BS EN 62826:2014

BSI Standards Publication

Surface cleaning appliances — Floor treatment machines with or without traction drive, for commercial use — Methods of measuring the performance

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National foreword

This British Standard is the UK implementation of EN 62826:2014. It is identical to IEC 62826:2014.

The UK participation in its preparation was entrusted by Technical Committee CPL/59, Performance of household electrical appliances, to Subcommittee CPL/59/6, Floor treatment appliances.

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

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English Version

Surface cleaning appliances - Floor treatment machines with or without traction drive, for commercial use - Methods of measuring the performance (IEC 62826:2014)

Appareils de nettoyage de surface - Machines de traitements des sols avec ou sans commande de dispositif de déplacement, à usage commercial - Méthodes de mesure des performances (CEI 62826:2014)

Oberflächenreinigungsgeräte - Bodenbehandlungsmaschinen mit oder ohne Antrieb für den gewerblichen Gebrauch - Prüfverfahren zur Bestimmung der Gebrauchseigenschaften (IEC 62826:2014)

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Foreword

The text of document 59F/238A/CDV, future edition 1 of IEC 62826, prepared by SC 59F "Surface cleaning appliances" of IEC/TC 59 "Performance of household and similar electrical appliances" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62826:2014.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2015-06-25
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2017-09-25

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In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 60312 Series	NOTE	Harmonized as EN 60312 Series (modified)

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu

Publication	Year	Title	EN/HD	Year
		Printing and business paper - Requirements for copy paper for dry toner imaging processes	EN 12281	-
IEC 60312-1	-	Vacuum cleaners for household use - Part 1: Dry vacuum cleaners - Methods for measuring the performance	EN 60312-1	-
IEC 60335-1 (mod) + corr.1 July + corr.2 April +A1	2010 2010 2011 2013	Household and similar electrical appliances - Safety - Part 1: General requirements	EN 60335-1 +A11	2012 2014
IEC 60335-2-69	-	Household and similar electrical appliances - Safety - Part 2-69: Particular requirements for wet and dry vacuum cleaners, including power brush for commercial use, for commercial use	EN 60335-2-69	-
IEC 60335-2-72	-	Household and similar electrical appliances - Safety - Part 2-72: Particular requirements for floor treatment machines with or without traction drive, for commercial use	EN 60335-2-72	-
ISO 554	-	Standard atmospheres for conditioning and/or testing - Specifications	-	-
ISO 1585	-	Road vehicles - Engine test code - Net power	-	-
SAE J1349	-	Engine Power Test Code - Spark Ignition and Compression Ignition - As Installed Net Power Rating	-	-

CONTENTS

SURFACE CLEANING APPLIANCES –

Floor treatment machines with or without traction drive, for commercial use – Methods of measuring the performance

1 Scope

This International Standard lists the characteristic performance parameters for walk-behind and ride-on floor scrubbers and sweepers and other floor cleaning machines according to IEC 60335-2-72. This standard does not apply to IEC 60312 series.

The intent is to serve the manufacturers in describing parameters that fit in their manuals, and in their literature. This may include all or some of the parameters listed in this definition document. When any of the parameters listed in this document are used, they are noted as being measurements made in accordance with this document.

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.

IEC 60312-1, *Vacuum cleaners for household use – Part 1: Dry vacuum cleaners – Methods for measuring the performance*

IEC 60335-1, *Household and similar electrical appliances – Safety – Part 1: General requirements*
IEC 60335-1:2010/AMD 1:2013[1]

IEC 60335-2-69, *Household and similar electrical appliances – Safety – Part 2-69: Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use*

IEC 60335-2-72, *Household and similar electrical appliances – Safety – Part 2-72: Particular requirements for floor treatment machines with or without traction drive, for commercial use*

ISO 554, *Standard atmospheres for conditioning and/or testing – Specifications*

ISO 1585, *Road vehicles – Engine test code – Net power*

EN 12281, *Printing and business paper – Requirements for copy paper for dry toner imaging processes*

SAE J 1349, *Engine Power Test Code Spark Ignition and Compression ignition As Installed Net Power Rating*

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[1] There exists a consolidated edition 5.1 (2013) that comprises edition 5 (2010) and its Amendment 1(2013).

