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Building construction machinery and equipment — Mobile crushers —

Part 1: Terminology and commercial specifications

Machines et matériels pour la construction des bâtiments — Concasseurs mobiles —

Partie 1: Terminologie et spécifications commerciales

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Foreword

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ISO 21873-1 was prepared by Technical Committee ISO/TC 195, *Building construction machinery and equipment*.

Introduction

This part of ISO 21873 deals with mobile crushers used together with earth-moving machinery mainly at construction job sites for crushing natural rocks, stones or concrete debris.

Building construction machinery and equipment — Mobile crushers —

Part 1: Terminology and commercial specifications

1 Scope

This part of ISO 21873 establishes terminology and content of commercial literature specifications for mobile crushers, mounted on crawler, truck or semi-trailer, used in the building construction industry. It is not applicable to fixed crushers.

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 11375:1998, *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.

3.1
mobile crusher
machine intended for reducing the size of mineral-based material to particles of smaller dimension and which is capable of relocation on its own chassis

NOTE 1 Depending on the method of relocation, three mobile crusher types are identified:

— self-propelled mobile crusher mounted on crawler chassis (see Figure A.1);

— truck-mounted mobile crusher;

— semi-trailer-mounted mobile crusher.

NOTE 2 An equivalent definition is given in ISO 11375:1998, 3.4, as “Crushing and screening plant (recycling plant)”.

3.2
basic unit
base machine of the mobile crusher usually composed of a working device, an operation control device, a power source, and transmitting device, and a travel device

NOTE An hydraulic device is most often used as the power transmitting device.

3.3
attachment
additional component that can be added to the basic unit to adapt it for a different application

NOTE Attachments can include the following: magnetic separator, metal detector, vibrating screen, dust suppression system, conveyor belt scale, additional conveyors, hydraulic rock pick and hopper extensions. These are attached to, and move with, the mobile crusher.

3.4
charged material
input material
primarily mineral-based material

EXAMPLE Natural stone, concrete, asphalt, or clean demolition rubble.

NOTE The charged material can also contain small amounts of foreign materials such as wood and metal.

3.5
feed hopper
receptacle that takes in charged material transitorily and charges it into the feed device

NOTE See Annex B for a simplified method of calculating hopper volume for a sloped side-feed hopper with constant cross-section.

3.6
feed device
feeder
device that supplies charged material to the crushing system

NOTE The following feed device types are identified:

— vibrating (grizzly) feeder;

— belt feeder;

— apron feeder;

— reciprocating plate feeder;

— roller grizzly;

— push feeder;

— vibrating screen.

3.7
by-pass device
device that diverts material separated from the crusher feed (by-pass material) away from the crusher

NOTE The following by-pass device types are identified:

— chute;

— reversible belt conveyors;

— vibrating screen.

A chute can have internal baffles that allow the diverted material to combine with material that passes through the crusher, or else the diverted material can be separated from the material that passes through the crusher and discharged with the by-pass conveyor. A reversible belt conveyor can work in the same way as the chute by changing the belt rotation direction.

3.8
by-pass conveyor
side conveyor
discharge device for fine material separated from the crusher feed (by-pass)

3.9
crushing device
crusher
mechanism that reduces the size of charged material by fracturing larger pieces into multiple smaller pieces

NOTE For examples of crushing devices (crushers) types, see ISO 11375.

3.10
discharge device
mechanism that removes processed material

NOTE The following discharge device types are identified:

— belt conveyor;

— screw conveyor;

— chute;

— vibrating feeder;

— reciprocating plate feeder.

3.11
return conveyor
device used to transfer oversized material back to the crusher or crusher feed device for additional processing

3.12
magnetic separator
device for removing, using magnets, ferrous contaminants from the material processed by the crusher

3.13
dust suppression system
device or set of components used to reduce the amount of fugitive dust emission from a mobile crusher

NOTE The following dust suppression system types are identified:

— water spray system;

— suction filter system (e.g. bag filter).

