

TD-201
Rev No. 00

Form No.



**PRODUCT STANDARD
PROJECT ENGINEERING & SYSTEMS
DIVISION HYDERABAD-503 032**

PY54017

Rev No. 00

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**JOB SPECIFICATION
FOR
RUPTURE DISC PACKAGE**

PROJECT : IOCL PARADIP SULPHUR RECOVERY UNIT

CUSTOMER : M/s. INDIA OIL CORPORATION LIMITED.

**Ref.
Doc**

**Prepared :
DSK**

**Checked :
AKS**

**Approved:
MSSN**

**Date :
09.06.22**

GENERAL:

This job specification document specifies the requirements of Rupture Discs package applicable for IOCL Paradip Sulphur Recovery Unit.

Bidder shall read this document in conjunction with '**Material Requisition for Rupture Discs (Doc. No B366-999-YR-MR-1365)**', for the technical requirements, scope of supply & services, design criteria, requirements of quality, inspection & testing, documentation etc. Bidder shall also refer to all the enclosures listed at the end of this job specification.

Bidder shall comply with all the requirements specified in the documents referred herein. In exceptional circumstances if bidder wishes to raise any queries /deviations, bidder is first advised to raise queries/deviations prior to submission of his Bid.

1. SCOPE OF SUPPLY FOR THE PROJECT:

The following items shall be supplied along with necessary accessories for each item, by the bidder as a part of Package scope of supply for the project.

- i. 1 set of 3" SS316 Rupture Discs assembly complete with Rupture Disc, Disc Holder/Safety Head, Tell-Tale Indicator Assy, Studs & Nuts, Jack Screws, J-Bolt **etc.** as per Datasheet (Doc No: B366-089-YR-DS-3115) and specification furnished as part of the said Material Requisition.
- ii. Mandatory spares as listed below

Sl.No.	Component	Qty
1	Gaskets	2 sets
2	Mandatory Spares	3 nos

The detailed scope of supply and services shall be referred in various sections of **Material Requisition Rupture Discs (Doc. No. B366-999-YR-MR-1365)**.

NOTE: Additional discs shall be considered by Vendor for carrying out burst pressure tests as per 080557C-000-JSS-1545-001.

2. Complete Technical requirements:

Bidder to carefully go through the following documents and comply to requirements.

Document Title Page	Document Number
Rupture Discs Material requirement	B366-999-YR-MR-1365
Specification Rupture Disc (for input data sheet and other requirements)	B366-089-YR-DS-3115
Vendor Data Requirements	B366-999-16-51-VDR-1365
Special Instruction To Vendor	B366-999-16-51-SIV-1365
Compliance Format	B366-999-16-51-CF-1365
Datasheet Index	B366-999-16-51-ID-1365
Job Specifications For Safety Valves (Specification requirements of only rupture disc shall be referred from this document. Safety valves is not in the vendor scope)	080557C-000-JSS-1545-001
Proven Track Record	B366-999-YR-PTR-1365



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3. DRAWING REVIEW AND APPROVAL

Vendor shall confirm in their bid for compliance in all respect for the submission of documents as follows-

Sl. No.	Document Name / Type	To Contain	Required With Offer	Required After P.O	
			Compliances from Vendor & No. of Sets Reqd.	No. of Sets Required – Engg. & Approval /Review Activities	No. of Sets Required- For Site & Customer Submission
1	(a) Drgs, Data Sheets, Catalogues, etc.	To contain complete information about the product.	1 (Addl. Copies Required - wherever Offer Docs. are subject to Review by Customer . See Spec. Requirement)	2	6
	O&M Manual Document Folder(s)	1) Submission 1-month before schedule eqpt. dispatch (Draft copy shall be submitted beforehand for review by BHEL) 2) The manual shall be submitted in an aesthetic, appropriate & durable folder(s). Each vol. shall be marked with its Vol. No. 3) <u>This Manual shall include primarily following information: -</u> i) Operational & safety instructions. ii) Environmental Safety instructions & indicating compliances of the Regulations in-force. iii) Guidelines incorporating requirements for Operation of the Equipment in Hazardous Environment- wherever applicable. iv) Master document List (MDL) doc. v) Bill of material (BOM) doc. vi) Erection Instructions. vii) Sub-vendor O&M Manuals		Adv. Copy (2 sets)- for review by BHEL	Final Copies – (16 sets)

3.1 MDL

SL.No.	Description	Due date of submission
1	Data sheet of Rupture Disc	Within 10 days from PO date
2	GAD of Rupture Disc	Within 10 days from PO date
3	QAP	Within 20 days from PO date
4	O&M Manual	Before 15 days of testing/delivery which ever is early

a) NOTES

- i) For first submission of documents: Vendor to submit the documents as per the schedule mentioned in the MDL. BHEL will furnish their approvals / comments within 10 days after first submission of drawings/ documents.
- ii) For revised submissions, vendor shall submit the revised drawings/documents incorporating all the comments within 7 working days of receipt of comments from BHEL. BHEL shall also revert with comments or approval (as applicable) within 7 working days from date of submission of the document. However, Bidder is responsible to submit the documents/ drawings correctly in line with tender specification.

4. CHECK LIST TO BE FURNISHED ALONG WITH OFFER:

Bidders are requested to fill and furnish the **checklist for the offer** as follows:

S. No.	Description	Enclosed (Yes/No)
1.	Duly filled in annexure I of PY54107 Key Information	
2.	Duly filled in annexure II of PY54107 List of recommended spares	
3.	Duly filled in Compliance Format (B366-999-16-51-CF-1365)	
4.	Duly filled in / Confirmed / Technical Data sheet for the Rupture disc	
5.	Duly filled in Proven Track Record format	
6.	Duly filled in unpriced Price Bid Format	
7.	Catalogue for the offered model	
8.	General Arrangement Drawing	
9.	Bidder to Confirm Compliance with Typical Quality Plan enclosed	



**PRODUCT STANDARD
PROJECT ENGINEERING & SYSTEMS
DIVISION HYDERABAD-502 032**

ANNEXURE – I

KEY INFORMATION

1. Name of the Bidding Company :
2. Registered in (mention the name of the Country) :
3. Name, designation, email id & telephone number and postal address of responsible officer of Bidder to whom all reference shall be made for expeditious coordination. :
4. Name, designation, email id & telephone number and postal address of responsible officer of Indian Agent. :
5. Bidder's proposal number :
6. Bidder's proposal date :
7. Validity of offer, counted from the date of opening of bid :
8. Guaranteed completion period, counted from date of issuance of LOI/TOI :
9. Confirm that Scope of supply and services are exactly as per specification requirement. : Yes/No
10. Confirm that Guarantees are as per Annexure-II : Yes/No
11. Confirm Technical compliance with specification : Yes/No
12. Confirm that List of Recommended Spares has been furnished as per Annexure-III : Yes/No
13. Confirm that Special Tools & Tackles are as per Annexure-IV : Yes/No
14. Confirm that deviations ,if applicable, have been furnished as per Annexure-V : Yes/No

Signature of Bidder's
Authorized representative .with date.....

Date

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LIST OF RECOMMENDED SPARE PARTS

Bidder shall tabulate in the proforma below list of all spare parts as recommended by the respective manufacturer for regular, reliable operation. In case the Bidder has to add any other relevant information, the same shall be indicated herein

This price of recommended spares should not be included in the quoted price. The quoted prices will be for information of purchaser and ordering of these items will be decided in future.

Sl. No	Description	Quantity	Unit Price	Total Price	Delivery Period	Remarks
--------	-------------	----------	------------	-------------	-----------------	---------

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VARIANT TABLE

00	PY9754017000	RUPTURE DISC ASSEMBLY (3"SS316)
01	PY9754017018	MANDATORY SPARES FOR RUPTURE DISC ASSY

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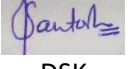


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RECORD OF REVISIONS

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Rev. No.	DATE	REVISION DETAILS	PREPARED BY	CHECKED BY	APPROVED BY
00	11.06.22	Fresh Issue	 DSK	 AKS	 MSSN

Ref.
Doc



**Engineering works for Standby SRU (525 TPD) Train of IOCL, Paradip
Refinery Project**

Rupture Discs

(Document No : B366-999-YR-MR-1365)



Click on the Document Title to go to that section of the document

Table of Contents			
Document Number	Rev.	Document Title	Page Number
B366-999-YR-MR-1365	A	Rupture Discs	3
B366-999-16-51-VDR-1365	A	VENDOR DATA REQUIREMENTS	7
B366-999-16-51-SIV-1365	A	SPECIAL INSTRUCTION TO VENDOR	10
B366-999-16-51-CF-1365	A	COMPLIANCE FORMAT	14
B366-999-16-51-ID-1365	A	DATASHEET INDEX	15
080557C-000-JSS-1545-001	B	Job Specifications for Safety Valves	17
B366-999-YR-PTR-1365	A	PROVEN TRACK RECORD	39

MATERIAL REQUISITION (TOP SHEET)

ITEM DESCRIPTION: Rupture Discs

GROUP ITEM CODE 15ZA

DESTINATION : IOCL PARADIP REFINERY

ITEM CATEGORY I

DELIVERY PERIOD :

DOCUMENT NUMBER

(Always quote the Document Number given below as reference)

B366	999	YR	MR	1365	A
JOB NO	UNIT/	MAIN COST	DOC. CODE	SR.NO.	REV

07/07/2021	16	51
DATE	DIVN.	DEPT.
ORIGINATOR		

Notes:

1. This page is a record of all Revisions of this Requisition
2. The nature of the Revision is briefly stated in the "Details" column below, the Requisition in its entirety shall be considered for contractual purpose.
3. Vendor shall note the MR category and shall submit his offer in line with the requirements included in attached 'Instructions to Bidders'

REV	DATE	BY	CHK	APPD	DETAILS
A	07/07/2021	AK	JJ	AR	Issued for Bids

This is a system generated approved document and does not require signature.

