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Graphical symbols for diagrams —

Part 11: Devices for heat transfer and heat engines

Symboles graphiques pour schémas —

Partie 11: Dispositifs pour échanges thermiques, et moteurs thermiques

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 14617 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14617-11 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 10, *Process plant documentation and tpd-symbols*.

ISO 14617 consists of the following parts, under the general title *Graphical symbols for diagrams*:

— *Part 1: General information and indexes*

— *Part 2: Symbols having general application*

— *Part 3: Connections and related devices*

— *Part 4: Actuators and related devices*

— *Part 5: Measurement and control devices*

— *Part 6: Measurement and control functions*

— *Part 7: Basic mechanical components*

— *Part 8: Valves and dampers*

— *Part 9: Pumps, compressors and fans*

— *Part 10: Fluid power converters*

— *Part 11: Devices for heat transfer and heat engines*

— *Part 12: Devices for separating, purification and mixing*

— *Part 15: Installation diagrams and network maps*

Other parts are under preparation.

Introduction

The purpose of ISO 14617 in its final form is the creation of a library of harmonized graphical symbols for diagrams used in technical applications. This work has been, and will be, performed in close cooperation between ISO and IEC. The ultimate result is intended to be published as a standard common to ISO and IEC, which their technical committees responsible for specific application fields can use in preparing International Standards and manuals.

Graphical symbols for diagrams —

Part 11:
Devices for heat transfer and heat engines

1 Scope

This part of ISO 14617 specifies graphical symbols for heat transfer and heat engines in diagrams.

For the fundamental rules of creation and application of graphical symbols in diagrams, see ISO 81714-1.

For an overview of ISO 14617, information on the creation and use of registration numbers for identifying graphical symbols used in diagrams, rules for the presentation and application of these symbols, and examples of their use and application, see ISO 14617-1.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 14617. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 14617 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 14617-1:2002, *Graphical symbols for diagrams — Part 1: General information and indexes*

ISO 14617-2:2002, *Graphical symbols for diagrams — Part 2: Symbols having general application*

ISO 81714-1:1999, *Design of graphical symbols for use in the technical documentation of products — Part 1: Basic rules*

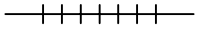
3 Terms and definitions

For the purposes of this part of ISO 14617, the terms and definitions given in ISO 14617-1 and ISO 14617-2 apply.

4 Heat-exchangers, condensers

4.1 Symbols of a basic nature

4.1.1	**301**		Envelope (tank) See R301 (4.2.1).
4.1.2	**2037**		Spray nozzle

4.1.3	**2501**		Heating or cooling coil
4.1.4	**2502**		Finned tube

4.2 Application rules for the symbols in 4.1

4.2.1	**R301**	Another shape may be used, for example, rectangular or circular. A specific shape shall be used if it is necessary to indicate a certain function or property associated with the shape of the envelope. The symbol shall be used only when the envelope is of significance for the primary function. For example, it should not be used to represent enclosures for the protection against ingress of dust and protection against contact with movable or electrically live parts. If necessary, the nature of the envelope shall be stated, for example, conductive material.

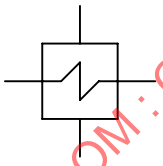
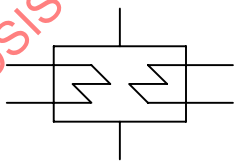
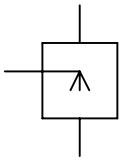
4.3 Symbol giving supplementary information

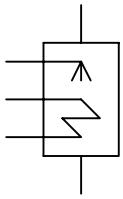
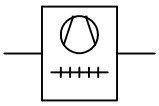
None.

4.4 Application rule for the symbol in 4.3

None.

4.5 Application examples

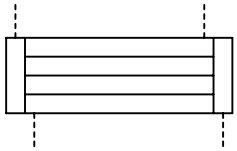
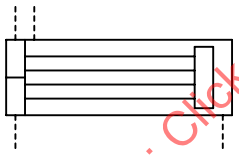
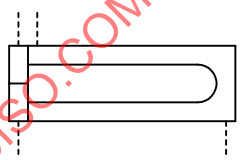
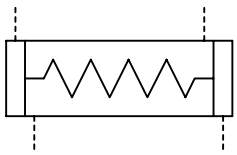
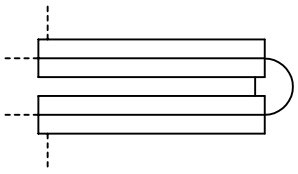
4.5.1	**X2501**	 301, 2501	Heat-exchanger, condenser
4.5.2	**X2502**	 301, 2501	Heat-exchanger with three flow paths
4.5.3	**X2503**	 301, 2037	De-superheater, humidifier

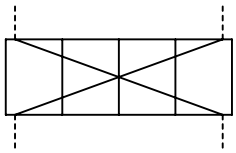
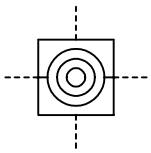
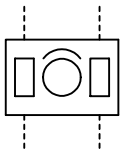
4.5.4	**X2504**	 301, 2037, 2501	Water-sprayed cooler
4.5.5	**X2505**	 101, 2302, 2502	Air-fin cooler with induced draft

5 Heat-exchangers of specified design

5.1 Symbols of a basic nature

NOTE For the use of the symbols, see R2121 (5.2.1).

