

TD-106-2 Rev No. 5	Form No.		PRODUCT STANDARD PUMPS HYDERABAD		FP 50088 Rev. No. 11 Page : 1 of 7
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. <u>TECHNICAL SPECIFICATION FOR FORGED BUSH</u> 1.0 <u>GENERAL :</u> This standard specifies the requirements of forged bushes required for Boiler Feed Pumps. 2.0 <u>DIMENSIONS & FINISH :</u> The forged bushes shall be supplied in rough machined condition with 12.5 microns finish all over, as per the dimensions given in Table-2. In case of Internal Forgings, the forged bushes shall be supplied in as forged condition with suitable allowance for finish machining. 3.0 <u>MATERIAL :</u> The material specification shall be as per Table-1. Specn nos. indicated in Table-1 for information and guidance to the manufacturer, forgings shall be supplied as per the chemical and mechanical properties given in Table-1. 3.1 <u>HEAT TREATMENT –FOR VAR NOS.02, 03,06,07,08 & 11 (BS 2S 143):</u> The forgings of above variants shall be supplied in solution treated condition only, but one sample per each melt shall be heat treated as follows. The mech properties of these samples shall conform to those given in Table-1. <u>SOLUTION TREATMENT :</u> Heating at 1000 – 1050°C for not less than 30 minutes, followed by air cooling. <u>CONDITIONING :</u> Heating uniformly at 750° C ± 10° C for not less than 2 hours, followed by air cooling. <u>AGING :</u> Heating at 540°C ± 10°C for not less than 2 hrs, followed by air cooling.					

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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.		3.2 Supplier shall furnish certificates for mechanical properties, Hardness in solution treated condition, Tensile Stress, Proof Stress, Elongation in heat treated condition as specified in clause No 3.1. 4.0 <u>INSPECTION :</u> 4.1 In case of bought out, Forgings shall be supplied with inspection and certification by BHEL approved Third Party Inspection Agency (TPIA). 4.2 In case of Internal forging, chemical and mechanical properties shall be inspected by BHEL internal quality control. 5.0 <u>TEST CERTIFICATES :</u> The supplier shall furnish 5 copies of test certificates duly certified by TPIA (in English) containing the following information. a) Dimensional Report b) Chemical analysis c) Mechanical properties d) Heat Treatment e) NDT results (Ultrasonic and Magnetic Particle, D.P. Test) f) BHEL order no. suppliers named. No. description of item. 6.0 <u>MARKING :</u> The following details shall be engraved on each forging for easy identification. Drawing No : eg. FP50088, Var. No. xx Melt No/Heat No. xxxxx 7.0 <u>PRESERVATION AND PACKING :</u> The forgings shall be properly protected from damage and corrosion during transport. Machined surfaces shall be protected with anti-greasy anti-corrosive coating. Painting is not permitted 8.0 <u>REJECTION AND REPLACEMENT :</u> The final decision regarding acceptance or rejection rests with BHEL. If the forging is not found as per specifications or drawing at anytime during further operation on the forging, the supplier shall replace the rejected forging at his own cost.		
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TABLE - 1

VAR NOS	MATERIAL	CHEMICAL COMPOSITION, %										MECHANICAL PROPERTIES			
		C	Si	Mn	Cr	Ni	Cu	Mo	Nb	P	S	TS N/mm ²	0.2% proof stress N/mm ²	Elongation %	Hardness BHN
02,03, 06,07 08,11	HY10773 (FOR INSIDE FORGINGS) BS 2S 143 SOLUTION TREATED	min	-	-	13.2	5.0	1.20	1.20	0.20	-	-	930 TO 1080	780 Min	15 Min	330 Max
		max	0.07	0.60	14.7	6.0	2.00	2.00	0.70	0.035	0.025				
01,04, 09,10, 12	HY10771 (FOR INSIDE FORGINGS) ASTM A276 S43100 ANNEALED	min	-	-	15.0	1.25	-	-	-	-	-	830 TO 1030	640 Min	10 Min	240 TO 302
		max	0.20	1.00	17.0	2.50	0.30	0.30	-	0.045	0.030				
05	ASTM A276 S31600 ANNEALED	min	-	0.20	16.0	10.0	-	2.00	-	-	-	515 Min	205 Min	30 Min	183 Max
		max	0.08	1.00	18.0	14.0	-	3.00	-	0.045	0.030				



