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Building construction machinery and equipment — Plants for the preparation of concrete and mortar —

Part 1: Terminology and commercial specifications

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Partie 1: Terminologie et spécifications commerciales

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Foreword

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A list of all parts in the ISO 19720 series can be found on the ISO website.

Building construction machinery and equipment — Plants for the preparation of concrete and mortar —

Part 1: Terminology and commercial specifications

1 Scope

This document specifies terms and definitions and commercial specifications for concrete mixing plants, concrete batching plants and dry mortar mixing plants used in the preparation of concrete and mortar.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 11375, *Building construction machinery and equipment — Terms and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11375 and the following apply.

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

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

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

3.1
concrete
material formed by mixing cement, coarse and fine aggregates, and water, with or without the incorporation of admixtures, additives or fibres, which develops its properties by hydration

3.2
mortar
mixture of binder (cement, etc.), fine aggregates, water and optional additives, which hardens and which is normally used as a jointing material

3.3
dry mortar
mixture of binder (cement, plaster, etc.), fine aggregates and optional additives and when mixed with water, hardens

3.4
concrete mixing plant
combination of structures and devices used for proportioning aggregates, cement, water and possible additives, admixtures, and mixing them by means of the *concrete mixing unit* (3.7) to generate *concrete* (3.1)

3.4.1
batch-type concrete mixing plant
concrete mixing plant (3.4) which runs periodically following defined processes including materials supply, proportion, charging, mixing and discharging

3.4.2
continuous concrete mixing plant
concrete mixing plant (3.4) in which all the processes including materials-supply, proportion, charging, mixing, discharging are operated continuously

3.4.3
vertical concrete mixing plant
tower concrete mixing plant
configuration of *concrete mixing plant* (3.4) where the aggregate *storage bins* (3.9) are located above the *concrete mixing unit* (3.7)

Note 1 to entry: See Figure A.1.

3.4.4
horizontal concrete mixing plant
configuration of *concrete mixing plant* (3.4) where the aggregate *storage bins* (3.9) or an active storage are located to the side of the *concrete mixing unit* (3.7)

Note 1 to entry: An example of a horizontal concrete mixing plant where aggregates are loaded into bins with a wheel loader is shown in Figure A.2.

Note 2 to entry: An example of a horizontal concrete mixing plant where aggregates are loaded into bins with a drag-line is shown in Figure A.3.

3.4.5
stationary concrete mixing plant
concrete mixing plant (3.4) which remains fixed in place during operation and designed to stay permanently in its position (e.g. installed on permanent foundations) until its dismantling

3.4.6
transferable concrete mixing plant
concrete mixing plant (3.4) which remains fixed in place during operation and where components can be quickly assembled and disassembled for transport from one place to another

Note 1 to entry: See Figure A.4.

3.4.7
mobile concrete mixing plant
concrete mixing plant (3.4) which remains fixed in place during operation and which is self-propelled or trailed to move from one place to another

Note 1 to entry: See Figure A.5.

3.5
concrete batching plant
combination of structures and devices used for proportioning aggregates, cement, and/or water, admixtures so that they can be ready for transport

3.5.1
vertical concrete batching plant
configuration of *concrete batching plant* (3.5) where the aggregate *storage bins* (3.9) are located above the batcher and the vehicle being loaded

Note 1 to entry: See Figure A.6.

3.5.2
horizontal concrete batching plant
configuration of *concrete batching plant* (3.5) where the aggregate *storage bins* (3.9) are arranged at the side of the charging (feeding) hopper

Note 1 to entry: See Figure A.7.

3.5.3
stationary concrete batching plant
concrete batching plant (3.5) which remains fixed in place during operation and is designed to stay permanently in its position (e.g. installed on permanent foundations) until its dismantling

Note 1 to entry: See Figure A.6.

3.5.4
transferable concrete batching plant
concrete batching plant (3.5) which remains fixed in place during operation and where components can be quickly assembled and disassembled for transport from one place to another

Note 1 to entry: See Figure A.7.

3.6
dry mortar mixing plant
combination of structures and devices used for proportioning binder (cement, plaster, etc.), fine aggregates and possible additives, and mixing them by means of the *dry mortar mixing unit* (3.8) to generate *dry mortar* (3.3)

3.6.1
compact dry mortar mixing plant
configuration of *dry mortar mixing plant* (3.6) where the aggregate *storage bins* (3.9) are arranged below the *dry mortar mixing unit* (3.8) and all the aggregates are lifted up beyond the mixing unit and then mass-dosed

Note 1 to entry: See Figure A.8.

3.6.2
serial dry mortar mixing plant
configuration of *dry mortar mixing plant* (3.6) where the aggregate *storage bins* (3.9) are arranged below the *dry mortar mixing unit* (3.8) and all the mass-dosed aggregates are lifted up beyond the mixing unit

Note 1 to entry: See Figure A.9.

3.6.3
tower dry mortar mixing plant
configuration of *dry mortar mixing plant* (3.6) where the aggregate *storage bins* (3.9) and *batcher* (3.15) are located above the *dry mortar mixing unit* (3.8)

Note 1 to entry: See Figure A.10.

3.7
concrete mixing unit
component of a *concrete mixing plant* (3.4) where measured (by mass or volume) proportions of water, cement, aggregate and possible additives, admixtures are mixed for a specified amount of time

3.8
dry mortar mixing unit
component of a *dry mortar mixing plant* (3.6) where mass-measured proportions of binder (cement, plaster, etc.), fine aggregates and possible additives are mixed for a specified amount of time

3.9
storage bin
container on mixing and batching plants used for storing raw materials (e.g. aggregates, cement)

Note 1 to entry: See Figure A.1.

3.10
conveying equipment
equipment used to transport materials from the storage area to the batching and/or mixing equipment

EXAMPLE Bucket elevator, belt conveyor.

Note 1 to entry: See Figure A.1, key number 1.

3.11
thermal energy equipment
equipment used for the generation, conversion of thermal energy for the drying of wet sand

EXAMPLE Fluidized bed furnace and burner.

3.12
drying equipment
equipment used to achieve heat exchange for the drying of wet sand

3.13
screening device
equipment used to classify and separate material particles by sizes passing through the grate openings

3.14
batching equipment
equipment used to prepare material or mixed material according to the proportion of *concrete* (3.1), *mortar* (3.2) and *dry mortar* (3.3) mixture

3.15
batcher
device consisting of the scales and necessary mechanism for its operation including cement batcher, aggregate batcher, additive batcher and water batcher, etc.

3.16
discharge device
mechanism that moves the mixed *concrete* (3.1) or *dry mortar* (3.3) to transport vehicle

Note 1 to entry: Discharge device of concrete mixing plant and batching plant is a fixed hopper while that of dry mortar mixing plant is extensible (see Figure A.2 and Figure A.10).

3.17
packer
machine which is able to automatically finish a series of operations for *dry mortar* (3.3) such as weighing, filling and sealing

3.18
dry mortar storage silo
enclosed device for storing *dry mortar* (3.3)

3.19
batching accuracy
relative deviation of the batched portion from the programmed value, expressed as a percent

Note 1 to entry: Batching accuracy is expressed by the following formula:

$$(m_a - m)/m \times 100\ \%$$

where

m is the specified mass for batching;

m_a is real value of a mass received in a batching process.

[SOURCE: ISO 15642:2003, 3.28]

3.20
discharge height
vertical distance from the lowest edge of discharge device of *concrete mixing plant* (3.4), *concrete batching plant* (3.5) and dry mortar mixing plant to the foundation plane when the equipment is working

Note 1 to entry: See Figures A.1 to A.10, dimension H.

Note 2 to entry: If the discharge device is extensible, it should have drawn back to the highest position while metering the discharge height. See Figures A.8 to A.10, dimension H.

3.21
cycle time
duration from the start of charging components to the completion of preparation to accept the next charge after the reset

Note 1 to entry: The cycle time, t_c, is calculated from the following formula:

$$t_c = t_1 + t_2 + t_3 + t_4$$

where

t_1 is the charging time(s);

t_2 is the mixing time(s);

t_3 is the discharging time(s);

t_4 is the reset time(s).

Note 2 to entry: Batching plant is without t_2.

Note 3 to entry: Adapted from ISO 18650-1.

