

फ्लैजों, स्पैक्टैकल ब्लाइंडों एवं ड्रिप रिंगों के लिए तकनीकी टिप्पणियाँ

TECHNICAL NOTES FOR FLANGES, SPECTACLE BLINDS AND DRIP RINGS

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Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman	Approved by	

Abbreviations:

AARH	:	Arithmetic Average Roughness Height
ANSI	:	American National Standards Institute
API	:	American Petroleum Institute
ASME	:	American Society of Mechanical Engineers
ASTM	:	American Society for Testing & Materials
AWWA	:	American Water Works Association
BHN	:	Brinell Hardness Number
HIC	:	Hydrogen Induced Cracking
IBR	:	Indian Boiler Regulations
IGC	:	Inter Granular Corrosion
IS	:	Indian Standard
MR	:	Material Requisition
MSS	:	Manufacturer's Standardization Society
NACE MR	:	National Association of Corrosion Engineers : Material Requirement
PMI	:	Positive Material Identification

Piping Standards Committee

Convenor : Mr. R. Nanda

Members : Mr. M. Ismaeel
Mr. Amrendra Kumar
Mr. G. Balaji
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1.0 GENERAL

1.1 All items, their dimensions, tolerances, chemical composition, physical properties, heat treatment and testing etc. shall conform to the latest codes and standards specified in the requisition. Supplier shall strictly comply with MR/PR stipulations and no deviations shall be permitted. Post Order Waiver/ Deviation format 5-0000-0180-F1 as mentioned in Cl. 5.18 of Specification for Quality Management System Requirements from Bidders (6-78-0001) is not applicable.

1.2 Testing

1.2.1 Test reports shall be supplied for all mandatory tests as per the relevant material specifications. Test reports shall also be furnished for any supplementary tests as specified in the requisition & Clauses 1.11, 1.12 & 1.15.

1.2.2 Material test certificates (physical property, chemical composition & heat treatment report) shall also be furnished for the flanges supplied.

1.2.3 Positive Material Identification (PMI) shall be performed as per the scope and procedures as defined in the 'Specification for Positive Material Identification (PMI) at Supplier's Works' (No. 6-81-0001).

1.2.4 Refer to specification no. 6-81-0006 for Inspection and Test plans for flanges, spectacle blinds & drip rings.

1.3 Ends of weld neck flanges shall be beveled to suit the schedule / thickness of matching pipe, as specified in the requisition.

1.4 Bevel end details for welding neck flanges shall be as per ASME B16.25. Contour of bevel end shall be as follows:

Material	Wall Thickness	Weld Contour
Carbon Steel (Except Low Temp. Carbon Steel)	Upto 22 mm	Figure 2 Type A
	> 22 mm	Figure 3 Type A
Alloy Steel, Stainless Steel & Low Temp. Carbon Steel	Upto 10 mm	Figure 4
	> 10 mm & Upto 25 mm	Figure 5 Type A
	> 25 mm	Figure 6 Type A

1.5 Bore of socket weld flanges & reducing blind flanges shall suit the outside diameter and schedule / thickness of matching pipe.

1.6 Bore of slip on flanges shall suit the outside diameter of matching pipe.

1.7 Flange face finish shall be normally specified in the requisition as serrated finish, 125 AARH etc. The interpretation for range of face finish shall be as follows:

Stock Finish	:	1000 μ in AARH max.
Serrated Finish/125 AARH	:	Serrations with 125 to 250 μ in AARH
63 AARH	:	32 TO 63 μ in AARH

- 1.8 Galvanized flanges shall be coated with zinc by hot dip process conforming to IS 4736 / ASTM A153.
- 1.9 Ends of screwed flanges unless otherwise specified shall have taper threads as per ASME/ANSI B1.20.1 (upto 1.5" NB) & IS 554 (for 2" to 6" NB).
- 1.10 For ring joint flanges, blinds and spacers the hardness shall be as follows:

Flange Material	Min. Hardness of Groove (BHN)
Carbon Steel	140
1% Cr to 5%, 9% Cr	150
Type 304, 316, 321, 347	160
Type 304L, 316L	140

- 1.11 For ring joint flanges, blinds and spacers, the hardness shall be recorded in the test report.

1.12 NACE/HIC Requirements

- 1.12.1 Flanges, blinds, drip rings under "NACE" category and those designated as "HIC1" shall meet the requirements given in NACE MR-0103 unless otherwise specified.
- 1.12.2 Flanges, blinds, drip rings made from plates and designated as "HIC1" shall meet the HIC requirements of EIL Specification 6-79-0013 unless otherwise specified.

- 1.13 All austenitic stainless steel flanges shall be supplied in solution annealed condition.

1.14 I.G.C. Test for Stainless Steels:

- 1.14.1 For all austenitic stainless steel flanges, blinds, drip rings & Fig.8 flanges intergranular corrosion test shall have to be conducted as per following:

ASTM A262 Practice 'B' with acceptance criteria of "60 mils/year (max.)".

OR

ASTM A262 Practice 'E' with acceptance criteria of "No cracks as observed from 20X magnification" & "Microscopic structure to be observed from 250X magnification".

- 1.14.2 When specifically asked for in requisition for high temperature application of some grades of austenitic stainless steel (like SS309, 310, 316, 316H etc.) ASTM A262 Practice 'C' with acceptance criteria of "15 mils/year" shall have to be conducted. When testing is conducted as per Practice 'E', photograph of microscopic structure shall be submitted for record.
- 1.14.3 For the IGC test as described in 1.14.1 & 1.14.2 two sets of samples shall be drawn from each solution treatment lot; one set corresponding to highest carbon content and the other corresponding to the highest rating / thickness.
- 1.15 All types of 321 or 347 stainless steel flanges shall be in a stabilized heat treated condition. Stabilising heat treatment shall be carried out subsequent to the normal solution annealing. Soaking temperature and holding time for stabilizing heat treatment shall be 900 C and 4 hours respectively.

- 1.16 For dual grades of SS where specified, chemical composition and mechanical properties of both grades specified shall be ensured.
- 1.17 AWWA C207 flanges shall be hub type.
- 1.18 Dimensions for handle projection for Spacers & Blinds shall be as specified in EIL Std. 7-44-0166.
- 1.19 Flanges of 22" size shall be as per MSS-SP44 unless otherwise specified
- 1.20 All 1Cr-½Mo and 1¼Cr-½Mo flanges shall be normalised and tempered.
- 1.21 Ring Joint Fig-8 Flanges, Spacers & Blinds shall be female type only.
- 1.22 The handle for spacers & blinds for classes 900# & above shall be designed by the vendor. The handle may be integral or attached to the line blank / spacer by welding. In case of attachment by welding heat treatment & welding shall be in accordance with B31.3.
- 1.23 For Hydrogen service following special requirements shall also be met:
- a. All carbon steel flanges having wall thickness 9.53 mm and above shall be normalised. The normalising heat treatment shall be a separate heat treatment operation and not a part of the hot forming operation.
 - b. All alloy steel (Cr-Mo) flanges shall be normalised and tempered. The normalising and tempering shall be a separate heat treatment operation and not a part of the hot forming operation.
 - c. For all carbon steels and alloy steels with wall thickness over 20mm, Charpy-V Notch impact testing shall be carried out in accordance with paragraph UG-84 of ASME Section VIII, Div-1 per heat of material and per heat treating batch. Impact test specimen shall be in accordance with ASTM A370. Impact energies at 0 C shall average greater than 27J (20 ft-lb) per set of 3 specimens, with a minimum of 19J (15ft-lb).

2.0 IBR REQUIREMENTS

2.1 IBR Documentation

- 2.1.1 Flanges coming under the purview of IBR (Indian Boiler Regulations) shall be accompanied with IBR Certificate original in Form III C duly approved and countersigned by IBR authority/ local authority empowered by Central Boiler Board of India. Photocopy of original certificate duly attested by the local boiler inspector where the supplier is located is the minimum requirement for acceptance.

- 2.2 For carbon steel pipes under IBR the chemical composition shall conform to the following:

Carbon (max)	:	0.25%
Others (S, P, Mn)	:	As prescribed in IBR.

The chemical composition as indicated in this clause is not applicable for pipes other than IBR services.

3.0 ACCEPTABLE DEVIATIONS

- 3.1 Blind Flanges and Spacers & Blinds if specified as plate materials are acceptable in forging materials also in the corresponding material grades.

3.2 Flanges/Spectacle Blinds/Drip rings of Grades SS317 of corresponding material are acceptable in place of Grades SS316 or SS316(2.5Mo min.).

3.3 Flanges/Spectacle Blinds/Drip rings of Grades SS317L of corresponding material are acceptable in place of Grades SS316L or SS316L(2.5Mo min.).

4.0 MARKING AND DESPATCH

4.1 All items shall be legibly and conspicuously stamped in accordance with the requirements of applicable ASME, API and MSS Standards. In addition, EIL item code, purchase order number & special conditions like "IBR", "CRYO", "NACE" "H2" etc. shall also be stamped.

4.2 All items coming under the purview of "IBR", "CRYO", "NACE" & "H2"(hydrogen) shall be painted in red stripes, light purple stripes, canary yellow stripes & sea green stripes (25 mm width) respectively for easy identification.

4.3 Paint or ink for marking shall not contain any harmful metal or metal salts such as zinc, lead or copper which cause corrosive attack on heating.

4.4 All items shall be dry, clean and free from moisture, dirt and loose foreign materials of any kind.

4.5 All items shall be protected from rust, corrosion and mechanical damage during transportation, shipment and storage.

4.6 Rust preventive on machined surfaces to be welded shall be easily removable with a petroleum solvent and the same shall not be harmful to welding.

4.7 Each end of flange shall be protected with the following materials:

Flange face	:	Wood, metal or plastic cover
Bevelled end	:	Wood, metal or plastic cover
Threaded end	:	Plastic plug
Socket welding end	:	Plastic cover or plug

4.8 Each size of flanges, blinds, etc. shall be supplied in separate packagings marked with the purchase order number, item code number, material specification, size and rating.

