Pall Corporation

Service Instructions

# UltiFuzor™ 61110 Series Degas Module

The UltiFuzor degas module is a hollow fiber membrane contactor designed for efficient removal of dissolved gases from ink jet inks on-board ink jet printing systems.

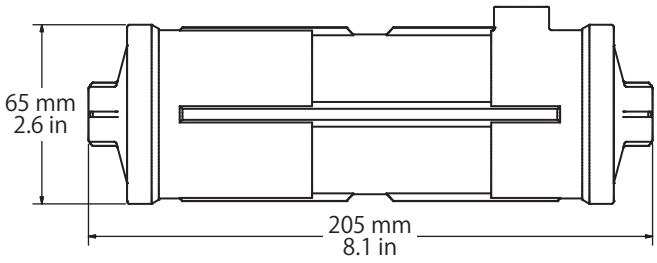




Figure 1: Dimensions

## 1.0 Specifications

**Part Number** UDM-61110

**Materials**

| | |
|---|---|
| Hollow fiber | Polyethylene |
| Housing | Polypropylene (black) |
| Potting resin | Epoxy |

**Connections** 1/4" FNPT

**Weight (dry)** 200 g

**Maximum Operating Pressure**[1]
0.16 MPa @ 45 ºC / 24 PSI @ 113 ºF

**Maximum Operating Temperature**[1]
45 ºC / 113 ºF

**Maximum Allowable Vacuum Pressure**
1 kPa absolute / 7.5 torr (warning: see vacuum operating guidelines, Section 3.6)

**Flow Range**
400 – 1500 mL/min[2]

[1] *In compatible liquids which do not soften swell or adversely affect the materials of construction*

[2] for single pass operation; in case of multi pass operation higher flow rates are possible. Please contact your Pall representative for advice.

## 2.0 Liquid Flow Path

The ink flows along the outside of the hollow fiber while vacuum is applied to the inside of the fiber. The flow path allows very low pressure drop through the module and continuous degassing along the fiber.

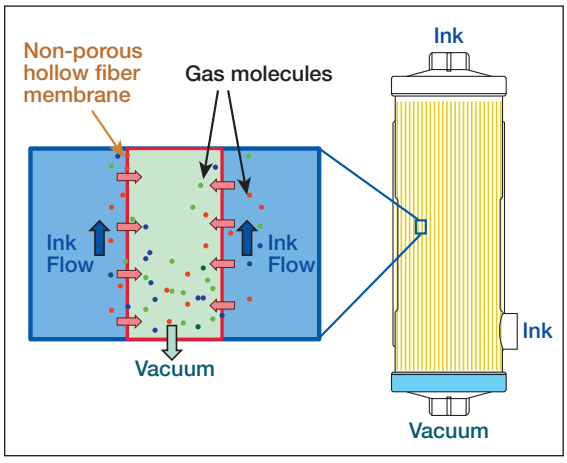



Figure 2: Schematic of fiber showing directional flow

## 3.0 Installation and Start-up General Guidelines

3.1 For best performance, it is recommended to operate the degas module in the flow patterns shown in chapter 6, If vapor condensation is an issue, it is recommended to position the vacuum port downward to facilitate draining potential condensates.

3.2 Connect ink inlet/outlet and the vacuum port. (See figure 2.) Verify that connection surfaces are clean and not damaged. Make sure not to overtighten the NPT fittings.

3.3 In order to avoid drawing any condensable vapor or liquid ink (in the case of damage to the UltiFuzor module) into the vacuum source, a trap may be placed between the vacuum port of the module and the vacuum pump (figure 3). This device should utilize standard trap construction with a vacuum tight vessel that can collect liquids and be drained periodically, if required. If safety is a concern, this trap may be maintained at a low temperature to condense any solvent that might evaporate from the ink, due to the applied vacuum.

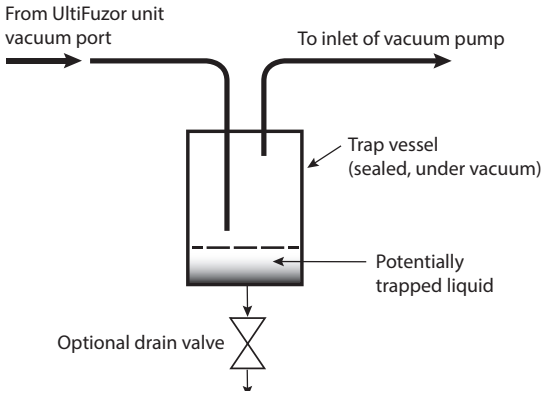



Figure 3: Schematic of a liquid trap set-up

3.4 Start the vacuum pump per the manufacturer's instructions. Gradually apply vacuum to the degas module.

3.5 ***Make sure that the absolute vacuum pressure is not lower than the vapor pressure of the most volatile component in the ink.*** The lower the absolute pressure on the vacuum side of the module (that is, the deeper the vacuum), the greater is the likelihood that the ink carrier liquid may evaporate into the vacuum. This can happen if the absolute pressure on the vacuum side approaches the vapor pressure of the carrier liquid (or other components present) at the operating temperature. It is generally recommended that if the vapor pressures of ink components are unknown, that the operator starts by employing a somewhat higher absolute pressure, for example, 13.4 kPa absolute (100 torr). Vacuum can then be adjusted as needed.

3.6 Slowly introduce the ink into the module.

## 4.0 Module Replacement

4.1 Stop flow, gradually release vacuum, isolate the UltiFuzor degas module and depressurize through system drain valve.

4.2 ***WARNING! Before attempting to remove the module from the system, ensure that it is fully isolated and depressurized. Failure to do so could result in a rapid discharge of liquid, which could cause personal injury and damage to equipment.***

4.3 Disconnect the module from the system. Note, a small amount of ink may be released from the module when it is disconnected.