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ENGINEERS INDIA LIMITED
NEW DELHI

Project : IOCL Paradip SRU
Client : IOCL

Sheet 1 Of 4

S.NO	TAG NO . / ITEM CODE	DESCRIPTION	QUANTITY	GROUP
1		Design ,engineering,manufacture,procurement of materials and bought out components, assembly at shop, inspection, testing at manufacturer's works, packing, delivery, as per instructions to vendors, job specification, data sheets etc including supply of mandatory spares		
1.0001	088-PSE-0262	Rupture Disc	1 Nos	
5		Supply of two years operation and Maintenance Spares,as per enclosed instructions to vendor		
8		Supervision of erection,testing and commissioning of items specified at item 1.00 above as per enclosed instructions to vendor		
8.0001	088-PSE-0262	For Item 1.0001	1 per diem	

 Vendors shall quote prices against these items in their price schedule
 Vendor to note that the numbers given in square '['] and curly '{} ' brackets are not for their use and meant for store purpose only.Items shall be tagged as per equipment Tag No. only.

FOLLOW BHEL PRICE BID FORMAT



ENGINEERS INDIA LIMITED
NEW DELHI

Project : IOCL Paradip SRU
Client : IOCL

REQUISITION No.

B366-999-YR-MR-1365

Sheet 2 Of 4

REV

A

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LIST OF ATTACHMENTS

S. No.	DOCUMENT TITLE	DOCUMENT NO.	REV	DATE	SHEETS
1	Vendor Data Requirement	B366-999-YR-VD-1365	0	07/07/2021	3
2	Special Instruction to Vendor	B366-999-YR-SI-1365	0	01/07/2021	5
3	Compliance Statement	B366-999-YC-CF-1365	0	01/07/2021	1
4	Data Sheet Index+ Datasheet	B366-999-YR-ID-1365	0	01/07/2021	2
5	Standard Specification for Pressure Relief Valves	080557C-000-JSS-1545-001	0	25/11/2019	22
6	Proven Track Record	B366-999-16-51-PTR-1360	0	01/07/2021	1

In case of any subsequent revision of MR or PR, only revised sheets of the attachments listed above shall be issued alongwith the revision.

GENERAL NOTES:



ENGINEERS INDIA LIMITED
NEW DELHI

Project : IOCL Paradip SRU
Client : IOCL

REQUISITION No.

B366-999-YR-MR-1365

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REV

A

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VENDOR DATA REQUIRMENT

Description	With Proposal (Prints)	AFTER PURCHASE ORDER		Final Documentation / As Built
		Prints	Date Needed	
1. Dimensional details with mounting details and model number	X	X(i)	3W	X
4. Parts list				X
5. Recommended spare parts list(for two years operation)	X			
6. Installation, Operation and maintenance manual				X
7. Test certificates		X(i)	6W	X
8. Assembly details				X
9. Catalogues in english	X			X
10. Testing and Inspection procedures		X(a)	3W	
11. Final Documentation in CD				X
12. Complinance Statement	X			
13. Vendor Drawing Document Schedule		X	1W	

0	07/07/2021	AK	JJ	AR	REQ. NO. : B366-999-YR-MR-1365	Page 1 Of 3
					ORDER NO. :	
REV	DATE	BY	CHKD	APPVD	VENDOR :	



ENGINEERS INDIA LIMITED
NEW DELHI

PLANT : IOCL Paradip SRU
UNIT : 999
CLIENT IOCL

SPECIFICATION	REV
B366-999-YR-VD-1365	0

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VENDOR DATA REQUIRMENT

NOTES :

1. Fold all drawings to 216mm X 279mm and roll transparencies.
2. Vendor to provide all printed matter to ENGINEERS INDIA LIMITED (EIL) / BHEL ATTENTION -

Vendor Drawing Control
5th Floor EI House, 1, Bhikaji Cama Place, New Delhi-110066.

LEGEND:

Categories preceeded with * will be approved for fabrication by Engineers India Limited / BHEL
The remaining drawings are needed for information only.

A/C = As compiled A/R = As required W/S = With shipment W = Weeks

IMPORTANT

While submitting drawings and documents for review as indicated in vendor data requirement, vendor must ensure the following :

1. A blank space measuring 75 mm W x 38 mm H shall be provided on all vendor drawings (on the front side) for marking review codes etc. by ENGINEERS INDIA LIMITED / BHEL
2. The review of the drawings shall be done as applicable, under the following review codes :
 - a) Review Code 1 : No Comments.
 - b) Review Code 2 : Proceed with manufacture / fabrication as per commented drawing. Revised drawing required.
 - c) Review Code 3 : Document does not conform to the basic requirements as marked. Resubmit for review.
3. Review of the vendor drawings by EIL / BHEL only to check compatibility with basic design and concepts and would in no way absolve the manufacturer / fabricator of his responsibility to meet the applicable codes, specifications and statutory rules and regulations.
4. For drawings / documents indicated as FOR INFORMATION in the vendor data requirement, vendor must clearly mark FOR INFORMATION ONLY on the submitted drawings / documents.
5. Any drawing/document not indicated in the list above but required during erection, commissioning or for reconfiguration of the system shall also be supplied by the Vendor on demand.
6. X indicates required. Suffix Codes mean the following:
 - (i) For Information
 - (a) For Approval
7. The soft copy of documentation shall be in editable form (CAD, Excel, Database etc).
8. Note-1 & 2 above is not applicable as document shall be submitted as soft copies through eDMS / equivalent document exchange system.
9. Refer elsewhere in the RFQ for FINAL DOCUMENTATION procdure.
10. DCI shall be prepared by vendor based on the VDR attached with PR and submitt within 15 days from the

0	07/07/2021	AK	JJ	AR	REQ. NO. : B366-999-YR-MR-1365	Page 2 Of 3
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REV	DATE	BY	CHKD	APPVD	VENDOR :	



ENGINEERS INDIA LIMITED
NEW DELHI

PLANT : IOCL Paradip SRU
UNIT : 999
CLIENT IOCL

SPECIFICATION	REV
B366-999-YR-VD-1365	0

VENDOR DATA REQUIRMENT


date of FOA.

11. Vendor shall submit the record/information category documents to Engineer In-charge with one copy through eDMS portal/ equivalent document exchange system to EIL BHEL and vendor shall proceed further without waiting for comments from EIL/BHEL.

12. All inspection related document (QA/QC/ITP) shall be submitted to TPIA.

13. No of copies to be submitted to the site and owner shall be 6hard copies along with 2 Nos CDs/DVD/Pendrive etc.

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0	07/07/2021	AK	JJ	AR	REQ. NO. : B366-999-YR-MR-1365	Page 3 Of 3	
					ORDER NO. :		
REV	DATE	BY	CHKD	APPVD	VENDOR :		
 ENGINEERS INDIA LIMITED NEW DELHI					PLANT : IOCL Paradip SRU	SPECIFICATION	REV
					UNIT : 999	B366-999-YR-VD-1365	0
					CLIENT IOCL		

SPECIAL INSTRUCTION TO VENDORS
(B366-999-YR-MR-1365)

JOB NO : B366

PROJECT : STANDBY SRU PROJECT, IOCL – PARADIP

CLIENT : INDIAN OIL CORPORATION LTD.

0	07.07.21	Issued with MR	AK	JJ	AR
Rev. No	Date	Purpose	Prepared by	Checked by	Approved by

Part A:

I. BIDDING INSTRUCTIONS

A1. Bidders must follow the following guidelines while submitting their offer. Offers not complying to these guidelines shall be rejected summarily without any intimation to the Bidder.

- a. Furnish quotations only for the item that bidder can supply strictly as per MR specifications
- b. In case of any contradiction between these bidding instructions and any other documents attached with the MR, this bidding instruction shall generally govern.

In case of contradiction however, bidder shall bring the same to the notice of Purchaser and Purchaser's decision will be final and binding without any implication.

A2. Bidder is responsible to meet all technical requirements in Material Requisition including Instrument data sheet. If at any stage, till the completion of order, the offered instruments and its accessories are found unsuitable to meet the specification, Bidder shall replace the same with suitable item, without any time/Cost implication.

A3. In addition to the requirements specified above, Bidder must follow the following guidelines while submitting their offer.

- a) The Material Requisition (MR) specifications (i.e. data sheet, Job specification and other attachments to this MR) shall be fully complied with. No deviations of any type are acceptable. Bidder to offer only std. product out of their manufacturing range as listed in their product catalogue including model no., size etc. Item with non std. model no., size shall not be accepted.
- b) Bidder shall submit the item price , covering all the accessories, spare plates, testing, inspection and applicable statutory certification requirements as specified in this MR. If any change at a later date is required in the selection of accessories due to wrong selection, the same shall be borne by the vendor without any time or cost implication.
- c) All documentation submitted by the bidder including their quotation, catalogues, drawings, installation, operation and maintenance manuals etc., shall be in English language only.

A4. During Offer as per VDR, Vendor shall furnish the filled in datasheet for inclusion in the PR.

A5. Bidder to note that prior to the submission of bids, bidder can seek any clarification/ confirmation if required as part of pre-bid clarification. Bidder shall ensure that MR is thoroughly scrutinized and both technical and commercial clarifications are resolved.

A6. The Bidder shall submit the required drawings/ documents as per the Vendor Data Requirements (VDR) enclosed with the MR.

A7. MUST COMPLY REQUIREMENTS

Offer must be complete in all respects complying fully with the MR requirements without exception. No price change, whatsoever, shall be allowed to the bidder after submission of bid.

**PART-B
SPECIFIC JOB REQUIREMENTS**

B1. The Rupture Disc covered in this MR is for IOCL PARADIP Refinery.

Refinery	Job Number	Unit Name	Unit Number	Licensed By
IOCL-Paradip	B366	SRU III	088	BLACK & VEATCH

The following definition shall apply in this requisition:

Owner: M/s Indian Oil Corporation Ltd (IOCL)

Consultant/ PMC: M/s Technip Energies

Purchaser/ LSTK Contractor: M/s Bharat Heavy Electricals limited (BHEL)

Engineering Sub Contractor: M/s Engineers India Ltd (EIL)

B2.

B3. Model Nos. for Rupture Disc being provided shall be field proven as per Clause 10.6 of Job Specification 080557C-000-JSS-1545-001.