5.0 REFERENCES

6-81-0001	:	Specification for Positive Material Identification (PMI) at Supplier's Works.
6-81-0006	:	Inspection & test plan for flanges, spectacle blinds & drip rings
6-79-0013	:	Material requirements for carbon steel components used in sour service for petroleum refinery environments
7-44-0162	:	Standard for Spacers & Blinds $\geq 26''$ (150CL, 300CL & 600CL FF)
7-44-0164	:	Standard for Spacers & Blinds $\geq 26''$ (For AWWA Flanges)
7-44-0166	:	Dimensions for Handle projection for Spacers & Blinds $\geq \frac{1}{2}''$ -24"

बट वैल्डेड, साकेट वैल्डेड एवं पेंच
फिटिंगों के लिए तकनीकी टिप्पणियाँ

TECHNICAL NOTES FOR BUTT WELDED, SOCKET WELDED AND SCREWED FITTINGS

5	31.12.13	REVISED AND ISSUED AS STD SPECN	<i>UK</i> UK	<i>SH</i> SH	<i>AK RN</i> AK RN	<i>SC</i> SC
4	04.07.08	REVISED AND ISSUED AS STD SPECN	RN	SC	DM	VC
3	15/03/00	REVISED AND ISSUED AS STD SPECN	RN	BRB	NS	AS
2	04/04/94	HYDROTEST AND I.G. TEST CLAUSE REVISED	AKG	BPV	GRR	AS
1	31/05/92	ISSUED AS GENERAL REVISION	AKG/BPV	MSD	GRR	RNS
0	01/03/90	ISSUED AS STANDARD SPECIFICATION	RKJ		GRR	RCPC
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Abbreviations:

AARH	:	Arithmetic Average Roughness Height
ANSI	:	American National Standards Institute
API	:	American Petroleum Institute
ASME	:	American Society of Mechanical Engineers
ASTM	:	American Society for Testing & Materials
BHN	:	Brinell Hardness Number
CS	:	Carbon Steel
DP	:	Dye Penetrant
HAZ	:	Heat Affected Zone
HIC	:	Hydrogen Induced Cracking
IBR	:	Indian Boiler Regulations
IGC	:	Inter Granular Corrosion
IS	:	Indian Standard
LT	:	Low Temperature
MP	:	Magnetic Particle
MR	:	Material Requisition
MSS	:	Manufacturer's Standardisation Society
NACE MR	:	National Association of Corrosion Engineers : Material Requirement
NB	:	Nominal Bore
PMI	:	Positive Material Identification
PO	:	Purchase Order
PR	:	Purchase Requisition
SMYS	:	Specified Minimum Yield Strength
SS	:	Stainless Steel

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1.0 GENERAL

1.1 Chemical composition, physical properties, tests, dimensions and tolerances, heat treatment and marking shall conform to the applicable latest codes / standards / specifications as specified in the material requisition (MR). Supplier shall strictly comply with MR/PR stipulations and no deviations shall be permitted. Post Order Waiver/ Deviation format 5-0000-0180-F1 as mentioned in Cl. 5.18 of Specification for Quality Management System Requirements from Bidders (6-78-0001) is not applicable.

1.2 Testing

1.2.1 Test reports shall be supplied for all mandatory tests as per the material specifications. Test reports shall also be furnished for any supplementary tests as specified in the MR, Clauses 1.7.8, 1.9, 1.10 & 1.11. Material test certificates (physical properties, chemical composition & heat treatment report) shall also be furnished for fittings supplied.

1.2.2 Positive Material Identification (PMI) shall be performed as per scope and procedures defined in the Specification for Positive Material Identification (PMI) at Supplier's Works (6-81-0001).

1.2.3 Refer to specification no.6-81-0005 for Inspection and Test plan for forged, seamless and welded fittings.

1.3 All fittings shall be seamless in construction unless otherwise specified. If fittings are specified as welded, the same shall conform to clause 1.7.

1.4 Outside diameters and wall thickness (unless otherwise mentioned) of butt welded fittings shall be in accordance with ASME B36.10 and ASME B36.19 as applicable.

1.5 For reducing butt weld fittings having different wall thicknesses at each end, the greater wall thickness of the fitting shall be employed and inside bore at each end shall be matched with the specified inside diameter.

1.6 Beveled ends for all fittings shall conform to ASME B16.25. Contour of bevel shall be as follows:

Material	Wall Thickness	Weld Contour
Carbon Steel (Except Low Temp. Carbon Steel)	Upto 22 mm	Figure 2 Type A
	> 22 mm	Figure 3 Type A
Alloy Steel, Stainless Steel & Low Temp. Carbon Steel	Upto 10 mm	Figure 4
	> 10 mm & Upto 25 mm	Figure 5 Type A
	> 25 mm	Figure 6 Type A

1.7 Welded Fittings

1.7.1 All welded fittings shall be double welded. Inside weld projection shall not exceed 1.6 mm. Welds shall be ground smooth at least 25 mm from the ends.

- 1.7.2 For fittings made out of welded pipe, the welded pipe shall be double welded type & shall be manufactured with the addition of filler metal.
- 1.7.3 Welded tees shall not be of fabricated (stub-in) type.
- 1.7.4 All welded fittings shall be normalized & 100% radiographed by X-ray on all welds made by fitting manufacturers & also on the parent materials.
- 1.7.5 Welded pipes employed for manufacture of fittings shall be made by automatic welding only.
- 1.7.6 Specified heat treatment for carbon steel & alloy steel fittings shall be carried out again after weld repairs.
- 1.7.7 Irrespective of the material code requirement, all welded fittings indicated in the MR as "Cryo"& "LT" shall meet impact test requirements of ASME B31.3. The impact test temperature shall be -196°C & -45°C for stainless steel & carbon steel respectively unless specifically mentioned otherwise in the MR.

1.8 Stainless Steel Fittings

- 1.8.1 All stainless steel fittings shall be supplied in solution heat treated condition.
- 1.8.2 Solution annealing for stainless steel fittings shall be carried out again after weld repairs.
- 1.8.3 For all stainless steel fittings Inter Granular Corrosion (IGC) test shall have to be conducted as per the following:
ASTM A 262 Practice "B" with acceptance criteria of "60 mils/year (max.)".
Or
ASTM A 262 Practice "E" with acceptance criteria of "no cracks as observed from 20X magnification" & "microscopic structure to be observed from 250X magnification".
- 1.8.4 When specifically asked for in MR for high temperature application of some grades of austenitic stainless steel (eg. SS309, 310, 316, 316H etc.) ASTM A 262 Practice "C" with acceptance criteria of "15 mils/year" shall have to be conducted.
- 1.8.5 For the IGC test as described in Clauses 1.8.3 & 1.8.4, two sets of samples shall be drawn from each solution treatment lot, one set corresponding to the highest carbon content and other set to the highest fitting thickness. When testing is conducted as per ASTM A 262 Practice "E", photograph of microscopic structure shall be submitted for record.

- 1.8.6 For dual grades of SS where specified, chemical composition and mechanical properties of both grades specified shall be ensured.

1.9 NACE/HIC Requirements

- 1.9.1 Fittings under "NACE" category or those designated as "HIC1" shall meet the requirements of NACE MR-0103 unless otherwise specified.
- 1.9.2 Fittings made from plates and designated as "HIC1" shall meet the HIC requirements of EIL specification 6-79-0013 unless otherwise specified.
- 1.10 Thickness/schedule lower or higher than specified for the finished product shall not be accepted.

For manufacturing of elbows from pipes, same size of pipe as that of elbow shall be used and the nominal wall thickness of the starting pipes shall have positive tolerance only. However, where the manufacturer has an established automatic/semi-automatic process for the manufacture of elbows, the starting pipe may be permitted to be of lower size with higher schedule as required. Starting pipe of higher size than that of the elbow shall not be permitted.

- 1.11** The gasket contact surfaces of stub ends shall be flat with face finish specified in the requisition. Interpretation on the specified face finish is as follows:
125 AARH : Serrations with 125 to 250 μ in AARH
- 1.12** Seamless stub ends shall not have any welds on the body. Stub ends shall be long pattern type.
- 1.13** Galvanized fittings shall be coated with zinc by hot dip process conforming to IS 4736 / ASTM A153.
- 1.14** Threaded ends shall have NPT taper threads in accordance with ASME/ANSI B1.20.1 up to 1.5" NB & IS 554 from 2" to 6" NB.
- 1.15** Unless and otherwise specified in the MR, all socket welded and screwed fittings shall be in accordance with ASME B16.11 to the extent covered in the specification except for unions which shall be in accordance with MSS-SP-83.
- 1.16** Special fittings like weldolet, sockolet, sweepolet, latrolet, elbolet etc., the dimensions of which are not covered in ASME, MSS-SP & EIL Standards, shall be as per manufacturer's std. Contours of these fittings shall meet the requirements of ASME B31.3. Manufacturer shall submit drawings / catalogues of these items for records after acceptance of offer.
- 1.17** Length of all long half couplings shall be 100 mm unless otherwise specified in the MR.
- 1.18** For reducers to manufacturers' standard, length of reducer shall not be less than 0.7D where D is the outside diameter of the larger end.
- 1.19** All seamless pipes employed for manufacturing of fittings shall be required to have undergone hydrostatic test to ASTM A 530. Welded pipes employed for manufacture of fittings shall be tested as given below :

Welded Pipe Employed For Manufacture Of Welded Fittings.	Test Criteria
ASTM A671 Gr. C65,70 (Cl.32) ASTM A672 Gr. C60,65,70 (Cl.12, 22) ASTM A671 Gr. CF60,65,70,66 (Cl.32) ASTM A691 Gr. ½Cr, 1Cr, 1¼Cr, 2¼Cr, 5Cr, 9Cr (Cl.42), 91 (Cl.42)	P = 2ST / D S = 90% of SMYS. T = Nom. Wall Thickness D = 0.D. of Pipe.
API 5L ASTM A358 TP 304, 304L, 304H, 318, 318L, 318H, 321, 347 (Cl.1, 3, 4)	P = 2ST / D S = 85% of SMYS. T = Nom. Wall Thickness D = 0.D. of Pipe.
ASTM B725	ASTM B725
ASTM B517	ASTM B517
ASTM B514	ASTM B514

- 1.20** The bevel ends of all butt weld fittings shall undergo 100% MP / DP test.

1.21 Abbreviations for ends of swages and nipples shall be as follows:

PBE	:	Plain Both Ends
TBE	:	Threaded Both Ends
TOE	:	Threaded One End
TSE	:	Threaded Small End
TLE	:	Threaded Large End

1.22 All types of SS321 or SS347 fittings shall be in stabilized heat treated condition. Stabilizing heat treatment shall be carried out subsequent to normal solution annealing. Soaking temperature and holding time for stabilizing heat treatment shall be 900°C and 4 hours respectively.

