BS ISO 21873-1:2015

BSI Standards Publication

Building construction machinery and equipment — Mobile crushers

Part 1: Terminology and commercial specifications

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee B/513, Construction equipment and plant and site safety.

A list of organizations represented on this committee can be obtained on request to its secretary.

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ISBN 978 0 580 80090 0

ICS 91.220

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2015.

Amendments issued since publication

Date	Text affected

BS ISO 21873-1:2015

INTERNATIONAL STANDARD

ISO 21873-1

Second edition
2015-08-15

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

Reference number
ISO 21873-1:2015(E)

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Foreword

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The committee responsible for this document is ISO/TC 195, *Building construction machinery and equipment*.

This second edition cancels and replaces the first edition (ISO 21873-1:2008), which has been technically revised.

ISO 21873 consists of the following parts, under the general title *Building construction machinery and equipment — Mobile crushers*:

— *Part 1: Terminology and commercial specifications*

— *Part 2: Safety requirements*

Introduction

This part of ISO 21873 deals with mobile crushers which are used for crushing rocks or reprocessing construction materials.

INTERNATIONAL STANDARD ISO 21873-1:2015(E)

Building construction machinery and equipment — Mobile crushers —

Part 1: Terminology and commercial specifications

1 Scope

This part of ISO 21873 specifies terminology and commercial literature specifications for mobile crushers used for crushing rocks or reprocessing construction materials and capable of relocation between worksites.

It applies to mobile crushers that are either

— self-propelled (mounted on a chassis),

— lorry (truck) mounted, or

— semi-trailer mounted.

It does not apply to the following:

— fixed (stationary) crushers;

— large mining-type movable crushers.

2 Normative references

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

ISO 16754:2008, *Earth-moving machinery — Determination of average ground contact pressure for crawler machines*

3 Terms and definitions

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

3.1
mobile crusher
machine affixed to a chassis which is typically composed of a feed device, a crushing device, a control system, a prime mover, a transmitting device, and a travel device designed for reducing the size of mineral-based material to particles meeting a desired specification

3.1.1
self-propelled mobile crusher
machine mounted to a chassis capable of propelling itself to another location

3.1.2
lorry-[truck-] mounted mobile crusher
machine mounted on and capable of being relocated on a lorry [truck] chassis

3.1.3
semi-trailer mounted mobile crusher
machine mounted on and capable of being relocated on a semi-trailer chassis

3.2
feed hopper
receptacle that takes in feed material transitorily and charges it into the feed device

3.3
feed device
feeder
device that supplies feed material to the crushing device

EXAMPLE Vibrating (grizzly) feeder, belt feeder, apron feeder, reciprocating plate feeder, roller grizzly, push feeder, vibrating screen.

3.4
crushing device
crusher
mechanism that reduces the size of feed material by fracturing larger pieces into multiple smaller pieces

3.4.1
jaw-type crushing device
jaw-type crusher
device which reduces material size by compression forces consisting of a fixed jaw and a movable jaw which moves so as to increase and decrease the gap between the two jaws

3.4.2
horizontal shaft impact crushing device
HSI crushing device
HSI crusher
device in which material is fragmented by kinetic energy applied by a rotor or impeller disc mounted on a horizontal shaft which rotates at high speed to the feed material which is propelled against a fixed surface

3.4.3
cone-type crushing device
cone-type crusher
device which reduces material size by compression forces consisting of a moving member rotated eccentrically within the fixed member; both moving and fixed members are in a form of truncated cones

3.4.4
vertical shaft impact crushing device
VSI crushing device
VSI crusher
device in which material is fragmented by kinetic energy applied by a rotor or impeller disc mounted on a vertical shaft which rotates at high speed to the feed material which is propelled against a fixed surface

3.5
discharge device
mechanism that removes processed material

EXAMPLE Belt conveyor, screw conveyor, chute, vibrating feeder, reciprocating plate feeder.

3.6
control system
system for controlling the crushing operation

Note 1 to entry: This system includes an operator interface and mechanical or electronic systems for controlling the operation of the mobile crusher.

3.7
prime mover
engine, motor or other device which provides mechanical energy for linear or rotational movement

EXAMPLE Internal combustion engine, electric generator, electric motor, external power plant.

3.8
transmitting device
transmission
translates or controls power source energy to the feed device and/or crushing device

EXAMPLE Hydraulic system, fluid coupling, torque converter, clutch, v-belts and sheaves, drive shaft.

