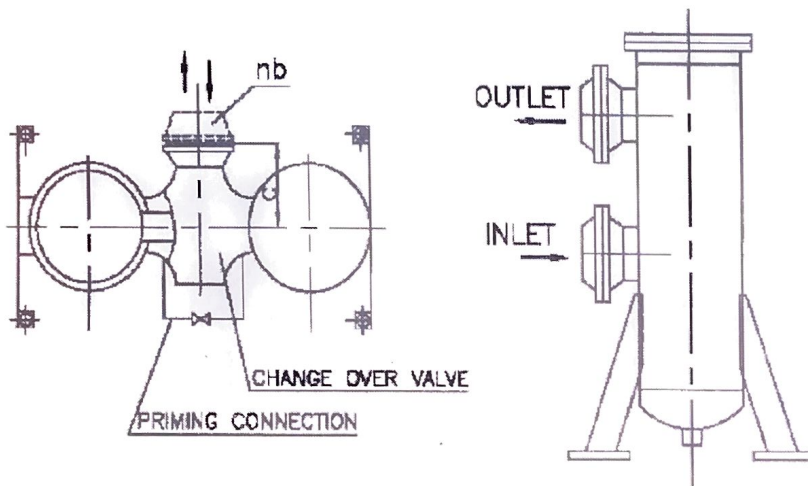


PRE-QUALIFICATION REQUIREMENT FOR DUPLEX FILTER LUBE OIL-BI017

Brief Introduction: - Duplex Filter Lube Oil is used to filter Lube oil going to turbine Bearings.

One side of duplex filter comes in operation with start of any one of the lubricating oil pumps and remains in service as long as any one of the lubricating oil pumps runs. The other side of the Duplex filter remains as a Stand-by and is brought into operation when the running side gets saturated with dirt and other contaminants. This saturation is reflected by the differential pressure read across the inlet and outlet of filter. The stand by filter is kept in primed condition (by equalizing valve) to facilitate the immediate change over. The change over device must prevent both the filters being off at the same time. The change over should be possible by the operation of single hand wheel/lever.

An Indicative Drawing of Duplex Filter is shown below. Please note that Inlet and Outlet connections are indicative and that their locations are interchangeable.



Pre-qualification Criteria for vendor

1. Vendor should have executed at least 2 projects within 8 years from date of issue of enquiry, satisfying the minimum Pre-evaluation criteria mentioned against each row in Table-1.
2. Vendor to furnish the details against each column in Table-1, of the projects executed by them satisfying clause-1 above.

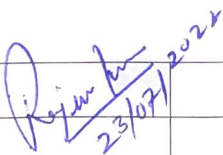
From the experience list furnished in Table-1


- a. Vendor has to furnish customer acceptance / successful operation certificate alongwith certified GA drawing/documents of Duplex Filters of any one project.
- b. Vendor to submit PO copies in support of clause 1 of PQR.

Table-1

	Minimum Pre-evaluation criteria	Project 1 (to be filled by Vendor)	Project 2 (to be filled by Vendor)
End customer Name			
Inlet- Outlet Size	Min 150 NB		
Design Pressure	Min 12 kg/cm ²		
Design Temp.	40-60 °C		
Type of fluid	Turbine oil VG46		
Differential pressure Switch cum Indicator Across filter	DP range 0 -1.2 Kg/Cm ²		
Material of construction of body	ASTM A 106 Gr B or equivalent		
Material of Filter element	Stainless Steel		
Application	To filter Lubricating Oil going to bearings of Steam turbine/Gas Turbine		
Year of Execution	Within last 8 years of date of issue of enquiry.		
No. of PO copies	02		
Quality of Filtration	25 to 40 microns		
Flow	Min 170 m ³ /hr		
Contact details, Telephone no's & Email id of End User	-		

Against vendor's replies, BHEL reserves the right to ask for more information / documents/ clarifications.

Prepared By		Approved By	
Rajeev Kumar		Sh. Anuj Jain	
Dy. Manger(STE-TL)		SDGM (STE-TL)	

	STEAM TURBINE ENGINEERING BHEL, HEER, HARIDWAR INDIA		Dolvi 250 MW	
			REV. - 00	DATE: 15.07.25

TURBINE INTEGRAL AUXILIARIES

Painting Scheme .

