



## **SPECIFICATION**

### **Equipment for Testing Concrete Frost Resistance**

#### **1. Scope**

- 1.1. This specification describes the requirements for equipment that provides a low-temperature environment for testing the frost resistance of concrete samples, hereinafter referred to as the 'Equipment'.
- 1.2. The scope of supply includes installation, pre-commissioning, operational training of the laboratory personnel at SSE Chornobyl NPP (hereinafter referred to as the "End User"), testing of the equipment for performance and warranty service.
- 1.3. The project is aimed at assistance to the End User to determine the frost resistance index of concrete samples during the production process of shielding containers manufacturing for radioactive waste packages.

#### **2. Relevant documents**

- 2.1. Ukrainian testing standard: DSTU (Derzhavnyi Standart Ukrayiny) B V.2.7-49-96 Methods for Testing Concrete Durability. Freeze-Thaw Resistance.

#### **3. Requirements**

##### **3.1. Functional and operational requirements**

The equipment shall meet the following functional and operational requirements:

- 3.1.1 The equipment shall be of a stationary design suitable for laboratory premises.
- 3.1.2 The equipment should be able to perform the freeze-thaw cycles in automatic mode.
- 3.1.3 The freezing cell is combined with a defrosting bath.
- 3.1.4 The equipment is equipped with a controller and an external touch panel with digital indication of the cell operating modes, graphical visualization of the cell operating modes, as well as recording and storage of these data on a computer or removable media.

##### **3.2. Technical requirements**

The equipment shall meet the following technical requirements:

- 3.2.1 The internal volume of the cell shall not be less than 150 litres.
- 3.2.2 The operating temperature range should be in the range of plus 18 °C and minus 40°C.
- 3.2.3 Able to accommodate at least 15 samples of dimensions 100mm x 100mm x 100mm.
- 3.2.4 Power supply of the installation from the AC network - 220 or 380V/50 Hz.

#### **4. Labelling**

- 4.1 The equipment should be appropriately and clearly labelled with the name of the equipment model, manufacturer, serial number or barcode.



4.2 The equipment should have all safety labelling in English.

## **5. Packaging**

5.1 The equipment delivered to the End User shall be packed in accordance with international standards applicable to air or ground transport.

5.2 All labelling on components and packaging shall be in English with clear indication of the address and contact person of the End User.

## **6. Quality requirements**

6.1 The equipment shall be manufactured and installed in accordance with the Contractor's ISO quality assurance system or equivalent quality assurance system.

6.2 The Contractor shall give documentary evidence of compliance with this quality assurance system (CIPM MRA international calibration certificate or certificate of verification/calibration of the metrological centre of Ukraine).

## **7. Testing and acceptance**

7.1 Before shipment, the equipment shall be tested for compliance with the manufacturer's specifications and the minimum requirements specified in this document.

7.2 After installation at the End User's site, the Equipment shall be tested by the Contractor in the presence of the End User to demonstrate that its performance is in accordance with the manufacturer's specifications and the minimum requirements specified in Section 3 of this specification.

7.3 The results of the equipment tests shall be documented by the Contractor in the acceptance reports signed by the End User.

## **8 Installation and training**

8.1 The Contractor shall install the equipment at the End User's site. The Contractor shall notify the End User after receipt of the Purchase Order about requirements for the installation and site preparation (if any).

8.2 Immediately after installation, the Contractor shall deliver one day training for two employees of the End User in the operation and maintenance of the Equipment at the End User's site.

## **9 Data elements for delivery**

9.1 The Contractor shall provide in both, hard copy and electronic formats, two complete sets of operating and maintenance manuals in English.

9.2 International calibration certificate CIPM MRA or certificate of verification/calibration of the metrological centre of Ukraine.