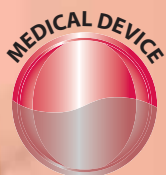




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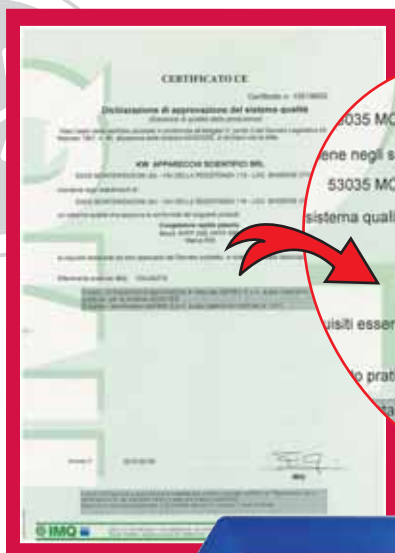
# BloodLine



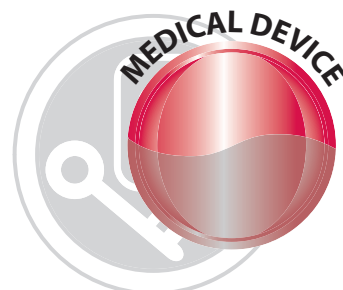


# BloodLine

## Rapid freezer for Plasma on contact



KW APPARECCHI SCIENTIFICI SRL  
53035 MONTERIGGIONI (SI) - VIA DELLA RESISTENZA  
Congelatore rapido plasma  
Mod. KPFF 24B; KPFF 48B  
Marca KW



**KPFF 24B**  
**Plasma Fast Freezing**



# Rapid freezer for Plasma on contact

**KW in addition to the -40°C liquid bath freezer, proposes an alternative solution, satisfying however the technical advices and the normative in place, on the freezing time of the plasma bags.**

**The adapted principal of thermal exchange, in this case, does not use a cold bath at -40°C, but -75 /- 80 °C surfaces, with which the bags are in direct contact.**

The plasma bags, to be frozen, are immersed, vertically, in wells in which the walls are at least -75°C -80°C. The geometry of the wells is conical, to simplify extraction and formation of the solid bag, without any impediment for the increase in volume which happens when there is a passing in state from liquid to solid

**RAPIDITY FREEZING** the bag is in contact with the surfaces of the wells and intense extraction of thermal energy is obtained in this manner, minimizing in this way the freezing time: < 45 ' for 24 (450 ml.) nominal standard bags, with a net content of plasma of at least 230 cc. and an initial temperature between + 25°C and + 30°C KW has undertaken tests with bags with a mass of 260 gr. each.

Besides, in many experiences, made in hospital laboratories, with full charged freezer, were evaluated times of 55' for 400 mL charge of plasma, 60' for 600 mL charge of plasma

These data confirm the good quality of frozen fresh plasma, with freezing quick system of KW freezer KPFF24\_48B.

Here are some freezing curves (temperature – time) with the T probes placed both on the heart of the bag and in the freezing wells.

The storage solution in vertical encounters, in fact, all the freezing advantages of the horizontal freezers, leaving the vertical placement of the plasma bags salvaged. The surface of the wells is smooth and in inox steel, without edges, and therefore permit the safe storage against accidental breaks or bumps of the bags; permits furthermore the eventual download of liquids exiting due to breakage, from the bottom, or the successive condensation to a freezing and maintenance stop, be means of outlets (one for each well), all gathered and leading to a single external tube.

**Furthermore, the solution of the horizontal freezer maintains the following advantages:**

• **TEMPERATURE UNIFORMITY** minimum alteration of the internal T during the loading phase of the plasma bags seeing as the movement is minimal from the internal cold air, that tends to remain on the bottom of the wells guaranteeing good cooling – freezing during the bag contact – well walls.

• **VERTICAL FREEZING** simplifies the bag immersion seeing as the operator does not feel the intense coldness from the wells and no air bubble inside the bags, with minimum breakage risk of the bags; the shape of frozen bag is like a tile, so the following phase of storage is easier.

• **MINIMUM MAINTENANCE** no ice formation in the area around the wells and in the retention gaskets, for minimum maintenance and an absolute guarantee of the maintenance of a constant T of -75 /- 80 °C.; no necessity of defrosting, possibility of continuous freezing..

