

Note No. #1

Attachment:Annexure-A to Price Bid Format .pdf

DISTRIBUTION OF FRAMEWORK ITEMS ACROSS PROJECTS IN KGS

ANNEXURE-A

ITEM: BW FITTINGS CS
PR NO 1900141563

Sl NO	Material No	Material Desc	KOTHAGUDEM	BHADRADEI	NORTH KARANPURA	BARH-1	BARH-2	MAUDA	BIBL NABINAGAR	NPGCL NABINAGAR	RAMAGUNDAM	KORGA	NSPL BILLAI	TUTICORIN	UDANGUDI	SAGARDIGHI	ENORE	BHUSAWAL	YADORI	PATRATU	PANKI	
1.00	P19752101054	ELBOW 90D LR CS (A234GRWPB) 2" STD BW																				
2.00	P19752101070	ELBOW 90D LR CS (A234GRWPB) 3" STD BW																				
3.00	P19752101089	ELBOW 90D LR CS (A234GRWPB) 4" STD BW																				
4.00	P19752101100	ELBOW 90D LR CS (A234GRWPB) 6" STD BW																				
5.00	P19752101119	ELBOW 90D LR CS (A234GRWPB) 8" STD BW																				
6.00	P19752101127	ELBOW 90D LR CS (A234GRWPB) 10" STD BW																				
7.00	P19752101313	ELBOW 90D LR CS (A234GRWPB) 8" 20 BW																				
8.00	P19752101321	ELBOW 90D LR CS (A234GRWPB) 10" 20 BW																				
9.00	P19752101356	ELBOW 90D LR CS (A234GRWPB) 16" 20 BW																				
10.00	P19752101364	ELBOW 90D LR CS (A234GRWPB) 12" 30 BW																				
11.00	P19752103111	CRD CR CS 4" X 3" STD X STD BW																				
12.00	P19752103120	CRD CR CS 6" X 3" STD X STD BW																				
13.00	P19752103138	CRD CR CS 8" X 4" STD X STD BW																				
14.00	P19752103154	CRD CR CS 8" X 6" STD X STD BW																				
15.00	P19752103170	CRD CR CS 10" X 8" STD X STD BW																				
16.00	P19752103499	CRD CR CS 8" X 8" SCH 20 X STD BW																				
17.00	P19752103502	CRD CR CS 10" X 8" SCH 20 X STD BW																				
18.00	P19752103510	CRD CR CS 10" X 8" SCH 20 X SCH 20 BW																				
19.00	P19752104010	ERD CR CS 6" X 4" STD X STD BW	1524	1888	989	913	1465	1669	989	989	989	989	1669	1524	25059	13967	1637	1528	12306	502	12894	
20.00	P19752104053	ERD CR CS 6" X 3" STD X STD BW																				
21.00	P19752104088	ERD CR CS 4" X 3" STD X STD BW																				
22.00	P19752104118	ERD CR CS 8" X 6" 20 X STD BW																				
23.00	P19752104320	ERD CR CS 16" X 10" STD X STD BW																				
24.00	P19752108067	TEE STRT CS 3" STD BW																				
25.00	P19752108075	TEE STRT CS 4" STD BW																				
26.00	P19752108083	TEE STRT CS 6" STD BW																				
27.00	P19752108091	TEE STRT CS 8" STD BW																				
28.00	P19752108105	TEE STRT CS 10" STD BW																				
29.00	P19752108164	TEE STRT CS 24" STD BW																				
30.00	P19752108296	TEE STRT CS 8" 20 BW																				
31.00	P19752108300	TEE STRT CS 10" 20 BW																				
32.00	P19752112013	ELBOW 45D LR CS 2" STD BW																				
33.00	P19752112129	ELBOW 45D LR CS 24" STD BW																				
34.00	P19752147046	RD TEE CS 10" X 6" 20 X STD BW																				
35.00	P19752147062	RD TEE CS 3" X 2" STD X STD BW																				
36.00	P19752147089	RD TEE CS 8" X 4" 20 X STD BW																				

1.The above list of Weight per project in kgs, project/customer is tentative only. Final details of quantity, Project/ Customer shall be informed at the time of PO

Note No. #1

Attachment:PQC Annexure-1.pdf

Annexure-1 PQC Criteria**Supply References for the Last 5 Years (dispatch date) from the Original due date of this tender**

Enquiry Item No & Description: (To be filled by Bidder)

Sl No	Project Name along with name of Customer	Description Item(s) supplied	Purchase Order No & Date (Copy to be enclosed)	Delivery Date as per Order	Value of Order	Inspection Reports / Dispatch Documents (Copy to be enclosed)	Remarks

Note No. #1

BULK PROCUREMENT OF GENERIC PIPING ITEMS Attachment:PQC.pdf
Pre-Qualification Criteria (Technical)

Package Name : BW FITTINGS CS FRAME WORK
PR No : 1900141563

Manufacturers of **BUTT WELD FITTINGS**, qualified as per the Pre-qualification criteria laid down below, are allowed to bid. Documentary evidence shall be provided by such bidders to establish their claim. **However, offer consideration is subjected to approval from end Customer.**

The bid evaluation shall be on Overall L1 basis. The Bidder shall meet the Pre-Qualification Criteria (listed below).

