

# **MANUAL FOR THE INSTALLATION, OPERATION AND MAINTENANCE OF FILTER VESSELS**

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## **I M P O R T A N T**

**Read and Understand ENTIRE  
Manual Before Operating  
This Vessel**

**X100B/ X100C**

**THIS MANUAL CONTAINS IMPORTANT REVISED INFORMATION AND  
SUPERSEDES ALL PRIOR PUBLICATIONS**

J 02

M 05

X100B

X100C

NO 01

## PRESSURE VESSEL DATA

**FSI® filter specialists int. GmbH**  
**Valterweg 3.1**  
**65817 Eppstein-Bremthal**

DESCRIPTION / APPLICATION:	Filter vessel for the filtration of liquids
MODEL / TYPE:	X100
MAX. ALLOWABLE PRESSURE (PS) IN BAR:	7
ALLOWABLE MAX./MIN. TEMPERATURE (TS) IN °C:	43 / 0
VOLUME IN LITRE:	11
HYDROSTATIC PRESSURE TEST (PT) IN BAR:	10
TESTMEDIUM:	Water

<b>CONDITION OF FLUID:</b>	<b>LIQUID, IF VAPOUR PRESSURE <math>p_D \leq 0,5</math> BAR</b>
<b>APPLIED CONFORMITY ASSESSMENT PROCEDURE:</b>	<b>97/23/EG ART. 3 ANNEX II PARA. (3) SOUND ENGINEERING PRACTICE</b>

# INDEX


1.	SAFETY.....	4
1.1	General Safety Instructions.....	4
1.2	Protective Clothing.....	5
1.3	Training of Maintenance Personnel.....	5
1.4	Appropriate Use.....	6
1.5	Self-Made Alterations/Changes.....	6
1.6	Authenticity of Documentation.....	6
1.7	Prevention of Accidents.....	7
2.	INSTALLATION.....	7
2.1	Accessibility of the Manual.....	7
2.2	Mounting.....	8
2.3	Piping.....	9
2.4	Observation of operating parameters.....	9
2.5	Gauges and Valves.....	9
2.6	Gaskets.....	10
2.7	Life time of Filter Vessel.....	11
2.8	Availability of Spare Parts.....	11
2.9	Guarantee.....	11
2.10	System Control.....	11
3.	MAINTENANCE OF THE X100 FILTER.....	12
4.	OPERATION OF THE X100 FILTER.....	13
5.	TAKING THE X100 BAG FILTER INTO OPERATION	15
6.	TAKING THE X100 CARTRIDGE FILTER INTO OPERATION.....	17
7.	OPENING THE PRESSURE VESSEL.....	19
8.	CLOSING LID & ADAPTER PLATE INSTALLATION...	22
9.	X01 FILTER BAG INSTALLATION.....	23
10.	X20 FILTER CARTRIDGE INSTALLATION.....	24

## 1. SAFETY

The Manual contains essential information to be observed during installation, operation and servicing of FSI<sup>®</sup> Pressure Vessels. It is imperative that this Manual is read and understood prior to the fitting and initial operation by all Engineers/Operators and other responsible persons. This Manual is to be always available at the installation point of the FSI<sup>®</sup> Pressure Vessel. Warning and Information Labels and the Nameplate relating to the vessels are to be clearly visible and legible. Warning labels are not a substitute for reading and understanding this Manual.

### LABEL FORMAT

- A. HAZARD ALERT WORD
- B. HAZARD AND CONSEQUENCE STATEMENT
- C. INSTRUCTION STATEMENT

	
<b>WARNING !</b>	
A / B	⇒ <b>Improper use of this vessel can cause serious injury, blindness or death.</b>
C	⇒ <b>Read the vessel nameplate, warning labels, and the instruction manual for the installation, operation and maintenance of the filter vessel before installation and operation.</b>

Labels must be replaced if lost, become illegible or if visibility is blocked. Labels have a part number in the lower right hand corner for re-ordering purposes.

### 1.1 GENERAL SAFETY INSTRUCTIONS

- In the event of installation within close proximity of machinery operating at a high or low temperature, accessible parts of the vessel are to be protected against touch.
- Appropriate action to deal with dangerous leaks and spillages is to be taken to avoid danger to personnel and the environment. Local regulations relating to the environment are to be strictly adhered to.

