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**Foundry machinery — Vocabulary —
Part 1:
General**

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Contents

| | Page |
|-------------------------------|------|
| Foreword | iv |
| Introduction | v |
| 1 Scope | 1 |
| 2 Normative reference | 1 |
| 3 Terms and definitions | 1 |
| Bibliography | 23 |
| Alphabetical index | 24 |

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 306, *Foundry machinery*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Documentation gives rise to numerous international exchanges of both intellectual and material nature. These exchanges often become difficult, either because of the great variety of terms used in various fields or languages to express the same concept, or because of the absence of, or the imprecision of, useful concepts.

To avoid misunderstandings due to this situation and to facilitate such exchanges, it is advisable to select terms to be used in various languages or in various countries to express the same concept, and to establish definitions providing satisfactory equivalents for the various terms in different languages.

The objects involved in the ISO 23472 series are foundry machines used in foundry production.

The purpose of the ISO 23472 series is to provide definitions in English that are rigorous, uncomplicated and which can be understood by all concerned. The scope of each concept defined has been chosen to provide a definition that is suitable for general application within foundry machinery, which includes machines and equipment adapted in each stage of the processes within different casting processes.

As a metal thermoforming method that fills molten metal into the mold to produce machine parts or rough parts after solidification, casting has a long history and various processes, and its technology remains constantly developing and changing. According to the differences of the molds used, or different ways of molten metal filling or solidification, casting processes are usually divided into sand casting, permanent casting and other casting processes. According to different casting processes and different stages of production, casting equipment covered by foundry machinery is divided into the following major categories:

- molding and coremaking machines and other equipment related to non-permanent mold casting process;
- die casting machines and other equipment related to permanent mold casting process;
- abrasive blasting machines and other equipment related to cleaning and finishing for casting;
- cupola furnaces and pouring devices and ladles.

This document only involves general terms and definitions of foundry machinery, including basic concepts concerning foundry machinery and related casting methods and production processes. The detailed terms of the specific categories are defined in other parts of the ISO 23472 series (see [Figure 1](#)).

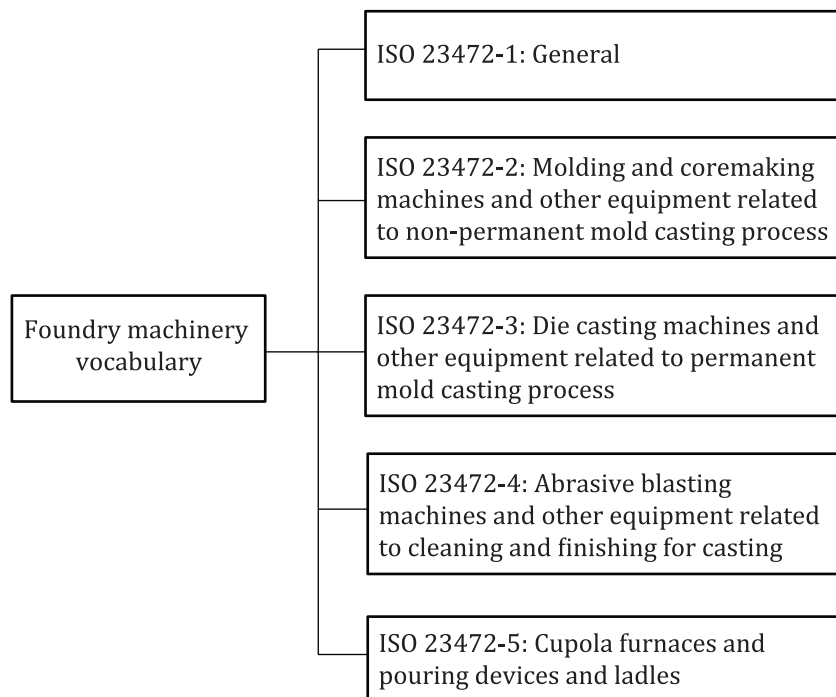


Figure 1 — Structure of foundry machinery vocabulary

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Foundry machinery — Vocabulary —

Part 1: General

1 Scope

This document gives an overview on the terms and definitions of foundry machinery that are commonly and widely used.

