER, CROSS, STUB)			
Alloy Steel (P11)	0.28	-	0.28
Stainless Steel (304L, 316L)	-	0.24	0.24
Carbon Steel (Plain)	19.89	104.78	124.66
Carbon Steel (Galvanised)	-	0.71	0.71
Carbon Steel (Internal Epoxy Coated)	-	0.52	0.52
SUB TOTAL	20.17	106.25	126.42
FLANGES (FLANGE, BLIND FLANGE, FIG 8 BLANK, SPACER & BLANK)			
Alloy Steel (P11)	0.57	-	0.57
Stainless Steel (304L, 316L)	-	0.40	0.40
Carbon Steel (Plain)	15.03	71.13	86.16
Carbon Steel (Galvanised)	-	0.34	0.34
Carbon Steel (Internal Epoxy Coated)	-	0.39	0.39
SUB TOTAL	15.60	72.25	87.85
GASKETS (METALLIC SPIRAL WOUND, NBR SHEET)			
Alloy Steel (P11)	-	-	-
Stainless Steel (304L, 316L)	-	-	-
Carbon Steel (Plain)	-	3.23	3.23
Carbon Steel (Galvanised)	-	-	-
Carbon Steel (Internal Epoxy Coated)	-	-	-
SUB TOTAL	-	3.23	3.23

NON IBR BREAKUP	
NON IBR NACE (+HIC)	NON IBR NON NACE
-	-
-	4.38
253.28	329.27
-	8.45
-	10.76
253.28	352.86
-	-
-	0.24
41.96	62.82
-	0.71
-	0.52
41.96	64.29
-	-
-	0.40
20.75	50.38
-	0.34
-	0.39
20.75	51.50
-	-
0.81	2.42
-	-
-	-
0.81	2.42

BOLTING (STUD WITH 2 NUTS, STUD WITH 3 NUTS)			
Alloy Steel (P11)	0.19	-	0.19
Stainless Steel (304L, 316L)	-	-	-
Carbon Steel (Plain)	-	15.73	15.73
Carbon Steel (Galvanised)	-	0.07	0.07
Carbon Steel (Internal Epoxy Coated)	-	-	-
SUB TOTAL	0.19	15.80	15.99
VALVES (GATE, GLOBE, CHECK, PLUG, BALL, BUTTERFLY)			
Alloy Steel (P11)	1.94	-	1.94
Stainless Steel (304L, 316L)	-	0.77	0.77
Carbon Steel (Plain)	35.17	45.88	81.05
Carbon Steel (Galvanised)	-	2.05	2.05
Carbon Steel (Internal Epoxy Coated)	-	-	-
SUB TOTAL	37.10	48.70	85.80

-	-
-	-
4.17	11.56
-	0.07
-	-
4.17	11.64
-	-
-	0.77
26.29	19.59
-	2.05
-	-
26.29	22.41

TABLE-3
ESTIMATED INCH-DIA OF PIPING SYSTEMS

MATERIAL	IBR	NON IBR	TOTAL
Alloy Steel (P11)	212	-	212
Stainless Steel (304L, 316L)	-	343	343
Carbon Steel (Plain)	9,348	25,755	35,103
Carbon Steel (Galvanised)	-	687	687
Carbon Steel (Internal Epoxy Coated)	-	481	481
TOTAL	9,560	27,266	36,826

NON IBR BREAKUP	
NON IBR NACE (+HIC)	NON IBR NON NACE
-	-
-	343
11,493	14,262
-	687
-	481
11,493	15,773

TABLE-4
ESTIMATED INCH-METER OF PIPING SYSTEMS

MATERIAL	IBR	NON IBR	TOTAL
Alloy Steel (P11)	339	-	339
Stainless Steel (304L, 316L)	-	1,233	1,233
Carbon Steel (Plain)	34,216	1,04,195	1,38,411
Carbon Steel (Galvanised)	-	2,662	2,662
Carbon Steel (Internal Epoxy Coated)	-	2,260	2,260
TOTAL	34,555	1,10,350	1,44,905

NON IBR BREAKUP	
NON IBR NACE (+HIC)	NON IBR NON NACE
-	-
-	1,233
43,154	61,041
-	2,662
-	2,260
43,154	67,196

TABLE-5
ESTIMATED SURFACE AREA OF PIPING SYSTEMS (SQ. METERS)