• **MAX ERGONOMICS** an handy load height eases the operator, without the introduction of any addition to a very low T and without contact with the cold air

• **ENERGY SAVING** minimum energy consumption in addition to the thermodynamic performance, thank to the high insulation and to the horizontal positions of the -80°C wells.

• **PROCESS TRACEABILITY** It's possible to equip the freezer with an electronic recorder and a bar code reader; the user can set a work schedule for single freezing batch, determining a) the single plasma units b) the operator c) the pulling down curve of T: All data are exportable whether in paper format or in digital format , which guarantee the full traceability of the freezing batch.

• **QUALITY OF FROZEN PLASMA** the quality was evaluated through the values of concentration of fibrinogen, before and after freezing, and concentration of VIII factor post freezing. The recovery of 96% of fibrinogen and 81% of concentration of VIII factor post, are very good results

## STRUCTURE:

Internal case, made of 6 wells (in the KPFF24B model) and of 12 wells (in the KPFF48B model) in inox AISI 304 steel (AISI 316 on request) with BA polished finishing, with rounded corners for easy cleaning; the external structure is in glazed inox AISI 304 steel sheet; the insulation is in polyurethane CFC and HCFC free, expanded in situ, with density of 40 Kg./mc. and with a minimum mean width of 140 mm., including the door; the door is mounted on the hinges with ABS cover, auto balanced. Triple gasket (absolute retention guarantee against air entry) in silicon rubber with welded joints, warmed up by the refrigerant and of unlimited duration. The handle has a very ergonomic design and has a key lock. The freezer has pivoting wheels for easy transportation and internal movement in the laboratories. KW's guarantee on the steel parts of the structure is for life.

## REFRIGERATION:

The refrigerant system is completely sealed up; it uses a cascade circuit, innovative in its components and in the fluids to follow, together with, maximum reliability and maximum performance cooling; with 2 hermetic compressors (of more than 2 HP of power) silent (the Leq dB (A) value < 65; at more than 3 metres < 55), at high capacity refrigerant, having magnetic-thermal protection and of a manostat of maximum/minimum pressure on both circuits: total reliability and absence of failures 1st stage.

The condensation surface of the 1st stage (air and thermal yield superior to 5000-10000 Watt, with environment T of about + 25° C), are very ample (with exchangers in tubeless execution) to overcome the most severe environmental and work conditions (functioning guarantee of environment T ≤ +35°C); this is also for the second stage, with more exchangers, both air, and counter current, between the two fluids in bi-phase conditions.



# Rapid freezer for Plasma on contact

The expansion of the refrigerating fluids is obtained using special thermostatic valves; the evaporators made up of serpentine tube in cooper thermally connected – to the entire external peripheral surface of the freezing wells. The solution, together with the use of tanks for refrigeration, guarantees:

- a great reserve of liquid, a consecutive fast response to the cold request in the act of introducing the bags and therefore a high refrigerant capacity (very rapid freezing)

- high internal temperature uniformity.

The entire thermofluidodynamic circuit is made in order to have maximum functionality (efficiency, reliability) and of maximum ease on the maintenance operations, and furthermore for maximum safety to the environment and operators, by means of inter-stage thermostats, of HP and LP manostats, etc. etc.

The refrigerants used are not toxic, inflammable, not explosive and ecological (maximum respect for the environment) HC free, CFC free, HCFC free (ODP=0 OZONE POTENTIAL DEPLETION).

R404A in the first refrigeration stage

R508B in the second refrigeration stage

## TERMOREGULATION AND CONTROLS:

The electrical command installations enabled by a switch under key (extractable in both conditions) for maximum safety in the management of the machine; and furthermore is present a light to signal the power supply. The internal T regulation is managed by a control panel that includes:

- digital electronic control with  $\mu P$ , having led display with both T set and actual -T values, with changeable hysteresis, with ON/OFF action.

The thermal probes used are thermo resistant RTD Pt 100 Ohm, placed in the air. The user may read the process T (the actual one in the freezing wells) in the display above, with in the inferior may verify the predefined set point value.

On the side of the display mentioned, there are functional leds:

- **COOLING** indicates that the refrigerator installation is working

- **ALARM** indicates the process value is out of acceptable range of T, with respect to the set point; having to do with the min /max alarm T default T set  $\pm 10^{\circ}\text{C}$ ., this alarm is both optical and visual and may be turned off by acting on the BUZZER OFF. indicates the visual alarm (red led turned on) persists until the system does not exit from the alarm conditions.