Paint (Coat)	Paint Type	No. of coat	DFT*
--------------	------------	-------------	------

Primer Paint	: Epoxy base Zinc rich primer paint	1 Coat	35
Intermediate Paint	: Epoxy TiO ₂ Pigmented Polyamide Cured Paint	1 Coat	70
Finish (Final) Paint	: Aliphatic Acrylic 2 Pack Polyurethane Finish paint	2 Coats	75
		Total DFT	180

* DFT – Dry Film Thickness (final) in microns.

Details of Color Scheme :

(Legend : W-at BHEL works; V- at vendor's works; S-at site; NA-Not applicable)


No	Assembly	Shade/ RAL	Primer	Int. Paint	Final Paint	Touch -up	Remarks
20	Duplex Filter (Lub oil)	Grey 9002	V	V	V	S	BOI Identification Tag/Band of White 9010 color. Legend in black letters.
21	Duplex Filter (Jacking Oil)	Grey 9002	V	V	V	S	BOI Identification Tag/Band of White 9010 color. Legend in black letters.


Surface Preparation: -


1. It is necessary that the surface to be painted is free from loose dust, mill scale, rust, grease, oil, old film etc. Surface cleaning and preparation shall be done for all the components as per BHEL/Vendor standard practice. The surfaces before painting shall correspond to standard degree of purity SA 2.5.
2. Checking of surface preparation, measurement of dry paint thickness, adhesion, gloss & finish of painted surface shall be done as per BHEL/Vendor standard practice.


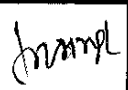
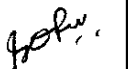
Notes:-



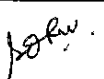
1. Stainless Steel Surfaces shall not be painted.


दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD	ST46056 पृष्ठ का Page 01 of 07																																																								
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को अधिकृतित करता है	TECHNICAL SPECIFICATION OF DUPLEX OIL FILTER																																																										
<p>1.0 INTENT OF SPECIFICATION :- The specification is intended to cover design, manufacturing, assembly, testing and supply of Duplex filter complete with commissioning spares(including one set of filter element and one set of all seal gaskets), special tools & tackles & differential pressure switch cum indicator(as per specification given in Anexure-1). The duplex filter is intended for operation in conjunction with Steam Turbines and should be suitable for operation at an ambient temperature of 60°C & 95% humidity.</p> <p>2.0 FUNCTION :- One side of duplex filter comes in operation with the start of any one of the lubricating oil pumps and remains in service as long as any one of the lubricating oil pump runs. The other side of the duplex filter remains as a stand-by and is brought into operation when the running side gets saturated with dirt and other contaminants which is reflected by the differential pressure read across the inlet and outlet of filter.</p> <p>The stand by filter is kept in primed condition to facilitate the immediate change over. The change over device must prevent both the filters being off at the same time. The change over should be possible by the operation of single hand wheel.</p> <p>3.0 OIL SPECIFICATION :- The specification of oil to be filtered complies with IS : 1012 or ISO VG 46. The equivalent grades of various oil suppliers are servoprime 46 of M/s Indian Oil Corporation and Turbinol – 47 of M/s Hindustan Petroleum Corporation.</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Kinematic viscosity at 50°C : 28 CS</p> <p>Specific gravity at 50°C : 0.852</p> <p>Flash point : 200°C (Min.)</p> <p>Operational temperature : 40°C</p> <p>Pour point : -6.0°C (Max.)</p> </div> <div style="width: 50%;"> <p>3.1 COMPLIANCE WITH NATIONAL STANDARD ——— NIL ———</p> <p>4.0 FILTER DATA :-</p> <p>Type : Duplex</p> <p>Inlet/Outlet Nozzles : Flanged</p> </div> </div> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th>Variant no.</th> <th>01</th> <th>02</th> <th>03</th> <th>04</th> <th>05</th> <th>06</th> <th>07</th> <th>08</th> </tr> <tr> <td>Capacity (M³/hr)</td> <td>40</td> <td>130</td> <td>250</td> <td>7</td> <td>60</td> <td>170</td> <td>6</td> <td>130</td> </tr> <tr> <td>Nozzle size Nb(mm)</td> <td>100</td> <td>125</td> <td>200</td> <td>25</td> <td>125</td> <td>150</td> <td>25</td> <td>150</td> </tr> <tr> <td>Design Pr. (Kg/cm²)</td> <td colspan="3">12</td> <td>250</td> <td colspan="2">12</td> <td>250</td> <td>12</td> </tr> </table> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <p>Design Temperature : 50° C</p> <p>Actual pressure drop cleaned condition : 4000 mm wc(Including change over valve)</p> <p>Actual pressure drop saturated condition : 12000 mm wc for var. 01 to 06 and 08 42000 mm wc for var. 04 and 07</p> <p>Quality of filtration : 37 micron</p> </div> </div>				Variant no.	01	02	03	04	05	06	07	08	Capacity (M ³ /hr)	40	130	250	7	60	170	6	130	Nozzle size Nb(mm)	100	125	200	25	125	150	25	150	Design Pr. (Kg/cm ²)	12			250	12		250	12																				
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स्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रकाश एवं प्रसारण के बिना भारत हेवी इलेक्ट्रिकल्स की लिमिटेड की लिखित अनुमति के बिना नहीं किया जायेगा।																																																											
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<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:15%;">MEMBER PSC</td> <td style="width:20%;">R. PANJA</td> <td style="width:15%;">R.P. 13.8.07</td> <td style="width:15%;">अनुवादक TRANSLATED BY</td> <td style="width:15%;"></td> <td style="width:20%;">नाम NAME</td> <td style="width:15%;">दिनांक एवं हस्ताक्षर SIGNATURE & DATE</td> </tr> <tr> <td>QAX</td> <td>N K Manwani</td> <td>(Signature)</td> <td>निर्माणकर्ता WORKED BY</td> <td>M.SINGH</td> <td></td> <td>(Signature) 31/7/07</td> </tr> <tr> <td>TSX</td> <td>V.K. CHAUHAN</td> <td>(Signature)</td> <td>जांचकर्ता CHECKED BY</td> <td>S.D.ROY</td> <td></td> <td>(Signature) 31/7/07</td> </tr> <tr> <td>सहमत विभाग AGREED DEPTT.</td> <td>नाम NAME</td> <td>दिनांक एवं हस्ताक्षर DATE & SIGNATURE</td> <td>पर्यवेक्षणकर्ता SUPERVISED BY</td> <td>S.C.A.</td> <td></td> <td>(Signature) 31/8/07</td> </tr> <tr> <td colspan="3"></td> <td>स्वीकृति APPROVED :</td> <td>A.K. JAIN</td> <td colspan="2">(Signature) 11/8/07</td> </tr> <tr> <td colspan="3"></td> <td>निर्माण PREPARED :</td> <td>STE</td> <td>जारी ISSUED :</td> <td>STE (TL)</td> </tr> <tr> <td colspan="3"></td> <td>REV. NO. 03</td> <td></td> <td>दिनांक DATE :</td> <td>02.02.1993</td> </tr> <tr> <td colspan="3"></td> <td>Dt 30.10.09</td> <td></td> <td></td> <td></td> </tr> </table>				MEMBER PSC	R. PANJA	R.P. 13.8.07	अनुवादक TRANSLATED BY		नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE	QAX	N K Manwani	(Signature)	निर्माणकर्ता WORKED BY	M.SINGH		(Signature) 31/7/07	TSX	V.K. CHAUHAN	(Signature)	जांचकर्ता CHECKED BY	S.D.ROY		(Signature) 31/7/07	सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	S.C.A.		(Signature) 31/8/07				स्वीकृति APPROVED :	A.K. JAIN	(Signature) 11/8/07					निर्माण PREPARED :	STE	जारी ISSUED :	STE (TL)				REV. NO. 03		दिनांक DATE :	02.02.1993				Dt 30.10.09			