- Precautions are to be taken to avoid danger from electrical energy. Consult with the local supplier to ensure compliance.
- The user is responsible to ensure that all fitting, maintenance and servicing is carried out by competent, authorised and qualified specialists that have sufficiently read and understood this Manual.
- Work is only to be carried out on the filter vessel during an operation shut down and then only in the method as described in this Manual.
- Filter vessels that are used for the filtration of dangerous fluids must be decontaminated during filter change and cleaning. The used filter bag along with any other contaminated materials must be disposed of in line with the prevailing regulations for disposal of contaminated materials.
- All Health and Safety regulations are to be adhered to.
- Used filter bags and waste materials must be disposed of in line with the prevailing regulations for disposal.

## 1.2 PROTECTIVE CLOTHING

**WARNING:** Before operating this vessel, the operator should wear protective clothing including gloves and a face shield. Refer to material safety data sheets (MSDS) for specific instructions for handling the liquid as supplied by the manufacturer.

## 1.3 TRAINING OF MAINTENANCE PERSONNEL

The personnel responsible for the service, maintenance and inspection must provide evidence of qualification to carry out such tasks. The user who is ultimately responsible must control the areas of responsibility, quality and supervision.

The personnel responsible for the service, maintenance and inspection should hold the following:

1. Proof of training and authorisation for the operation of a Pressure Vessel.
2. Proof of training and authorisation for safety management and safety equipment.
3. Proof of First-Aid Training.

Revision of training should be at regular intervals.

## **1.4 APPROPRIATE USE**

The filter vessel is to be used exclusively within the parameters provided in the Manual. Any digression will be deemed non-appropriate use.

The pressure vessel is built to strict safety specifications any changes can be extremely dangerous for operators, other third parties and the environment.

The X100 Bag/Cartridge vessel is designed for liquid filtration only. A liquid is defined in the Pressure Vessel Regulations 97/23/EG when the vapour pressure at the maximum operating temperature of the filtered liquid is  $\leq 0,5$  bar.

The filter system is only to be operated when in an optimal technical condition. Particular attention is to be paid to safety and the operators are to be wary of possible dangers as described in the operating manual and health and safety regulations.

Immediate action is to be taken to rectify any fault that interferes with the correct operation of the filter vessel.

The aforementioned internal or external inspection or maintenance must be carried out as and when required.

The filter vessel is to be used exclusively within the operating parameters recorded on the Vessel Code Plate and for the process it was designed for.

The manufacturer will not be responsible for injury or damage caused if the filter vessel is used outside of the recorded parameters or for any purpose other than that it was designed for.

## **1.5 SELF MADE ALTERATIONS/CHANGES**

Alterations/Changes/Modifications to Pressure Vessels are not to be made without the prior written consent of FSI<sup>®</sup>. For safety precautions only original spare parts authorised by FSI<sup>®</sup> should be used. FSI<sup>®</sup> will not be responsible for the consequences if other unrecognised parts are used.

## **1.6 AUTHENTICITY OF DOCUMENTATION**

The documentation should be compared with the nameplate on the Pressure Vessel.

Documentation contains:

1. Conformity Assessment Procedure acc. PED 97/23/EG
2. Pressure Certification
3. Manual

It is the responsibility of the user to ensure that the Pressure Vessel and the documentation are maintained in the optimal operational standard and that the condition of liquid filtered is kept within the agreed parameters.  
**(SEE SECTION 4. OPERATION OF THE X100 BAG FILTER VESSEL)**

## **1.7 PREVENTION OF ACCIDENTS**

To ensure injuries to personnel are avoided the current Health and Safety regulations are to be strictly adhered to. It is a requirement that all responsible persons are informed of any changes to such regulations. The health and safety regulations are to be readily available for everyone.

## **2. INSTALLATION**

The user is responsible to ensure that only authorised competent and qualified personnel carry out the transportation, storing, mounting and connection work.

Prior to installation, ensure that the product to be filtered is chemically compatible with the material from which the pressure vessel and gasket are manufactured. The X100 bag/cartridge is manufactured from talc filled polypropylene. Although the filter has a wide range of chemical resistance, several factors can effect or restrict the usage, i.e., temperature and concentration of solutions. Failure to comply with the chemical compatibility may result in operational failure. Such failure can result in severe injury to the user.

It is essential that the filtered products maximum operating parameters be well within the capabilities of the X100 bag/cartridge filter vessel.

The tasks are only to be undertaken in conjunction with the following:

- The Manual.
- The warning and safety shields on the Pressure Vessel.
- The Pressure Vessel specifications and requirements
- The current Health and Safety regulations.

Extreme injuries and damage can result from:

- Improper application and installation
- Incorrect positioning, fitting and operation.
- Unauthorised removal of protection systems. For example heat guards.

### **2.1 ACCESSIBILITY OF THE MANUAL**

The Manual is to be made readily available at the point of installation of each Pressure Vessel for ease of reference by the user and the maintenance personnel.