1.23 For Hydrogen service fittings following special requirements shall also be met:

- a. All carbon steel fittings having wall thickness 9.53 mm (0.375") and above shall be normalised. Cold drawn fittings shall be normalised after the final cold draw pass for all thicknesses. In addition, fittings made from forgings shall have Carbon- 0.35 % max. and Silicon- 0.35 % max. The normalising heat treatment shall be a separate heating operation and not a part of the hot forming operation
- b. All alloy steel (Cr-Mo) fittings shall be normalised and tempered. The normalising and tempering shall be a separate heating operation and not a part of the hot forming operation. The maximum room temperature tensile strength shall be 100,000 psi.
- c. For carbon steel fittings, hardness of weld and HAZ shall be 200 BHN (max.). For alloy steel fittings, hardness of weld and HAZ shall be 225 BHN (max.).
- d. For all austenitic stainless steels, the weld deposit shall be checked for ferrite content. A Ferrite No.(FN) not less than 3% and not more than 10% is required to avoid sigma phase embrittlement during heat treatment. FN shall be determined by Ferritoscope prior to post weld heat treatment.
- e. For all Carbon steel and Alloy steel fittings with wall thickness over 20mm, Charpy-V Notch impact testing shall be carried out in accordance with paragraph UG-84 of ASME Section VIII, Div-1 for weld metal and base metal from the thickest item per heat of material and per heat treating batch. Impact test specimen shall be in complete heat treated condition and accordance with ASTM A370. Impact energies at 0°Celsius shall average greater than 27J (20 ft-lb) per set of three specimens, with a minimum of 19J (15 ft-lb).

1.24 For all welded alloy steel fittings with mandatory requirements of heat treatment and radiography, radiography shall be performed after heat treatment.

1.25 All 1Cr-0.5Mo & 1.25Cr-0.5Mo fittings shall be normalized and tempered. All 2.25Cr-1Mo, 5Cr-0.5Mo, 9Cr-1Mo & 9Cr-1Mo-V welded fittings shall be normalized and tempered.

1.26 Fitting material as per ASTM A234 Gr.WP5/WP9/WP91, wherever specified, shall be as per 'Cl.1', unless otherwise specified.

1.27 Materials designated as structural steel grades like IS 2062, SA 36 etc. or similar specification are not permitted for manufacture of fittings.

2.0 IBR REQUIREMENTS

2.1 IBR Documentation Required

2.1.1 Fittings under the purview of "IBR" (Indian Boiler Regulations) shall be accompanied with original IBR certificate in Form III-C duly approved and countersigned by IBR authority / local authority empowered by Central Boiler Board of India. Photocopy of the original certificate duly attested by the local boiler inspector where the supplier is located is the minimum requirement for acceptance.

2.1.2 For materials 1¼Cr - ½Mo (ASTM A 234Gr.WP11 & ASTM A234 Gr.WP11W) & 2¼Cr - 1Mo (ASTM A 234 Gr.WP22 & ASTM A234 Gr. WP22W) & 9Cr-1Mo-V (A234 Gr.WP91/ A234Gr.WP91W), where fittings are manufactured from pipe, Form III-C approved by IBR shall include the tabulation of E_t , S_c , & S_r values for the entire temperature range given below. E_t , S_c , & S_r values shall be such that throughout the temperature range

$$\begin{array}{lcl} E_t / 1.5 & \geq & \\ S_r / 1.5 & \geq & S_A \\ S_c & \geq & \end{array}$$

- S_A : Allowable stress at the working metal temperature.
 E_t : Yield point (0.2% proof stress at the working metal temperature)
 S_c : The average stress to produce elongation of 1%(creep) in 100000 hrs at the working metal temperature.
 S_r : The average stress to produce rupture in 100000 hrs at the working metal temperature and in no case more than 1.33 times the lowest stress to produce rupture at this temperature.

S_A (psi)												
Temp(F) Material	500	600	650	700	750	800	850	900	950	1000	1050	1100
A234Gr.WP11/ A234Gr.WP11W	21700	20900	20500	20100	19700	19200	18700	13700	9300	6300	4200	2800
A234Gr.WP22 / A234Gr.WP22W	17900	17900	17900	17900	17900	17800	14500	12800	10800	7800	5100	3200
A234Gr.WP91/ A234Gr.WP91W	28100	27700	27300	26700	25900	24900	23700	22300	20700	18000	14000	10300

Note : S_A values shall be as per the latest edition prevailing.

2.2 For carbon steel pipes under IBR the chemical composition shall conform to the following:

- Carbon (max) : 0.25%
 Others (S, P, Mn) : As prescribed in IBR.

The chemical composition as indicated in this clause is not applicable for pipes other than IBR services.

3.0 ACCEPTABLE DEVIATIONS

- 3.1 Seamless fittings are acceptable in place of welded fittings, however, welded fittings are not acceptable in place of seamless fittings. Forged fittings are acceptable in place of wrought fittings. However, wrought seamless fittings are acceptable in place of forgings only in case of swages.
- 3.2 Fittings of Grades SS317 of corresponding material are acceptable in place of Grades SS316 or SS316(2.5Mo min.).
- 3.3 Fittings of Grades SS317L of corresponding material are acceptable in place of Grades SS316L or SS316L(2.5Mo min.).

4.0 MARKING AND DESPATCH

- 4.1 Each fitting shall be legibly and conspicuously stamped in accordance with the requirements of applicable standards along with special condition like "IBR", "Cryo", "NACE" and "H2" etc.
- 4.2 Steel die marking with round bottom punch may be permitted on body of butt weld CS & lower alloy steel fittings, but for SS & higher alloy steel fittings, the same should be marked by electro-etching only.
- 4.3 Paint or ink for marking shall not contain any harmful metals or metal salts such as Zinc, Lead or Copper which causes corrosive attack on heating.
- 4.4 Fittings shall be dry, clean and free of moisture, dirt and loose foreign materials of any kind.
- 4.5 Fittings shall be protected from rust, corrosion and mechanical damage during transportation, shipment and storage.
- 4.6 Rust preventive used on machined surfaces to be welded shall be easily removable with a petroleum solvent and the same shall not be harmful to welding.
- 4.7 Fittings under "IBR", "CRYO", "NACE" and "H2" shall be painted in red, light purple, canary yellow and sea green stripes respectively for easy identification. Width of stripe shall be 25mm.
- 4.8 Each end of fitting shall be protected with a wood, metal or plastic cover.
- 4.9 Each size of fitting shall be supplied in separate packaging marked with the purchase order number, item code number, material specification, size and schedule / thickness / rating. For small quantities, fittings of different sizes may be packed in separate packing size-wise and these packing may be packed in a bigger package/ container clearly identifying the contents.

5.0 REFERENCES

- 6-81-0001 : Specification for Positive Material Identification (PMI) at Supplier's Works
- 6-81-0005 : Inspection & test plan for forged, seamless and welded fittings
- 6-79-0013 : Material requirements for carbon steel components used in sour service for petroleum refinery environments

हौज एवं हौज कपलिंग के लिए तकनीकी टिप्पणियाँ

TECHNICAL NOTES FOR HOSES & HOSE COUPLINGS

1	28.03.13	REVISED & ISSUED AS STANDARD SPECIFICATION	UK	SH	RN	ATD	DM
0	29.06.09	ISSUED AS STANDARD SPECIFICATION	PK	RN	SC		ND
Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman	Approved by

Abbreviations:

AARH	:	Arithmetic Average Roughness Height
ASME	:	American Society of Mechanical Engineers
CS	:	Carbon Steel
eDMS	:	Electronic Document Management System
MR	:	Material Requisition
PMI	:	Positive Material Identification

Piping Standards Committee

Convenor : Mr. R. Nanda

Members : Mr. Harish Chander
Mr. M. Ismaeel
Mr. Amrendra Kumar
Mr. G. Balaji
Mr. K.J. Harinarayanan (HMTD)
Mr. P P Lahiri / Mr. S. Ghoshal (SMMS)
Mr. G.K. Iyer (Construction)
Mr. K.V.K Naidu (Projects)

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1.0 PURPOSE & SCOPE

These Technical Notes shall form part of Material Requisition as well as the Purchase Requisition for Hoses & Hose couplings. These shall also serve as reference for Materials Engineer and Inspection. These notes cover the technical requirements, documentation, inspection, testing, marking and dispatch requirements for hoses and hose couplings.

2.0 TECHNICAL REQUIREMENTS

2.1 Hose material and Ends thereof shall be as per Material Requisition (MR).

2.1.1 The material composition, physical properties, heat treatment, mandatory tests, dimensions and tolerances and marking shall conform to the applicable codes/standards/specifications.

2.2 Hoses shall be suitable for outdoor installation in an atmosphere containing hydrocarbon vapour, steam etc. The outer cover shall be resistant to ageing, abrasion & weather effects etc.

2.3 Flanges for flanged hoses shall be in accordance with ASME B16.5 unless specified otherwise in the requisition. Flange finish shall be as specified in the requisition. The interpretation for range of face finish shall be as follows:

Serrated/Smooth/125AARH: 125 to 250 micro inch AARH.

2.4 Hose end connections shall be supplied as per MR.

2.5 CS Fittings(hose couplings, clamps, claws, nozzles etc.) shall be cadmium chromium Plated.

2.6 Manufacturer shall guarantee suitability of hoses for the service and working conditions (design pressure, design temperature) as specified in Data sheet of hoses and hose couplings.

3.0 DOCUMENTATION

3.1 No documents shall be submitted along with the offer. However, vendor shall submit the following documents for records through EIL eDMS:

- Duly signed and stamped data sheet for hoses & hose couplings.
- Vendor's catalogue/ drawings showing detailed dimensions along with material for different parts.
- Material test certificates as applicable; test reports of mandatory tests, hydrotest and special tests as per applicable specifications and standards.

3.2 In addition to submissions through eDMS, the following documents shall be submitted in hard copies (6 sets) and soft copies (2 CDs/DVDs) along with the delivery of respective items:

- Vendor's catalogue/ drawings showing detailed dimensions along with material for different parts.

4.0 TESTING & INSPECTION

4.1 All hoses shall be tested at 2 times the design Pressure along with end connections.

4.2 Steam resistance test, vacuum test and electrical continuity test shall be carried out and shall fulfill the requirements of the applicable design code/specifications.

- 4.2.1 Electrical continuity test shall be conducted on individual non-metallic hoses.
- 4.2.2 Vacuum test shall be conducted on all individual metallic and rubber hoses intended for steam service. For rubber hoses intended for steam service, steam resistance test shall also be conducted.
- 4.3 Flanges shall be so aligned so that the deviations measured in any direction do not exceed 0.5°.
- 4.4 The length of the finished hose assembly shall not differ from the specified length by more than $\pm 1\%$. Hose assembly shall be measured after being subjected to the various tests. Tolerances shall be as per specified design code.
- 4.5 Positive Material Identification (PMI) shall be performed as per the scope and procedures as defined in the 'Specification for Positive Material Identification (PMI) at Supplier's Works (No. 6-81-0001).
- 4.6 Inspection shall be carried out by EIL or its representative prior to dispatch.

5.0 MARKING & DESPATCH

- 5.1 All hoses along with their couplings shall be dry, clean and free from moisture, dirt and loose foreign material of any kind. All hoses shall be suitably packed and protected to avoid damage during transportation, shipment and storage.
- 5.2 Each hose shall have a weatherproof tag attached with a corrosion resistant metal wire. The weatherproof tag shall be embossed with item code, size of hose and length of hose. In addition, all hoses shall be clearly marked with service and maximum working pressure at both ends.