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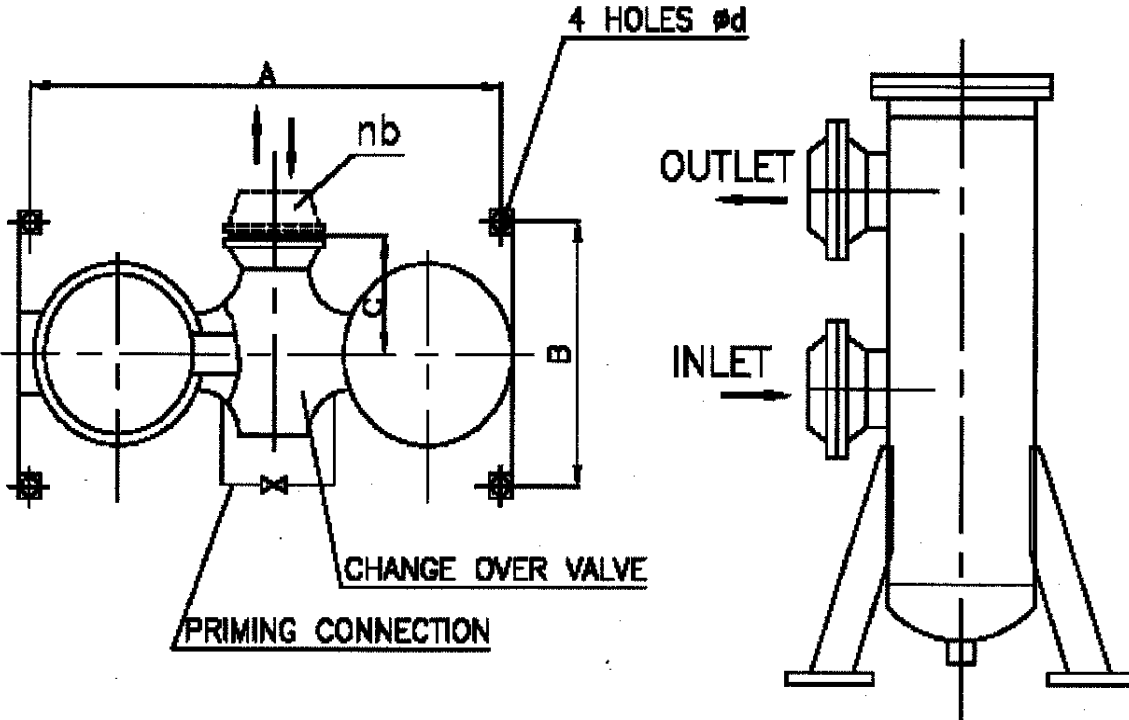
दिनांक: 07/07/2007 SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD	ST46056 पृष्ठ का Page 02 of 07																						
SUPERSEDES INVENTORY NO.	5.0 DESIGN, MATERIAL & CONSTRUCTION OF FILTER :- <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">a) Filter element</td> <td colspan="3"> : Wire cloth of 25 micron to 40 micron : Material Stainless Steel : Pleated type filter Elements are not acceptable : Elements shall be cleanable type for reuse. </td> </tr> <tr> <td>b) Filter body</td> <td colspan="3"> : Seamless pipe ASTM A 106 Gr. B or equivalent for var .01, 02, 03, 05, 06, 08 and ASTM A 105 or equivalent for var. 04 & 07. </td> </tr> <tr> <td rowspan="3">c) Change over Valve</td> <td>: Type</td> <td colspan="2">Ball valve</td> </tr> <tr> <td>: Body Material</td> <td colspan="2">ASTM 216 Gr. B or equivalent</td> </tr> <tr> <td>: Internals</td> <td colspan="2">Stainless Steel</td> </tr> <tr> <td>d) Sealings</td> <td colspan="3">: VITON</td> </tr> </table> <p>Materials of other components shall be selected by the bidder. The materials of construction of filter shall be such as to resist corrosion & erosion and shall give a long trouble free service. No cast iron components shall be acceptable. BHEL/owner reserves the right to ask for changes in material.</p> <p>At suitable points on filter, lifting lugs shall be provided for ease of transportation & erection. Their locations must be shown on the dimensional drawings.</p> <p>Each side of the filter shall be provided with a vent connection suitable for pipe thread R1/4" and a drain connection suitable for pipe thread R1/2" for var. 01, 04 & 07 and R1" for var. 02, 03, 05, 06 & 08. Vent connections should necessarily be provided on the sides of each filter chamber top flange to facilitate removal of filter cover for cleaning / maintenance without removal of vent piping connected to this connection.</p> <p>Priming line with a valve shall be provided between two filter chambers. The filter as per var. 01, 02, 03, 05, 06, 08 is envisaged to be mounted in a tray and the distance between legs of filter shall be above inlet connection. Other dimensions shown in the sketch are binding.</p> <p>The filter as per var. 04 & 07 shall be provided with suitable arrangement to support it with Main Oil Tank /steel structure.</p>			a) Filter element	: Wire cloth of 25 micron to 40 micron : Material Stainless Steel : Pleated type filter Elements are not acceptable : Elements shall be cleanable type for reuse.			b) Filter body	: Seamless pipe ASTM A 106 Gr. B or equivalent for var .01, 02, 03, 05, 06, 08 and ASTM A 105 or equivalent for var. 04 & 07.			c) Change over Valve	: Type	Ball valve		: Body Material	ASTM 216 Gr. B or equivalent		: Internals	Stainless Steel		d) Sealings	: VITON		
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समग्र सूची संख्या को अधिकृत करता है	6.0 QUALITY ASSURANCE, INSPECTION AND TESTINGS : <p>6.1 The bidder shall submit quality plan along with his offer format for BHEL/Owner's approval.</p> <p>6.2 The particulars of the proposed shop tests and procedures for the tests shall be submitted to BHEL/Owner for approval along with Quality Plan.</p> <p>6.3 The filter shall be dispatched only after inspection, approval of test certificates and clearance from BHEL/Owner.</p> <p>6.4 Wherever welding is involved, it is to be carried out by qualified welders and weld procedures are to be qualified as per ASME code section-IX.</p> <p>6.5 The minimum tests/checks to be carried out on the Duplex Oil Filter are given below. BHEL/Owner reserves the right to ask for any more checks at the time of Quality Plan finalisation.</p> <p>6.5.1 Testing of materials: The material of body, spindle, disc seat, filter elements etc. shall be tested as per relevant standard for its chemical composition, mechanical properties viz. YS, UTS, impact, %age elongation, reduction in areas etc and NDT . The test certificates for all the tests indicating actual test results should be furnished. Supplier shall give the type and details of NDT to be carried out along with the offer. Material certificate of conformance & acceptable in case of M/s hydac & M/s EPE & BOLL & KIRCH.</p> <p>※ Ductile cast iron (EN-GJS-400-18)</p>																								
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	स्वत्वाधिकार एवं गोपनीय इस दस्तावेज पर सभी अधिकार स्वतंत्र रूप से सुरक्षित हैं। इस दस्तावेज को बिना लिखित अनुमति के किसी भी प्रकार का उपयोग नहीं किया जा सकता है।																								
दिनांक: 07/07/2007 SIGN & DATE	13/8/07																								
समग्र सूची संख्या INVENTORY NO.	REV. NO. 03	निर्माणकर्ता WORKED BY M.SINGH	31/7/07																						
समग्र सूची संख्या INVENTORY NO.	जांचकर्ता CHECKED BY SDR.	31/7/07	31/7/07																						