3.9
travel device
chassis used for re-locating the mobile crusher

3.10
feed material
charged material
material which has been loaded into the receiving hopper and/or the feed device

3.11
by-pass device
system that diverts material separated from the crusher feed directly to the discharge device

Note 1 to entry: Chute, belt conveyor, vibrating screen.

3.12
pre-screen side conveyor
device for discharging material separated from the crusher feed material

3.13
return conveyor
device used to transfer oversized material back to the crushing device or feed device for additional processing

3.14
magnetic separator
device for removing ferrous contaminants from the material processed by the crusher using magnets e.g. permanent or electric

3.15
dust suppression system
device or set of components used to reduce the amount of fugitive dust emission from a mobile crusher

EXAMPLE Water spray system, suction filter system (e.g. bag filter).

3.16
machine mass in operating mode
mass of the machine without operator and without feed material with the feed device, crushing device and attachments designated by the manufacturer, full fuel tank, and full lubricating, hydraulic and cooling systems

Note 1 to entry: When specifying the mass of a machine where the operator is at an operator station on the machine, a mass representing the operator equal to 75 kg should be added.

3.17
machine mass in transporting mode
mass of the machine without an operator and without feed material with feed device, crushing device and attachments designated by the manufacturer, with half-full fuel tank, and full lubricating, hydraulic and cooling systems

Note 1 to entry: Where parts are removed or attached for transporting, their weights are deducted or included in the machine mass.

3.18
ground clearance in transporting mode
height of the lowest point of the machine from the ground

3.19
operating mode
configuration as defined by the manufacturer where the machine is ready to perform its intended functions

3.20
transporting mode
configuration of the machine as defined by the manufacturer where the machine is ready to be transported from one location to another

3.21
net feed opening
indication of the crushing device's ability to accept feed without bridging

Note 1 to entry: The net feed opening is not intended to define crushing device feed size (which is determined by the crusher manufacturer).

4 Commercial literature specifications

4.1 General data

The following general data shall be presented:

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) machine 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) machine mass in transporting mode kg;

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

j) average ground contact pressure (crawler type only) (determined in accordance with ISO 16754:2008, 4.2) kPa.

4.2 Detailed data for mobile crusher components

4.2.1 Prime mover

4.2.1.1 Internal combustion engine

The following data shall be presented:

a) manufacturer;

b) model name;

c) swept capacity cm^3;

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

d) rated revolutions r/min;

e) fuel type;

f) fuel tank capacity l.

4.2.1.2 Electric motor

The following data shall be presented:

a) type (e.g. 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 motors.

4.2.2 Secondary power source

4.2.2.1 Electric generator

The following data shall be presented:

a) type;

b) power kVA;

c) rated current A;

d) voltage and frequency V and Hz.

4.2.3 Feed hopper

The following data shall be presented:

a) type (fixed or foldable);

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

c) capacity (struck capacity) (see Annex B for calculating hopper volume) m^3;

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

4.2.4 Feed device

The following data shall be presented:

a) type (see 3.3 for examples);

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

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

4.2.5 Crushing device

The following data shall be presented.

4.2.5.1 Jaw-type crushing device (see C.2.1)

a) net feed opening size mm × mm (specify whether peak-to-peak or peak-to-valley);

b) revolutions operating r/min;

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

4.2.5.2 Horizontal shaft impact (HSI) crushing device (see C.2.2)

a) net feed opening size — mm × mm;

b) revolutions operating — r/min;

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

4.2.5.3 Cone-type crushing device (see C.2.3)

a) feed opening — mm;

b) size designation — mm;

c) countershaft speed — r/min;

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

4.2.5.4 Vertical shaft impact (VSI) crushing device (see C.2.4)

a) net feed opening size — mm × mm;

b) revolutions operating — r/min;

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

4.2.6 Discharge device

The following data shall be presented:

a) type (see 3.5);

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).

4.2.7 Travel device for self-propelled machines

4.2.7.1 For crawler-type chassis (see Figure A.1)

The following data shall be presented:

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).

4.2.8 Travel device for lorry (truck) mounted machines

The following data shall be presented:

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.