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 60335-2-72 and the following apply.

3.1.1
pad
cleaning tool of round, oval or other shape, attached to a scrubber in order to clean the surface (floor) by abrasive rotations

Note 1 to entry: It consists of a coarse or fine synthetic membrane. The abrasiveness can be recognized by the colour. The structure (open/closed) determines the suitability for high/low speeds.

3.1.2
brush
cleaning tool of round, oval or other shape, attached to a scrubber in order to clean the surface (floor) by abrasive rotations

Note 1 to entry: It consists of natural or synthetic fibres of different kinds of hardness fixed in a holder. The hardness is subject to the tasks that have to be executed, such as scrubbing, polishing or shampooing.

3.1.3
broom
cleaning tool of round shape, attached to a sweeper in order to clean the surface (floor)

Note 1 to entry: Regarding the automatic cleaning brooms it can be distinguished between main broom (main cylindrical brush) and side broom. The main broom is located normally close to the hopper. The bristles of the main broom normally are arranged as straight, spiral or spiral-vee lines of bristles. Thereby they generate the necessary skidding and there is room enough for bigger particles between the lines of bristles. The function of the side broom is to sweep away dirt from corners and borders towards the course of the main broom.

3.2 Abbreviations

For the purpose of this document, the following abbreviations apply.

GVW Gross vehicle weight
FOPS Falling-object protective structures
ROPS Roll over protection system

4 General conditions for testing

4.1 Atmospheric conditions

Where required, the test procedures and measurements shall be carried out under the following conditions (in accordance with ISO 554):

Standard atmosphere: 23/50
Temperature: (23 ± 2) °C
Relative humidity: (50 ± 5) %
Air pressure: 86 kPa to 106 kPa

Temperature and humidity conditions within the specified ranges are required for good repeatability and reproducibility. Care should be taken to avoid changes during a test.

4.2 Machine loading

The machine is loaded for testing with its GVW, as specified in 8.1, unless otherwise stated.

4.3 Machine set-up

Machine settings shall be as described under normal operation as defined in IEC 60335-2-72, except as noted elsewhere in this standard. Throughout the measurements, the same type of pad/brush has to be used.

5 Working path width

5.1 Working scrubbing path width

The path the machine cleans, based solely on the width of the brushes or pads. This is the width that is exposed to the full cleaning process, to indicate the effective cleaning width of the machine, not the outside physical width of the machine.

5.2 Total pad/brush width

The nominal width of the cleaning pads or brushes, not taking into account overlap of the pads or brushes. The purpose of this value is to communicate to the end user the size of the pads or brushes that are to be used with the machine.

NOTE This value can be given as follows (example): W_{Pad} = 300 mm for a single pad, or W_{Pad} = 2 × 300 mm for two pads.

5.3 Maximum squeegee width

The path that is covered by the squeegee while operating in a straight line.

5.4 Minimum working sweeping path width

The path the machine sweeps based solely on the nominal width of the main broom, to indicate the effective sweeping width of the machine, not the outside physical width of the machine.

5.5 Maximum working sweeping path width

The path the machine sweeps based solely on the nominal width of the main broom and the side brooms. It is intended to indicate the effective sweeping width of the machine, not the outside physical width of the machine.

5.6 Measurement method

The working path width is the measured width of the floor that is swept or wetted and scrubbed while cleaning in a straight line. All measurements shall be done with the machine in the minimum down force setting.

NOTE 1 The more down force that is applied to brushes the larger the overall diameter of the contact circle with the floor. Testing at the minimum setting will minimise this effect.

NOTE 2 The maximum working path width can be visually detected and measured by letting the brooms/pads/brushes work on a wax coated floor or a soiled floor (e.g. with sand for sweepers and paint for scrubbers).

5.7 Reporting

The values shall be given for a standard machine, and the widths for machines fitted with options shall be noted separately. The values are reported in mm.

6 Minimum aisle turn-around width

6.1 General

The minimum aisle width the machine can turn around in without reversing is an indication of the manoeuvrability of the machine during operation.

6.2 Measurement method

Aisle turn-around width is measured as the minimum distance between two parallel vertical planes that allows the machine to turn 180°, during normal operation, without contacting either of the planes. The planes used shall be higher than the highest elements of the machine under test. The test has to be carried out in both directions.

