

# *Instruction Manual*

## FL20K Foreline Trap

Description	Item Number
FL20K	A133-05-000



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## Associated publications

Publication title	Publication number
Vacuum pump and vacuum system safety	P400-40-100

# 1 Introduction

## 1.1 Scope and definitions

This manual provides installation, operation and maintenance instructions for the Edwards FL20K Foreline Trap. You must use the FL20K as specified in this manual.

Read this manual before you install and operate the FL20K. Important safety information is highlighted as WARNING and CAUTION instructions; you must obey these instructions. The use of WARNINGS and CAUTIONS is defined below.



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### **WARNING**

Warnings are given where failure to observe the instruction could result in injury or death to people.

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### **CAUTION**

Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process

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The units used throughout this manual conform to the SI international system of units of measurement.

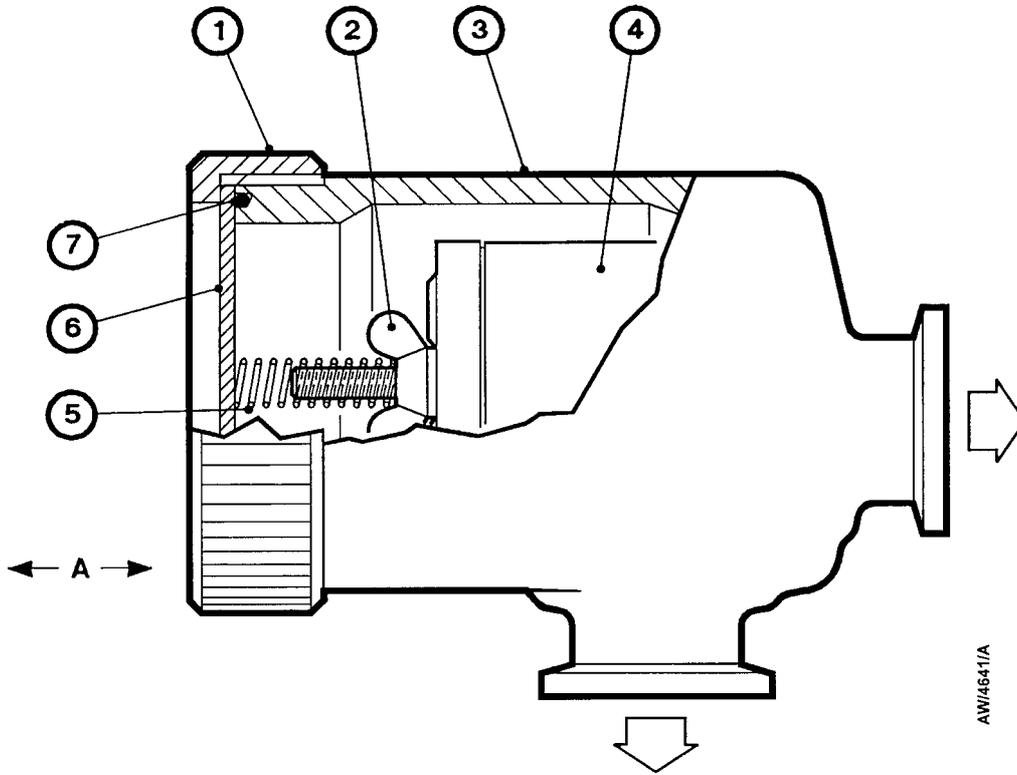
## 1.2 General Description

The FL20K has been developed for use in clean pumping systems to prevent the back-migration of rotary pump oil vapour into the systems; we particularly recommend that you use an FL20K with two-stage rotary pumps.

The component parts of the FL20K are illustrated in Figure 1. The FL20K consists of a metal basket (4) located within a cast aluminium body (3), the metal basket is secured in place by a knurled nut (1), lid (6) and spring (5).

A sorbent is contained in the metal basket to absorb any oil which back-migrates from the pump. The sorbent material used is activated alumina which has exceptional trapping properties for oil vapour. It has a long life (up to six months) before it becomes saturated and has to be renewed.