3.14
belt scale
device mounted to conveyor used to weigh material carried by the conveyor

3.15 machine mass

3.15.1
machine mass
⟨in operating mode⟩ mass of the machine without operator and charged material with working device and attachments designated by the manufacturer, full fuel tank, and full lubricating, hydraulic and cooling systems

3.15.2
machine mass
〈in transporting mode〉 mass of the machine without operator, without charged material, with working device and attachments designated by the manufacturer, fuel tank half-full, and with full lubricating, hydraulic and cooling systems

NOTE When specifying the machine mass of a self- propelled crusher, a mass representing the operator equal to 75 kg is added. Where parts are removed or attached for transporting, their weights are deducted from and/or included in the machine mass.

3.16
ground clearance
height of the lowest point of the machine from the ground when travelling, at the centre part of the machine and with a minimum width of 25 % of track gauge or axle track

NOTE The ground clearance for wheel-mounted units does not include axles.

3.17
gradability
maximum inclination which allows the mobile crusher, without charged material, to climb, descend and stop without losing stability, spilling fluids or causing engine or other component damage

4 Description of components

4.1 Working device

The working device can contain the following components:

a) feed hopper;

b) feed device;

c) crushing device;

d) discharge device.

4.2 Operation control device

The operation control device consists of one or more of the following types of systems:

a) mechanical;

b) electric (electronic);

c) hydraulic.

4.3 Power source and transmitting devices

Power source and transmitting devices consist of one or more of the following components:

a) internal combustion engine;

b) electric generator;

c) electric motor;

d) transmission:

- hydraulic device (see 4.4);
- fluid coupling;
- torque converter;
- clutch;
- v-belts and sheaves;
- drive shaft.

4.4 Hydraulic device

The hydraulic device consists of one or more of the following components:

a) pump;

b) oil filter;

c) pipe and hose;

d) cylinder;

e) valve;

f) motor;

g) oil tank;

h) oil cooler.

4.5 Travel device

The travel device consists of one of the following:

a) crawler type undercarriage;

b) truck chassis for truck mounted crushers;

c) semi-trailer chassis for semi-trailer mounted crushers.

5 Commercial specifications

5.1 General data

Specify the following:

a) manufacturer or importer (if imported);

b) model;

c) prime mover type (internal combustion engine, electric motor);

d) power installed kW;

e) overall dimensions in operating mode:

— length (see L_0 in Figures A.2, A.3 and A.4) mm;

— width (see W_0 in Figures A.2, A.3 and A.4) mm;

— height (see H_0 in Figures A.2, A.3 and A.4) mm;

f) mass in operating mode kg;

g) overall dimensions in transporting mode:

— length (see L_1 in Figures A.2, A.3 and A.4) mm;

— width (see W_1 in Figures A.2, A.3 and A.4) mm;

— height (see H_1 in Figures A.2, A.3 and A.4) mm;

h) mass in transporting mode kg;

i) ground clearance (see H_4 in Figures A.2, A.3 and A.4) mm.

5.2 Detailed data for mobile crusher components

5.2.1 Internal combustion engine

Specify the following:

a) manufacturer;

b) model name;

c) swept capacity cm^3;

d) net power (according to the standard specified by manufacturer) kW;

e) rated revolutions r/min;

f) fuel type;

g) fuel tank capacity l.

5.2.2 Electric motor

Specify the following:

a) type (e.g. squirrel-cage induction motor, wound-rotor induction motor, direct current motor);

b) power kW;

c) rated current A;

d) voltage and frequency V and Hz;

e) revolutions r/min.

NOTE See IEC 60034-1 for the specification of electric motor.

5.2.3 Feed hopper

Specify the following:

a) type (fixed or foldable);

b) size (charging width × charging length) (see $W_4 \times L_4$ in Figures A.2 and A.4) — mm × mm;

c) capacity (struck capacity) (see Annex B for simplified method of calculating hopper volume for a sloped side feed hopper with constant cross-section) — m^3;

d) charging height (see H_2 in Figures A.2, A.3 and A.4) — mm.