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD	ST46056	
			पृष्ठ का Page 03 of 07	
समीची सूची संख्या का INVENTORY NO	6.5.2 All butt welds shall be subjected to 10% RT and all fillet welds to 100% MPI. All welding Shall be carried out by qualified procedures and welders.			
COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company.	6.5.3 Following tests shall be carried out during various stages of manufacturing at bidder's works :-			
	a) Check for dimensions of all the component. b) <u>Hydraulic Test</u> : The body of filters shall be tested at one and half times the design Pressure in fully assembled condition for 5 mts. c) <u>Seat leakage test</u> : It shall be carried out at the design pressure for 5 minutes. Acceptance norms shall be nil leakage. d) <u>Functional Test</u> : It shall demonstrate smooth operation of change over valve. e) <u>Verification of mesh size of element</u> : By recognised lab. f) <u>Collapsibility Test</u> : A type test at a differential pressure of 5.0 kg/cm ² for var 01,02,03,05,06 & 160.0 kg/cm ² for variant 04 & 07. This test shall be conducted as per ISO : 2941. g) <u>Pressure Drop Test</u> : As per ISO 3968. The pressure drop in clean condition should not exceed 0.4kg/cm ² including change over valve. This is type test.			
स्वत्वधिकार एवं गोपनीय इस दस्तावेज में दी गई सूचना भारत भारी इलेक्ट्रिक लि. की संपत्ति है। इसका प्रयोग केवल भारत भारी इलेक्ट्रिक लि. के लिए ही किया जा सकता है। अन्य किसी भी प्रकार का प्रयोग बिना भारत भारी इलेक्ट्रिक लि. की लिखित अनुमति के ग्राहक को नहीं करना चाहिए।	7.0 <u>DOCUMENTS:</u>			
	A. <u>Along with offer</u> : i) Detailed catalogue with electrical contact rating. ii) Assembly drawing with part lists, material of each part, nozzle sizes & their coordinates, leg spacing, cross sectional arrangement incorporating overall dimensions. iii) Pressure loss curve for normal flow at different flow areas. iv) Details of priming connection, change over valve, differential pressure switch, flow direction indicator, etc. v) Quality plan. vi) Testing procedures. vii) List of commissioning spares which will include one set of all type of seals/gaskets & one filter element. viii) List of spares for 5 years of operation. ix) List of special erection/maintenance tools. x) Type test certificate for collapsibility test and pressure drop test shall be submitted alongwith the offer.			
दिनांक एवं हस्ताक्षर SIGN & DATE	B. <u>After Placement of order</u> i) Documents listed at 7.0(A) above (for approval) 4 weeks ii) O & M instructions 12 weeks iii) Instruction on conservation and deconservation. 12 weeks			
	No. of copies shall be specified at the time of ordering. However if not specified, 10 copies shall be furnished by the bidder.			
समीची सूची संख्या INVENTORY NO	C. <u>Along with Dispatch</u> i) Detailed catalogue ii) Calibration & test certificates iii) Guarantee certificate iv) Type test certificate for degree of protection			
	REV. NO. 03			
समीची सूची संख्या INVENTORY NO	P-5136	निर्माणकर्ता WORKED BY	M.SINGH	31/7/07
समीची सूची संख्या INVENTORY NO	P-5136	जांचकर्ता CHECKED BY	SDR.	31/7/07