4.4 Handle and discard the module in accordance with local health and safety procedures associated with the process fluid.

4.5 Install new UltiFuzor degas module per section 3.

4.6 UltiFuzor degas modules are consumable products and intended for exposure to one ink. The use of multiple inks is not recommended as ink compatibility interactions may diminish performance or damage modules. Flushing or cleaning is not recommended.

## 5.0 General Comments

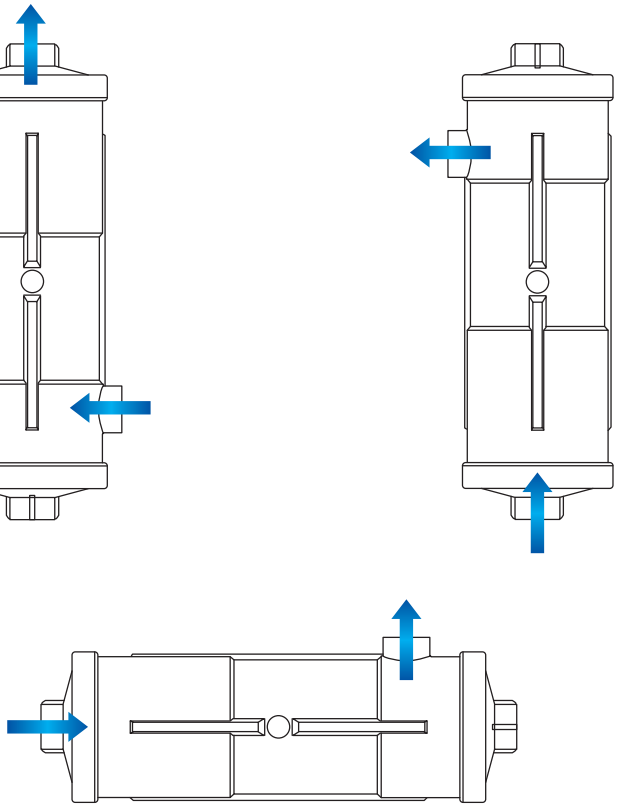
5.1 Removal of dissolved gases is dependent on a number of factors. These factors can be manipulated to achieve the desired degassing level.

- *Flow rate:* The slower the flow rate the better the degas efficiency, since the gas has a longer opportunity to come into contact with the fiber wall.
- *Temperature:* The higher the temperature, the more volatile the gas and thus easier to remove
- *Vacuum level:* The deeper the vacuum (that is the lower the absolute pressure on the vacuum side), the more effective it is at removing dissolved gases. However, as noted above, it is critical not to apply an excessive amount of vacuum so as not to evaporate desirable ink components.

5.2 The ink should be passed through a Pall filter, having a removal rating of 5 µm or finer.

5.3 Periodically check for liquid in the vacuum line and trap, and drain as required. If the ambient temperature is significantly lower than the operating temperature, the level of condensate in the vacuum lines may increase, necessitating more frequent draining.

## 6.0 Preferred flow pattern



## Appendix 1

### EUROPEAN DIRECTIVE 94/9/EC (ATEX): EQUIPMENT INTENDED FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES

Installation and maintenance should be undertaken by a competent person. National and local codes of practice, environmental regulations and health and safety directives must be adhered to and take precedence over any stated or implied practices within this document.

For fluids having low conductivity, there exists the possibility of generating static electricity during use with all-polymeric components. This could potentially lead to a static electricity discharge, resulting in the ignition of a potentially explosive atmosphere, where such an atmosphere is present. These Pall products are not suitable for use with such low conductivity fluids in an environment that includes flammable liquids or a potentially explosive atmosphere.

Where flammable or reactive fluids are being processed through a Pall degas module, the user should ensure that spillages during filling, venting, depressurizing, draining and module change-out operations are minimized, contained or directed to a safe area. In particular, the user should ensure that flammable fluids are not exposed to surfaces at a temperature that may ignite the fluid, and that reactive fluids cannot contact incompatible materials that may lead to reactions generating heat, flame or that are otherwise undesirable.

Pall degas modules do not generate heat, but during the processing of high temperature fluids, and process upset conditions, it will take on the temperature of the fluid being processed. The user should ensure that this temperature is acceptable for the area in which the filter is to be operated, or that suitable protective measures are employed. When processing flammable fluids, the user should ensure that any air is fully purged from within the assembly during filling and subsequent operation to prevent the formation of a potentially flammable or explosive vapor/air mixture inside the equipment. This can be achieved through careful venting of the assembly or system.

To prevent damage or degradation which may result in leakage of fluids from this equipment, it is imperative that the end user check the suitability of all materials of construction (including seals on the connections where appropriate) with the process fluid and conditions. The user should ensure that the module is regularly inspected for damage and leaks, which should be promptly corrected, and that seals (where appropriate) are renewed after every module change. Leakage of flammable or reactive fluids from this module, arising through incorrect installation or damage to the equipment (including any seals), may generate a source of ignition if flammable fluids are exposed to a heated surface, or if reactive fluids contact incompatible materials that may lead to reactions generating heat, flame or that are otherwise undesirable.

The user should ensure that the assembly is regularly inspected for damage and leaks, which should be promptly corrected, and that any seals are renewed after every filter change. The user should ensure that these products are protected from foreseeable mechanical damage that might cause such leakage, including impact and abrasion.

Regular cleaning with an anti-static material is required to avoid the build-up of dust on the degas module.

Please contact your local Pall office or distributor for additional information, if required.

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