Non-compliance to any of the criteria listed below will lead to disqualification of bidder for the subject item of the tender.

Qualification Criteria of the Bidder:

1. The bidder should be an established manufacturer of **Butt Weld Fittings** and should have successfully completed Manufacture, Supply of the same.
2. The Bidder should have successfully completed supply of **Butt Weld Fittings(CS, AS, SS)** with a total minimum quantity of **42 Tons** ,through a single Purchase Order or multiple Purchase Orders in the last 5 years ending on original due date of this tender, with at least one order executed after 01.01.2019.
3. Detailed BOQ of the items supplied, satisfying the criteria laid down above, shall be provided in the format enclosed as Annexure-1, with details like Project & Customer, Description & Quantity of Items supplied, PO details etc. as a minimum for assessing pre-qualification. **PO Copies, Inspection Reports and Dispatch documents shall be enclosed for the references provided.**
4. The bidder should not have been under suspension for business or blacklisted by any of the BHEL units.

Note No. #1



Attachment:Price Bid Format.pdf
BHARAT HEAVY ELECTRICALS LIMITED
 RAMACHANDRAPURAM, HYDERABAD-32
PROJECT ENGINEERING & SYSTEMS DIVISION

PRICE BID FORMAT
BW FITTINGS CS

BHEL's Enquiry No & Date : Bidder to Specify
 Bidder's Name : Bidder to Specify
 Bidder's Offer No & Date : Bidder to Specify
 Bidder's Ref No & Date : Bidder to Specify

SI No	Item Description	Package Weight (Kg)	Unit Price per Kg (Rs.)
1	BW FITTINGS CS FRAME WORK PACKAGE	83871.85	

NOTES:

1. Vendor to Quote **Unit Price Per Kg (Rs).** for the Total Package.
2. The Frame work is for total weight as indicated in the above table, the individual line item quantities may vary based on requirement.
3. **Unit price quoted by the bidder in the price bid format / finalized during the reverse auction process, shall be binding on the vendor till successful execution of the order and after taking care of PVC as applicable.**
4. The distribution of the line items across the projects is attached as Annexure-A.
5. The permissible ordering limits (+/- 50 %) as specified in NIT are strictly applicable on the Total Framework Value. The same are not applicable at the Individual Project level.
6. Final details of quantity, Project/ Customer shall be informed while placing purchase order.
7. No Observations / Objections shall be entertained after the Techno-Commercial Bid is opened.
8. The Bid Evaluation is on Overall L1 Basis. Each and Every item of the Package shall be quoted by the bidder.
9. Partial offers will not be considered for evaluation and the same are liable for rejection.
10. Gross Weight of the package as given above in the price bid format is arrived at by considering the unit weights of the individual items as per the applicable standards. **These unit weights shall be binding on the successful bidder to arrive at the final weight of the package that is supplied.**
11. The Unit price per kg. quoted shall be INCLUSIVE of Freight, Packing & Forwarding and Testing Charges.
12. The Unit price per kg quoted shall be EXCLUSIVE of GST, Third party inspection (TPI) & Insurance Charges.
13. Bidder shall confirm submission of the unpriced bid as part of their technical offer by typing "QUOTED" in the above format.

Note No. #1

Attachment:PVC BW FITTINGS CS .pdf

Bulk Procurement of Flanges
Price Variation Formula – BW FITTINGS CS
PVC-CS-BW FITTINGS

$$PO = PA \times \left(\left[0.65 \times \frac{MO}{MA} \right] + \left[0.20 \times \frac{LO}{LA} \right] + 0.15 \right)$$

PO	Purchase Order Value, adjusted in accordance with above Price Variation Formula
PA	Purchase Order Value, as per Original Framework Agreement Price

Escalation for Raw Material:

MO	JPC Retail Market Price of "PIG IRON", as on the date of respective Project PO Placement, <i>calculated as an Average of the Prices for Kolkata, Delhi, Mumbai, Chennai regions.</i>
MA	JPC Retail Market Price for "PIG IRON", as on the date of Part-1 bid opening of Framework Agreement Tender, <i>calculated as an Average of the Prices for Kolkata, Delhi, Mumbai, Chennai regions.</i>
As published under the Item "PIG IRON" by Joint Plant Committee, Ministry of Steel, Govt of India, in their subscription based bimonthly publication "JPC MARKET PICE RETAIL".	