ITEMS WITH PROTOTYPE DESIGNS OR ITEMS NOT MEETING PROVENNESS CRITERIA SPECIFIED ABOVE SHALL NOT BE CONSIDERED BY THE BIDDER.

Vendor shall submit document B366-999-16-51-PTR-1365 with all PTR for the of rupture disc offered to substantiate the same. items not having proven references in similar applications shall not be acceptable.

B4. Bidder shall furnish quotations only for those item that bidder can supply strictly as per MR specifications. However, if a bidder is not having proven-ness criteria as per clause B3 above, for any particular item type and rating, bidder can quote for the same, provided their principal qualifies proven-ness criteria for those items and in such case these items shall be inspected by TPIA and supplied in fully assembled condition from the bidder's principal works.

B5. Purchaser may require the service of Bidder's specialist during commissioning for supervision of Rupture Disc. Hence bidder must quote per diem rate for the visit of their specialist to IOCL Paradip for supervision of testing and commissioning of Rupture disc at site. One (01) day of visit shall be quoted by the vendor for evaluation purpose. This is exclusively for commissioning assistance and does not include any visit by Bidder for malfunctioning of instrument or instrument not meeting the requirements as per specification.

Bidder to note that in case bidder/ manufacturer's visit is found necessary because of non-functional behaviour or any instrument not meeting the agreed specification during warranty period, this shall be considered as per warranty agreement. Bidder shall depute their expert, as required with in short notice period.

B7. SPECIFIC TEST REQUIREMENTS

Bidder to note that the charges for all the applicable testing requirements as per Job Specification for Safety Valves 080557C-000-JSS-1545-001 shall be included in the item price.

All required additional discs required for carrying out the burst pressure tests as per 080557C-000-JSS-1545-001 shall be included in the base price of the tag.

B8. The Job Specification for Safety valves (080557C-000-JSS-1545-001) shall be read in conjunction with this 'Special Instructions to Vendor' and the datasheets enclosed in this Material Requisition. Discrepancies shall be brought to Purchaser and Purchaser's decision shall be final and binding without any implication.

B11. Inspection and Test requirements:

a) All the items supplied / integrated by the bidder at his works shall be subject to inspection at bidder's works by Third Party Inspection Agency (TPIA) appointed by M/s BHEL.

b) As a minimum, the inspection and testing requirements as per Job Specification for Safety Valves (080557C-000-JSS-1545-001) attached along with the MR shall be adhered to.

B12. Bidder shall furnish a separate quote for spare parts for the Rupture Disc and their accessories for 2 years of normal operation separately as recommended by Bidder.

B13. The manufacturing design range of the rupture disc shall be 0%.

B14. The rupture disc shall be suitable for withstanding full vacuum condition. Necessary vacuum support for same , if required, shall be supplied by the vendor alongwith the rupture disc.

B15. Bidder to note that the drawing/documents to be submitted by bidder after purchase order as per VDR shall be for information category and for reference for further engineering by EIL/BHEL and bidder shall be responsible for completeness and correctness of the same. The specifications shall be as per MR only.

B16. Bidder to ensure that submission of all drawings / documents mentioned in VDR shall be in soft copies through eDMS/ equivalent document exchange system only during detail engineering & no document shall be submitted through hard copies However, as built document shall be submitted in hard copy along with soft copy.

B17. MANDATORY SPARES:

Bidder shall supply the following mandatory spares for each item. Price for the same shall be included in the item price

2 no. of gaskets and 3 no's. of disc for each tag

B18. SITE CONDITIONS:

The Item and accessories covered in the MR shall be suitable for unprotected installation in Hot, Humid and Corrosive environment having following ambient condition. The site environmental conditions are as follows:

IOCL-Paradip Refinery	
Maximum ambient temperature	42.4 ° C
Minimum ambient temperature	11.3 ° C
Relative humidity	95% (max) @ 42.4 °C
Maximum recoded rainfall	335 mm in 24 hour

TECHNICAL COMPLIANCE STATEMENT

(TO BE SIGNED BY VENDOR'S PRINCIPAL CORPORATE LEVEL SIGNATORY ON COMPANY LETTERHEAD)

I, ON BEHALF OF M/s_____ CONFIRM THAT THE PROPOSAL OF -----
-----QUOTED BY M/s_____ **FOR SRU STANDBY
TRAIN, IOCL PROJECT AT PARADIP OF M/S INDIAN OIL CORPORATION LIMITED**
AGAINST MATERIAL REQUISITION /TENDER/PACKAGE No. -----
----- IS IN TOTAL COMPLIANCE TO THE FOLLOWING



- A. SCOPE OF SUPPLY AND WORK
- B. TECHNICAL AMENDMENT IF APPLICABLE
- C. ANY OTHER DOCUMENT ATTACHED AS PART OF MR

AS WELL AS ALL THE TECHNICAL SPECIFICATION AND NO DEVIATION, VARIATION OR RESERVATION WHATSOEVER HAS BEEN MENTIONED IN THE TECHNICAL OFFER. IT IS FURTHER AGREED THAT THE TECHNICAL DETAILS FURNISHED IN OUR OFFER WILL BE REVIEWED BY BHEL/EIL/IOCL DURING DETAILED ENGINEERING STAGE AFTER ORDER AND ANY CHANGE REQUIRED TO MEET THE REQUIREMENTS OF ENQUIRY SCOPE AND SPECIFICATION INCLUDING AMENDMENT(S) (IF ANY) WILL BE INCORPORATED BY US WITHOUT ANY PRICE AND TIME IMPLICATION.

(SIGNATURE WITH SEAL)



GENERAL	1	Tag Number		088-PSE -0262	
	2	Service		SULPHUR PIT LOW PRESSURE INLET PRESS	
	3	Line No.	Equipment No.	3"-SL-086-3324-A2A-IT	
	4	Line Size	Line Schedule	3 in	STD
	5	Line I.D.			
BASIS	6	Design Code		API	
	7	Basis for Selection			
	8	Applicaition (Primary / Secondary Relief)		PRIMARY	
PROCESS CONDITIONS	9				
	10	Fluid	Fluid State	STEAM	Steam
	11	Flow Capacity		455	kg/h
	12	Estimated Burst Pressure at 22 Deg C			
	13	Oper. Pressure		atm	kgf/cm ² -g
	14	Temperature Rel.	Temperature Oper.	°C	151.4 °C
	15	Back Pressure			kgf/cm ² -g
	16	Burst Press	Min. Max.	kgf/cm ² -g	1 kgf/cm ² -g
	17	Discharges			
	18	Relative Density	Molecular Weight	1.02	kg/m ³ 18.02
	19	Ratio of Specific Heats	Compressibility	1.318	
	20	Viscosity at Releiving temp.			
21					
22					
DISC	23	Type		Reverse Bucking with scored surface design	
	24	Size	Rating	3 in	300#
	25	Material		SS 316	
	26	Coating	Inlet Outlet		
VACCUM SUPPORT	27	Material			
	28	Quantity Per Assembly		Note 12	
	29	Attached to Disc			
30					
DISC HOLDER	31	Type of Assembly		Safety Head	
	32	Connection Size	Rating	3 in	300#
	33	Facing & Finish		RF 125AARH	
	34	Disc Holding Material	Hold Down Material	SS 316	
	35	Connecting pipe ID		77.90 mm	
	36	Connecting pipe OD		88.90 mm	
	37	Tap in Hold Down Flange		1/2" NPTF	
38					
39					
OPTIONS	40	Preassembly Screw		Required	
	41	Companion Flanges	Size & Rating	Not Required	
	42	Facing & Finish			
	43	Studs and Nuts		Required	
	44	Excess Flow Check Valve		Required	
	45	Pressure Gage		Required	
	46	Jack Screws		Required	
	47	J - Bolts		Required	
48					
PURCHASE	49	Requisition Number		B366-999-YR-MR-1365	
	50	Manufacturer		*	
	51	Model No.	Safety Head Disc	*	
	52	Purchase Order Number			
	53	Price	Item Number		
54	Serial Number				

Notes: See notes

				INSTRUMENT SPECIFICATION		 	
				Rupture Disc			
				Project: BHEL IOCL SRU STANDBY TRAIN			
				Job No : B366			
				Unit No.088- SRU 3		Sheet 1 of 2	
0	AK	07-07-2021	Issued with MR				
No.	By	Date	Revision		Code: 81	Doc. No.: B366-089-YR-DS-3115	Rev.: 0

Tag Number : 088-PSE -0262

- 1.*-Vendor furnished
2. Design Conditions for steam: Design Pressure (Max) : 7 kg/cm2g
Design Temperature (Max): 240°C
3. Rupture Disc is installed in 3" snuffing steam line of Sulphur Pit. Disc will rupture when there is a fire in Sulphur Pit which is operating at atmospheric pressure. Operator will open the snuffing steam line valve (which is normally closed) on detection of fire. Snuffing steam will flow into Sulphur Pit. Operating pressure of snuffing steam is 4 kg/cm2g.
4. Rupture disc, pressure gauge (Element Material SS316) with suitable range such that operating pressure falls in middle third of the overall range) & Excess flow check valve (Trim & Wetted part material SS316) shall be provided fully assembled as Tell-Tale assembly by vendor. Each Tell-Tale assembly shall also be provided with a spare 1/2" NPT (F) plugged connection, which can be used by purchaser for connecting pressure transmitter (PT in Purchaser Scope), in case required in future.
5. Rupture disc mounting direction shall be clearly marked on the disc holder.
6. Vendor can provide small size 1/4"NPT for connection of Tell-Tale assembly as per manufacturer's std with suitable adaptor of 1/2"NPT.
7. S No 31: Rupture disc shall be a pre-torqued assembly & shall be provided fully assembled with safety head, J Bolts, studs & Bolts suitable for mounting between ASME 3", 300# RF flanges provided by purchaser. The material for bolt & nuts shall be ASTM A193 Gr. B7 and ASTM A194 Gr.2H respectively . Long stud bolts & nuts shall be in Vendor scope.
8. S No.37: To be provided with 1/4" NPT plug. Plug shall be SS316 and weatherproof to IP-55.
9. Sulphur Pit: Operating Temperature (Normal/ Max) : 138 °C/ 172 °C
10. Total no. of discs shall be 4 nos (1 installed + 3 spares). These 3 spares include mandatory spares as mentioned in SIV. Additional discs shall be considered by Vendor for carrying out burst pressure tests as per 080557C-000-JSS-1545-001.
11. Vendor to mention the maximum possible flow through 3"rupture disc.
12. The manufacturing design range of the rupture disc shall be 0%.
13. The rupture discs shall be suitable for withstanding vacuum condition. Necessary vacuum support for same, if required, shall be supplied by the vendor along with the rupture disc.
14. IBR requirements shall be complied as per Job specification Document 080557C-000-JSS-1545-001.