## 2.2 MOUNTING

There are two methods available for the mounting of the X100.

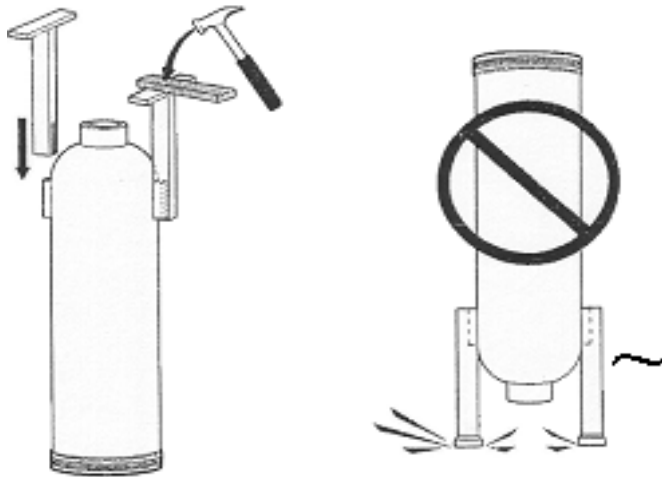
### a. X100 Polypropylene Legs

The X100 Polypropylene Legs can be used when permanently connecting the X100 to a filter system. They are to be used in conjunction with hard piping to provide vertical rigid support. Horizontal movement such as that caused by using flexible piping is to be avoided.

**(Leg Assembly Instructions see FIGURE 1 ON PAGE 8)**

### b. Metal Wall Mounting Brackets

Wall mounting brackets in Stainless Steel available as extras can be used when permanently connecting the X100 to a filter system. The use of such brackets provide for optimal stability of the X100.



Tap lightly to seat the vessel legs to the vessel lugs.

Do not use force to set the legs.

**FIGURE 1**

### **MOUNTING INFORMATION!**

Extreme care should be taken when connecting piping to the inlet and outlet to avoid a cross thread. Applying extra strength in such a situation can lead to serious damage to the vessel.

The Pressure Vessel is to be earthed by a qualified engineer if it is to be installed in a flame/explosion-proof area.





## **SAFETY INFORMATION !**

**Use specific tools only.**



**Wear the correct protective clothing when working with dangerous materials.**

**Do not confuse inlet and out lets of the Pressure Vessel.**

**In flame/explosion-proof areas the Pressure Vessel is to be earthed.**

**Ensure that no items are in the Pressure Vessel.**

### **2.3 PIPING**

The piping material used should be the same as the base material of the vessel. It should have a rating equal to or greater than the pressure and temperature rating of the vessel.

The piping and adhesives used must be chemically compatible with the filtered products at maximum operating parameters. Failure to comply with the chemical compatibility may result in operational failure. Such failure can result in severe injury to the user.

### **2.4 OBSERVATION OF OPERATING PARAMETERS**

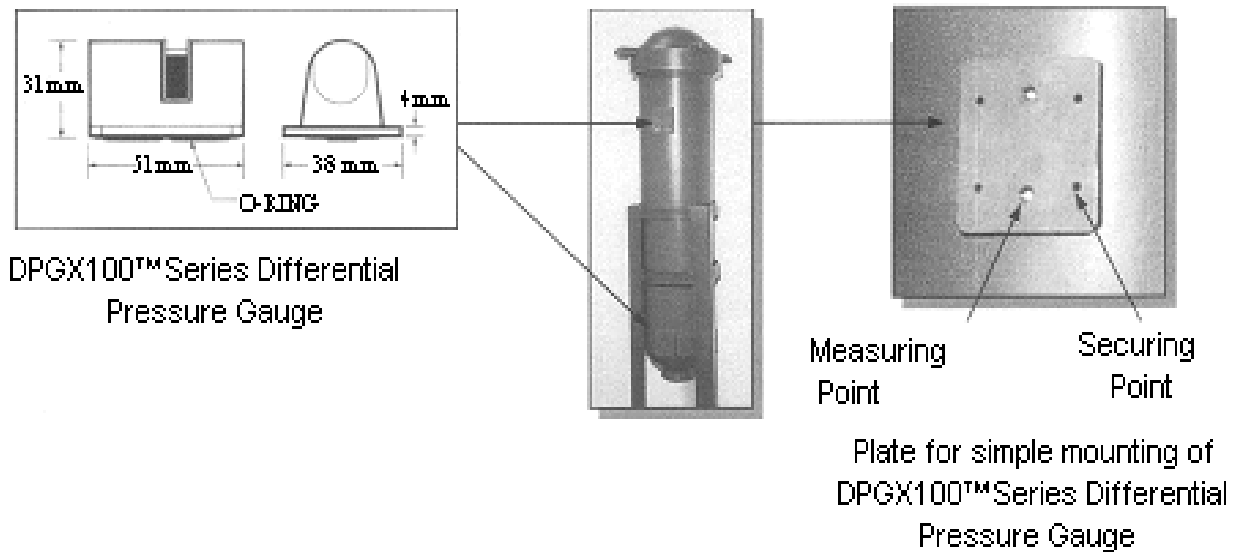
It is the responsibility of the end user to ensure that the respective operating parameters of the FSI<sup>®</sup> pressure vessel are not contravened by adding any components or by making changes to the system.