- **TIMER** indicates that there is in act the counting of time (setted by the user) of freezing. The lab technician may read the count down (in minutes) on the lower display, while on the upper one remains the T indication of the process inside the wells.

When the cycle is finished, i.e. when the time set by the user is over, the following visual signal appears End on the lower display. And an acoustic buzzer is activated to signal the end of the cycle; it may be turned off by pressing the RUN or FUNC buttons.

## POWER FAIL

The rapid plasma freezer also has an energy acoustic alarm independent power supply (estimated battery life span of about 3 years) 12 Vdc 1.2 Ah that recharges automatically on the return of the electrical power supply, via a switching supply. the buzzer may be turnedoff, by pressing the BUZZER OFF button.

## SIGNAL REMOTING

All the alarms are integrated and connected to distance signal repeating unit, having a plug and relative socket (5A), ready for cabling according to the user (sounders and visual signalling devices in the laboratory, tele

– alarm unit, etc.).

## ACCESSORIES: (available on request)

- open door alarm

- tele – alarm device

- weekly disk recorder with battery power supply 1.5 Vdc

- Strip – chart electronic recorder with one or more traces

- **Electronic digital video-graphic recorder** for complete traceability of the activity of production of PFC: the system allows the recording of all operational phases of the procedure thanks to its barcode reader and the digital recording system. You can create a worklist for each batch of freezing, identifying:

- **The individual units of plasma**

- **The operator**

- **The reduction of the temperature curve of the inner chamber.**

All data can be exported in both paper and electronic format, ensuring traceability of the process of freezing.

- Possibility of automatic unloading of data to the end of each cycle of freezing and availability traceability of the plan of freezing on the internal network of the laboratory.

