
**Diagrams for the chemical and
petrochemical industry —**

**Part 2:
Graphical symbols**

*Schémas de procédé pour l'industrie chimique et pétrochimique —
Partie 2: Symboles graphiques*





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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 2.

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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 10628-2 was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 10, *Process plant documentation*.

This first edition of ISO 10628-2, along with ISO 10628-1 (under preparation), cancels and replaces ISO 10628:1997, which has been technically revised.

ISO 10628 consists of the following parts, under the general title *Diagrams for the chemical and petrochemical industry*:

— *Part 2: Graphical symbols*

The following part is under preparation:

— *Part 1: Specification of diagrams*

Diagrams for the chemical and petrochemical industry —

Part 2: Graphical symbols

1 Scope

This part of ISO 10628 defines graphical symbols for the preparation of diagrams for the chemical and petrochemical industry. It is a collective application standard of the ISO 14617 series.

This part of ISO 10628 does not apply to graphical symbols for electrotechnical diagrams; for these, see IEC 60617.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10209, *Technical product documentation — Vocabulary — Terms relating to technical drawings, product definition and related documentation*

ISO 14617 (all parts), *Graphical symbols for diagrams*

ISO 15519-1, *Specification for diagrams for process industry — Part 1: General rules*

ISO 81714 (all parts), *Design of graphical symbols for use in the technical documentation of products*

IEC 81714 (all parts), *Design of graphical symbols for use in the technical documentation of products*

3 Terms and definitions

For the purposes of this document, the definitions given in the ISO 14617 series and ISO 10209 apply.

4 Structure of graphical symbols

The graphical symbols are grouped according to functional and/or design features. See Table 1.

Table 1 — Subject groups

Group number	Subject group
1	Vessels and tanks
2	Columns with internals
3	Heat exchangers
4	Steam generators, furnaces, recooling device
5	Cooling tower
6	Filters, liquid filters, gas filters
7	Screening devices, sieves and rakes
8	Separators
9	Centrifuges
10	Drier

Table 1 (continued)

Group number	Subject group
11	Crushing/Grinding machines
12	Mixers/Kneaders
13	Shaping machines – processing in vertical direction
14	Shaping machines – processing in horizontal direction
15	Liquid pumps
16	Compressors, vacuum pumps
17	Blowers, fans
18	Lifting, conveying and transport equipment
19	Proportioners, feeders and distribution facilities
20	Engines
21	Valves
22	Check valves
23	Valves and fittings with safety function
24	Fittings
25	Graphical symbols for piping
26	Apparatus elements
27	Internals
28	Agitators, stirrers
29	Internal characteristics and built-in-components

5 Graphical symbols

Graphical symbols for diagrams used in chemical and petrochemical industry are presented in Table 2, which is divided into four columns, as follows:

1	Item no.	Consecutive numbering within each subject group according to Table 1
2	Reg. no.	Registration numbers structured as follows: nnn Registration number for ISO 14617 graphical symbols. Cnnnn Preliminary registration number for a new graphical symbol, which will be implemented in ISO 14617. The preliminary registration number will be replaced with the final ISO 14617 registration number at first periodical review of ISO 10628-2. X2nnn Registration number for ISO 14617 symbol examples. X8nnn Registration number for ISO 10628-2 symbol examples.
3	Graphical symbol	Graphical symbols shown with a 2,5 mm dotted grid behind. Preferred locations of connections at graphical symbols are indicated by “—”. This is not a part of the graphical symbol.
4	Description	The preferred descriptors for the graphical symbol.

Rules for modification of proportions and orientation of graphical symbols are given in ISO 81714 and IEC 81714.

If a graphical symbol is not accessible in ISO 10628-2, then ISO 14617 should be consulted for the needed graphical symbol.

If the needed graphical symbol is not available in ISO 14617, then the symbol shall be created by combining ISO 14617 symbols of basic nature with symbols given supplementary information according to rules given in ISO 14617, ISO 81714 and IEC 81714.

Table 2 — Graphical symbols for diagrams

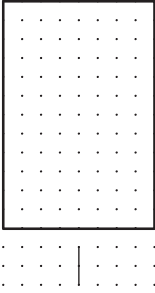
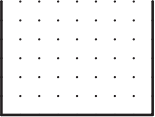
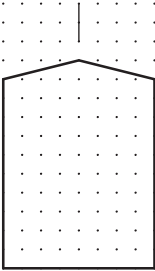
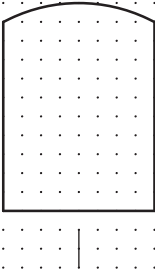
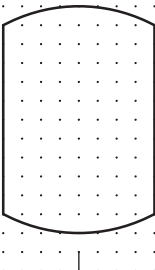
Item no.	Reg. no.	Graphical symbol	Description
1	VESSELS AND TANKS		
1.1	301		Tank, vessel
1.2	2061		Container, tank, cistern
1.3	X2063		Tank with conical roof and flat bottom
1.4	X8200		Tank with dished roof
1.5	2062		Tank, vessel with dished ends

Table 2 (continued)

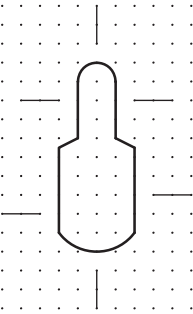
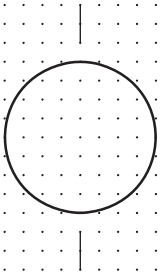
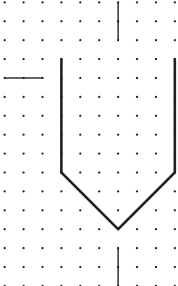
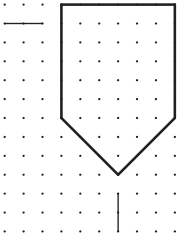
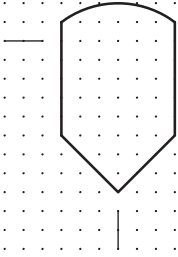
Item no.	Reg. no.	Graphical symbol	Description
1.6	X8201		Vessel with two different diameters
1.7	2063		Spherical vessel
1.8	2064		Bunker with conical bottom
1.9	X2062		Closed tank with conical bottom
1.10	X8008		Vessel with dished roof and conical bottom

Table 2 (continued)

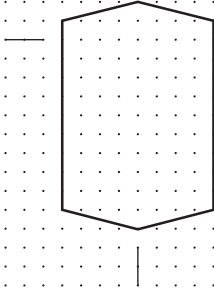
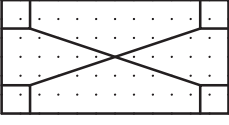



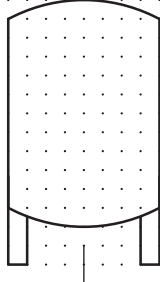
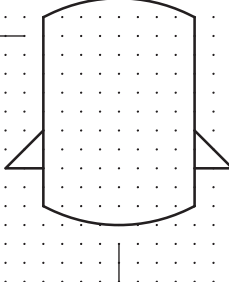
Item no.	Reg. no.	Graphical symbol	Description
1.11	X8009		Vessel with conical roof and bottom
1.12	C0001		Container for solids, liquids, gases
1.13	2067		Barrel, drum
1.14	C0002		Gas cylinder
1.15	2068		Bag
1.16	X8002		Vessel with dish ends and support legs
1.17	X8003		Vessel with dish ends and support brackets

Table 2 (continued)

