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)



ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

# Contents

Page

# 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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

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.

# 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;

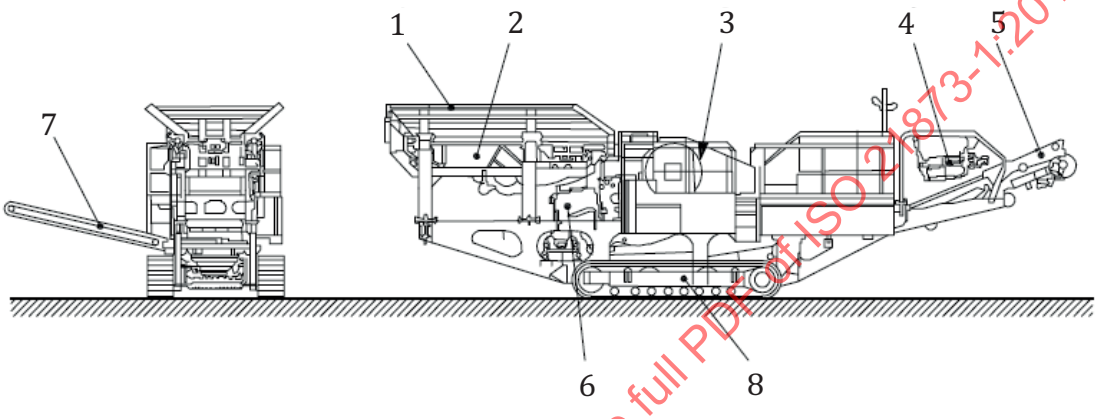
g) diesel emission fluid tank, if equipped l.



# Annex A
(informative)

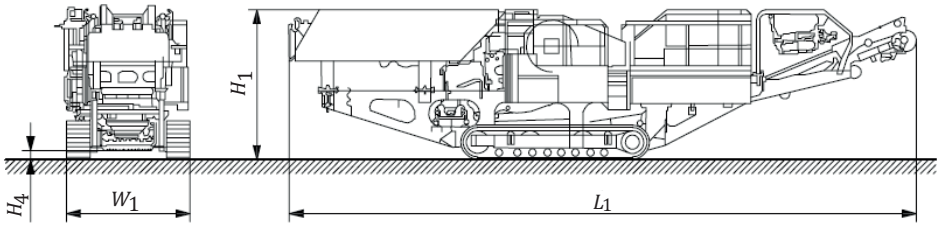
# Structures and dimensional characteristics of mobile crushers — Examples