MATERIAL	IBR	NON IBR	TOTAL
Alloy Steel (P11)	30	-	30
Stainless Steel (304L, 316L)	-	106	106
Carbon Steel (Plain)	2,962	8,889	11,851
Carbon Steel (Galvanised)	-	254	254
Carbon Steel (Internal Epoxy Coated)	-	196	196
TOTAL	2,991	9,446	12,437

NON IBR BREAKUP	
NON IBR NACE (+HIC)	NON IBR NON NACE
-	-
-	106
3,529	5,360
-	254
-	196
3,529	5,916

IMPORTANT NOTES

- 1 The above values and the values provided in the Annexures are exclusive of Piping Supports, Steel for Pipe Supports, Piping Insulation and other Piping Specialities. This input is in addition to the input already provided for Piping Tie-in Scope and ControTrace application for existing Piping.
- 2 IBR Piping is being supplied by BHEL Piping Centre, Chennai. Necessary approvals for IBR Pipe Spool fabrication shall be obtained by BHEL Piping Center, Chennai from CIB of Tamilnadu (where pre-fabrication takes place).
Erection Agency to obtain the final IBR approval from CIB, State of Odisha, where Erection takes place.
- 3 Non IBR Piping will be supplied by PE&SD (through Customer approved Vendor).
- 4 All Piping of size NB50 and above, shall be supplied as per the following philosophy:

A IBR (By BHEL Piping Center)
 - a) Pipes will be spooled (cut to length as per Isometric).
 - b) All pipe spools will be edge prepared as per requirement.
 - c) All Stubs (Pressure tap-offs, Temp tap-offs, Vent & Drain tap-offs and all pipe to pipe tees & stubs) will be welded onto the Main Pipe.
 - d) All Fittings other than the Stubs, will be supplied loose duly edge prepared as per requirement.
 - e) All Flanges, Gaskets & Stud Nuts will be supplied loose.
 - f) All Valves will be supplied loose.
 - g) Pipe Spools & Fittings shall be delivered after Surface preparation and Application of Primer as per Customer Specification.
 - h) Welding Electrodes shall not be supplied by PC and the same shall be arranged by Erection Agency.
B Non IBR (By PE&SD)
 - a) Pipes will be spooled (cut to length as per Isometric).
 - b) All pipe spools will be edge prepared as per requirement.
 - c) All Stubs (Pressure tap-offs, Temp tap-offs, Vent & Drain tap-offs and all pipe to pipe tees & stubs) will be welded onto the Main Pipe.
 - d) All Fittings other than the Stubs, will be supplied loose duly edge prepared as per requirement.
Wherever possible, atleast one fitting will be welded to the adjoining Pipe spool to minimise site welding.
 - e) All Flanges, Gaskets & Stud Nuts will be supplied loose.
 - f) All Valves will be supplied loose.
 - g) Pipe Spools & Fittings shall be delivered after Surface preparation and Application of Primer as per Customer Specification.
 - h) Welding Electrodes shall not be supplied by PE&SD and the same shall be arranged by Erection Agency.
 - i) Jacketed Piping shall be supplied completely pre-fabricated with Flanged joints.
- 5 All Piping (both IBR and Non IBR Piping) of size below NB50, shall be supplied as per the following philosophy:
 - a) Pipes will be supplied loose in single random length of 3 to 7 metres.
 - b) All Stubs (Pressure tap-offs, Temp tap-offs, Vent & Drain tap-offs and all pipe to pipe tees & stubs) will be supplied loose.
 - c) All Fittings, Flanges, Gaskets & Stud Nuts will be supplied loose.
 - d) All Valves will be supplied loose.
 - e) All Pipes, Fittings & Flanges shall be delivered after Surface preparation and Application of Primer as per Customer Specification.
 - f) Required Welding Electrodes shall be arranged by Erection Agency.
- 6 Primer Repair (if any), Intermediate Paint and Final Paint (Supply & Application) as per Customer Specification for both IBR and Non IBR Piping is in the scope of the Erection Agency.
- 7 Any modification to be carried out at site (to be duly approved by PE&SD) on the pre-fabricated piping spools shall be done by the Erection Agency.
- 8 Pipe shoe fabrication and welding of the pipe shoe to the Main Pipe including welding of shoe pad is in scope of Erection Agency. Necessary plates, pipes shall be supplied loose.
- 9 Spring Hangers and Rigid Hangers will be supplied in assemblies / part-assemblies. Cutting of hanger rods (if required) to adjust the Hanger length suit to site requirement, is in erection agency scope.
- 10 Fabrication and Installation of Auxiliary Structure for Pipe Supports is in the scope of Erection Agency. Necessary Structural Steel and Plates shall be supplied loose.
- 11 Surface preparation of Structural Steel supplied for Pipe & Cable Tray Supports is in the scope of Erection Agency. Supply & Application of Primer and Final painting for the structural steel is also in the scope of Erection Agency.
- 12 In general, Embedded steel plates / Concrete pedestals with a steel plate are provided on the Grade/ Floor/ Wall/ Slab / Ceiling for Pipe Supports. However, if such provision is not made because of any reason, where a pipe support is envisaged, then a steel plate shall be provided with the help of Anchor fasteners by Erection Agency. The plate will be supplied by PE&SD. Procurement of Anchor Fasteners and Installation of Steel Plate with the help of Anchor fasteners shall be in the scope of Erection Agency.

