भारतीय मानक

Indian Standard

IS 18802 : 2023
ISO 22042 : 2021

व्यावसायिक उपयोग के लिए ब्लास्ट चिलर और फ्रीजर कैबिनेट — वर्गीकरण, अपेक्षाएँ और परीक्षण अवस्थाएँ

Blast Chiller and Freezer Cabinets for Professional Use — Classification, Requirements and Test Conditions

ICS 97.130.20

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

September 2023 **Price Group 7**

Refrigeration and Air Conditioning Sectional Committee, MED 03

NATIONAL FOREWORD

This Indian Standard which is identical to ISO 22042 : 2021 ‘Blast chiller and freezer cabinets for professional use — Classification, requirements and test conditions’ issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Refrigeration and Air Conditioning Sectional Committee and approval of the Mechanical Engineering Division council.

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain terminologies and conventions are, however, not identical to those used in Indian Standard. Attention is particularly drawn to the following:

a) Wherever the words ‘International Standard’ appear, referring to this standard, they should be read as ‘Indian Standard’; and
b) Comma (,) has been used as a decimal marker, while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

This document specifies the requirements for the verification of performance and energy consumption of blast cabinets for professional use in commercial kitchens, hospitals, canteens, institutional catering and similar professional areas.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded-off value should be the same as that of the specified value in this standard.

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Indian Standard

BLAST CHILLER AND FREEZER CABINETS FOR PROFESSIONAL USE — CLASSIFICATION, REQUIREMENTS AND TEST CONDITIONS

1 Scope

This document specifies the requirements for the verification of performance and energy consumption of blast cabinets for professional use in commercial kitchens, hospitals, canteens, institutional catering and similar professional areas.

The appliances covered by this document are intended to rapidly cool down hot foodstuffs up to a load capacity of 300 kg.

This document applies to:

— blast chillers;

— blast freezers;

— multi-use blast chillers/freezers.

The following appliances are not covered:

— roll-in cabinet;

— pass-through cabinet;

— cabinets with remote condensing unit;

— cabinets with water cooled condenser;

— blast chilling and freezing tunnels;

— continuous blast-chilling and blast-freezing equipment;

— bakery combined freezing and storage units.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
blast cabinet
insulated refrigerating appliance primarily intended to rapidly cool down hot foodstuff

3.1.1
blast chiller
blast cabinet intended to rapidly cool down hot foodstuff to below +10 °C

3.1.2
blast freezer
blast cabinet intended to rapidly cool down hot foodstuff to below −18 °C

Note 1 to entry: Blast freezers are also able to operate as blast chillers.

Note 2 to entry: Different full load capacity is claimed depending on the mode of operation for chilling or freezing considered.

3.2
test food
reference food used for the tests

3.3
full load capacity
weight of the test food, in kg, as declared by the manufacturer, that can be processed in the appliance for testing its performance

3.4
reference temperature cycle
cycle from which temperature in °C down to which temperature in °C test food is intended to be cooled and in how many minutes

3.5
energy consumption
ratio of total energy measured in kWh per kg of test food per reference temperature cycle, rounded to four digits after the comma

3.6
test pan
container made by solid stainless steel

3.7
M-pan
test pans equipped for temperature measurement, fitted with a temperature probe placed at the geometrical centre of the test food volume

3.8
operating conditions
conditions which exist when the cabinet, including all permanently located accessories, has been set up to the program specified by the manufacturer in order to achieve final reference temperature cycle

3.9
operational ambient temperature
ambient temperature at which the appliance has been designed to be operated

Note 1 to entry: The operational ambient temperatures are 25 °C $^{-1}_{+5}$ or 30 °C $^{-1}_{+5}$ or 40 °C $^{-1}_{+5}$.

4 Requirements

4.1 Reference temperature and time of test food

Blast chillers shall bring the test food from an initial reference temperature of +65 °C to a final temperature of +10 °C within a test time of 120 min.

Blast freezers shall bring the test food from an initial reference temperature of +65 °C to a final temperature of –18 °C within a test time of 270 min.

For blast chillers at the end of the test, the temperature of the coldest M-pan shall be higher than –1 °C.

NOTE In some countries specific hygiene requirements apply.

4.2 Test time

The test time is the time between:

— T_0, time when the average temperature of the test food in the M-pans is equal to the initial reference temperature; and

— T_f, time when the temperature of the test food in all M-pans reaches the final reference temperature.

The measured time is rounded to the next full minute.