Flexible components like squeegees or brushes are allowed to contact the planes.

6.3 Reporting

The value is reported in mm. If the test results for both directions are different, then both figures shall be reported.

7 Machine transport width

7.1 General

The minimum width the machine can pass through, to indicate the manoeuvrability of the machine during transport, not the effective cleaning width of the machine.

7.2 Measurement method

Machine width is measured as the minimum distance between two parallel vertical planes that allows the machine to pass between the planes, while moving in a straight line. Any removable machine part taken off as indicated in the operating manual for this measurement shall be reported with the result.

7.3 Reporting

The value is reported in mm for each machine configuration.

8 Weight

8.1 Gross vehicle weight (GVW) taken from IEC 60335-2-72

The maximum allowable fully laden weight of the machine and its payload, as ready for use, to indicate the maximum weight of the machine.

The GVW includes, if applicable, full clean water tanks, empty dirty water tanks (half full for recycling systems), hopper and dust bags loaded at rated weight capacity, largest recommended batteries, all options such as cords, hoses, wands, cleaning agents, brooms, brushes, air conditioning and cabins. For ride-on machines, the GVW shall include a standard operator, which weighs 75 kg.

NOTE 1 A sweeper with a full hopper is not ready for use, but is the heaviest configuration for a sweeper.

NOTE 2 GVW could be apportioned into front and rear axle weight.

8.2 Empty weight

The empty weight of the operational machine, to indicate the maximum weight of the machine without options and batteries.

NOTE This value along with the weight of the container and packaging can be used to calculate the shipping weight.

The empty weight of the operational machine shall exclude

– traction batteries,
– options (e.g. driver cabin, FOPS, ROPS, second and third side broom, front mounted sweeping attachment for scrubbers),
– waste water,
– cleaning detergent,
– swept debris,
– fresh water (in case of scrubbers or combined machines), and
– operator's weight.

The weight of options and batteries can be noted separately.

8.3 Transportation weight

The transportation weight of the machine in kilograms, which includes the batteries but excludes options (e.g. driver cabin, FOPS, second and third side broom, front mounted sweeping attachment for scrubbers), fresh water (in case of scrubbers or combined machines), and the weight of a standard operator (75 kg).

8.4 Reporting

The values are reported in kg. The actual mass may vary by ±5 %.

9 Maximum scrub deck down force

9.1 General

The maximum down-force on the floor is intended to be an indication of the maximum scrubbing force that can be generated by the machine in normal operation, without overloading motors or circuit protection devices.

9.2 Measurement method

Maximum scrub deck down force is measured as the reactive force while operating the machine in a stationary position, with the deck on a smooth stainless steel surface (not more than 1,5 mm above or under the ground plane).

NOTE Squeegees that are mounted on the scrubbing unit will affect the result of measurement. For the purpose of this measurement this is acceptable.

9.3 Reporting

The reported value in N is the recorded maximum force that the measurement does not drop below during a 15 s measurement period, using clean tap water. For a cylindrical deck, the manufacturer shall specify the type of brush material to be used. For a disc deck, a typical medium grade pad shall be used.

The brush or pad material type and the machine scrub setting shall be stated in the report.

If the machine design is such that the down force varies as the power input changes, the minimum value during the 15 s measurement period shall be recorded. All side skirts that contact the stainless steel plate during the test shall be positioned, or fixed, so that they are capable of supporting as much weight as they would if the machine were propelling forward.

10 Maximum scrub deck down pressure

10.1 General

The scrub deck down pressure is calculated as the force per pad/brush contact area.

10.2 Determination method

The scrub deck down pressure is calculated by dividing the scrub deck down force (see Clause 9) by the complete pad/brush contact area.

The contact area can be visualized (and subsequently measured) by letting the pad/brush work on a wax coated floor or a soiled (painted) floor. For cylindrical brushes or pads, the area inside of the rectangular pattern that the pad/brush visualized on the floor is relevant.