### **2.5 GAUGES AND VALVES**

Pressure gauge, temperature gauge, or the vent valve are not supplied unless specifically ordered. These protective components can be supplied separately by FSI<sup>®</sup>.

A Differential Pressure Gauge for the X100 filter vessel can be supplied as an optional extra. This is a simple effective way to maintain optimum performance. The visual indicator changes from green to red to alert the user that the filter is dirty.

**(FIGURE 2 –PAGE 10)**



**FIGURE 2**

## 2.6 GASKETS

Use only FSI® approved Gaskets.



### **WARNING !**

**Gaskets can fail, causing serious injury and/or blindness.**



### **SAFETY INFORMATION !**

**Gasket material must be chemically and temperature compatible with fluid being filtered.**

**NOTE:** The operating temperature of gasket material changes with respect to the fluid temperature and chemical concentration of the product.

Each FSI<sup>®</sup> gasket is labelled to show the vessel type it will fit and the gasket material.

**Example:**

**Vessel type:** X100

**Gasket material:** VITON<sup>®</sup>

**Instruction:** Inspect gasket groove and gasket. If gasket is nicked or wrong, replace only with FSI<sup>®</sup> replacement parts.

USE ONLY FSI<sup>®</sup> APPROVED GASKETS.

## **2.7 LIFE TIME OF FILTERVESSELS**

The lifespan equals  $N^{\text{recorded}} \leq 1000$  or maximal 5 Year, by 10% pressure fluctuation from PS.

A test is to be carried out on the filter vessel having reached half of the planned pressure changes or after five years, which ever comes sooner.

The end user is advised, that the number of pressure changes should be suitably recorded and arrangements made for the necessary inspection to be carried out at the appropriate time.

## **2.8 AVAILABILITY OF SPARE PARTS**

If the filter system has a decisive roll in the production process, availability of genuine FSI<sup>®</sup> spare parts is essential to eliminate down time.

## **2.9 GUARANTEE**

The liability for a failed delivery and/or receipt of damaged articles is determined by the delivery conditions. No liability will be accepted for damage caused by failing to abide by the Manual.

Modifications to the Pressure Vessel automatically cancel the liability and guarantee.

## **2.10 SYSTEM CONTROL**

It is advisable to hydro-statically test the vessel with water to determine if there are any leaks in the system.

**SHOULD ANY PROBLEMS BE ENCOUNTERED DURING THE  
INSTALLATION PLEASE CONTACT:**

**FSI<sup>®</sup> filter specialists int. GmbH**  
**Valterweg 3.1**  
**65817 Eppstein-Bremthal**

**Tel.: +49-6198-5808-0**

**Filter Specialists International**  
**Unit H1, Taylor Business Park**  
**Risley, Warrington, Cheshire, WA3 6BL**

**Tel.: +44-1925-767667**

**3. MAINTENANCE OF THE X100 FILTER**

The personnel responsible for the maintenance are to be aware of the dangers that can be encountered during and as a consequence of maintenance.

- Threads are clean and well greased.
- The X100 filter is to be checked regularly for wear and tear.
- Damaged parts are to be replaced with original FSI<sup>®</sup> parts.
- Parts relevant to safety such as valves and gauges are to be continually checked for malfunction.
- The lifetime equals  $N^{\text{recorded}} \leq 1000$  or maximal 5 Year, by 10% pressure fluctuation from PS. A test is to be carried out on the filter having reached half of the planned pressure changes or after five years, which ever comes sooner.