Escalation for Labour:

LO	All-India Average Consumer Price Index Number for Industrial Workers (Base_2016=100), as on date of respective Project PO Placement
LA	All-India Average Consumer Price Index Number for Industrial Workers (Base_2016=100), as on the date of Part-1 bid opening of Framework Agreement Tender
As published by Labour Bureau, Ministry of Labour and Employment, Govt of India, on their website www.labourbureaunew.gov.in	

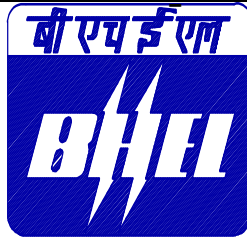
Overheads and Margin:

0.15	Constant for Overheads and Margin
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NOTE: Latest Index Values, as published by respective agencies, **Available as on the date** of Part-1 bid opening of FA Tender / date of PO, shall be considered, for all the factors.

566700/2021/PE-SD-339 Q&BE

Attachment:QAP AND CHECKLIST.pdf

 PROJECT ENGINEERING & SYSTEM DIVISION		STANDARD MANUFACTURING QUALITY PLAN					QP. NO.:PESD/QA/PIPEFITTINGS/01/18-19						
		PRODUCT: PIPE FITTINGS			BHEL SPEC: AS PER P.O		REV NO: 02	DATE: 15-02-2021					
							PAGE 2 OF 4						
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY			REMARKS
										P	W	V	

1.0 RAW MATERIALS & BOUGHT OUT ITEMS													
1.1	Raw Material (Bar/Pipes/Plates Ingots/Billets etc.)	Mechanical & Chemical Properties, UT/hydro test as applicable.	Major	Verification of RMTc	100%	BHEL Spec / Approved Drawing	MTC	✓	2	-	1	Corelation with MTC to be maintained by manufacture r.	
2.0 INPROCESS INSPECTION													
2.1	WELDING#	WPS, PQR, WQR#	Major	Doc. Verification	100%	BHEL Spec / Appd. Dwg. / ASME Sec IX / Sec VIII	WPS, PQR, WQR	✓	2	2	1	# for Welded Fittings	
2.2		Heat Treatment	Major	TC Review	100%		TC, HT Chart	✓	2	2	1		
2.3		Mechanical Analysis (UTS, YS, EL)	Major	Mech. Analysis	One per Lot/Batch /Heat		MTC / TC	✓	2	2	1		
2.4		Visual (Rating, Markings Edge preparation Finish etc.), Dimensions	Major	Visual, Measurement	100%		ITR	✓	2	2	1		
2.5		MPI/LP*	Major	NDE	100%		ITR	✓	2	2	1		

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL/BHEL NOMINATED INSPECTION AGENCY & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

PREPARED BY



BHEL QA SIGNATURE & STAMP

APPROVED BY


BHEL QA SIGNATURE & STAMP

APPROVED BY

CUSTOMER'S SIGNATURE & STAMP

566700/2021/PE-SD-339 Q&BE

Attachment:QAP AND CHECKLIST.pdf

 PROJECT ENGINEERING & SYSTEM DIVISION	STANDARD MANUFACTURING QUALITY PLAN						QP. NO.:PESD/QA/ PIPEFITTINGS/01/18-19			
	PRODUCT: PIPE FITTINGS			BHEL SPEC: AS PER P.O			REV NO: 02	DATE: 15-02-2021		
							PAGE 3 OF 4			

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* AGENCY				REMARKS
									D	P	W	V	
2.6		Radiography Test#	Critical	RT	100%			NDE Report	✓	2	2	1	# for Welded Constructions fittings.
3.0 FINAL INSPECTION & TESTING													
3.1	PIPE FITTINGS	Visual (Rating, Markings Edge preparation Finish etc.), Dimensions	Major	Visual, Measurement	100%	BHEL Spec / Approved Drawing/ASTM E 572/ASTM E 262/IS 4736		IR	✓	2	1	-	10% shall be witnessed by 1.
3.2		Hardness Check	Major	Hardness test	One per Lot/Batch /Heat			IR	✓	2	1	-	
3.3		MPI / LPT#	Major	MPI / LPT	10%			IR	✓	2	1		# Refer Note-4
3.4		IBR Certificate#	Critical	Doc. Review	100%			IBR Cert.	✓	2	-	1	# if applicable
3.5		IGC test	Major	IGC test	Highest thickness & highest carbon/HT lot			Lab report	✓	2		1	Refer Note-8
3.6		PMI#	Major	PMI test	As per Spec			IR / TC	✓	2	1	-	# if applicable

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SL NO		COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* AGENCY				REMARKS
										D	P	W	V	
3.7			Galvanization# (Uniformity, mass of zinc coating Thickness of Coating)	Major	Measurement	100%			TC/ITR	✓	2	1		# if applicable
4.0		PRESERVATION & PACKING												
4.1			Painting (Shade, DFT,Marking)#	Major	Visual	Random			TC	✓	2	1		# if applicable
4.2			Packing#	Major	Visual	100%	BHEL Spec / Approved Drawing		Packing Slip	✓	2	-	1	#Seaworthy packing for export orders