5.2.4 Feed device

Specify the following:

a) type (see 3.6);

b) drive type (e.g. hydraulic, mechanical or electric);

c) width × length (see $W_5 \times L_5$ in Figures A.2 and A.4) — mm × mm.

5.2.5 Crushing device

Specify the following:

a) type (see 3.9);

b) feed opening size (e.g. $W_6 \times L_6$ in Figure A.2) — mm × mm;

c) discharge setting range (min. to max.) — mm;

d) revolutions operating — r/min;

e) drive type (e.g. hydraulic, mechanical or electric).

5.2.6 Discharge device

Specify the following:

a) type (see 3.10);

b) size × length (e.g. for belt conveyors use width of belt × length between centres of head and tail pulleys) — mm × mm;

c) discharging height (distance between the ground and top of a head pulley– see H_3 in Figures A.2, A.3 and A.4) — mm;

d) drive type (e.g. hydraulic, mechanical or electric).

5.2.7 Travel device (for crawler mounted machines only)

Specify the following:

a) track gauge (see W_2 in Figure A.2) mm;

b) track shoe width (see W_3 in Figure A.2) mm;

c) track length on ground (see L_2 in Figure A.2) mm;

d) ground contact pressure average (base unit) kPa;

e) maximum travel speed km/h;

f) drive type (e.g. hydraulic, mechanical or electric).

5.2.8 Travel device for truck mounted machine

Specify the following:

a) manufacturer;

b) wheelbase (see L_2 in Figure A.3) mm;

c) axle loads (base unit):

— rear kN;

— front kN;

d) axle track (see W_2 in Figure A.3) mm;

e) travel speeds (maximum travel speed at each speed gear ratio) km/h;

f) truck engine power kW;

g) axle spacing (see L_3 in Figure A.3) mm.

5.2.9 Travel device for semi-trailer mounted machine

Specify the following:

a) number of axles;

b) semi-trailer axle spacing (see L_3 in Figure A.4) mm;

c) semi-trailer axle track (see W_2 in Figure A.4) mm;

d) wheelbase (see L_2 in Figure A.4) mm;

e) kingpin design height (see H_5 in Figure A.4) mm;

— kingpin load kN;

— axle load (at centre of axle group, see Figure A.4) kN;

f) semi-trailer mass (base unit) kg.

5.2.10 Tanks

Specify the following (capacity of tanks listed):

a) fuel l;

b) hydraulic oil l;

c) engine oil l;

d) crusher oil (lubricating oil for crusher) l;

e) engine cooling water l;

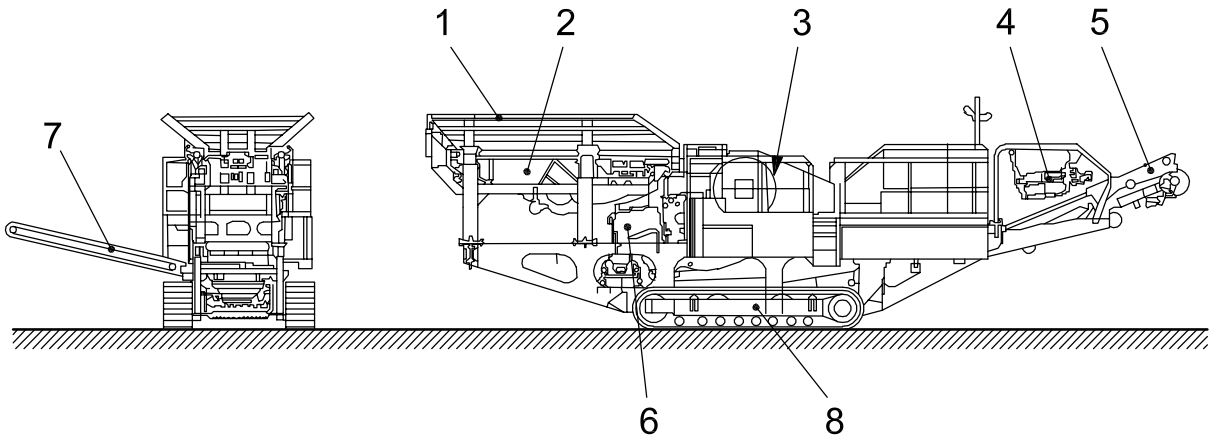
f) water for dust suppression l.

5.3 Attachments available

Specify the attachment (3.3), including installed weights (with axle loads for truck mounted crusher, and axle and kingpin loads for semi-trailer mounted crusher) for attachments.

Annex A
(informative)

Structures and dimensional characteristics of mobile crushers — Examples

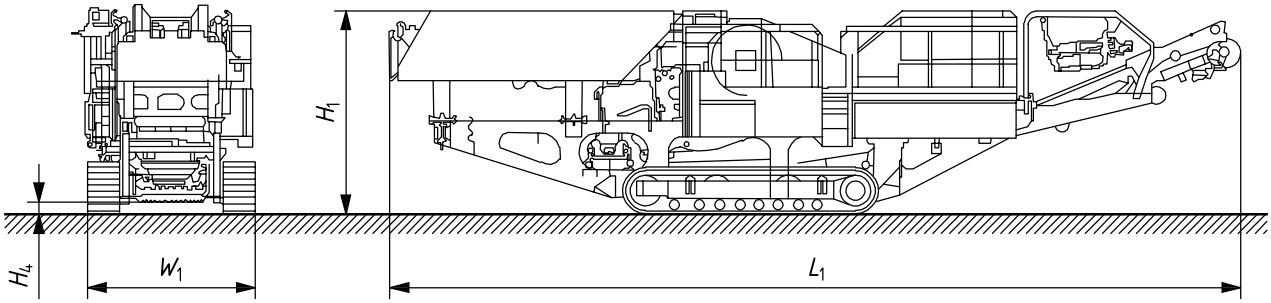


Key

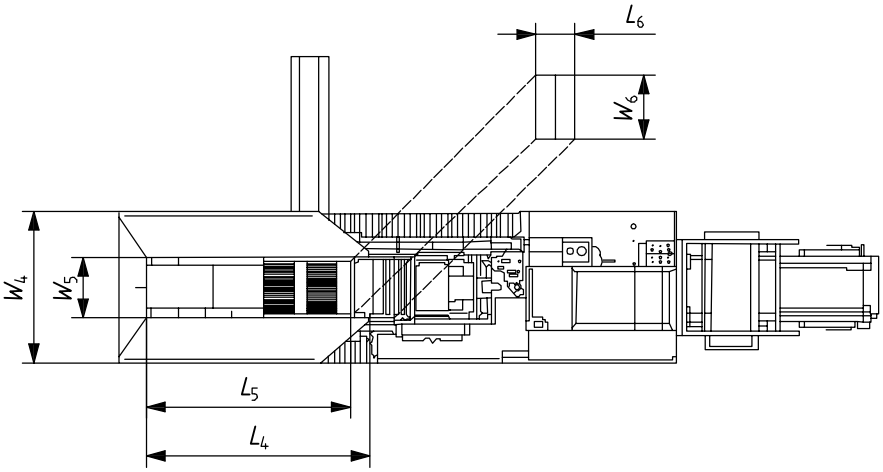
1 feed hopper
2 feed device
3 crushing device
4 magnetic separator
5 discharge device (belt conveyor)
6 by-pass device
7 by-pass (side) conveyor
8 travel device (track undercarriage)