It applies to standard development in the foundry machinery field, technical documentation, related scientific and technical publications, etc.

2 Normative reference

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:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

abrasive blasting

shot blasting

process in which the workpiece to be cleaned or surface to be treated is subjected to continuous attack by *abrasive media* (3.3) to achieve a desired result

3.2

abrasive blasting machinery

shot blasting machinery

machine used for *shot blasting* (3.1) process by either centrifugal force or compressed air to accelerate *abrasive media* (3.3)

3.3

abrasive media

shot blasting media

granular metallic or non-metallic material to be forcibly applied to a surface to achieve a desired result

Note 1 to entry: For the classification of metallic abrasives, see ISO 11124-1. For the classification of non-metallic abrasives, see ISO 11126-1.

3.4

adding and compacting sand device

device for sand adding and compacting by vibration in molding process in *expendable pattern casting* (3.58), for example, shower adding sand machine and *vibrating table* (3.176)

3.5
automatic mode

full-automatic mode

operating mode where the completion of a casting cycle initiates the next casting cycle

EXAMPLE To continuously produce *castings* (3.11) with any external process steps being automatically carried out by ancillary device.

3.6
batch sand mixer
batch sand mill

machine for batch mixing (blending, coating, kneading) of molding or core sand with bonding agents, water and complementary mold material additions

Note 1 to entry: The machines are provided with rotating paddles and/or milling rollers and fast rotating paddles for the aeration of the material. Typically, machines consist of a circular container in which rotating ploughs and/or mill wheels (mullers) are mounted.

3.7
binder
bonding substance

material with bonding property, mainly used to prepare molding (core) sand, coating and core adhesive in foundry production

Note 1 to entry: Foundry binders are usually divided into two categories: inorganic and organic binders, or clay binders and non-clay binders.

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3.8
burdening

<melting> process in which the proportion of various metallic charge is determined according to the requirement of the chemical composition of *casting alloy* (3.10), the actual situation of burden and the changing law of elements in *melting* (3.98)

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3.9
burdening

<molding> process in which the mixing proportion of various *molding materials* (3.108) is determined according to the requirement of *molding sand* (3.111) properties in *molding sand preparation* (3.112)

3.10
cast metal
cast alloy

metal with proper castability which is used to produce *castings* (3.11), including cast iron, cast steel and non-ferrous cast alloys (such as cast aluminium alloy, magnesium alloy, copper alloy, zinc alloy and titanium alloy)

3.11
casting

<products> metal part or rough part that has been given its shape in a *mold* (3.101) by *solidification* (3.160) of *molten metal* (3.95)

3.12
casting

<technology> process in which *molten metal* (3.95) is poured, injected or suctioned into the mold cavity and solidified to obtain metal parts or rough parts with certain shapes, sizes and properties

3.13
casting cooling

process in which the temperature of a *casting* (3.11) drops gradually after it is formed

Note 1 to entry: It includes the cooling of the casting in the *mold* (3.101), as well as the secondary cooling of the casting after removal from the mold.

3.14 casting cooling and transferring system

system used for recooling of *casting* (3.11) after demolding

Note 1 to entry: It uses *continuous conveyor* (3.23), such as vibrating conveyor or overhead chain conveyor, and can be equipped with ventilating and spray cooling system.

3.15 centrifugal casting

process in which *molten metal* (3.95) is filled into a *mold* (3.101) that rotates around a horizontal or vertical axis and solidifies under the action of centrifugal force to produce *castings* (3.11)

Note 1 to entry: The molten metal is evenly distributed to the surface of the mold cavity under the centrifugal force produced by the rotation of the mold, forming cylindrical cylinder sleeve, pipe and other ringlike castings.