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL/BHEL NOMINATED INSPECTION AGENCY & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

PREPARED BY



BHEL QA SIGNATURE & STAMP

APPROVED BY


BHEL QA SIGNATURE & STAMP

APPROVED BY

CUSTOMER'S SIGNATURE & STAMP

566700/2021/PE-SD-339 Q&BE

Attachment:QAP AND CHECKLIST.pdf


 PROJECT ENGINEERING & SYSTEM DIVISION		STANDARD MANUFACTURING QUALITY PLAN					QP. NO.:PESD/QA/PIPEFITTINGS/01/18-19						
		PRODUCT: PIPE FITTINGS			BHEL SPEC: AS PER P.O		REV NO: 02	DATE: 15-02-2021					
							PAGE 5 OF 4						
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY P W V			REMARKS


Notes:-

1. This Standard MQP should be read along with specification (Latest revision as per PO), approved drawings & approved datasheet (as applicable).
2. Drawing/datasheet shall prevail over quality plan for contradiction if any.
3. Any project/customer specific requirements , which shall be notified, have to be fulfilled by the vendor at the time of execution of order.
4. MPI/LPT Should be carried on Knuckle of Reducers, Outer bend portion of Elbows and Neck portion of Tees.
 - a) CS & AS Material – MPI b) SS Material – LPT.c) DP test on bevel ends d)DP test on sidewall area of tees manufactured from cold forming method.
5. Seaworthy packing shall be **witnessed** BHEL/BHEL nominated inspection agency for overseas project.
6. End Customer/Consultant inspection if any shall be intimated during quality plan approval.
7. **NACE requirement:** For items coming under **NACE category**, all tests, reports, MTC and certificates shall be submitted as per **NACE MR0103** requirements.
8. IGC test for austenitic stainless steel shall be conducted in a NABL approved lab as follows: IGC practice" E " with acceptance criteria of "No crack observed from 20X magnification and microstructure to be observed at 250X magnification to ensure absence of any crack/fissure. Photograph of microstructure shall be submitted for records.Two samples shall be drawn from each solution annealing lot,,one correspond to highest carbon and other corresponding to highest thickness.

Abbreviations:-

MTC - Material Test certificate	TC - Test Certificate
IR - Inspection Report	ITR - Internal Test Report
UTS - Ultimate Tensile Strength	YS - Yield Strength
EL. - Elongation	PMI - Positive Material Identification
MPI - Magnetic Particle Inspection	LPT - Liquid Penetrant Test
IBR - Indian Boiler Regulations	NDE - Non Destructive Examination
RT - Radiography Test	UT - Ultrasonic Test

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL/BHEL NOMINATED INSPECTION AGENCY & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY  BHEL QA SIGNATURE & STAMP	APPROVED BY BHEL QA SIGNATURE & STAMP	APPROVED BY CUSTOMER'S SIGNATURE & STAMP

Note No. #1	Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED Attachment: SPEC.pdf PROJECT ENGINEERING & SYSTEMS DIVISION PY 52 101		
			TECHNICAL SPECIFICATION		Rev. No. 01
			ELBOW 90D, LONG RADIUS, CARBON STEEL, BUTT WELDING		Page 1 of 1

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1.0 GENERAL

- 1.1 The Butt Welding Elbows 90D supplied according to this specification shall conform to the requirements of latest version of ASME Standard B16.9 "Factory-Made Wrought Butt welding Fittings" and comply with the following additional requirements.
- 1.2 This specification is applicable for Butt Welding Elbows of Sizes NPS ½" to NPS 48".

2.0 MATERIAL & CONSTRUCTION:

Material, Construction, Chemical Composition, Mechanical Properties, Heat Treatment, Testing and other requirements related to Material shall be in accordance with the ASTM Standard (latest version) as specified below:

- 2.1 For Elbows of size NPS ½" to 14":
Seamless Construction according to ASTM A234 Gr WPB.
- 2.2 For Elbows of size NPS 16" to 48":
Welded Construction according to ASTM A234 Gr WPB-W.
- 2.3 Galvanizing shall be carried out as per ASTM A123, if specified.

3.0 DIMENSIONS, TOLERANCES AND OTHER REQUIREMENTS:

Shall be as per ASME B16.9 (Latest edition).

4.0 SIZE AND THICKNESS:

Elbow Size (NPS in inches) and Wall thickness (Schedule) shall be as per BHEL Enquiry/Order.

5.0 DESIGNATION:

A 10" Sch 40 Carbon Steel 90D Elbow, shall be designated as:





ELBOW 90D CS (A234WPB) 10" SCH 40 BW.




