

	PRODUCT STANDARD HYDRO TURBINE ENGINEERING	HT 10498
		Rev. 05
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<u>REQUIREMENTS FOR STEEL PLATES TO ASTM A 537 CLASS 2</u>		

CHECK LISTS

(To be filled in by the vendor and submitted along with the offer)

Check List - 1

Sl. No.	Description	Tick whichever applicable
1	For all plates, condition of supply as per sl. no.1 of Table-1	Yes / No
2	For all plates, thickness & size as per sl. no. 2 of Table-1	Yes / No
3	For all plates, quantity variation as per sl.no.3 of Table-1	Yes / No
4	For all plates, dimensions and tolerances as per sl. no. 4 of Table-1	Yes / No
5	For all plates, charpy V-notch impact test on longitudinal direction as per sl. no. 5 of Table-1	Yes / No
6	For all plates, reduction ratio as per sl. no. 6 of Table-1	Yes / No
7	For all plates, ultrasonic testing as per sl. no. 7 of Table-1	Yes / No
8	For all plates, testing & inspection documents as per sl. no.8 of Table-1	Yes / No
9	Deviations (if any) to be submitted in separate sheet otherwise it is considered that vendor shall comply to Table-1 of HT 10498 in all aspects	Yes / No

Name/stamp of vendor

Name and authorized signature

Date: _____

Enquiry No E1493034

Rev. No.	Date of Rev.	Remarks	Approved	Checked	Date of issue (Rev.00)
02	31.08.2015	Completely reviewed and page-2 added.	J.S.Hanspal, AGM (HOD)-HTE		
03	08.08.2016	Requirement for microstructure examination added.	Prepared Harish Kumar Sr.Mgr-HTE	A.Mandal AGM-HTE	
04	05.07.2018	Completely reviewed. Checklist, page 3 & 4 added.			04.01.2006
05	25.07.2018	Completely reviewed & page-5 added.	Saved in server as no. 42009910498		



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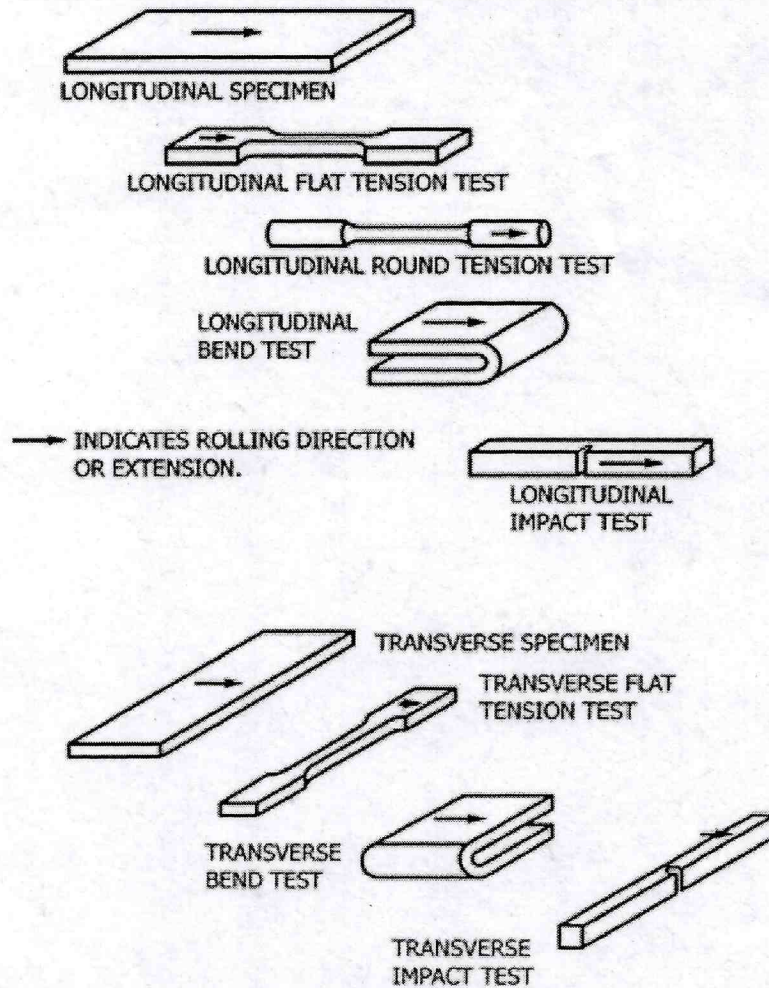
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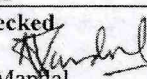
Relation of test coupons and test specimens to
rolling direction of steel plates
(Fig.-1 of ASTM A 370 reproduced above)