3.16 centrifugal casting machine

machine that uses *centrifugal casting* (3.15) process to produce *castings* (3.11), such as horizontal centrifugal casting machine and centrifugal casting-pipe machine

3.17 ceramic mold casting

process in which the ceramic mold is used to pour *castings* (3.11)

Note 1 to entry: Ceramic mold casting is a kind of *precision casting* (3.127) method, which is mainly used for single piece and small batch manufacturing of metal molds, as well as turbine blades, impellers and other precision castings.

Note 2 to entry: Ceramic mold is made by casting ceramic slurry, then spraying and firing, and then ceramic solid mold or thin shell mold is made.

3.18 clay bonded sand

molding sand (3.111) that uses clay as binder and is made of foundry sand, clay, water and additives (such as seacoal, etc.) mixed in a certain proportion

Note 1 to entry: Clay is a commonly used binder in sand mold casting production, which can be divided into kaolin or bentonite.

Note 2 to entry: Clay bonded sand can be divided into wet sand and dry sand according to different conditions of use, in which wet sand is also called *green sand* (3.79).

3.19 cleaning

process of removing contaminant and unwanted material (for example, *sand core* (3.140) and residual sand on the surface from casting, gate and riser, flash, burr, oxide scale, etc.) from *casting* (3.11)

3.20 compacting

process of compacting loose *molding sand* (3.111) by jolting, squeezing, shooting, air flowing and other ways during the molding process to obtain the strength required for *sand mold* (3.146)

3.21 continuous casting

process of continuously casting metal ingots, pipes or fixed section long *castings* (3.11)

Note 1 to entry: Process in which *molten metal* (3.95) is poured into a cooled mold open on both sides via tundish. The shaping element of the strand is the *mold* (3.101). On the short way through the mold, so much heat is extracted from the molten metal that it solidifies completely or with the formation of a load-bearing edge shell. The strand is pulled out of the mold on the opposite side with the aid of a drawing device. In this way, different strand formats with a constant cross-section can be produced.

3.22

continuous casting machine

machine that uses *continuous casting* (3.21) process to produce *castings* (3.11)

3.23

continuous conveyor

machine and device used for long distance continuous conveying of loose material (such as *sand* (3.69)) or items (such as *castings* (3.11)) in foundry shop

Note 1 to entry: The types of machines include belt conveyor, pan conveyor, vibrating conveyor, overhead chain conveyor, etc., excluding pneumatic conveyor for conveying clay, dry sand, seacoal and other powder materials.

3.24

continuous sand mixer

machine in which the sand with bonding agents are continuously mixed and conveyed to the discharge gate

Note 1 to entry: Typically, the mixing takes place by screw-type mixing principles.

3.25

core

component of a mold used to form the inner cavity within a *casting* (3.11), a protruding part on the side or a deep groove in case of pronounced undercuts and/or negative (back) drafts

Note 1 to entry: According to different uses or requirements, there are *sand core* (3.140), metal core, soluble core, ceramic core and so on.

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3.26

core assembly molding

molding process in which the *core box* (3.28) is used instead of the *pattern* (3.117) and the produced *sand cores* (3.140) are assembled directly into the *mold* (3.101)

Note 1 to entry: It is mainly used for batch production of complex *castings* (3.11) or repeated production of large castings.

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3.27

core blower

machine where the sand is transported by means of compressed air into the *core box* (3.28)

Note 1 to entry: The sand is conveyed along in front of the compressed air. Typically used for resin-coated dry sand.

3.28

core box

mold for sand core making, whose inner cavity has the shape and size required for the *sand core* (3.140)

Note 1 to entry: It is usually made of metal, wood or plastic.

Note 2 to entry: It can be divided into integral type and bisection type according to its structure and can be divided into hot core box and cold core box according to its use temperature.

3.29

**core sand
coremaking mixture**

mixture of raw sand, various binders and additives mixed in a certain proportion, which meets a certain property requirement of making *sand core* (3.140)

3.30

core shooter

machine where compressed air is rapidly expanded via the sand reservoir into the sand

Note 1 to entry: After expanding, the sand is then fluidized by the airstream and the sand-air-mix is transported into the core box. Typically used for cold box, hot box and inorganic binder systems.

