

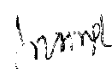
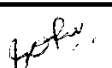
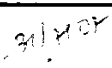


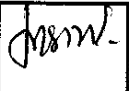
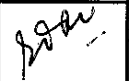


परीक्षण तिथि SIGN & DATE 31/8/07	परीक्षण संख्या INVENTORY NO P-5136	स्वत्वधिकार एवं गोपनीय दस्तावेज - प्र. 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 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, 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800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000	उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD	ST46056																														
				पृष्ठ का Page 02 of 07																														
5.0 <u>DESIGN, MATERIAL & CONSTRUCTION OF FILTER :-</u>																																		
<table border="1"> <tr> <td>a) Filter element</td> <td colspan="4"> : 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="4"> : 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>c) Change over Valve</td> <td>Type</td> <td colspan="3">Ball valve</td> </tr> <tr> <td></td> <td>Body Material</td> <td colspan="3">ASTM 216 Gr. B or equivalent</td> </tr> <tr> <td></td> <td>Internals</td> <td colspan="3">Stainless Steel</td> </tr> <tr> <td>d) Sealings</td> <td colspan="4">: VITON</td> </tr> </table>					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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	Internals	Stainless Steel																																
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<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>																																		
6.0 <u>QUALITY ASSURANCE, INSPECTION AND TESTINGS :</u>																																		
6.1 The bidder shall submit quality plan along with his offer format for BHEL/Owner's approval. 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. 6.3 The filter shall be dispatched only after inspection, approval of test certificates and clearance from BHEL/Owner. 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. 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.																																		
6.5.1 <u>Testing of materials:</u> 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.																																		
REV. NO. 02		<table border="1"> <tr> <td>निर्माणकर्ता WORKED BY</td> <td>M.SINGH</td> <td>31/8/07</td> </tr> <tr> <td>जांचकर्ता CHECKED BY</td> <td>SDR.</td> <td>31/8/07</td> </tr> </table>			निर्माणकर्ता WORKED BY	M.SINGH	31/8/07	जांचकर्ता CHECKED BY	SDR.	31/8/07																								
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दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD		ST46056	
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अनुमोदित एवं संपादित SUPERSEDES 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 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.	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 भारती इलेक्ट्रिकल्स लिमिटेड की संपत्ति है। इसका प्रयोग केवल उद्देश्य के लिए ही किया जाये। All rights reserved. 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.	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 along with 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.				
दिनांक एवं हस्ताक्षर SIGN & DATE	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. 02				
INVENTORY NO. P-5136	निर्माणकर्ता WORKED BY M.SINGH		जांचकर्ता CHECKED BY SDR.		31/7/07

दिनांक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD		ST46056									
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सामग्री सूची संख्या को उपदिष्टित करता है	SUPERSEDES INVENTORY NO.	8.0 IDENTIFICATION : The name plate of filter shall have following information i) Type/Designation : Duplex filter ii) Tag no. <table border="1" data-bbox="483 517 1062 636"> <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>				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										
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		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											
		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											
स्वाधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयुक्त एवं अप्रयुक्त रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो न किया जाए ।		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 : 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.											
हस्ताक्षर एवं दिनांक SIGN & DATE 13/12/07		12.0 DESPATCH : The equipment along with all accessories shall be dispatched to a destination to be specified after the placement of order.											
सामग्री सूची संख्या INVENTORY NO. P-5136	REV. NO. 02		निर्माणकर्ता WORKED BY M.SINGH										
			जांचकर्ता CHECKED BY SDR										

रिनक एवं हस्ताक्षर SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD		ST46056	
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सामग्री सूची संख्या को SUPERSEDES INVENTORY NO	ANNEXURE-1 <u>DIFFERENTIAL PRESSURE SWITCH CUM INDICATOR :</u>				
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	स्वत्वधिकार एवं गोपनीय इस प्रलेख में दी गई सूचना भारत भारती 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।	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.				
रिनक एवं हस्ताक्षर SIGN & DATE	REV. NO. 02	निर्माणकर्ता WORKED BY M.SINGH	जांचकर्ता CHECKED BY SDR.	13/08/07	21/10/07
सामग्री सूची संख्या INVENTORY NO. P-5136					

निमनक वरुनर SIGN & DATE		उत्पाद मानक STEAM TURBINE ENGINEERING PRODUCT STANDARD		ST46056	
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सामग्री सुची सख्या का INVENTORY NO	SUPERSEDES INVENTORY NO	12.0 Hydraulic impulse connection details = R1/4 <u>DATA SHEET TO BE FURNISHED BY THE BIDDER OF DUPLEX FILTER</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 a) Differential pressure switch cum indicator Yes/ No b) Connected piping & valve Yes/ No			
		2.0 Priming valve & piping Yes/ No			
		3.0 Legs, flange connections & other dimensions as per sketch Yes/ No			
		4.0 Contract drawings & curves Yes/ No			
		5.0 Commissioning spares, O & M spares for five years of operation Yes/ No			
		6.0 Special erection/ Maintenance tools Yes/ No			
		7.0 Quality of filtration Micron's			
		8.0 Pressure loss at normal flow : a) In cleaned condition mm wc i) In the filter ii) In the valve b) In saturated condition (50% choked condition) mm wc			
		9.0 Material of components as per clause-5 Yes/ No			
		10.0 Weight of filter kg			
		11.0 Tests to be carried out : a) Chemical composition & Mechanical properties of components mentioned in clauses – 5 Yes/ No b) NDT Yes/ No c) Hydraulic test of body (filter & valve) Yes/ No d) Functional test Yes/ No e) Collapsibility test Yes/ No f) Mesh size verification from recognized lab Yes/ No g) Pressure drop test Yes/ No			
		12.0 Gross filtering area mm ²			
		13.0 Net filtering area mm ²			
LIST OF CROSS REFERRED STANDARD ——— NEXT PAGE.					
सामग्री सुची सख्या INVENTORY NO	REV. NO. 02	निर्माणकर्ता WORKED BY		M.SINGH	
P-5136		जांचकर्ता CHECKED BY		SDR	
					31/3/07

DUPLEX FILTER