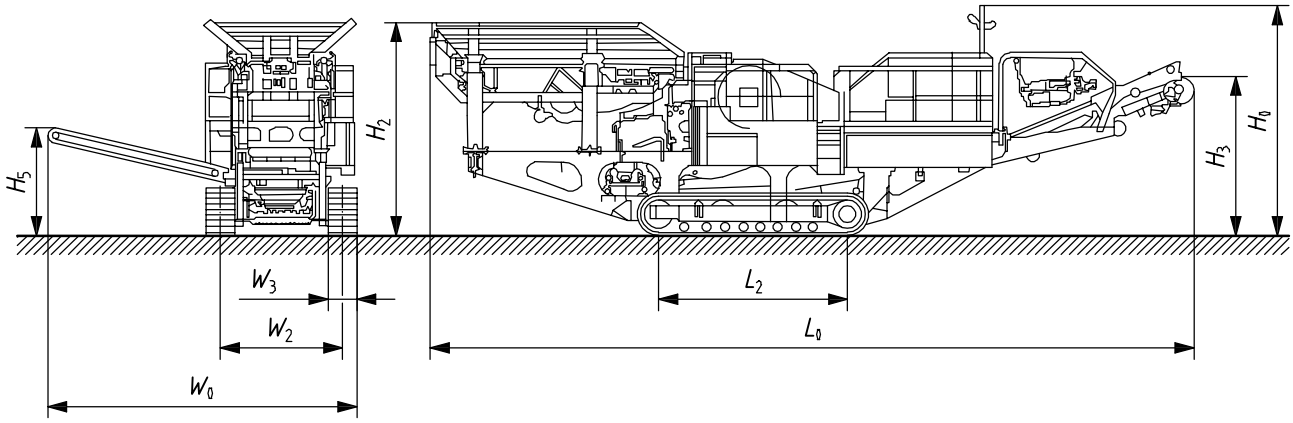
NOTE The structure of other types of mobile crusher is similar, except for the travel device, here crawler.

Figure A.1 — Structure of self-propelled mobile crusher



a) Dimensions in transporting mode



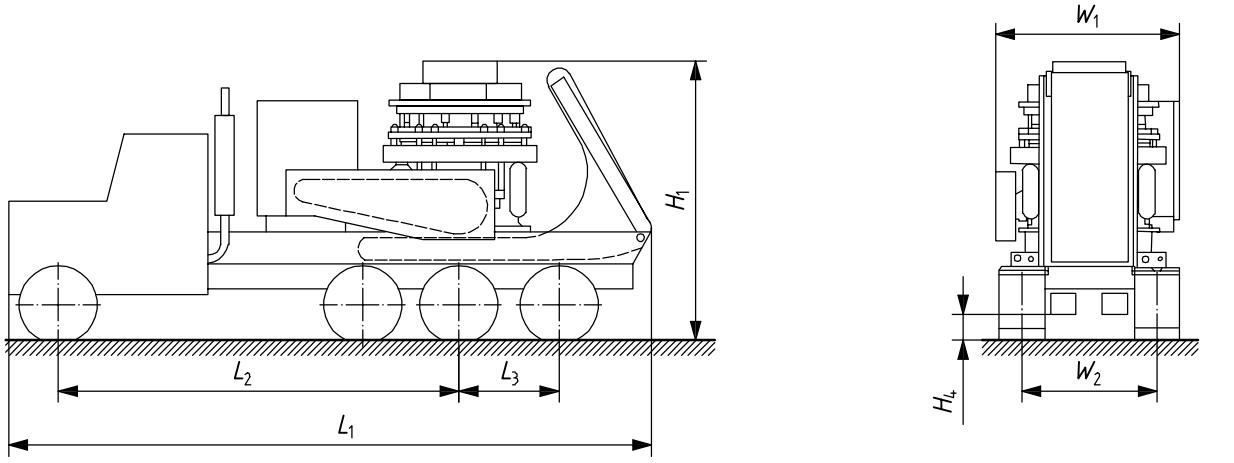


b) Dimensions in operating mode

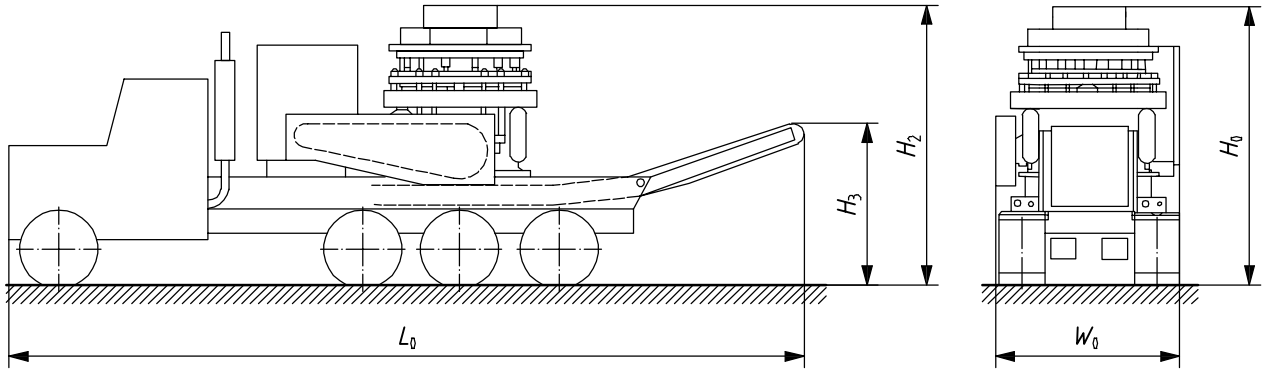
Key

H_0 overall height (operating mode)
H_1 overall height (transporting mode)
H_2 charging height
H_3 discharging height (top of conveyor)
H_4 ground clearance
H_5 discharging height of the by-pass conveyor
L_0 overall length (operating mode)
L_1 overall length (transporting mode)
L_2 track length on ground
L_4 feed hopper charging length
L_5 feeder length
L_6 length of crusher feed opening
W_0 overall width (operating mode)
W_1 overall width (transporting mode)
W_2 track gauge
W_3 track shoe width
W_4 feed hopper charging width
W_5 feeder width
W_6 width of crusher feed opening

Figure A.2 — Dimensional characteristics of self-propelled mobile crusher on crawler chassis