				INSTRUMENT SPECIFICATION		 	
				RUPTURE DISKS			
0	AK	07-07-2021	Issued with MR			Sheet 2	of 2
No.	By	Date	Revision	Code:81	Dwg. No.: B366-089-YR-DS-3115	Rev.: 0	

 	PROJECT Standby SRU & Additional Tanks IOCL Paradip Refinery			
	CLIENT INDIAN OIL CORPORATION LIMITED			
JOB SPECIFICATIONS FOR SAFETY VALVES	Project No. 080557C001	Document No. 080557C-000-JSS-1545-001	Rev. No. B	Page 1 of 22

JOB SPECIFICATIONS FOR SAFETY VALVES

REV.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED	AUTHORIZED
B	25-11-2019	ISSUED FOR DESIGN	CRK	KRS	SS	JMC
A	18-10-2019	ISSUED FOR DESIGN	CRK	KRS	SS	JMC

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1. INTRODUCTION

INDIAN OIL CORPORATION LIMITED (IOCL) has awarded Fax of Acceptance (FOA) dated 29th August 2019 to M/s. Technip India Limited (TPIL) for Consultancy services (PMC/EPCM services) for overall project management, FEED Review / FEED, Detailed Engineering, Procurement & expediting services, Tendering & award, Construction Management & Supervision, Assistance in start-up, Commissioning & performance test runs for installation of a Standby SRU of 525 TPD capacity and execution of Additional tanks for Paradip Refinery, Odisha, India.

2. General Abbreviations

Abbreviation	Definition /Expanded form
IOCL/ CLIENT	Indian Oil Corporation Limited
PMC/ CONSULTANT	Technip India Limited
LICENSOR	Party selected by IOCL for process technology ownership for any UNIT
CONTRACTOR	Party whose services are obtained for performing the works specified as part of LSTK / packages.
EPCM	Engineering, Procurement & Construction Management Services.
LSTK	Lump Sum Turn Key portion of the work to be executed by CONTRACTOR
FEED	Front End Engineering Design
AUTHORISED REPRESENTATIVE	IOCL's/ CONSULTANT's representative authorized to act for and on behalf of them.
VENDOR	Any third party supplying the equipment/materials for setting up the Plant
PROJECT	Indicates Standby SRU and Additional tanks Project, Paradip Refinery
UNIT	Indicates any particular portion of the project to be built which can be Process related or Utilities/Offsites related
SRU	Sulphur Recovery Unit

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3. Technical Abbreviations

AARH	Arithmetic Average Root Height
BIS	Bureau of Indian Society
CCOE	Chief Controller Of Explosives
CMRI	Control Mining Research Institute
MAWP	Maximum Allowable Working Pressure
NACE	National Institute of Chemical Engineers
NPS	Nominal Pipe Size
NPT	National Pipe Threads
OSHA	Occupational Safety and Health Authority
PESO	Petroleum and Explosives Safety Organisation
PTFE	Poly Tetra Fluoro Ethylene
TSO	Tight Shutoff

4. CONFLICTS AND DEVIATIONS

If conflicting statements exist within this document or between this document and Design Basis, other applicable specifications, Standard Drawings, Industry standards, codes, etc., it shall be brought to Owner's / PMC notice for clarification and proper approval shall be obtained before implementation. Decision of Owner / PMC shall be final.

In case of contradiction between licensor specification, design basis and JSS, it has to be brought to the notice of Owner/PMC and Decision of Owner/PMC shall be binding on Contractor/Vendor.

In general, order of priority of the documents shall be as follows,

- Local regulatory and statutory requirement.
- Licensor Requirements (as applicable)
- Project specification and datasheets, wherever applicable.
- This specification and relevant equipment/system specification.
- Codes and standard.

5. REFERENCE NATIONAL / INTERNATIONAL STANDARDS

Design and terminology shall comply, as a minimum, with the latest edition of following codes, standard practices and publications:

ANSI/ASME	American National Standard Institute/American Society of Mechanical Engineer.
B 1.20.1	Pipe Threads, General Purpose (Inch)
B 16.5	Pipe Flanges and Flanged Fittings
B 16.20	Metallic Gaskets for Pipe Flanges, Ring Joint, Spiral wound and Jacketed.
B 16.34	Valves – flanged, Threaded and Welding End.

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	Sec-I	Rules for Construction of Power Boilers
	Sec-VIII	Rules for Construction of Pressure Vessels
API		American Petroleum Institute
API 520		Sizing, Selection and Installation of Pressure Relieving Devices in Refineries.
	Part I	Sizing & Selection
	Part II	Installation
API 521		Guide for Pressure Relieving and Depressurizing Systems.
API 526		Flanged Steel Pressure Relief Valves.
API 527		Seat Tightness of Pressure Relief Valves.
API 2000		Venting Atmospheric and Low Pressure Storage Tanks
EN 10204		Inspection Documents for Metallic Products.
NACE MR0175/ ISO 15156		Petroleum, Petrochemical and Natural gas Industries-Material for Use in H2S-containing environments in Oil and Gas Production
NACE MR0103		Petroleum, Petrochemical and Natural Gas Industries-Metallic materials resistant to Sulphide Stress cracking in corrosive Petroleum refining environments
IBR		Indian Boiler Regulation.
OISD-STD-132		Inspection of Pressure Relieving Devices
OSHA		Occupational safety and health hazard

6. REFERENCE DOCUMENTS

080557C-000-JSD-1540-001	Design Basis – Instrumentation Tanks
080557C-088-JSD-1540-002	Design Basis – Instrumentation
080557C -000-ITP-1500-001	Inspection and Test Plan for Instrumentation
080557C -000-JSD-1300-002	Piping Material Specification
080557C -000-SP-1500-001	Data sheet formats (typical) for Instrumentation Items

7. Environmental and Process Protection

All valves and devices mounted in the field shall have environmental protection to IEC 60529 - IP66 as a minimum, in areas not subject to flooding. In areas subject to flooding e.g. pits, they shall be protected to IP67 or 68 as required.

The selection of materials for in-line instrument such as valves and rupture discs shall follow the associated piping material specification as a minimum.

Process impulse line shall be 316 stainless steel, unless the flowing medium dictates the use of a "higher"

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alloy. Those containing flammable mediums shall be TIG welded. Those containing non- flammable mediums and operating at ≥ 10 kg/cm² shall also be TIG welded. Those containing non-flammable mediums and operating at ≤ 9 kg/cm² may utilise stainless steel tube and double ferrule compression fittings.

8. GENERAL REQUIREMENTS

- 1) Safety Valve design, manufacturing and testing shall be complete in all respects for the safe, efficient and easy operation, start up and shutdown of the units.
- 2) All instruments wetted parts shall be SS316 as minimum and Electronic housing (if any) material shall be of Epoxy coated die cast Aluminium. Body, bolting materials shall comply with Piping Material Specification.
- 3) Body and yoke material shall comply with ASME Sections I & VIII requirements but as a minimum their material and rating shall generally be in accordance with the upstream piping specification class. However, due consideration must be given to the Joules-Thompson effect that may require the downstream piping to be of a different grade. In these cases, the valve body shall comply with the downstream piping specification material class.
- 4) Safety valve and all supplied Instruments and accessories shall be suitable for use for specified site climatic conditions and industrial environment in which corrosive gases and / or chemicals may be present.
- 5) All the instruments in Hydrogen Service shall be certified for use in Hydrogen service by the manufacturer specifically with respect to Hydrogen Diffusion. All the Instruments in NACE service shall meet specific material requirements like hardness, radiography, material requirements and material testing requirements as per ISO 15156. For specific requirements requiring PWHT, Ultrasonic test, Radiography etc., piping material specification shall be referred.
- 6) The safety valves used on pipe and vessel under IBR services shall be certified by IBR or IBR authorized representative. IBR design code shall be governed by Regulation 294 and regulation 295 of IBR and tested and certified by IBR as per Appendix 'L' of IBR. All IBR approved drawing and certificates shall be handed over to Owner through PMC.
- 7) Conventional valves shall be specified for constant back-pressure while Balanced Bellows seal type safety valves shall be provided when variable backpressure exceeds 10% of the set pressure or fluid is corrosive. Pilot operated pressure relief valves shall be used for special services and where the margin between the maximum operating pressure (MOP) of the protected system and the relief valve set pressure is less than 10 % of the relief valve set pressure or if the back pressure is more than 50% of the Set pressure, in general. Thermal relief type valves shall be used for thermal expansion of liquid or gas. Vacuum relief type valves shall be used for Storage tank. Steam jacket type safety valves shall be used for crystallizing fluid at ambient temperature.
- 8) Pressure and Safety Relief Valves shall always be mounted in a vertical position directly on nozzles having a well-rounded approach that provides smooth, unobstructed flow from the vessel or line to the valve.
- 9) The installation of safety and safety relief valves shall be in accordance with the recommendations of API RP 520 Part II.

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- 10) Unless otherwise mentioned, end connection details shall be as below:
- Threaded End connection shall be NPT as per ASME B 1.20.1
 - Flanged end connections shall be as per ASME B.16.5 upto NPS 600mm
 - Flanged end connections shall be as per ASME B.16.47 for valves larger than NPS 600mm
 - Flanged face finish shall be as per ASME B.16.5. The face finish as specified in the requisition, shall be as follows:

125 AARH	:	125 to 250 microinch AARH
63 AARH	:	32 to 63 microinch AARH
- 11) All valves, except thermal relief valves, shall be flanged, spring loaded, high lift, "high capacity type," with a top guided disc. All valves shall be provided with pressure tight bonnets.
- 12) Flanged valves shall have full nozzles arranged so that the nozzle and the parts comprising the disc are the only parts exposed to inlet pressure or to the corrosive action of the inlet fluid when the valve is closed. This does not apply to pilot-operated valves with semi-nozzle design.