-
- 13 The Material required for temporary supports are to be arranged by Erection Agency.
- 14 Insulation Mattress, Aluminium Cladding & Insulation Anciliaries will be supplied under separate packages. Application of Thermal Insulation for Piping is in the Scope of Erection Agency.
- 15 Access platforms wherever required as per Piping Layout/ as per final site conditions, are in the scope of Erection Agency.
- 16 Valves are supplied by BHEL-Trichy and other PE&SD Vendors.
- 17 The final piping hook-up at all the Terminal Points is in the Scope of BHEL.
- 18 Hot Tapping, wherever envisaged shall be in the Scope of Erection Agency, including the Material required for Hot Tapping.
- 19 NB40 & below piping shall be site routed by Erection Agency. Indicative routing of these lines shall be provided by PE&SD. Erection Agency to take prior approval from PE&SD for routing of these lines.
- 20 **Erection and Commissioning of Piping Systems shall be carried out by the Erection Agency according to the relevant Construction Specifications provided by IOCL/ Technip as part of the Contract Specification.**
- 21 Inputs pertaining to Fire Protection System and Underground Systems, is provided separately by MPG and Civil respectively.
- 22 Enclosures:
- Annexure - A PIPE SIZE WISE DATA SUMMARY
- Annexure - B INPUTS FOR MISCELLANEOUS ITEMS
-

Prepared by

V Uday Kumar
Manager

Approved by

Srikanth G
DGM

INPUT TO E&C TENDER

PROJECT: IOCL PARADIP 525 TPD STANDBY SRU

PE&SD SCOPE OF PIPING ENGINEERING (INCLUDES IBR PIPING BEING SUPPLIED BY BHEL-PC)