**SAFETY INFORMATION !**



**Wear the correct protective clothing  
when working with dangerous materials.**

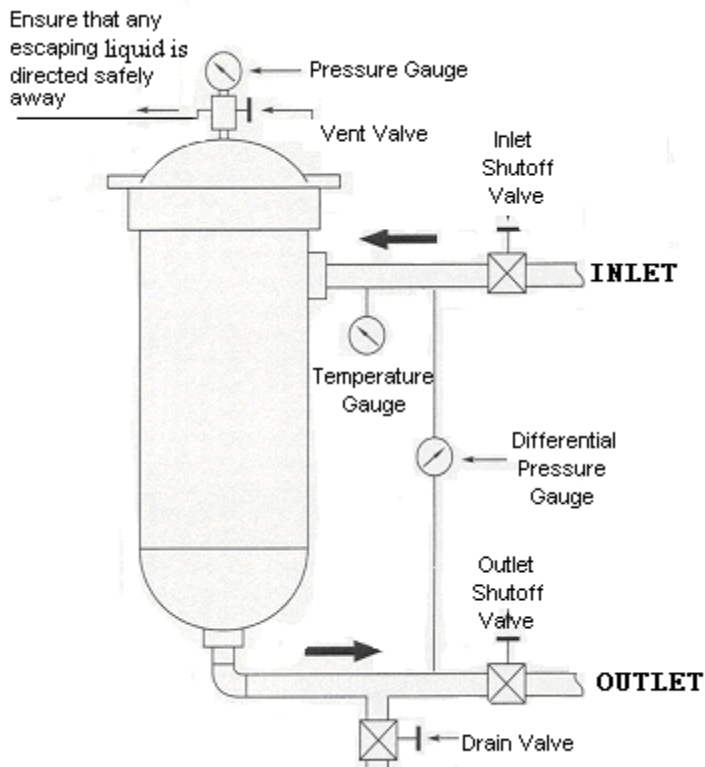


**Do not contaminate the environment.**

**Do not open a vessel whilst it is under pressure.**

**Use specific tools only.**

**Use only original FSI<sup>®</sup> spare parts.**



It is the responsibility of the user to ensure that the respective operating parameters of the FSI® pressure vessel are not contravened by adding any components for example Pressure and temperature gauges, or vent valves.

**FIGURE 3**

#### 4. OPERATION OF THE X100 FILTER

The X100 Bag/Cartridge Vessel is designed for liquid filtration only. A liquid is defined in the Pressure Vessel Regulations 97/23/EG when the vapour pressure at the maximum operating temperature of the filtered liquid is  $\leq 0,5$  bar.



### **WARNING !**

**Never use this vessel outside of the fluid group and condition of fluids.**

**Operating outside of the fluid group and fluid conditions can be cause serious injury and blindness.**

The bag filter is designed only for the filtration of liquid stipulated in the documentation relating to the Pressure Vessel. The liquids are defined in Article 9 of the Pressure Vessel Regulations 97/23/EG in:

- a.) Group 1 - Dangerous
- b.) Group 2 - All Other

It is the responsibility of the end user to ensure that the condition of fluid and fluid group of the product to be filtered agrees with those stipulated in the documentation and that the given parameters such as pressure and temperatures are adhered to.



### **WARNING !**

**Serious injury and damage can result from operating the Pressure Vessel outside of the defined parameters.**

**The nameplate records the maximum operating parameters of the Pressure Vessel. The maximum operating parameters relate to the liquid being filtered and it is these parameters that must be adhered to.**



### **WARNING !**

**Hot or chemically active liquids can be cause serious injury and blindness.**

Prior to proceeding with any work on the Pressure Vessel it is a requirement that the correct protective clothing is worn. Fundamental protection includes a facemask and gloves.

Specific safety information/ warnings provided by the producer of the filtered liquid are to be observed. Refer to material safety data sheets (MSDS) for specific instructions for handling the liquid as supplied by the manufacturer.



## **WARNING !**

**Do not exceed the operating limits of this vessel and gasket.**

**Serious injury or death can result if limits are exceeded.**

The maximum pressure and the maximum temperature can be found on the Vessel Code Plate of the Pressure Vessel.

The maximum operating temperature of the gasket is obtainable on request from FSI<sup>®</sup>.

The filtered liquids temperature, chemical concentration and pressure can cause the operating temperature of gasket material to change.

If you change the chemical components of the filtered product the compatibility of the gasket is to be confirmed.



## **WARNING !**

**By varying permissible changes of the Operating Temperature, the minimal parameters of the Pressure Vessel, gasket and filter materials should not be exceeded.**

## **5. TAKING THE X100 BAG FILTER INTO OPERATION**

- 5.1 Isolate the filter from the system by closing the appropriate valves and ensure filter vessel is not under pressure. The pressure gauge should indicate zero (0 BAR) (**FIGURE 3 - PAGE 13**). The system pump should be switched off and disconnected from the electric supply.