4.2.9 Travel device for semi-trailer mounted machine

The following data shall be presented:

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;

f) kingpin load kN;

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

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

4.2.10 Tank capacity

The following capacity data shall be presented for the tanks listed below:

a) fuel l;

b) hydraulic oil l;

c) engine oil l;

d) crushing device oil (lubricating oil for crushing device) l;

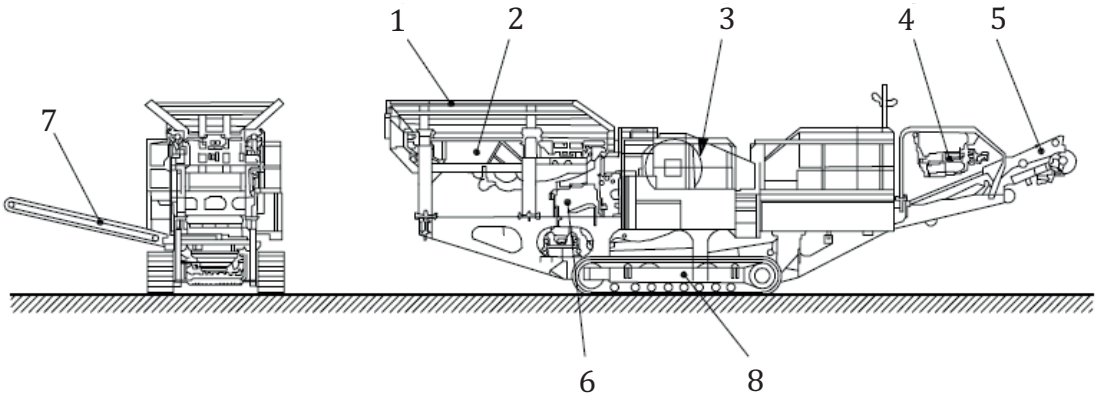
e) engine cooling water l;

f) water for dust suppression l;

g) diesel emission fluid tank, if equipped l.

Annex A
(informative)

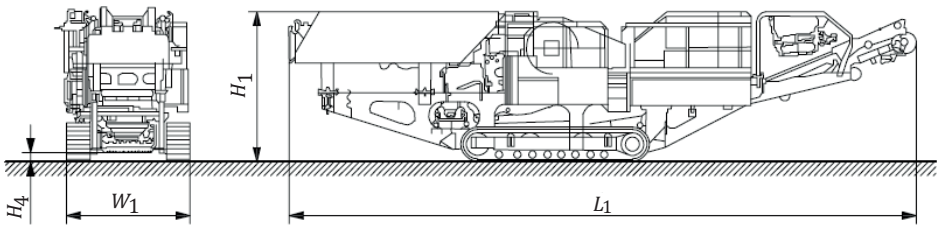
Structures and dimensional characteristics of mobile crushers — Examples



