



# SuperDebind™

## Binder removal from injection moulded components

The SuperDebind™ utilises supercritical fluid extraction to remove binders from injection moulded components. The working principle is dissolving the binders in supercritical carbon dioxide and thereby removing them from the components. This environmentally friendly solution also reduces debinding time compared to conventional methods. All parts are made of stainless steel. Fully automated operation. Compact design.

## General

The supercritical fluid debinding system, SuperDebind™, is designed for removing binders from components produced by Powder Injection Moulding (or the related Metal Injection Moulding and Ceramics Injection Moulding). The process uses environmentally benign carbon dioxide as solvent. The unit offers full flexibility for any parameter of the operating condition that has an impact on the cleaning process. The binder removed is separated and collected for reuse or disposal. The unit is built in a compact skid mounted frame on wheels which can easily be connected to the electrical network, air supply and carbon dioxide storage. The size and weight of the unit (2600 x 800 x 2000 mm and 1400 kg) make installation easy and flexible.

## Process

The cleaning process is based on dissolving binder components in supercritical carbon dioxide (scCO<sub>2</sub>) at elevated temperature and pressure. The CO<sub>2</sub> is initially pressurised and then heated to the desired conditions before being fed to the washing chamber. After dissolving the binders the CO<sub>2</sub> passes through a pressure release valve. The pressure of the "loaded" CO<sub>2</sub> is reduced to 50 bar and any liquid CO<sub>2</sub> is gasified in the evaporator/separator. The binder is collected in the bottom of the separator from where it is removed. An activated carbon filter is used to eliminate any liquid contaminants from circulating in the system. The gaseous CO<sub>2</sub> is then liquefied in the condenser and drops into the storage tank ready to be reused.

## Process Items

### Washing Chamber

The unit has a washing chamber with 45 L effective volume and an inner diameter of 315 mm. It is equipped with a lifting tool to make loading and unloading easy. The washing chamber has a lid with easy to operate open-close function. Other sizes of washing chambers are available on request.

### CO<sub>2</sub> Unit

The CO<sub>2</sub>-loop consists of the main equipment as per the figure to the right. The main process parameters, temperature, pressure and washing time are controlled and can be adjusted independently for any process requirements or to tune the solvating performance of the carbon dioxide.

## Instrumentation

The process is fully automated which makes operation very easy. The interface between the operator and the built-in control system consists of buttons for the main functions such as starting and stopping the washing sequence and there is a touch-screen for more detailed interaction with the control system. The progress of the washing cycle and the remaining washing time can be monitored on the screen as well. As an option the unit can be equipped with remote control and data logging.

## Installation

All parts are assembled in a compact frame, complete with all piping, instrumentation and electrical wiring. The frame is covered with plate elements and all controls and gauges are located on the front panel.

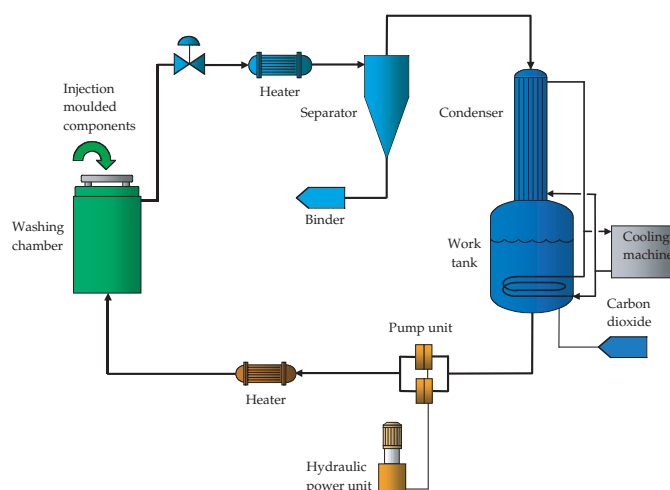
## Process Parameters

These values are indicative representing an average process. However, other values can be obtained depending on the application.

Washing chamber volume	45 litres
Max CO <sub>2</sub> flow	75 kg/h
Max pressure	400 bar
Max temperature	100 °C

### Requirements:

Average power demand	6 kW
Electrical	3 phase, 400 V
Compressed air	6-7 bar, <0.05 Nm <sup>3</sup> /h
CO <sub>2</sub> Consumption	3-7 kg/batch



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