6.0 TECHNICAL DELIVERY CONDITIONS:

- 6.1 Unless otherwise specified on the order, IBR certification is not required.
- 6.2 All other requirements shall be as per BHEL Corporate Standard AA0851402 – Technical Delivery Conditions for Pipe Fittings. ASME Standard B16.28 referred in this TDC shall be read as ASME B16.9.


+++

RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Revised by	Approved by
00	20.07.2015	FIRST ISSUE	 SRIKANTH G	 S B RAO
01	20.07.2018	Clause 2.0 updated to include Galvanizing Specification.	 G.KALYAN	 SRIKANTH G

Refer Doc	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
		 CH MANOJ	 SRIKANTH G	 S B RAO	20.07.15

Note No. #1

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED		Attachment: SPEC.pdf
		PROJECT ENGINEERING & SYSTEMS DIVISION		PY 52 103
		TECHNICAL SPECIFICATION		Rev. No. 01
		REDUCER, CONCENTRIC, CARBON STEEL, BUTT WELDING		Page 1 of 2

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1.0 GENERAL

- 1.1 The Butt Welding Concentric Reducers supplied according to this specification shall conform to the requirements of latest version of ASME Standard B16.9 "Factory-Made Wrought Butt welding Fittings" and comply with the following additional requirements.
- 1.2 This specification is applicable for Concentric Reducers of sizes NPS ½" to NPS 48".

2.0 MATERIAL & CONSTRUCTION:

Material, Construction, Chemical Composition, Mechanical Properties, Heat Treatment, Testing and other requirements related to Material shall be in accordance with the ASTM Standard (latest version) as specified below:

- 2.1 For Concentric Reducers of Larger End size NPS ½" to 14":
Seamless Construction according to ASTM A234 Gr WPB.
- 2.2 For Concentric Reducers of Larger End size NPS 16" to 48":
Welded Construction according to ASTM A234 Gr WPB-W.

3.0 DIMENSIONS, TOLERANCES AND OTHER REQUIREMENTS:

Shall be as per ASME B16.9 (Latest edition).

4.0 SIZE AND THICKNESS:

Sizes of Large and Small ends of the Reducer (NPS in inches) and their corresponding Wall thicknesses (Schedule) shall be as per BHEL Enquiry/Order.

5.0 DESIGNATION:

A Concentric Reducer of Size 12" STD x 10" STD Carbon Steel, shall be designated as:
CRDCR CS 12" x 10" STD x STD BW




A Concentric Reducer of Size 12" schedule 20 x 10" schedule 30 Carbon Steel, shall be designated as:
CRDCR CS 12" x 10" SCH 20 x SCH 30 BW

A Concentric Reducer of Size 12" Thickness 10mm x 10" Thickness 8mm Carbon Steel, shall be designated as:
CRDCR CS 12" x 10" THK 10 X THK 8 BW


6.0 TECHNICAL DELIVERY CONDITIONS:

- 6.1 Unless otherwise specified on the order, IBR certification is not required.
- 6.2 All other requirements shall be as per BHEL Corporate Standard AA0851402 - Technical Delivery Conditions for Pipe Fittings. ASME Standard B16.28 referred in this TDC shall be read as ASME B16.9.





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Refer Doc	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
		 CH MANOJ	 SRIKANTH G	 S B RAO	20.07.15
	PROJECT ENGINEERING & SYSTEMS DIVISION				

Note No. #1

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	Attachment: SPEC.pdf PY 52 103	
		TECHNICAL SPECIFICATION		Rev. No. 01
		REDUCER, CONCENTRIC, CARBON STEEL, BUTT WELDING		Page 2 of 2


RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Revised by	Approved by
01	02.05.2017	UPDATED S.NO.5: DESIGNATION	 G.KALYAN	 SRIKANTH G
00	20.07.2015	FIRST ISSUE	 SRIKANTH G	 S B RAO

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Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED		Attachment: SPEC.pdf
		PROJECT ENGINEERING & SYSTEMS DIVISION		PY 52 104
		TECHNICAL SPECIFICATION		Rev. No. 01
		REDUCER, ECCENTRIC, CARBON STEEL, BUTT WELDING		Page 1 of 2

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1.0 GENERAL

- 1.1 The Butt Welding Eccentric Reducers supplied according to this specification shall conform to the requirements of latest version of ASME Standard B16.9 "Factory-Made Wrought Butt welding Fittings" and comply with the following additional requirements.
- 1.2 This specification is applicable for Eccentric Reducers of sizes NPS ½" to NPS 48".

2.0 MATERIAL & CONSTRUCTION:

Material, Construction, Chemical Composition, Mechanical Properties, Heat Treatment, Testing and other requirements related to Material shall be in accordance with the ASTM Standard (latest version) as specified below:

- 2.1 For Eccentric Reducers of Larger End size NPS ½" to 14":
Seamless Construction according to ASTM A234 Gr WPB.
- 2.2 For Eccentric Reducers of Larger End size NPS 16" to 48":
Welded Construction according to ASTM A234 Gr WPB-W.