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD		ST46056									
				पृष्ठ का Page 04 of 07									
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को अधिकृत किया जाएगा है	8.0 IDENTIFICATION : The name plate of filter shall have following information <ul style="list-style-type: none"> i) Type/Designation : Duplex filter ii) Tag no. <table border="1" style="margin-left: 20px;"> <tr> <td>Var.</td> <td>01 & 05</td> <td>02,03,06&08</td> <td>04 & 07</td> </tr> <tr> <td>Tag no.</td> <td>MAV43 BT001</td> <td>MAV42 BT001</td> <td>MAV35 BT001</td> </tr> </table> iii) Nominal size of inlet / outlet nozzles iv) Press loss (in cleaned condition) v) Manufacturer's name vi) Medium vii) Purchase order no. viii) Month & year of manufacture 					Var.	01 & 05	02,03,06&08	04 & 07	Tag no.	MAV43 BT001	MAV42 BT001	MAV35 BT001
Var.	01 & 05	02,03,06&08	04 & 07										
Tag no.	MAV43 BT001	MAV42 BT001	MAV35 BT001										
9.0 CLEANING, PAINTING, CONSERVATION & PACKING : The bidder shall give exact and precise details about the measures envisaged by him for surface protection. Painting of interior surface coming in contact with oil is prohibited. After testing of filter its internals shall be thoroughly cleaned, dried and conserved before packing. conservation shall be suitable for storing in saline atmosphere & for a period of 2 years before use. Filter shall be suitably packed for transportation. Instruction should be issued regarding reconsevation, deconsevation and storage of package													
10.0 GENERAL : The bidder can make suitable offers even if there are minor deviations which do not effect the efficient functioning of the equipment. However the deviation must be clearly spelt the same along with the offer. The offer may not be considered if all the technical particulars and information called for in the specification are not submitted along with the offer.													
11.0 GUARANTEE : <ul style="list-style-type: none"> i) The supplier shall guarantee trouble free and satisfactory operation of the equipment for a period of 18 months after delivery or 12 months after commissioning whichever is earlier. ii) The bidder shall guarantee the quality of filtration & pressure loss in cleaned and saturated conditions. iii) If during erection / commissioning at site and deficiency in parts is detected. BHEL site office shall prepare the assessment report and copy of the same shall be forwarded to the bidder. The bidder shall replace / rectify the concerned items free of charge. The bidder if he so desires may depute his representative to site at his own cost with in one week after receipt of the above report, shall be final & binding on bidder of Duplex filter. 													
12.0 DESPATCH : The equipment along with all accessories shall be dispatched to a destination to be specified after the placement of order.													
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत केवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रलेख एवं आलेख रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।	COPYRIGHT AND CONFIDENTIAL The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company												
दिनांक एवं हस्ताक्षर SIGN & DATE 13/8/07													
सामग्री सूची संख्या INVENTORY NO. P-5136	REV. NO. 03		निर्माणकर्ता WORKED BY M.SINGH		31/7/07								
			जांचकर्ता CHECKED BY SDR		31/7/07								