PIPE SIZE WISE DATA SUM MARY

ANNEXURE-A

DOC NO: PY-AE-4-M170-2001-01

I TOTAL

	PIPE SIZE IN INCHES	0.5	0.75	1	1.5	2	3	4	6	8	10	12	14	16	18	20	24	28	30	36	44	48	TOTAL
A	ESTIMATED WEIGHT (MT) (EXCL BOLTING)																						
	Alloy Steel (P11)	0.02	-	-	0.10	0.18	-	-	-	-	4.68	-	-	-	-	-	-	-	-	-	-	-	4.98
	Stainless Steel (304L, 316L)	-	0.04	-	0.06	0.04	-	-	-	-	5.64	-	-	-	-	-	-	-	-	-	-	-	5.78
	Carbon Steel (Plain)	12.69	12.97	2.33	8.07	18.52	35.61	40.73	74.36	58.98	74.71	40.42	3.15	41.88	39.61	34.75	45.74	20.62	51.41	156.88	46.08	242.15	1,061.64
	Carbon Steel (Galvanised)	0.01	0.06	1.41	1.52	2.21	3.51	2.29	0.04	-	0.49	-	-	-	-	-	-	-	-	-	-	-	11.55
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	1.37	1.59	-	8.72	-	-	-	-	-	-	-	-	-	-	-	11.67
	SUB TOTAL	12.72	13.07	3.74	9.76	20.95	39.13	44.38	75.98	58.98	94.23	40.42	3.15	41.88	39.61	34.75	45.74	20.62	51.41	156.88	46.08	242.15	1,095.61
B	ESTIMATED INCH DIA																						
	Alloy Steel (P11)	1	-	-	22	21	-	-	-	-	168	-	-	-	-	-	-	-	-	-	-	-	212
	Stainless Steel (304L, 316L)	-	6	-	28	9	-	-	-	-	300	-	-	-	-	-	-	-	-	-	-	-	343
	Carbon Steel (Plain)	743	773	190	526	694	1,552	1,721	2,490	2,053	2,376	1,262	169	1,544	1,756	1,296	2,197	978	1,620	3,509	1,427	6,227	35,103
	Carbon Steel (Galvanised)	1	12	85	97	129	216	147	-	-	-	-	-	-	-	-	-	-	-	-	-	-	687
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	73	96	-	312	-	-	-	-	-	-	-	-	-	-	-	481
	SUB TOTAL	745	791	275	673	853	1,768	1,941	2,586	2,053	3,156	1,262	169	1,544	1,756	1,296	2,197	978	1,620	3,509	1,427	6,227	36,826
C	ESTIMATED INCH METER																						
	Alloy Steel (P11)	2	-	-	17	26	-	-	-	-	294	-	-	-	-	-	-	-	-	-	-	-	339
	Stainless Steel (304L, 316L)	-	4	-	22	3	-	-	-	-	1,204	-	-	-	-	-	-	-	-	-	-	-	1,233
	Carbon Steel (Plain)	4,232	3,373	556	2,052	2,760	6,290	7,004	10,115	8,682	9,254	5,276	451	6,833	5,268	4,984	6,487	2,078	5,460	13,458	5,976	27,822	1,38,411
	Carbon Steel (Galvanised)	2	14	380	305	583	958	420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,662
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	314	336	-	1,610	-	-	-	-	-	-	-	-	-	-	-	2,260
	SUB TOTAL	4,236	3,391	936	2,396	3,372	7,248	7,738	10,451	8,682	12,362	5,276	451	6,833	5,268	4,984	6,487	2,078	5,460	13,458	5,976	27,822	1,44,905
D	ESTIMATED NO OF WELDS																						
	Alloy Steel (P11)	1	-	-	13	10	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-	41
	Stainless Steel (304L, 316L)	-	7	-	17	4	-	-	-	-	30	-	-	-	-	-	-	-	-	-	-	-	58
	Carbon Steel (Plain)	1,472	1,001	173	338	334	505	425	409	254	238	104	12	96	97	65	91	35	54	97	32	130	5,962
	Carbon Steel (Galvanised)	1	14	82	61	62	71	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	327
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	18	16	-	31	-	-	-	-	-	-	-	-	-	-	-	65
	SUB TOTAL	1,474	1,022	255	429	410	576	479	425	254	316	104	12	96	97	65	91	35	54	97	32	130	6,453
E	ESTIMATED LENGTH OF PIPE (MTRS)																						
	Alloy Steel (P11)	2	-	-	10	11	-	-	-	-	25	-	-	-	-	-	-	-	-	-	-	-	48
	Stainless Steel (304L, 316L)	-	4	-	12	1	-	-	-	-	103	-	-	-	-	-	-	-	-	-	-	-	120
	Carbon Steel (Plain)	7,252	3,851	475	1,172	1,182	1,796	1,500	1,445	930	793	377	28	366	251	214	232	64	156	320	116	497	23,017
	Carbon Steel (Galvanised)	2	16	325	174	250	274	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,131
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	67	48	-	138	-	-	-	-	-	-	-	-	-	-	-	253
	SUB TOTAL	7,256	3,871	800	1,368	1,444	2,070	1,657	1,493	930	1,059	377	28	366	251	214	232	64	156	320	116	497	24,569

INPUT TO E&C TENDER

PROJECT: IOCL PARADIP 525 TPD STANDBY SRU

PE&SD SCOPE OF PIPING ENGINEERING (INCLUDES IBR PIPING BEING SUPPLIED BY BHEL-PC)