## **DANGER !**

**Do not open a vessel under pressure.**

**Escaping fluid under pressure can cause serious injury and blindness.**

- 5.2 Remove the lid by manually turning anti clockwise. A gentle tap against the handle may be necessary, if the lid was over tightened.
- 5.3 Check the lid gasket, lid gasket groove and basket for serviceability and cleanliness. Replace damaged components using original FSI<sup>®</sup> spare parts. Please ensure you quote the vessel model, type and the type of gasket material required when placing an order.
- 5.4 Insert the basket and ensure that it correctly seated.
- 5.5 Insert the X-100 Filter bag of the required media and micron rating into the basket. Ensure that the collar of the filter bags lies below the inlet.
- 5.6 Slip the gasket over the filter and into the gasket groove. Make sure the gasket is not twisted and the bevelled edges are facing out. Apply a small amount of non-contaminating lubricant to the outside of the gasket. (**FIGURE 4 -PAGE 22**).
- 5.7 Replace the lid, turning it clockwise until it is correctly seated. Do not over tighten additional force will not enhance the seal; it will cause the threads to stick.
- 5.8 Close the vent valve.
- 5.9 Switch the pump on.
- 5.10 Slowly open the inlet valve and watch for any leakages. Should leaking occur, close the inlet valve and go to **PARAGRAPH 7. ON PAGE 19** and follow the instructions.
- 5.11 Open the outlet valve (**FIGURE 3 -PAGE 13**).
- 5.12 Slowly open the vent valve and ventilate until the liquid flows from the vent. Ensure that escaping liquid is directed safely away to avoid personal injury to the operator and damage to the surrounding area.





## **DANGER !**

**Do not open a vessel under pressure.**

**Escaping fluid under pressure can cause serious injury and blindness.**

- 5.13 Close the vent valve after successful ventilation and inspect the Vessel, the connections and valves for leaks. In the event of leaks, close the valves and switch off the pump. **(PARAGRAPH 7. ON PAGE 19).**
- 5.14 The vessel is now in operation.

## **6. TAKING THE X100 CARTRIDGE FILTER INTO OPERATION**

- 6.1 Isolate the filter from the system by closing the appropriate valves and ensure filter is not under pressure. The pressure gauge should indicate zero (0 BAR) **(FIGURE 3 -PAGE 13)**. The system pump should be switched off and disconnected from the electric supply.



## **DANGER !**

**Do not open a vessel under pressure.**

**Escaping fluid under pressure can cause serious injury and blindness.**

- 6.2 Remove the lid by manually turning anti clockwise. A gentle tap against the handle may be necessary, if the lid was over tightened.
- 6.3 Check the adapter (conversion) plate, adapter (conversion) plate gasket, lid gasket, gasket grooves and basket for serviceability and cleanliness. Replace any damaged components using original FSI<sup>®</sup> spare parts. Please ensure you quote the vessel model, type and the type of gasket material required when placing an order.
- 6.4 Fit the adapter (conversion) plate gasket ensuring it is of the correct material **(FIGURE 5 -PAGE 22)**.

- 6.5 Slide the adapter (conversion) plate with the fitted gasket into the filter. Push the plate firmly against the support ribs.
- 6.6 Insert the X100 filter cartridge (CMMF-X20) of the pre determined micron rating into the filter and gently push so that base plate of the cartridge is interlocked with the adapter (conversion) plate.
- 6.7 Check to see if the cartridge is seated correctly by lightly pulling on the handle of the cartridge.
- 6.8 Slip the gasket over the filter and into the gasket groove. Make sure the gasket is not twisted and the bevelled edges are facing out. Apply a small amount of non-contaminating lubricant to the outside of the gasket. **(FIGURE 4 -PAGE 22)**.
- 6.9 Replace the lid, turning it clockwise until it is correctly seated. Do not over tighten additional force will not enhance the seal; it will cause the threads to stick.
- 6.10 Close the vent valve.
- 6.11 Switch the pump on.
- 6.12 Slowly open the inlet valve and watch for any leakages. Should leaking occur, close the inlet valve and go to **PARAGRAPH 7. ON PAGE 19** and follow the instructions.
- 6.13 Open the outlet valve **(FIGURE 3 -PAGE 13)**
- 6.14 **Slowly** open the vent valve and ventilate until the liquid flows from the vent. Ensure that escaping liquid is directed safely away to avoid personal injury to the operator and damage to the surrounding area.