9. DESIGN AND CONSTRUCTION

9.1. Safety Valve Design

- The basis of design and selection of safety relief valves shall be in accordance with latest edition of API RP 520 - sizing, selection and installation of pressure relieving devices in refineries, the latest revisions of ASME boilers and pressure vessels code and Indian Boiler Regulations.
- Contractor shall calculate the orifice areas as per the process data furnished and select the safety relief valves accordingly. Orifice area, if given an indicative drawing.
- For the PSV, the selected orifice, letter designation, inlet and outlet size and rating, centre to flange dimensions of the pressure relief valve and relieving area of the valve shall be accordance with API-526. Dimensional tolerance shall be as mentioned therein.
- All relief valves unless otherwise specified, shall have a minimum inlet and outlet flange rating of ANSI class 300 lbs.
- Following discharge coefficient values shall be used for sizing of pressure relief valves;
 - For all valves in gas, vapour or steam service with design code as ASME Sec VIII or ASME Section I discharge co-efficient of 0.975 as per API 520 shall be used.
 - For valves in liquid service, the discharge coefficient of 0.62 shall be used as per API 520. However, vendor may use the ASME certified valve coefficients when pressure relief valve with liquid trim design are offered.
- The discharge capacity of the selected pressure relief valves shall be calculated based on certified ASME capacity curves or by using ASME certified discharge coefficient and actual orifice area. Higher valve size shall be selected in case pressure relief valve discharge capacity so computed, is less than the required flow rate.
- For all valves in steam service covered under IBR design code, discharge co-efficient shall either be selected as per Regulation 293 or as tested and certified by IBR as per Appendix 'L' of IBR.
- All pressure relief valves in oxygen and chlorine service shall be thoroughly degreased using reagents like trichloro-ethylene or carbon tetrachloride. End connections shall be blinded / plugged after this degreasing process to avoid images of oil particles.

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- 9) Two phase flow in pressure relief valves shall be calculated using API 520 Appendix D.
- 10) Noise limitations shall be in accordance with IEC 534-8. All relief valves shall have their predicted aerodynamic / hydrodynamic noise level calculated. The calculations should be in accordance with IEC 534-8-3 for aerodynamic noise and IEC 534-8 – 4 for hydrodynamic noise. However the Vendors Standard calculation based on construction and experience shall be considered paramount inline with good engineering practice. The predicted aerodynamic noise level at a 1m radius from the valve discharge flange shall not be greater than 85 dBA.
- 11) The code stamps shall be provided for safety valves in case ASME and Indian Boiler Regulations design.
- 12) Rupture disc and pressure safety valve combination shall be sized in accordance with API 520 and ASME code.
- 13) Safety relief valves shall normally be direct spring loaded type and provided with full nozzle and full lift type except for Thermal Relief Valve, which has modified nozzle.
- 14) Resilient seat, seals or O-rings wherever used shall be suitable for pressure and temperature conditions specified.
- 15) In the event that class 900 and above relief valves are specified, elastomer seal materials shall be resistant to explosive decompression. Approved materials are:
 - a) James Walker FR58/98
 - b) Dowty 9730
 - c) Green Tweed 926
 - d) Oldrati EDG
 - e) Zylflon
 Maximum 'O' ring diameter shall be 7 mm.
- 16) Special considerations shall be taken in compressor discharge and positive displacement pump service. Mechanical vibration and pressure waves could lift the valve disc with each stroke and may cause flat metal-to-metal seats to rub together and become damaged. Blowdown shall be adjustable and provisionally set at 5%.
- 17) In general, Conventional valve shall be used for gas or liquid services.
- 18) Conventional valves shall be specified for constant back-pressure while balanced bellows seal type safety valves shall be provided when variable back pressure exceeds 10% of the set pressure or fluid is corrosive / toxic / flammable / lethal service with H2S content. Bellows material shall be generally Inconel, Monel, Hastelloy or similar, compatible with process condition specified. Exposed spring bonnet used for superheated steam >232° C where confirm to ASME and open lever type.
- 19) Bonnet for conventional valve shall be closed type with isolated spring chamber and sealable caps. Tapped and plugged vent shall be provided on bonnet.
- 20) In general bonnet for Balanced Bellows type shall be vented bonnet.
- 21) For potential risk or toxic service, balanced bellow with supplemented piston shall be considered. Bonnet vent connection shall be 1/2" welded, flanged connection, it shall be connected to pipe and route the pipe to safe area or routed to flare system.

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22) Relief valves shall be sized in accordance with the following basis:

- a) API RP 520
- b) API 2000

Gas and Vapour Service Codes

- a. ASME I for Fired Vessels
- b. ASME VIII for Unfired Vessels

Liquid Service

- a) API RP 520 using the Liquid "Certified" Formula

23) In general, Thermal relief type valves shall be used for thermal expansion of liquid.

24) Percentage of over pressures used in calculating the sizes area as under:

- | | |
|--|-----|
| a) Steam Service | |
| ASME SEC I (Power Boiler) | 3% |
| IBR (Before steam let-down station) | 5% |
| IBR (Distribution and utilities) and ASME Section VIII | 10% |
| b) Gas, Vapour or liquid except in (c) and (d) below | 10% |
| c) Liquid for Thermal Relief | 25% |
| d) Fire exposure on unfired vessels | 21% |

25) All valves shall be provided with a cap over the adjusting bolt. Cap shall be of either bolted type or screwed type.

26) Unless otherwise specified flanged, full nozzle, full lift type valves shall be supplied for sizes 1" and larger. The nozzle bushing shall extend through and beyond the inlet flange base and shall form the gasket bearing surface for the inlet flange.

27) Thermal Relief Valves shall have modified nozzle type and sizing shall be as per the Sizing Calculations. The end connection shall be ¾" x 1" threaded. If the piping specification does not allow screwed connection then flange connection shall be used.

28) Body drain with a plug shall be provided as a standard feature on every pressure relief valve. Where Stellite is required, the Stellite of disc and nozzle stands for stellite of the seat joint and the entire disc contour, unless otherwise mentioned.

29) Pressure relief valves with design as per ASME Section I, shall have two adjustable rings to adjust valve over-pressure and blow down.

30) Unless otherwise specified the material of construction shall be cast carbon steel (ASTM A216 Gr WCB) for body or as per piping material specification, SS316 (forged) for trim and Cadmium/Nickel plated CS for spring as minimum. Tungsten alloy steel springs shall be used for temperature above 230 deg. C. Stainless steel (SS316) springs shall be used for temperature below -29°C :

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31) Whenever semi nozzle designs are unavoidable, body material shall be at least same as nozzle material.

32) API Effective Area and Effective Coefficient of Discharge

The minimum size of pressure relief valves shall be as follows:

- a) 1 in. NPS (25 mm) inlet size with flanged inlet and outlet connections.
- b) 3/4 in. NPS (20 mm) when used only for protection against liquid thermal expansion. This size may be used with threaded inlet and outlet connections. If the piping specification does not allow screwed connection, then flange connection shall be used.
- c) The use of smaller sizes shall be approved by Owner's Engineer.
- d) Unless otherwise specified, pressure relief valves with Q, R, and T size orifices shall not be used where the temperature exceeds 350°F (177°C) and the molecular weight is less than 10 without Owner Engineer's approval. Pressure relief valves with orifice sizes larger than T (16,775 mm² or 26.0 in²) or with inlet flanges larger than NPS 8 in. (200 mm) shall not be used without Owner Engineer's approval.

33) Direct Acting Conventional Spring-Loaded Pressure Relief Valves

- a) Direct Acting Conventional Spring-Loaded Pressure Relief Valves shall only be used for applications where the build-up backpressure \leq 10% of the set pressure or where the backpressure is substantially constant, e.g. atmospheric relief. When determining the Set Pressure, Super imposed back pressure shall be considered.
- b) Valves in hydrocarbon service shall have closed bonnets. For steam or hot condensate service open bonnets may be considered.
- c) Direct Acting Conventional Spring-Loaded Pressure Relief Valves shall not be used on H2S service.
- d) For flammable or toxic service, bonnets shall be vented to the discharge side of valve.
- e) Bodies shall be carbon or alloy steel and trims 12% Cr alloy or other suitable corrosion resistant alloy.