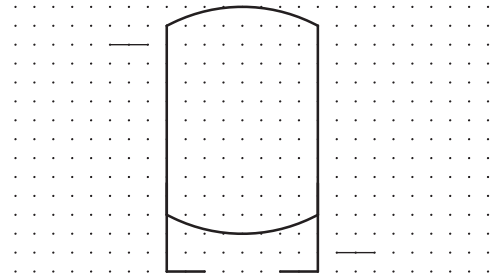
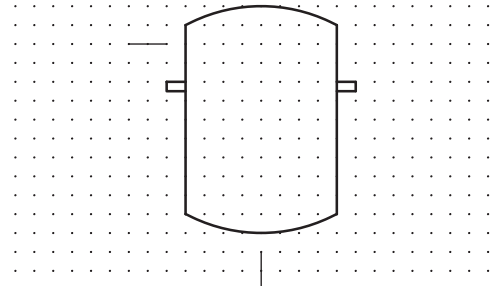
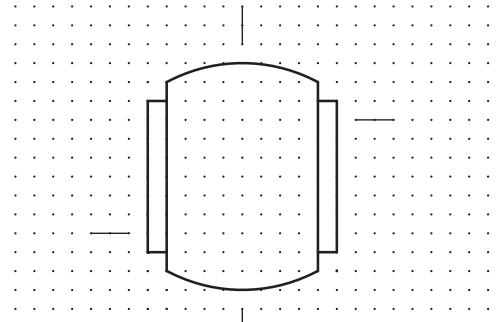
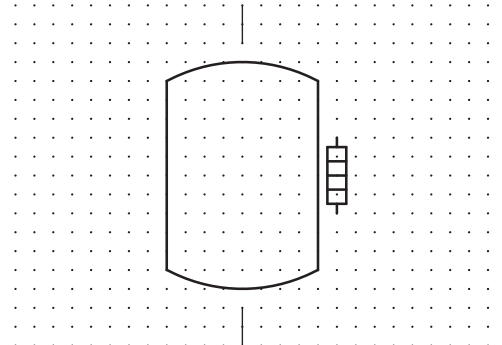
Item no.	Reg. no.	Graphical symbol	Description
1.18	X8004		Vessel with dished ends and support skirt
1.19	X8005		Vessel with dished ends and support ring
1.20	X2069		Vessel with dished ends and heating/cooling jacket
1.21	X2070		Vessel with dished ends and electrical heating

Table 2 (continued)

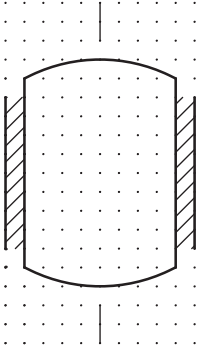
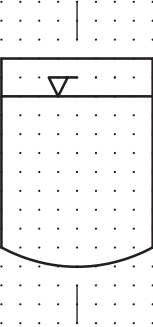
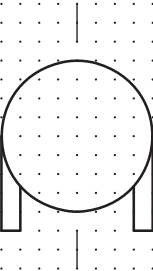
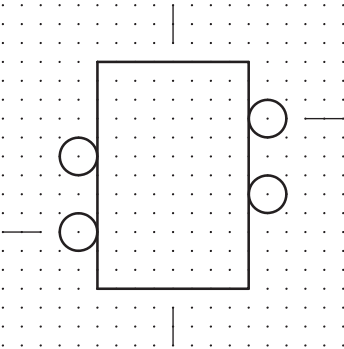
Item no.	Reg. no.	Graphical symbol	Description
1.22	X8098		Vessel with dished ends and thermal insulation
1.23	X8007		Vessel with dished bottom and surface indication
1.24	X8010		Spherical vessel on legs
1.25	X8000		Vessel with full-tube heating/cooling coil

Table 2 (continued)

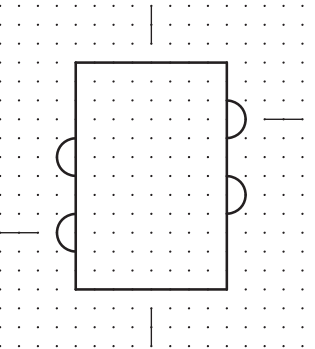
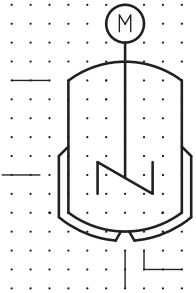
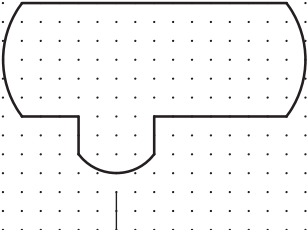

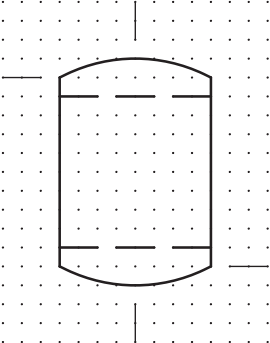
Item no.	Reg. no.	Graphical symbol	Description
1.26	X8001		Vessel with semi-tube heating/cooling coil
1.27	X8006		Jacketed vessel with dished ends and agitator driven by electric motor
1.28	X8202		Vessel with pit
1.29	2065		Open bulk storage
2	COLUMNS WITH INTERNALS		
2.1	X8100		Column (general)

Table 2 (continued)

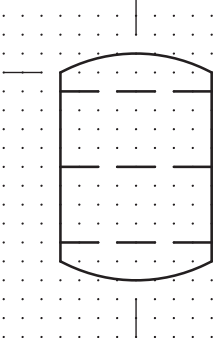
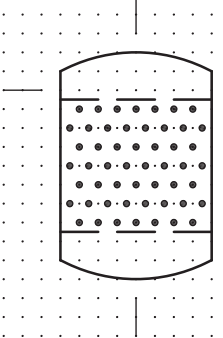
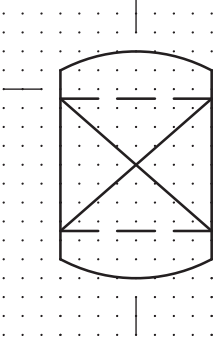
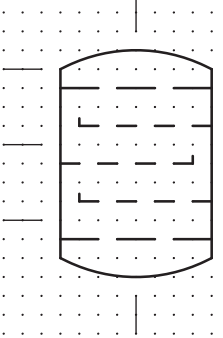
Item no.	Reg. no.	Graphical symbol	Description
2.2	X8101		Tray column (general)
2.3	X8014		Column with fluidized bed
2.4	X8015		Column with fixed bed
2.5	X8013		Column with staggered baffle trays

Table 2 (continued)

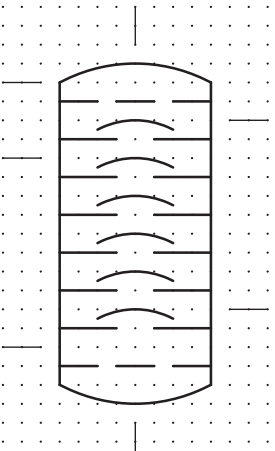
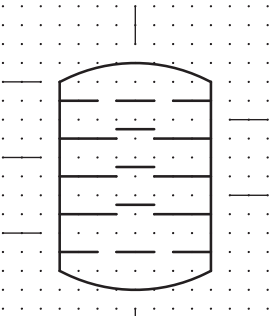
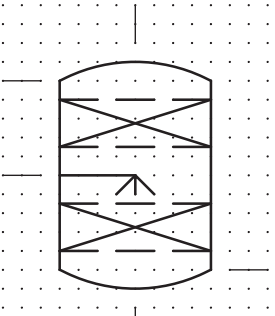
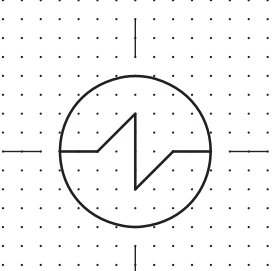
Item no.	Reg. no.	Graphical symbol	Description
2.6	X8011		Column with bubble cap trays
2.7	X8012		Column with valve trays
2.8	X8016		Column with two fixed bed sections and intermediate spray nozzle
3 3.1	X8079	<p style="text-align: center;">HEAT EXCHANGERS</p> 	Heat exchanger (general), condenser