3.22
reset time
duration from the completion of the discharging to the start of charging for the next batch(s)

3.23
number of batches
quantity of batches of mixing or batching per one hour

Note 1 to entry: The number of batches per hour is calculated as follows:

$$n = 3\ 600/t_c$$

where

t_c is the cycle time(s).

Note 2 to entry: Adapted from ISO 18650-1.

3.24
nominal capacity
parameter equal to the components (cement + aggregates +/or water) capacity, or the output capacity of compacted ready *concrete* (3.1) and *dry mortar* (3.3) per batch of operation

Note 1 to entry: The components (cement + aggregates +/or water) capacity applies to batching plants.

3.25
theoretical output capacity
volume of compacted ready *concrete* (3.1) [*concrete mixing plant* (3.4)] or the components for mixing [*concrete batching plant* (3.5)] or mass of *dry mortar* (3.3) produced by a mixing plant and batching plant per hour of operation

Note 1 to entry: The theoretical output for batch type concrete mixing plant and batching plant is expressed by the following formula:

$$Q = n \times V_u / 1\,000$$

where

n is the number of batches per hour (h^{-1});
V_u is the capacity of compacted ready concrete or the components for mixing (dm^3);
Q is the theoretical output capacity (m^3/h).

Note 2 to entry: The theoretical output capacity for continuous concrete mixing plant is calculated as follows:

$$Q = 3{,}6\, q_m / \rho$$

where

q_m is the mass flow rate of charging concrete components (kg/s);
ρ is the specific gravity of the produced concrete components (kg/dm^3);
Q is the theoretical output capacity (m^3/h).

Note 3 to entry: The theoretical output for dry mortar mixing plant is expressed by the following formula:

$$Q = \rho \times n \times V_u / 1\,000$$

where

ρ is the specific gravity of the produced dry mortar components (t/m^3);
n is the number of batches per hour (h^{-1});
V_u is the capacity of dry mortar (dm^3);
Q is the theoretical output capacity (t/h).

Note 4 to entry: Adapted from ISO 18650-1.

4 Classification

Machinery and plants for the preparation of concrete and mortar are divided into concrete mixing plant, concrete batching plant and dry mortar mixing plant.

In general terms, concrete mixing plants are typically classified by the following three main characteristics (see Table 1):

— production mode;

— position of aggregate bin relative to the mixing unit;

— mode and frequency of transportation.

Table 1 — Classification of the concrete mixing plant

Classification	Type	Reference figures
Production mode	Batch-type concrete mixing plant	see Figures A.1 to A.5
	Continuous concrete mixing plant	—
Position of aggregate bin relative to the mixing unit	Vertical (tower) concrete mixing plant	see Figure A.1
	Horizontal concrete mixing plant	see Figures A.2 and A.3

Table 1 *(continued)*

Classification	Type	Reference figures
Mode and frequency of transportation	Stationary concrete mixing plant	see Figures A.1 to A.3
	Transferable concrete mixing plant	see Figure A.4
	Mobile concrete mixing plant	see Figure A.5

In general terms, concrete batching plants are typically classified by the following two main characteristics (see Table 2):

— position of aggregate bin relative to the batcher and transport vehicle;

— mode and frequency of transportation.

Table 2 — Classification of the concrete batching plant

Classification	Type	Reference figures
Position of aggregate bin relative to the batcher and transport vehicle	Vertical concrete batching plant	see Figure A.6
	Horizontal concrete batching plant	see Figure A.7
Mode and frequency of transportation	Stationary concrete batching plant	see Figure A.6
	Transferable concrete batching plant	see Figure A.7

In general terms, dry mortar mixing plants are typically classified by the following main characteristics (see Table 3).

Table 3 — Classification of the dry mortar mixing plant

Classification	Type	Reference figures
Position of aggregate bin relative to the mixing unit and batcher	Compact dry mortar mixing plant	see Figure A.8
	Serial dry mortar mixing plant	see Figure A.9
	Tower dry mortar mixing plant	see Figure A.10

5 Commercial specifications

5.1 General characteristics

The following characteristics shall be specified:

a) type and model

b) manufacturer's name

c) theoretical output capacity — m^3/h (or t/h for dry mortar mixing plant)

d) total installed power — kW

e) discharge height — mm

f) total mass (unloaded) — t

g) dimensions:

1) overall length — m

2) overall width — m

3) overall height — m