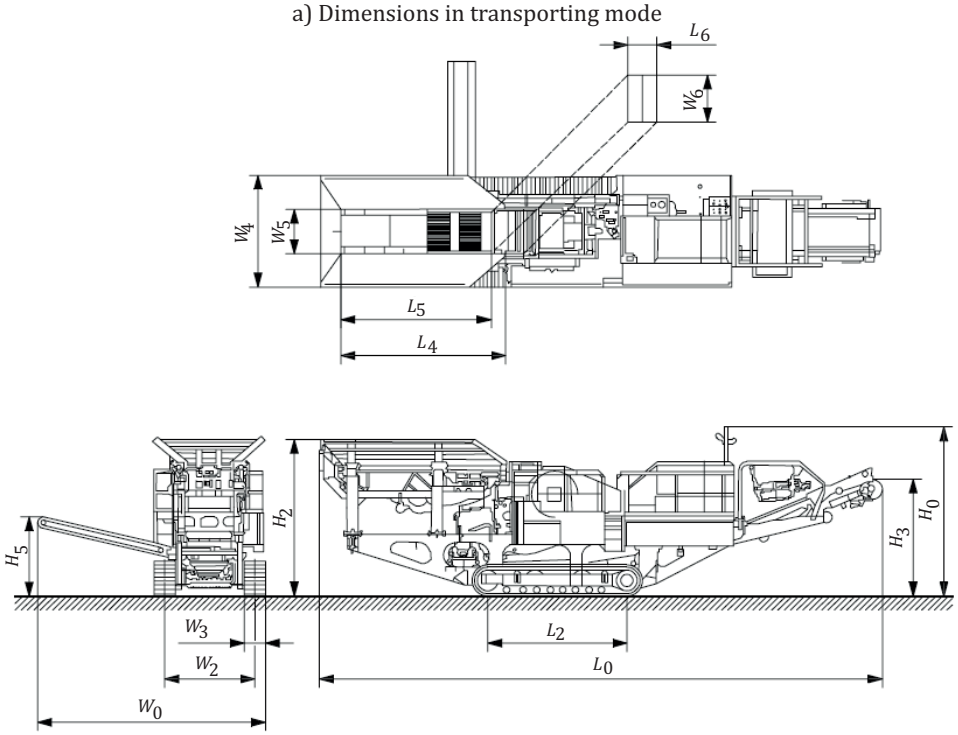
Key

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

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



a) Dimensions in transporting mode

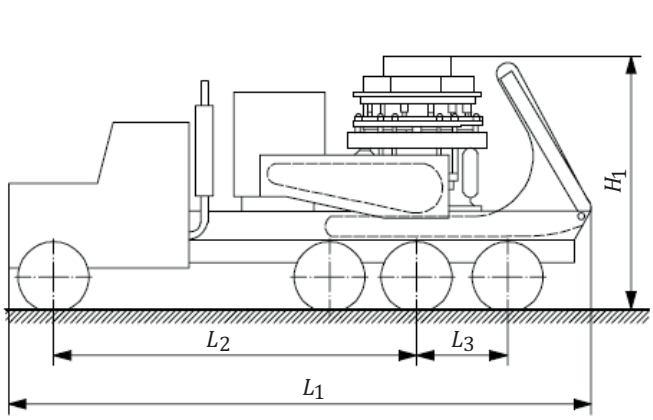


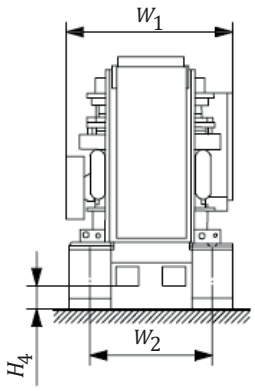
b) Dimensions in operating mode

Key

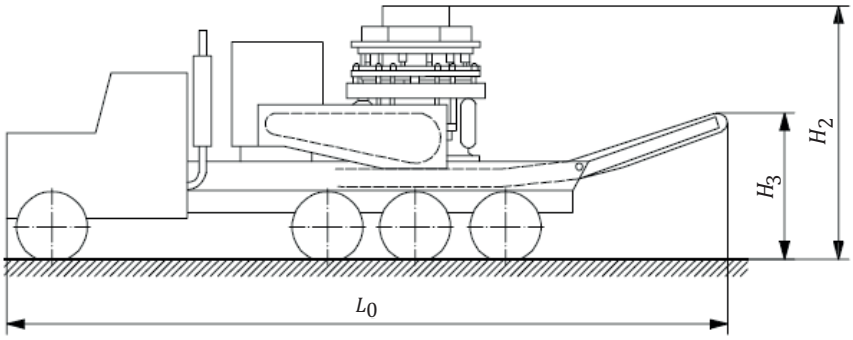
H_0 overall height (operating mode)
H_1 overall height (transporting mode)
H_2 charging height
H_3 discharging height (top of conveyor)
H_4 ground clearance (see 3.16)
H_5 discharging height of the pre-screen side conveyor
L_0 overall length (operating mode)
L_1 overall length (transporting mode)
L_2 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

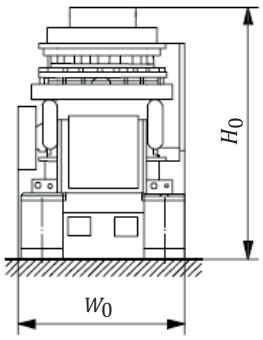
Figure A.2 — Dimensional characteristics of self-propelled mobile crusher on crawler chassis