a) Dimensions in transporting mode

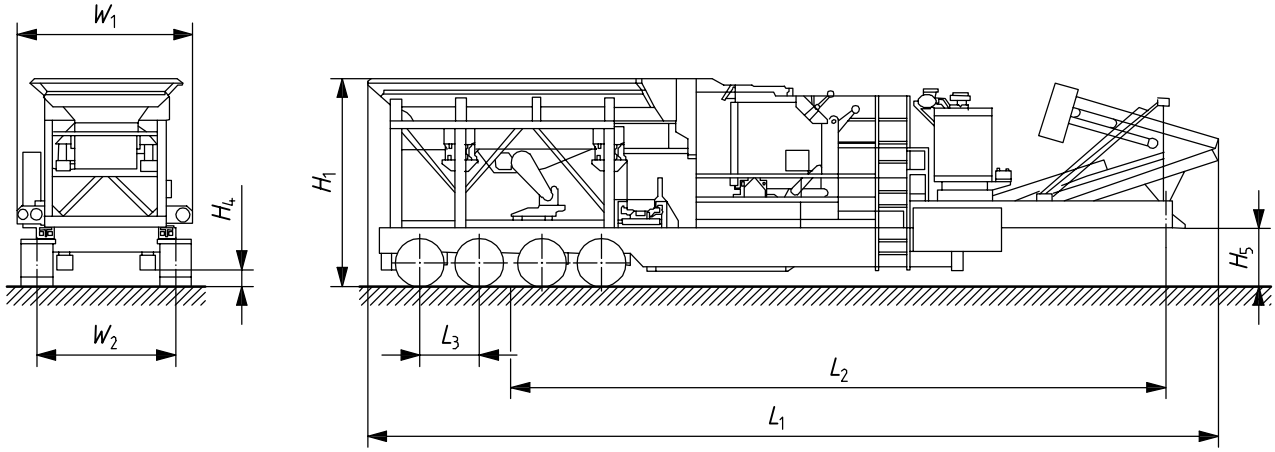


b) Dimensions in operating mode

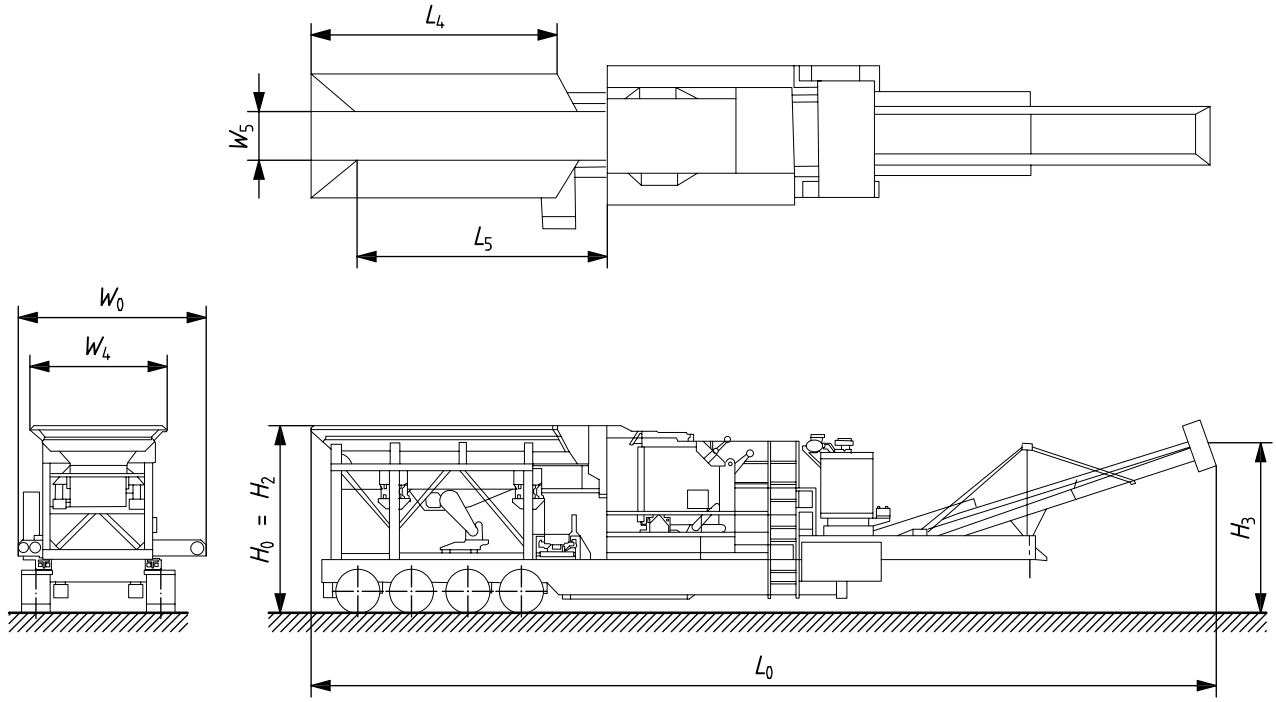
Key

H_0	overall height (operating mode)	L_1	overall length (transporting mode)
H_1	overall height (transporting mode)	L_2	truck wheelbase
H_2	charging height of the feed hopper	L_3	truck axle spacing
H_3	discharging height (top of the conveyor)	W_0	overall width (operating mode)
H_4	ground clearance	W_1	overall width (transporting mode)
L_0	overall length (operating mode)	W_2	truck axle track

Figure A.3 — Dimensional characteristics of truck-mounted mobile crusher



a) Dimensions in transporting mode



b) Dimensions in operating mode

Key

H_0	overall height (operating mode)	L_3	semi-trailer axle spacing
H_1	overall height (transporting mode)	L_4	feed hopper length
H_2	charging height of the feed hopper	L_5	feeder length
H_3	discharge height (top of the conveyor)	W_0	overall width (operating mode)
H_4	ground clearance	W_1	overall width (transporting mode)
H_5	kingpin design height	W_2	semi-trailer axle track
L_0	overall length (operating mode)	W_4	feed hopper width
L_1	overall length (transporting mode)	W_5	feeder width
L_2	semi-trailer wheelbase		

Figure A.4 — Dimensional characteristics of semi-trailer-mounted mobile crusher

Annex B
(informative)

Simplified method for calculating feed hopper volume

For comparison of the feed hopper capacities for different machines, its struck volume has been selected. An example of a simplified method for calculating the feed hopper struck volume, for one type of hopper, is presented.