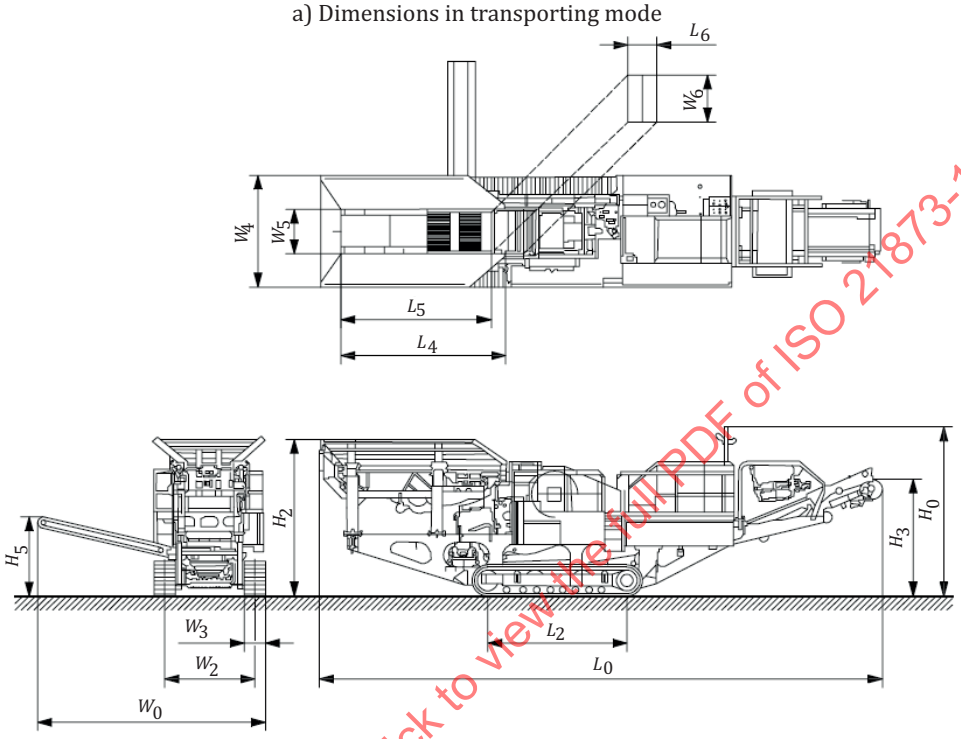

**Key**

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



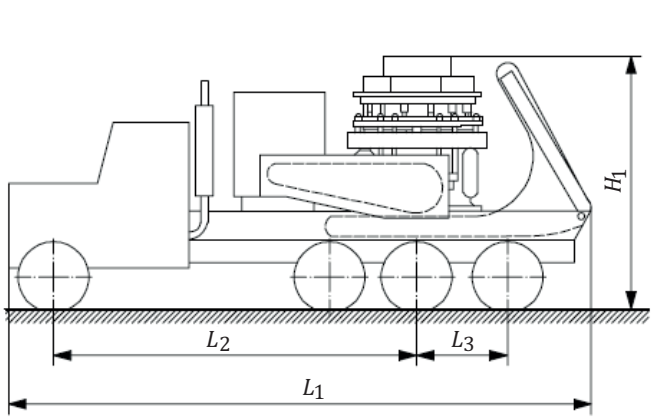

b) Dimensions in operating mode

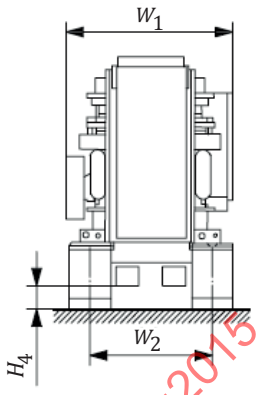


**Key**

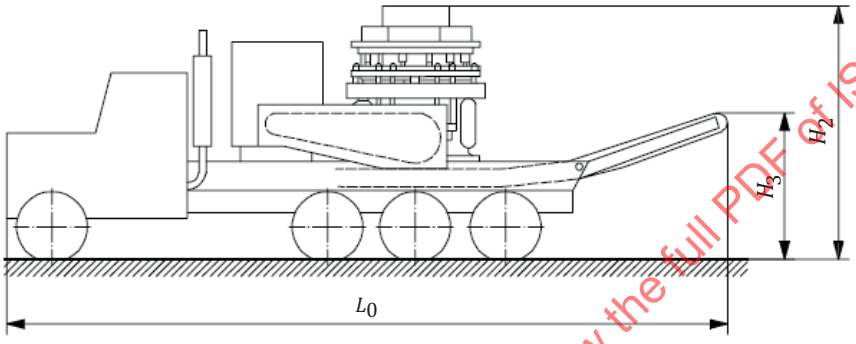
$H_0$ overall height (operating mode)
$H_1$ overall height (transporting mode)
$H_2$ charging height
$H_3$ discharging height (top of conveyor)
$H_4$ ground clearance (see 3.16)
$H_5$ discharging height of the pre-screen side conveyor
$L_0$ overall length (operating mode)
$L_1$ overall length (transporting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

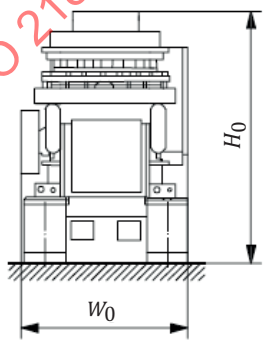
**Figure A.2 — Dimensional characteristics of self-propelled mobile crusher on crawler chassis**