Alternatively, the contact area of disc brushes or pads may be calculated as follows:

$$A = \pi \cdot (r_o^2 - r_i^2)$$

where

r_o is the outer radius of the contact area (total pad/brush width, see 5.2);

r_i is the inner radius of the contact area, i.e. the internal area without bristles, if applicable.

For orbiting scrub systems, the contact area shall be calculated.

NOTE Due to the orbiting system, a visualization as previously described would enlarge the measured area incorrectly.

10.3 Reporting

Maximum scrub deck down pressure is reported in N/cm^2. The type of pad or brush should be noted along with the machine scrub setting used during this measurement.

11 Rotating speed of pads, brushes and brooms

11.1 General

The rotating speed indicates the number of revolutions per minute that the cleaning attachment will attain at the stated load.

11.2 Measurement method – unloaded operation

Maximum rotating speed attainable without cleaning attachment in contact with the floor. The nominal speed of the output shaft of the pad/brush/broom motor gear box combination can be taken as indication for the maximum rotating speed.

NOTE It may be impossible to measure this value because machine controls switch off the drive of the unloaded cleaning attachment.

11.3 Measurement method – loaded operation

Maximum rotating speed attainable while operation cleaning attachment under maximum scrub deck down force (see Clause 9).

11.4 Reporting

The rotating speed is reported in r/min.

12 Maximum floor load and wheel contact pressure

12.1 General

The maximum pressure exerted onto a floor surface by any wheel or caster on the machine, during expected operation or transport mode.

These parameters are intended to indicate the suitability of the machine for specific floor surfaces. The values can be compared against the static load limit rating of the floor surface.

12.2 Measurement method

The maximum floor load shall be measured in accordance with Annex A on concrete precast paving slabs according to IEC 60335-2-72.

12.3 Reporting

The value is reported in accordance with Annex A.

13 Speed

13.1 Maximum transport mode speed (power driven machines)

The transport speed of the machine, moving in a straight forward direction, on a flat smooth surface. This parameter is intended to indicate the maximum transport speed of the machine, with no other machine functions operating.

13.2 Maximum working mode speed

The working speed, as defined by the manufacturer, at which the machine is travelling in a straight, forward direction, on a straight, flat, smooth concrete surface. This parameter is intended to indicate the recommended maximum working speed of the machine, with all floor cleaning functions of the machine operating simultaneously.

13.3 Measurement method

Transport mode speed is measured after acceleration to the maximum speed is achieved.

Working mode speed is measured after acceleration to the working speed is achieved.

13.4 Reporting

The values are reported in km/h.

14 Sound

14.1 Sound power level

The overall A-weighted emission sound power level of the machine, to indicate of the total sound power emitted by the machine.

14.2 Sound pressure Level

The overall A-weighted emission sound pressure level, at the operator position, to indicate the noise that the operator is exposed to during the normal operation of the machine.

14.3 Measurement method

Measurement in accordance with measurement of emission of acoustical noise as given in IEC 60335-2-72.

14.4 Reporting

The values and the uncertainties are reported in dB(A).

15 Vibration

15.1 Hand-arm system vibration total value

For all machines, the vibration total value to which the hand-arm system is subjected shall be measured.

15.2 Whole-body vibration total value

For ride-on machines and walk-behind machines with sulky, the highest root mean square value of weighted acceleration to which the whole body is subjected shall be measured.

15.3 Measurement method

Measurement in accordance with measurement of emission of vibration as given in IEC 60335-2-72.

15.4 Reporting

The values including their uncertainty surroundings are reported in m/s^2.

16 Solution flow rate

16.1 General

The amount of solution (water only) sprayed or dispensed to the brushes at each flow setting, to indicate the average continuous solution flow rate during normal operation.

16.2 Measurement method

Solution flow rate shall be measured with the solution tank at half of its full useful capacity as determined in Clause 18.

NOTE 1 The solution flow rate can vary depending upon head pressure.

NOTE 2 The flow rate can be measured and calculated by various methods. One method is to weigh the machine at the start and end of a defined time period, calculate the weight differential, divide this value by the weight of water to determine the volume of water, and then divide the volume by the test time to get the flow rate. Another method is to use a flow meter to take this measurement.

16.3 Reporting

The value is reported in l/min at each flow or scrub setting. If the flow rate is variable, the maximum value shall be reported along with the available range, for example 0 l/min to 10 l/min.