a) Dimensions in transporting mode



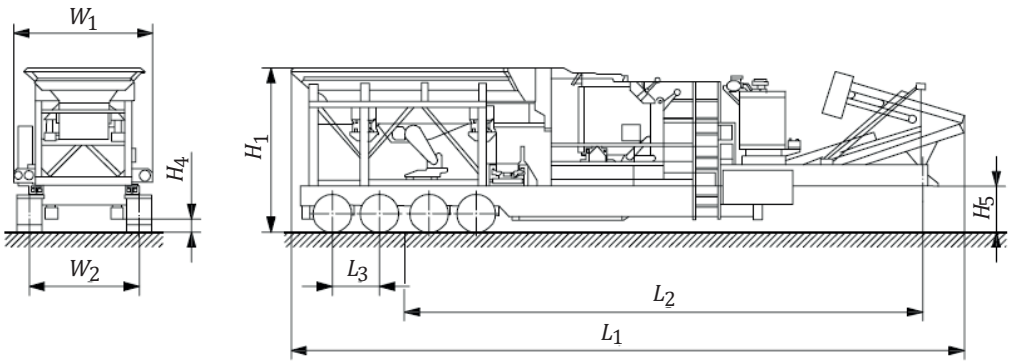


b) Dimensions in operating mode

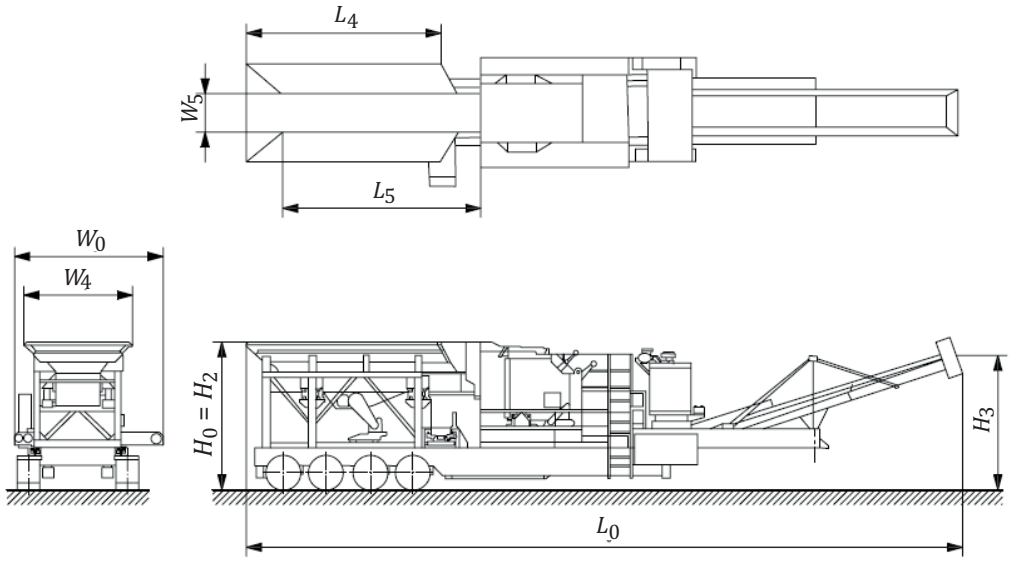
Key

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 (see 3.19)	W_1	overall width (transporting mode)
L_0	overall length (operating mode)	W_2	truck axle track

Figure A.3 — Dimensional characteristics of lorry (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 (transporting mode)	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).