3.0 DIMENSIONS, TOLERANCES AND OTHER REQUIREMENTS:

Shall be as per ASME B16.9 (Latest edition).

4.0 SIZE AND THICKNESS:

Sizes of Large and Small ends of the Reducer (NPS in inches) and their corresponding Wall thicknesses (Schedule) shall be as per BHEL Enquiry/Order.

5.0 DESIGNATION:

An Eccentric Reducer of Size 12" STD x 10" STD Carbon Steel, shall be designated as:
ERDCR CS 12" x 10" STD x STD BW.




An Eccentric Reducer of Size 12" schedule 20 x 10" schedule 30 Carbon Steel, shall be designated as:
ERDCR CS 12" x 10" SCH 20 x SCH 30 BW.

An Eccentric Reducer of Size 12" Thickness 10mm x 10" Thickness 8mm Carbon Steel, shall be designated as:
ERDCR CS 12" x 10" THK 10 X THK 8 BW


6.0 TECHNICAL DELIVERY CONDITIONS:

- 6.1 Unless otherwise specified on the order, IBR certification is not required.
- 6.2 All other requirements shall be as per BHEL Corporate Standard AA0851402 – Technical Delivery Conditions for Pipe Fittings. ASME Standard B16.28 referred in this TDC shall be read as ASME B16.9.





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Refer Doc	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
		 CH MANOJ	 SRIKANTH G	 S B RAO	20.07.15
	PROJECT ENGINEERING & SYSTEMS DIVISION				

Note No. #1


Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	Attachment: SPEC.pdf PY 52 104	
		TECHNICAL SPECIFICATION		Rev. No. 01
		REDUCER, ECCENTRIC, CARBON STEEL, BUTT WELDING		Page 2 of 2

RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Revised by	Approved by
01	02.05.2017	UPDATED S.NO.5: DESIGNATION	 G KALYAN	 SRIKANTH G
00	20.07.2015	FIRST ISSUE	 SRIKANTH G	 S B RAO

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Note No. #1	Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED Attachment: SPEC.pdf PROJECT ENGINEERING & SYSTEMS DIVISION PY 52 108		
			TECHNICAL SPECIFICATION		Rev. No. 01
			TEE, STRAIGHT CARBON STEEL, BUTT WELDING		Page 1 of 1

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1.0 GENERAL

- 1.1 The Straight Tees supplied according to this specification shall conform to the requirements of latest version of ASME Standard B16.9 "Factory-Made Wrought Butt welding Fittings" and comply with the following additional requirements.
- 1.2 This specification is applicable for Straight Tees of Sizes NPS ½" to NPS 48".

2.0 MATERIAL & CONSTRUCTION:

Material, Construction, Chemical Composition, Mechanical Properties, Heat Treatment, Testing and other requirements related to Material shall be in accordance with the ASTM Standard (latest version) as specified below:

- 2.1 For Straight Tees of size NPS ½" to 14":
Seamless Construction according to ASTM A234 Gr WPB.
- 2.2 For Straight Tees of size NPS 16" to 48":
Welded Construction according to ASTM A234 Gr WPB-W.
- 2.3 *Galvanizing shall be carried out as per ASTM A123, if specified.*

3.0 DIMENSIONS, TOLERANCES AND OTHER REQUIREMENTS:

Shall be as per ASME B16.9 (Latest edition).

4.0 SIZE AND THICKNESS:

Straight Tee Size (NPS in inches) and Wall thickness (Schedule) shall be as per BHEL Enquiry/Order.

5.0 DESIGNATION:

A 10" Sch 40 Carbon Steel Straight Tee, shall be designated as:





TEE STRT CS 10" SCH 40 BW.




6.0 TECHNICAL DELIVERY CONDITIONS:


- 6.1 Unless otherwise specified on the order, IBR certification is not required.
- 6.2 All other requirements shall be as per BHEL Corporate Standard AA0851402 – Technical Delivery Conditions for Pipe Fittings. ASME Standard B16.28 referred in this TDC shall be read as ASME B16.9.

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RECORD OF REVISIONS:

Rev	Date	Revision Detail	Revised by	Approved by
00	20.07.2015	FIRST ISSUE	 SRIKANTH G	 S B RAO
01	20.07.2018	Clause 2.0 updated to include Galvanizing Specification.	 G.KALYAN	 SRIKANTH G

Refer Doc	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
		 CH MANOJ	 SRIKANTH G	 S B RAO	20.07.15

Note No. #1	Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED Attachment: SPEC.pdf PROJECT ENGINEERING & SYSTEMS DIVISION PY 52 112		
			TECHNICAL SPECIFICATION		Rev. No. 01
			ELBOW 45D, LONG RADIUS, CARBON STEEL, BUTT WELDING		Page 1 of 1

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1.0 GENERAL

- 1.1 The Butt Welding Elbows 45D supplied according to this specification shall conform to the requirements of latest version of ASME Standard B16.9 "Factory-Made Wrought Butt welding Fittings" and comply with the following additional requirements.
- 1.2 This specification is applicable for Butt Welding Elbows of Sizes NPS½" to NPS 48".

