1. SCOPE:

This drawing covers the design, fabrication, testing and cleaning of high pressure gas filters.

DESIGN REQUIREMENTS

2. APPLICABLE PUBLICATIONS:

Military Specifications

MIL-H-6875	Heat Treatment of Steel, Aircraft Practice and Process

Marshall Space Flight Center Specifications

MC-240	Boss, Standard Dimensions for Straight Thread

Military Standards

MS 29512	"Gasket, Fuel Resistant Straight Thread Tube Fitting Boss"

ASME Boiler and Pressure Vessel Code

Section VIII	Rules for Unfired Pressure Vessels
Section IX	Welding

Air Force-Navy Aeronautical Standards

AN 806	Plug-Flared Tube

3. GENERAL REQUIREMENTS:

The filters shall be designed, fabricated, tested and cleaned with the requirements specified herein. The manufacturer shall provide any additional measures necessary in the design, fabrication, inspection and testing to produce equipment which will satisfactorily pass the tests specified herein. This MTF drawing shall govern and take preference where it may depart or conflict with provisions of referenced document.

4. MATERIALS:

The materials shall be free from all defects impairing strength, durability and appearance and of the best commercial quality for the purpose specified. All materials shall be new and shall have structural properties to sustain safety and stresses to which they are subjected at the design conditions.

5. APPROVAL OF DEPARTURES:

Any departures from these specifications shall be submitted to the Purchaser for approval. The details of the departures shall include calculations, design drawing(s) and laboratory test data where applicable. Any departures approved by the Purchaser shall be made at no cost to the Buyer.

SYM	ZONE	DESCRIPTION	DATE	APPROVED
		REVISIONS		

SIGNATURES	DATE
DRAWN	12/67
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ENGINEER	2/68
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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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MISSISSIPPI TEST FACILITY
BAY ST. LOUIS, MISSISSIPPI

MTSD GENERAL ELECTRIC

FILTERS, HIGH PRESSURE, GAS
GENERAL

SIZE	DWG. NO.	REV.
B	54B00-GG00	

54B00-D001 AUTHORITY NASAw-410 Mod MSFC-1 SHEET 1 of 5

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6. REPORTS:

Certified copies shall be furnished in quantities listed below and one certified reproducible, of the following listed reports:

	For Approval	Certified
Outline Drawing and Spec Departures	2	2
Detail Drawings	2	2
Design Calculations, Material Specs	2	2
Reports of Tests Required Under this Section		2
Cleaning Procedure		2

7. INTERCHANGEABILITY:

Wherever possible the filters shall be designed and constructed to permit the maximum interchangeability of the filter elements without detriment to the specified performance characteristic.

8. MAINTAINABILITY:

The filter design shall be such that adjustment and replacement of the element in all pot, tee and L filters can be made without removing the case from the line, and with a minimum of special tools and hoisting devices. Where in-line filters are specified the above requirement shall not apply.

9. SUPPORT DATA:

Each pot or tee type filter shall be provided with support lugs in accordance with Figure A. Each in-line type filter, having a nominal diameter of three inches or greater shall be provided with a support plate in accordance with Figure B. For Figure A and B refer to Sheet No. 5.

10. LIFTING LUGS:

All components weighing more than 50 pounds shall be equipped with lifting lug(s), located to permit easy removal of parts.

11. END CONNECTIONS:

If integral, cast-in connectors are used, the manufacturer shall be responsible for meeting the requirements of the mating flanges. Where Grayloc connectors are specified they shall conform to the standards of the Gray Tool Company, P. O. Box 2291, Houston 1, Texas.

12. PORTS:

Each filter shall have a low point drain and a high point vent consisting of a plugged boss, conforming to 1/2 Inch MC-240. In addition to the above, each filter shall be furnished with connections for measurement of differential pressure across the filter. These connections shall conform to 1 2 Inch MC-240 and shall be plugged. The plugs shall conform to AN-806-8 and the "O" ring gaskets shall conform to MS-29512-8.

