Doc: MTD 26 (26884) WC
November 2024

भारतीय मानक ब्यूरो

DRAFT FOR WIDE CIRCULATION

भारतीय मानक मसौदा

औद्योगिक भट्टियाँ और सम्बन्ध प्रसंस्करण उपकरण — सुरक्षा

भाग 2 दहन और ईंधन प्रबंधन प्रणाली

(*आईएस 17984 (भाग - 2) का पहला पुनरीक्षण*)

Draft Indian Standard

Industrial furnaces and associated processing equipment — Safety

Part 2 Combustion and fuel handling systems

(*First Revision of IS 17984 (Part 2)*)

ICS 13.100; 25.180.01

Industrial Fuel-Fired Furnaces Sectional Committee, MTD 26

Last date for receipt of comments is **25th December 2024**

NATIONAL FOREWORD

(*formal clause will be added later*)

Other parts in this series are:

Part 1 General Requirement
Part 3 Generation and use of protective and reactive atmosphere gases
Part 4 Protective systems

This standard was originally published in 2024. The first revision of this standard has been undertaken to align it with the latest version of ISO 13577-2 : 2023 under dual numbering system to harmonize it with the latest developments that have taken place at international level.

The changes compared to the previous edition are as follows:

i) revised document structure with requirements consolidated for the different fuels;
ii) improvement and specification of the requirements for testing the fuel pipework after construction;
iii) addition of requirements for gas pressure boosting systems;
iv) integration of selected requirements from the regional annexes into the global standard text;

v) requirements for solid fuels removed;
vi) additional informative annex listing relevant product standards for components in the different regions.

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 with those used in Indian Standard. Attention is especially drawn to the following:

a) Wherever the words `International Standard' appear referring to this standard, it should be read as `Indian Standard'.

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.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exists. The corresponding Indian Standards which are to be substituted in their place are listed below along with their degree of equivalence for the edition indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 7-1 : 1994 Pipe threads where pressure-tight joints are made on the threads — Part 1: Dimensions, tolerances and designation	IS 554 : 1999/ISO 7-1 : 1994 Pipe threads where pressure — Tight joints are made on the threads — Dimensions, tolerances and designation (*fourth revision*)	Identical
ISO 228-1 : 2000 Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation	IS 2643 : 2005/ISO 228-1 : 2000 Pipe threads where pressure — tight joints are not made on the threads — Dimensions, tolerances and designation (*third revision*)	Identical
ISO 12100 : 2010 Safety of machinery general principles for design risk assessment and risk reduction	IS 16819 : 2018/ISO 12100 : 2010 Safety of machinery — General principles for design — Risk assessment and risk reduction	Identical
ISO 13574 : 2015 Industrial furnaces and associated processing equipment — Vocabulary	IS 8849 : 2024/ISO 13574 : 2015 Industrial furnaces and associated processing equipment — Vocabulary (*second revision*)	Identical
ISO 13577-1 : 2016 Industrial furnaces and associated processing equipment — Safety — Part 1: General requirements	IS 17984 (Part 1) 2024/ ISO 13577-1 : 2016 Industrial furnaces and associated processing equipment — Safety — Part 1: General requirements	Identical
ISO 13577-4 : 2022 Industrial furnace and associated processing equipment — Safety — Part 4: Protective systems	Doc No. : MTD/26/19270 Industrial furnace and associated processing equipment — Safety — Part 4: Protective systems	Identical

ISO 16852 : 2016 Flame arresters — Performance requirements, test methods and limits for use	IS 16485 : 2020/ISO 16852 : 2016 Flame Arresters — Performance Requirements, Test Methods and Limits for Use (*first revision*)	Identical
IEC 60204-1 : 2016 Safety of machinery — Electrical equipment of machines — Part 1: General requirements	IS 16504 (Part 1) : 2019/ IEC 60204-1 : 2016 Safety of machinery — Electrical equipment of machines: Part 1 General requirements (*first revision*)	Identical

The technical committee responsible for the preparation of this standard has reviewed the provisions of following International Standards referred in these adopted standards and decided their acceptability for use in conjunction with this standard.