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04	05.07.2018	Completely reviewed. Checklist, page 3 & 4 added.	Harish Kumar Sr.Mgr-HTE	A.Mandal AGM-HTE	(Rev.00) 04.01.2006
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Table-2	Supplementary Requirements		
1	Charpy V-notch impact test on transverse specimen (See Fig.-1 of ASTM A 370 reproduced at page-3) For thicknesses up to 100 mm For thicknesses above 100 mm	ASTM A 20/ A 20M Temperature of testing shall be 10°C above the minimum temperature specified in Table A2.15 for longitudinal tests Impact Test at -36°C : 16 J (Min. for 1 specimen), 20 J (Min. average for 3 specimens)	Only for plates identified in BHEL enquiry (Vendor to submit filled in check list-2 along with the offer)
2	Through thickness tension testing to Quality class Z35 (Test applicable for plate thickness 25mm and above)	DIN EN 10164	
3	Bend test (Longitudinal direction)	ASTM A 20	
4	Microstructure examination for inclusions: The examination of cleanliness must be performed in one plate per lot. It should be conducted after heat treatment. The microstructure must be uniform and free from porosity, excessive segregation and in-homogeneities. Inclusion content as per ASTM E 45/Method A - 'Thin series' inclusions : Type A, B, C, D (Max. severity level 2) - 'Heavy series' inclusions : Type A, B, C, D (Max. severity level 1.5)	As per ASTM E45 – 13	
5	a) Testing shall be conducted on all the individual plates as-rolled / mother plates (b) Inspection documents as per results of tests for- • Impact testing (Transverse direction) • Through thickness tension test • Bend test (Longitudinal direction) • Microstructure examination report	ASTM A 20 As per applicable relevant standards as given above	

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03	08.08.2016	Requirement for microstructure examination added.	Prepared  Harish Kumar Sr.Mgr-HTE	Checked  A. Mandal AGM-HTE	Date of issue (Rev.00) 04.01.2006
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Table-1		Basic Requirements	
Sl. no.	Requirement	Standard	Remarks
1	Condition	Quenched & Tempered	For all plates as per BHEL enquiry (Vendor to submit filled in check list-1 along with the offer)
2	Thickness and size	As per BHEL enquiry	
3	Quantity variation	+10% -0 %	
4	Dimensions and tolerances	ASTM A 20/ A 20M	
5	Charpy V-notch impact test on longitudinal specimen (See Fig.-1 of ASTM A 370 reproduced at page-3) For thicknesses up to 100 mm For thicknesses above 100 mm	ASTM A 20/ A 20M At temperature specified in Table A2.15 Impact Test at -46°C : 16 J (Min. for 1 specimen), 20 J (Min. average for 3 specimens)	
6	Reduction Ratio	3:1 (Reduction ratios as low as 2:1 are permitted if all the limitations of clause 5.3 of ASTM A 20/ A 20M are met along with through thickness tension test to quality class Z35 as per DIN EN 10164)	
7	Ultrasonic testing	ASTM A578/ A 578M Level B	
8	a) Testing (Chemical, Mechanical & Charpy V-notch) shall be conducted on all the plates as-rolled / mother plates (b) Inspection documents as per results of tests for- • Chemical Analysis • Mechanical Properties • Heat treatment • NDT • Impact testing (Longitudinal direction) • Reduction ratio	ASTM A 20 As per applicable relevant standards as given above	

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Check List - 2

(To be filled in by the vendor and submitted along with the offer)

Sl. No.	Description	Applicable for BHEL enquiry / item no.	Tick whichever applicable
1	For plates identified in BHEL enquiry, charpy V-notch impact test in transverse direction as per sl. no. 1 of Table-2	For all items of the enquiry	Yes / No
2	For plates identified in BHEL enquiry, through thickness test as per sl. no. 2 Table-2	For item 4 of enquiry.	Yes / No
3	For plates identified in BHEL enquiry, bend test as per sl. no. 3 Table-2	For all items of the enquiry	Yes / No
4	For plates identified in BHEL enquiry, microstructure examination as per sl. no.4 Table-2		Yes / No
5	For plates identified in BHEL enquiry, testing & inspection documents as per sl. no.5 Table-2		Yes / No
6	Deviations (if any) to be submitted in separate sheet otherwise it is considered that vendor shall comply to Table-2 of HT 10498 in all aspects		Yes / No

Name/stamp of vendor

Name and authorized signature

Date: _____

Enquiry No E1493034

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