

CRYOGENIC MEDICAL EQUIPMENT AND LABWARE

Description

Scientific and Engineering Company "Dnipro-MTO" LTD develops and produce the following cryogenic equipment:

- low temperature refrigerators for freezing and long storage of blood and its components (in particular storage stem cells - hemopoietic cells - predecessors), donor organs and other biomaterials with a level of cooling up to -90°C ;
- cryosurgical and cryotherapeutic equipment for treatment of oncological and inflammatory diseases within the temperature span from -35 up to -165°C ;
- histological equipment for express diagnostics of inflammatory oncological diseases.

Technology based on one cascade (contour) of cooling and utilizing mixture of refrigerating agents allows us to develop cryogenic refrigerator systems with a level of cooling up to -190°C with the use of usual household (trading) refrigerating unit (compressor) and without the use of liquid nitrogen. Such approach provides for better reliability, improved efficiency and reduced cost price.

Innovative Aspect and Main Advantages

- Scientific and technical characteristics of the developed equipment correspond to the best world famous analogues. At the same time this equipment is efficient, cheaper (in 1,5-2 times) and simpler in comparison with the cryogenic equipment and apparatuses working on liquid nitrogen, nitrous oxide or others cryoagents. Cryogenic refrigerator systems on mixes of coolants of firm "Dnipro-MTO" work from electric mains, do not demand periodic updating of any cryoagents and are irreplaceable in places where delivery of the liquefied or compressed refrigerating agent is complicated or impossible.

- Economic efficiency, reliability and rather low cost in comparison with multicascade systems of cooling, traditionally used for reception of cryogenic temperatures. The presence of several cascades (contours) of cooling (3 or 4 cascades) instead of one-cascade cycle on mixes essentially complicates design that causes decrease in reliability and increase in cost.

- Ecological safety - non-polluting components are used in structure of mixes.

Areas of Application

- Medicine (surgery, therapy, diagnostics, cryopreservation);
- Mechanical engineering (climatic tests);
- The food-processing industry (storage of products).

Stage of Development

Chemical compounds of mixes of coolants, pneumatic circuits and designs of refrigerating machineries are protected by author's certificates and patents of Ukraine.

The following devices are produced:

- low temperature refrigerators with a level of cooling up to -90°C ;
- cryosurgical equipment with a level of cooling up to -150°C ;
- cryotherapeutic equipment with a level of temperatures -40°C .

During the last 5 years medical institutions are supplied with over 1000 samples of the equipment. Operation has shown

qualitative clinical results. Up to 20 % of volume of production is exported to the countries of the Western Europe, the USA and Japan.

In the stage of development (experimental and pre-production models):

- low temperature refrigerators up to -150°C ;
- cryosurgical equipment up to -175°C ;
- cryotherapeutic equipment and test chambers up to -60°C .



Fig.1. Low temperature refrigerators for freezing and storages of plasma of blood and its components (laboratory testing).



Fig.2. Microtome-cryostat for the express diagnostics of oncological diseases in interoperation conditions.



Fig.3. Cryogenic treatment of acute and chronic diseases of skin.



Fig.4. Tests of new low temperature medical equipment

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