13. FILTER ELEMENT:

The filter elements shall be of materials as indicated on the individual filter assembly drawings. The filter element shall be locked into position relative to the casing for all operating conditions. Refer to MTF DWG 54B00-GG01 for additional requirements.

14. PRESSURE DROP:

The pressure drop permissible for the filter element and casing (including nozzle losses) shall not exceed the values specified in the individual filter assembly drawings. The element shall be designed so that when 50% of the openings are closed the total pressure drop (element and housing) do not exceed 125% of the clean pressure drop.

15. INNERSEAL:

The innerseal between the filter bodies and the filter elements shall be leaktight at a differential pressure no less than the collapse pressure rating of the element. The manufacturer's proposal shall adequately define the details of these connections. This definition shall include, where applicable, diametral tolerance between the bore and male gland, depth of the "o" ring grooves, and recommended "o" ring selections. It is the manufacturer's responsibility to provide elements compatible with the filter units to achieve the specified sealing capability.

SYM	ZONE	DESCRIPTION	DATE	APPROVED
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FABRICATION

16. WELDING:

All welding shall be performed and inspected in accordance with the ASME Boiler and Pressure Vessel Code, Section VIII and IX for Unfired Pressure Vessels. Manufacturer shall certify that the welds are within required specifications.

Carbon Steel - All carbon steel shall be welded by the electric metallic arc process using coated electrodes, or by the inert gas shielded arc welding process. An EB consumable insert of the proper material shall be used at all weld joints or the root pass shall be performed with an inert gas shielded arc process.

Stainless Steel - All stainless steel shall be welded by the inert gas shielded arc welding process. An inert gas backup purge shall be maintained on the interior of the filter during the welding process.

Flanged Joints - ASA flanged joints shall be paralled within 1/32 Inch. Grayloc connectors shall be installed in accordance with the Gray Tool Company instructions.

Bevels - Carbon steel shall have either machine cut bevels, or smooth, clean slag-free flame cut bevels. Stainless steel bevels shall be prepared by machining or grinding using wheels or discs uncontaminated by previous carbon steel work.

17. HEAT TREATMENT:

All stainless steel materials shall be in the annealed condition prior to fabrication. Parts that are cold worked shall be annealed after fabrication. If work hardened parts are to be welded, the annealing shall be performed before welding. Heat treatment shall be in accordance with MIL-H-6875.

TESTING

18. WITNESS OF TEST:

Prior to purchaser's acceptance the filters shall be subjected to the tests in the sequence listed herein. The purchaser's authorized representative shall witness all the tests, if specified on the purchase order. The manufacturer shall notify the purchaser a minimum of 72 Hours prior to a scheduled test sequence.

19. PROOF PRESSURE:

A hydrostatic proof test shall be performed on each filter housing, in accordance with Section VIII, ASME Code for Unfired Pressure Vessels. The hydrostatic test shall be performed at 1.5 times the maximum design pressure. The duration of the test shall be a minimum of 30 minutes. During this period the unit under test shall be shut-off from the pressure source and no decrease in test pressure shall be permitted.

NOTE: The manufacturer shall submit for approval a description of all equipment and test procedures to be used for the tests specified in paragraphs 20 and 21.

20. PNEUMATIC LEAK TEST:

All filters shall be subject to a pneumatic leakage test at the design pressure. Filters shall be tested using a 5% helium, 95% nitrogen gas mixture. All mechanical joints, such as taps and closures, as well as welds shall be tested using LEAK-TEK or approved equivalent. No leakage allowed.

21. INNERSEAL LEAK TEST:

Each filter shall be subjected to a testing procedure to demonstrate that the innerseal between the filter body and the filter element shall be leaktight at a differential pressure no less than the collapse pressure rating of the element. No leakage allowed.

22. REJECTION:

Failure to meet any of the specified test requirements shall result in the rejection of the unit under test.