34) Direct Acting Balanced Spring-Loaded Pressure Relief Valves

- a) Direct Acting Balanced Spring-Loaded valves shall be used where build-up back pressure is $>$ 10% of the cold differential test pressure (CDTP) or for toxic service and for all services into the flare systems. All designs (piston type, bellows type, etc.) may be considered.
- b) They shall comply with the requirements of API 526, have full nozzles and generally be metal seated.
- c) Bonnet and bellow vents shall be piped, with minimum restriction, to a safe location.
- d) These vents shall not be piped into the valve discharge piping or flare system. Isolation valves on this line are prohibited. The discharge of the vent piping shall be fitted with a bug screen.
- e) Auxiliary balancing piston type shall be used for critical and fouling services.
- f) Bellows type valves shall not be used in fouling conditions.
- g) Safety relief valve capacity shall usually be determined based on a built-up back- pressure at the valve no greater than 30% of the valve set pressure for a balanced bellows type valve. In addition, built-up back-pressure up to 50% of the valve set pressure is allowed for balanced bellows type

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<p>valve.</p> <p>35) Pilot Operated Pressure Relief Valves Pilot Operated Pressure Relief Valves shall be a “fail-safe to open” design.</p> <p>a) They shall be employed when:</p> <ol style="list-style-type: none"> Set pressures are $\geq 90\%$ and $\leq 95\%$ of the cold differential test pressure. Rapid opening and closing is required. Widely varying relief flows can occur. There is excessive inlet pipe pressure loss or when the main valve must be located at a pressure source different from the pilot sensing point because of service limitations of the main valve. <p>b) Modulating Pilot Operated Relief Valves may also be considered for use in lieu of multiple relief valves</p> <p>c) Pilot Operated Pressure Relief Valves shall not be used in fouling or high temperature service.</p> <p>d) Generally no-flow “pop” action pilots shall be fitted but the use of no-flow “modulating” pilots shall be considered to obviate valve “chatter”, where widely varying relief flows can occur,</p> <p>e) Pilot operated relief valves are not affected by back pressure. However in services having low set points consideration must be given to the inclusion of backflow preventers</p> <p>f) Pilot assisted valves shall be considered where accuracy or rapid opening and closing are required</p> <p>g) Unless specified otherwise, pilot shall be non-flowing type.</p> <p>h) Pilot operated pressure relief valves shall have remote sense facility for pilot valve. Internal sensing for pilot shall be avoided as far as possible. For Pilot operated valves remote sense line must be free draining from pilot to sense location. Pilot design shall be of inherently fail safe. All accessories like back flow preventer, pilot filter etc. required for proper operation of pilot operated valves as per indicated service conditions shall be included. Material of pilot shall be same as that of main valve nozzle as a minimum. The O-ring and diaphragm material of pilot shall be suitable for the pressure and temperature conditions specified</p> <p>i) Pilot operated relief valves shall be used for back-pressure greater than 50% of valve set pressure</p> <p>36) Lifting lever shall be provided whenever the fluid to be relieved is steam and air or water above 65°C. Bonnet shall be of the closed type for all process applications in general. Open type bonnet shall be used only for steam and non-hazardous/ non-toxic fluids. For all steam applications under design code IBR or ASME Section-I with open bonnet design, weather protection cover shall be provided.</p> <p>37) Plain lifting levers shall be provided for steam and air services. Packed lifting levers shall be used when protection against leakage is required.</p> <p>38) Pressure relief valves required for liquid service shall have liquid trim with discharge coefficient certified by ASME.</p> <p>39) Test Gag shall be provided for all pressure relief valves.</p> <p>40) Testing for seat tightness shall be accordance with the latest edition of API Std.527. Soft seating (coring) shall be provided wherever tight shutoff is called for.</p> <p>41) Whenever the specified set pressure exceeds 70 kg /cm²g, contractor shall submit the leakage rate of valves for approval.</p> <p>42) Safety relief valves for set pressure of 17.5 kg/sq.cm. (250 psig) or less shall have springs suitable for a</p>
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<p>range of adjustment of plus or minus 10% of the set pressure.</p> <p>43) Safety relief valves set at pressures higher than 17.5 Kg/ sq.cm. (250 psig) shall have springs suitable for range of adjustment of plus or minus 5% of the set pressure. Range identification shall be provided on the spring.</p> <p>44) The allowable tolerance in set pressures shall be ± 0.14 kg/cm² g for set pressure upto and including 5 kg/cm² g and $\pm 3\%$ for set pressure above 5 kg/cm² g.</p> <p>45) Safety relief valves shall be provided with tamper proof seals after factory set calibration.</p> <p>46) For high temperature application, the materials for the internals shall be selected to avoid galling.</p> <p>47) Relieving condition results in a temperature above equipment design conditions are excluded from consideration for material selection. This only applies to fire case relief valves on gas filled vessel.</p> <p>48) Pressure loss between nozzle on the vessels/equipment and the inlet of the valve shall not exceed 3% of the valve set pressure (gauge), calculated using the rated capacity of the relief valve.</p> <p>49) All safety relief valves shall have the UV code stamp as applicable to their service.</p> <p>50) Gaskets wherever used shall be metallic type. Gaskets with asbestos filler or with asbestos bearing material shall not be used</p>

9.2. Rupture Disc

- 1) Rupture disc shall be designed and manufactured in accordance with ASME, section VIII, division 1, paragraphs UG-127 and UG-132. Sizing of rupture disc shall be as per API 520.
- 2) The use of rupture discs shall be minimised. Applications other than additional leak-proof sealing devices where standard relief valve leakage is unacceptable or for the protection of relief valve internals from a corrosive, viscous, dirty or polymerizing fluid shall be subject to prior written approval by IOCL.
- 3) Rupture disc assemblies installed upstream of a relief valve shall be close coupled and purchased with the relief valve as an entity. The combined relief capacity shall be calculated as required by the ASME Code
- 4) A pressure gauge, excess flow check valve and/or pressure transmitter with high pressure alarm shall be installed between the two devices to indicate a burst or leaking disc. The discharge point, if open to atmosphere, shall be fitted with a bug screen.
- 5) Rupture disc shall be reverse buckling type with scored surface design.
- 6) The manufacturing design range of the rupture disc shall be 0%.
- 7) Where specified, the rupture disc outlet holders shall be supplied with preassembled accessories.
- 8) The rupture disc assembly shall consist of the following.
 - A pre-torque assembly complete with disc holders.
 - J-bolt to facilitate aligned installation
 - Jack-server assembly
 - 1/4" NPT Ball valve
 - Excess flow valve
 - Pressure gauge 100mm dial.

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- 9) The outlet holder accessories material shall be 316SS minimum.
- 10) Excess flow check valve shall be ball type with 1/4" NPT threaded connection. The excess flow valve will remain open to atmosphere during normal operation and close with snap action when the rupture disc has burst. The assembly of the connection, nipple and excess flow valve shall be threaded and seal welded on the disc holder
- 11) Where specified, the rupture disc inlet holder shall be supplied with preassembled accessories 1/4" NPT ball valve and an elbow with nipple and plug.
- 12) The material for inlet holder accessories shall be as per holder material
- 13) The rupture disc rated burst pressure shall not be less than 110% of maximum operating pressure for reverse buckling discs.
- 14) The rupture disc and holder assembly shall be designed such that the disc always remains in position without leakage or slipping. The disc holder assembly shall be suitable for wafer installation between ANSI B 16.5 flanges. Others supply the flanges, gaskets, bolts and nuts. Care shall be exercised in selecting the type of holder because whilst an insert type may facilitate ease of installation and maintenance, a full bolting type may be more suitable to reduce the heat flow to flange studs in a fire.
- 15) The rupture disc and disc holder shall be constructed of stainless steel unless service conditions require higher alloys.
- 16) The disc-holder shall identify correct orientation of disc installation into the holder, and be clearly marked identifying the direction of flow through the disc when bursting.
- 17) Test sample should be from the actual component. If this is not practical, the test specimen should be from the same lot or heat as the component and have the same thermal treatment.
- ~~18) The rupture discs shall be furnished in (3) three quantities for each tag plus one to be burst tested by Contractor inspector.~~
- 19) A chart of pressure correction factors vs temperature to determine the bursting pressure of the disc supplied at elevated or cold temperature shall be furnished along with offer.
- 20) The rated temperature at which the rupture discs are specified to function is the minimum temperature of the disk itself before it relieves. This may be lower than the normal process temperature due to ambient cooling of the non-flowing piping, rupture discs, and disk holder, and is strongly affected by the geometry of the inlet piping.
- 21) The inlet piping must be designed and evaluated before the rated rupture temperature of the rupture discs is finalized.
- 22) Relief valves only with the approval of the Owner's Engineer. Acceptable types of rupture discs are:
 - a) Pre-scored tension loaded conventional (forward acting) for both liquid and gas/two-phase service.
 - b) Pre-scored (cross-scored) reverse buckling for gas/two-phase only service.
 - c) Pre-scored (semi-circular) reverse buckling for gas/two-phase or liquid service. Pre-scored (semi-circular) may not be used under pressure relief valves due to possible fragmentation.
- 23) The manufacturing range for all rupture discs shall be the lowest available from the manufacturer. The manufacturing range shall be applied below the design pressure of the equipment. Use of other types of rupture discs with larger manufacturing ranges shall be approved by the Owner's Engineer.

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9.3. Pressure Vacuum Relief Valve

- 1) Pressure Vacuum Relief valves shall, in general, be sized and designed as per API 2000.
- 2) Unless otherwise mentioned, the pressure / vacuum relief valve shall:
 - a) Prevent loss of the stored product from the storage tank under normal conditions.
 - b) Inbreathe (allow free air in to the tank) if the vacuum inside the tank exceeds the set value.
 - c) Out breathe (vent vapour from the tank) if the pressure inside the tank exceeds the set value.
- 3) Capacity data for the type of breather valve, pressure/vacuum relief valve selected. These data shall be presented as per clause 1.7.2 of API S-2000 with the following exceptions:
 - i. Air flow shall be presented in m³/h (Standard) (i.e. at the reference of 15°C and 1.013 bar absolute pressure).
 - ii. Pressure and vacuum shall be expressed in mm of water.
- 4) The capacity calculations/curves for the combination whenever flame arrester or vent is specified together with pressure / vacuum valve.
- 5) Pressure / vacuum relief valve shall be designed for 10% overpressure.
- 6) Blow down shall be reduced to a minimum.
- 7) Pressure / vacuum valve shall be weight loaded pallet and open vent type. The body of the pressure / vacuum relief valve shall be self-draining.
- 8) Pallet material shall be metallic construction.
- 9) The seating surfaces shall be shielded from condensates. Design shall prevent tendency of the pallet to stick to the seat.
- 10) For refrigerated tanks, the discharge side of the valve shall be designed to prevent air re-circulation into the valve body during relieving conditions to prevent ice formation when the relieving temperature is below 0°C.

10. SPECIAL INSTRUCTIONS

Unused electrical cable entries shall be plugged with recessed head screw in full compliance with the applicable explosion proof classification and ingress protection level of the respective component.

Set pressure tolerance shall be in accordance with UG-134.

10.1. Valve NDE & NDT Requirements

NDT requirements for all safety valves shall be as follows:

Classes in 150# for normal hydrocarbon service shall be subjected to 10% radiography and rest 90% DP/MP check. Classes in 300# for normal hydrocarbon service shall be subjected to 20% radiography and rest 80% DP/MP check. For AS & CS piping in critical services such as NACE services, LPG, AMINE, CAUSTIC & HYDROGEN, all NDT & Radiography shall be done after stress relieving heat treatment only for its final acceptance.