Figure 1 - Component parts of the FL20K



AWI4641/A

- 1. Nut
  - 2. Wing nut
  - 3. Body
  - 4. Basket
  - 5. Compression spring
  - 6. Lid
  - 7. O-ring
- A. Clearance required for removal of basket (4)

## 2 Technical Data

### 2.1 Operating conditions

Ambient operating temperature range 0 to 50 °C

### 2.2 Performance

Leak tightness (1 bar (1 x 10<sup>5</sup> Pa) differential) 1 x 10<sup>-6</sup> mbar ls<sup>-1</sup>, 1 x 10<sup>-4</sup> Pa ls<sup>-1</sup>

Maximum internal pressure 1 bar absolute, 1 x 10<sup>5</sup> Pa

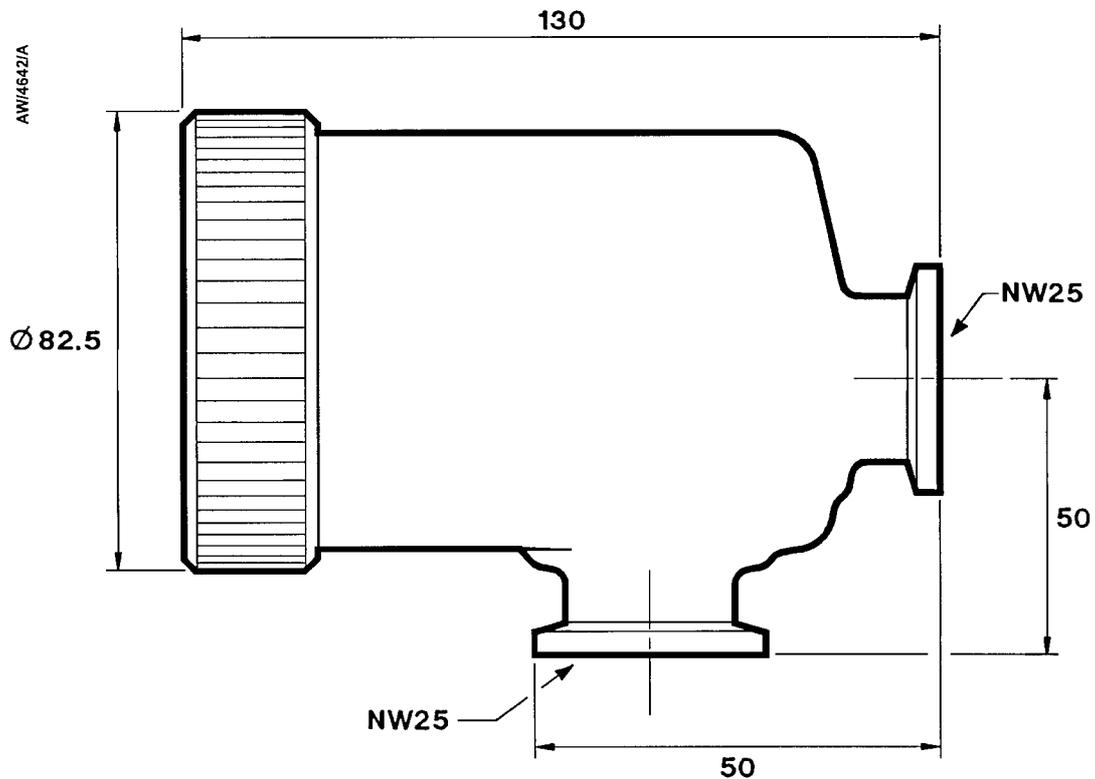
### 2.3 Mechanical data

Dimensions See Figure 2

Mass 1 kg

Sorbent charge 0.07 kg

Figure 2 - Dimensions (mm)



## 3 Installation

### 3.1 Unpack and inspect

Remove all packing materials and check the FL20K. If the FL20K is damaged, notify your supplier and carrier in writing within three days; state the item number of the FL20K together with your order number and your supplier's invoice number. Retain all packaging materials for inspection. Do not use the FL20K if it is damaged.

