

### The Original, Proven, High Pressure Freezing Machine for Larger Samples



Shown with optional optical workstation.

### FEATURES

- ◆ Over 100 installations world-wide with well-established user group
- ◆ More than 400 scientific publications
- ◆ Well frozen specimens up to 200µm thickness and 6mm diameter, without the use of cryoprotectants using standard type A or B 3mm and 6 mm diameter specimen carriers
- ◆ The HPM 010 provides excellent results with tissue samples and, of course, suspensions.
- ◆ Array of specimen carriers available, i.e. for suspensions (capillary tubes), tissue extracted by fine needle biopsy and carriers for monolayer cell cultures.

The HPM 010 provides sustained high pressure during the freezing cycle due to its hydraulic system (it is not pneumatic!). Sustained high pressure freezing yields good freezing quality throughout a 100 - 200 micrometer thick specimen (published).

Excellent freezing of the specimens intended for examination in the electron microscope is one of the most important prerequisites for achieving reproducible results from the various subsequent cryo preparation methods.

The freezing method should produce microcrystalline or amorphous ice from the specimen water. To achieve this, the specimens must be frozen as quickly as possible at a freezing rate no lower than 10,000 C/s.

The conventional freezing methods in use are plunge freezing, jet spray and cold

block (slamming) cryo fixation. However, due to the poor heat conductance of water, these methods can only satisfactorily freeze specimens measuring up to between 10 and 20µm.

Thicker specimens (such as tissue samples) could only be frozen in the past, if a cryoprotectant was added to lower the freezing point of the water in the specimen. The disadvantage of chemical cryoprotectants is that they often affect certain cell structures, causing different types of undesirable artifacts.

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# SPECIFICATIONS

## Dimensions and Weight

Dimensions	see diagram below
Weight, approx.	450 kg

## Working Data

Working pressure	2300 - 2600 bar
Maximum pressure	2800 bar
Duration of working pressure, at least	500 ms
Cooling time from 0C to -50C (measured between 3 mm copper disc)	10 ms

## Specimen Dimensions

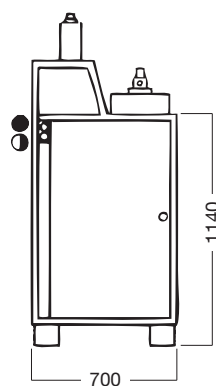
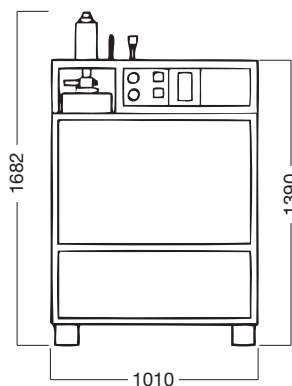
Sample size, up to max. of	200µm thickness and 6mm diameter
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## Connection Data

Voltages, frequencies	3 x 380/220 V, 50 Hz or 3 x 208 V, 60 Hz
Power input, approx.	3kVA
Compressed air (5 bar)	G 1/4" outer thread
LN <sub>2</sub> (1 bar excess pressure)	G 1/4" outer thread
Heating water (rubber hose)	Ø 7/14 mm

## Operational Data

Hydraulic oil reservoir	40 liters
Hydraulic oil bias pressure	140 - 250 bar
LN <sub>2</sub> Dewar (in system)	7 liters
LN <sub>2</sub> consumption	10 - 20 liters/hour
Initial system cooling, approx.	15 min.
Max. processing sequence, approx.	40 shots/hour
Isopropyl alcohol reservoir, approx.	0.5 liters



Measurements  
in  
Millimeters

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