17 Rated hopper volume capacity

17.1 General

The maximum functional volume of debris that a hopper may hold in normal operation, to indicate the useful volume of the respective hopper. This value is the sum of struck hopper capacity, how much fluid the hopper could hold, and the heaped capacity, how much dry debris could be piled above the top of the struck capacity.

17.2 Measurement method

Measurement with dry sand (1 600 kg/m^3 ± 150 kg/m^3). The machine is operated in the cleaning mode while recovering the test sand until sand starts to exit the hopper.

NOTE The weight of sand that falls before the emptying phase starts is excluded from the measurement.

17.3 Reporting

The value is reported in l, and shall be specified as hopper capacity.

18 Tank capacity – solution tank and recovery tank

18.1 General

The maximum functional volume that a tank may hold in normal operation (i.e. filled to the stated "fill-line"), to indicate the useful volume of the respective tank.

The solution volume is the volume of solution that can be dispensed in normal operation, and the recovery volume is the volume of wastewater that can be recovered in normal operation. Normal operation includes starting, stopping, turning as well as climbing and descending rated grades.

NOTE When bladder tanks are used, the sum of solution tank and recovery tank capacity can be higher than the geometric dimension of the machine tank.

18.2 Measurement method – solution tank

The volume of water the tank will hold can be determined by calculating the weight difference or by measuring the amount of water with a flowmeter. Care shall be taken to exclude the loss through splashing during normal operation of the machine, and the amount that cannot be drained or is trapped in the interconnecting hoses and pipes, etc.

18.3 Measurement method – recovery tank

Suction of waste water during normal operation into the recovery tank through the normal suction hose until float switch or other protection means switch the suction unit off. Measurement of the weight of the picked up water. Care shall be taken to exclude the amount that cannot be drained or is trapped in the interconnecting hoses and pipes,

18.4 Reporting

The value is reported in l and shall be specified as recovery or solution tank capacity. For machines with bladder tanks the reasoning for a tank capacity exceeding the geometric dimension of the machine tank shall be given.

19 Recovery tank drain time

19.1 General

This is the time that it takes to drain a recovery tank that is filled to the rated capacity that is determined in Clause 18. This value is used in Clause 27.

19.2 Measurement method

Fill recovery tank to the rated capacity as determined in Clause 18. Record the time it takes to drain the tank. Add 1 min to this time to account for washing out tank and miscellaneous tasks needed in the drain area.

19.3 Reporting

The value is reported in min.

20 Water coverage test

20.1 General

The purpose of this test is to determine the amount of water per area that a scrubber uses to clean a given area at a given speed.

20.2 Machine preparation

The following list shows the points which have to be considered for the water coverage test:

– Fill solution tank to ½ of the rated capacity as determined in Clause 18.
– Set cleaning speed to the values determined in Clause 13.
– Set solution flow to the lowest setting as defined by the manufacturer.
– Operate machine in the cleaning mode until the solution is flowing normally.

20.3 Measurement method

The following list shows the points which have to be considered for the measurement of the water coverage test:

– Select the amount of the test area to be used as the basis for the measurement. This value is reported in m^2.
– Select the given cleaning speed that will be used during the test.
– Determine the length of the test course by dividing the test area by the working scrubbing path width as defined in Clause 5. The test course shall be at least 40 times the working scrubbing path width. Each single pass over the test area shall be at least 10 m long. This value is reported in m.
– Operate machine in cleaning mode while traveling at the given cleaning speed over the test course. Measure the amount of water used while traveling over the test course.

NOTE The volume of water can be measured and calculated by various methods. One method is to weigh the machine at the start and end of the test, calculate the weight differential, divided by the weight of water for a unit volume. The second method is to use the flow rate determined in Clause 16 and multiply this flow rate by the time it takes to transverse the test course.

20.4 Reporting

The volume of water used to clean the test area is reported in l/m^2.

EXAMPLE:

Given the following;

Test area:	60 m^2
Cleaning speed:	1,33 m/s
Working scrubbing path width:	53 cm [0,53 m]

Therefore:

Test course (shall be at least 40 times the working scrubbing path width) = Test area/ Working scrubbing path width = 60 m^2/0,53 m = 113 m.

The amount of water used on the test course was measured and found to be 0,96 l. The test area is 60 m^2. This leads to water consumption per area of 0,016 l/m^2.

21 Battery amp-hour capacity

21.1 General

The rated capacity of a battery pack is the maximum amperage the battery pack can continuously supply over a defined period and is intended to be an indication of the power storage capacity of a battery pack.

21.2 Reporting

Battery amp-hour capacity as provided by the battery supplier shall be reported in amp-hours (Ah) along with the corresponding discharge rate of either 5 h or 20 h discharge time.

22 Calculated battery-powered – (max.) machine run time

Clause 22 is under consideration and will be reviewed and updated.

23 Rated power

23.1 Rated power for combustion engines (output power)

The rated power of the engines, based on a continuous duty cycle rating, as defined by the engine manufacturer. This parameter is intended to be an indication of the maximum possible output power of the engine, independent of its suitability to a specific application.

The engine manufacturer normally supplies this value. The maximum power has to be declared according to ISO 1585. In addition, the revolution speed and the measurement specification has to be declared (e.g. 150 kW at 2 300 rpm according to SAE J 1349). The actual power of the sweeper/scrubber is lower and affected by, but not limited to, accessories (air cleaner, exhaust, charging, cooling, fuel-pump, etc.), application, engine speed and ambient operating conditions (temperature, humidity and altitude).

NOTE The measurement according to ISO 1585 corresponds, in principle, to the European Directive 80/1269/EEC, Curve N, and to SAE J 1349.

23.2 Rated power input

Power input for the whole machine, assigned to the machine by the manufacturer, e.g. in the manual and at the type-plate. The method for measuring is indicated in IEC 60335-1 (e.g. 3.1.4) and subsequently modified by IEC 60335-2-72.

This value may be estimated by the total of all electric motors installed in the machine, as defined by the single motor manufacturers, to be calculated as follows:

$$P_{\text{total}} = \sum_{i=1}^{n} P_i = P_1 + P_2 + P_3 + P_n$$

where

P_1 is the input power of traction motor;

P_2 is the input power of suction motor;

P_3 is the input power of broom/brush motor;

P_n is the input power of further permanent loads, e.g. water pump.

Due to the duty cycle of motors and their controls, the real power consumption may be lower than P_{total} according to this formula. Ensure compliance with Clause 10 of IEC 60335-1:2010/AMD1:2013.

23.3 Rated power for electric motors

The rated input or output power of a single electric motor, as defined by the motor manufacturer.

23.4 Reporting

The values are reported in kW or W, as appropriate.

24 Air flow of sweeping/scrubbing machines

24.1 General

The volume of air movement through a machine per unit of time under standard atmospheric conditions is an indication of the vacuum capability of the machine under high-flow conditions.

24.2 Measurement methods

The airflow shall be measured in the conduct which connects the underpressure zone with the suction turbine, during normal use, without traction drive. The measurement shall be taken as near to the suction turbine as feasible. The measuring uncertainty of the airflow measuring device shall not be greater than ± 5 %.

For battery powered machines, the measurement shall be carried out with a power supply that can regulate the voltage to ± 2,5 % of the rated voltage.

24.3 Reporting

The maximum value of the air flow in litres per second that can be achieved during normal use shall be reported.

25 Maximum vacuum

25.1 General

The absolute difference from ambient pressure created by the machine, to indicate the vacuum capability of the machine under sealed flow conditions.

25.2 Measurement method

The vacuum system intake is sealed. For battery-powered machines, tests will be conducted with a power supply that can regulate the voltage to ± 2,5 % of the rated voltage. Manufacturer may choose to include vacuum lift figures for additional test orifices (see IEC 60312-1).

25.3 Reporting

The value is reported in Pa.

26 Filter area

26.1 General

The filter area is the exposed area of the filter media. This parameter is intended to indicate the effective size of the available air filter media. The area of a filter with a pleated media is the area of the media if spread out on a flat surface. This included area shall be positioned and constructed to be available to the flow of working air.