5 Test conditions

5.1 Test room

Tests shall be carried out in a test room at a temperature in accordance with the operational ambient temperature. Temperature measurement shall be at one decimal place.

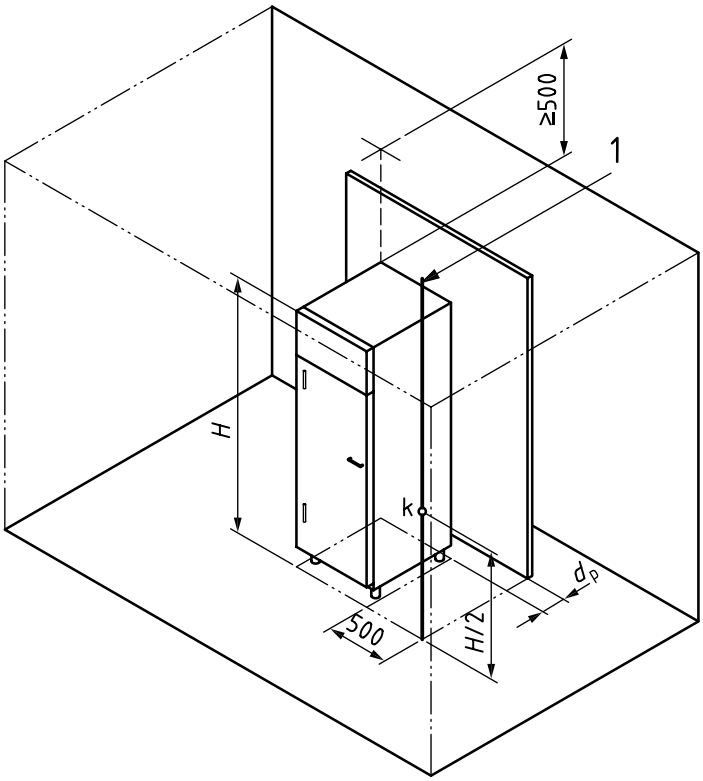
The measuring point (k) shall be located opposite to the hinges of the door of the blast cabinet, 500 mm upstream of the blast cabinet, in line with the front of the cabinet at a vertical height that is half the blast cabinet height (including cabinet feet and fixings).

No specific requirement on relative humidity is applicable.

5.2 Blast cabinet selection, installation and positioning within the test room

The blast cabinet, including all components required for normal operation, shall be assembled, set up and sited as it would be installed in service as far as practicable and in accordance with the manufacturer's instructions. All permanently located accessories required for normal use shall be in their respective places. Blast cabinets shall be placed against a wall of the test room or a vertical partition having a length of at least 1 m on the side of the test room temperature measuring point, 0,5 m on the opposite side and an height of at least 0,5 m more than the cabinet under testing at a distance from the rear as specified in the instructions for use (see Figure 1).

Dimensions in millimetres



Key

1 climate measuring line

H overall height of the cabinet including feet

k climate measuring point detecting temperature

d_p clearance between rear wall of test room and vertical position specified by the manufacturer (if used)

Figure 1 — Test room temperature measuring point and positioning of the cabinet

5.3 Blast cabinet operation

The blast cabinet shall be operated at normal operating conditions.

5.4 Power supply

The blast cabinet shall be supplied at the voltage and frequency marked on the rating plate. In case a range of voltage or frequency are indicated, the cabinet is supplied at the conditions giving the highest energy consumption. The tolerance on power supply shall be ±2 % for voltage and ±1 % for frequency, in relation to the nominal values given on the marking plate or otherwise stated.

5.5 Instruments, measuring equipment and measuring accuracy

All measurements shall be carried out with instruments that are subjected to a due calibration program.

The following measurement accuracies shall be met:

— temperature shall be measured to an accuracy of ±0,8 °C;

— total energy shall be measured to an accuracy of ±2 %;

— weight shall be measured to an accuracy of ±2 g;

— time interval measurements shall be made to an accuracy of at least 1 %;

— time measurements shall be made to an accuracy of at least ±1 s;

— dimensions shall be measured to an accuracy of ±2 mm.

5.6 Test load

5.6.1 Test food

The test food shall be reconstituted mashed potatoes. Composition for a kg of reconstituted mashed potatoes shall be:

— 115 g of instant mashed potatoes (flakes);

— 877 g of water;

— 8 g of common salt.

