भारतीय मानक **IS 7157 : 2023**

Indian Standard

सुवाह्य वायुचालित ग्राइन्डिंग मशीन — विशिष्टि

(दूसरा पुनरीक्षण)

Portable Pneumatic Grinding Machine — Specification

(Second Revision)

ICS 23.140.10

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
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December 2023 **Price Group 6**

Pneumatic and Hydraulic Tools Sectional Committee, PGD 08

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Pneumatic and Hydraulic Tools Sectional Committee had been approved by the Production and General Engineering Division Council.

This standard was first published in 1974 and subsequently revised in 1987. In the first revision, the air consumption, load test and no load test values had been given tolerance on their declared values by the manufacturers. Safe limits of the peripheral wheel speed had also been included. In the second revision of the standard, requirements have been altered to keep pace with the latest technological developments and international practices. The major changes in this standard keeping in view the current practices adopted by the industry are as below:

a) In the classification clause right angle type has been changed to angle type;
b) Terminologies namely gauge pressure, air consumption on free run have been modified; and
c) Test methods for load test has been updated.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PORTABLE PNEUMATIC GRINDING MACHINES — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard specifies the dimensions and other requirements of portable pneumatic grinding machines suitable for working with abrasive wheels of nominal diameter up to 250 mm.

1.2 This Standard does not cover grinding machines for use with coated sanding discs.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

3 TERMINOLOGY

3.1 Gauge Pressure — A steady dynamic pressure (on load operating air pressure) of compressed air measured on the gauge located within three metres from the inlet to the grinding machine.

3.2 Maximum Air Consumption on Free Run (No Load Condition) — The volume of air corrected to standard atmospheric conditions of temperature and pressure according to IS 196 consumed by the grinding machine without any fluctuations of pressure during the test.

3.3 Grinding Machine — Machine designed to carry abrasive wheel, buff, wire brushes or other appliances for removing the metal by abrasive action of the rotating wheel.

3.4 Portable Grinding Machine — Grinding machine designed to be held, and operated while being held, in the operator's hands during its normal working.

3.4.1 *Straight Type Portable Grinding Machine* — Grinding machine with the spindle of the wheel in line with the handle and the grinding action done by the periphery of the wheel.

3.4.2 *Angle Type Portable Grinding Machine* — Grinding machine with the spindle of the wheel at an angles to the handle and the grinding action done mainly by the face (side) of the wheel.

4 CLASSIFICATIONS

The grinding machines shall be classified into the following two types:

a) Type A — Straight type; and
b) Type B — Angle type.

5 DIMENSIONAL REQUIREMENTS

The dimensions for portable pneumatic grinding machine shall be as given in Fig. 1.

6 GENERAL REQUIREMENTS

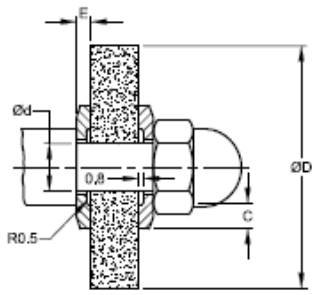
6.1 Abrasive Wheel

For the selection of various types, sizes, grades, and bonds of the abrasive wheels, IS 1249 shall be referred**,** and for dimensions of the grinding wheels IS/ISO 603 (Part 2) and IS 3300 shall be referred.

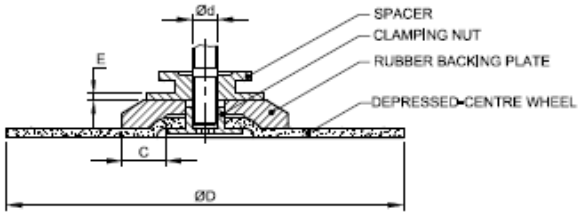
6.2 Wheel Speed

The peripheral wheel speeds, in calculated on the largest wheel diameter; shall not exceed the safe limits given below and the relevant Indian Standards:

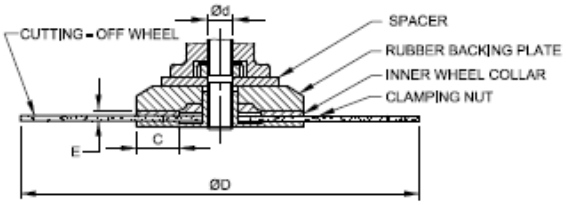
a)	Mounted wheels	:	As per to IS 1991 (Part 10)
b)	Vitrified bonded wheels	:	2 000 metres per minute
c)	Resinoid bonded wheels	:	3 000 metres per minute
d)	Resinoid bonded depressed centre discs and reinforced flat cut of wheels	:	4 800 metres per minute



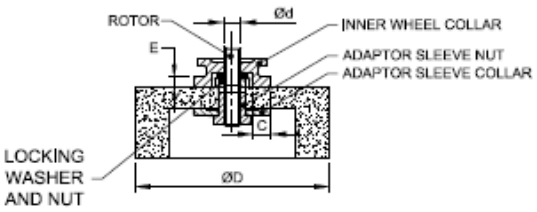
FOR STRAIGHT WHEELS



DEPRESSED - CENTRE WHEEL ASSEMBLY



CUTTING - OFF WHEEL ASSEMBLY



STRAIGHT - CUP WHEEL ASSEMBLY

Sl No.	Nominal Size	Wheel Capacity (Up to and Including) D	Spindle Dia, d	Mass, Kg, *Max*	Recommended Air Connection Size (As per IS 554)	Flange Dimension		
						C *Min*	E, *Min*	
							Type A	Type B
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	25	Suitable for mounted points		2.5	Rc $\frac{1}{4}$	-	-	-
ii)	40	40	9.53, 10	2.5	Rc $\frac{1}{4}$	3	4	-
iii)	50	50	9.53, 10	2.5	Rc $\frac{1}{4}$	3	4	-
iv)	63	63	9.53, 10	2.5	Rc $\frac{1}{4}$	3	4	-
v)	80	80	9.53, 10	2.5	Rc $\frac{1}{4}$	3	4	-

Sl No.	Nominal Size	Wheel Capacity (Up to and Including) D	Spindle Dia, d	Mass, Kg, *Max*	Recommended Air Connection Size (As per IS 554)	Flange Dimension		
						C *Min*	E, *Min*	
							Type A	Type B
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
vi)	100	100	13, (15.88), 16	6.0	Rc $\frac{1}{2}$	10	4	3
vii)	125	125	13, (15.88), 16	6.5	Rc $\frac{1}{2}$	10	7	3
viii)	150	150	13, (15.88), 16	7.0	Rc $\frac{1}{2}$	10	7	3
ix)	180	180	13, (15.88), 16	7.5	Rc $\frac{1}{2}$	12	7	3
x)	200	200	13, (15.88), 16	8.5	Rc $\frac{1}{2}$	16	9	4
xi)	230	230	13, (15.88), 16	8.5	Rc $\frac{1}{2}$	16	9	4
xii)	250	250	13, (15.88), 16	8.5	Rc $\frac{1}{2}$	19	9	4

NOTES

1 Nominal size of the grinding machine is the maximum grinding wheel size utilized by it.
2 Spindle sizes given in parenthesis are non-preferred sizes.

All dimensions in millimetres.

FIG. 1 DIMENSIONS OF GRINDING WHEEL, TYPE A AND TYPE B

6.3 Air Inlet Connection

Air inlet connection shall conform to IS 554.

6.4 Air Control

The grinding machine shall be provided with a manually operated ‘ON-OFF’ switch for switching on and off the air supply. For die grinders, spring loaded levers with dead man effects (safety lock) shall be provided. The same applies to ring throttle also.

6.5 Speed Control

Grinding machines with nominal sizes of 50 and above shall be governed for controlling the speed of the grinding machine.

6.6 Lubrication

Arrangement shall be made to lubricate internal moving parts either with a built-in lubricator or by an external lubricator installed in the system. After some use operator may lubricate the tool manually.

6.7 Flange Plates

Both the flange plates used to grip the abrasive wheel of the grinding machine shall be of the same diameter and shall not be less than one third of the diameter of the abrasive wheel. The bearing surface of the flange shall be perpendicular to the axis within maximum error of 0.13 mm measured on the extreme periphery of the bearing surface. For more details on flanges, reference may be made to IS 1991 (Part 5). The material used for the flanges shall have minimum tensile strengthof 400 N/mm^2.