Control panel for rapid freezing for plasma

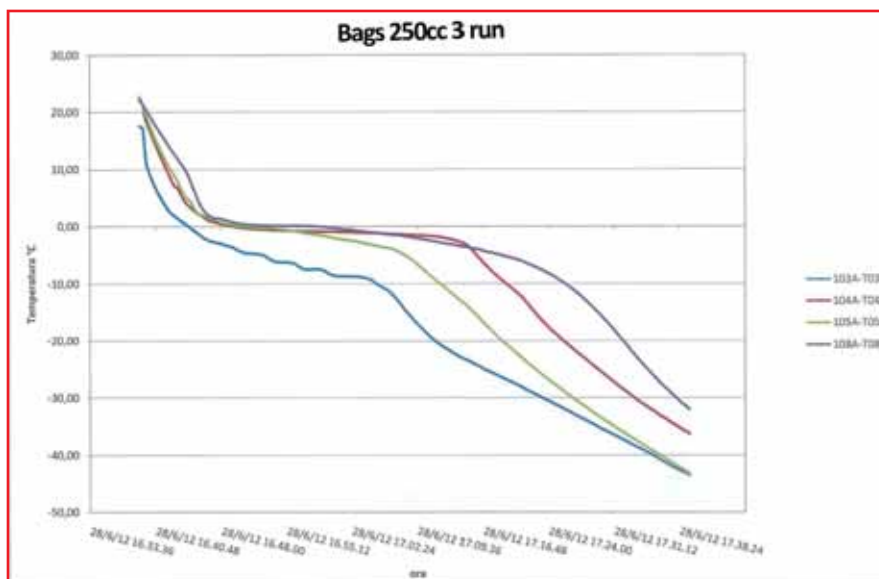


**KPFF 24B**  
**Plasma Fast Freezing**

**Internal case of the rapid freezer with standard 450 ml. bags in freezing**

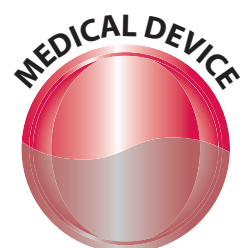
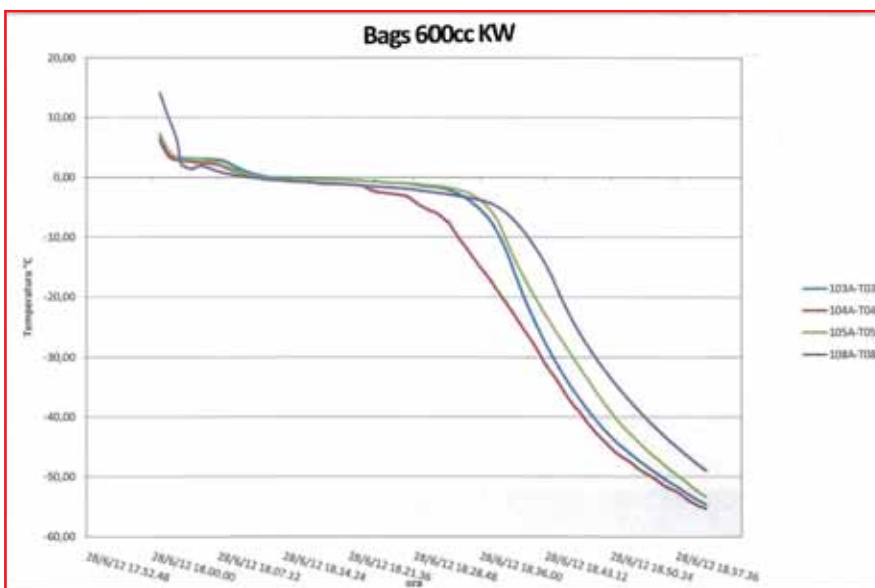


**Standard 450 ml. bags after freezing**



**1000 ml. bags  
After freezing**

**Cooling curve in the freezing wheels**



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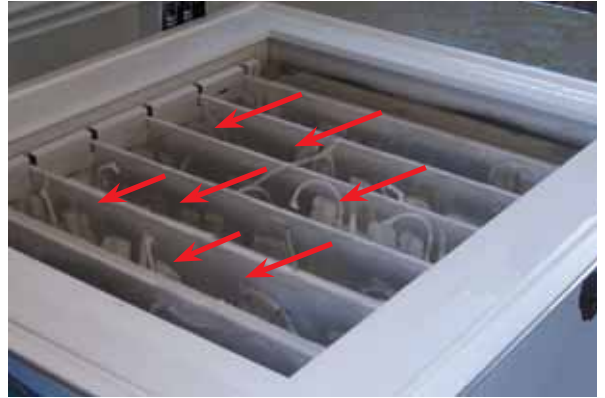




## NEW SYSTEM SEMI-AUTOMATIC STORAGE KW



Opened door, wells free for introduction and/or extraction of plasma bags



When the door is closed, the baffles automatically move, compressing plasma bags inside the wells, for the best freezing



### CONTROL PANEL

**KPFF 24B**  
**Plasma Fast Freezing**

### AUTOMATIC DATA DOWNLOADING

**Possibility of automatic data downloading to the end of each cycle** of freezing and availability/traceability of the plan of freezing on the internal laboratory network. At the same time of the refrigeration system action, time count on the digital electronic recorder is activated, without any further intervention by the operator