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10.2. PMI Requirements:

PMI shall be performed for alloy metal valves as per approved Positive Material Identification Procedure.

10.3. Sour and HIC service / NACE Requirements

In case of Sour and HIC service, the valve materials must meet the specific requirements hardness, radiography and other testing requirements, as per NACE MR-0103 latest edition.

10.4. Hydrogen Service Requirement

For Safety valve used in Hydrogen Service, the valve must be certified for the use in Hydrogen service, specifically Hydrogen diffusion problems. Reference list, along-with performance feedback shall be furnished.

For hydrogen service the control valve shall meet all the material and testing requirements such as Helium leak test etc.

10.5. Indian Boiler Regulation (IBR) Requirements

1. Safety valves in IBR services, the manufacturer must furnish the IBR certification.
2. Safety relief valves (boiler drums, de-superheaters and steam lines before pressure reducing station) shall be designed and supplied as per latest revision of IBR regulation in line with the vessel design code or ASME Sec-I (If specifically indicated). All the safety/ pressure relief valves in IBR services shall have IBR certification
3. In case safety valves are in IBR service, the type of the valve shall be as per regulation no. 292 with 5% overpressure and 5% blow down and bidder shall provide following certificates:
 - i) IBR form IIIC certificate of the manufacturer and test of boiler mountings and fittings.
 - ii) IBR form IIIC construction certificate of manufacturer and test as per item No. 12.
 - iii) Type test certificate from IBR authority as per appendix-L of IBR for the valve series supplied.
 - iv) Radiography of all castings as applicable.
4. In case, ASME section I, safety valves supplied shall be 'V' stamped and should have the certificate from ASME certified laboratory certified by IBR.
5. The discharge capacity of these safety valves shall be calculated as per IBR regulation no. 293 a, b, & c.
6. Equipment nozzle length and size shall meet the corresponding code i.e. IBR requirements
7. Safety valves on utility steam network, after main pressure reducing station shall be as per ASME section VIII as a minimum with 10% over pressure and 7% blow down unless otherwise indicated. These valves shall be provided with IBR form IIIC certificates.
8. All IBR approved drawings and certificates shall be submitted to owner through PMC.

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10.6. PTR Requirement

Safety relief valves selected for the unit shall be rugged in design and must be well proven in the hydrocarbon industry. Proto type design or equipment's of experimental nature or design undergoing testing etc. shall not be selected by the Contactor. Following criteria must be applied before selecting a particular instrument item.

"The Safety relief valves as being offered/supplied should have been operating satisfactorily in a hydrocarbon industry like refinery, petrochemical and gas processing plant under similar process conditions for at least 8000 hours from the bid opening."

Contractor shall furnish reference list along-with with performance feedback in support of the above requirement.

Selection of the correct model numbers of Safety valves shall be entirely the responsibility of the Contractor, if any discrepancies are found between model numbers and specifications of offered devices at any stage after placement of LOI/order, same shall be rectified by Contractor without any price and time implications.

11. NAMEPLATE

Each Safety valve shall have a stainless-steel nameplate attached firmly to it at a visible place, furnishing the following information:

- a) Manufacturer's name and/or trademark
- b) Valve Tag no.
- c) Serial no. and Type
- d) Orifice designation
- e) Valve inlet and outlet connection sizes and ratings
- f) Valve body, spring and nozzle materials
- g) Set pressure
- h) Back pressure
- i) Relieving temperature
- j) Cold differential test pressure
- k) Test Medium
- l) ASME Code stamp shall be furnished with the safety relief valve (Type test only) If specified.

Each rupture disc shall be provided with an identification nameplate in stainless steel material permanently fastened to the instrument body having the following data:

Disc

- a) Tag number
- b) Manufacturer's name, model, and serial number (lot number)

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- c) Size
- d) Rupture pressure (Kg/cm² g)
- e) Disc Material
- f) Bursting pressure at 20 degC
- g) Estimated bursting pressure at operating temperature

Holder

- a) Tag number
- b) Manufacturer's name, model, and serial number
- c) Size and rating
- d) Holder material

Each Pressure / Vacuum valves shall be provided with an identification nameplate in stainless steel material permanently fastened to the instrument body having the following data:

- a) Tag number as per purchaser's data sheets.
- b) Manufacturer's serial number or model number.
- c) Manufacturer's name/ trademark.
- d) Pressure and vacuum settings in mm WC.
- e) Capacity in Standard m³/h or Nm³/h of free air

12. INSPECTION AND TESTING

- 1) Testing and inspection for all items shall be carried out as per approved factory testing procedures.
- 2) Unless otherwise specified, Owner/Consultant reserves the right to test and inspect all the items at the vendor's works, in line with inspection test plan for Safety valves
- 3) Vendor shall submit following test certificates and test reports:
 - a. Dimension report for all safety valves, rupture disc, pressure / vacuum relief valves
 - b. Type test certificate for flow coefficient as per ASME Section VIII.
 - c. Material test certificate as per clause 3.1B of EN 10204 for each valve body, bonnet castings/ forgings and trim.
 - d. Certificate of radiography/X-ray for valve castings. 100% radiography shall be carried out for the following valve castings as a minimum:
 - i. As per piping material specification.
 - ii. Body rating ANSI 600 pounds and above.
 - iii. Radiography procedure for casting shall be as per ANSI B16.34 and acceptance shall be as per ANSI B16.34 Annexure-B.
 - iv. Radiography procedure for welded parts shall be as per Piping Material Specifications / ASTM – ASME 31.3

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- e. Post-weld heat treatment shall be provided for welds, as per piping material specification.
- f. Leakage test at 1.5 times the maximum Working pressure for inlet flange and nozzle
- g. Seat tightness test
- h. Set Pressure test
- i. IBR certificate in form III C for all valves covered under IBR certification. All IBR approved drawings and certificates shall be submitted to owner through PMC.
- j. Hydrostatic test reports for all valve bodies and functional test reports for all valves as per clause **12.1 and 12.2** of this specification.

12.1. Hydrostatic Test

- 1) ~~Each Pressure relief valve body shall undergo hydrostatic test as per outlet flange ANSI rating. However, all the safety valves castings covered under IBR shall be tested as per IBR regulations. There shall not be any visible leakage during this test.~~
- 2) ~~For full nozzle type of pressure relief valve, nozzle shall undergo hydrostatic test as per inlet flange ANSI rating. For Semi nozzle design, valve Inlet shall be tested after assembly as per Inlet flange ANSI rating.~~
- 3) ~~Pressure relief valves shall not be gagged to permit hydrostatic testing of equipment or piping. Blinds shall be installed as required.~~
- 4) Representative samples of rupture discs shall be tested by the manufacturer at the rated temperature per the certification provisions of the ASME SEC VIII D1 and D2. At least one test shall be made with the rupture disc installed upside-down. Rupture disc fails the test if the upside-down test burst pressure exceeds the proof test pressure or 1.5 times the design pressure (whichever is lower) of the rated equipment. If the rupture disc is to be used in liquid filled systems, the test system shall also be liquid filled.
- 5) ~~Hydro test report for each breather valve, pressure / vacuum relief valve.~~

12.2. Functional Tests

1. ~~Cold bench set pressure test:

Pressure relief valve shall be tested for opening at specified set pressure. Testing of pressure relief valves shall be with air or nitrogen. testing of thermal relief valves shall be with water.~~
2. ~~Seat Leakage test:

 - a. Whenever the specified set pressure is less than or equal to 420 kg/cm²g, the valve shall meet the seat tightness requirements specified in API RP-527. The maximum permissible leakage rates against various sizes shall be as specified therein. Whenever the specified set pressure exceeds 420 kg/cm²g, the vendor shall submit the leakage rates of valves for approval by the purchaser. Where bubble tightness has been specified, there shall be no leakage or bubbles of air at the specified percentage of set pressure.~~

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- ~~b. Seat leakage test pressure shall be as per API RP 527 for all valves except for valves under IBR or ASME Section-I design code and pilot operated pressure relief valves. For these valves seat leakage shall be carried out at the following pressure~~
- ~~i) Valves Under IBR or ASME Section-I : 95% of Set Pressure~~
- ~~ii) Pilot operated Pressure relief valves~~
- ~~° Upto 3.5 Kg/cm2G : 90% of set Pressure~~
- ~~° Above 3.5 Kg/cm2G : 95% of Set Pressure~~
3. ~~The outlet side shall be tested at a minimum pressure of 50 psig (345 kPa gauge) for soundness of mating parts~~
4. Burst pressure test for Rupture Disc:
The specified bursting pressure at the coincident temperature shall be determined by bursting two or more specimens from a lot of the same material and of the same size to be used. The test shall be made with a holder of the same form, pressure, area and dimensions with which the disc is to be used.
- ~~5. Leakage test report for each pressure / vacuum relief valve.~~
- ~~i) Leakage shall be 0 at 75% of set pressure.~~
- ~~ii) Shall not exceed 0.03 Nm3/hr at 90% of set value.~~
6. Functional test report for opening at the stated pressure and vacuum for each pressure / vacuum relief valve.

12.3. Witness Inspection

- Pre-dispatch inspection for all valves shall be performed and following tests/checks shall be carried out as a minimum.
 - Physical dimensional verification and workmanship.
 - Hydrostatic test as per clause 12.1 of this specification on representative samples.
 - Functional tests as per clause 12.2 of this specification on representative samples.
 - Review of all certificates and test reports as indicated in Section 12 point #3 of this specification.
- In the event when no witness inspection is carried out by Owner/Consultant, the tests shall anyway be completed by Contractor and documents for the same shall be submitted to Owner/Consultant for scrutiny.

13. SPARES

For Spare Philosophy for Instrumentation items, refer attachment "Philosophy for Identifying Mandatory Spares" in Design basis – Instrumentation

14. SHIPPING

- It is the responsibility of the contractor to ensure that the equipment is adequately protected and packed to meet the shipping and delivery requirements. The equipment may be stored outdoor for long period before installation. Packing shall be suitable for outdoor storage in the area with heavy rains and high ambient temperature.
- Machined surface which may be exposed to the atmosphere in the transit and subsequent storage shall

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be properly protected with an easily removeable rust preventing coating of the proper consistency applied by the manufacturer, but not until inspection.

