

		Heat Exchanger Group BHEL - Bhopal		QUALITY ASSURANCE PLAN (QAP)				QAP		CDE-18-3395			
								Revision No.		01			
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S. No.	Components & Operations	Characteristics	Class	Type of Check	Quantum of check	Reference Document	Acceptance Norms	Format of Records	Agency			Remarks	
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1.0	Raw Material Inspection												
1.1	Acrylo Nitrile Synthetic Rubber	Qualitative analysis	Major	Visual	For each batch	BS2751 Gr. BA70	Cl.4 of BS2751	MTC	P	R	R	Review of MTC.	
2.0	Manufacturing & In Process Inspection												
2.1	Mixing of ingredient & reinforcement (if any)	Properties	Critical	Visual	100%	Mfg. standard	BHEL Drawing & BS2751	---	P	-	-	See Note-8	
2.2	a) Moulding of Seals & Test Pieces and Vulcanizing. OR b) Moulding & Vulcanizing of Seals & Test pieces through Compression Moulding	Process / Vulcanizing	Critical	Visual	100%	Mfg. standard	BHEL Drawing & BS2751	---	P	R/W	-	- See Note-3, 4, 5 & 6 "W" for identification and co-relation. - See Note-1 & 2 for 2.2 (a)	
2.3	Testing on Test Piece												
2.3.1	Chemical	Chemical properties	Major	Testing + I	01 / Batch	BHEL Drawing & BS2751 Gr. BA70	BHEL Drawing & BS2751	TC	P	R	-	- See Note-7 & 8 - Copper Ion < 8 PPM	
2.3.2	Mechanical	a) Tensile Strength	Major	Testing + I	01 / Batch	BHEL Drawing & BS2751 Gr. BA70	Minimum 12.5 (MPa)	TC	P	R	-	See Note-7	
		b) Elongation at break	Major	Testing + I			Minimum 250 %	TC	P	R	-		
		c) Shore hardness	Major	Testing + I			65 to 70 ⁰ (IRHD)	TC	P	R	-		
		d) Compression set at 70°C for 24 hours	Major	Testing + I			20 % (Max)	TC	P	R	-		

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2.3.3	Accelerated ageing by heating in air at 110 ± 5 °C for 168 hr (min). : Change in value from Original	a) Change in hardness	Major	Testing + I	01 / Batch	BHEL Drawing & BS2751 Gr. BA70	(-) 0 / (+) 10 IRDH	TC	P	R	-	See Note-7
		b) Change in TS	Major	Testing + I			(-) 10 % : Max.	TC	P	R	-	
		c) Change in Elongation at break	Major	Testing + I			(-) 15 % : Max.	TC	P	R	-	
2.3.4	Ozone Resistance	Resistance to Crack	Major	Testing + I	01 / Batch	ASTM D1149-B	No visible cracks on the surface after completion of the test.	TC	P	R	-	See Note-7 & 9
2.3.5	Volume Change in distilled Water at 73.4 ± 2 °F for 70 hrs.	Resistance to Liquid	Major	Testing + I	01 / Batch	BHEL Drawing & BS2751 Gr. BA70	(-) 0 / (+) 2%	TC	P	R	-	See Note-7
2.4	Dimensional conformity of Finished Door Seals	Measurement	Critical	Visual + I	100 %	BHEL Drawing (for dim. – A & B) & ISO 3302 CLASS M2 (for other dim.)	BHEL Drawing (for dim. – A & B) & ISO 3302 CLASS M2 (for other dim.)	IR	P	W (*)	-	(*) 10% randomly selected out of the offered quantity by BHEL-IA for each size. - See Note-10 & 12
2.5	Identification, Documentation, Protection & Packing											
2.5.1	Identification	For co-relation with TC / IR	Minor	Visual	100%	See Remarks	See Remarks	IR	P	W	-	See Note – 5, 6 & 12
2.5.2	Documentation	To ensure completeness	Minor	Visual	100%	PO, Drg. & QAP	PO, Drg. & QAP	IR	P	R	-	See Note - 11
2.5.3	Protection and Packing	To prevent contamination & damage during transit	Major	Visual	100%	BHEL drg.	BHEL Drg.	IR	P	-	-	

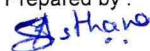
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						ITEM		DOOR SEAL FOR B. F. VALVES				Page
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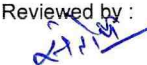
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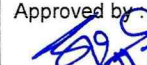
- Vulcanizing to be performed in furnace duly calibrated by reputed agency (e.g. IBR, NABL approved agency). Date of Vulcanizing is required to be a part of the inspection report. BHEL-IA needs to ensure the same.
- Before Vulcanizing Operation : Dimensional check, seal compactness, drilling of holes, etc. to be ensured.
- For preparation of test Piece – Cl. 5 of Spec. BS2751 needs to be referred. Co-relation of test piece with seals to be ensued.
- Seals to be molded endless. Any glued joint is not acceptable.
- Identification shall be done by using indelible ink for seals of 600 NB & above sizes. For sizes lower than 600 NB, seals are to be packed in polythene bags with suitable identification.
- Manufacturer's identity or trade mark, manufacturer's batch no. or similar means for production identity, date of Vulcanizing are the bare minimum requirement for test piece & seal identification.
- Mechanical & chemical testing is required to be performed at any Govt. / NABL Approved Lab. Supplier own in-house testing instruments (duly calibrated by NABL) is also acceptable. In-house Spectrometer (duly calibrated using master calibration block) is also acceptable for chemical testing.
- The rubber compounds shall not contain more than 8 PPM of Copper Ion and shall include Copper Inhibitors to prevent Copper degradation of the Rubber Material.
- Use chamber having minimum 50 parts per 100 million of Ozone Concentration. Duration shall be minimum 70 hrs. at 104°F.
- For dimensional tolerance – refer BHEL Drawing. Unless otherwise specified in BHEL-Drawing, Class-M2 of BS ISO 3302-1 can be referred.
- All the inspection report & test certificates shall be part of the final QA Document duly signed and stamped by BHEL-IA. Quantity of set = Three (03) Nos. All reports shall be arranged in sequential manner as per this QAP with proper index sheet at top and same to be submitted to BHEL along-with the supply only. Later submission of these reports are not at all acceptable. BHEL-IA to ensure it while giving final dispatch clearance.
- Additionally, each item shall also be marked with unique identification no. for easy co-relation with its dimensional reports.
- Finished Seals shall be of smooth finish, free from grit, extraneous matter, surface imperfections, cracks, etc.
- For smooth checking, suitable fixture / template can be used to ensure all the dimensions within the tolerance as specified.
- After receipt of items, BHEL shall randomly select any sample / test piece (as supplied) which shall be subjected to test at their own NABL approved lab. Discrepancy found if any shall be reported to vendor for complete replacement.
- In case of any conflict between this QAP and other document, this QAP shall govern finally.

Approval does not relieve supplier from meeting our requirements as per the drawing / specification.

LEGEND : 1: Seal Supplier, 2: BHEL-IA, 3: Customer (NTPC/NPCIL/BHEL-HWR/other if any) / Customer's IA; P-Perform, W-Witness, R-Review, MTC : Manufacturer TC, TC : Test certificate, IR : Inspection report, IA : Inspection Agency, I : Instrument to be used for check,

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21/09/2020