**DANGER !**

**Do not open a vessel under pressure.**

**Escaping fluid under pressure can cause serious injury and blindness.**

- 6.15 Close the vent valve after successful ventilation and inspect the Vessel, the connections and valves for leaks. In the event of leaks, close the valves and switch off the pump. **(PARAGRAPH 7. ON PAGE 19)**.
- 6.16 The vessel is now in operation.

## 7. OPENING THE PRESSURE VESSEL



### **DANGER !**

**Do not open a vessel under pressure.**

**Escaping fluid under pressure can cause serious injury and blindness.**

#### **Follow the steps:**

- 7.1 Switch off the system pump and disconnect from the electric supply.
- 7.2 First close the inlet valve and then close the outlet valve.
- 7.3 Open the vent valve. Ensure that any escaping liquid is directed safely away to avoid personal injury to the operator and damage to the surrounding area.



### **DANGER !**

**Escaping fluid under pressure can cause serious injury and blindness.**

- 7.4 Ensure that internal pressure has been released. The pressure gauge should indicate zero (0 BAR) (**FIGURE 3 -PAGE 13**).
- 7.5 The Pressure Vessel is emptied by gravity through the drain valve\* or the main outlet valve (*\* is not always a component of the filter vessel*).
- 7.6 Remove the lid by manually turning anti clockwise. A gentle tap against the handle may be necessary, if the lid was over tightened.
- 7.7 Remove the filter bag or cartridge\* (\* X100-C Cartridge Filter only).

- 7.8 Ensure the restrainer basket or adapter (conversion) plate\* are not deformed or damaged in any way. (\* X100-C Cartridge Filter only).
- 7.9 Check the restrainer basket, adapter (conversion) plate\*, adapter (conversion) gasket\* and all other parts for serviceability and cleanliness. Replace any damaged components using original FSI<sup>®</sup> spare parts. Please ensure you quote the vessel model, type and the type of gasket material required when placing an order. (\* X100-C Cartridge Filter only).
- 7.10 After inserting the restrainer basket or adapter (conversion) plate\* with adapter (conversion) gasket\* the new filter bag or filter cartridge\* can be inserted. Ensure all elements are seated correctly. (\* X100-C Cartridge Filter only).
- 7.11 Check the lid gasket and lid gasket groove serviceability and cleanliness. Replace damaged components using original FSI<sup>®</sup> spare parts. Please ensure you quote the vessel model, type and the type of gasket material required when placing an order.
- 7.12 Slip the gasket over the filter and into the gasket groove. Make sure the gasket is not twisted and the bevelled edges are facing out. Apply a small amount of non-contaminating lubricant to the outside of the gasket. **(FIGURE 4 -PAGE 22)**
- 7.13 Replace the lid, turning it clockwise until it is correctly seated. Do not over tighten additional force will not enhance the seal; it will cause the threads to stick.
- 7.14 Close the vent valve **(FIGURE 3 -PAGE13)**.
- 7.15 Switch the pump on.
- 7.16 **Slowly** open the inlet valve and watch for any leakages. Should leaking occur, close the inlet valve and go to **PARAGRAPH 7. ON PAGE 19**.
- 7.17 Open the outlet valve **(FIGURE 3 -PAGE13)**.
- 7.18 **Slowly** open the vent valve and ventilate until the liquid flows from the vent. Ensure that escaping liquid is directed safely away to avoid personal injury to the operator and damage to the surrounding area.



**DANGER !**

**Do not open a vessel under pressure.**

**Escaping fluid under pressure can cause serious injury and blindness.**

7.19 Close the vent valve after successful ventilation and inspect the Vessel, the connections and valves for leaks. In the event of leaks, close the valves and switch off the pump.  
**(PARAGRAPH 7. ON PAGE 19).**

7.20 The vessel is now in operation.

**Should leakages occur after the filter has been taken into operation and the lid has been properly fitted, please contact FSI<sup>®</sup>.**

**UNDER NO CIRCUMSTANCES IS THE FILTER LID TO BE TIGHTENED DURING OPERATION. ENSURE THE OPERATION IS STOPPED AND THE FILTER IS RELIEVED OF ALL PRESSURE.**

## 8. CLOSING LID AND ADAPTER PLATE INSTALLATION

### PREPARATION:

- Clean Gasket Groove
- Check Gasket Serviceability
- Fit Gasket Correctly

Standard FSI<sup>®</sup> filters are designed to use gaskets made of self-energising materials such as Buna, EPR or Viton<sup>®</sup> which seals adequately with the minimum of pressure. Turn the X100 lid clockwise until it is correctly seated. Do not over tighten additional force will not enhance the seal; it will cause the threads to stick. FSI<sup>®</sup> does not recommend gaskets made from material or rope. They may require excessive tightening torque. Due to the many variables that influence torque, exact values are not given here. For general torque values applicable to your particular vessel please contact FSI<sup>®</sup> Filter Specialists International.