PIPE SIZE WISE DATA SUMMARY

ANNEXURE-A

DOC NO: PY-AE-4-M170-2001-01

F	ESTIMATED NO OF VALVES																						
	Alloy Steel (P11)	9	-	-	2	2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	15	
	Stainless Steel (304L, 316L)	-	7	-	-	1	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	11	
	Carbon Steel (Plain)	319	510	91	121	237	143	80	79	24	22	4	-	7	2	4	2	-	1	4	-	4	1,654
	Carbon Steel (Galvanised)	2	7	24	25	13	8	18	4	-	2	-	-	-	-	-	-	-	-	-	-	103	
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	SUB TOTAL	330	524	115	148	253	151	98	83	24	29	4	-	7	2	4	2	-	1	4	-	4	1,783

II IBR

	PIPE SIZE IN INCHES	0.5	0.75	1	1.5	2	3	4	6	8	10	12	14	16	18	20	24	28	30	36	44	48	TOTAL
A	ESTIMATED WEIGHT (MT) (EXCL BOLTING)																						
	Alloy Steel (P11)	0.02	-	-	0.10	0.18	-	-	-	-	4.68	-	-	-	-	-	-	-	-	-	-	-	4.98
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Plain)	0.10	2.97	0.85	6.85	10.87	11.30	24.15	34.55	20.95	35.76	28.49	-	7.16	39.25	7.76	23.07	-	-	-	-	-	254.07
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUB TOTAL	0.13	2.97	0.85	6.95	11.05	11.30	24.15	34.55	20.95	40.44	28.49	-	7.16	39.25	7.76	23.07	-	-	-	-	-	259.05
B	ESTIMATED INCH DIA																						
	Alloy Steel (P11)	1	-	-	22	21	-	-	-	-	168	-	-	-	-	-	-	-	-	-	-	-	212
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Plain)	4	158	82	408	395	483	842	886	701	1,128	929	-	291	1,734	384	923	-	-	-	-	-	9,348
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUB TOTAL	5	158	82	430	416	483	842	886	701	1,296	929	-	291	1,734	384	923	-	-	-	-	-	9,560
C	ESTIMATED INCH METER																						
	Alloy Steel (P11)	2	-	-	17	26	-	-	-	-	294	-	-	-	-	-	-	-	-	-	-	-	339
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Plain)	3	655	225	1,817	1,868	1,739	3,351	3,142	2,297	3,976	3,596	-	807	5,268	1,372	4,100	-	-	-	-	-	34,216
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUB TOTAL	5	655	225	1,834	1,894	1,739	3,351	3,142	2,297	4,270	3,596	-	807	5,268	1,372	4,100	-	-	-	-	-	34,555
D	ESTIMATED NO OF WELDS																						
	Alloy Steel (P11)	1	-	-	13	10	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-	41
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Plain)	5	204	73	265	193	156	208	145	86	113	77	-	18	96	19	38	-	-	-	-	-	1,696
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUB TOTAL	6	204	73	278	203	156	208	145	86	130	77	-	18	96	19	38	-	-	-	-	-	1,737

INPUT TO E&C TENDER
PROJECT: IOCL PARADIP 525 TPD STANDBY SRU
PE&SD SCOPE OF PIPING ENGINEERING (INCLUDES IBR PIPING BEING SUPPLIED BY BHEL-PC)
PIPE SIZE WISE DATA SUM MARY
ANNEXURE-A
DOC NO: PY-AE-4-M170-2001-01

E	ESTIMATED LENGTH OF PIPE (MTRS)																					
	Alloy Steel (P11)	2	-	-	10	11	-	-	-	-	25	-	-	-	-	-	-	-	-	-	-	48
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Plain)	4	748	192	1,038	800	497	718	449	246	341	257	-	43	251	59	146	-	-	-	-	5,789
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUB TOTAL	6	748	192	1,048	811	497	718	449	246	366	257	-	43	251	59	146	-	-	-	-	5,837

F	ESTIMATED NO OF VALVES																					
	Alloy Steel (P11)	9	-	-	2	2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	15
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Plain)	20	184	35	94	142	42	37	34	14	12	4	-	2	2	-	-	-	-	-	-	622
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUB TOTAL	29	184	35	96	144	42	37	34	14	14	4	-	2	2	-	-	-	-	-	-	637

III NON IBR (NACE & NACE + HIC)