The test food shall be prepared in the following way:

— heat the water and the salt in a cooking pan covered with a lid (to minimize water evaporation) to a temperature between 75 °C and 80 °C;

— when the above temperature is reached, pour the flakes into the water and mix vigorously with a whisk to an even consistency, leave to rise 2 min to 3 min in the cooking pan covered with a lid;

— place the mashed potatoes into the test pans in layers of uniform thickness.

It is recommended to prepare a quantity of test food exceeding the needed quantity by approximately 20 %.

The test food shall only be used once.

5.6.2 Test pan loading

The test pans, having the maximum surface that can be allowed by the shelf and with a height of 40 mm, shall be loaded by test food load evenly distributed up to a height of 35 mm.

In case a blast cabinet cannot fit the test pans, a pan made by a rectangular stainless-steel container with the height of 40 mm shall be loaded with test food load evenly distributed up to a height of 35 mm.

In case of blast cabinets loaded with only 1 test pan and in case reference temperature and time of test food specified in 4.1 with an amount of food corresponding to one test pan as in Nomenclature 1/1 in Table 1 cannot be reached, a rectangular stainless steel container with the height of 40 mm shall be loaded with test food load evenly distributed up to a height of 35 mm.

Table 1 — Nomenclature and nominal dimensions of test pans

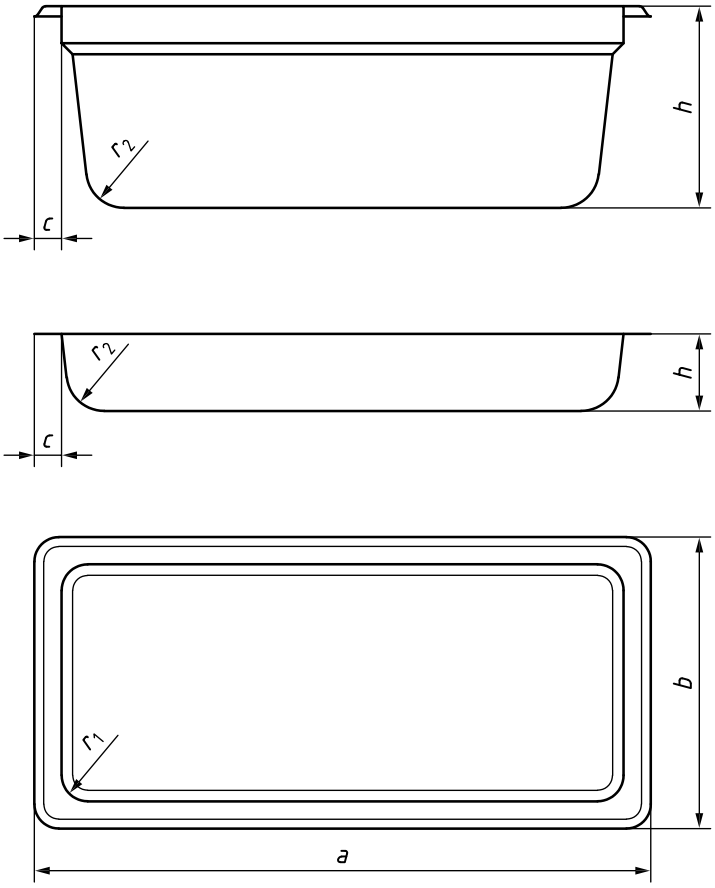
Dimensions in millimetres

Nomenclature	Dimension[a]												
	a	*b*	*h*[b]						*c*[c]	r_1		r_2	
										min.	max.	min.	max.
2/1	650	530	20	40	65	100	150	200	13	30	80	3	40
1/1	530	325	20	40	65	100	150	200	13	30	80	3	40
1/2	325	265	20	40	65	100	150	200	13	30	80	3	40
2/3	354	325	20		65	100	150	200	13	30	80	3	40
1/3	325	176	20		65	100	150	200	13	30	60	3	20
1/6	176	162			65	100	150	200	13	30	50	3	20
1/9	176	108			65	100			13	30	50	3	20
1/4	265	162	20		65	100	150	200	13	30	50	3	20
2/8	325	132			65	100	150		13	30	50	3	20
2/4	530	162		40	65	100	150		13	30	50	3	20

[a] See Figure 2.

[b] Commonly available height.

[c] This dimension may be larger to allow for drop-down handles or other features. Where such features are incorporated the *c* dimension shall be measured to the feature.



Key

a length
b width
c length, including retractable handles or other accessories
h depth
r_1 external radius
r_2 internal radius

Figure 2 — Basic module, derived dimensions and nomenclature

No lids shall be placed on the containers.