a) Dimensions in transporting mode



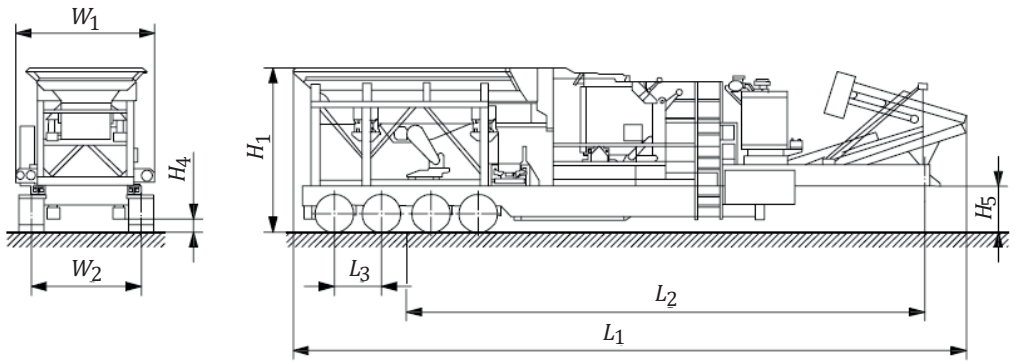




b) Dimensions in operating mode

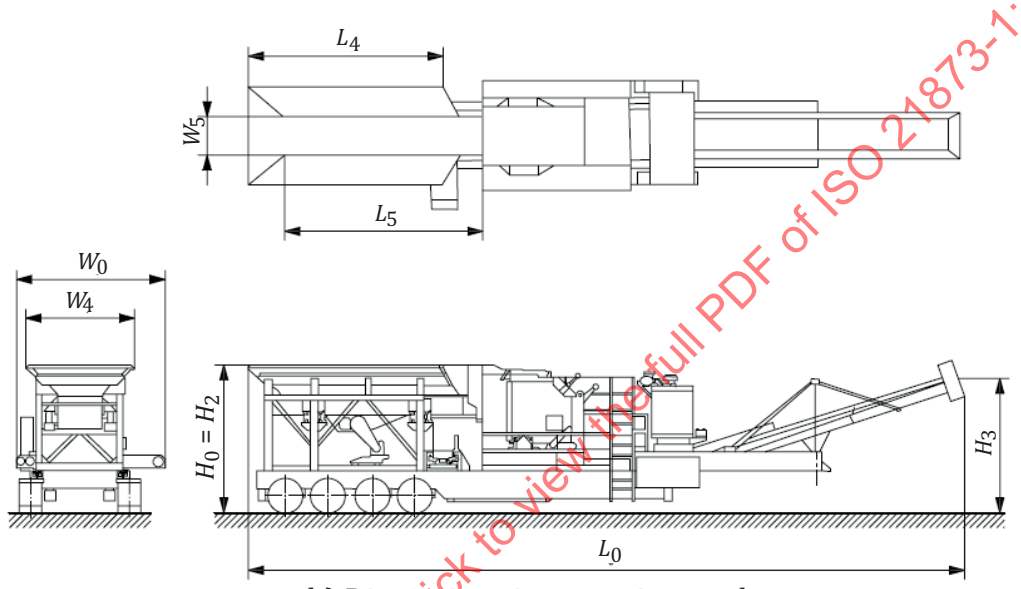
**Key**

| | | | |
|---|---|---|---|
| $H_0$ | 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).

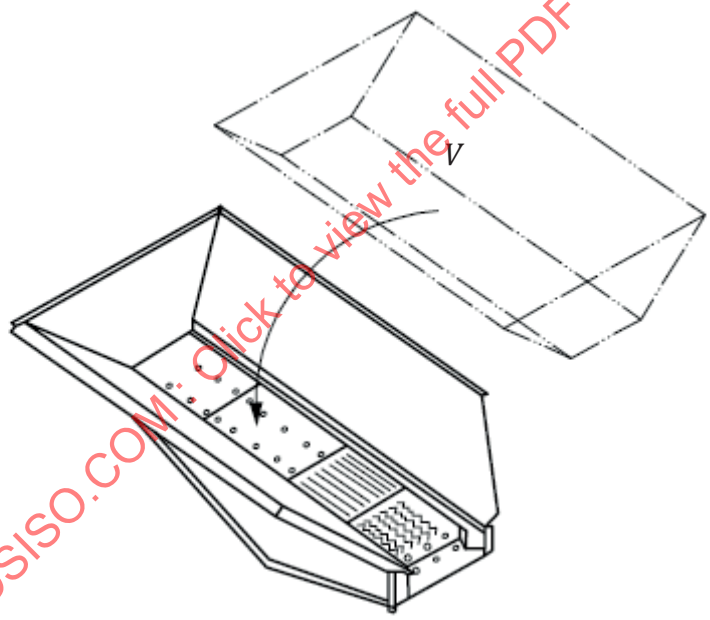
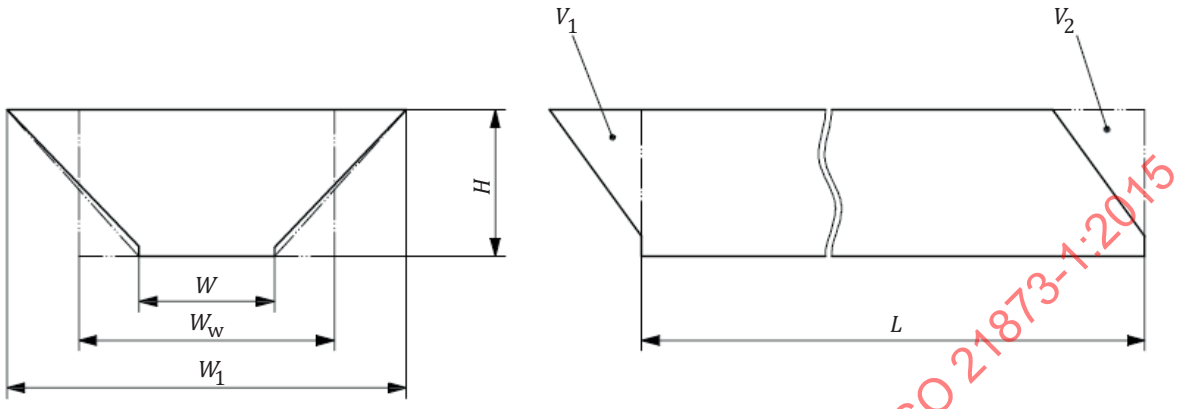