	PIPE SIZE IN INCHES	0.5	0.75	1	1.5	2	3	4	6	8	10	12	14	16	18	20	24	28	30	36	44	48	TOTAL
A	ESTIMATED WEIGHT (MT) (EXCL BOLTING)																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Plain)	0.07	1.19	0.15	0.04	2.84	18.68	5.31	6.82	0.15	9.42	-	-	34.70	-	26.99	22.49	20.62	-	23.65	-	169.97	343.09
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUB TOTAL	0.07	1.19	0.15	0.04	2.84	18.68	5.31	6.82	0.15	9.42	-	-	34.70	-	26.99	22.49	20.62	-	23.65	-	169.97	343.09
B	ESTIMATED INCH DIA																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Plain)	7	95	15	24	96	778	321	349	59	372	-	-	1,253	-	912	1,216	978	-	867	-	4,151	11,493
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUB TOTAL	7	95	15	24	96	778	321	349	59	372	-	-	1,253	-	912	1,216	978	-	867	-	4,151	11,493
C	ESTIMATED INCH METER																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Plain)	10	163	20	3	228	3,638	1,278	925	12	1,386	-	-	6,026	-	3,612	2,387	2,078	-	3,176	-	18,212	43,154
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUB TOTAL	10	163	20	3	228	3,638	1,278	925	12	1,386	-	-	6,026	-	3,612	2,387	2,078	-	3,176	-	18,212	43,154

INPUT TO E&C TENDER

PROJECT: IOCL PARADIP 525 TPD STANDBY SRU

PE&SD SCOPE OF PIPING ENGINEERING (INCLUDES IBR PIPING BEING SUPPLIED BY BHEL-PC)

PIPE SIZE WISE DATA SUMMARY

ANNEXURE-A

DOC NO: PY-AE-4-M170-2001-01

D	ESTIMATED NO OF WELDS																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Carbon Steel (Plain)	10	116	13	14	44	256	79	56	7	37	-	-	78	-	46	50	35	-	24	-	86	951
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	SUB TOTAL	10	116	13	14	44	256	79	56	7	37	-	-	78	-	46	50	35	-	24	-	86	951

E	ESTIMATED LENGTH OF PIPE (MTRS)																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Carbon Steel (Plain)	17	185	17	1	97	1,039	274	132	1	119	-	-	323	-	155	85	64	-	76	-	325	2,910
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	SUB TOTAL	17	185	17	1	97	1,039	274	132	1	119	-	-	323	-	155	85	64	-	76	-	325	2,910

F	ESTIMATED NO OF VALVES																					
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stainless Steel (304L, 316L)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Plain)	7	120	8	-	64	57	8	11	-	3	-	-	4	-	4	2	-	-	-	4	292
	Carbon Steel (Galvanised)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SUB TOTAL	7	120	8	-	64	57	8	11	-	3	-	-	4	-	4	2	-	-	-	4	292

IV NON IBR (NON NACE)

	PIPE SIZE IN INCHES	0.5	0.75	1	1.5	2	3	4	6	8	10	12	14	16	18	20	24	28	30	36	44	48	TOTAL
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A	ESTIMATED WEIGHT (MT) (EXCL BOLTING)																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stainless Steel (304L, 316L)	-	0.04	-	0.06	0.04	-	-	-	-	5.64	-	-	-	-	-	-	-	-	-	-	-	5.78
	Carbon Steel (Plain)	12.51	8.81	1.34	1.17	4.82	5.63	11.27	32.99	37.88	29.53	11.93	3.15	0.01	0.36	-	0.18	-	51.41	133.23	46.08	72.18	464.48
	Carbon Steel (Galvanised)	0.01	0.06	1.41	1.52	2.21	3.51	2.29	0.04	-	0.49	-	-	-	-	-	-	-	-	-	-	-	11.55
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	1.37	1.59	-	8.72	-	-	-	-	-	-	-	-	-	-	-	11.67
	SUB TOTAL	12.52	8.92	2.75	2.76	7.06	9.14	14.92	34.61	37.88	44.38	11.93	3.15	0.01	0.36	-	0.18	-	51.41	133.23	46.08	72.18	493.47