6.0 ATTACHMENTS

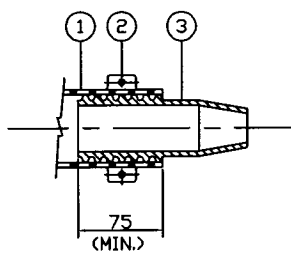
6-44-0064-A1 : Sketches for hoses and hose couplings (End details)

7.0 ATTACHMENTS FOR MR

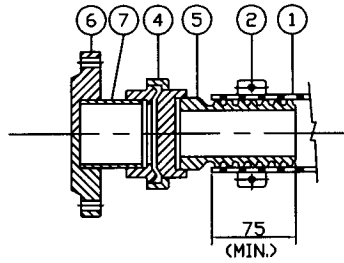
Format No.3-1643-0095: Data sheet for hoses and hose couplings

8.0 REFERENCES

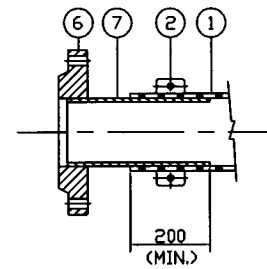
6-81-0001 : Specification for PMI at Supplier's Works



TYPE-1

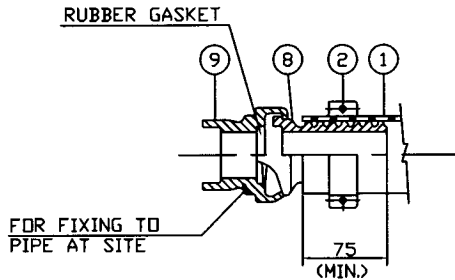


TYPE-2

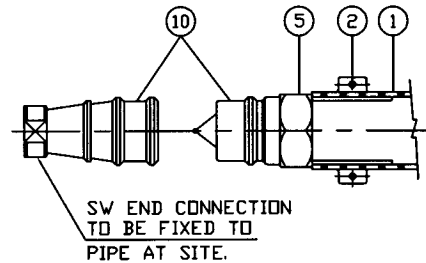


TYPE-3A & 3B

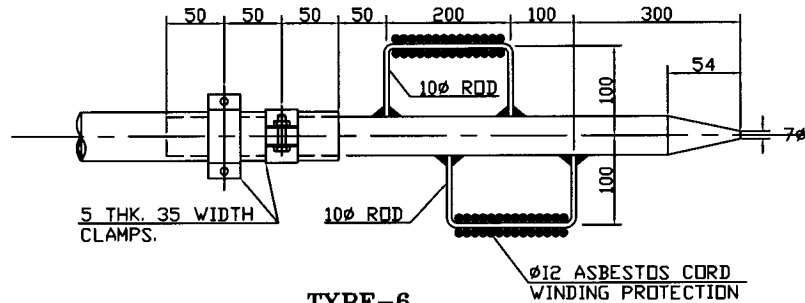
NOTE: FOR TYPE 3B HOSE TO BE FULLY
VULCANIZED OVER NIPPLE & NO CLAMP



TYPE-4



TYPE-5



TYPE-6

(FOR STEAM HOSE CONNECTION)
PIPE OD 33.4 & 4.5 THK.

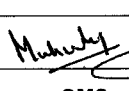
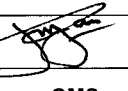
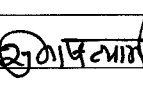
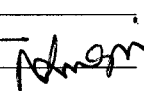
ITEM No.	DESCRIPTION
1	HOSE PIPE AS SPECIFIED
2	HOSE PIPE CLAMP WITH BOLTS MINIMUM 6mm THK. STEEL PLATE (IS2062) IN TWO PARTS BOLT/ NUTS A307 GR'B'
3	PIPE NIPPLE MATERIAL AS SPECIFIED (SEAMLESS)
4	3000 LB SW UNION, ENDS TO SUIT ITEM (5) AND (7). MATERIAL AS SPECIFIED
5	SEAMLESS PIPE NIPPLE WITH SERRATIONS TO SUIT ITEMS (1) AND (4). MATERIAL AS SPECIFIED
6	END FLANGE MATERIAL AND DETAIL AS SPECIFIED
7	PIPE MATERIAL AS SPECIFIED WITH SERRATIONS
8	QUICK CLAW COUPLING (HOSE END) MATERIAL AS SPECIFIED BOTH COUPLINGS TO BE SUPPLIED IN TYPE 4
9	QUICK CLAW COUPLING WITH SOCKET WELD PIPE END. MATERIAL AS SPECIFIED
10	QUICK ACTING, QUICK RELEASE COUPLER/ ADAPTOR ASSEMBLY WITH BUILT IN CHECK VALVE BOTH COUPLER AND ADAPTOR SHALL BE SUPPLIED IN TYPE 5

NOTE:-

ALL DIMENSIONS ARE IN MM.

बोलीकर्ता से गुणवत्ता प्रबंधन प्रणाली अपेक्षाओं हेतु विनिर्देश

SPECIFICATION FOR QUALITY MANAGEMENT SYSTEM REQUIREMENTS FROM BIDDERS

0	04.06.09	Issued as Standard Specification	 QMS Standards Committee	 QMS Standards Committee	 SCT	 ND
Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standard Bureau Chairman
						Approved by

Abbreviations:

MR	-	Material Requisition
PR	-	Purchase Requisition
PO	-	Purchase Order
QA	-	Quality Assurance
QMS	-	Quality Management System
ISO	-	International Organization for Standardization
CV	-	Curriculum Vitae

QMS Standards Committee

Convenor: Mr. S.C. Tyagi

Members: Mr. Chandra Kant (Insp.)
Mr. R.K. Trivedi (Engg.)
Mr. R.K. Sabharwal (C&P)
Mr. M.P. Jain (Projects)
Mr. Ravindra Kumar (Const.)
Mr. Mukesh Meena (CQA)

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Attachment

Format for Concession/Deviation Permit : Format No.5-0000-0180-F1

1.0 SCOPE

This specification establishes the Quality Management System requirements to be met by BIDDER for following purpose:

- QMS requirements to be met by suppliers/contractors after award of work/during contract execution.

2.0 DEFINITIONS

2.1 Bidder

For the purpose of this specification, the word "BIDDER" means the person(s), firm, company or organization who is under the process of being contracted by EIL / Owner for delivery of some products (including service). The word is considered synonymous to supplier, contractor or vendor.

2.2 Project Quality Plan

Document tailored from Standard Quality Management System Manual of BIDDER, specifying how the quality requirements of the project will be met.

2.3 Owner

Owner means the owner of the project for which services / products are being purchased and includes their representatives, successors and assignees.

3.0 REFERENCE DOCUMENTS

6-78-0002	Specification for Documentation Requirements from Contractors
6-78-0003	Specification for Documentation Requirements from Suppliers

4.0 QUALITY MANAGEMENT SYSTEM – GENERAL

Unless otherwise agreed with EIL / Owner, the BIDDER proposed quality system shall fully satisfy all relevant requirements of ISO 9001 "Quality Management Systems – Requirements." Evidence of compliance shall be current certificate of quality system registration to ISO 9001 or a recent compliance audit recommending registration from a registrar. The quality system shall provide the planned and systematic control of all quality related activities for execution of contract. Implementation of the system shall be in accordance with BIDDER'S Quality Manual and PROJECT specific Quality Plan.

5.0 QUALITY SYSTEM REQUIREMENTS

5.1 BIDDER shall ensure that the responsible authority for execution of the order / contract has communicated the PO / contract requirements including any identified or intended statutory and regulatory requirements to all concerned in their organization and sub-contractor's organization who are contributing to the execution of the PO/ contract.

5.2 BIDDER shall establish a documented Quality Policy and Quality Objectives to achieve the specified and intended requirement of PO / contract.

- 5.3** BIDDER shall identify and communicate the responsibilities and authorities of the personnel contributing to the execution of the PO / contract.
- 5.4** BIDDER shall deploy competent and trained personnel for various activities for fulfillment of PO / contract. BIDDER shall arrange adequate infrastructure and work environment to ensure that the specification and quality of the deliverable are maintained.
- 5.5** BIDDER shall do the quality planning for all activities involved in delivery of order. The quality planning shall cover as minimum the following:
- Resources
 - Product / deliverable characteristics to be controlled.
 - Process characteristics to ensure the identified product characteristics are realized
 - Identification of any measurement requirements, acceptance criteria
 - Records to be generated
 - Need for any documented procedure
- The quality planning shall result into the quality assurance plan, inspection and test plans (ITPs) and job procedures for the project activities in the scope of bidder. These documents shall be submitted to EIL/Owner for review/approval, before commencement of work.
- 5.6** Requirements for sub-contracting / purchasing of services specified in contract / tender shall be adhered to. Wherever requirements are not specified, the sub-contractor shall establish and maintain a system for purchasing / sub-contracting to ensure that purchased product / service conforms to specified requirements. Criteria for selection of sub-contractor, evaluation, re-evaluation, maintenance of purchasing data and verification of purchased product (sub-contractor services), constitute important components of this requirement.
- 5.7** BIDDER shall plan and carry production and service provision under controlled conditions. Controlled conditions shall include, as applicable
- a) the availability of information that describes the characteristics of the product
 - b) the availability of work instructions
 - c) the use of suitable equipment
 - d) the availability and use of monitoring and measuring devices
 - e) the implementation of monitoring and measurement
 - f) the implementation of release, delivery and post delivery activities
- 5.8** BIDDER shall validate any processes for production and service provision where resulting output cannot be verified by subsequent monitoring and measurement. This includes any process where deficiencies become apparent only after the product is in use or service has been delivered.
- 5.9** BIDDER shall establish a system for identification and traceability of product / deliverable throughout product realization. Product status with respect to inspection and testing requirements shall be identified.
- 5.10** BIDDER shall identify, verify, protect and safeguard EIL / Owner property (material / document) provided for use or incorporation into the product. If any Owner / EIL property is lost, damaged or otherwise found to be unsuitable for use, this shall be reported to the EIL / Owner.