6.8 Wheel Guard

Every grinding machine shall be provided with wheel guard, except those fitted with collets for holding mounted points.

The guard shall be properly secured with the machine. For other details on wheel safety guards, reference may be made to IS 1991 (Part 4).

6.8.1 *Exposure*

For plain grinding wheels, the maximum angular exposure of the periphery of abrasive wheel shall not exceed 180º and the top of the wheel shall be protected at all times. For disc grinding wheels, the maximum angular exposure of the periphery of the wheels shall be 180º and shall be located so as to be between the operator and the wheel during use. For more details on exposure, refer IS 1991 (Part 4).

6.8.2 *Dimensions for Guards*

The dimensions for wheel guards shall be as given in Fig. 2.

6.9 Instruction Manual

An instruction manual shall be supplied with each grinding machine. For details of data to be given in the instruction manual, reference may be made to IS 11609.

7 TESTS

7.1 Measurement of Air Consumption

Air consumption shall be determined with either liquid displacement meter or any suitable flow measuring instrument. The flow measuring instrument shall be located within three metres from the grinding machine.

7.2 Measurement of Speed

For measurement of speed in revolution per minute (rpm), any contact or non-contact type speed measuring device shall be used, such as tachometer or stroboscope.

7.3 Measurement of Pressure

For measurement of air pressure, gauge of any suitable type shall be used. The pressure to be read shall fall between one fourth and three fourth of full scale reading. The pressure shall remain constant at 6.0 bars ± 0.5 bars during testing. (1 bar = 10^5 Pa)

7.4 No Load Test

No load running shall be carried out for a period of minimum two minutes. Speed and air consumption shall be measured during no load test. There shall be a tolerance of $^{+0}_{-5}$ percent of declared value of the speed and air consumption shall be within +5 percent of the declared value.

7.5 Load Test

Grinding machines of nominal size 100 and above will be subjected to load test. The load test shall be carried out by coupling the grinder spindle to prony brake or to any suitable attachment to cause resistance. The speed and air consumption shall be measured at the specified load condition. The speed shall be within $^{+0}_{-5}$ percent of its declared value and the air consumption shall be within +5 percent of the declared value.

7.6 Operation Test

The grinding machine shall be tested for easy starting and stopping. The temperature rise on the surface of the machine shall not exceed 10 °C above ambient, when tested, after running it for half an hour continuously on rated full load.

8 PACKAGING AND MARKING

Before packing, the inlet, exhaust, and other openings of each grinding machine shall be adequately protected/covered against entry of dust and other harmful material. Each grinding machine shall be packed in such a way that no damage is done during transit. For packing, IS 11609 may be referred.

9 MARKING

9.1 The grinding machines shall be marked at a suitable place so that in the course of normal use, the markings do not get damaged. The grinders shall be marked with the following information:

a) Manufacturer’s name, initials or trade-mark;
b) Maximum working air pressure;
c) Maximum working speed;
d) Serial number and year of manufacturing; and
e) When wheel guards are used, RPM of tool and symbol indicating the direction of rotation of wheel shall be marked on wheel guard.

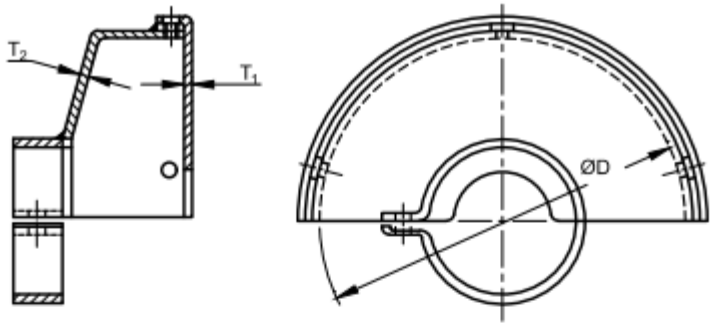
9.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