B	ESTIMATED INCH DIA																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Stainless Steel (304L, 316L)	-	6	-	28	9	-	-	-	-	300	-	-	-	-	-	-	-	-	-	-	-	343
	Carbon Steel (Plain)	732	520	93	94	203	291	558	1,255	1,293	876	333	169	-	22	-	58	-	1,620	2,642	1,427	2,076	14,262
	Carbon Steel (Galvanised)	1	12	85	97	129	216	147	-	-	-	-	-	-	-	-	-	-	-	-	-	-	687
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	73	96	-	312	-	-	-	-	-	-	-	-	-	-	-	481
	SUB TOTAL	733	538	178	219	341	507	778	1,351	1,293	1,488	333	169	-	22	-	58	-	1,620	2,642	1,427	2,076	15,773

INPUT TO E&C TENDER

PROJECT: IOCL PARADIP 525 TPD STANDBY SRU

PE&SD SCOPE OF PIPING ENGINEERING (INCLUDES IBR PIPING BEING SUPPLIED BY BHEL-PC)

PIPE SIZE WISE DATA SUMMARY

ANNEXURE-A

DOC NO: PY-AE-4-M170-2001-01

C	ESTIMATED INCH METER																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Stainless Steel (304L, 316L)	-	4	-	22	3	-	-	-	-	1,204	-	-	-	-	-	-	-	-	-	-	1,233	
	Carbon Steel (Plain)	4,219	2,555	311	232	664	913	2,375	6,048	6,373	3,892	1,680	451	-	-	-	-	-	5,460	10,282	5,976	9,610	61,041
	Carbon Steel (Galvanised)	2	14	380	305	583	958	420	-	-	-	-	-	-	-	-	-	-	-	-	-	2,662	
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	314	336	-	1,610	-	-	-	-	-	-	-	-	-	-	2,260	
	SUB TOTAL	4,221	2,573	691	559	1,250	1,871	3,109	6,384	6,373	6,706	1,680	451	-	-	-	-	-	5,460	10,282	5,976	9,610	67,196
D	ESTIMATED NO OF WELDS																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Stainless Steel (304L, 316L)	-	7	-	17	4	-	-	-	-	30	-	-	-	-	-	-	-	-	-	-	58	
	Carbon Steel (Plain)	1,458	680	86	59	96	94	138	208	161	88	28	12	-	1	-	2	-	54	73	32	43	3,313
	Carbon Steel (Galvanised)	1	14	82	61	62	71	36	-	-	-	-	-	-	-	-	-	-	-	-	-	327	
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	18	16	-	31	-	-	-	-	-	-	-	-	-	-	65	
	SUB TOTAL	1,459	701	168	137	162	165	192	224	161	149	28	12	-	1	-	2	-	54	73	32	43	3,763
E	ESTIMATED LENGTH OF PIPE (MTRS)																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Stainless Steel (304L, 316L)	-	4	-	12	1	-	-	-	-	103	-	-	-	-	-	-	-	-	-	-	120	
	Carbon Steel (Plain)	7,231	2,918	266	132	284	260	509	864	683	334	120	28	-	-	-	-	-	156	245	116	172	14,318
	Carbon Steel (Galvanised)	2	16	325	174	250	274	90	-	-	-	-	-	-	-	-	-	-	-	-	-	1,131	
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	67	48	-	138	-	-	-	-	-	-	-	-	-	-	253	
	SUB TOTAL	7,233	2,938	591	318	535	534	666	912	683	575	120	28	-	-	-	-	-	156	245	116	172	15,822
F	ESTIMATED NO OF VALVES																						
	Alloy Steel (P11)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Stainless Steel (304L, 316L)	-	7	-	-	1	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	11	
	Carbon Steel (Plain)	293	207	48	28	31	44	35	34	10	7	-	-	-	-	-	-	1	4	-	-	742	
	Carbon Steel (Galvanised)	2	7	24	25	13	8	18	4	-	2	-	-	-	-	-	-	-	-	-	-	103	
	Carbon Steel (Internal Epoxy Coated)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	SUB TOTAL	295	221	72	53	45	52	53	38	10	12	-	-	-	-	-	-	1	4	-	-	856	

IOCL Paradip 525 TPD Standby SRU Project INPUTS FOR MISCELLANEOUS ITEMS

The Various Miscellaneous Items Which are part of piping and not covered in the main input are as follows:

- INSTALLATION OF CONTROTRACE®
- STRUCTURAL STEEL FOR THE PIPE SUPPORTS
- INSULATION FOR THE PIPING SYSTEMS
- MISCELLANEOUS PIPING ITEMS

This Miscellaneous Items are part of the E&C vendor Scope of work.