- 5.11** BIDDER shall preserve the conformity of product / deliverable during internal processing and delivery to the intended destination. Requirements mentioned in the tender shall be adhered to.
- 5.12** BIDDER shall establish system to ensure that inspection and testing activities are carried out in a manner that is consistent with the inspection and testing requirements. Where necessary, measuring equipments shall be calibrated at specified frequency, against national or international measurement standards; where no such standard exists, the basis used for calibration shall be recorded. The measuring equipments shall be adjusted or re-adjusted as necessary, identified to enable the calibration status to be determined. The measuring equipments shall be protected from damage during handling, maintenance and storage.
- 5.13** BIDDER shall ensure effective monitoring, using suitable methods, of the processes involved in production and other related processes for delivery of the scope of contract.
- 5.14** BIDDER shall monitor and measure the characteristics of the product/deliverable to verify that product requirement has been met. The inspection (stage as well as final) by BIDDER and EIL / Owner personnel shall be carried out strictly as per the ITPs forming part of the contract. Product release or service delivery shall not proceed until the planned arrangements have been satisfactorily completed, unless otherwise approved by relevant authority and where applicable by Owner / EIL.
- 5.15** BIDDER shall establish and maintain a documented procedure to ensure that the product which does not conform to requirements is identified and controlled to prevent its unintended use or delivery
- 5.16** All non-conformities (NCs) / deficiencies found by the BIDDER'S inspection / surveillance staff shall be duly recorded, including their disposal action shall be recorded and resolved suitably. Effective corrective and preventive action shall be implemented by the BIDDER so that similar NCs including deficiencies do not recur.
- 5.17** All deficiencies noticed and reported by EIL / Owner shall be analyzed by the BIDDER and appropriate corrective and preventive actions shall be implemented. BIDDER shall intimate EIL / Owner of all such corrective and preventive action implemented by him.
- 5.18** BIDDER should follow the standards, specifications and approved drawings. Concessions/Deviations shall be allowed only in case of unavoidable circumstances. In such situations Concession/deviation request must be made by the BIDDER in attached Format No. 5-0000-0180-F1.
- 5.19** BIDDER shall have documented procedure for control of documents.
- 5.20** All project records shall be carefully kept, maintained and protected for any damage or loss until the project completion, then handed over to EIL / Owner as per contract requirement (Refer Specification Nos. 6-78-0002 - Specification for Documentation Requirements from Contractors and 6-78-0003 - Specification for Documentation Requirements from Suppliers), or disposed as per relevant project procedure.
- 5.21** BIDDER shall prepare and submit for review and approval, Project Quality Plan / Quality Assurance Plan for contracted scope / job. The BIDDER'S Quality Plan shall address all of the applicable elements of ISO 9001, identify responsible parties within BIDDER'S organization, for the implementation / control of each area, reference the applicable procedures used to control / assure each area, and verify the documents produced for each area. The Project Quality Plan shall necessarily define control or make reference to the relevant procedures, for design and engineering, purchase, documentation, record control, bid evaluation, inspection, production/manufacturing, preservation, packaging and storage,

quality control at construction site, pre-commissioning, commissioning and handing over (as applicable) in line with contract requirement and scope of work.

6.0 AUDITS

BIDDER shall plan and carry out the QMS audit for the job. Quality audit programme shall cover design, procurement, construction management and commissioning as applicable including activities carried out by sub-vendors and sub-contractors. This shall be additional to the certification body surveillance audits carried out under BIDDER'S own ISO 9001 certification scheme.

The audit programmes and audit reports shall be submitted to EIL / Owner as per specified documentation requirements. EIL or Owner's representative reserves the right to attend, as a witness, any audit conducted during the execution of the WORKS.

In addition to above EIL, Owner and third party appointed by EIL/Owner may also perform Quality and Technical compliance audits. BIDDER shall provide assistance and access to their systems and sub-contractor / vendor systems as required for this purpose. Any deficiencies noted shall be immediately rectified by BIDDER.

7.0 DOCUMENTATION REQUIREMENTS

BIDDER shall submit following QMS documents immediately after award of work (Within one week) for record / review by EIL / Owner.

- Organization chart (for complete organization structure and for the project)
- Project Quality Plan/Quality Assurance Plan
- Job specific Inspection Test Plans
- Job Procedures
- Inspection/Test Formats

In addition to above QMS documents, following documentation shall be maintained by the BIDDER for submission to EIL / Owner on demand at any point of time during execution of the project.

- Quality Manual
- CVs of the personnel in BIDDER'S QA Organogram
- Certificate of approval for compliance to ISO: 9001 standard
- Procedure for Control of Non-conforming Product
- Procedure for Control of Documents
- Sample audit report of the QMS internal and external audits conducted during last one year
- Customer satisfaction reports from at least 2 customers, during the last one year
- Project audit report
- Corrective action report on the project audits
- Technical audit reports for the project

Documents as specified above are minimum requirements. BIDDER shall submit any other document/data required for completion of the job as per EIL/Owner instructions.

CONCESSION/DEVIATION PERMIT

(USE ONLY THIS PAGE FOR COMMUNICATION WITH VENDOR/CONTRACTOR)

TO BE FILLED BY ORIGINATOR	Project _____		Originator Ref. _____	
	Job No. _____		Order/Contract No. _____	
	Equipment Title _____		Item No. _____	
	Originator: Vendor/Contractor _____			
	Caution : Originator to note that any delay in processing of concession/deviation permit shall be to originator's account and shall not be used as a reason for extension in delivery			
	Requirement as per specification		Description of Concession/Deviation sought	
	Why the Concession/Deviation is required? Supporting evidence/calculations enclosed/not enclosed			
Contractual implications if Concession/Deviation is granted:				
* Time impact		More/Less/No change		
* Cost impact		More/Less/No change		
* Performance Warranty/Guarantee		Affected/Not affected		
Under present constraints requested Concession/deviation is most optimum for the project and does not involve any hazard, and shall meet the stipulated performance requirements.				
Date: _____				
Signature Vendor /Contractor (with seal)				

Decision on Concession/Deviation including decision, on time and cost implications

(To be filled by the Inspection engineer [at RPO/HO] or RCM, responsible for conveying the decision to the originator, after resolution)

Date: _____

Signature _____

Location : _____

Name _____

Opinion from EIL site supervisor/inspection engineer
(Specify whether post-facto approval required for regularization)

Date : _____

Name : _____
RPO/Site Name _____

Original forward to : _____
(Target division/department/group)

Copy to : _____
(Project Manager)

Date : _____

Name : _____

Disposal by target division/department

Whether any vendor/contractor made 'Technically not Acceptable' during bid evaluation, on the aspect of which this concession/deviation is sought-----YES/NO

Date : _____

Name : _____

Final decision of Project Manager along with overall review
(Client's decision required/not required)

Date : _____

Name : _____

Client's decision, if required

Date : _____

Signature : _____
Name : _____

आपूर्तिकर्ताओं से प्रलेखन अपेक्षाओं हेतु विनिर्देश

SPECIFICATION FOR DOCUMENTATION REQUIREMENTS FROM SUPPLIERS

0	04.06.09	Issued as Standard Specification	QMS Standards Committee	QMS Standards Committee	SCT	ND
Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
Approved by						

Abbreviations:

HOD	-	Head of Division / Department
QMS	-	Quality Management System
MOU	-	Memorandum of Understanding
PO	-	Purchase Order
PR	-	Purchase Requisition
MR	-	Material Requisition
EDMS	-	Electronic Document Management System
FOA	-	Fax of Acceptance
LOA	-	Letter of Acceptance
ITP	-	Inspection and Test Plan
URL	-	Universal Resource Locator
PVC	-	Poly Vinyl Chloride
TPIA	-	Third Party Inspection Agency

QMS Standards Committee

Convenor: Mr. S.C. Tyagi

Members: Mr. Chandra Kant (Insp.)
Mr. R.K. Trivedi (Engg.)
Mr. R.K. Sabharwal (C&P)
Mr. M.P. Jain (Projects)
Mr. Ravindra Kumar (Const.)
Mr. Mukesh Meena (CQA)

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Attachments

Format for Drawing/Documentation Transmittal	:	Format No. 3-78-0001
Format for Drawing/Documentation Schedule	:	Format No. 3-78-0002
Format for Comments Resolution sheet	:	Format No. 3-78-0003
Format for completeness of Final Documentation	:	Format No. 3-78-0004

1.0 SCOPE

This specification establishes the Documentation Requirements from Suppliers.

All documents/data against the PO / PR / MR shall be developed and submitted to EIL/Owner by the suppliers for review / records, in line with this specification.

2.0 DEFINITIONS

2.1 Supplier

For the purpose of this specification, the word "SUPPLIER" means the person(s), firm, company or organization who is under the process of being contracted by EIL / Owner for delivery of some products (including service). The word is considered synonymous to bidder, contractor or vendor.

2.2 Owner

Owner means the owner of the project for which services / products are being purchased and includes their representatives, successors and assignees.

3.0 REFERENCE DOCUMENTS

6-78-0001 Specification for Quality Management System Requirements from Bidders

4.0 DOCUMENTATION REQUIREMENTS

4.1 Documents/Data to be Submitted by the Supplier

4.1.1 The Supplier shall submit the documents and data against the PO/PR/MR as per the list given in respective PO/PR/MR.

4.1.2 Review of the supplier drawings by EIL would be only to review the compatibility with basic designs and concepts and in no way absolve the supplier of his responsibility/contractual obligation to comply with PR requirements, applicable codes, specifications and statutory rules/regulations. Any error/deficiency noticed during any stage of manufacturing/execution/installation shall be promptly corrected by the supplier without any extra cost or time, whether or not comments on the same were received from EIL during the drawing review stage.

4.1.3 Unless otherwise specified, submission of documents for Review/Records shall commence as follows from the date of Fax of Intent /Letter of Intent:

QMS - 1 week
Drawing/Document Index - 2 weeks
Other Documents/Drawings - As per approved Drawing/Document Index/Schedule

4.1.4 Documents as specified in PO/PR/MR are minimum requirements. Supplier shall submit any other document/data required for completion of the job as per EIL/Owner instructions.

4.2 Style and Formatting

- 4.2.1 All Documents shall be in ENGLISH language and in M.K.S System of units.
- 4.2.2 A blank space measuring 75 mm (W) x 38 mm (H) shall be provided on the body of all supplier drawings for marking of review codes by EIL.
- 4.2.3 Before forwarding the drawings and documents, contractor shall ensure that the following information are properly entered in each drawing:

Purchase Requisition Number
Name of Equipment / Package
Equipment / Package Tag No.
Name of Project
Client
Drawing / Document Title
Drawing / Document No.
Drawing / Document Revision No. and Date
Transmittal Number
EIL Vendor Print No.
(In case of second & subsequent Revisions)

Note: EIL "Vendor Print Number" is to be picked up from the EIL Review Code Stamp affixed on the previous revision.

4.3 Review and Approval of Documents by Supplier

- 4.3.1 The Drawing/Documents shall be reviewed, checked, approved and duly signed/stamped by supplier before submission. Revision number shall be changed during submission of the revised supplier documents and all revisions shall be highlighted by clouds. Whenever the supplier require any sub-supplier drawings to be reviewed by EIL, the same shall be submitted by the supplier after duly reviewed, approved and stamped by the supplier. Direct submission of sub-supplier's drawings without contractor's approval shall not be entertained.