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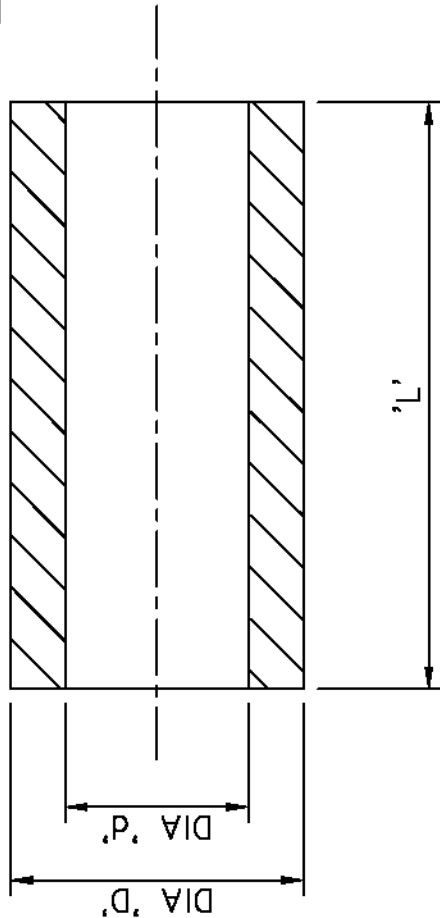
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VAR NO.	D^{+1}	d^{-1}	L^{+2}	MATERIAL	N D T			PURPOSE
					TEST TO BE DONE	AS PER STD	ACC. STD.	
01	200	90	150	HY10771 (FOR INSIDE FORGINGS)	100% UT	AA0850118	AA0850118 CATEGORY-1	BALANCE DRUM FK6D30
				ASTM A276 S43100	100% MPI	AA0850133	AA0850102 CATEGORY-1	FP9750088018
02	310	194	12	HY10773 (FOR INSIDE FORGINGS) BS 2S 143	100% UT	AA0850118	AA0850118 CATEGORY-1	SPRING DISC FK6D30 FP9750088026



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VAR NO.	D ⁺¹	d ⁻¹	L ⁺²	MATERIAL	N D T			PURPOSE MATL CODE
					TEST TO BE DONE	AS PER STD	ACC. STD.	
03	230	174	150	HY10773 (FOR INSIDE FORGINGS) BS 2S 143	100% UT	AA0850118	AA0850118 CATEGORY-1	BALANCE DRUM BUSH FK6D30 FP9750088034
					100% DPI	AA0850131	AA0850132 LEVEL 1	
04	245	125	186	HY10771 (FOR INSIDE FORGINGS) ASTM A276 S43100	100% UT	AA0850118	AA0850118 CATEGORY-1	BALANCE DRUM FK4E36 FP9750088042
					100% MPI	AA0850133	AA0850102 CATEGORY-1	
05	756	668	25	ASTM A276 S31600 ANNEALED	-	-	-	SEAL RING
06	385	225	12	HY10773 (FOR INSIDE FORGINGS) BS 2S 143	100% UT	AA0850118	AA0850118 CATEGORY-1	SPRING DISC KHI CATRIDGE FP9750088069
07	280	190	176	HY10773 (FOR INSIDE FORGINGS) BS 2S 143	100% UT	AA0850118	AA0850118 CATEGORY-1	BALANCE DRUM BUSH 200KHI FP9750088077
					100% DPI	AA0850131	AA0850132 LEVEL-1	
08	396	194	12	HY10773 (FOR INSIDE FORGINGS) BS 2S 143	100% UT	AA0850118	AA0850118 CATEGORY-1	SPRING DISC FK8C36 FP9750088085
09	205	90	150	HY10771 (FOR INSIDE FORGINGS) ASTM A276 S43100	100% UT	AA0850118	AA0850118 CATEGORY-1	BALANCE DRUM FK8C36 FP9750088093
					100% MPI	AA0850133	AA0850102 CATEGORY-1	



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VAR NO.	D ⁺¹	d ⁻¹	L ⁺²	MATERIAL	N D T			PURPOSE
					TEST TO BE DONE	AS PER STD	ACC. STD.	MATL CODE
10	210	95	180	HY10771 (FOR INSIDE FORGINGS) ASTM A276 S43100	100% UT	AA0850118	AA0850118 CATEGORY-1	BALANCE DRUM 200 KHI
					100% MPI	AA0850133	AA0850102 CATEGORY-1	FP9750088107
11	304	255	85	HY10773 (FOR INSIDE FORGINGS) BS 2S 143	100% UT	AA0850118	AA0850118 CATEGORY-1	SPRING DISC FP9750088115
					100% MPI	AA0850133	AA0850102 CATEGORY-1	BALANCE DRUM FTAZ30
12	180	80	180	HY10771 (FOR INSIDE FORGINGS) ASTM A276 S43100	100% UT	AA0850118	AA0850118 CATEGORY-1	BALANCE DRUM FTAZ30
					100% MPI	AA0850133	AA0850102 CATEGORY-1	FP9750088123

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