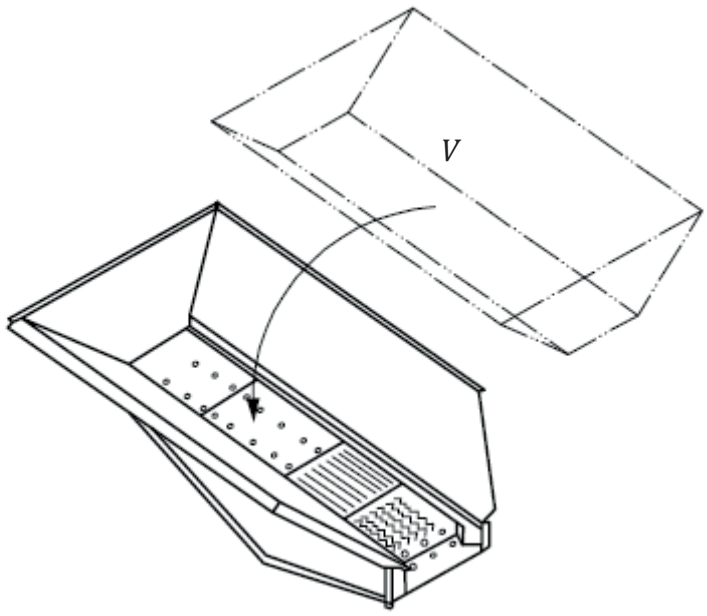
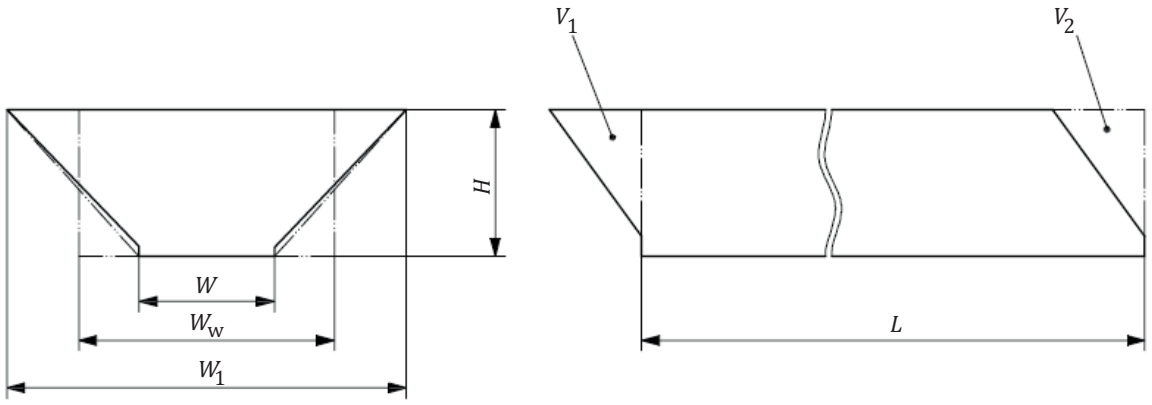


Figure B.1 — Graphical presentation of feed hopper volumetric capacity *V*



Key

L	length of the feed hopper (including grizzly)	(mm)
H	height	(mm)
W	feeder width	(mm)
W_1	feed hopper width	(mm)
W_w	feed hopper width reduced to the rectangle's side and calculated from Formula (B.1):	(mm)

$$W_w = \left(\frac{W_1 - W}{2} + W \right) \quad \text{(mm)} \qquad \text{(B.1)}$$

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 Formula (B.2):

$$V = L \times H \times \left(\frac{W_1 - W}{2} + W \right) \times 10^{-9} \quad (\mathrm{m}^3) \qquad \text{(B.2)}$$

NOTE For definitions of L, H, W and W1, see Figure B.2.

Annex C
(normative)

Methods for defining crushing device net feed opening size

C.1 General

The purpose of this information is to define the net feed opening size for common types of mobile crushers.