**Figure B.1 — Graphical presentation of feed hopper volumetric capacity *V***




**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.

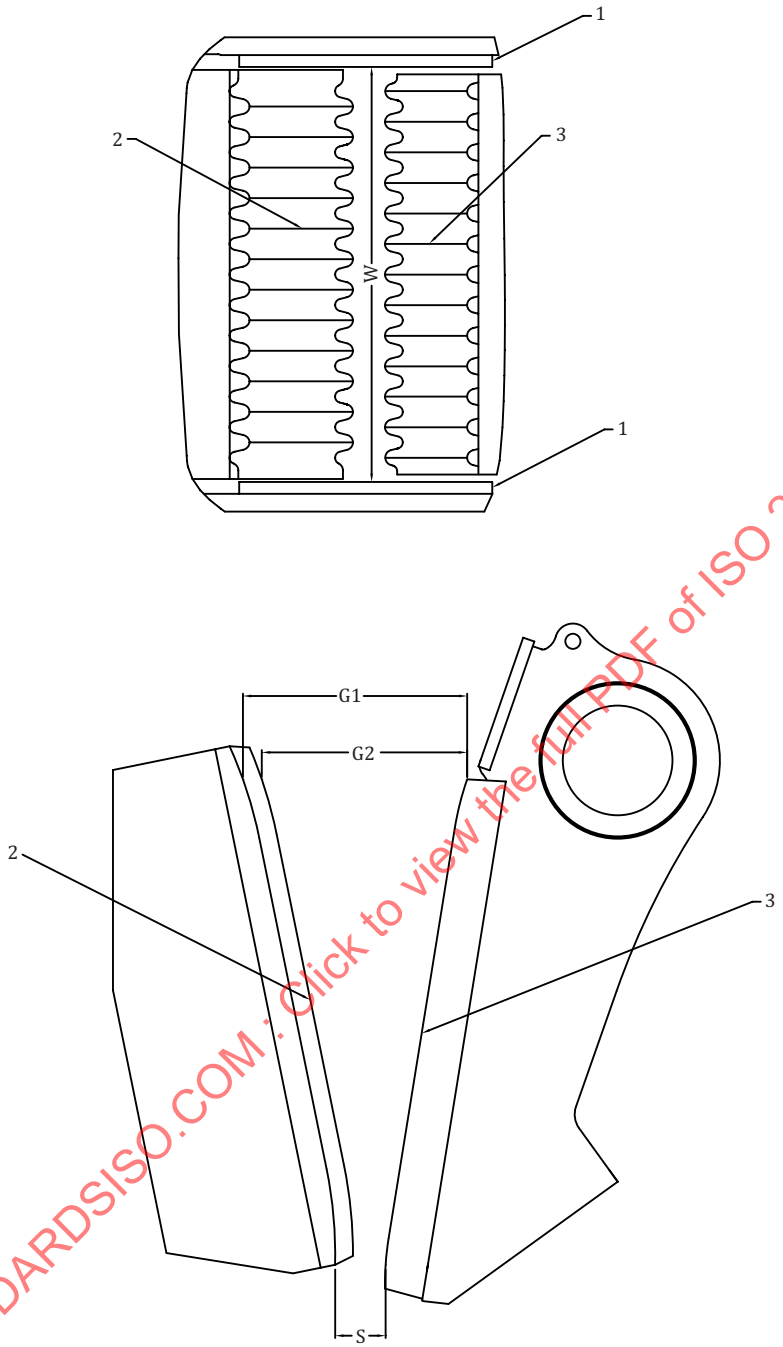
## C.2 Measuring methods

### 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**