Table 2 (continued)

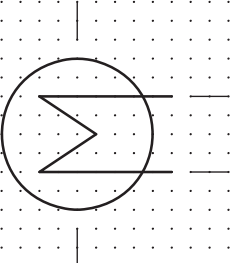
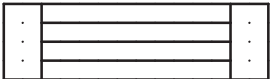
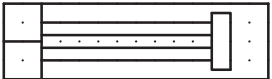
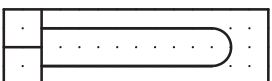
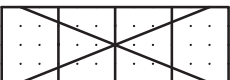

Item no.	Reg. no.	Graphical symbol	Description
3.2	X8017		Heat exchanger (M-shape)
3.3	2511		Heat exchanger with straight tubes (fixed-tube plates)
3.4	2512		Heat exchanger of floating head type
3.5	2513		Heat exchanger with U-shaped tubes
3.6	2516		Heat exchanger of plate type
3.7	2514		Heat exchanger with coil shaped tubes

Table 2 (continued)

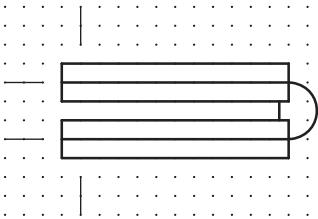
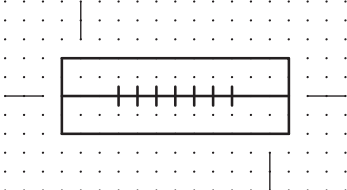
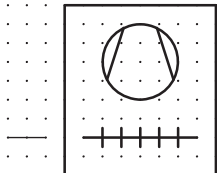
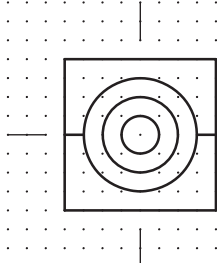

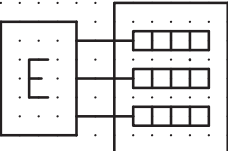
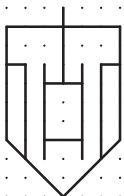
Item no.	Reg. no.	Graphical symbol	Description
3.8	2515		Heat exchanger of double-pipe type
3.9	X8018		Heat exchanger with finned tube
3.10	X2505		Heat exchanger with finned tube and fan
3.11	2517		Heat exchanger of spiral type
3.12	X8131		Evaporator, re-boiler
3.13	X8132		Electric heater
3.14	X8133		Thin-film evaporator

Table 2 (continued)

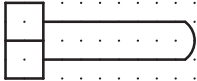
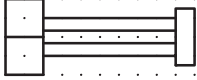
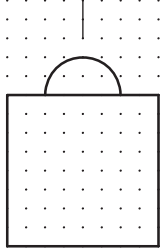
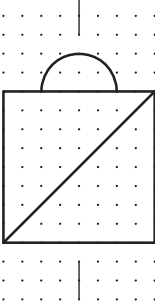
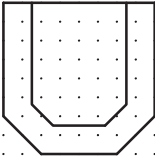
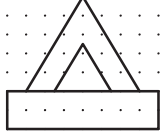
Item no.	Reg. no.	Graphical symbol	Description
3.15	X8136		Tube bundle, heat exchanger with U-shaped tubes
3.16	X8137		Tube bundle, heat exchanger of floating head type
4	STEAM GENERATORS, FURNACES, RECOOLING DEVICE		
4.1	2532		Boiler with dome
4.2	X8103		Steam generator with hot liquid as generating media
4.3	2533		Furnace
4.4	X8107		Firing system, burner (general)

Table 2 (continued)

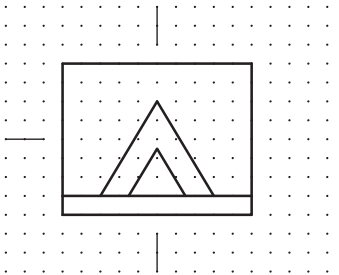
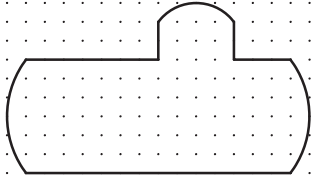
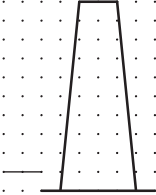
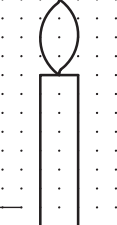
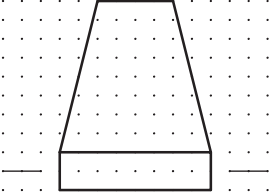
Item no.	Reg. no.	Graphical symbol	Description
4.5	X8106		Combustion chamber
4.6	X8108		Vessel with dome
4.7	2041		Stack, chimney
4.8	2591		Gas flare
5	COOLING TOWER		
5.1	2521		Cooling tower (general)

Table 2 (continued)

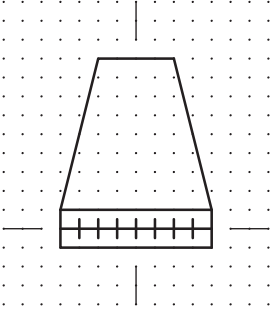
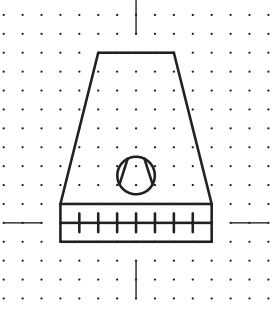
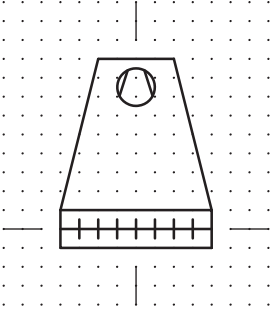
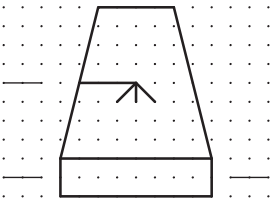
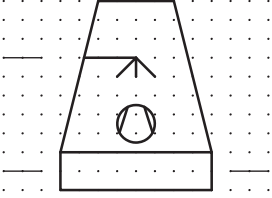
Item no.	Reg. no.	Graphical symbol	Description
5.2	X8109		Cooling tower, dry with natural draught
5.3	X8110		Cooling tower, dry with forced draught
5.4	X8111		Cooling tower, dry with induced draught
5.5	X8112		Cooling tower, wet with natural draught
5.6	X8113		Cooling tower, wet with forced draught

Table 2 (continued)

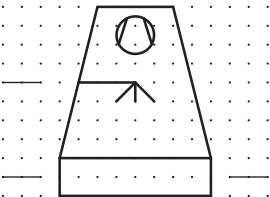
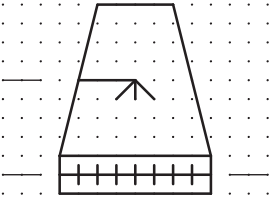
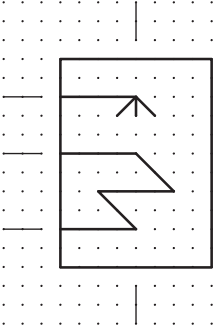
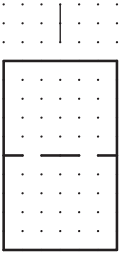
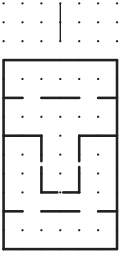
Item no.	Reg. no.	Graphical symbol	Description
5.7	X8114		Cooling tower, wet with induced draught
5.8	X8115		Cooling tower, wet-dry with natural draught
5.9	X2504		Spray cooler
6	FILTERS, LIQUID FILTERS, GAS FILTERS		
6.1	X8116		Liquid filter (general)
6.2	X8117		Liquid filter, bag, candle or cartridge type

Table 2 (continued)

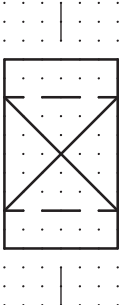
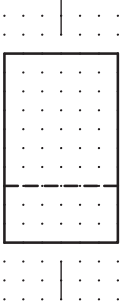
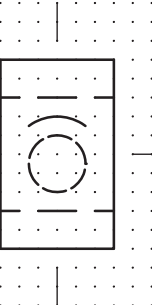
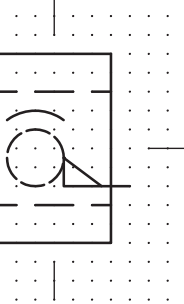
Item no.	Reg. no.	Graphical symbol	Description
6.3	X8118		Liquid bed filter fixed type
6.4	X8019		Suction filter
6.5	X8119		Liquid rotary filter, drum or disc type
6.6	X8120		Liquid rotary filter, drum or disc type with scraper

Table 2 (continued)

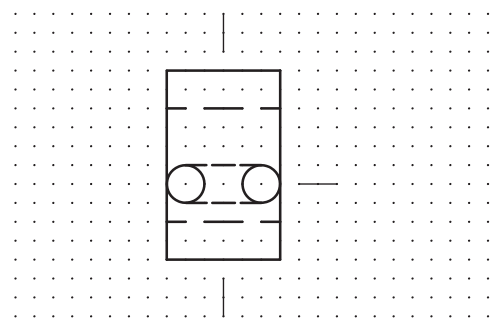
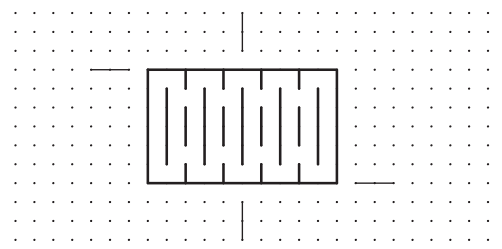
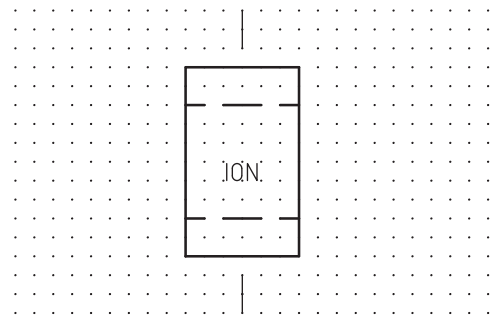
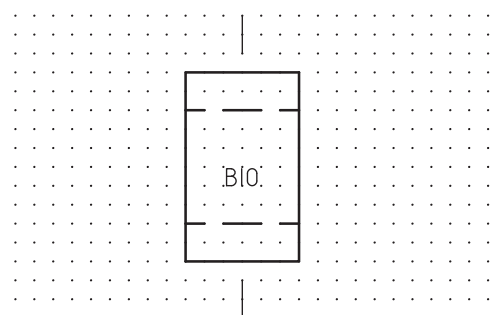
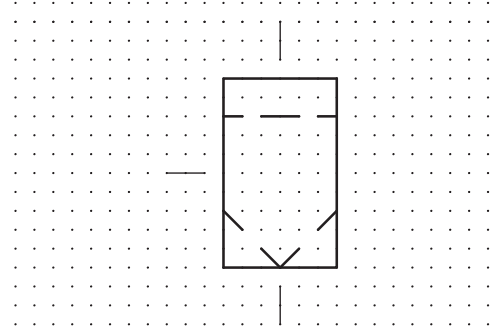
Item no.	Reg. no.	Graphical symbol	Description
6.7	X8121		Liquid filter, belt or roll type
6.8	X2611		Filter press, press filter
6.9	X8020		Liquid bed filter, ion exchanger type
6.10	X8021		Liquid bed filter, biological type
6.11	X8122		Gas filter (general)

Table 2 (continued)

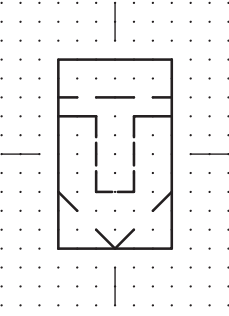
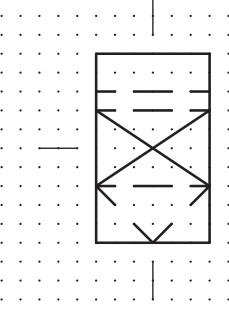
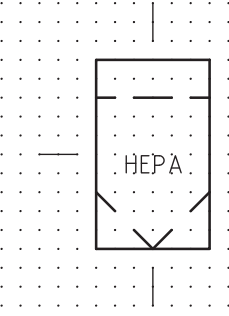
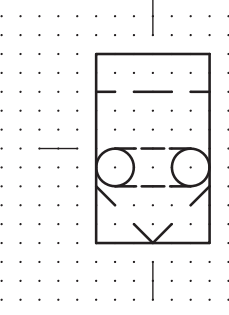
Item no.	Reg. no.	Graphical symbol	Description
6.12	X8022		Gas filter, bag, candle or cartridge type
6.13	X8023		Gas bed filter fixed type
6.14	X8024		Gas filter, high efficiency particulate air filter HEPA type
6.15	X8025		Gas filter, belt or roll type

Table 2 (continued)

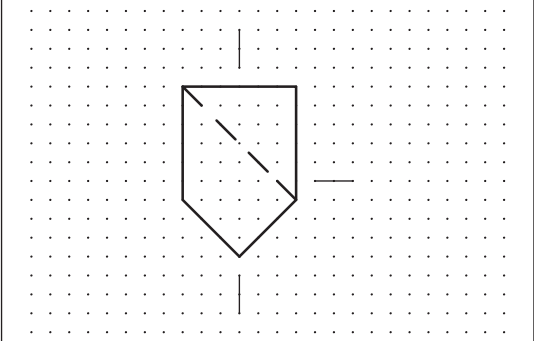
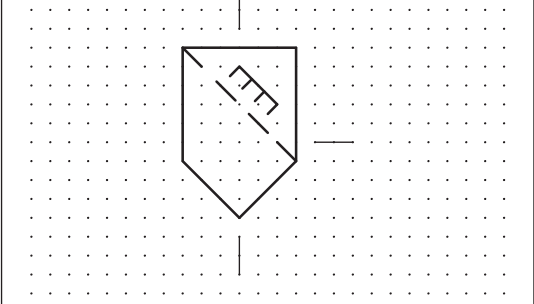
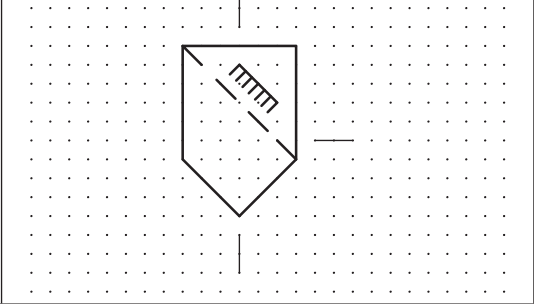
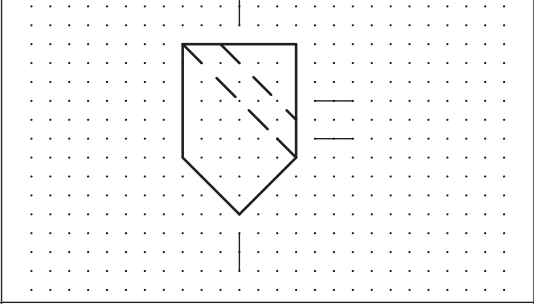
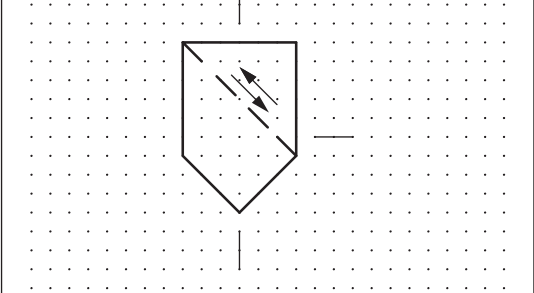
Item no.	Reg. no.	Graphical symbol	Description
7 7.1	X8123	<p style="text-align: center;">SCREENING DEVICES, SIEVES AND RAKES</p> 	Screening device, sieve, strainer, general
7.2	X8026		Screening device, coarse rake type
7.3	X8027		Screening device, fine rake type
7.4	X8028		Screening device with coarse and fine screens
7.5	X2605		Screening device, sieve, strainer, vibrating type