2.0 MATERIAL & CONSTRUCTION:

Material, Construction, Chemical Composition, Mechanical Properties, Heat Treatment, Testing and other requirements related to Material shall be in accordance with the ASTM Standard (latest version) as specified below:

- 2.1 For Elbows of size NPS ½" to 14":
Seamless Construction according to ASTM A234 Gr WPB.
- 2.2 For Elbows of size NPS 16" to 48":
Welded Construction according to ASTM A234 Gr WPB-W.
- 2.3 *Galvanizing shall be carried out as per ASTM A123, if specified.*

3.0 DIMENSIONS, TOLERANCES AND OTHER REQUIREMENTS:

Shall be as per ASME B16.9 (Latest edition).

4.0 SIZE AND THICKNESS:

Elbow Size (NPS in inches) and Wall thickness (Schedule) shall be as per BHEL Enquiry/Order.

5.0 DESIGNATION:

A 10" Sch 40 Carbon Steel 45D Elbow, shall be designated as:





ELBOW 45D CS (A234WPB) 10" SCH 40 BW.




6.0 TECHNICAL DELIVERY CONDITIONS:

- 6.1 Unless otherwise specified on the order, IBR certification is not required.
- 6.2 All other requirements shall be as per BHEL Corporate Standard AA0851402 – Technical Delivery Conditions for Pipe Fittings. ASME Standard B16.28 referred in this TDC shall be read as ASME B16.9.


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RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Revised by	Approved by
00	20.07.2015	FIRST ISSUE	 SRIKANTH G	 S B RAO
01	20.07.2018	Clause 2.0 updated to include Galvanizing Specification.	 G.KALYAN	 SRIKANTH G

Refer Doc	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
		 CH MANOJ	 SRIKANTH G	 S B RAO	20.07.15

Note No. #1

Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED	Attachment: SPEC.pdf
		PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52 147
		TECHNICAL SPECIFICATION	Rev. No. 01
		TEE, REDUCING, CARBON STEEL, BUTT WELDING	Page 1 of 1

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1.0 GENERAL

- 1.1 The Butt Welding Reducing Tee supplied according to this specification shall conform to the requirements of latest version of ASME Standard B16.9 "Factory-Made Wrought Butt welding Fittings" and comply with the following additional requirements.
- 1.2 This specification is applicable for Reducing Tee of sizes NPS ½" to NPS 48".

2.0 MATERIAL & CONSTRUCTION:

Material, Construction, Chemical Composition, Mechanical Properties, Heat Treatment, Testing and other requirements related to Material shall be in accordance with the ASTM Standard (latest version) as specified below:

- 2.1 For Reducing Tee of Larger End size NPS ½" to 14":
Seamless Construction according to ASTM A234 Gr WPB.
- 2.2 For Reducing Tee of Larger End size NPS 16" to 48":
Welded Construction according to ASTM A234 Gr WPB-W.
- 2.3 *Galvanizing shall be carried out as per ASTM A123, if specified.*

3.0 DIMENSIONS, TOLERANCES AND OTHER REQUIREMENTS:

Shall be as per ASME B16.9 (Latest edition).

4.0 SIZE AND THICKNESS:

Sizes of Large (Run) and Small (Outlet) ends of the Reducing Tee (NPS in inches) and their corresponding Wall thicknesses (Schedule) shall be as per BHEL Enquiry/Order.

5.0 DESIGNATION:

A Reducing Tee of Size 12" STD x 10" STD Carbon Steel, shall be designated as:





RDTEE CS 12" x 10" STD x STD BW.



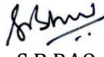
6.0 TECHNICAL DELIVERY CONDITIONS:

- 6.1 Unless otherwise specified on the order, IBR certification is not required.
- 6.2 All other requirements shall be as per BHEL Corporate Standard AA0851402 - Technical Delivery Conditions for Pipe Fittings. ASME Standard B16.28 referred in this TDC shall be read as ASME B16.9.