INSTALLATION OF CONTROTRACE®

1.1 Introduction

Steam Tracing on Tail Gaslines in New SRU unit is to be erected with ControTrace®, a proprietary Bolt-on Heating System from Control Southeast Inc., USA.

ControTrace®

- Is a fully engineered bolt-on heating system, for efficient Steam tracing of pipe lines
- Supplied as fully pre-fabricated bolt-on ControTrace® Panels complete with Steam supply connection and drain connection on either ends
- Bolt-on Panel is made up of individual ControTrace® elements (2" x 1" Rectangular sections) shaped to match the OD of the Pipe
- No welding is envisaged to the Parent pipe and also among the Panels
- Max length of any ControTrace® segment is 12m. Steam Jump overs between panels, from panels to jacketed valves, shall be with flexible hoses, to be supplied along with the package.
- Special Jackets shall be designed and supplied to be installed on the existing Valves

1.2 Scope of Work

- A. Installation of ControTrace®
- B. Steam supply connections from LP Steam Header to ControTrace® Panels
- C. Condensate drain connections from ControTrace® Panels to nearest condensate manifolds / Steam trap stations
- D. Installation of Steam Supply manifolds, Condensate manifolds and Steam Trap Stations, as applicable.
- E. Installation of Thermal Insulation

1	ControTrace® Package	Includes Bolt-on ControTrace® Panels formed from ControTrace® Elements, Heating Jackets for Valves and other inline components, Bolting Material, Flexible metal Jump over hoses for Steam connectivity, Heat Transfer Compound, Installation Hardware
2	Piping Package for LP Steam Piping	Valves, Steam Traps, Steam supply manifolds, Condensate manifolds for return condensate, Steam Trap stations, Pipes, Fittings, Flanges, Gaskets & Bolting
4	Inch Meter (Erection of Controtrace)	Total Inch meter for the Erection of the contro trace Piping is: 15,000. During the erection of the controtrace panels the Pipe on which the controtrace panels have to be placed are to be cleaned for any foreign particles like Rust, paint. This cleaning activity's is also part of the erection agency.

STRUCTURAL STEEL FOR PIPE SUPPORTS

- 1) Pipe Support fabrication is in Erection Agency/ Contractor Scope. Necessary plates, pipes, Structural steel Members shall be supplied loose. Pipe Support fabrication & welding is at site. Support's shall be Fabricated as per the BHEL drawings.
- 2) Spring Hangers and Rigid Hangers are supplied in Loose. The E&C agency activity involves the installation of This Spring hangers and rigid Hangers. Proper setting of this supports is part of E&C agency
- 3) Fabrication and Installation of Auxiliary Structure for Pipe Supports is in Erection Agency/ Contractor Scope. Necessary Structural Steel and Plates shall be supplied loose. Cutting of structural steel to required dimensions, welding is in erection scope.
- 4) The Material required for temporary supports are to be arranged by erection contractor.

1	Structural steel for pipe supports.	Total Structural steel which consists of plates , Angles , channels, beams is 100 Mt.
2	Spring Hangers and Rigid Hangers	Total Tonnage of Spring Hangers & Rigid hangers is 80 Mt.

INSULATION FOR THE PIPE AND EQUIPM ENT

- 1) Piping systems and certain Equipment require Insulation. The E&C agency activity involves the installation of this insulation materials along with associated Cladding and auxiliaries.

1	New Thermal Insulation Package	New Thermal Insulation has to be installed and is estimated as 200 Mt (This is inclusive of the mineral wool , Cladding ,insulation auxiliaries) Bifurcation of quantities is as follows : a. Minwool : 120 Mt b. Cladding and auxiliaries :80 Mt
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MISCELLANEOUS PIPING ITEMS

- 1) Piping systems involves Erection of the Miscellaneous inline items .They are like strainers, Blow down Valves , Angle Valve , Steam and condensate manifolds, Compact steam traps, Strahman Valves , flexible hoses , Sampling assemblies, etc . The E&C agency activity involves the installation of all this Piping speciality items.

1	Miscellaneous Piping items	The total tonnage of the Piping specialty items are estimated as 25 Mt.
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