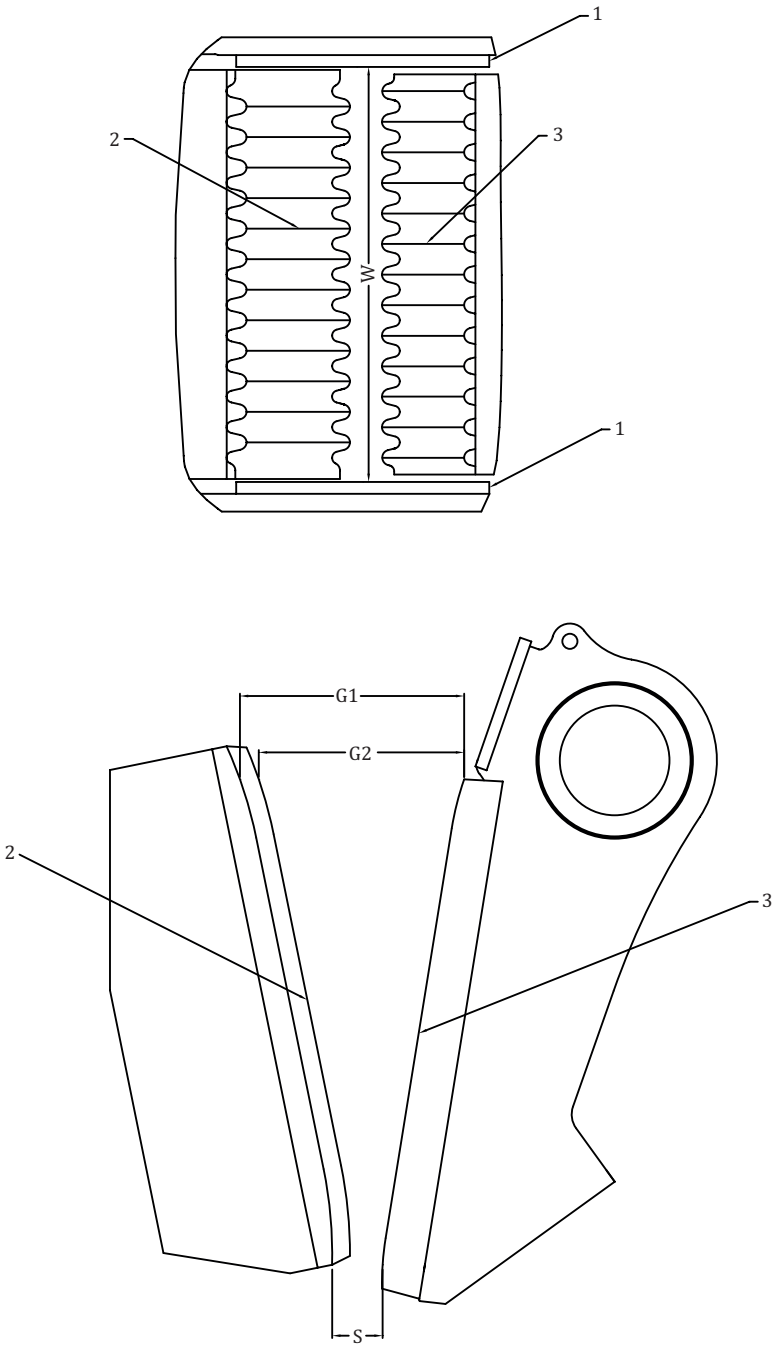
C.2 Measuring methods

C.2.1 For jaw-type crushing device

The gape opening shall be measured from either peak-to-peak (tip to tip) or peak-to-valley (tip to trough) at the top of the jaw dies with the swing jaw (pitman) in its most open position. The gape shall be measured with the closed side setting at its minimum recommended opening.

The gape shall be measured with new jaw dies installed.

The width opening shall be measured as the minimum distance between side liners in the crushing chamber with new liners installed.



Key

1 cheek plate/side liner
2 fixed jaw die
3 moving jaw/swing jaw die
G_1 gape – Peak to valley
G_2 gape – Peak to peak
S crushing device setting/clearance
W chamber width

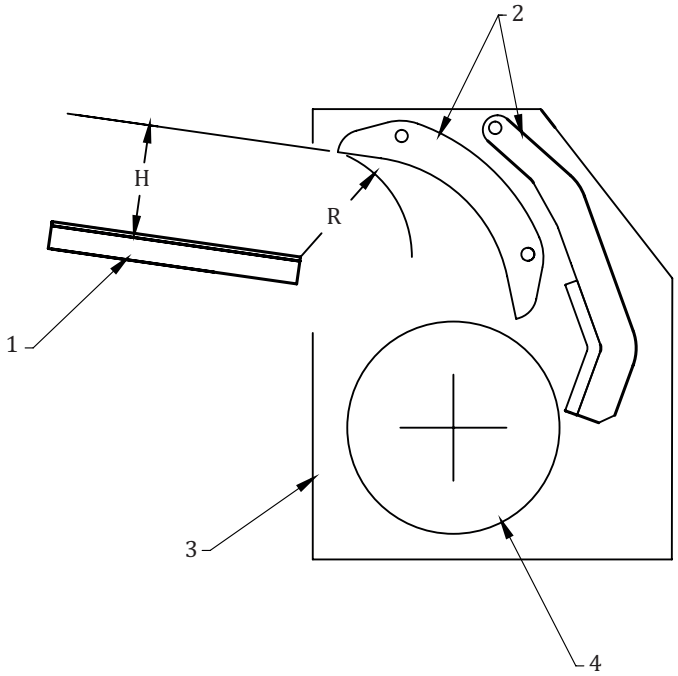
Figure C.1 — Example of jaw-type crushing device feed opening measurement

C.2.2 For horizontal shaft impact (HSI) crushing device

The vertical opening shall be measured from top (H) or end (R) of grizzly bars (or other feed device) to nearest obstruction on the crushing device, whichever is smaller. The vertical opening shall be measured with breaker plate settings matched to application.

The horizontal opening shall be measured as either the distance between side liners in the crushing device or discharge opening for feed device, whichever is narrower.

