

Annexure – B

TECHNICAL REQUIREMENT FOR FINISH MACHINING OF IMPELLER BLADE CASTING

S.No.	BHEL Requirement	Vendor's Confirmation
1.	Blade should be machined as per the drawing 02040718103/M2 R00 and model file which shall be supplied by BHEL. Snapshot in the file "Blade P VI.jpg" is also attached for viewing the details.	<i>Vendor to confirm</i>
2.	Blade castings to be machined all over as per the coordinates shown in the drawing 02040718103/M2 R00. 2 mm allowance to be left on pressure and suction surfaces of the blade. Tolerance on profile shall be 0.5 mm & surface finish shall be 3.2 microns or better.	<i>Vendor to confirm</i>
3.	Welding edges as shown are also to be made on both crown-blade and skirt-blade mating surface. Detail of welding edge is shown in the drawing.	<i>Vendor to confirm</i>
4.	After completion of machining, 0.3 mm deep line should be inscribed by machine tool at location of Section D and F, throughout the length of the blade on both suction and pressure surface.	<i>Vendor to confirm</i>
5.	Machining allowance available for profile machining shall be around 20-25 mm.	<i>Vendor to Note</i>
6.	Offered cast weight of blade:- 4000 kg (approx.)	<i>Vendor to Note</i>
7.	Finish weight of blade:- 1930 kg (approx.)	<i>Vendor to Note</i>
8.	Material of blade shall be : ASTM A743 Gr CA6NM (13%Cr-4%Ni Stainless Steel)	<i>Vendor to Note</i>
9.	Complete Dimensional, Profile & Surface finish inspection shall be carried out by BHEL representative at Vendor's works.	<i>Vendor to Note</i>
10.	All required tools, instruments, jigs, fixtures, templates, gauges, material scanning, coordinate measuring facility etc. should be arranged by the vendor	<i>Vendor to confirm</i>
11.	After machining, blade should be given identification details by Hard punched	<i>Vendor to confirm</i>
12.	Job to be suitably packed after machining to avoid any damage to machined surfaces during loading/unloading/transportation	<i>Vendor to confirm</i>
13.	Vendor to submit following with the offer:- a) Details of the Organization b) Details of the machine tools and other facilities installed in the company	<i>Vendor to submit</i>
14.	Vendor to submit Filled Supplier Registration Form along with Requisite Documents to SDC Cell in MM Deptt. of CFFP, BHEL, Haridwar. If already registered at CFFP or any other unit of BHEL, then Vendor code may be furnished. Vendor may plan a visit to CFFP	<i>Vendor to submit</i>
15.	Vendor may plan a visit to CFFP for technical discussion.	<i>Vendor to Note</i>
16.	BHEL team may visit vendor's works for facility/capacity verification.	<i>Vendor to Note</i>

Tender No.:FF/SC/16026/201600641
Opening Due Date: 21/06/2016

Name & Signature of Sub-contractor
With date & Seal

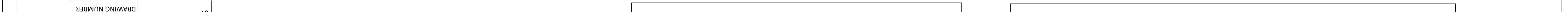
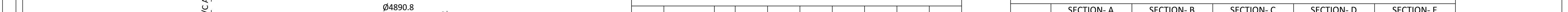
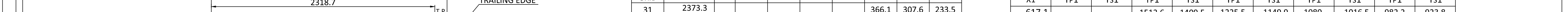


Table 1 - Y COORDINATES OF GRID POINTS

[illegible][illegible]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466
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237.3	1737.3	1624	1426	1338.1	1206.2	1138	1082.5	1020.9	980.8	921.8
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213.6	1727.7	1617.4	1419.4	1334.5	1202.6	1136.1	1079.2	1018.8	977.1	919.3
189.9	1717.9	1611.8	1412.8	1331.4	1198.8	1134.6	1075.5	1016.7	972.9	916.8
166.1	1708.2	1607.2	1406	1328.8	1194.5	1133.1	1071.3	1014.8	968.3	914.4
142.4	1698.2	1603.7	1398.8	1326.6	1189.9	1132.1	1066.8	1013.2	963.2	912.3
118.7	1688	1601.1	1391.7	1325.2	1185	1131.5	1061.8	1012.1	957.6	910.6
94.9	1677.6	1599.9	1384.4	1324.7	1179.7	1131.6	1056.4	1011.9	951.5	909.2
71.2	1666.9	1601.1	1376.9	1325.7	1173.9	1132.7	1050.7	1012.6	944.8	908.6
47.5	1656.2	1604.7	1369.3	1328.7	1167.9	1134.9	1044.4	1014.6	937.8	908.9
23.7	1645.4	1611.5	1361.6	1334.1	1161.5	1138.6	1037.7	1017.4	930.1	910.5
0	1627.5	1627.5	1347.6	1347.6	1149.5	1149.5	1026.6	1026.6	918.2	918.2
NOSE RADIUS	9.8		8.5		7		5.7		5.7	