International Standard	*Title*
ISO 49 : 1994	Malleable cast iron fittings threaded to ISO 7-1
ISO 5817 : 2023	Welding — Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) — Quality levels for imperfections
ISO 7005-1 : 2011	Pipe flanges — Part 1: Steel flanges for industrial and general service piping systems
ISO 7005-2 : 1988	Metallic flanges — Part 2: Cast iron flange
ISO 8434-1 : 2018	Metallic tube connections for fluid power and general use — Part 1: 24° Cone connectors
ISO 8434-2 : 2007	Metallic tube connections for fluid power and general use — Part 2: 37 Degree flared connectors
ISO 8434-3 : 2005	Metallic tube connections for fluid power and general use — Part 3: O-ring face seal connectors
ISO 19879 : 2021	Metallic tube connections for fluid power and general use — Test methods for hydraulic fluid power connections
ISO 23550 : 2018	Safety and control devices for gas and/or oil burners and appliances — General requirements
ISO 23551-1 : 2012	Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 1: Automatic and semi-automatic valves
ISO 23551-2 : 2018	Safety and control devices for gas burners and gas-burning appliances Particular requirements — Part 2: Pressure regulators
ISO 23551-5:2023	Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 5: Manual gas valves
ISO 23551-6:2021	Safety and control devices for gas burners and gas-burning appliances — Particular requirements — Part 6: Thermoelectric flame supervision controls
ISO 23552-1 : +AMD 1:2010	Safety and control devices for gas and/or oil burners and gas and/or oil appliances — Particular requirements — Part 1: Fuel/air ratio controls, electronic type
ISO 23553-1 : 2022	Safety and control devices for oil burners and oil-burning appliances — Particular requirements — Part 1: Automatic and semi-automatic valves
ISO 23555-2:2022	Gas pressure safety and control devices for use in gas transmission, distribution and installations for inlet pressures up to and including 10 MPa — Part 2: Gas pressure regulator

IEC 60730-2-5 : 2013+A1:2017	Automatic electrical controls — Part 2-5: Particular requirements for automatic electrical burner control systems
IEC 60730-2-6 : 2015 +A1:2019, CSV	Automatic electrical controls — Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements
ASME B1.20.1-2013	Pipe Threads, General Purpose, Inch
CAN/CSA-C22.2 No.199-M89:2004	Combustion Safety Controls and Solid-State Igniters for Gas- and Oil-Burning Equipment
CAN/CSA-C22.2 No.60730-2-4-14: 2019	Automatic electrical controls for household and similar use - Part 2-5: Particular requirements for automatic electrical burner control systems
CSA/ANSI Z21.18-2019/CSA 6.3-2019	Gas appliance pressure regulators
CSA/ANSI Z21.21-19/CSA 6.5-2019	Automatic valves for gas appliances
EN 88-1:2016	Pressure regulators and associated safety devices for gas appliances — Part 1: Pressure regulators for inlet pressures up to and including 50 kPa
EN 88-2:2015	Safety and control devices for gas burners and gas burning appliances — Part 2: Pressure regulators for inlet pressure above 50 kPa up to and including 500 kPa and associated safety devices
EN 88-2:2020	Pressure regulators and associated safety devices for gas appliances — Part 2: Pressure regulators for inlet pressures above 500 mbar up to and including 5 bar
EN 88-3:2017	Safety and control devices for gas burners and gas burning appliances — Part 3: Pressure and/or flow rate regulators for inlet pressures up to and including 500 kPa, electronic types
EN 125:2010+A1:2015	Flame supervision devices for gas burning appliances — Thermoelectric flame supervision devices
EN 161:2013	Automatic shut-off valves for gas burners and gas appliances
EN 298:2012	Automatic burner control systems for burners and appliances burning gaseous or liquid fuels
EN 331:2015	Manual operated ball valves and closed bottom taper plug valves for gas installations for buildings
EN 334:2019	Gas pressure regulators for inlet pressure up to 100 bar
EN 1854:2010	Pressure sensing devices for gas burners and gas burning appliances
EN 12067-2:2004	Safety and control devices for burners and appliances burning gaseous or liquid fuels — Control functions in electronic systems — Part 2: Fuel/air ratio control/supervision of the electronic type
EN 14382:2019	Gas safety shut-off devices for inlet pressure up to 10 MPa (100 bar)
EN 13774:2013	Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar - Performance requirements
EN 16678:2016	Safety and control devices for gas burners and gas burning appliances — Automatic shut-off valves for operating pressure of above 500 kPa up to and including 6,300 kPa
EN 60730-2-5:2015+A1:2019	Automatic electrical controls for household and similar use — Part 2-5: Particular requirements for automatic electrical burner control systems