The thickness of the test pan shall be 0,8 mm ± 0,05 mm, measured at the centre of the bottom of the test pan.

For the correct performance of the tests the following information shall be provided by the manufacturer or the person applying for the tests:

— position of the pan on the support,

— in case no test pans are used, description and dimensions of the pan made by a rectangular stainless-steel container.

5.6.3 M-pans

The probe supports shall be fixed, made of non-thermal conductive and non-deformable material.

5.6.4 Blast cabinet loading

Blast cabinets shall be filled with the number of test pans corresponding to the full load capacity. Each loaded level shall be filled with the maximum number of test pans.

In appliances which contain less than 10 test pans, all test pans shall be M-pans.

In case of supports that can receive test pans as in nomenclature 2/1 in Table 1, two test pans as in Nomenclature 1/1 in Table 1 shall be used if this is possible by the construction of the blast cabinet.

Each level shall include at least one M-pan placed alternatively at the front and at the back starting from the upper at the front.

During the loading process, the temperature inside the appliance shall be in equilibrium with the test room temperature (no pre-cooling).

The top-level test pan support and the bottom level test pan support shall be loaded with test pans. In case the manufacturer has foreseen specific vertical loading configuration for these pans and for a given product, the instruction for use shall specify in detail the loading scheme to be used for the test.

The remaining test pans supports shall be evenly distributed and loaded with test pans. In case of uneven distribution, the remaining test pans are placed on the first available level close to the top.

In case of one level, test pan shall be loaded, and it shall be placed so that the centre of the test food is as much as possible close to the vertical centre of the blast cabinet.

In case the test pan can slide on the support, it is placed in accordance with manufacturer's instruction. If not, it is placed at the geometrical centre of the support.

The door of the appliance shall be left open ujntil to the start of the test.

The weight of the test food for each test pan shall be measured.

The appliance shall be loaded as quickly as possible.

The test food temperature in all the pans forming the full load shall be between +65 °C and +80 °C.

Immediately after the loading of the last test pan the door is closed, the appliance is switched-on at normal operating conditions and the test is started. The door shall be kept closed for the full duration of the test.

5.7 Temperature recording

The test room temperature and the M-pan temperatures shall be recorded at a rate of a measurement of at least every 5 min.

To define T_0 at the beginning of the test and T_f at the end of the test, temperatures shall be recorded at least every 30 s.

6 Test procedure for total energy measurement

Measure the total energy according to the procedure defined in 4.1 with all fitted electrical power using components switched on. The total energy is expressed in kWh, given to two decimal places.

Measurement shall be made at least every 10 s and the relevant average or integrated values shall be recorded every 30 s.

For blast freezers two tests shall be conducted with the respective full load capacity, one for the blast chilling cycle and one for the blast freezing cycle and two values of total energy shall be measured, one for the blast chiller function and one for the blast freezer function.

The appliance under test, with the door opened, shall be placed in the test room at least 12 h before the test starting.

The sum of the loads used on each pan for the chilling cycle is the full load capacity to be considered for the calculation of the energy consumption during the chilling function.

The sum of the loads used on each pan for the freezing cycle is the full load capacity to be considered for the calculation of the energy consumption during the freezing function.

7 Information to be declared

An example of template reporting the information to be declared is given in Table 2.

Table 2 — Template for information to be declared

Model(s): [information identifying the model(s) to which the information relates]			
Type of product	Blast chiller / Blast freezer		
Refrigerant fluid(s): [information to identify the refrigerant fluid(s), including GWP]			
Indication of the program used for blast chilling			
Indication of the program used for blast freezing			
Item	Symbol	Value	Unit
Energy consumption for chilling function	*E*	x,xxxx	kWh /kg
Chilled full load capacity		x,xx	kg
Energy consumption for freezing function	*E*	x,xxxx	kWh /kg
Frozen full load capacity		x,xx	kg
Refrigerant charge		x,xx	kg
Operational ambient temperature		x	°C
Blast chilling cycle from +65 °C to +10 °C	*t*	x	min
Blast freezing cycle from +65 °C to –18 °C	*t*	x	min
Contact details	Name and address of the manufacturer or its authorized representative.		

Bibliography

[1] EN 631-1, *Materials and articles in contact with foodstuffs — Catering containers — Part 1: Dimensions of containers*

Bureau of Indian Standards

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Review of Indian Standards

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This Indian Standard has been developed from Doc No.: MED 03 (22551).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093	2821 8093

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Published by BIS, New Delhi