SECTION 1			SECTION 2			SECTION 3		
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SECTION- E			SECTION- F			SECTION- G		
X	Yp2	Ys2	X	Yp2	Ys2	X	Yp2	Ys2
2433.9	237.6	237.6	2441.4	139.1	139.1	2445.5	18.4	18.4
2410.1	292.3	233.5	2417.7	204.8	136.6	2421.7	101.2	15.8
2386.4	340.8	266.9	2394	262	173.1	2398	171.1	57.8
2362.7	386.4	302	2370.2	314.1	212.4	2374.3	231.3	103
2338.9	430.2	338.4	2346.5	362.6	253.7	2350.5	285.7	150.6
2315.2	472.5	375.3	2322.8	409.3	296.2	2326.8	337.6	200.8
2291.5	513.5	412.6	2299	454.7	339.1	2303.1	387.8	253.6
2267.7	552.9	450	2275.3	498.3	381.8	2279.3	435.6	306.6
2244	590.7	487.6	2251.6	539.3	423.6	2255.6	480.2	357.1
2220.3	627	525.3	2227.8	578	464.6	2231.9	521.8	403.6

RADIUS	115	115	115
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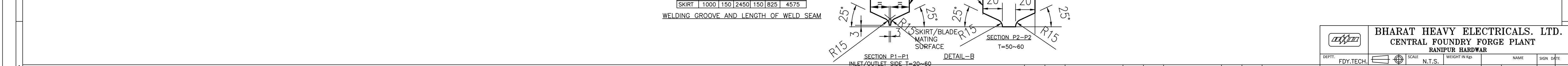
AT INTERSECTION WITH SKIRT

SECTION	PRESSURE SIDE		SUCTION SIDE	
	X3	Y3	X4	Y4
A	-1039.9	1444.6	-864	1556.2
B	-487.6	1711.9	-310.4	1752.7
C	154.9	1785.6	345.3	1758.6
D	994.7	1647.6	1178.5	1521.4

AT INTERSECTION WITH CROWN

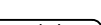
SECTION	PRESSURE SIDE		SUCTION SIDE	
	X5	Y5	X6	Y6
F	-428.7	864.7	-308.9	914.3
G	788.1	1408.6	887.5	1348.2

1. Blade castings to be machined all over as per the coordinates shown in the drawing. 2 mm allowance to be left on pressure and suction surfaces of the blade. Tolerance on profile shall be 0.5 mm.
2. Surface finish of machined blade shall be 3.2 micron or better.
3. Crown and skirt profiles are shown in rotated elevation while section lines are shown in true elevation corresponding to plan.
4. Leading edge nose for all sections are tangential to the line marked at 135 ° from x-axis at origin.
5. Welding edges as shown are also to be made on both crown-blade and skirt-blade mating surface. Details of welding edge is shown in the drawing.
6. After completion of machining, 0.3 mm deep line should be inscribed by machining tool at location of Section D and F, throughout the length of the blade on both suction and pressure surface.
7. Machining allowance available for profile machining shall be around 20-25 mm.
8. Weight of casting in as-cast condition is estimated as 4000 kg
9. Weight of casting after machining is estimated as 1930 kg
10. Total surface area of blade is around 9.467 sqm
11. Material of blade: 13Cr-4Ni Stainless steel to ASTM A743 Gr CA6NM



DING GROOVE AND LENGTH OF WELD :

ZONE	ZONE	ZONE
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		BHARAT HEAVY ELECTRICALS. LTD. CENTRAL FOUNDRY FORGE PLANT RANIPET HARDWARE					
DPTT: 	SCALE: 	N.T.S.		WEIGHT/KGS:	NAME:		SIGN DATE:
TITLE:				DRN: /23243499M.OVG T.DAVE CHD BLA/RA APPD T.DAVE			
MACHINING DRAWING FOR IMPELLER BLADE				DRN: /23243499M.OVG T.DAVE CHD BLA/RA APPD T.DAVE			
PROFILE AND CUSTOMER NAME: PRANATHI VIII PHFP HPEF HARDWARE				TECHNOLOGY NO. DRAWING NO. 23499			
				0-204-07-18103/M2 SHEET NO. 1 OF 01 SHEETS			