4.4 Document Category

4.4.1 Review Category

Following review codes shall be used for review of supplier Drawings/Documents:

Review Code 1	-	No comments.
Review Code 2	-	Proceed with manufacture/fabrication as per commented document. Revised document required
Review Code 3	-	Document does not conform to basic requirements as marked. Resubmit for review
R	-	Retained for Records.
V	-	Void

4.4.2 Records Category

Documents under this category are meant for EIL records. These documents would not be returned to supplier. However, comments, if any, will be communicated to supplier.

4.5 Methodology for Submission of Documents to EIL/Owner

4.5.1 Submission of Soft Copy of Drawings/Documents

Soft copy of drawings/documents and data shall be uploaded on the EIL EDMS Portal. The detail guidelines for uploading documents on EIL EDMS Portal are available on following URL

<http://edocx.eil.co.in/vportal>

4.5.2 Submission of Hard Copy of Drawings/Documents

Required number of hard copies of drawings/documents shall be submitted as per PO/PR/MR along with drawing/document transmittal, Format for Drawing/Document Transmittal (Format No. 3-78-0001) is attached with this specification.

4.5.3 Designated Authority for Submission of Drawings/Documents

Drawings/Documents shall be submitted to the designated authority of EIL/Owner as per PO/PR/MR or as communicated to the supplier during kick off meeting or subsequent correspondences.

4.5.4 Details of Contact Persons of Supplier

After placement of order supplier shall inform in writing the details of contact persons associated with the project / job. The details should include e-mail address, mailing address, telephone nos., fax nos. and names of associated persons of the supplier. The above details shall be sent to EIL Project Manager, EIL Inspection HO and concerned Regional Procurement office of EIL.

4.5.5 Drawing/Document Schedule

Supplier shall submit total index of drawings/documents required for review/records based on PO/PR/MR along with schedule date of submission of each drawing/document. The drawing schedule shall be submitted in Format No. 3-78-0002 for approval of EIL/Owner. The drawing schedule shall be specific with regard to drawing/document no., the exact title and size of the drawing/document. For submission of drawing schedule, the supplier shall proceed based on PO/PR/MR and subsequent correspondence. With each submission of drawings/documents, supplier shall submit updated index with schedule v/s actual submission dates, status of drawings, revision no., date, of approval etc. Any submission without index shall not be entertained for review. It shall be ensured that proper sequencing of the drawings/documents to be submitted is maintained in the drawing schedule

4.5.6 Schedule and Progress Reporting

Supplier shall submit monthly progress report and updated procurement, engineering and manufacturing status (schedule vs. actual) every month in, beginning within 2 weeks from FOA/LOA. In case of exigencies, EIL/Owner can ask for report submission as required on weekly/fortnightly/adhoc basis depending upon supply status and supplier shall furnish such reports promptly without any price implication. Format for progress report shall be submitted by the Supplier during kick off meeting or within one week of receiving FOA/LOA, whichever is earlier.

4.5.7 Quality Assurance Plan/Inspection and Test Plan

Inspection and test plans attached if any, to the MR/PR are generic and indicative only. Immediately after receipt of the order, supplier shall submit within one week of receiving FOA/LOA, the Quality Assurance Plan for manufacturing, covering quality control of critical bought out items/materials, inspection & testing at various stages of production, quality control records and site assembly & testing as may be applicable to the specific order and obtain approval from concerned Regional procurement Office of EIL/third party inspection agency, as applicable.

4.5.8 Inspection Release Note (IRN)

Supplier shall ensure that all documents viz. documents reviewed, manufacture's test certificate etc. mentioned in Inspection Release Note (IRN) issued by EIL/third party, are sent to EIL for issue of IRN.

IRN shall be issued by EIL Inspector/ third party inspection agency only after all the drawings/documents as per Supplier's index of drawings/documents are submitted and are accepted under review code-1. Material/Equipments dispatch from Supplier's/sub Supplier's works shall not commence till above condition is met.

Note: Non fulfilling above requirement shall result into appropriate penalty or withholding of payment as per conditions of PO/PR/MR.

4.5.9 Transportation Plan

Transportation Plan for Over Dimensional Consignments (ODC), if any, shall be submitted to concerned Regional procurement Office within 2 weeks of receiving FOA/LOA, for approval. Consignment with parameters greater than following shall be considered as over dimensional.

Dimensions: 5.5 meters width x 5.5 meters height x 25 meters length

Weight : 100 MT

4.5.10 Statutory Approvals

Wherever approval by any statutory body is required to be taken by Supplier, the Supplier shall submit copy of approval by the authority to EIL.

4.5.11 Comments Resolution Sheets

While re-submitting drawings/documents the supplier shall confirm whether all comments have been incorporated, through a comments resolution sheet (As per attached format No. 3-78-0004). If any comments are not incorporated or excluded, then reason or justification for the same shall be furnished in comments resolution sheet

4.5.12 Multi Sheet Documents

Multi sheet documents other than drawings shall be submitted in their entirety in the event of a re-submission, even if only few sheets are revised.

4.6 Final Documentation

4.6.1 As Built Drawings

Shop changes made by Supplier after approval of drawings under 'Code 1' by EIL and deviations granted in deviation permits, if any, shall be marked in hard copies of drawings which shall then be stamped 'As-built' by the supplier. These 'As-built' drawings shall be reviewed and stamped by EIL Inspector or TPIA also. Supplier shall prepare scanned images files of all marked – up 'As – built' drawings. Simultaneously Supplier shall incorporate the shop changes in the native soft files of the drawings also.

4.6.2 As Built Final Documents

As built final documents shall be submitted as listed in PO/PR/MR.

4.6.3 Packing/Presentation of Final Documents

Final Documents shall be legible photocopies in A4, A3 size only. Drawings will be inserted in plastic pockets (both sides transparent, sheet thickness minimum 0.1 mm) with an extra strip of 12 mm wide for punching so that drawings are well placed.

Final Documentation shall be bound in Hard board Plastic folder(s) of size 265 mm x 315 mm ($10\frac{1}{2}$ inch x $12\frac{1}{2}$ inch) and shall not be more than 75 mm thick. It may be of several volumes and each volume shall have a volume number, index of volumes and index of contents of that particular volume. Where number of volumes are more, 90mm thickness can be used. Each volume shall have top PVC sheet of minimum 0.15 mm thick duly fixed and pressed on folder cover and will have 2 lever clip. In case of imported items documents, 4 lever clip shall also be accepted. All four corners of folders shall be properly metal clamped. Indexing of contents with page numbering must be incorporated by supplier. Spiral/Spico bound documents shall not be acceptable. As mentioned above, books should be in hard board plastic folders with sheets punched and having 2/4 lever clips arrangement.

Each volume shall contain on cover a Title Block indicating package Equipment Tag No. & Name, PO/Purchase Requisition No., Name of Project and Name of Customer. Each volume will have hard front cover and a reinforced spine to fit thickness of book. These spines will also have the title printed on them. Title shall include also volume number (say 11 of 15) etc.

4.6.4 Submission of Soft Copies

Supplier shall submit to EIL, the scanned images files as well as the native files of drawings/documents, along with proper index.

In addition to hard copies, Supplier shall submit electronic file (CD-ROM) covering soft copies of all the final drawings and documents, all text documents prepared on computer, scanned images of all important documents (not available as soft files), all relevant catalogues, manuals available as soft files (editable copies of drawings/text documents, while for catalogues/manuals/proprietary information and data PDF files can be furnished).

4.6.5 Completeness of Final Documentation

Supplier shall get the completeness of final documentation verified by EIL and attach the Format for Completeness of Final Documentation (Format No. 3-78-004) duly signed by EIL Inspector or TPIA as applicable to the document folder.

DRAWING/DOCUMENT TRANSMITTAL SHEET

CONTRACTOR'S VENDOR'S LOGO ETC.
PL. DO NOT CHANGE LOCATION OR EXCEED THIS SPACE

PR/TENDER NO.	:	JOB NO.	:
CONTRACTORS/VENDOR'S NAME	:	PROJECT	:
EIL LOI/PO NO.	:	CLIENT	:
CONTRACTOR'S VENDOR'S LETTER NO.	:	DATE	:

[illegible]

CATEGORY CODES:

R- Drawings which are required to be reviewed by EIL

I – Drawings which are to be submitted for EIL record

Page 1 of 1

EIL JOB NO. :
CONTRACTOR'S/VENDOR'S NAME
EIL LOI/PO NO.
DATE
CLIENT

PROJECT

CONTRACTOR'S/VENDOR'S NAME, LOGO
ETC.
PL. DO NOT CHANGE LOCATION OR EXCEED
THIS SPACE

[illegible]

R – Drawings which are required to be reviewed by EIL.
I – Drawings which are to be submitted for EIL record.

Comment Resolution Sheet

Job. No. _____

Project Title_____

Drawing/Document No._____

Revision No. _____

[illegible]

COMPLETENESS OF FINAL DOCUMENTATION

Name of Supplier/Contractor :
Customer :
Project :
EIL's Job No. :
Purchase Order No./
Contract No. :

Purchase Requisition No./
Tender No. :

Rev. No. :

Name of the Work/ Equipment :
Tag. No. :
Supplier's/ Contractor's Works :
Order No. :

Certified that the Engineering Documents/ Manufacturing & Test Certificates submitted by the supplier are complete in accordance with the Supplier Data Requirements of Purchase Requisition.

Signature :
Date :
Name :
Designation :
Department :

Signature :
Date :
Name :
Designation :
Department :

Supplier/Contractor

EIL

INSPECTION AND TEST PLAN
FOR
FORGED, SEAMLESS & WELDED FITTINGS

STANDARD SPECIFICATION No.

6-81-0005 Rev. 5

Page 1 of 6

फोर्ज्ड, सीमलेस एंड वैल्डेड फिटिंगों के लिये
निरीक्षण व परीक्षण योजना
INSPECTION AND TEST PLAN
FOR
FORGED, SEAMLESS & WELDED FITTINGS

5.	17.06.2013	REVISED AND RE-ISSUED	TKK	RKS	SCG	DM
4	15.07.2011	REVISED AND RE-ISSUED	TKK	SCG	AKC	DM
3	30.06.2010	REVISED AND RE-ISSUED	RKB	VKJ	SKP	ND
2	31.01.2008	REVISED AND RE-ISSUED	CS	SS	MVKK	VC
1	30.06.2004	REVISED AND ISSUED FOR IMPLEMENTATION	MS	SPS	SY	SKG
Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	

INSPECTION AND TEST PLAN FOR FORGED, SEAMLESS & WELDED FITTINGS

STANDARD SPECIFICATION No.