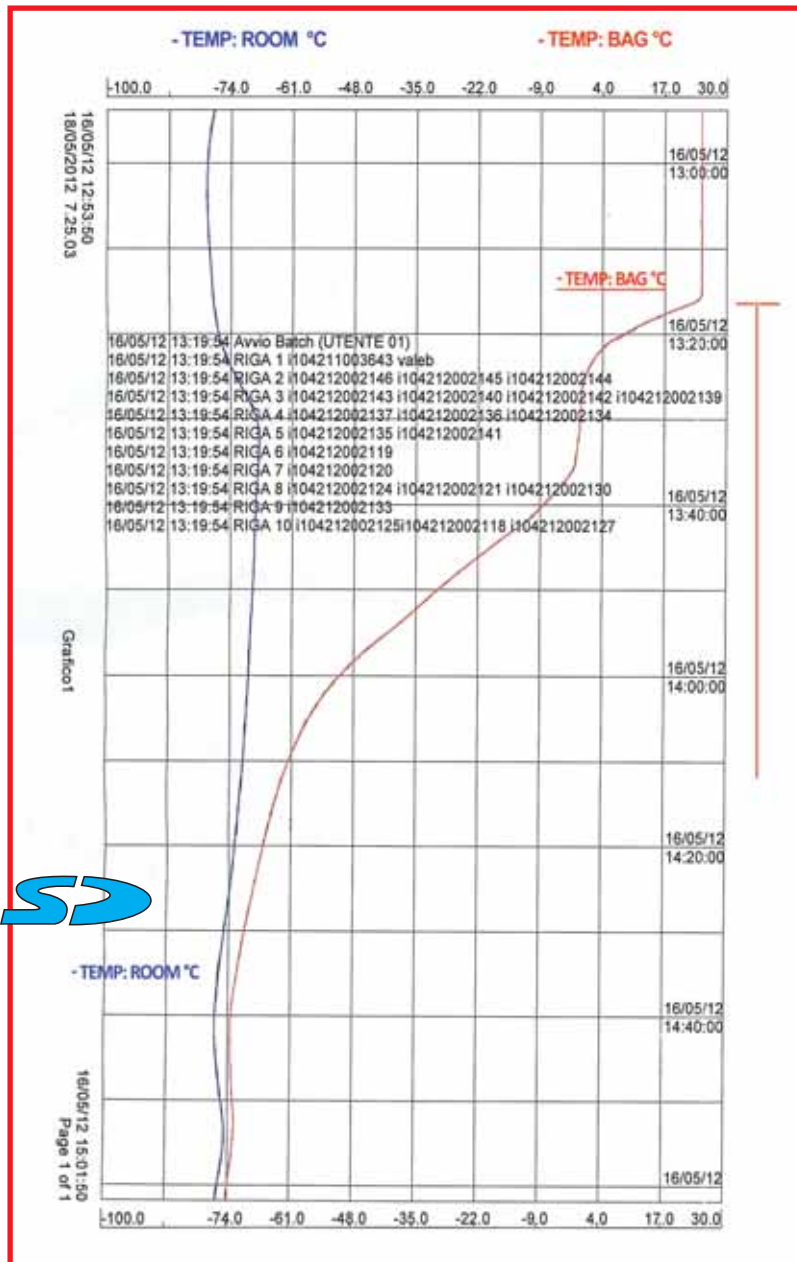
### GUARANTEED TRACEABILITY

With the recording of the procedure all operative phases, by a digital system touch screen and by a bar code reader, with many possibilities for the connection to the transfusion centre network



**KPFF 48B**

# Rapid freezer for Plasma on contact



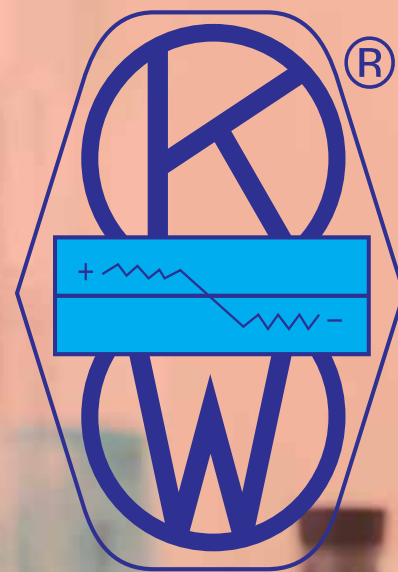
EXAMPLE OF FREEZING CYCLE DIAGRAM

## Rapid freezers for Plasma on contact

K= Kalt P= Plasma F= Fast F= Freezer 24 - 48 (number of 450 ml. standard bags or 1000 ml.) B= Bags

Model	Max external dimensions (lxwxh)	Plasma bags shelf level	Internal wells	Used refrigerants	Power supply	Weight
KPFF 24B	cm. 120x84x126 h	117 cm	n.6 (to 4 bags cad.)	R404A ed R508B	V 230/1/Hz 50 max absorption 15 A (on request, execution 400V/3/50Hz+N+T)	Kg. 250
KPFF 48B	cm. 179x84x126 h	117 cm	n.12 (to 4 bags cad.)	R404A ed R508B	V 400/3/Hz 50 +N+T max absorption 10 A	Kg. 400





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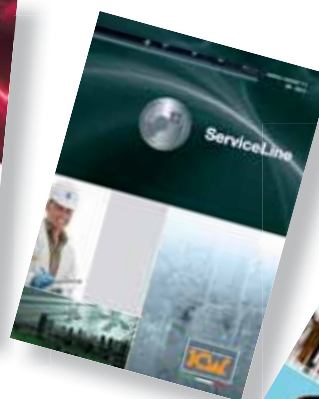
**Cold storage equipment**



**Incubation and microbiological test equipment**



**Ovens, drying and sterilizing equipment**



**Maintenance, IQ, OQ, PQ, hardware and software for equipment management**



**Medical devices for transfusion centres**

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