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RECORD OF REVISIONS:

Rev	Date	Revision Detail	Revised by	Approved by
00	24.12.2015	FIRST ISSUE	 SRIKANTH G	 S B RAO
01	20.07.2018	Clause 2.0 updated to include Galvanizing Specification.	 G.KALYAN	 SRIKANTH G

Refer Doc	LAYOUTS & PIPING ENGINEERING	PREPARED	CHECKED	APPROVED	DATE
	PROJECT ENGINEERING & SYSTEMS DIVISION	 CH MANOJ	 SRIKANTH G	 S B RAO	24.12.15

Note No. #1



Attachment:Bill of Material.pdf
BHARAT HEAVY ELECTRICALS LIMITED
 RAMACHANDRAPURAM, HYDERABAD-32
PROJECT ENGINEERING & SYSTEMS DIVISION

BILL OF MATERIAL FOR FRAME WORK
BW FITTINGS CS

Sl.No	MATERIAL CODE	DESCRIPTION	Wt (Kg)	Quantity (No.s)	Total Weight (Kgs)
1	PY9752101054	ELBOW 90D LR CS (A234GRWPB) 2" STD BW	0.65	28	18.20
2	PY9752101070	ELBOW 90D LR CS (A234GRWPB) 3" STD BW	2.03	1,600	3248.00
3	PY9752101089	ELBOW 90D LR CS (A234GRWPB) 4" STD BW	3.85	2,580	9933.00
4	PY9752101100	ELBOW 90D LR CS (A234GRWPB) 6" STD BW	10.15	1,600	16240.00
5	PY9752101119	ELBOW 90D LR CS (A234GRWPB) 8" STD BW	20.37	600	12222.00
6	PY9752101127	ELBOW 90D LR CS (A234GRWPB) 10" STD BW	36.08	1	36.08
7	PY9752101313	ELBOW 90D LR CS (A234GRWPB) 8" 20 BW	15.95	560	8932.00
8	PY9752101321	ELBOW 90D LR CS (A234GRWPB) 10" 20 BW	24.99	420	10495.80
9	PY9752101356	ELBOW 90D LR CS (A234GRWPBW) 16" 20 BW	74.53	4	298.12
10	PY9752101364	ELBOW 90D LR CS (A234GRWPB) 12" 30 BW	46.81	190	8893.90
11	PY9752103111	CRDCR CS 4" X 3" STD X STD BW	1.60	80	128.00
12	PY9752103120	CRDCR CS 6" X 3" STD X STD BW	3.90	60	234.00
13	PY9752103138	CRDCR CS 6" X 4" STD X STD BW	3.90	100	390.00
14	PY9752103154	CRDCR CS 8" X 6" STD X STD BW	6.50	10	65.00
15	PY9752103170	CRDCR CS 10" X 8" STD X STD BW	10.70	10	107.00
16	PY9752103499	CRDCR CS 8" X 6" SCH 20 X STD BW	6.67	65	433.55
17	PY9752103502	CRDCR CS 10" X 6" SCH 20 X STD BW	10.37	4	41.48
18	PY9752103510	CRDCR CS 10" X 8" SCH 20 X SCH 20 BW	7.62	7	53.34
19	PY9752104010	ERDCR CS 6" X 4" STD X STD BW.	3.90	2	7.80
20	PY9752104053	ERDCR CS 6" X 3" STD X STD BW.	3.90	50	195.00
21	PY9752104088	ERDCR CS 4" X 3" STD X STD BW	1.71	7	11.97
22	PY9752104118	ERDCR CS 8" X 6" 20 X STD BW	6.67	8	53.36
23	PY9752104320	ERDCR CS 16" X 10" STD X STD BW	33.96	1	33.96
24	PY9752108067	TEE STRT CS 3" STD BW	3.82	60	229.20
25	PY9752108075	TEE STRT CS 4" STD BW	5.76	700	4032.00
26	PY9752108083	TEE STRT CS 6" STD BW	13.49	230	3102.70
27	PY9752108091	TEE STRT CS 8" STD BW	24.69	55	1357.95
28	PY9752108105	TEE STRT CS 10" STD BW	41.89	12	502.68
29	PY9752108164	TEE STRT CS 24" STD BW	194.79	4	779.16
30	PY9752108296	TEE STRT CS 8" 20 BW	18.69	25	467.25
31	PY9752108300	TEE STRT CS 10" 20 BW	28.24	30	847.20
32	PY9752112013	ELBOW 45D LR CS 2" STD BW	0.33	2	0.66
33	PY9752112129	ELBOW 45D LR CS 24" STD BW	101.35	3	304.05
34	PY9752147046	RDTEE CS 10" X 6" 20 X STD BW	23.52	5	117.60
35	PY9752147062	RDTEE CS 3" X 2" STD X STD BW	2.36	1	2.36
36	PY9752147089	RDTEE CS 8" X 4" 20 X STD BW	14.37	4	57.48
				Total Wt.	83871.85

Note No. #1**Attachment:Bill of Material.pdf****Note:**

1. The above is the indicative list of items that are planned to be ordered.
2. The above list is not exhaustive. It shall be binding on the successful bidder, to accept any change in Size. Actual BOQ shall be as per the Individual Project Purchase order.
3. The Project Purchase Order Price shall be derived based on the Total Weight of the Project Purchase Order and the Unit Rate finalized for the Framework Agreement (+ PVC).
- 4. The Unit Weights furnished above, shall be binding on the successful bidder. Any deviations/observations on unit weight of the above mentioned items to be brought up during Pre bid Queries only.**