Table 2 (continued)

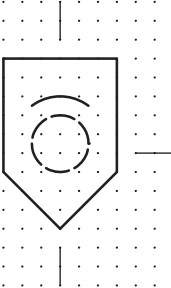
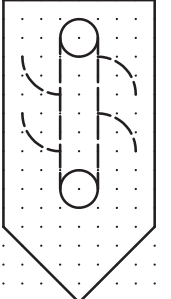
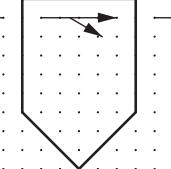
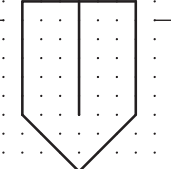
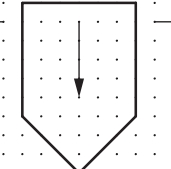
Item no.	Reg. no.	Graphical symbol	Description
7.6	X8029		Screening device, rotating drum type
7.7	X8030		Screening device, basket reel type
8	SEPARATORS		
8.1	X8081		Separator, sifter (general)
8.2	X2616		Impact separator
8.3	X8031		Gravity separator, settling chamber

Table 2 (continued)

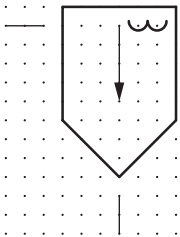
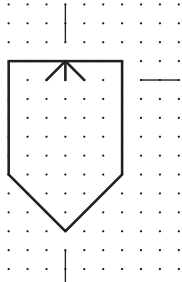

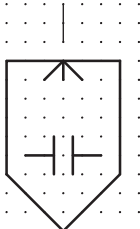

Item no.	Reg. no.	Graphical symbol	Description
8.4	X8124		Separator, scrubber wet type
8.5	X2621		Spray scrubber
8.6	X8125		Separator, precipitator electrostatic type
8.7	X8033		Precipitator wet, electrostatic type
8.8	X8126		Electromagnetic separator

Table 2 (continued)

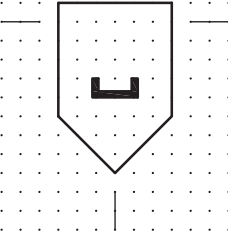
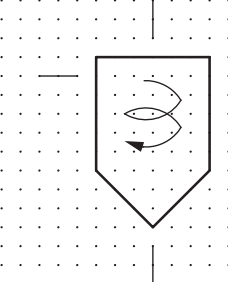
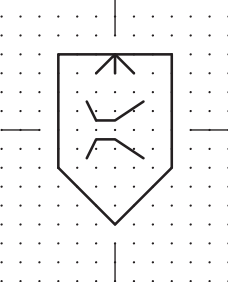
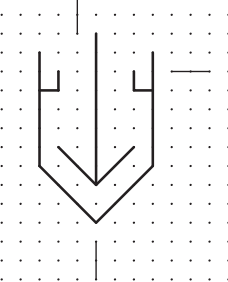
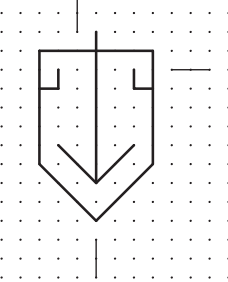
Item no.	Reg. no.	Graphical symbol	Description
8.9	X8127		Permanent magnet separator
8.10	X2618		Separator, cyclone type
8.11	X8034		Separator, scrubber venturi type
8.12	X8128		Solidifier for waste water treatment plant open type
8.13	X8129		Solidifier closed type

Table 2 (continued)

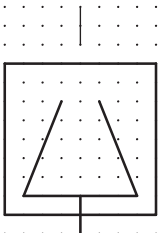
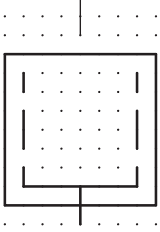
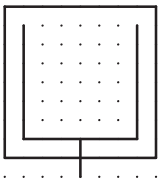
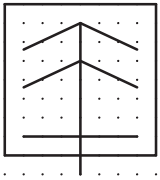
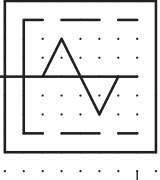
Item no.	Reg. no.	Graphical symbol	Description
9 9.1	X2619	<p>CENTRIFUGES</p> 	High speed centrifuge
			Centrifuge with perforated shell
9.3	X8035		Centrifuge with solid shell
9.4	X8036		Centrifuge, separator disc-type
9.5	X8037		Centrifuge, screw-type with perforated shell

Table 2 (continued)

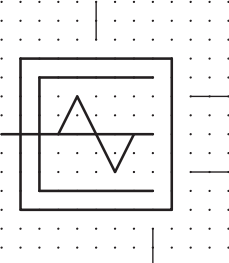
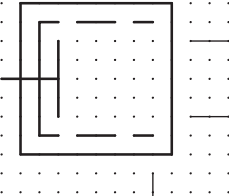
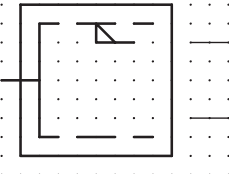
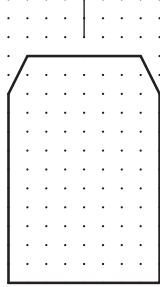

Item no.	Reg. no.	Graphical symbol	Description
9.6	X8082		Decanter, centrifuge, screw type with solid shell
9.7	X8038		Centrifuge, pusher type
9.8	X8039		Centrifuge, skimmer type
10	DRIER		
10.1	C0046		Drier (general)
10.2	X8083		Drying oven, drying chamber, shelf drier

Table 2 (continued)

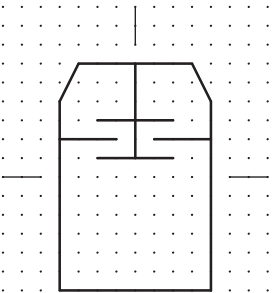
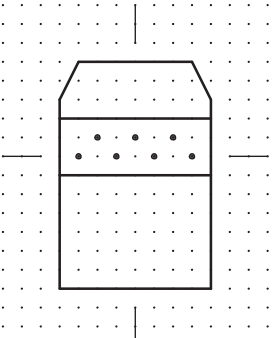
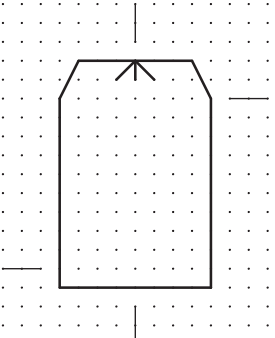
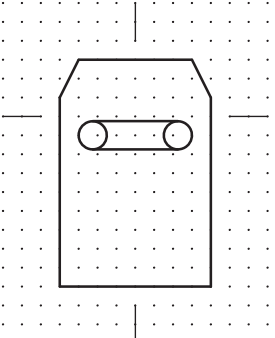
Item no.	Reg. no.	Graphical symbol	Description
10.3	X8040		Turbo drier, disc drier, moving shelf drier
10.4	X8041		Fluidized bed drier
10.5	X8042		Spray drier
10.6	X8043		Belt drier, roller-conveyor type drier

