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

**Part 1:
Terminology and commercial
specifications**

*Machines et matériels pour la construction des bâtiments — Usines de
préparation du béton et du mortier —*

Partie 1: Terminologie et spécifications commerciales

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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.

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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 +/- 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 +/- 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 (dm³);
- Q is the theoretical output capacity (m³/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/dm³);
- Q is the theoretical output capacity (m³/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/m³);
- n is the number of batches per hour (h⁻¹);
- V_u is the capacity of dry mortar (dm³);
- 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 m³/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

5.2 Characteristics of main components

5.2.1 Concrete mixing unit

The following characteristics shall be specified:

- | | | |
|----|--|-------------------|
| a) | type and model | |
| b) | nominal capacity | dm ³ |
| c) | output per hour for a specified number of cycles, <i>n</i> | m ³ /h |
| d) | maximum size of aggregates: | |
| | 1) gravel | mm |
| | 2) crushed stone | mm |
| e) | power | kW |

Characteristic [5.2.1 c\)](#) designates the technical capability of a mixer and usually refers to ordinary concrete production. Some concrete mixes (e.g. with a low water/cement ratio used in the precast-concrete industry) can require a prolonged mixing time. In these cases, it is necessary that the mixer's output capacity be agreed between the purchaser and supplier.

5.2.2 Dry mortar mixing unit

The following characteristics shall be specified:

- | | | |
|----|--|-----------------|
| a) | type and model | |
| b) | nominal capacity | dm ³ |
| c) | output per hour for a specified number of cycles, <i>n</i> | t/h |
| d) | maximum size of sands | mm |
| e) | power | kW |

Characteristic [5.2.2 c\)](#) designates the technical capability of a mixer and usually refers to ordinary dry-mixed mortar production. Some special dry-mixed mortar (e.g. with a variety of additives or with trace additive) may require a prolonged mixing time. In these cases, it is necessary that the mixer's output capacity be agreed between the purchaser and supplier.

5.2.3 Storage bin

The following characteristics shall be specified:

- | | | |
|----|--|----------------|
| a) | storage volume and number of bins of aggregate | m ³ |
| b) | storage volume and number of bins of binder (cement, etc.) | m ³ |
| c) | storage volume and number of bins of additive | m ³ |
| d) | volume of water tank | m ³ |

5.2.4 Conveying equipment

The following characteristics shall be specified:

- a) type and model
- b) max. theoretical conveying capacity t/h
- c) power kW

5.2.5 Thermal energy equipment

The thermal energy equipment is used only for dry mortar mixing plant:

- a) type and model
- b) fuel (e.g. coal, gas, fuel oil, etc.)
- c) heat supply J/h

5.2.6 Drying equipment

The drying equipment is used only for dry mortar mixing plant.

- a) type and model
- b) dry sand capacity t/h
- c) power kW

5.2.7 Screening device

The following characteristics shall be specified:

- a) type and model
- b) screening capacity t/h
- c) screen layers and size of mesh mm
- e) power kW

5.2.8 Batching equipment

The following characteristics shall be specified:

- a) range and accuracy of aggregate batcher kg, %
- b) range and accuracy of cement batcher kg, %
- c) range and accuracy of admixtures batcher kg, %
- d) range and accuracy of additive batcher kg, %
- e) range and accuracy of water batcher kg, %

5.2.9 Packer

The following characteristics shall be specified:

- a) type and model
- b) output of packer t/h
- c) power kW

5.2.10 Dry mortar storage silo

The following characteristics shall be specified:

- storage capacity and number of silos of dry mortar m³

5.3 Other characteristics

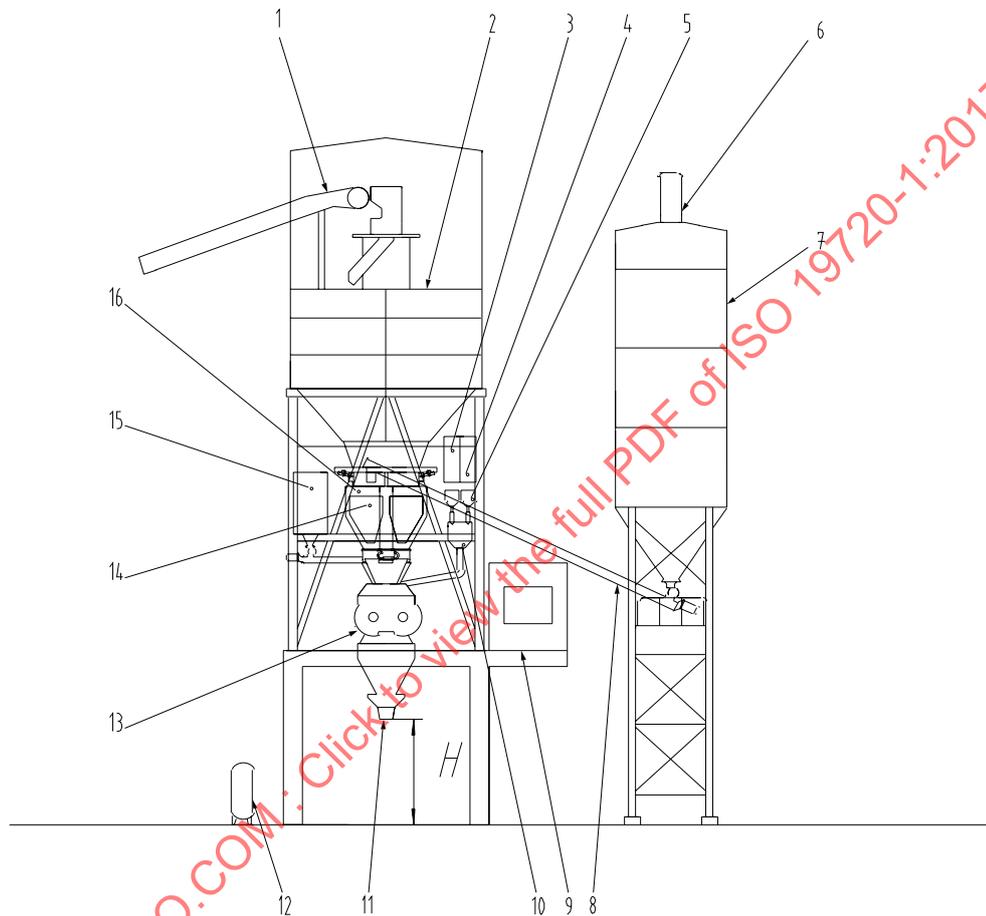
The following data shall be specified:

- power supply:
 - 1) number of phases
 - 2) supply voltage V
 - 3) frequency Hz

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Annex A (informative)