Both the horizontal and vertical openings shall be measured with new wear parts installed.



Key

1 grizzly bar or other feed device
2 breaker plates
3 impact crushing device frame
4 rotor
H maximum clearance height for feed opening
R radial clearance dimension

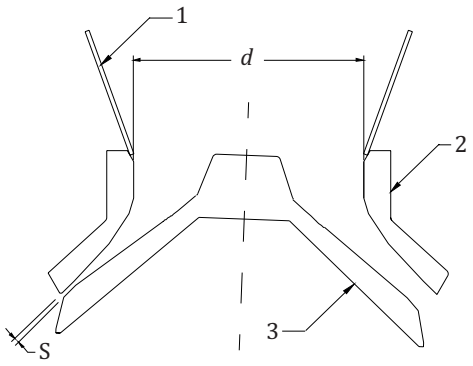
Figure C.2 — Example of horizontal shaft impact (HSI) crusher feed opening measurement

C.2.3 For cone-type crushing device

The crushing device feed opening is either the distance across the feed opening of the crushing device or the distance across the crushing device feed hopper discharge opening, whichever is smaller.

The feed opening is typically round. If the feed opening is another shape other than round, define the length and width instead of diameter.

The feed opening shall be measured with new wear parts installed.



Key

1 feed hopper
2 bowl liner
3 mantle
d diameter of opening
S crushing device setting/clearance

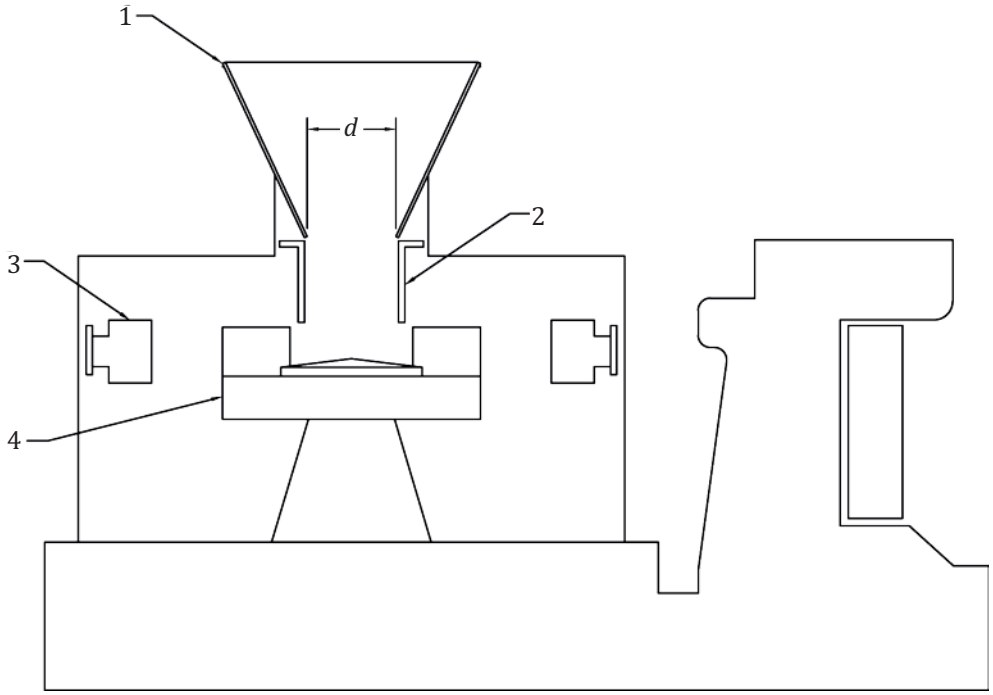
Figure C.3 — Example of cone-type crusher feed opening measurement

C.2.4 For vertical shaft impact (VSI) crushing device

The crushing device feed opening is either the distance across the feed tube or the distance across the crushing device feed hopper discharge opening, whichever is smaller.

The feed opening is typically round. If the feed opening is another shape other than round, define the length and width instead of diameter.

The feed opening shall be measured with new wear parts installed.



Key

1 feed hopper
2 feed tube
3 fixed surface (anvil/rock shelf)
4 impeller (rotor/table)
d diameter of feed opening

Figure C.4 — Example of vertical shaft impact (VSI) crushing device feed opening measurement

Bibliography

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

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