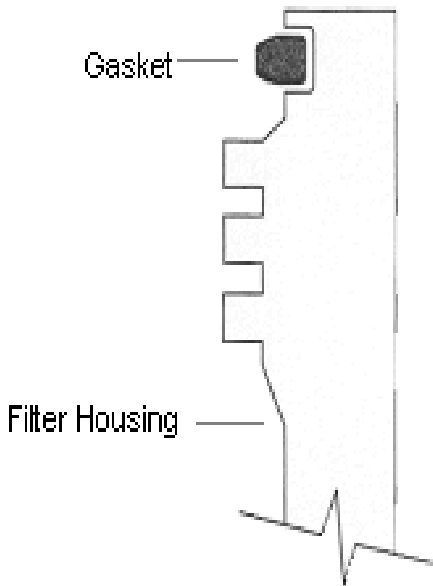


FIGURE 4

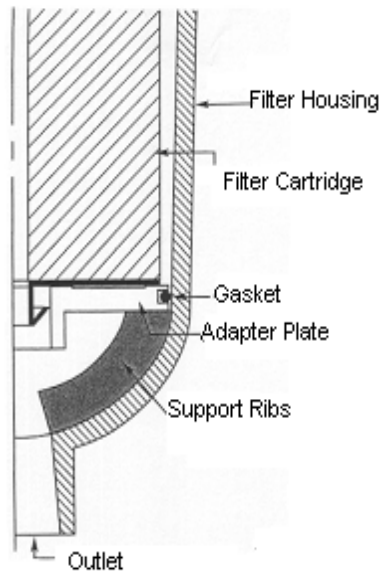
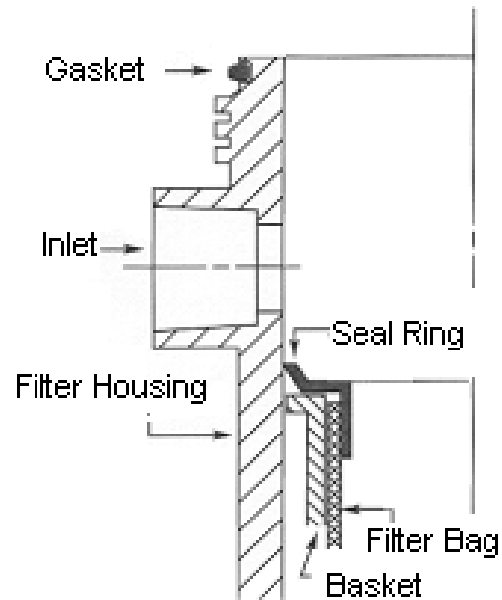


FIGURE 5

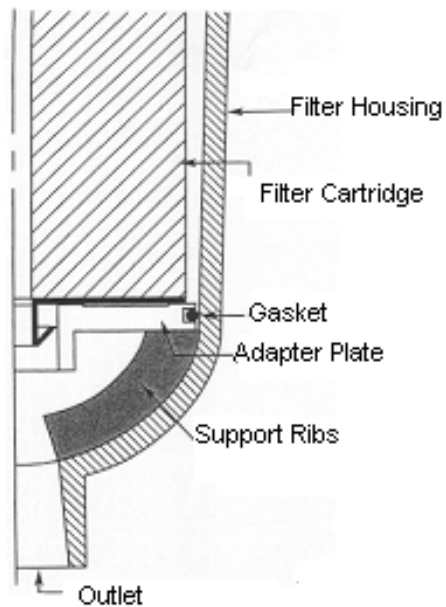
## 9. X01 FILTER BAG INSTALLATION



**FIGURE 6**

Once the filter is operational and in use, the differential pressure should be checked regularly. It is suggested that when the differential pressure across the filter elements reaches a predetermined amount, the filter bags be changed. For information relating to typical differential pressure see our data sheets or contact Filter Specialist International. If the differential pressure suddenly drops, stop filtration immediately and check bags for proper seal or rupture.

## 10. X20 FILTER CARTRIDGE INSTALLATION



**FIGURE 7**

Once the filter is operational and in use, the differential pressure should be checked regularly. It is suggested that when the differential pressure across the filter elements reaches a predetermined amount, the filter cartridge be changed. For information relating to typical differential pressure see our data sheets or contact Filter Specialist International. If the differential pressure suddenly drops, stop filtration immediately and check filter cartridge for damage.