EN 60730-2-6:2016+A1:2020	Standard for automatic electrical controls — Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements
JIS C 9730-2-5:2010	Automatic electrical controls for household and similar use — Part 2-5: Particular requirements for automatic electrical burner control systems
UL 372:2012	Automatic electrical controls for household and similar use — Part 2: Particular requirements for Burner Ignition Systems and Components, 6th Edition
UL 429:2013	Standard for Electrically Operated Valves, 7th Edition
UL 60730-2-5:2014	Automatic electrical controls for household and similar use — Part 2-5: Particular requirements for automatic electrical burner control systems
UL 60730-2-6:2016	Standard for automatic electrical controls – Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements

In reporting the results of a test or analysis made in accordance with this standard, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical-values (*second revision*)'.

The scope of the standard is as follows:

SCOPE

This document specifies the safety requirements for combustion and fuel handling systems that are part of industrial furnaces and associated processing equipment (TPE), including single and multiple burner systems in thermoprocessing equipment and machines.

NOTE The general safety requirements common to TPE are provided in ISO 13577-1:2016. ISO 13577-1:2016, Annex B also includes a list of processes for which industrial furnaces and heating systems covered by the ISO 13577 series are used.

This document deals with significant hazards, hazardous situations and events relevant to combustion and fuel handling systems as listed in Annex A, when used as intended and under the conditions for use as described in the instruction handbook.

This document covers:

— fuel pipework downstream of and including the manual isolating valve;

— combustion air supply (including oxygen and oxygen enriched combustion air) and flue gas system;

— burner(s), burner system and ignition device;

— functional requirements for safety related control system.

This document applies to any oxidation of gaseous and liquid fuels with air or other gases containing free oxygen to release thermal energy in TPE. Annex B includes examples of gaseous and liquid fuels.

For thermal or catalytic post combustion and waste incineration, this document applies only to auxiliary burners designed to start-up and/or support the process.

The pressure hazard of the piping and components covered by this document is within the maximum pressure/size relationship of category I as specified in Annex C.

This document also gives the necessary requirements regarding information for use.

This document does not cover hazards from heating generated by electricity.

This document does not deal with the hazards created by the release of flammable substances from the products processed in the TPE.

This document is not applicable to combustion and fuel handling systems:

— of gas welding and allied processes;

— up-stream of the TPE manual isolating valve.

This document is not applicable to industrial furnaces and associated processing equipment (TPE), including single and multiple burner systems in thermoprocessing equipment and machines manufactured before the date of its publication.

This document is not applicable to blast furnaces, converters (in steel plants), boilers, fired heaters (including reformer furnaces) in the petrochemical and chemical industries.

This document is not applicable to electrical cabling and power cabling upstream of the TPE control panel/protective system.

The complete document/text of ISO 13577-2 : 2023 'Industrial furnaces and associated processing equipment — Safety — Part 2: Combustion and fuel handling systems' may be made available, on request to:

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