3.31**core storehouse and conveying system**

system used for automatic conveying, storing and distributing of *sand core* (3.140), for example, core three-dimensional storehouse

3.32**coremaking**

process in sand casting process that uses *core sand* (3.29), *core box* (3.28) and other toolings to make sand core, including hand coremaking and machine coremaking

3.33**coremaking line**

equipment used to make ready-to-use single cores and/or core assemblies

Note 1 to entry: A line may consist of, e.g., a sand preparation equipment, core making machine, equipment for handling, deflashing, assembling, coating and drying of cores.

3.34**coremaking machinery**

machines used to make solid and/or hollow cores

3.35**counter pressure casting****differential pressure casting**

pressure casting process in which *molten metal* (3.95) is filled up the *mold* (3.101) and solidified under counter pressure of compressed air

Note 1 to entry: The actual casting process is carried out in a similar way to *low pressure casting* (3.89), also with the help of a riser tube. The *cast metal* (3.10) is conveyed up into the *die* (3.45) by the riser tube. However, the pressurization of the metal bath in the furnace in order to convey the melt up into the die is caused by a pressure difference up by lowering the gas pressure in the pressurized die a little. This causes an overpressure in the furnace which causes the metal to rise into the die.

Note 2 to entry: Its working pressure levels are usually higher than ones in low pressure casting.

3.36**crystallizer**

special *die* (3.45) with water-cooled structure for rapid solidification of molten metal and used for continuous or *semi-continuous casting* (3.150), *suction casting* (3.163) and *electroslag melting and casting* (3.54)

3.37**cupola furnace**

cylindrical vertical *melting furnace* (3.99) with pig iron, foundry returns and/or steel scrap as metallic charge for melting cast iron

Note 1 to entry: Cupola furnace *melting* (3.98) is a process that produces heat through the reaction (combustion) of fuel (for example, coke) and oxygen, so that the metallic charge melts and overheats, and finally obtains the required molten iron. In this process, the metallic charge is in direct contact with fuel and is blast-assisted from the tuyere for continuous melting.

3.38**decoring****core knock-out**

process in which *sand core* (3.140) is removed from the inner cavity of the casting by hammering or any other way

3.39**decoring cell**

complete set of *decoring* (3.38) equipment that consists of a *decoring machine* (3.40), a robot for loading and unloading workpieces, and an *exhaust system* (3.56), etc.

3.40

decoring machine

machine that removes the *sand core* (3.140) from the inner cavity of the *casting* (3.11) by pneumatic or hydraulic impact hammer

Note 1 to entry: It is usually composed of hammering mechanism, conveying mechanism for workpiece and a chamber which prevents dust from escaping. Among them, the conveying of the workpiece can adopt motorized roller, mobile car, turntable, manipulator or robot.

3.41

decortivating

process of removing the *shell mold* (3.154) after *casting* (3.11) is formed in the *investment casting* (3.83)

3.42

degating

process of removing the gate and riser from *casting* (3.11)

Note 1 to entry: Commonly used methods are striking, grinding wheel or machine cutting, flame cutting, etc.

3.43

degating device

device used to remove gate and riser of castings, such as gate hydraulic cutting machine and riser impacting hammer

3.44

dewaxing

process of removing wax pattern assembly from shell mold and forming cavity by melting, dissolving or burning in *investment casting* (3.83)

Note 1 to entry: Commonly used methods are hot water dewaxing, steam dewaxing, etc.

3.45

die

permanent mold

mold (3.101) made of metal materials

Note 1 to entry: It is not destroyed after the *casting* (3.11) has been removed and can be used repeatedly.

3.46

die casting

high pressure die casting

process in which *molten metal* (3.95) is injected into a *die* (3.45) and held under pressure until complete solidification

3.47

die casting cell

die casting machine (3.48), together with auxiliary and ancillary equipment, which form a complete production unit

3.48

die casting machine

machine with the purpose to inject *molten metal* (3.95) under pressure into a parted die which is connected to the platens of the machine

3.49

disposable mold

mold (3.101) that is destroyed to remove the *casting* (3.11)

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