Feeder and feed hopper form a volume, V, presented in Figure B.1. For simplified calculation of the feed hopper volume, the following assumptions are made:

— the volume, V_1, is equal to V_2 (see Figure B.2);

— the area of the cross-section of the feed hopper volume is constant and reduced to the rectangle of the side lengths $H \times W_w$ (see Figure B.2).

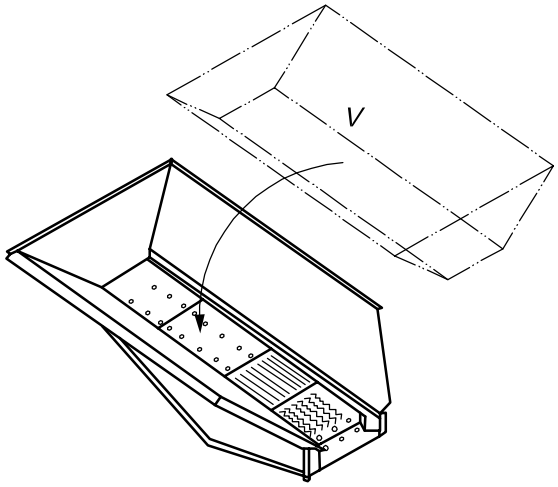
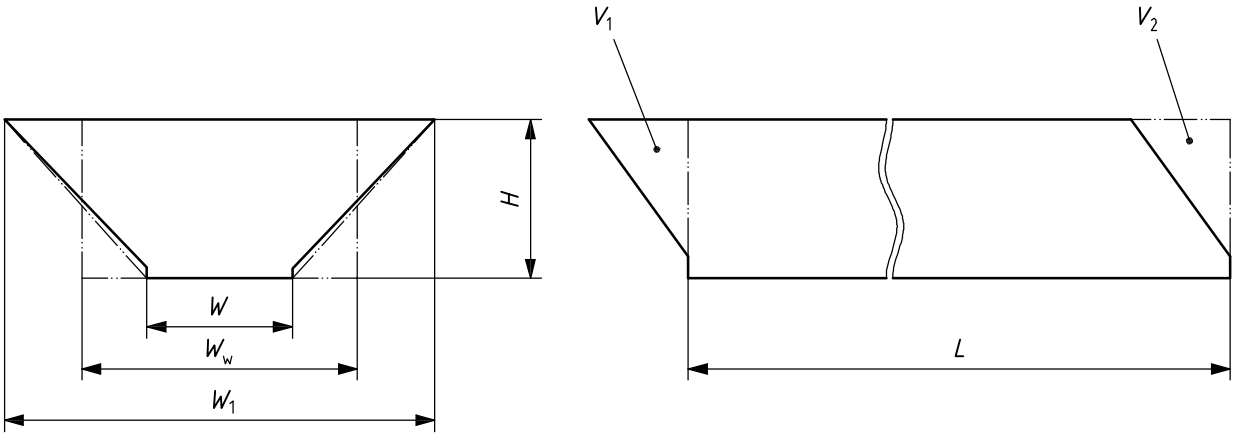


Figure B.1 — Graphical presentation of feed hopper volumetric capacity V



Key

L length of the feed hopper (including grizzly)

H height

W feeder width

W_1 feed hopper width

W_w feed hopper width reduced to the rectangle's side and calculated from the formula

$$W_w = \frac{W_1 - W}{2} + W$$

Figure B.2 — Graphical presentation of the feed hopper volumetric capacity reduced to cuboid (assumption $V_1 = V_2$**)**

The feed hopper volume, V, is calculated from the formula:

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NOTE For definitions of L, H, W and W_1, see Figure B.2.

Bibliography

[1] IEC 60034-1:2004, *Rotating electrical machines — Part 1: Rating and performance*

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