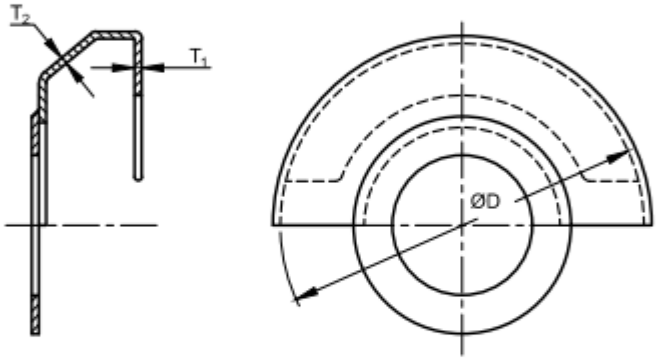
10 DECLARED VALUES

Manufacturers shall furnish the values of the following parameters at 6 bars ± 0.5 bars inlet air pressure, as their declared values, at the time of enquiry:

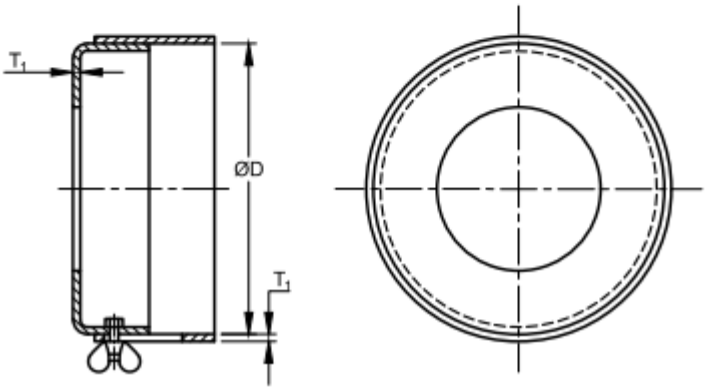
a) Wheel capacity of the grinding machine for different types of grinding wheels with different bonds;
b) No load speed;
c) Air consumption on no load;
d) Speed at the declared load condition for nominal sizes 100 and above; and
e) Air consumption at the declared load condition for nominal sizes 100 and above.



GUARD FOR STRAIGHT WHEELS, FRONT - ENCLOSED



GUARD FOR DEPRESSED-CENTRE WHEEL AND CUTTING - OFF WHEEL



GUARD FOR STRAIGHT AND TAPER-CUP WHEELS

Nominal Size of Grinding Machines	*T_1, Min*	*T_2, Min*	*D*
For wheel size up to 100	1.5	1.5	Dia, of wheel +10
For wheel size 100 to 250	2	3	

NOTE — Figures shown above are only indicative and do not specify the design features.

All Dimensions in millimetres.

FIG. 2 DIMENSION FOR GUARDS

ANNEX A

(*Clause* 2)

LIST OF REFERRED STADARDS

IS No.	*Title*
IS 196 : 1966	Atmospheric conditions for testing (*revised*)
IS 554 : 1999/ ISO 7-1 : 1994	Pipe threads where pressure-tight joints are made on the threads — Dimensions, tolerances and designation (*fourth revision*)
IS/ISO 603 (Part 2) : 1999	Bonded abrasive products — Dimensions: Part 2 Grinding wheels for centreless external cylindrical grinding
IS 1249 : 1997	Recommendations for selection of grinding wheels (*second revision*)
IS 1991	Safety requirements for the use, care and protection of abrasive grinding wheels:
(Part 4) : 1988	Part 4 Safety guards (*second revision*)
(Part 5) : 1987	Part 5 Flanges (*second revision*)
(Part 10) : 1987	Part 10 Mounted wheels (*second revision*)
IS 3300 : 1980	Dimensions for mounted wheels and points (*first revision*)
IS 11609 : 1986	Technical supply conditions for pneumatic tools

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Pneumatic and Hydraulic Tools Sectional Committee, PGD 08

Organization	*Representative(s)*
Bharat Heavy Electrical Limited, New Delhi	SHRI M. RAVI **(*Chairperson*)**
Bharat Electronics Limited, Bengaluru	SHRI SUDARSHAN K.
Border Roads Organization, New Delhi	SHRI PANKAJ BHATNAGAR
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Indian Institute of Technology Roorkee, Roorkee	SHRI APURBBA KUMAR DR AKSHAY DVIVEDI (*Alternate*)
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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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