3. Steel Valve bodies shall be painted in accordance with Project Specification 080557C -000-JSD-2300-001 Standard specification for Painting & Coating
4. The valve and its accessories shall be supplied pre-assembled and pre-tubed (as applicable).
5. All threaded and flanged openings shall be suitably protected to prevent entry of foreign material. Temporary plugs used should be readily distinguishable from permanent metal plugs.
6. Valves with external lubricators shall be lubricated prior to shipment.
7. Valves in oxygen and chlorine service shall be packed separately along with a certificate indicating 'CERTIFIED FOR OXYGEN / CHLORINE SERVICE', as applicable.

15. DOCUMENTATION

Following are the drawings and documents required to be submitted for the Control Valve, as a minimum:

- 1) QA Manual
- 2) Relief Device Specification Data Sheets
- 3) Relief Device Sizing & Noise Calculation Sheets
- 4) Spare Parts Lists
- 5) Fabrication & weld procedures
- 6) General Arrangement Drawings
- 7) Manufacturing Documentation
- 8) Material Certificates
- 9) Bills of Materials
- 10) Inspection & Test Procedures
- 11) Calibration Certificates
- 12) NDE/NDT Reports
- 13) Hydraulic & Functional Test Certificates
- 14) Hazardous Area Certificates
- 15) IOM Manuals
- 16) Production Data Books
- 17) Shipping Details

All the documents shall be A4 or A3 size only; all the document prints larger than A4 shall be folded to A4 size with identification data visible at the bottom right.


All the documents submitted shall be checked & approved by Contractor, unchecked document will be returned un-reviewed & Contractor will be responsible for the delay.

Any revision to a document after its first submission shall be clearly identified on the documents in the revision box at the right bottom.

16. GUARANTEE AND WARRANTY

1. Contractor shall warranty the supply against defective materials, design and workmanship.
2. Contractor shall guarantee the performance of the Control valve at site, for the specified time specified

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		PROJECT	Standby SRU & Additional Tanks		
			IOCL Paradip Refinery		
		CLIENT	INDIAN OIL CORPORATION LIMITED		
JOB SPECIFICATIONS FOR SAFETY VALVES	Project No. 080557C001	Document No. 080557C-000-JSS-1545-001		Rev. No. B	Page 22 of 22

elsewhere.

3. Equipment performance shall be guaranteed in accordance with requirements of applicable specifications and codes at conditions indicated in relevant specification.
4. If the stated performances are not achieved, Contractor shall, at his own expenses, make necessary repairs, modifications and replacements to the supply to enable the performance to be achieved.

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SL. NO.	DESCRIPTION	AS OFFERED FOR THIS PROJECT	ITEM AS INSTALLED @ SITE 1	ITEM AS INSTALLED @ SITE 2	ITEM AS INSTALLED @ SITE 3	ITEM AS INSTALLED @ SITE 4
1	Name of Plant					
2	Name, Address, E-Mail, Tel. No. of contact person in plant					
3	Name, Address, E-Mail & Telephone No. of consultant					
4	Month & year of supply					
5	Month & year of commissioning					
6	Any major breakdown till date					
7	Size for Rupture Disc: a) 3", 300#					

Bidder Seal & Signature



QAP GUIDELINES & FORMAT

(ANNEXURE)


The QAP format and guidelines for filling up the format shall be used by vendor for preparation and submission of QAP after order placement.


Note:


1. Typical /Indicative /Standard QAP(s) for equipment /package attached is reference document and to use by successful bidder in future for preparation and submission of QAP for BHEL /CUSTOMER approval.
2. No deviation to reference document is acceptable.

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Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE Rev No. 00 Page 2 of 4
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<u>GUIDELINES TO VENDORS FOR PREPARATION OF QUALITY ASSURANCE PLAN</u>		
Ref. Doc	<ol style="list-style-type: none"> 1. QAP shall be made in landscape mode on A4 size paper as per the format enclosed. Font size shall be minimum 10. 2. Each page of QAP shall contain the following information. <ol style="list-style-type: none"> a) Vendor's name & address. b) Customer: BHEL, Hyderabad. c) Project. d) BHEL Product Standard Number/revision number as referred in P.O. e) BHEL Purchase Order Number & Date. f) Product as per P.O. description. g) QAP Number (unique and shall not repeat)/revision number/date. h) Page number and number of pages 3. QAP shall contain four parts / stages as follows. <ol style="list-style-type: none"> a) Raw materials and bought out items. b) In process Control / Inspection. c) Final assembly, Inspection & Testing. d) Painting, preservation & packing. 4. Under 'Component', indicate name of the component (say casing, rotor, pressure gauge, etc). 5. Under 'Characteristics', indicate appropriately (say chemical analysis, mechanical properties, NDT (UT, DP etc.), hydrostatic test, calibration check etc.) 6. Under 'Class', indicate minor, major or critical depending on the importance of characteristic. 7. Under 'Type of check', indicate appropriately (say chemical, mechanical, UT, DP etc.) 8. Under 'Quantum of check', indicate appropriately (say 100%, 10%, sample, per melt, per heat, all pieces etc.) 9. Under 'Reference document' and 'Acceptance norms', appropriate National & International standards, BHEL standards, approved drawing references etc. should be indicated. It is not correct to mention as "Vendor's internal standards or Vendor's standard practice etc.". If vendors' internal standards are referred, same shall be in line with BHEL Spec. indicated in the P.O. These may require review & approval by our Engineering dept. 10. Under 'Format of record', indicate appropriately supplier's test certificate, calibration certificate, lab report, inspection report etc. 11. Please refer 'Agency' in QAP format. Under P: Perform, W: Witness, V: Verify Indicate against each characteristic 1: (BHEL CQS/Nominated inspection agency), OR 2: (Vendor / Sub vendor) 		

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>Note: Performing agency is normally vendor or his sub vendor (Legend 2). Where witness points are indicated in specification, P.O., Drawing etc., for such operations, Under Witness (W) column use 1. Under 'Verify' column, use code1.</p> <p>12. Under 'D' please put (<input type="checkbox"/> Tick) against each characteristic where vendor proposes to submit test certificate/report etc. OR as required as per BHEL Specification.</p> <p>13. Vendor's signature & stamp should be available on each page of QAP.</p> <p>14. Vendor should read the BHEL Product Standard thoroughly and QAP should be made only inline and relevant to the Specification & Approved Drawings.</p> <p>15. The following operations/characteristics/check points may be included (AS APPROPRIATE)</p> <ol style="list-style-type: none"> a) Visual check b) Dimensional check c) Mechanical and Chemical properties. d) Surface preparation before painting (by chemical cleaning, sand blasting, shot blasting etc. as the case may be.) e) Painting check for shade, Dry Film Thickness (DFT), Adhesion/ peel off test etc. f) Check for correctness for all components mounted as per General Arrangement Drawing, Bill of Materials (BOM), etc. for range, rating, make, color, size, location as per GA, quantity, label description including tag nos., annunciator facia, loose components, accessories, spares etc. g) Verification of test certificate for protection class for the enclosures. h) Mechanical functioning of switches. i) Continuity of earthing and provision of earth points. j) Colour coding of wiring, size, tightness & dressing of wiring. k) Review of test certificates of assembled items, raw materials, internal test reports etc. l) Witness of functional checks, which may include mechanical run & electrical run, H.V.test, IR measurement, Electrical and Mechanical tests etc. m) PQR, WPS, Welder Qualification Record, welding records (fit up, DP) etc. n) Material identification (for punch marks of serial numbers, Heat No, Melt No, Inspector's stamp etc.) o) Hydraulic Pressure Test, Pneumatic Pressure Test, Liquid Penetration Examination and other Non-Destructive Tests. p) Tests on Galvanised items (Visual, Hammer Test, Knife Test, Thickness, Pierce Test (Copper sulphate test), Hydrogen evaluation test, Stripping test (for Mass of Zinc coating) q) All tests as per BHEL Product Standard & approved drawings including Type tests and Routine tests on individual items and on System as a whole. r) Packing and Preservation. <p>16. QAP Format enclosed.</p> <p>17. For inspections outside India, customer/PMC approved TPIA to be hired by vendor and TPIA charges to be borne by vendor.</p> <p>TPIA list:</p> <ol style="list-style-type: none"> a. M/s TUV SUD South Asia Pvt. Ltd. b. M/s SGS India Pvt. Ltd. c. M/s VCS Quality Services Private Limited d. M/s International Certification Services Pvt. Ltd. e. M/s ABS Industrial verification Pvt. Ltd. 		
Ref. Doc			

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<p>f. M/s Projects and Development India Ltd.</p> <p>g. M/s TATA Project Limited</p> <p>h. M/s Certification Engineers International Limited</p> <p>i. M/s Bureau Veritas (India) Pvt. Ltd.</p>			
Ref. Doc				



**PROJECT ENGINEERING & SYSTEMS DIVISION
RC PURAM, HYDERABAD.
QUALITY & BUSINESS EXCELLENCE**

INSPECTION / TC REVIEW FORMAT

1	Vendor's Name:		5	Applicable BHEL Spec No:	
2	Project:		6	Approved Drawing No:	
3	PO No:		7	Approved Data Sheet No:	
4	Item Description:		8	Approved QAP No:	

OFFER LIST

S.No	BBU/ PO Sr. No.	Item Description	Total Qty as per PO/BBU	Qty. already accepted	Qty offered for TC review	Cumulative Qty	Balance Qty
A							
B							
C							
D							

TC REVIEW REQUISITION

BBU / PO Sr. No.	QAP Clause No.	Format of Record	Certificate No. & Date	Page No.	REMARKS
A. Item Description:					
B. Item Description:					
C. Item Description:					
D. Item Description:					
E. Item Description:					

SUPPLIER / VENDOR SIGNATURE WITH SEAL

BHEL/ BHEL's TPIA SIGNATURE WITH SEAL

Dt:

Dt: