
**Building construction machinery and
equipment — Concrete mixers —**

**Part 1:
Commercial specifications**

*Machines et matériels pour la construction des bâtiments —
Malaxeurs à béton —*

Partie 1: 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.

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

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

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

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

This document was prepared by Technical Committee ISO/TC 195, *Building construction machinery and equipment*, Subcommittee SC 1, *Machinery and equipment for concrete work*.

This second edition cancels and replaces the first edition (ISO 18650-1:2004), which has been technically revised.

The main changes compared to the previous edition are as follows:

- added definition for "self-loading mobile concrete mixer" in [3.1.3.4](#) and also added reference to [Figures A.23](#) and [A.24](#);
- added commercial specifications for discharging-chute concrete mixer in [5.3.4](#) and self-loading mobile concrete mixer in [5.3.8](#);
- added [Figures A.17](#) to [A.22](#) for clarification of classification.

A list of all parts in the ISO 18650 series can be found on the ISO website.

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

Building construction machinery and equipment — Concrete mixers —

Part 1: Commercial specifications

1 Scope

This document establishes the content for commercial literature for concrete mixers used either as individual machines on building sites or as components of batching plants.

Definitions refer to whole machines, their structure and parameters.

The commercial specifications establish technical characteristics of the whole machines and their components.

Truck mixers, as defined in ISO 19711-1, are excluded from this document.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

3.1

concrete mixer

machine designed for the production of concrete by mixing of measured (by mass or volume) proportions of water, cement, aggregate and possibly chemical additives, within a certain time limit

Note 1 to entry: A concrete mixer can be furnished with the following accessories: charging skip hoist, fixed or wheeled, or self-propelled supporting frame, mechanical shovel, water dosing equipment, and a skip weighing system.

3.1.1

batch-type concrete mixer

concrete mixer (3.1) in which charging with concrete constituents and discharging of the drum are carried out periodically, in batches

3.1.2

continuous-type concrete mixer

concrete mixer (3.1) in which charging with concrete constituents and discharging of the drum are carried out continuously as an uninterrupted flow

Note 1 to entry: See [Figures A.15](#) and [A.16](#) for examples.

3.1.3

gravity concrete mixer **free-fall concrete mixer**

concrete mixer (3.1) where mixing is performed by repeatedly elevating the mixed concrete and dropping it from a certain height, inside a mixing drum, during its rotation

3.1.3.1

reversing-drum concrete mixer

reversing concrete mixer

gravity concrete mixer (3.1.3) with a reversible direction of rotation of the mixing drum where discharge of mixed concrete is by reversing the rotation of the drum

Note 1 to entry: See [Figures A.4](#) and [A.5](#) for examples.

3.1.3.2

tipping-drum concrete mixer

free-fall concrete mixer (3.1.3) with a tipping mixing drum, open at one end for charging and discharging of the concrete mix where discharging is carried out by tilting the drum

Note 1 to entry: See [Figures A.1](#), [A.2](#) and [A.3](#) for examples.

3.1.3.3

discharging-chute concrete mixer

free-fall concrete mixer (3.1.3) with a mixing drum open at both sides where charging is carried out from one side and discharging from the other by means of a chute entering the drum

Note 1 to entry: See [Figure A.17](#) for an example.

3.1.3.4

self-loading mobile concrete mixer

gravity concrete mixer (3.1.3) with a reversible direction of rotation of the mixing drum where discharge of mixed concrete is by reversing the rotation of the drum, integrated into a self-propelled frame equipped with a self-loading attachment intended to use for a complete production and batching of concrete, including transportation on road and off-road to reach the pouring site

Note 1 to entry: See [Figures A.23](#) and [A.24](#) for examples.

3.1.4

compulsory concrete mixer

concrete mixer (3.1) with mixing effected by the action of one or more agitators moving inside a mixing chamber with either a vertical axis (pan) or horizontal axis (trough)

Note 1 to entry: See [Figure A.18](#) for an example.

3.1.4.1

pan-type concrete mixer

compulsory concrete mixer (3.1.4) with agitators rotating about the vertical axis of a stationary or rotating pan

3.1.4.2

turbo concrete mixer

compulsory concrete mixer (3.1.4) with an agitator rotating about the vertical axis of a stationary pan, charged from the top and discharged by opening a segment of the pan bottom

Note 1 to entry: See [Figures A.6](#), [A.7](#) and [A.8](#) for examples.

3.1.4.3**planetary concrete mixer**

compulsory concrete mixer (3.1.4) with vertically mounted agitators having a planetary type of motion, inside a stationary pan where the mixer is charged from the top, and discharged by opening a segment of the pan bottom

Note 1 to entry: See [Figures A.9](#) and [A.10](#) for examples.

3.1.4.4**turbo planetary concrete mixer**

compulsory concrete mixer (3.1.4) having one agitator rotating about the vertical axis of a stationary pan in addition to other agitators in planetary motion where the mixer is charged from the top and discharged by opening a segment of the pan bottom

Note 1 to entry: See [Figure A.19](#) for an example.

3.1.4.5**counter-current operation concrete mixer**

compulsory concrete mixer (3.1.4) with one or more agitators rotating about the vertical axes in a counter-rotating pan where the mixer is charged from the top and discharged by opening a segment of the pan bottom

Note 1 to entry: See [Figure A.20](#) for an example.

3.1.4.6**concurrent operation concrete mixer**

compulsory concrete mixer (3.1.4) with one or more agitators rotating about vertical axes in a pan rotating concurrently where the mixer is charged from the top and discharged by opening a segment of the pan bottom

Note 1 to entry: See [Figure A.21](#) for example.

3.1.4.7**concrete mixer with high-speed stirrer
concrete mixer with high-speed activator**

compulsory concrete mixer (3.1.4) with one or more agitators rotating about vertical axes including one high speed agitator (activator) where the mixer is charged from the top and discharged by opening a segment of the pan bottom

Note 1 to entry: See [Figure A.22](#) for an example.

3.1.4.8**paddle concrete mixer**

compulsory concrete mixer (3.1.4) with one or two paddle agitators rotating about horizontal axis in a casing (trough) where the mixer is charged from the top and discharged by opening a segment of the pan bottom

Note 1 to entry: The paddles may be straight or helix edged.

Note 2 to entry: See [Figures A.11](#), [A.12](#), [A.13](#) and [A.14](#) for examples.

3.2**charging time**

t_1

duration, expressed in seconds, of charging the concrete components to the *batch-type concrete mixer* (3.1.1) for one batch

3.3 mixing time

t_2
<batch-type concrete mixer> duration, expressed in seconds, from the completion of charging the concrete components in a *batch-type concrete mixer* (3.1.1) to the completion of their mixing

3.4 mixing time

t_2
<continuous-type concrete mixer> duration, expressed in seconds, during which the concrete components in a *continuous-type concrete mixer* (3.1.2) are kept in the mixing chamber

Note 1 to entry: The mixing time for a continuous-type concrete mixer is calculated as follows:

$$t_2 = \frac{m_c}{q_m}$$

where

m_c is the mass of concrete components in the mixing chamber, expressed in kilograms;

q_m is the mass flow rate of the concrete components being charged, expressed in kilograms per second.

3.5 discharging time

t_3
duration, expressed in seconds, from the start of discharging to its completion

Note 1 to entry: The remainder in the mixer after discharging is expected to not to exceed 3 % of *ready concrete capacity* (3.10).

3.6 reset time

t_4
duration, expressed in seconds, from the completion of the discharging to the start of charging for the next batch

3.7 cycle time

t_c
duration, expressed in seconds, from the start of charging concrete components to the completion of preparation to accept the next charge after the reset

Note 1 to entry: The cycle time is calculated as follows:

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

3.8 number of batches

n
quantity of batches of mixing in a one-hour period of time

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* (3.7), expressed in seconds.

3.9**dry components capacity** V_c

volume, expressed in cubic metres, of dry components (cement + aggregates) for one batch

3.10**ready concrete capacity** V_u

volume, expressed in cubic meters, of ready concrete received from one batch

Note 1 to entry: The approximate volume of ready concrete received from one batch can be calculated as follows:

$$V_u = V_c \cdot \alpha$$

where

V_c is the *dry components capacity* (3.9), expressed in cubic metres;

α is the coefficient equal to the ratio V_u / V_c , which, for ordinary concrete [as defined in Note 1 to entry for *rated capacity* (3.11)], is 0,7.

3.11**rated capacity**

parameter equal to the *dry components capacity* (3.9), V_c , divided by the *ready concrete capacity* (3.10), V_u

Note 1 to entry: Typically, concrete mixer rated capacity refers to the ordinary concrete used in building sites which has a density between 1 800 kg/m³ and 2 500 kg/m³ and is composed of cement, water, fine and coarse mineral aggregates and possibly mineral additives and chemical admixtures. In the case of special concrete mixes (e.g. heavy aggregates), it is necessary that the concrete mixer capacity value be agreed between the supplier and purchaser.

EXAMPLE If the dry-components capacity for a mixer is 0,5 m³ and the ready concrete capacity is 0,35 m³, then the rated capacity is 350/500.

3.12**theoretical output capacity** Q

number of cubic metres of ready concrete received from the mixer per hour of operation expressed in cubic meters per hour

Note 1 to entry: The theoretical output for a batch type concrete mixer is calculated as follows:

$$Q = n \times V_u$$

where

n is the *number of batches* (3.8) per hour;

V_u is the *ready concrete capacity* (3.10), expressed in cubic metres.

Note 2 to entry: The theoretical output capacity for a continuous mixer is calculated as follows:

$$Q = \frac{3\,600 \times q_m}{\rho}$$

where

q_m is the mass flow rate of charging concrete components, expressed in kilograms per second;

ρ is the specific gravity of the produced concrete components, expressed in kilograms per cubic metre.

4 Description of the basic structures of concrete mixers

4.1 Basic structure of gravity concrete mixers

4.1.1 General

Gravity concrete mixers (see [Figures A.1 to A.5](#)) consist of the following basic units: an electric motor or combustion engine, a mixing drum, a mixing drum transmission, and a tipping drum mechanism and supporting frame, which may be provided with wheels to aid relocation. The larger machines (with a capacity larger than approximately 0,35 m³) typically have a skip hoist or charging bucket, a water-dosing unit and a towbar (see [Figures A.3, A.4 and A.5](#)).

4.1.2 Basic structure of self-loading mobile concrete mixer

Self-loading mobile concrete mixer consists of the following basic units: a self-propelled chassis, a mixing drum and a self-loading attachment (see [Figures A.23 and A.24](#)).

4.2 Basic structure of compulsory concrete mixers

Compulsory concrete mixers (see [Figures A.6 to A.14](#)) consist of the following basic units: a pan or trough, mixing blades, an electric motor and transmission for the mixing-blades drive, a discharging gate and its drive. Larger machines (with a capacity larger than approximately 0,35 m³) are typically equipped with a charging skip hoist, a cover for the pan or trough and a water-distributing installation (see [Figures A.7, A.8, A.10 and A.14](#)). For easy relocation, the machines may be provided with wheels.

5 Commercial specifications

5.1 Basic characteristics of a concrete mixer

5.1.1 General data

Specify the following parameters in the designated units, where given:

- a) general type, e.g. tipping drum, reversing drum, discharging chute, pan, turbo, planetary, turbo-planetary, counter-current operation, concurrent operation, with high-speed stirrer and paddle concrete mixer;
- b) rated capacity, in m³;
 - dry components capacity, in m³;
 - ready concrete capacity, in m³;
 - theoretical output capacity, in m³;
- c) output per hour for a specified number of cycles, n , in m³/h;
 - charging time, in s;
 - mixing time, in s;
 - discharging time, in s;

- reset time, in s;
- cycle time, in s;
- number of batches, in h^{-1} ;

This parameter designates the technical capability of a mixer and usually refers to ordinary concrete (as defined in Note 1 to entry 3.11) production. Some concrete mixes (e.g. with a low water/cement ratio used in the precast-concrete industry) 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.

d) maximum size of aggregates:

- gravel, in mm;
- crushed stone, in mm;

e) total power installed, in kW;

f) mass of the base machine, in kg;

g) mass of the unloaded machine in operating mode, in kg;

h) overall dimensions during operation:

- length, in mm;
- width, in mm;
- height, in mm.

5.1.2 Detailed data for the concrete mixer components

5.1.2.1 Motors and engines for mixing mechanisms

Specify whether the unit is driven by an electric motor or a combustion engine, and the relevant information from the following:

a) electric motors:

- number of phases;
- supply voltage, in V;
- power, in kW;
- frequency, in Hz;
- revolutions, in min^{-1} ;

b) combustion engines:

- type:
 - 4-stroke gasoline;
 - 2-stroke gasoline;
 - diesel;
- power, in kW;
- revolutions, in min^{-1} .

5.1.2.2 Skip hoist or bucket with optional specifications

Specify the following:

- a) skip-hoist or bucket capacity, in m^3 ;
- b) speed of lifting and descending, in m/min ;
- c) time of lifting and descending (for charging bucket), in s;
- d) mass of the skip hoist or bucket assembly, in kg.

5.1.2.3 Hydraulic or pneumatic installation for tilt mechanism

Specify the following:

- a) capacity of the hydraulic pump or compressor, in l/min ;
- b) maximum pressure (gauge), in MPa;
- c) volume of the hydraulic oil tank or air tank, in l.

5.1.2.4 Water dosing installation with optional specifications

Specify the following:

- a) water-supply pressure, in MPa;
- b) water-pump capacity, in l/min ;
- c) nominal diameter of water supply line, in mm;
- d) type of water-supply unit:
 - flow type with flow meter;
 - volume type with water tank;
 - weighing type with scale;
- e) operating capacity of water-supply unit, in l.

5.2 Dimensional characteristics of concrete mixers

The following dimensions and characteristics of concrete mixers, required for their installation and operation, shall be provided:

- a) overall dimensions (length, width and height) in operating mode and prepared for relocation (the latter pertains to a mixer provided with wheels);
- b) maximum angle of inclination of the mixing drum in operation (pertains to tipping-drum concrete mixers);
- c) dimensions and location of charging and discharging holes, including the slewing angle for the discharging gate;
- d) dimensions of the skip hoist or charging bucket assembly;
 - width and length of the skip-hoist track;
 - overall dimensions of the ship hoist and bucket;
- e) location of the charging skip hoist relative to the drum or pan;

- f) dimensions of the pan and its cover (diameter, height);
- g) spacing of mounting holes (pertains to stationary mixers).

NOTE Examples of dimensional characteristics of concrete mixers are presented in [Figures A.1](#) to [A.6](#) and [A.8](#) to [A.14](#).

5.3 Other specifications for particular types of concrete mixers

5.3.1 General

These characteristics augment the data given in [5.1](#).

5.3.2 Tipping drum gravity concrete mixer

Specify the following:

- a) revolutions of the drum, in min^{-1} ;
- b) method of additional protection from electric shock (2-class isolation, residual current device (RCD), separating transformer, etc.);
- c) permissible transport speed, in km/h ;
- d) type of tilting mechanism:
 - manual:
 - hand lever with drum position locking;
 - hand wheel with: direct drum position locking, brake disc or pedal operated drum position locking;
 - pneumatic;
 - hydraulic;
- e) type and dimension of wheels:
 - iron;
 - elastic;
 - solid-rubber tyres;
 - pneumatic tyres;
- f) options:
 - car or truck towbar, mudguards, lighted license plate and spring-mounted axle for towing up to 80 km/h ;
 - drum cover for horizontal mixing;
 - washer for the drum cover.

NOTE For dimensions, see [5.2](#) and [Figures A.1](#), [A.2](#) and [A.3](#).

5.3.3 Reversing-drum concrete mixer

Specify the following:

- a) number of revolutions of the drum, in min^{-1} ;

- b) permissible transport hauling speed, in km/h;
- c) options:
 - scraping shovel;
 - water-supply equipment (flow meter or volumetric gauging unit to measure water delivery, strainer and the cut-off valve);
 - skip-hoist weighing system.

NOTE For dimensions, see [5.2](#) and [Figures A.4](#) and [A.5](#).

5.3.4 Discharging-chute concrete mixer

Specify the following:

- a) number of revolutions of the drum, in min⁻¹;
- b) permissible transport hauling speed, in km/h:
 - options:
 - scraping shovel;
 - water-supply equipment (flow meter or volumetric gauging unit to measure water delivery, strainer and the cut-off valve);
 - skip-hoist weighing system.

NOTE For dimensions, see [5.2](#).

5.3.5 Pan-type concrete mixers

5.3.5.1 General data

NOTE See [Figures A.6](#), [A.7](#), [A.8](#), [A.9](#) and [A.10](#).

Specify the following:

- a) method of discharging of the mixer:
 - rotary or sliding gate, either actuated manually or driven electro-mechanically, hydraulically or pneumatically;
 - drop gate located in the centre of the pan bottom;
 - by tipping of the mixer;
- b) method of suspension of the mixing blade arms:
 - rigid;
 - elastic;
- c) control:
 - push-button contacts in switchbox;
 - options for the charging skip-hoist assembly, supporting the structure, metering the water flow, including a dirt-trap and a stop valve, volumetrically metering the water-supply unit, and weighing units for the cement and aggregates.

NOTE For dimensions, see 5.2 and Figures A.8 and A.10. Due to the variety of pan-type concrete mixers, only two examples of the characteristic dimensions are given. These are turbo and planetary concrete mixers, which are the most common.

5.3.5.2 Turbo concrete mixer

NOTE See Figures A.6, A.7 and A.8 for examples.

Specify following information for the mixing-blade assembly:

- number of revolutions of the rotor, in min^{-1} ;
- number of mixing blades;
- number of scraper cleaning blades for the side surfaces of the pan.

NOTE For dimensions, see 5.2 and Figure A.8.

5.3.5.3 Planetary and turbo-planetary concrete mixer

NOTE See Figures A.9 and A.10 for examples.

Specify the following information for the mixing-blade assembly:

- number of revolutions of the planetary gear, in min^{-1} ;
- number of revolutions of the mixing star(s), in min^{-1} ;
- number of mixing stars;
- number of blades for the single mixing stars;
- number of the scraper cleaning blades for the pan surface;
- number of working blades in the turbo system.

NOTE For dimensions, see 5.2 and Figure A.10.

5.3.5.4 Counter-current and concurrent operation concrete mixers

Specify the following information for the mixing-blade assembly:

- number of revolutions of the pan, in min^{-1} ;
- number of revolutions of the mixing star, in min^{-1} ;
- number of mixing stars;
- number of blades per single mixing star;
- number of the scraper cleaning blades for the pan surface;

NOTE For dimensions, see 5.2.

5.3.5.5 Concrete mixer with (a) high-speed stirrer(s)

Specify the following information for the mixing-blade assembly:

- number of stirrers;
- number of revolutions of the stirrer, in min^{-1} .

NOTE For dimensions, see 5.2.

5.3.6 Paddle concrete mixer

NOTE See [Figures A.11, A.12, A.13](#) and [A.14](#) for examples.

Specify the following information

- a) type of the mixer:
 - one-paddle agitator;
 - two-paddle agitators;
 - number of revolutions of the paddle agitators, in min^{-1} ;
- b) method of discharging:
 - by opening of the segment of the trough bottom;
 - by tipping (deals with small-sized paddle mixers);
 - dimensions;
- c) options for the charging skip hoist, supporting base frame, for the water-supply installation comprised of the water-supply unit and the cut-off valve and measuring device for cement and aggregate.

NOTE For dimensional characteristics of paddle mixers, see [5.2](#) and [Figures A.13](#) and [A.14](#).

5.3.7 Continuous-type concrete mixer

NOTE See [Figures A.15](#) and [A.16](#) for examples.

Specify the following:

- a) type of mixer:
 - gravity concrete mixer;
 - compulsory concrete mixer (with one or two paddle agitators);
- b) output capacity, in m^3/h ;
- c) maximum size of aggregates:
 - gravel, in mm;
 - crushed stone, in mm;
- d) power installed, in kW;
- e) motor or engine characteristics (in accordance with [5.1.2.1](#));
- f) mass.

NOTE For dimensions characteristics of the continuous-type concrete mixers, see [5.2](#) and [Figures A.15](#) and [A.16](#).

5.3.8 Self-loading mobile concrete mixer

NOTE See [Figure A.23](#) and [A.24](#) for examples.

Specify the following:

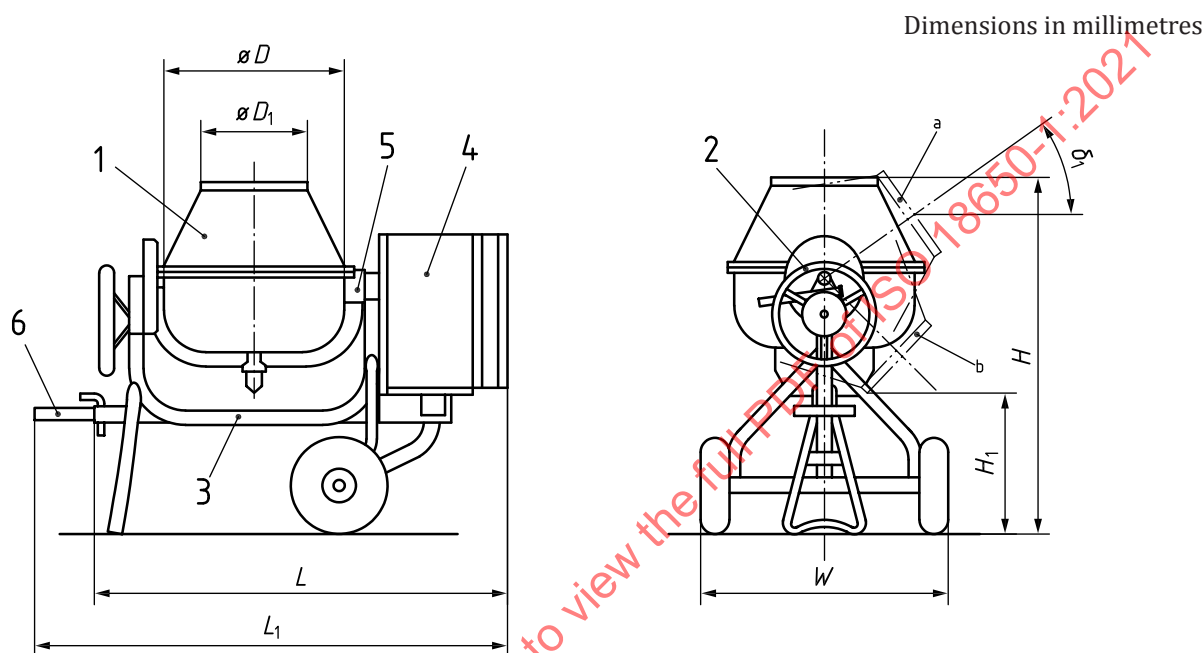
- a) Speed travel, in km/h ;

- b) loading direction, front or rear;
- c) hopper capacity, in m^3 ;
- d) bucket capacity, in m^3 ;
- e) number of revolutions of the drum, in min^{-1} ;
- f) water tank capacity, in l.

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Annex A (informative)

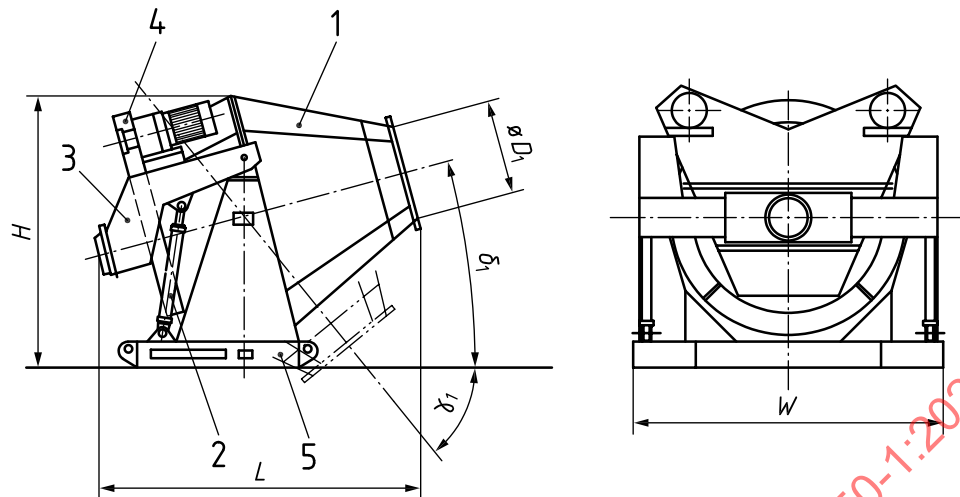
Examples of concrete mixer structures and dimensional characteristics



Key

- 1 mixing drum
- 2 tipping mechanism with internal tooth gear and lock for the drum position
- 3 frame and running wheels
- 4 motor with belt transmission and electrical installation
- 5 bevel gear pair
- 6 towbar
- D diameter of the mixing drum
- D_1 diameter of the charging hole
- H overall height
- H_1 height of discharging
- δ_1 angle of inclination of the mixing drum during operation, in degrees
- L overall length
- L_1 overall length in travelling position
- W overall width
- a Position for charging and mixing.
- b Position for discharging.

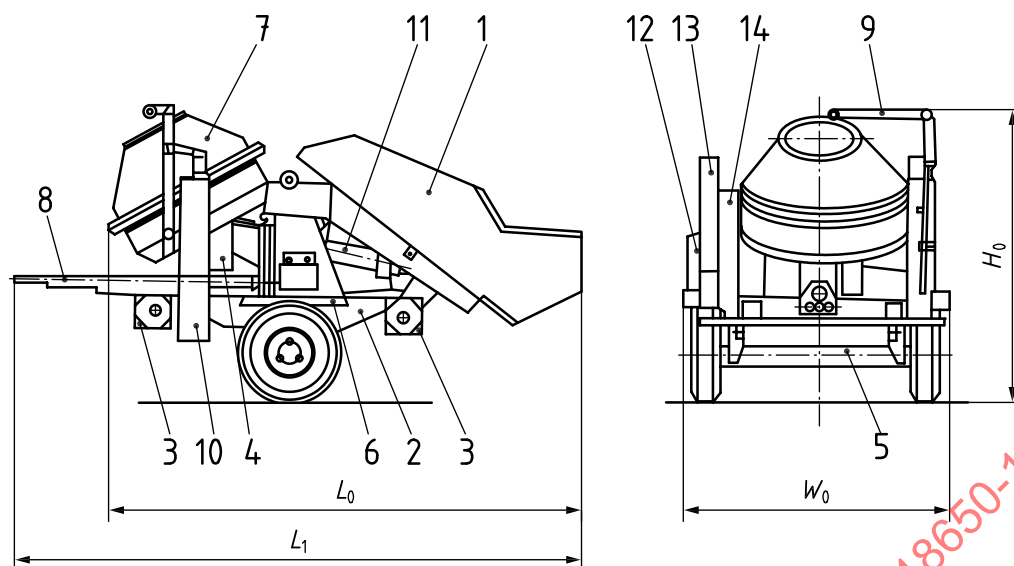
Figure A.1 — Small-sized tipping-drum concrete mixer equipped with travelling wheels



Key

- 1 mixing drum
- 2 tipping mechanism
- 3 yoke
- 4 drive unit
- 5 frame
- D_1 diameter of the charging hole
- δ_1 angle of inclination of the mixing drum during operation
- γ_1 discharge angle
- L overall length
- W overall width
- H overall height

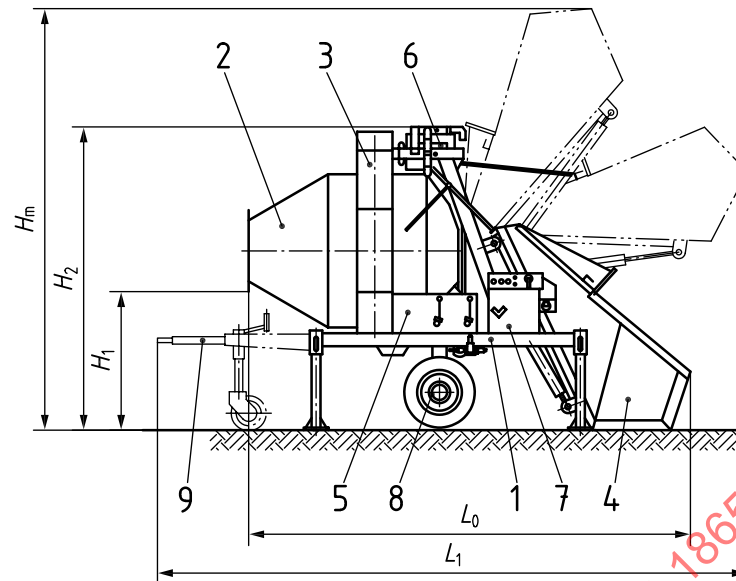
Figure A.2 — Tipping-drum stationary concrete mixer



Key

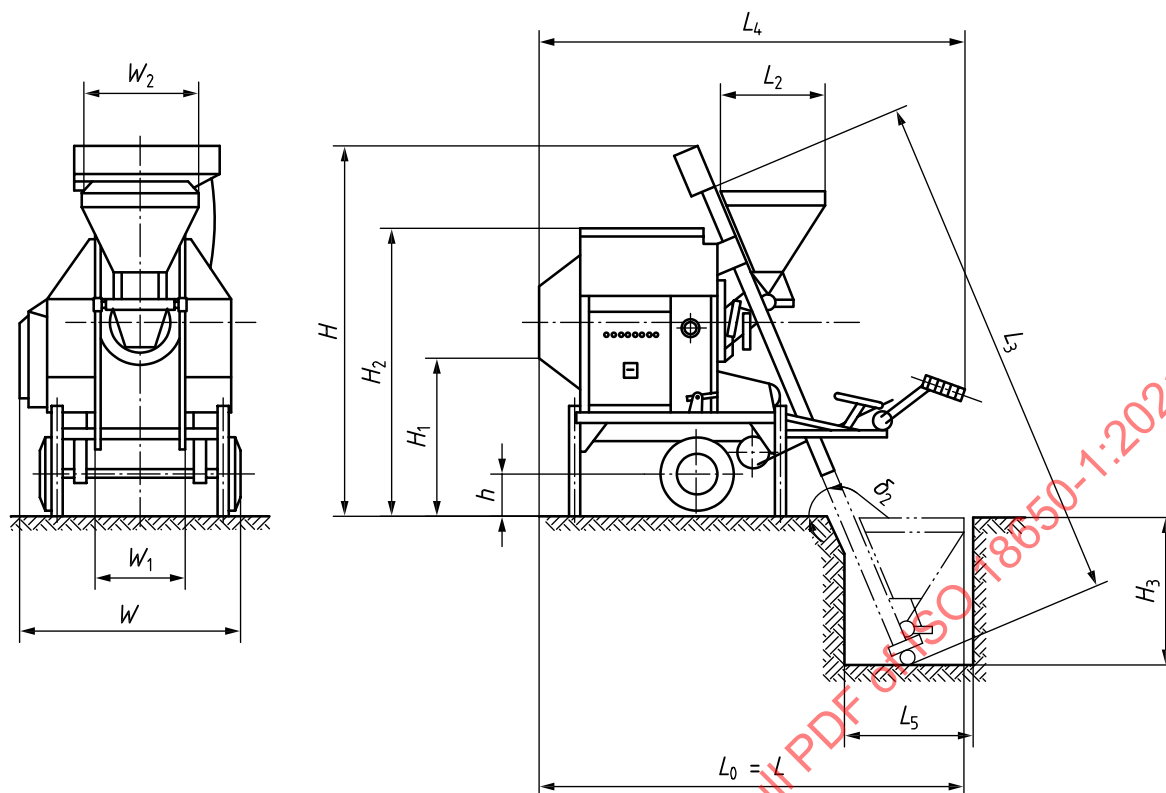
- 1 charging bucket
- 2 chassis
- 3 front and rear supports
- 4 electric installation
- 5 axle
- 6 side support
- 7 mixing drum
- 8 towbar
- 9 water-supply installation
- 10 tipping mechanism
- 11 hydraulic drive
- 12 controls
- 13 guard
- 14 support for mixing drum
- H_0 overall height in operating mode
- L_0 overall length in operating mode
- L_1 overall length in transport position
- W_0 overall width in operating mode

Figure A.3 — Tipping-drum concrete mixer with a hydraulic drive for the drum and the skip charging bucket

**Key**

- 1 frame
- 2 mixing drum
- 3 guard for the crown gear
- 4 charging bucket
- 5 hydraulic drive
- 6 water supply
- 7 electrical control panel
- 8 axle
- 9 towbar with mounting jack
- H_m maximum height
- H_1 height in discharging
- H_2 height of transport position
- L_0 length in operating mode
- L_1 length in transport position

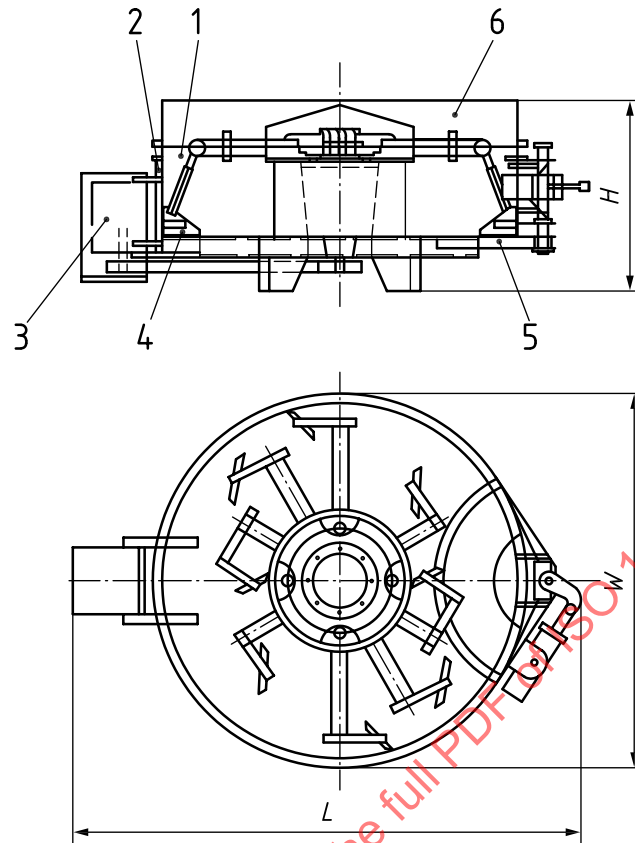
Figure A.4 — Reversing-drum concrete mixer with hydraulically driven mixing drum and charging bucket



Key

- L_0 length in operating mode
- L_2 length of the charging skip hoist
- L_3 length of the skip-hoist track
- L_4 length from the head of the mixing drum to the mechanical shovel connection
- L_5 length of the hole for the charging skip hoist
- W_1 width of the skip-hoist track
- W_2 width of the charging skip hoist
- H_1 height of discharging
- H_2 height
- H_3 height of the hole for the charging skip
- h distance from the transport axle to the ground
- δ_2 angle of inclination of the track
- L overall length
- W overall width
- H overall height

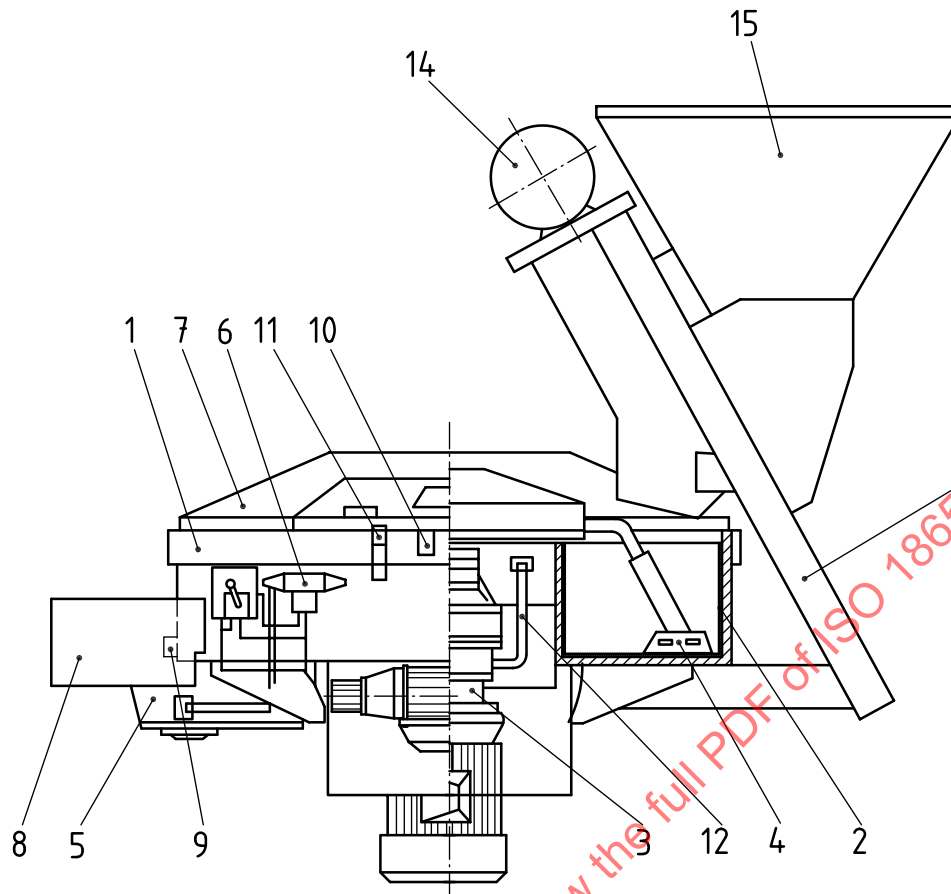
Figure A.5 — Reversing-mixing-drum concrete mixer with a mechanical drive for the drum and the skip hoist



Key

- 1 pan
- 2 lining
- 3 drive unit
- 4 mixing blades
- 5 discharging gate
- 6 cover for the pan
- L overall length
- W overall width
- H overall height

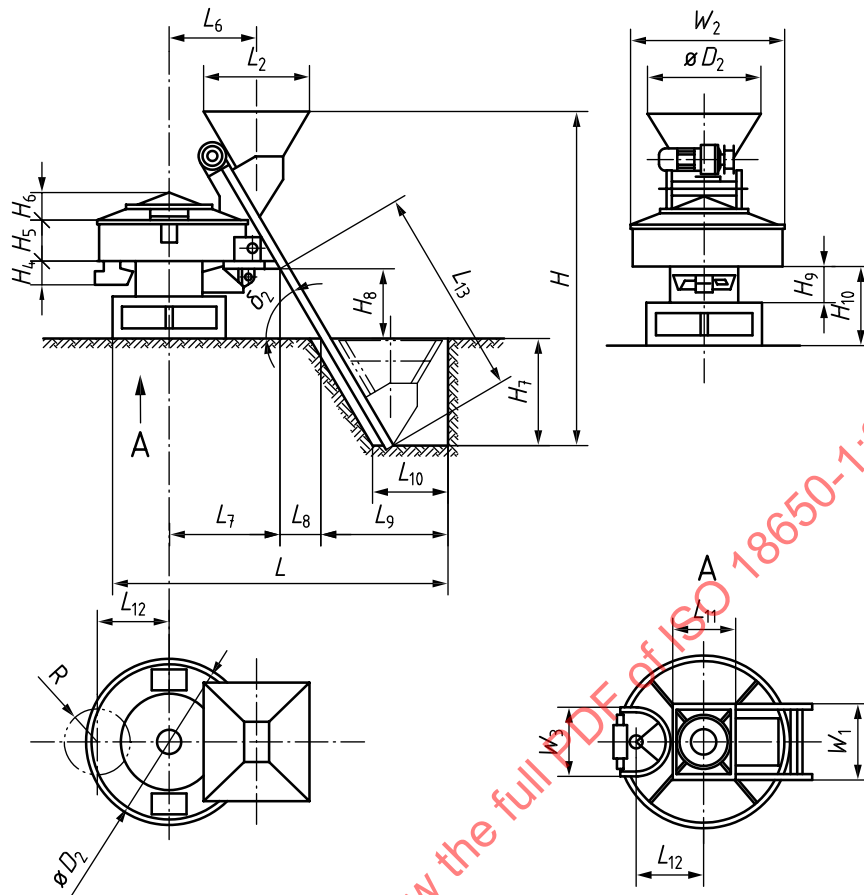
Figure A.6 — Turbo concrete mixer



Key

- 1 pan
- 2 lining
- 3 drive unit
- 4 mixing blades
- 5 discharging gate
- 6 hydraulic drive assembly for the discharging gate
- 7 pan cover
- 8 guard for the discharging gate
- 9 limit switches for the discharging gate
- 10 safety cut-out switch for the cover of the pan
- 11 water nozzle
- 12 oil-filling inlet
- 13 track
- 14 hoisting winch
- 15 charging skip hoist

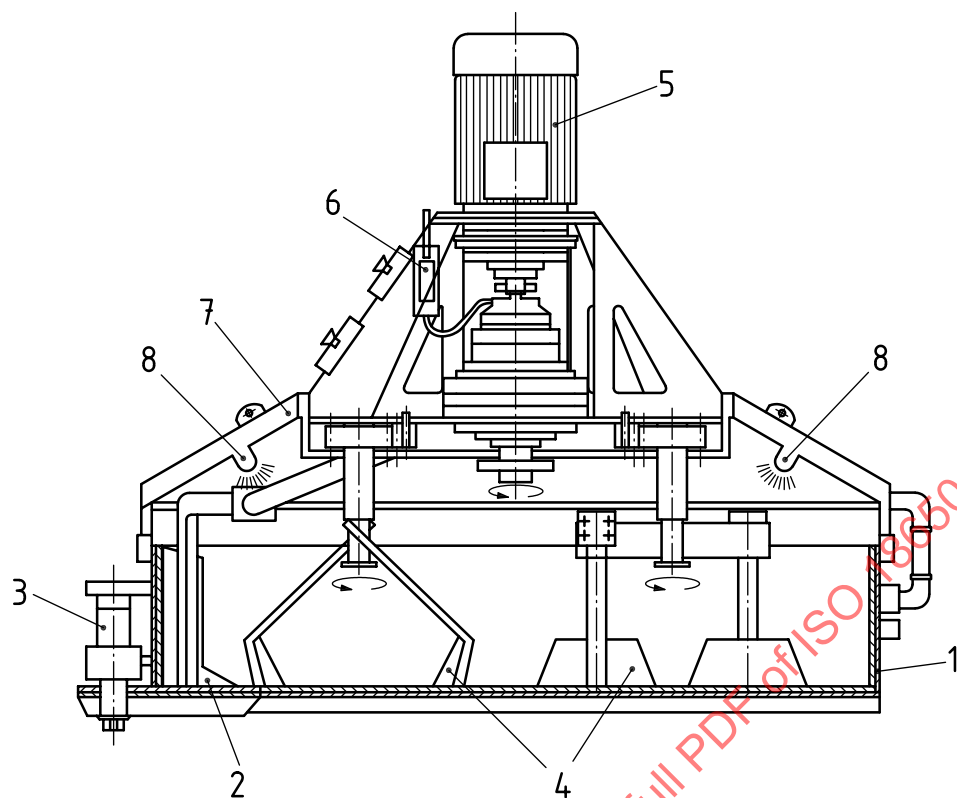
Figure A.7 — Structure of a turbo concrete mixer with a charging skip hoist



Key

H	overall height	L_6	distance between axles of the mixer and skip hoist in its discharging position
H_4	height of discharging unit assembly	L_7	distance between the axle of the mixer and track support
H_5	height of the pan	L_8	distance between the track support and the track entrance to the hole
H_6	height of the cover	L_9	distance between the track entrance to the hole and its rear wall
H_7	height of the hollow for the skip hoist	L_{10}	length of the bottom of the hole
H_8	distance between the support of the track and ground	L_{11}	length of the housing of the mixing-unit drive
H_9	height of the housing of the mixing unit drive	L_{12}	distance between the axes of the discharging gate and the mixer
H_{10}	distance between the pan and ground	L_{13}	length of the lower part of the track
D_2	diameter of the pan	W_1	width of the skip hoist
R	radius of slewing of the discharging gate	W_2	width of the track
L	overall length	W_3	width of the housing of the mixing-unit drive
L_2	length of the skip hoist	δ_2	angle of inclination of the track

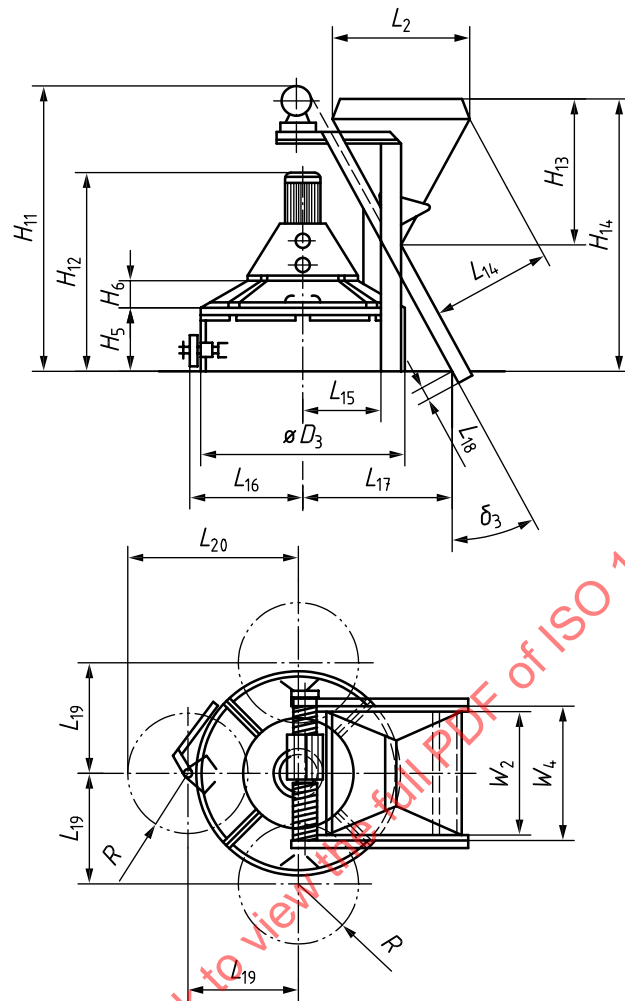
Figure A.8 — Dimensional characteristics of the turbo concrete mixer



Key

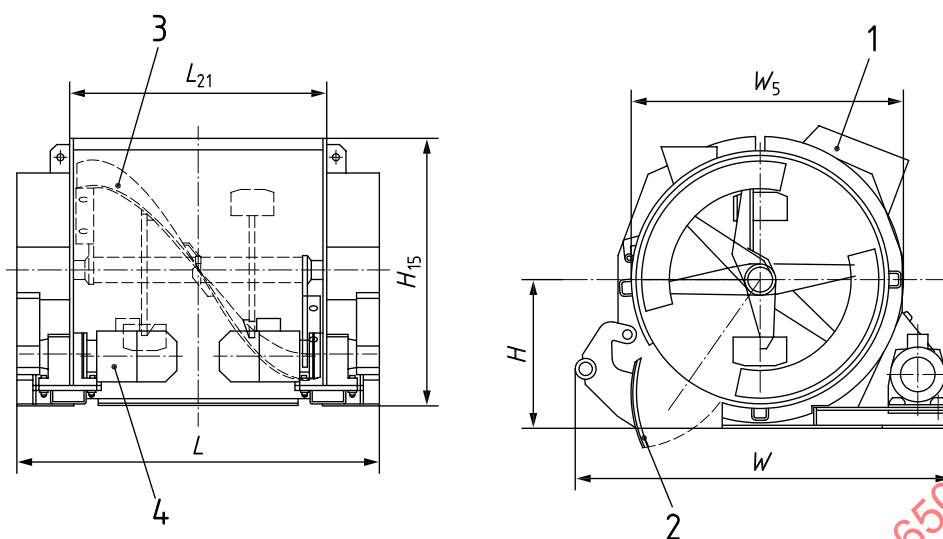
- 1 pan
- 2 cleaning blade
- 3 hydraulic drive for the discharging gate
- 4 mixing blades for planetary movement
- 5 drive unit for the mixing blades
- 6 electrical control system
- 7 pan cover
- 8 water nozzle

Figure A.9 — Structure of the planetary concrete mixer

**Key**

H_5	height of the pan	L_{15}	distance from the track-supporting structure to the mixer's axis
H_6	height of the cover	L_{16}	distance from the discharging gate driving unit to the mixer's axis
H_{11}	height from pan support to the skip-hoist winch	L_{17}	distance from the track to the mixer's axis measured at the mixer's base plane
H_{12}	height of the mixer	L_{18}	length from lower part of the track measured to the mixer's base plane
H_{13}	height of the skip hoist	L_{19}	distance between the mixer's and the discharging gate axes
H_{14}	distance between the mixer base and skip-hoist upper edge	L_{20}	maximum distance between discharging gate in its open position and the mixer's axis
D_3	outer diameter of the pan	R	slewing radius of the discharging gate
L_2	length of the skip hoist	W_2	width of the skip hoist
L_{14}	distance from the skip-hoist outer edge to the track	W_4	inner width of the track
		δ_3	angle of inclination of the skip hoist track

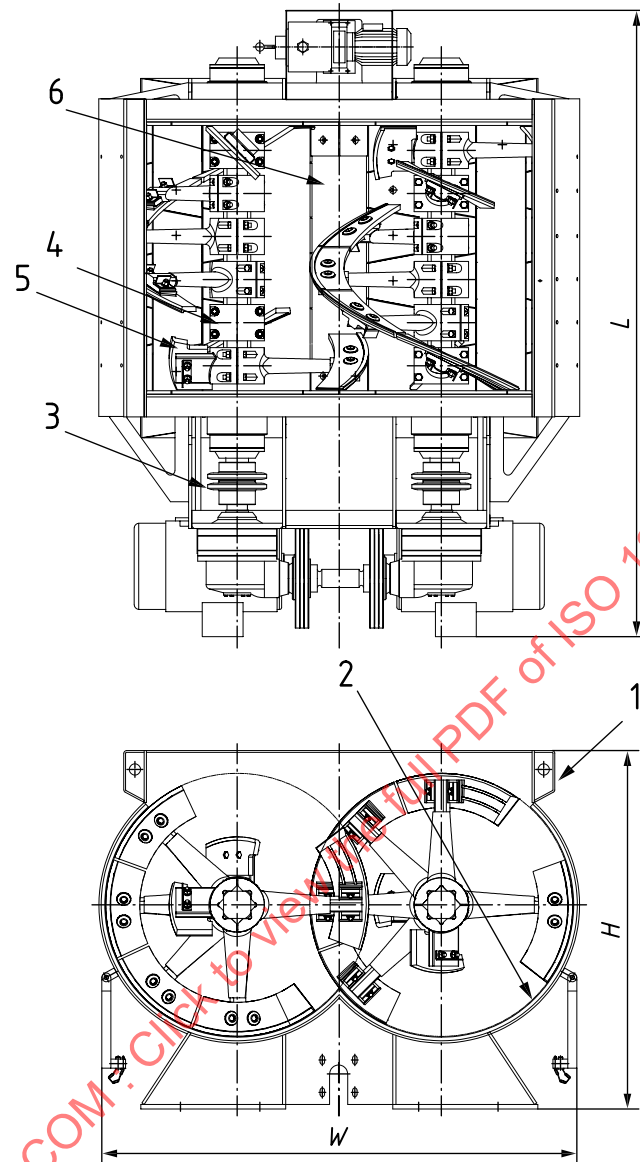
Figure A.10 — Dimensions characteristic of the planetary concrete mixer with charging skip hoist and three possible gates for discharging



Key

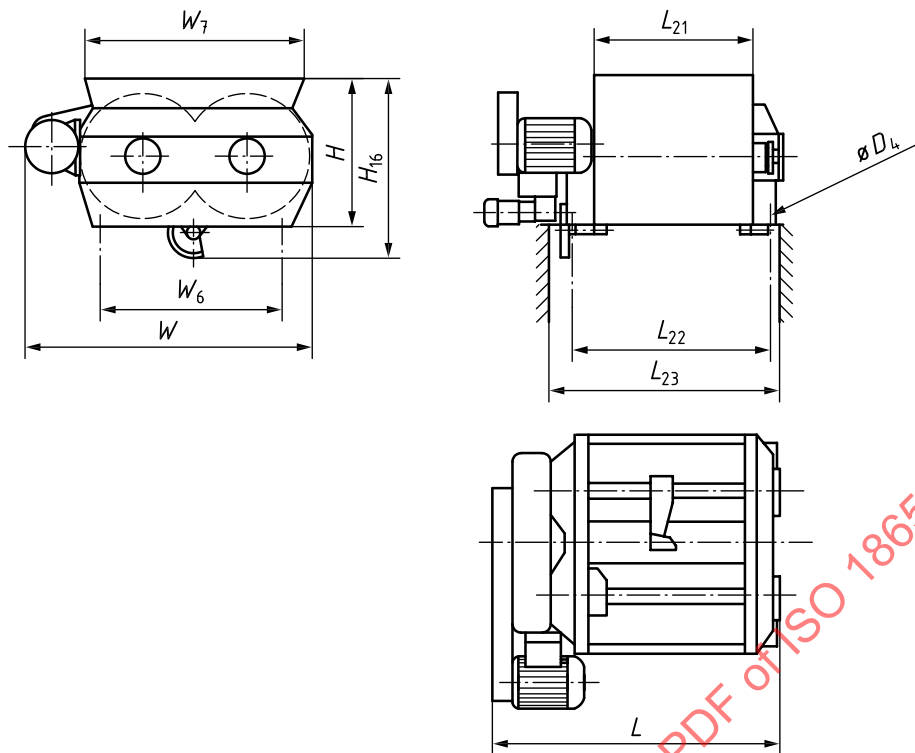
- 1 aggregate inlet
- 2 discharging gate
- 3 mixing system with two helices and blades
- 4 gear motor and chain transmission for mixing system drive
- L overall length
- W overall width
- H height of the shaft measured from the mixer's base
- H_{15} overall height
- L_{21} length of the trough
- W_5 width of the trough

Figure A.11 — Paddle concrete mixer with a single paddle agitator

**Key**

- 1 lining
- 2 trough
- 3 discharging gate
- 4 shaft and arms
- 5 mixing blades
- 6 drive unit
- L overall length
- W overall width
- H overall height

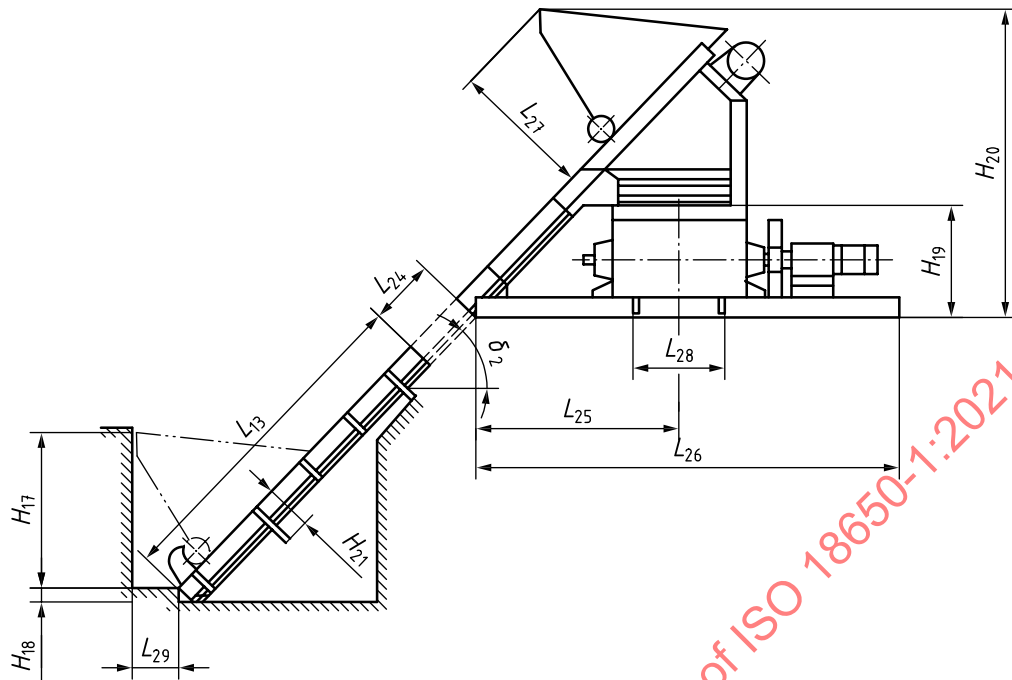
Figure A.12 — Paddle concrete mixer with two-paddle agitators



Key

- L overall length
- L_{21} length of the trough
- L_{22} distance between the axes of the mounting holes
- L_{23} required distance for discharging
- W overall width
- W_6 distance between the axes of the mounting holes
- W_7 width of the upper edge of the trough
- H overall height of the mixer
- H_{16} height of the mixer in discharging position
- D_4 diameter of the mounting holes

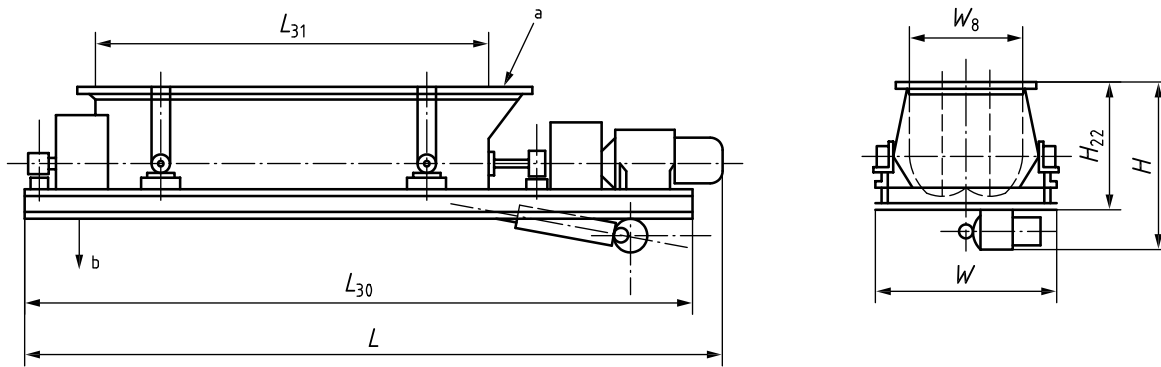
Figure A.13 — Paddle concrete mixer (characteristic dimensions)



Key

- H_{17} height of the excavation for the charging skip hoist
- H_{18} height of the lower track support
- H_{19} height of the trough and base frame
- H_{20} height from base frame to the upper edge of the charging skip hoist
- H_{21} height of the support of the track
- L_{13} length of the lower part of the track
- L_{24} optional length of the track relative to the height the mixer's supporting structure
- L_{25} distance from the frame edge to its axis
- L_{26} length of the frame
- L_{27} distance between the track and the upper edge of the skip hoist
- L_{28} length of the hole for discharging in the base frame
- L_{29} length of the concrete rest for the track
- δ_2 angle of inclination of the track

Figure A.14 — Paddle concrete mixer with skip hoist for location on a supporting structure



Key

- L overall length
- W overall width
- H overall height
- H_{22} height from the base frame to the upper edge of the trough
- L_{30} length of the base frame
- L_{31} length of the effective mixing part of the trough
- W width of the trough
- a Charging of concrete components.
- b Discharging of concrete mix.

Figure A.15 — Continuous-type concrete mixer