Table 2 (continued)

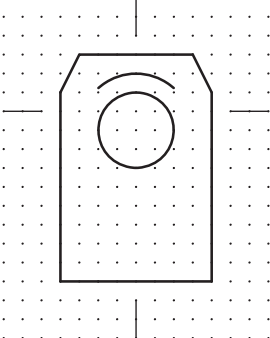

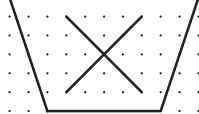

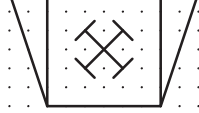
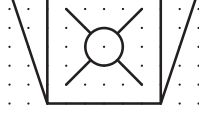
Item no.	Reg. no.	Graphical symbol	Description
10.7	X8044		Rotary drum drier, rotary drier, tumbling drier
10.8	C0016		Heat consumer
11	CRUSHING/GRINDING MACHINES		
11.1	X8084		Crushing/grinding machine (general)
11.2	X8085		Crusher (general)
11.3	X8045		Crusher, hammer type
11.4	X8046		Crusher, impact type

Table 2 (continued)

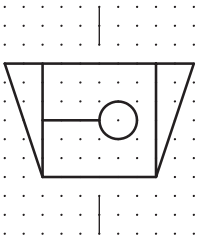
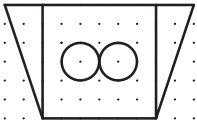
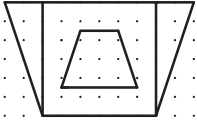
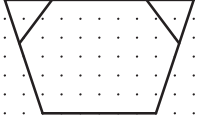

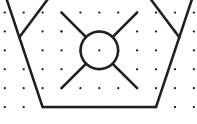
Item no.	Reg. no.	Graphical symbol	Description
11.5	X8047		Crusher, jaw type
11.6	X8048		Crusher, roller type
11.7	X8049		Crusher, cone type
11.8	X8086		Mill, pulverizer (general)
11.9	X8050		Mill, pulverizer hammer type
11.10	X8051		Mill, impact type

Table 2 (continued)

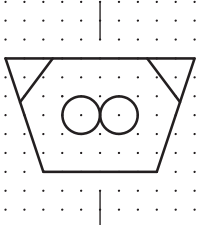
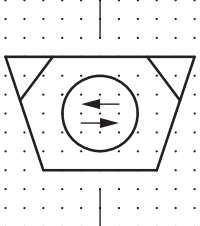
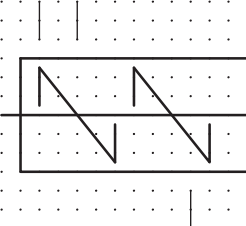


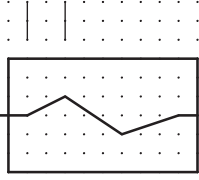
Item no.	Reg. no.	Graphical symbol	Description
11.11	X8053		Mill, horizontal rotation roller type
11.12	X8054		Mill, vibration type
12	MIXERS/KNEADERS		
12.1	X2672		In-line rotary mixer
12.2	X2673		In-line static mixer
12.3	X8184		Mixing path
12.4	X8134		Kneader

Table 2 (continued)

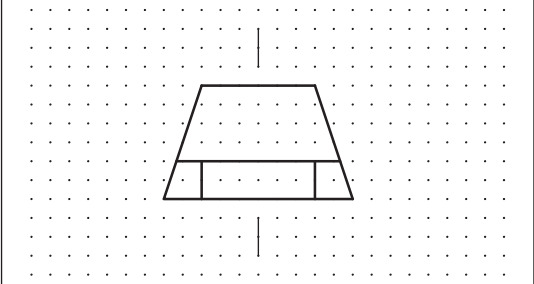
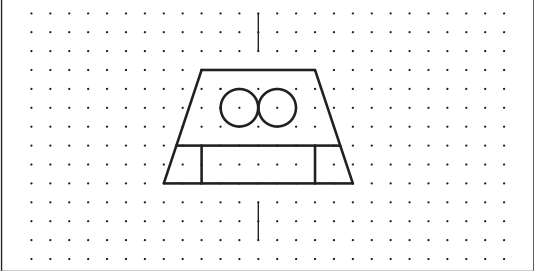
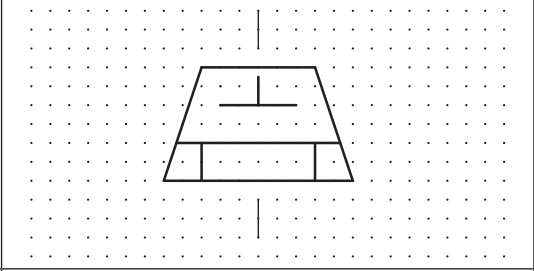
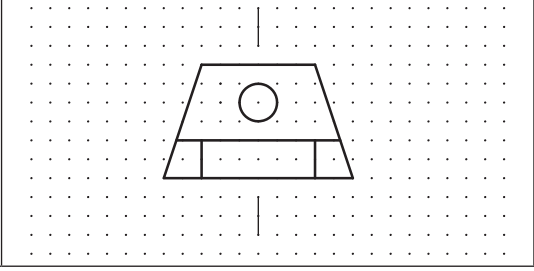
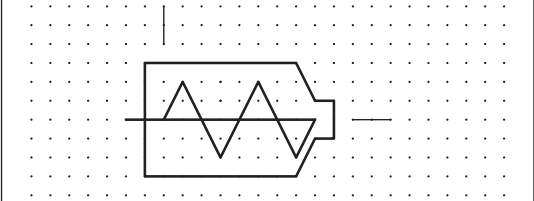
Item no.	Reg. no.	Graphical symbol	Description
<p>13</p> <p>13.1</p>	<p>C0052</p>	<p style="text-align: center;">SHAPING MACHINES — PROCESSING IN VERTICAL DIRECTION</p> 	<p>Shaping machine, vertical type (general)</p>
			<p>Press, roller type</p>
			<p>Press, piston type</p>
			<p>Pelletizing disc</p>
		<p>14</p> <p>14.1</p>	<p>C0053</p>
	<p>Extruder, screw type</p>		

Table 2 (continued)

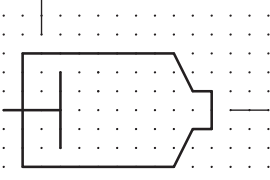
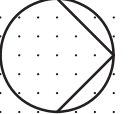
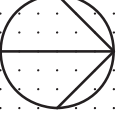
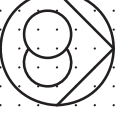



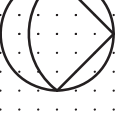

Item no.	Reg. no.	Graphical symbol	Description
14.3	X8059		Extruder, piston type
15	LIQUID PUMPS		
15.1	2301		Pump, liquid type (general)
15.2	2322		Pump, centrifugal type
15.3	X8091		Pump, gear type
15.4	X8092		Pump, screw type
15.5	X8093		Pump, progressive cavity type
15.6	X8094		Pump, reciprocating piston type
15.7	X8095		Pump, diaphragm type
15.8	X8096		Jet pump, liquid type ejector pump

Table 2 (continued)

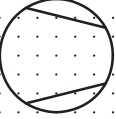
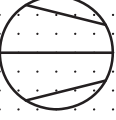