Check that your package contains the items shown in Table 1. If any one of these items is missing, notify your supplier in writing within three days.

Table 1 - Checklist of items

Qty	Description	Check (✓)
1	FL20K Valve	<input type="checkbox"/>
1	Tin of activated alumina	<input type="checkbox"/>

If the FL20K is not to be used immediately, return it to its protective packaging.

### 3.2 Install the FL20K

We recommend that you mount the FL20K horizontally, as shown in Figure 1. If necessary, however, you can mount the FL20K in any orientation, as the sorbent is securely retained in the basket. The mass of the FL20K will be adequately supported by the pipeline connections and you can connect either port to the rotary vacuum pump. However, we recommend that you mount the FL20K as close to the vacuum system and as far from the rotary pump as possible, to maximise the useful life of the sorbent. When you mount the FL20K, ensure that you leave adequate clearance to enable the sorbent basket to be removed.

Use the standard KF coupling components (that is, NW clamping rings, centring rings and O-rings) to connect the FL20K to the pump and the vacuum system.

### 3.3 Fill the FL20K with sorbent



#### **WARNING**

Activated alumina is a desiccant and will absorb materials from your process system. You must take suitable precautions to protect people from the harmful effects of any noxious materials released if you bake the spent alumina to reactivate it. Avoid inhalation of its dust, eye contact and unnecessary skin contact.

#### **CAUTION**

Do not overfill the basket with sorbent, if you do, crushed sorbent could be sucked into the rotary pump and damage the pump.

1. Refer to Figure 1; unscrew and remove the nut (1) and the lid (6).
2. Remove the basket (4) and spring (5) from the trap body (3).
3. Refer to Figure 3. Remove the wing nut (9) and end cap (1) from the basket (3). Remove the washer (10), compression spring (8) and perforated disk (7).
4. Fill the basket with sorbent; when full, the end disk (7) should align with the marker (6) on the spindle:

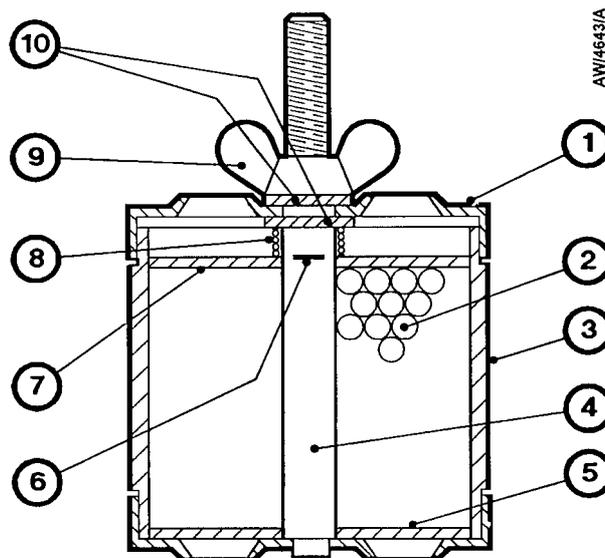
- Fill the basket with alumina balls so that the top of the sorbent charge is approximately level with the marker (6).
  - Tap the basket gently to settle the sorbent, then add more alumina balls if necessary.
5. Place the perforated end disk (7) on top of the alumina balls and slide the spring (8) over the spindle (4) so that it rests on the end disk (7). Ensure that both end disks (5 and 7) have their smooth side in contact with the balls.
  6. Refit the washer (10) and end cap (1) over the spindle.
  7. Refit the second washer (10) and wing nut (9) over the spindle (4) and tighten the wing nut (9). To ease tightening of the wing nut, push the lid down gently
  8. Position the charged basket in the trap, ensuring that it is fully located on the bottom O-ring seal.
  9. Refer to Figure 1 and replace the spring (5), lid (6) and nut (1).