6-81-0005 Rev. 5

Page 2 of 6

Abbreviations:

CEIL	:	Certification Engineers International Limited	MRT	:	Mechanical Run Test
CIMFR	:	Central Institute of Mining & Fuel Research	NDT	:	Non Destructive Testing
CE	:	Carbon Equivalent	NPSH	:	Net Positive Suction Head
DFT	:	Dry Film Thickness	PO	:	Purchase Order
DPT	:	Dye Penetrant Testing	PESO	:	Petroleum Explosive Safety Organization
DHT	:	De-hydrogen Heat Treatment	PQR	:	Procedure Qualification Record
ERTL	:	Electronics Regional Test Laboratory	PR	:	Purchase Requisition
FCRI	:	Fluid Control Research Institute	PMI	:	Positive Material Identification
HT	:	Heat Treatment	RT	:	Radiography Testing
HIC	:	Hydrogen Induced Cracking	SSCC	:	Sulphide Stress Corrosion Cracking
ITP	:	Inspection and Test Plan	TC	:	Test Certificate
IP	:	Ingress Protection	TPI or TPIA	:	Third Party Inspection Agency
IHT	:	Intermediate Heat Treatment	UT	:	Ultrasonic Testing
IC	:	Inspection Certificate	VDR	:	Vendor Data Requirement
IGC	:	Inter Granular Corrosion	WPS	:	Welding Procedure Specification
MPT/MT	:	Magnetic Particle Testing	WPQ	:	Welders Performance Qualification
MTC	:	Material Test Certificate			

Inspection Standards Committee

Convenor : Mr. S C Gupta

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr. Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

INSPECTION AND TEST PLAN FOR FORGED, SEAMLESS & WELDED FITTINGS

STANDARD SPECIFICATION No.

6-81-0005 Rev. 5

Page 3 of 6

1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of Forged, Seamless & Welded Fittings.

2.0 REFERENCE DOCUMENTS

PO/PR/Standards referred therein/ Job specifications /Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	Procedure						
1.1	Heat Treatment / NDT	Documented Procedures	100%	Procedure Documents	-	H	R
1.2	WPS,PQR & WPQ	Welding Parameters & Qualification	100%	WPS,PQR & WPQ	-	H	W- New R- Existing
2.0	Material Inspection						
2.1	Raw Material Identification (Billets, Rounds, Pipes, Coil, Plates, etc.)	Chemical and Mechanical Properties	100%	Mill test certificate, Supplier's Inspection Report	-	H	R

INSPECTION AND TEST PLAN
FOR
FORGED, SEAMLESS & WELDED FITTINGS

STANDARD SPECIFICATION No.

6-81-0005 Rev. 5

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.0	In Process Inspection						
3.1	Forming & Welding	Forming & Welding Parameters	100%	Supplier's records	-	H	-
3.2	Ferrite Check Of SS Welds (If Applicable)	% Ferrite Check	100%	Inspection Report	-	H	R
3.3	Heat Treatment	Stress Reliving, Normalising, Tempering, Solution Annealing, Stabilization Heat Treatment etc. as applicable	100%	HT chart / Report	-	H	R
3.4	NDT As Applicable	Surface & Internal Imperfections	As per PR/Purchase Specification	NDT Reports	-	H	R
3.5	Identification of Test Samples	Product Chemical, Mechanical, Impact, IGC and Other test as applicable	100%	Test Reports	-	H	H (Note-1)
3.6	Product Analysis	Chemical Composition	As per PR/Purchase Specification	Test Reports	-	H	R
3.7	Destructive Testing	Mechanical, Impact, IGC and Other test as applicable	100%	Test Reports	-	H	H (Note-1)

INSPECTION AND TEST PLAN
FOR
FORGED, SEAMLESS & WELDED FITTINGS

STANDARD SPECIFICATION No.

6-81-0005 Rev. 5

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.8	Galvanizing (If Applicable)	Integrity Of Galvanised Coating	100%	Inspection Report	-	H	-
4.0	Final Inspection						
4.1	Visual and Dimension	Size, Thickness / Schedule, Dimensions, Surface quality, Marking, etc.	100%	Inspection Report	-	H	RW (Note-1)
4.2	PMI Check	Chemical Check	As Per EIL Spec. 6-81-0001	Inspection report	-	H	RW
4.3	Final Stamping	Stamping Of Accepted Fittings	Stamping of Fittings which are witnessed by EIL/TPIA.	Inspection Report	-	H	H (Note-1)
5.0	Painting						
5.1	Rust Preventive Coating & Color Coding	Visual & Color Coding as applicable	100%	Inspection Report	-	W	-
6.0	Documentation & IC						

INSPECTION AND TEST PLAN
FOR
FORGED, SEAMLESS & WELDED FITTINGS

STANDARD SPECIFICATION No.

6-81-0005 Rev. 5

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.1	Documentation & Inspection Certificate(IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Supplier TC & IC	-	H	H

Legend: H- Hold (Do not proceed without approval), P-Perform, RW - Random Witness (As specified or 10% (min.1 no. of each size and type of Bulk item)), R-Review, W-Witness (Give due notice, work may proceed after scheduled date).

NOTES (As applicable):

- For Non NACE & Non Hydrogen service Carbon Steel Fittings up to size 14" will be accepted on review of Supplier Test Certificates. Supplier Test Certificate to be reviewed by EIL/TPIA.
- This document describes the generic test requirements. Any additional test or Inspection scope if specified in contract documents shall also be applicable.(unless otherwise agreed upon)
- Acceptance Norms for all the activities shall be as per PO/PR/STANDARDS referred there in /Job Specification /Approved Documents.
- For orders placed on stockist, items shall be accepted based on manufacturer's TC with EN10204 type 3.2 certification from EIL approved suppliers.

फ्लैंजों, स्पैक्टैकल ब्लांडों एवं ड्रिप रिंगों के लिये
निरीक्षण व परीक्षण योजना
INSPECTION AND TEST PLAN
FOR
FLANGES, SPECTACLE BLINDS & DRIP RINGS

4.	17.06.2013	REVISED AND RE-ISSUED	TKK	RKS	SCG	DM
3	15.07.2011	REVISED AND RE-ISSUED	TKK	SCG	AKC	DM
2	30.06.2010	REVISED AND RE-ISSUED	RKB	VKJ	SKP	ND
1	28.09.2007	REVISED AND RE-ISSUED	PD	RB	MVKK	VC
0	23.04.2002	ISSUED FOR IMPLEMENTATION	NKN	SPS	AKB	SB
Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
Approved by						

INSPECTION AND TEST PLAN FOR FLANGES, SPECTACLE BLINDS & DRIP RINGS

STANDARD SPECIFICATION No.

6-81-0006 Rev. 4

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Abbreviations:

CEIL	:	Certification Engineers International Limited	MRT	:	Mechanical Run Test
CIMFR	:	Central Institute of Mining & Fuel Research	NDT	:	Non Destructive Testing
CE	:	Carbon Equivalent	NPSH	:	Net Positive Suction Head
DFT	:	Dry Film Thickness	PO	:	Purchase Order
DPT	:	Dye Penetrant Testing	PESO	:	Petroleum Explosive Safety Organization
DHT	:	De-hydrogen Heat Treatment	PQR	:	Procedure Qualification Record
ERTL	:	Electronics Regional Test Laboratory	PR	:	Purchase Requisition
FCRI	:	Fluid Control Research Institute	PMI	:	Positive Material Identification
HT	:	Heat Treatment	RT	:	Radiography Testing
HIC	:	Hydrogen Induced Cracking	SSCC	:	Sulphide Stress Corrosion Cracking
ITP	:	Inspection and Test Plan	TC	:	Test Certificate
IP	:	Ingress Protection	TPI or TPIA	:	Third Party Inspection Agency
IHT	:	Intermediate Heat Treatment	UT	:	Ultrasonic Testing
IC	:	Inspection Certificate	VDR	:	Vendor Data Requirement
IGC	:	Inter Granular Corrosion	WPS	:	Welding Procedure Specification
MPT/MT	:	Magnetic Particle Testing	WPQ	:	Welders Performance Qualification
MTC	:	Material Test Certificate			

Inspection Standards Committee

Convenor : Mr. S C Gupta

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr. Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

INSPECTION AND TEST PLAN FOR FLANGES, SPECTACLE BLINDS & DRIP RINGS

STANDARD SPECIFICATION No.

6-81-0006 Rev. 4

Page 3 of 6

1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of Flanges, Spectacle Blinds & Drip Rings.

2.0 REFERENCE DOCUMENTS

PO/PR/Standards referred therein/ Job specifications /Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	Procedure						
1.1	Heat Treatment, NDT and Other Procedures	Documented Procedures	100%	Procedure Documents	-	H	R
1.2	WPS,PQR & WPQ	Welding Parameters & Qualification Record	100%	WPS,PQR & WPQ	-	H	W- New R- Existing
2.0	Material Inspection						
2.1	Raw Material Inspection	Chemical & Mechanical Properties	100%	Test Certificates	-	H	R
3.0	In Process Inspection						

**INSPECTION AND TEST PLAN
FOR
FLANGES, SPECTACLE BLINDS & DRIP RINGS**

STANDARD SPECIFICATION No.

6-81-0006 Rev. 4

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.1	Welding / Forging	Forging /Welding Parameters	100%	Inspection Reports	-	H	-
3.2	Heat Treatment	Stress Relieving, Normalising, Tempering, Solution Annealing, Stabilization Heat Treatment etc. as applicable	100%	HT chart	-	H	R
3.3	Identification of Test Samples	Product Chemical, Mechanical, Impact, IGC and Other test as applicable	100%	Test Reports	-	H	H (Note-1)
3.4	Product Analysis (As applicable)	Chemical Composition	As per PR/Purchase Specification	Test Reports	-	H	R
3.5	Destructive Testing	Mechanical, Impact, IGC and Other test as applicable	100%	Test Reports	-	H	H (Note-1)
3.6	NDT as applicable	Surface & Internal Imperfections	As per PR/Purchase Specification	NDT Reports	-	H	R
3.7	Galvanizing (If Applicable)	Integrity Of Galvanised Coating	100%	Inspection Report	-	H	-
4.0	Final Inspection						

**INSPECTION AND TEST PLAN
FOR
FLANGES, SPECTACLE BLINDS & DRIP RINGS**

STANDARD SPECIFICATION No.

6-81-0006 Rev. 4

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SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.1.	Final Inspection	1.Visual 2. Dimensions 3.Hardness 4. Marking etc	100%	Inspection Report	-	H	H (Note-1)
4.2	PMI Check	Chemical Check	As Per EIL Spec. 6-81-0001	Inspection report	-	H	RW
4.3	Final Stamping	Stamping Of Accepted Items	Stamping of Items which are witnessed by EIL/TPIA.	Inspection Report	-	H	H (Note – 1)
5.0	Painting						
5.1	Rust Preventive Coating & Color Coding	Visual & Color Coding as applicable	100%	Inspection Report	-	H	-
6.0	Documentation & IC						

**INSPECTION AND TEST PLAN
FOR
FLANGES, SPECTACLE BLINDS & DRIP RINGS**

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.1	Documentation & Inspection Certificate(IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Supplier TC & IC	-	H	H

Legend: H- Hold (Do not proceed without approval), P-Perform, RW - Random Witness (As specified or 10% (min.1 no. of each size and type of Bulk item)), R-Review, W-Witness (Give due notice, work may proceed after scheduled date).