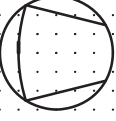


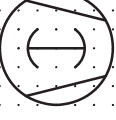

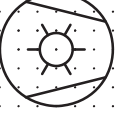
Item no.	Reg. no.	Graphical symbol	Description
16	COMPRESSORS, VACUUM PUMPS		
16.1	X2302		Compressor, vacuum pump (general)
16.2	X8179		Compressor, centrifugal type
16.3	X8097		Compressor, vacuum pump, reciprocating piston type
16.4	X8099		Compressor, vacuum pump diaphragm type
16.5	X8102		Compressor, vacuum pump, turbo type
16.6	X8104		Compressor, vacuum pump, roller vane type, compressor
16.7	X8105		Compressor rotary type, vacuum pump, rotary piston type
16.8	X8161		Compressor, screw type
16.9	X8162		Compressor, vacuum pump liquid ring type

Table 2 (continued)



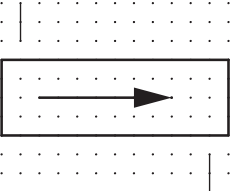
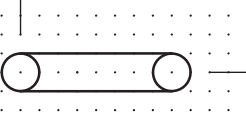
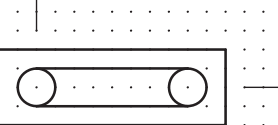
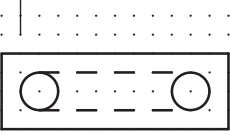
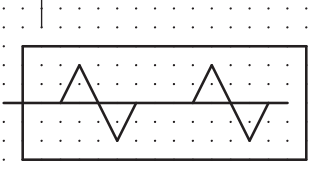
Item no.	Reg. no.	Graphical symbol	Description
16.10	X8163		Compressor, ejector type, vacuum pump jet type
BLOWERS, FANS			
17 17.1	X8164		Blower, fan (general)
LIFTING, CONVEYING AND TRANSPORT EQUIPMENT			
18 18.1	X8060		Conveyor (general)
18.2	3821		Conveyor, belt type
18.3	X8061		Conveyor, belt type in box
18.4	X8062		Conveyor, chain type, closed
18.5	X8063		Conveyor, screw type, closed

Table 2 (continued)

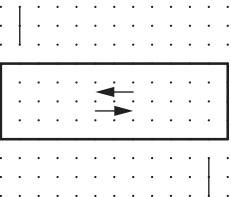
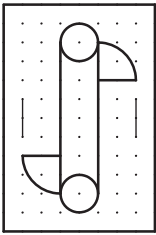
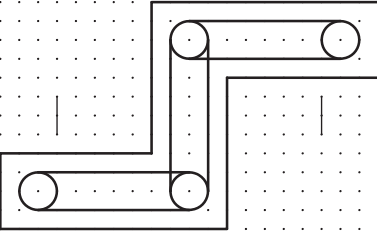
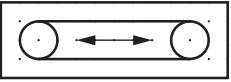
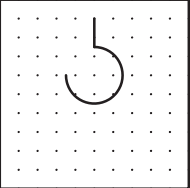
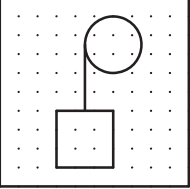
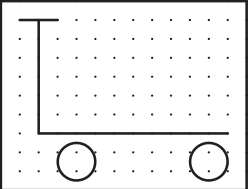
Item no.	Reg. no.	Graphical symbol	Description
18.6	X8064		Conveyor, vibrating type, closed
18.7	X8065		Elevator, bucket type
18.8	X8066		Elevator, bucket type Z-form
18.9	X8175		Conveyor, belt type, reversible
18.10	3841		Crane
18.11	3842		Lift
18.12	C0094		Forklift, manually operated

Table 2 (continued)

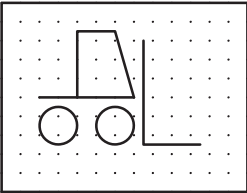
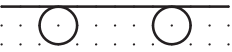
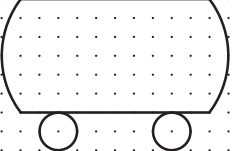
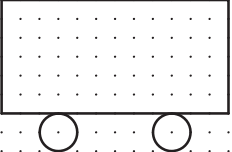


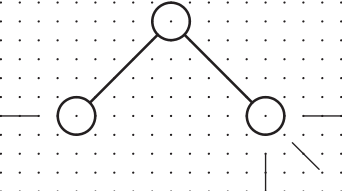
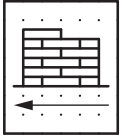
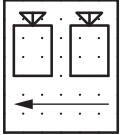
Item no.	Reg. no.	Graphical symbol	Description
18.13	3862		Forklift truck
18.14	3871		Industrial truck (general)
18.15	3874		Tank car, tank wagon
18.16	3872		Box truck
18.17	3881		Ship
18.18	X8142		Roller conveyor
18.19	X8143		Loading arm
18.20	X8145		Palletizer
18.21	X8146		Bag filling machine

Table 2 (continued)

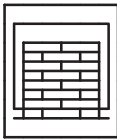





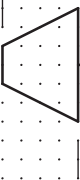

Item no.	Reg. no.	Graphical symbol	Description
18.22	X8144		Protective palette covering
19	PROPORTIONERS, FEEDERS AND DISTRIBUTION FACILITIES		
19.1	C2056		Proportional feeder (general)
19.2	X8067		Proportional feeder, rotary valve type
19.3	C0074		Feeder, rotary table type
19.4	C0035		Proportional feeder, metering type
19.5	2037		Spray nozzle
20	ENGINES		
20.1	2571		Turbine (general)
20.2	X8167		Gear

Table 2 (continued)

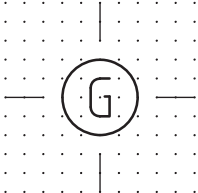
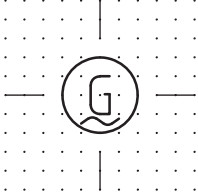
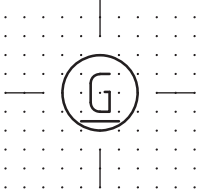
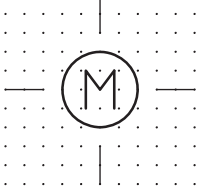
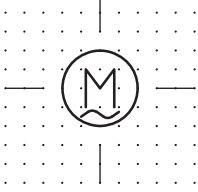
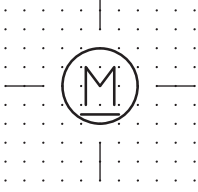

Item no.	Reg. no.	Graphical symbol	Description
20.3	C0079		Generator (general)
20.4	X8154		Generator, AC
20.5	X8155		Generator, DC
20.6	C0082		Electric motor (general)
20.7	X8157		Electric motor, AC
20.8	X8158		Electric motor, DC
21	VALVE		
21.1	2101		Valve (general)

Table 2 (continued)


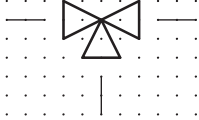

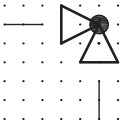
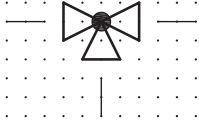

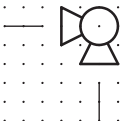
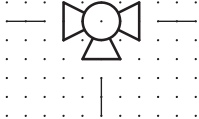


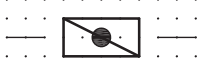

Item no.	Reg. no.	Graphical symbol	Description
21.2	2102		Valve, angle type (general)
21.3	2103		Valve, three way type (general)
21.4	X8068		Valve, globe type
21.5	X8069		Valve, angle globe type
21.6	X8070		Valve, three way globe type
21.7	X8071		Valve, ball type
21.8	X8072		Valve, angle ball type
21.9	X8073		Valve, three way ball type
21.10	X8074		Valve, gate type
21.11	X8075		Valve, butterfly type (Form 1)
21.12	X8075		Valve, butterfly type (Form 2)
21.13	X8076		Valve, needle type