**WARNING**

Ensure that the nut (item 1, Figure 1) is fully secured on assembly. Failure to do so may result in the risk of a vacuum leak or of ejected parts.

Figure 3 - Component parts of the basket assembly



- |                      |                       |
|----------------------|-----------------------|
| 1. End cap           | 6. Alignment marker   |
| 2. Activated alumina | 7. End disk           |
| 3. Basket            | 8. Compression spring |
| 4. Spindle           | 9. Wing nut           |
| 5. End disk          | 10. Washer (M6)       |

## 4 Operation



### *WARNING*

Activated alumina is a desiccant and will absorb materials from your process system. You must take suitable precautions to protect people from the harmful effects of any noxious materials released if you bake the spent alumina to reactivate it. Avoid inhalation of its dust, eye contact and unnecessary skin contact.

Take note of the following information:

- In common with other types of sorbent, activated alumina absorbs moisture. This will not affect its oil vapour trapping properties but may tend to prolong rough pumping on successive pumping cycles. Regular regeneration by baking the trap or renewal of the sorbent will be necessary for rapid pump-down.
- If the FL20K has been open to atmosphere for a long period of time, it may be necessary to carry out prolonged pumping with a gas-ballasted rotary pump to remove the absorbed moisture. Alternatively, remove the basket from the FL20K and bake it at 250°C to 300°C for two hours.
- Use a valved by-pass line to minimise vapour absorption during pump-down.

## 5 Maintenance

### 5.1 Replace the sorbent charge



#### **WARNING**

Activated alumina is a desiccant and will absorb materials from your process system. You must take suitable precautions to protect people from the harmful effects of any noxious materials released if you bake the spent alumina to reactivate it. Avoid inhalation of its dust, eye contact and unnecessary skin contact.

During normal use, the sorbent material nearest to the port connected to the rotary pump will become brown in colour. When the discolouration reaches the sorbent layer furthest from the port, you must change the sorbent charge. The time taken for this to occur depends on the frequency of use and the location of the trap in relation to the rotary pump. A typical charge life is six months, although we recommend that you change the charge every three months as a routine maintenance procedure.

1. Refer to Figure 1. Unscrew and remove the nut (1) and the lid (6).
2. Remove the basket (4) and spring (5) from the trap body (3).
3. Refer to Figure 3. Remove the wing nut (9) and end cap (1) from the basket (3). Remove the washer (10), compression spring (8) and perforated end disk (7).
4. If the trap body interior appears oily or dirty, wash it out with iso-propyl or ethyl alcohol and then dry it thoroughly.
5. Fill the basket (3) with sorbent: refer to steps 4 to 9 of Section 3.3.

## 6 Storage and disposal

### 6.1 Storage

1. Return the FL20K to its protective packaging.
2. Store the FL20K in clean dry conditions, away from direct sources of heat and sunlight.

### 6.2 Disposal

Dispose of the FL20K safely and in accordance with all local and national safety and environmental requirements.

## 7 Spare and accessories

### 7.1 Introduction

Edwards products, spares and accessories are available from Edwards companies around the world. The majority of these centres employ people who have undergone comprehensive Edwards training courses.

Order spare parts and accessories from your nearest Edwards company or distributor. When you order, please state for each part required:

- Model and Item Number of your equipment
- Serial Number (if any)
- Item Number and description of part

### 7.2 Spares

Description	Item Number
0.45 kg activated alumina	H026-00-050

### 7.3 Accessories

Description	Item Number
Stainless steel clamping ring - NW20/25	C105-14-401
Polymer clamp - NW20/25	C105-14-403
Centring ring and O-ring - NW25 (polymer with nitrile O-ring)	C105-14-393
Centring ring and O-ring - NW25 (stainless steel with nitrile O-ring)	C105-14-396
Centring ring and O-ring - NW25 (polymer with fluoroelastomer O-ring)	C105-14-394
Centring ring and O-ring - NW25 (stainless steel with fluoroelastomer O-ring)	C105-14-395
Changeover valve	C079-02-000

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