दिनांक एवं हस्ताक्षर SIGN & DATE			उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD		ST46056 पृष्ठ का Page 05 of 07	
SUPERSEDES INVENTORY NO. सामग्री सूची संख्या को अतिरिक्त करता है		ANNEXURE-1 <u>DIFFERENTIAL PRESSURE SWITCH CUM INDICATOR :</u>				
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company		1.0 The differential pressure switch shall consist of a calibrated indicator for indicating the differential pressure across each filter basket. Switch with electrical contacts shall be actuated when the differential pressure reaches preset value. 2.0 The differential pressure switch shall be suitable for Ambient temperature : 0-60°C and Relative humidity : 95% 3.0 Housing : Body material : Die cast aluminum alloy or stainless steel Degree of protection : IP 65 External surface : Finished with staving enamel 4.0 Sensing element type : Diaphragm/piston 5.0 Material of sensing element and other parts : Stainless steel AISI 304 or equivalent in contact with the service medium 6.0 Differential pressure range : 0-1.2 kg/cm ² for var. 01,02,03,05,06 & 08 0-6 kg/cm ² for var. 04 & 07 7.0 Max. static pressure : one and half times design pressure 8.0 Set point adjustment : The switching point shall be adjusted to operate at 0.9 kg/cm ² in pressure increasing direction for var. 01, 02, 03, 05, 06 & 08. for var. 04 & 07 the switching shall be set at 4.2 kg/cm ² . However, the set point for variants shall be adjustable over the specified differential pressure range. There shall be proper facility with suitable lockable arrangement for set point adjustment. 8.1 Switching repeatability : ± 1% of differential pressure range 8.2 Accuracy : Equal or better than ± 2% at mid 50% of differential pressure range 9.0 Electrical contact : Contact type : Snap action micro switch / Reed contact Contact material : Silver plated Contact rating : 0.25A / 120 V AC, 3W/ DC No. of Contact s : 1 No. change over type i. e. 1 SPDT Contact life : approx. (10) ⁶ switching cycles. 10.0 Electrical connection : Cable entry shall be provided with cable gland complete with neoprene grommet. Terminals shall be suitable for cable termination of 0.5 mm ² cable core cross section. 11.0 Identification Tag : In addition to the instrument name plate, one separate stainless steel tag punched with tag no. MAV 43 CP 011 for variants 01 & 05, MAV 42 CP 013 for var. 02, 03, 06 & 08 and MAV 35 CP 016 for var. 04 & 07 shall be fastened with the switch, if not possible to engrave on instrument name plate.				
स्वत्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रत्यक्ष एवं अप्रत्यक्ष रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए।						
दिनांक एवं हस्ताक्षर SIGN & DATE	31/7/07					
INVENTORY NO. P-5136		REV. NO. 03		निर्माणकर्ता WORKED BY जांचकर्ता CHECKED BY	M.SINGH SDR.	 