Table 2 (continued)





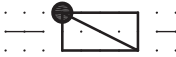
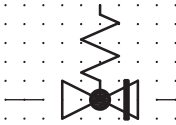
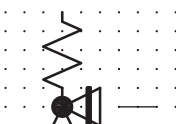


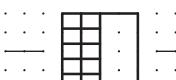


Item no.	Reg. no.	Graphical symbol	Description
21.14	X8087		Valve, control type, continuously operated
22	CHECK VALVE		
22.1	X8077		Check valve (general)
22.2	X2113		Check valve globe type
22.3	X8078		Swing check valve (Form 1)
22.4	X8165		Swing check valve (Form 2)
23	VALVES AND FITTINGS WITH SAFETY FUNCTION		
23.1	X2124		Safety valve, spring loaded, globe type
23.2	X2125		Safety valve, spring loaded, globe angle type
23.3	X8080		Rupture disc
23.4	2036		Flame arrestor
23.5	C0087		Flame arrestor explosion-proof
23.6	C0088		Flame arrestor detonation-proof
23.7	C0091		Flame arrestor fire-resistant

Table 2 (continued)

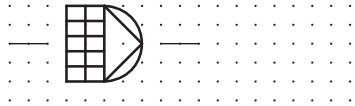

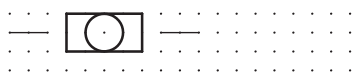
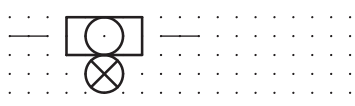
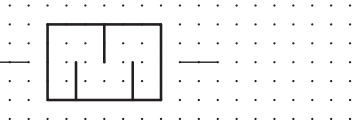
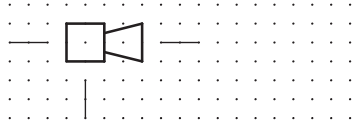
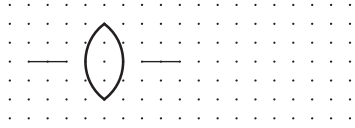
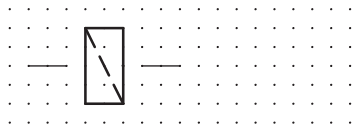
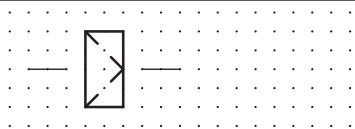
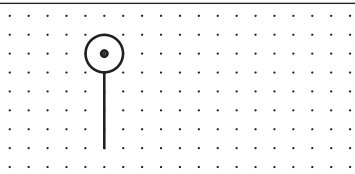
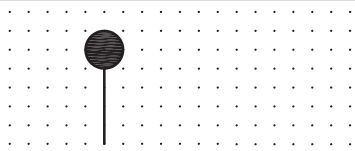
Item no.	Reg. no.	Graphical symbol	Description
23.8	C0089		Fire-resistant and detonation-proof flame arrester out to the atmosphere
23.9	X8088		Breather valve
24	FITTINGS		
24.1	2034		Viewing glass
24.2	X8089		Viewing glass with lighting
24.3	2033		Silencer
24.4	C0093		Mixing nozzle, injector
24.5	533		Compensator
24.6	X8090		Strainer
24.7	X8150		Cone type strainer
24.8	C0096		Orifice plate
24.9	C0097		Blind disc

Table 2 (continued)

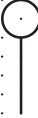










Item no.	Reg. no.	Graphical symbol	Description
24.10	C0098		Open disc
24.11	2044		Interchangeable disc (blind disc)
24.12	2045		Interchangeable disc (open disc in function)
24.13	2039		Vent (outlet to the atmosphere for steam/gas)
24.14	2040		Funnel
24.15	2181		Self-operating release valve (steam trap)
24.16	511		Flanged connection
24.17	516		Reducer
24.18	X411		Hose
24.19	C0100		Coupling
24.20	513		Clamped flange coupling

Table 2 (continued)


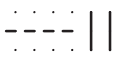


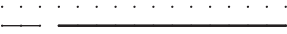



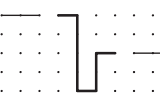
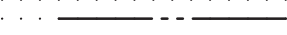
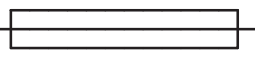
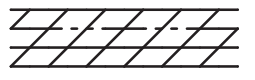
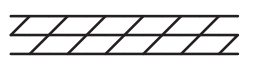



Item no.	Reg. no.	Graphical symbol	Description
24.21	C0108		Breakthrough
24.22	517		Flanged dummy cover
24.23	X8152		Single flange
24.24	X8153		Dummy cover
25	GRAPHICAL SYMBOLS FOR PIPING		
25.1	405		Pipeline
25.2	X8156		Secondary pipeline
25.3	241		Flowmotion in direction of arrow
25.4	3061		Slope
25.5	2038		Siphon
25.6	C0106		Tracer for heating or cooling
25.7	X409		Jacketed pipeline
25.8	X8174		Piping, heated or cooled and insulated
25.9	X322		Pipeline with thermal insulation
26	APPARATUS ELEMENTS		
26.1	C2005		Support leg
26.2	C2006		Support bracket
26.3	C2007		Support skirt

Table 2 (continued)


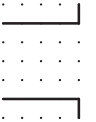


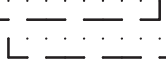

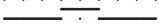



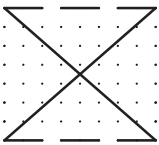


Item no.	Reg. no.	Graphical symbol	Description
26.4	C2008		Support ring
26.5	X8159		Manhole
26.6	X8160		Socket, connection nozzle
27	INTERNALS		
27.1	C2044		Tray (general)
27.2	X8166		Tray with baffle
27.3	C2010		Tray, bubble-cap type
27.4	C2011		Tray, valve type
27.5	2602		Sieve tray, screen or sieve element
27.6	C2047		Filter insert (general)
27.7	2604		Fluidized bed
27.8	X8141		packing
28	AGITATORS, STIRRERS		
28.1	2672		Agitator (general), stirrer (general)
28.2	C2019		Agitator, flate-blade paddle type

Table 2 (continued)








Item no.	Reg. no.	Graphical symbol	Description
28.3	C2020		Agitator, gat paddle type
28.4	C2021		Agitator, cross-beam type
28.5	C2022		Agitator, anchor type
28.6	C2023		Agitator, helical type
28.7	C2024		Agitator, impeller type
28.8	C2025		Agitator, propeller type
28.9	C2026		Agitator, disc type

Table 2 (continued)





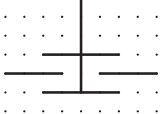








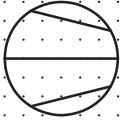

Item no.	Reg. no.	Graphical symbol	Description
28.10	C2027		Agitator, turbine type
29	INTERNAL CHARACTERISTICS AND BUILT-IN COMPONENTS		
29.1	C2028		Gravity type, settling type
29.2	C2030		Electrostatic type
29.3	C2031		Electromagnetic type
29.4	C2033		Disc type
29.5	C0240		Crushing
29.6	C024		Gear type, gearwheels type
29.7	C2034		Hammer type
29.8	C2035		Impact type
29.9	C2036		Jaw type
29.10	321		Liquid type, wet type
29.11	C2037		Roller type
29.12	C2038		Cone type

Table 2 (continued)

Item no.	Reg. no.	Graphical symbol	Description
29.13	X8176		Jet type
29.14	3831		Vibration type

Annex A (informative)

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Bibliography

- [1] IEC 62424, *Representation of process control engineering — Requests in P&I diagrams and data exchange between P&ID tools and PCE-CAE tools*
- [2] IEC 60617 (all parts), *Graphical symbols for diagrams*