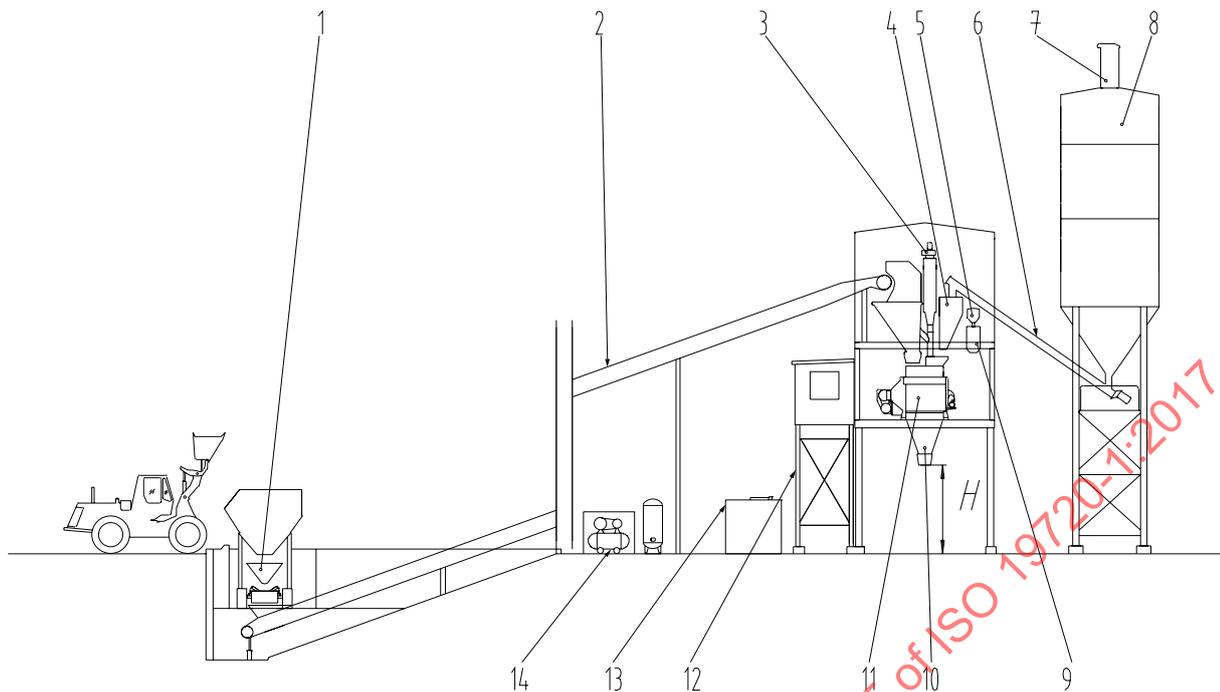
Examples of concrete and dry mortar mixing and batching plants



Key

1	aggregate conveying equipment	10	water batcher
2	aggregate storage bin	11	discharge device
3	additive storage device	12	pneumatic system
4	water tank	13	concrete mixing unit
5	additive batcher	14	cement batcher
6	dust collector of cement storage bin	15	dust collector of mixing unit
7	cement storage bin	16	aggregate batcher
8	cement conveying equipment	<i>H</i>	discharge height
9	electrical control system		

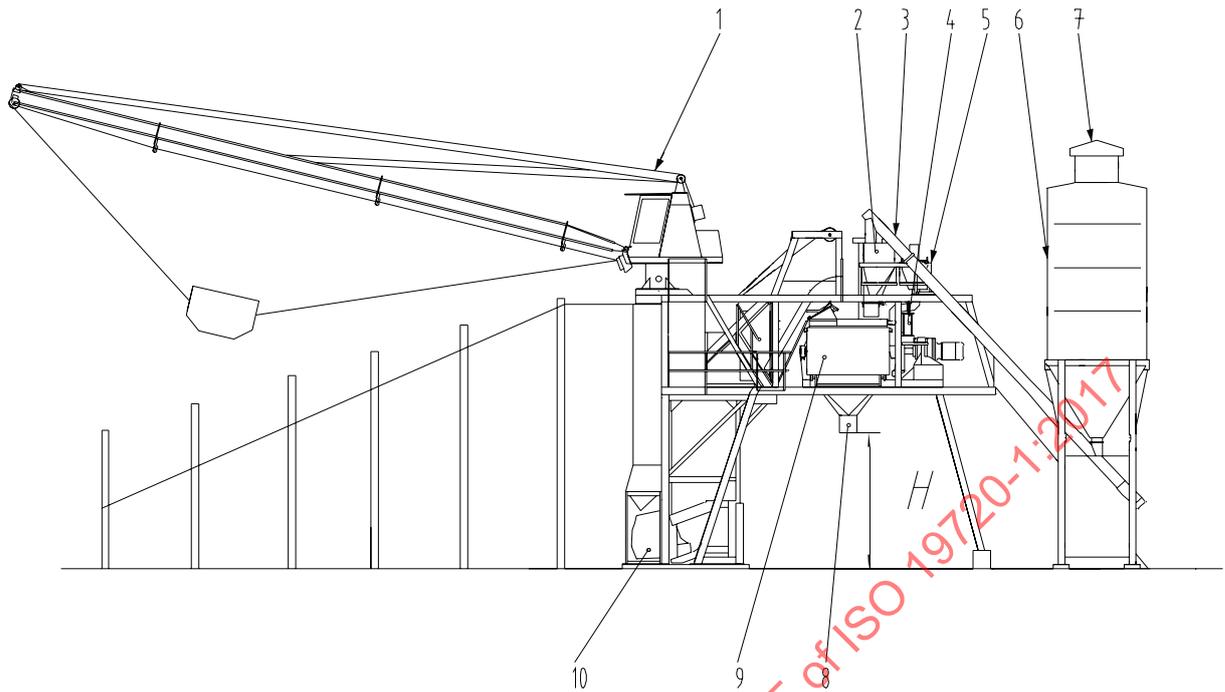
Figure A.1 — Vertical (tower) concrete mixing plant



Key

- | | |
|--|------------------------------|
| 1 aggregate batcher | 9 water batcher |
| 2 aggregate conveying equipment | 10 discharge device |
| 3 dust collector of mixer unit | 11 concrete mixing unit |
| 4 cement batcher | 12 electrical control system |
| 5 additive batcher | 13 additive storage bin |
| 6 cement conveying equipment | 14 pneumatic system |
| 7 dust collector of cement storage bin | H discharge height |
| 8 cement storage equipment | |

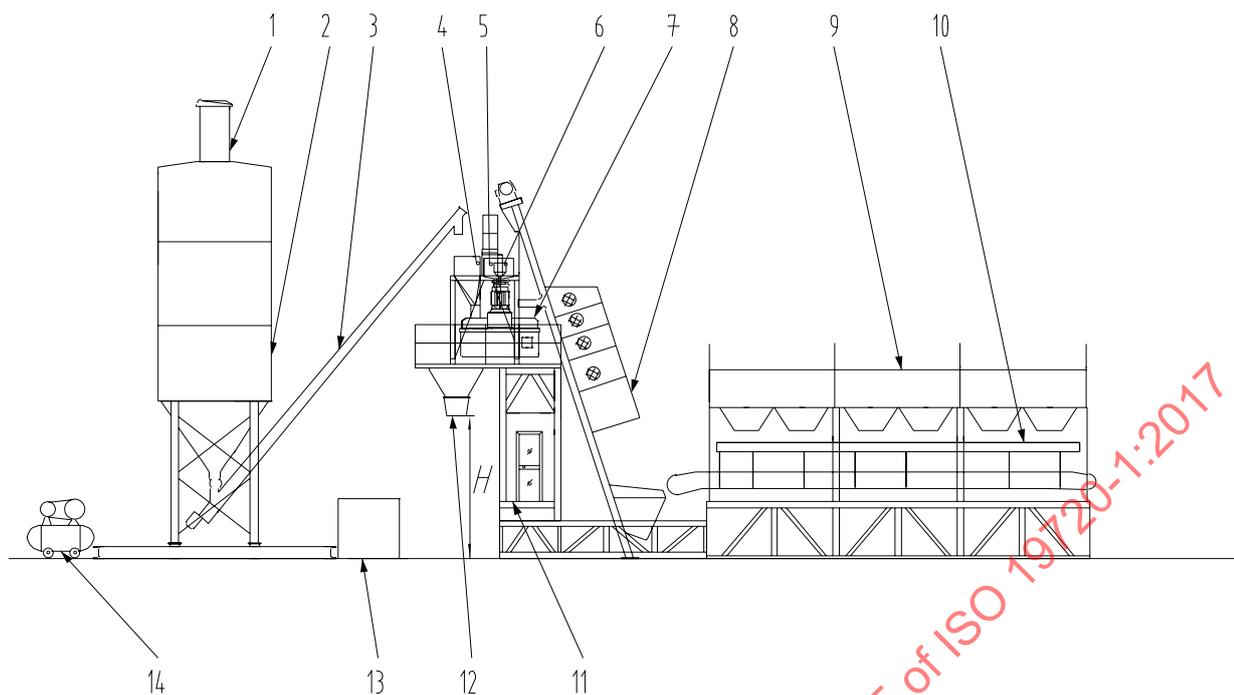
Figure A.2 — Horizontal concrete mixing plant — Aggregates loaded into bins with wheel loader



Key

- | | |
|--|---------------------------|
| 1 aggregate conveying equipment | 9 concrete mixing unit |
| 2 cement batcher | 10 aggregate batcher |
| 3 cement conveying equipment | <i>H</i> discharge height |
| 4 water batcher | |
| 5 additive batcher | |
| 6 cement storage bin | |
| 7 dust collector of cement storage bin | |
| 8 discharge device | |

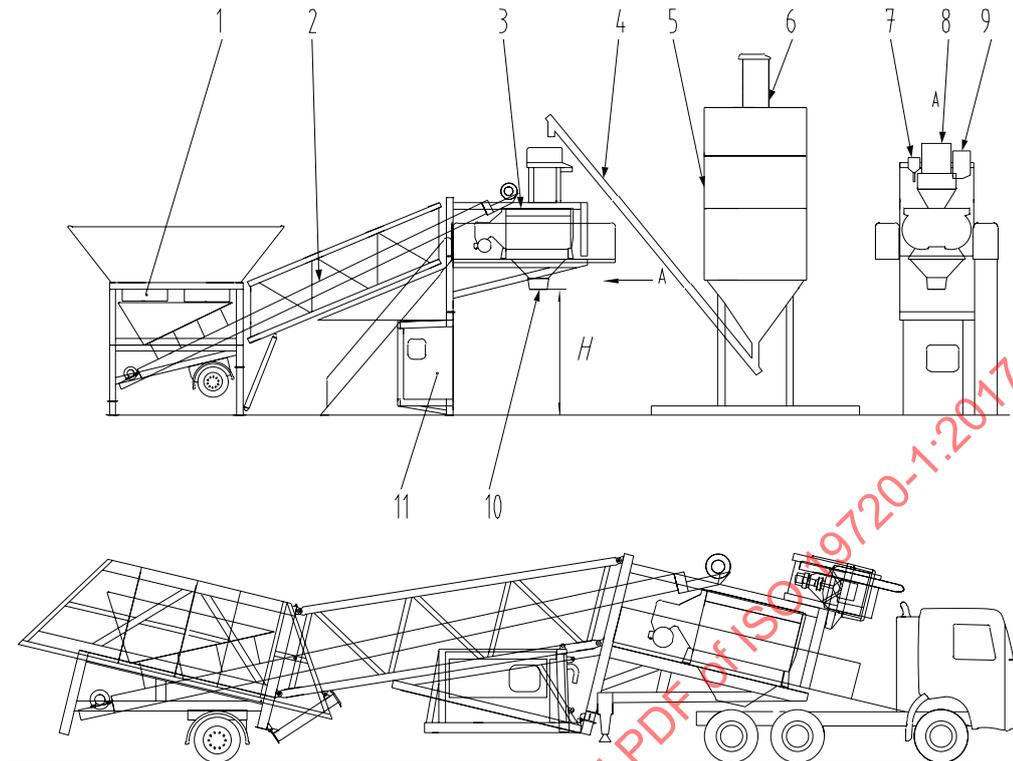
Figure A.3 — Horizontal concrete mixing plant — Aggregates loaded into bins with drag-line



Key

- | | | | |
|---|--------------------------------------|----------|---------------------------|
| 1 | dust collector of cement storage bin | 9 | aggregate storage bin |
| 2 | cement storage equipment | 10 | aggregate batcher |
| 3 | cement conveying equipment | 11 | electrical control system |
| 4 | cement batcher | 12 | discharge device |
| 5 | water batcher | 13 | additive storage bin |
| 6 | additive batcher | 14 | pneumatic system |
| 7 | concrete mixing unit | <i>H</i> | discharge height |
| 8 | aggregate conveying equipment | | |

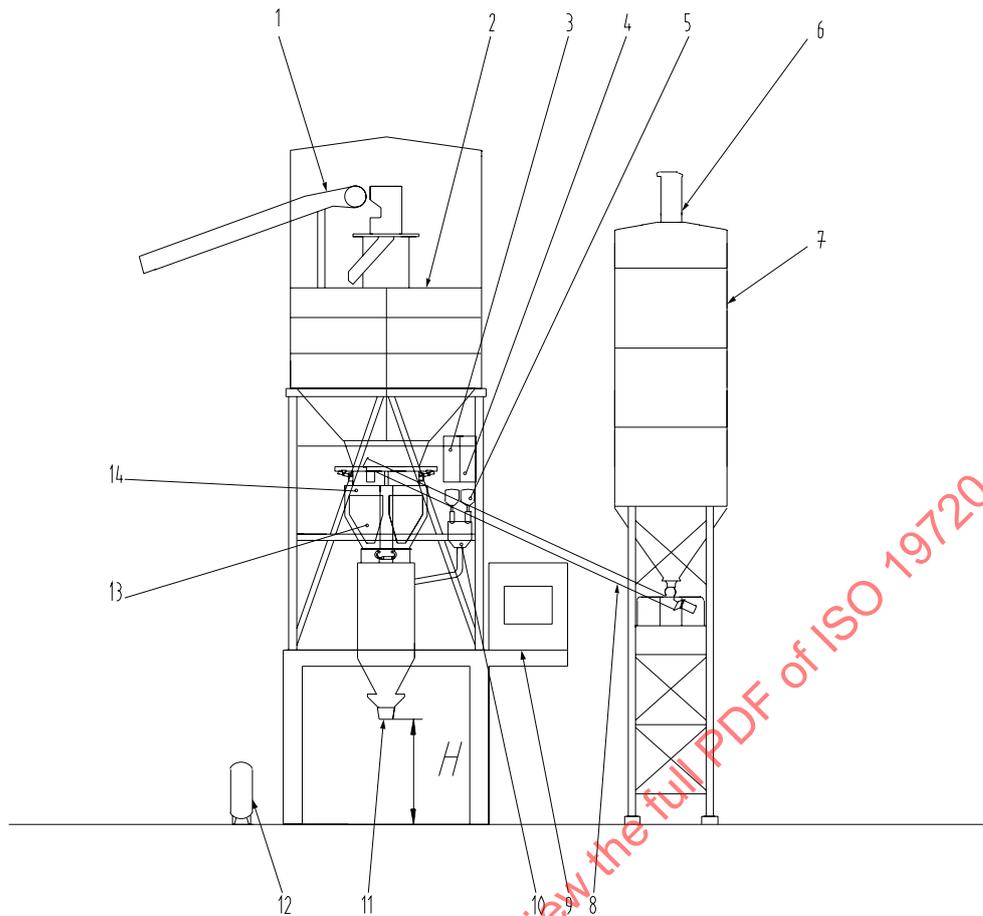
Figure A.4 — Transferable concrete mixing plant



Key

- | | |
|--|------------------------------|
| 1 aggregate batcher | 9 water batcher |
| 2 aggregate conveying equipment | 10 discharge device |
| 3 concrete mixing unit | 11 electrical control system |
| 4 cement conveying equipment | <i>H</i> discharge height |
| 5 cement storage bin | |
| 6 dust collector of cement storage bin | |
| 7 additive batcher | |
| 8 cement batcher | |

Figure A.5 — Mobile concrete mixing plant



Key

- | | |
|--|-----------------------------|
| 1 aggregate conveying equipment | 9 electrical control system |
| 2 aggregate storage bin | 10 water batcher |
| 3 additive storage bin | 11 discharge device |
| 4 water tank | 12 pneumatic system |
| 5 additive batcher | 13 cement batcher |
| 6 dust collector of cement storage bin | 14 aggregate batcher |
| 7 cement storage bin | H discharge height |
| 8 cement conveying equipment | |

Figure A.6 — Vertical concrete batching plant/stationary concrete batching plant