5.1.1	**2511**		Heat-exchanger with straight tubes (fixed-tube plates)
5.1.2	**2512**		Heat-exchanger of floating type
5.1.3	**2513**		Heat-exchanger with U-shaped tubes
5.1.4	**2514**		Heat-exchanger with coil-shaped tubes
5.1.5	**2515**		Heat-exchanger of double-pipe type

5.1.6	**2516**		Heat-exchanger of plate type
5.1.7	**2517**		Heat-exchanger of spiral type
5.1.8	**2518**		Regenerative pre-heater

5.2 Application rule for the symbols in 5.1

5.2.1	**R2121**	The symbols shall be used only when it is necessary to show the construction.

5.3 Symbol giving supplementary information

None.

5.4 Application rule for the symbol in 5.3

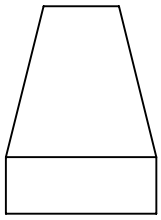
None.

5.5 Application example

None.

6 Cooling towers

6.1 Symbol of a basic nature

6.1.1	**2521**		Cooling tower

6.2 Application rule for the symbol in 6.1

None.

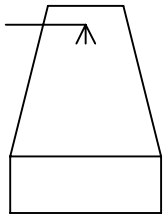
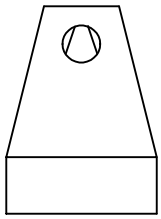
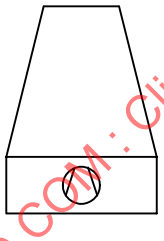
6.3 Symbol giving supplementary information

None.

6.4 Application rule for the symbol in 6.3

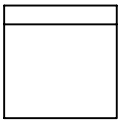
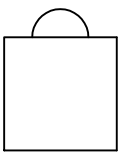
None.

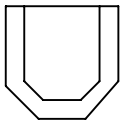
6.5 Application examples

6.5.1	**X2521**	 2037, 2521	Cooling tower, humidifier
6.5.2	**X2522**	 2302, 2521	Cooling tower with induced draft
6.5.3	**X2523**	 2302, 2521	Cooling tower with forced draft

7 Boilers, steam generators, furnaces, and hot air generators

7.1 Symbols of a basic nature

7.1.1	**2531**		Boiler, steam generator
7.1.2	**2532**		Boiler with dome

7.1.3	**2533**		Furnace

7.2 Application rule for the symbols in 7.1

None.

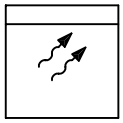
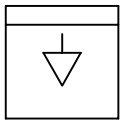
7.3 Symbols giving supplementary information

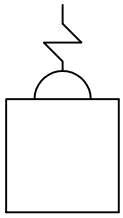
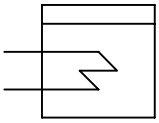
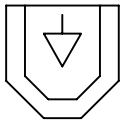
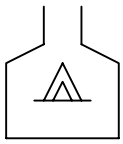
7.3.1	**IEC**		Ionizing radiation type; nuclear type
7.3.2	**2541**		Fired type
7.3.3	**IEC**		Electric heating element type
7.3.4	**IEC**		Electric electrode type
7.3.5	**IEC**		Electric induction type
7.3.6	**2501**		Heat-exchanger type

7.4 Application rules for the symbols in 7.3

None.

7.5 Application examples

7.5.1	**X2531**	 2531, 2541	Boiler, fired-type
7.5.2	**X2532**	 2531, IEC	Nuclear reactor, hot-water type
7.5.3	**X2533**	 2531, IEC	Boiler, electrode type

7.5.4	**X2534**	 2501, 2532	Boiler with superheater
7.5.5	**X2535**	 2501, 2531	Steam generator
7.5.6	**X2536**	 2533, IEC	Electrode furnace
7.5.7	**X2537**	 301, 2541	Fired heater

8 Heat pumps, refrigerators and freezers

8.1 Symbol of a basic nature

8.1.1	**2551**		Heat pump, refrigerator or freezer See R2551 (8.2.1).

8.2 Application rule for the symbol in 8.1

8.2.1	**R2551**	The asterisk shall be replaced with the applicable symbol from 8.3.

8.3 Symbols giving supplementary information

8.3.1	**130**		Transition to a higher quantity level
8.3.2	**131**		Transition to a lower quantity level
8.3.3	**132**		Transition to a higher or lower quantity level

8.4 Application rule for the symbols in 8.3

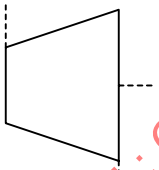
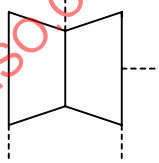
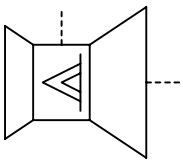
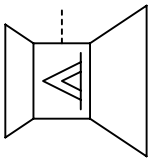
None.

8.5 Application examples

8.5.1	**X2551**	 130, 2551	Heat pump
8.5.2	**X2552**	 131, 2551	Refrigerator or freezer
8.5.3	**X2553**	 132, 2551	Device serving as a heat pump or refrigerator

9 Steam and gas turbines

9.1 Symbols of a basic nature

9.1.1	**2571**		Steam turbine
9.1.2	**2572**		Steam turbine with centre inlet
9.1.3	**2573**		Gas turbine
9.1.4	**2574**		Jet motor