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स्वतंत्राधिकार एवं गोपनीय
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दिनांक एवं दिनांक
SIGN & DATE

MANUFACTURER'S NAME AND ADDRESS			STANDARD QUALITY PLAN				TO BE FILLED BY BHEL		TO BE FILLED BY BHEL				
BHEL	VENDOR'S NAME	ITEM	DUPLEX OIL FILTER (JACKING OIL)		QP NO.	QA/BI/QP/022							
		DATED			24.12.2024								
		DRG. NO.	AS PER PO	REV	02								
		SPEC.	ST46056										
		REV	AS PER PO		Page 1 of 2								
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY		REMARKS
										M	B	N	
1	2	3		4	5	6	7	8	9	D	10		11

1. MATERIAL													
1.1	BODY, DISC SEAT, SPINDLE, SEAT, MAGNETIC INSERTS, DPS ETC.	CHEMICAL COMPOSITION	MAJOR	CHEMICAL	1/HEAT	ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET	ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET	TC	✓	P	V		
		MECHANICAL PROPERTIES NDT	MAJOR	MECHANICAL	1/HEAT			TC	✓	P	V		
1.2	FILTER ELEMENT	MESH SIZE	MAJOR	DIMENSIONS	100%	BHEL APPD DRAWING/SPEC	BHEL APPD DRAWING/SPEC	TC	✓	P	V		FROM RECOGNIZED LAB
		CHEMICAL COMPOSITION	MAJOR	CHEMICAL	1/HEAT	ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET	ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET	TC	✓	P	V		
2. IN-PROCESS INSPECTION													
2.1	WELD QUALITY	RT	MAJOR	VISUAL	10% BUTT WELDS	BHEL APPD DRAWING/SPEC	BHEL APPD DRAWING/SPEC	TC	✓	P	V		
		MPI	MAJOR	VISUAL	100% FILLET WELDS	BHEL APPD DRAWING/SPEC	BHEL APPD DRAWING/SPEC	TC	✓	P	V		
3. FINAL INSPECTION													
3.1	ASSEMBLY	DIMENSIONS	MAJOR	MEASUREMENT	100%	BHEL APPD DRAWING/BHEL SPEC.	BHEL APPD DRAWING/BHEL SPEC.	IR	✓	P	W		
3.2	FUNCTIONAL TEST	OPENING & CLOSING	MAJOR	VISUAL	100%	SMOOTH OPERATION OF CHANGEOVER VALVE		TC	✓	P	W		

		LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER	FOR CUSTOMER USE		
MANUFACTURER/ SUBCONTRACTOR					APPROVED BY

MANUFACTURER'S NAME AND ADDRESS			STANDARD QUALITY PLAN				TO BE FILLED BY BHEL		TO BE FILLED BY BHEL			
BHEL	VENDOR'S NAME	ITEM	DUPLEX OIL FILTER (JACKING OIL)		QP NO.	QA/BI/QP/022						
				DATED	24.12.2024							
		DRG. NO.	AS PER PO		REV	02						
		SPEC.	ST46056									
		REV	AS PER PO		Page 2 of 2							
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY			REMARKS
									M	B	N	
1	2	3	4	5	6	7	8	9	D	10		11

3.3	BODY AND ASSEMBLED FILTER	LEAKAGE	CRITICAL	HYDRAULIC TEST	100%	BHEL APPD DRAWING/SPEC	NO LEAKAGE	TC	✓	P	W		
3.4	SEAT LEAKAGE	LEAKAGE	CRITICAL	HYDRAULIC TEST	100%	BHEL APPD DRAWING/SPEC	NO LEAKAGE	TC	✓	P	W		
3.5	COLLAPSIBILITY TEST	AS PER SPEC	MAJOR	TYPE TEST		BHEL APPD DRAWING/SPEC	BHEL APPD DRAWING/SPEC	TC	✓	P	V		SHALL BE SUBMITTED ALONG WITH OFFER
3.6	PRESSURE DROP TEST	AS PER SPEC	MAJOR	TYPE TEST		BHEL APPD DRAWING/SPEC	BHEL APPD DRAWING/SPEC	TC	✓	P	V		SHALL BE SUBMITTED ALONG WITH OFFER
3.7	PRESERVATION AND PACKING		MAJOR	VISUAL	100%	BHEL SPEC	BHEL SPEC	TC	-	P	V		PAINTING AS PER NOTE 5
3.8	COMPLETENESS OF ACCESSORIES	LIST OF ACCESSORIES	Minor	Visual	100%	BHEL SPEC/ ORDR DRWG/ APPD DATASHEET	BHEL SPEC/ ORDR DRWG/ APPD DATASHEET	-	-	P	V		Vendor should ensure the list of accessories to be sent with Duplex filter as per approved Drwg, /documents/ datasheet.

NOTE:1 - Welding to be done by qualified welder as per ASME IX WPS and PQR to be checked by inspecting agency.

Note 2: All instruments to be used for testing/ inspection shall have valid 'calibration certificates' to be verified by agencies/ manufacturer/contractor/TPIA.

Note 3: All pages of the inspection documents shall be numbered in chronology with the QAP clauses, duly mentioning the corresponding QAP clause no. at the top of each page.

Note 4: One 'index' page containing the document descriptions, their page no's & QAP cl no. shall be attached upfront the inspection documents.

Note 5: Painting can be done only after inspection clearance, as per customer's /BHEL approved paint specification / schedule (if required). otherwise manufacturer's standard shall be followed.

Note 6: For any spares item, apart from 'visual inspection' the 'interchangeability fitment certificate' or 'material TC' are to be submitted, with specific mentioning of the ' part no/ item no of the approved GA/ x-sec drwg."

		LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION	FOR CUSTOMER USE	
MANUFACTURER/ SUBCONTRACTOR		ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER		APPROVED BY