NOTES (As applicable):

- For Non NACE & Non Hydrogen service Carbon Steel Flanges, Spectacle Blinds & Drip Rings up to size 24"-300ANSI Class Will be accepted on review of Supplier Test Certificates. Supplier Test Certificate to be reviewed by EIL/TPIA.
- This document describes the generic test requirements. Any additional test or Inspection scope if specified in contract documents shall also be applicable.(unless otherwise agreed upon)
- Acceptance Norms for all the activities shall be as per PO/PR/STANDARDS referred there in /Job Specification /Approved Documents.

होज पाइप्स एवं कपलिंग के लिये निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR HOSE PIPES AND COUPLING

2	17.06.2013	REVISED AND RE-ISSUED	TKK	RKS	SCG	DM
1	13.07.11	REVISED AND RE-ISSUED	TKK	SCG	AKC	DM
0	28.09.07	Issued for implementation	PD	RB	MVKK	VC
Rev. No.	Date	Purpose	Prepared by	Checked by	Convenor Standards Committee	Chairman Standards Bureau
						Approved by

INSPECTION AND TEST PLAN FOR HOSES AND COUPLINGS

STANDARD SPECIFICATION No.

6-81-0135 Rev.2

Page 2 of 5

Abbreviations:

CEIL	:	Certification Engineers International Limited	MRT	:	Mechanical Run Test
CIMFR	:	Central Institute of Mining & Fuel Research	NDT	:	Non Destructive Testing
CE	:	Carbon Equivalent	NPSH	:	Net Positive Suction Head
DFT	:	Dry Film Thickness	PO	:	Purchase Order
DPT	:	Dye Penetrant Testing	PESO	:	Petroleum Explosive Safety Organization
DHT	:	De-hydrogen Heat Treatment	PQR	:	Procedure Qualification Record
ERTL	:	Electronics Regional Test Laboratory	PR	:	Purchase Requisition
FCRI	:	Fluid Control Research Institute	PMI	:	Positive Material Identification
HT	:	Heat Treatment	RT	:	Radiography Testing
HIC	:	Hydrogen Induced Cracking	SSCC	:	Sulphide Stress Corrosion Cracking
ITP	:	Inspection and Test Plan	TC	:	Test Certificate
IP	:	Ingress Protection	TPI or TPIA	:	Third Party Inspection Agency
IHT	:	Intermediate Heat Treatment	UT	:	Ultrasonic Testing
IC	:	Inspection Certificate	VDR	:	Vendor Data Requirement
IGC	:	Inter Granular Corrosion	WPS	:	Welding Procedure Specification
MPT/MT	:	Magnetic Particle Testing	WPQ	:	Welders Performance Qualification
MTC	:	Material Test Certificate			

Inspection Standards Committee

Convenor : Mr. S C Gupta

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr. Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Hose pipes and Couplings

2.0 REFERENCE DOCUMENTS:

PO/PR/ Standards referred there in/ Job specifications /Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	Procedure						
1.1	Hydrostatic Test & NDT Procedure	Documented Procedures	100%	Procedure Documents	-	H	R
1.2	WPS,PQR & WPQ	Welding Parameters & Qualification Record	100%	WPS,PQR & WPQ	-	H	R- Existing W-For New
2.0	Material Inspection						

INSPECTION AND TEST PLAN FOR HOSES AND COUPLINGS

STANDARD SPECIFICATION No.

6-81-0135 Rev.2

Page 4 of 5

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
2.1	Incoming materials (Rubber hose/ SS pipe/SS wire braiding/ Flanges/ coupling)	Chemical & Mechanical Properties. & IGC (For SS Items if applicable.)	100%	Test certificates	H	H	R
3.0	In Process Inspection						
3.1	Welding	Welding Parameters as per WPS / PQR	100%	Inspection Reports	-	H	-
3.2	NDT as applicable	Weld soundness	100%	Test Reports	-	H	R
4.0	Final Inspection						
4.1	Hydrostatic/Pneumatic Testing	Leak Check	100%	Test Report	-	H	R
4.2	Vacuum test, Steam Resistance, Electrical Continuity and other tests as applicable	Leak & Soundness Check	100%	Test Report	-	H	R
4.3	Visual and Dimensional Inspection	Surface Condition & Dimensions	100%	Inspection Report	-	H	R
4.4	PMI Check	Chemical Check	As Per EIL Spec. 6-81-0001	Inspection report	-	H	R
4.5	Final Stamping	Stamping Of Accepted Items	100%	Inspection Report	-	H	-

INSPECTION AND TEST PLAN FOR HOSES AND COUPLINGS

STANDARD SPECIFICATION No.

6-81-0135 Rev.2

Page 5 of 5

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
5.0	Painting						
5.1	Painting & Color Coding	Visual ,DFT & Color Coding as applicable	100%	Inspection Report	-	H	-
6.0	Documentation & IC						
6.1	Documentation & Inspection Certificate(IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Supplier TC & IC	-	H	H

Legend: H- Hold (Do not proceed without approval), P-Perform, RW - Random Witness (As specified or 10% (min.1 no. of each size and type of Bulk item)), R- Review, W-Witness (Give due notice, work may proceed after scheduled date).

NOTES (As applicable):

1. This document describes the generic test requirements. Any additional test or Inspection scope if specified in contract documents shall also be applicable.(unless otherwise agreed upon)
2. Acceptance Norms for all the activities shall be as per PO/PR/STANDARDS referred there in /Job Specification /Approved Documents.

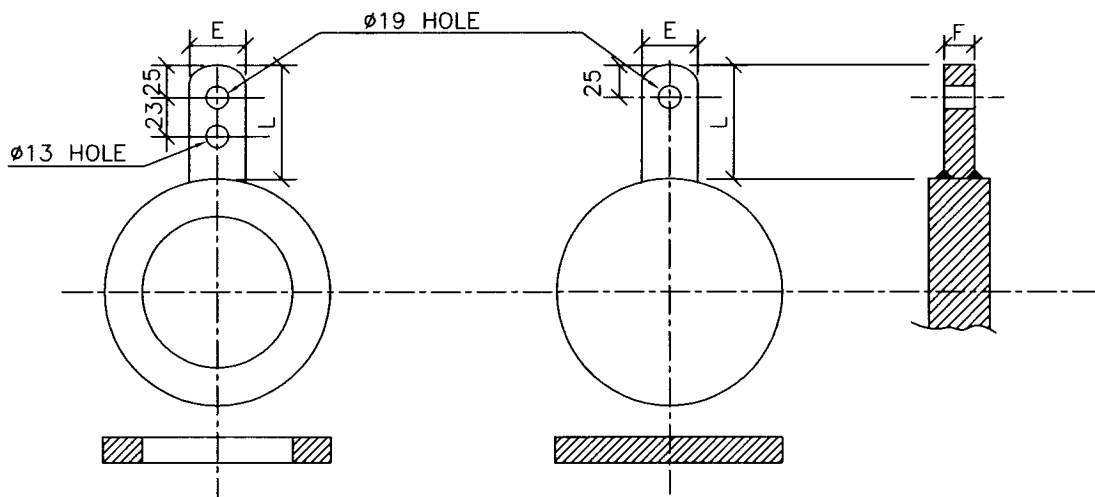
SCHEDULE OF HOSE PIPES & HOSE COUPLINGS

Sr .N o	Item Code	Qty	Service	Ends	Design Press. Kg/Cm2g	Design Temp (Deg.C)	MATERIAL SPECIFICATION				Remarks
							Hose Pipe Specification	End Flange	Pipe/ Nipple/ Nozzle	Quick Coupling/ Adapter Coupler	
1	HP29300615003ZA3A	24	Service Water	End1: Type-4 (Note-3) End2: Type 1	10.0	65	High Strength synthetic chord reinforced natural rubber hose with neoprene liner inside, corrugated finish outside	----	A106 Gr B, Sch 160	A105, Equivalent to Sch 160	Note-2

Note-1: Refer sketch in Doc. No. 6-44-0064 for details of end types.

Note-2: Each Hose shall be supplied with 2 Nos. Quick type matching pipeside claw coupling female threaded end to ASME B 1.20.1-NPT(F) (Item No 9) which shall be fixed on pipe .

	ENGINEERS INDIA LIMITED RO-KOLKATA							JOB NO-6907 PROJECT-BPCP MR N0-	DATA SHEET FOR HOSE & HOSE COUPLINGS	SPECIFICATION 6907-160-16-43-DS-4001	REV 0
		0	13.08.14	ISSUED WITH TENDER	AD	VM	AKG				0
		REV	DATE	REVISION	BY	CHK	APP			Page 1 of 1	



PIPE SIZE INCH	150CL FF			300CL FF			600CL FF		
	E	F	L	E	F	L	E	F	L
1/2"	25	3	100	25	6	100	25	6	110
3/4"	25	3	100	25	6	100	25	6	110
1"	25	3	100	25	6	100	25	6	110
1 1/2"	25	6	100	25	6	100	25	6	110
2"	25	6	100	25	6	100	25	6	110
2 1/2"	25	6	100	25	6	110	25	6	110
3"	40	6	105	40	6	110	40	8	110
4"	40	6	105	40	6	110	40	8	110
6"	40	6	105	40	6	110	40	8	115
8"	40	6	105	40	8	110	40	10	125
10"	40	8	105	40	10	110	40	10	125
12"	40	8	110	40	10	120	40	15	125
14"	40	10	120	40	15	120	40	15	145
16"	40	10	120	40	15	130	40	20	140
18"	40	10	120	40	20	130	40	20	140
20"	40	14	120	40	20	140	40	25	140
24"	50	16	120	50	20	140	50	25	145

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL OTHER DIMENSIONS SHALL BE AS PER ASME B16.48.
3. MATERIAL SHALL BE AS PER MR.
4. THE HANDLE MAY BE INTEGRAL OR ATTACHED TO THE LINE BLANK/SPACER BY WELDING. IN CASE OF ATTACHMENT OF HANDLE BY WELDING, HEAT TREATMENT AND WELDING SHALL BE IN ACCORDANCE WITH ASME B31.3.

3	31.07.13	REAFFIRMED & ISSUED AS STANDARD	UK	SH	RN	ATD	DM
2	15.11.08	REAFFIRMED & ISSUED AS STANDARD	AC	RN	DM	VC	
Rev. No.	Date	Purpose	Prepared by	Checked by	Std. Committee Convenor	Std. Bureau Chairman	Approved by