23. PREPARATION FOR SHIPMENT:

Each filter shall be pressurized to 10 PSIG, using dry (-40°F dew point) oil free nitrogen. The closures on the assembly shall be tight enough to maintain a positive pressure on the assemblies for a minimum of 90 days. Each assembly shall be equipped with a small gauge and shut-off valve.

SYM	ZONE	DESCRIPTION	DATE	APPROVED
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SIGNATURES	DATE
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ENGINEER	2/26
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24. SPECIAL TOOLS:

Two sets of all special tools necessary for the maintenance and repair of the filter and strainer assemblies shall be furnished in hard wood or metal containers. Where tools can be interchanged between the various assemblies, duplicate sets need not be provided for each filter. Special tools shall be tagged for identification in accordance with MTF DWG 54000-GP01. The manufacturer's original bid shall include a description of all special tools required (initial procurement only).

25 MAINTENANCE INSTRUCTIONS:

The manufacturer shall furnish 3 sets of maintenance manuals covering all operations associated with the assembly, disassembly, adjustment and cleaning of the filter assemblies. The instructions shall describe each specific type of filter assembly. Separate instructions for each filter assembly will not be required.

26. IDENTIFICATION:

A nameplate shall be securely affixed to the filter casing and in a conspicuous place. The nameplate shall contain the following information:

Filter Designation
Manufacturer's Name
Assembly Part No.
Element Part No.
Weight of Assembly
Design Pressure/Temperature
Design Delta P
Manufacturer's Serial No.

SYM	ZONE	DESCRIPTION	DATE	APPROVED
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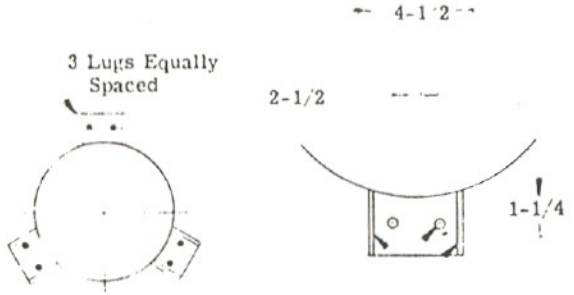


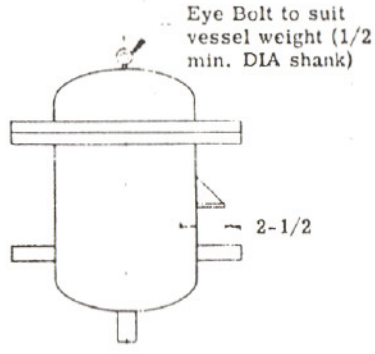
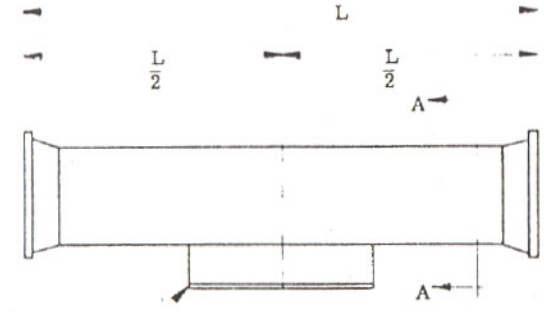


FIGURE A

Notes:

1. All welding of supports and eye bolt to be done before pressure testing vessel.
2. Use reinforcing pads behind supports as required.



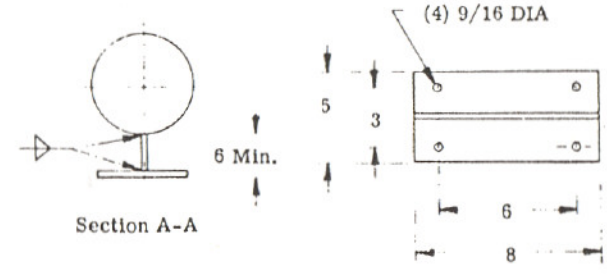


FIGURE B

Note:

1. Welding of support to vessel to be done before pressure testing.

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