26.2 Measurement method

The area of a specific air filter can be taken from the filter supplier, or it can be measured directly by disassembling a filter. If a statement of filtration performance is given, it shall be the filtration performance of the media at the expected airflow seen in the machine. Requirements are given in IEC 60335-2-69, particular requirements for vacuum cleaners and dust extractors for the collection of hazardous dusts.

26.3 Reporting

The value is reported in m^2.

27 Productivity

Clause 27 is under consideration and will be reviewed and updated.

Annex A
(normative)

Evaluation of wheel contact pressure on hard floors and floor loading of floor cleaning machines

A.1 Mean pressure of wheels

The mean static pressure of each wheel is defined by the wheel load (as a function of load, weight of persons, equipment, batteries, etc.) and the footprint of the wheel (as a function of tyre equipment (tread), dimensioning, material, etc.).

A.2 Weight of the operable machine

The following list gives the points that have to be considered for the weight of the operable machine:

- net weight of the machine;
- weight of water in the filled fresh-water tank;
- weight of the operator (75 kg for ride-on machines);
- weight of the battery, where one exists;
- weight of the fuel tank, where one exists (filled to 90 %);
- weight of the attachment components (canopy, front end, etc.).

A.3 Evaluation of mean wheel contact pressure

The mean pressure of each wheel is to be calculated with the following formula:

$$\bar{p}_{\text{wheel}} = \frac{F_{\text{wheel}}}{A_{\text{wheel}}}$$

where

$\overline{p}_{\text{wheel}}$ is the mean pressure of wheel [N/mm^2];

F_{wheel} is the wheel load [N];

A_{wheel} is the footprint of wheel [mm^2] = L1 × L2

and for double castors respectively: A_{wheel} = $L_{1\text{eff}} \times L_2$.

The wheel load F can be calculated by measuring each wheel of the operable machine. The allocation of weight to each wheel is affected by the position of the equipment in contact with the floor. This allocation shall be determined in both the transport and one defined operation position:

- castor(s) in driving direction;
- squeegee and/or brush(es)/equipment set to the minimum floor pressure.

The maximum value due to this determination has to be reported (see Clause A.5).

The footprint of the wheel can be calculated by the so-called paper method with an operable machine (see above). For this, sheets of paper[2] are slid to the footprint on all of the four sides (see Figure A.1 and Figure A.2), the footprint now can be measured on the floor.

In the case of air-filled wheels, the manufacturer's default air pressure shall be adjusted and declared. Treads are not considered. Burrs of solid wheels shall be eliminated before measurement.

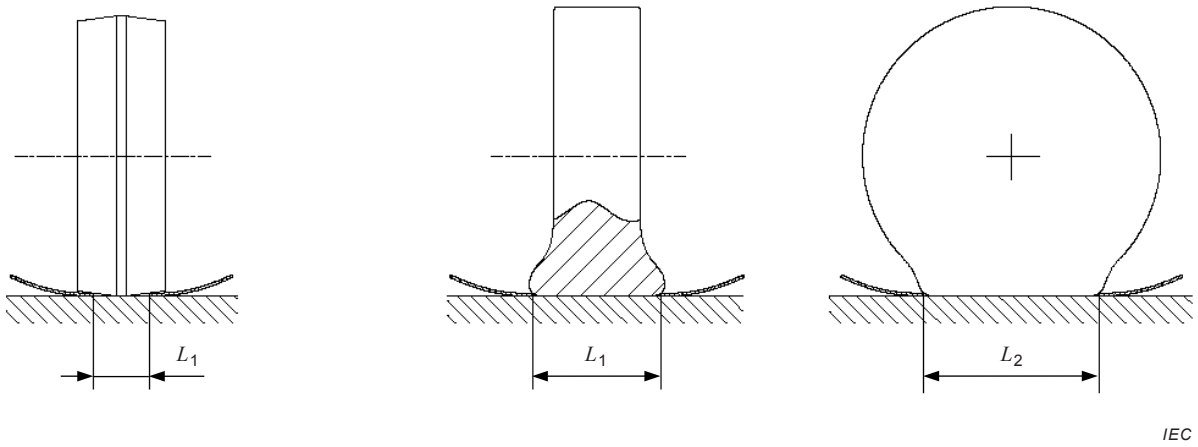

Figure A.1 – Method for evaluating a wheel footprint

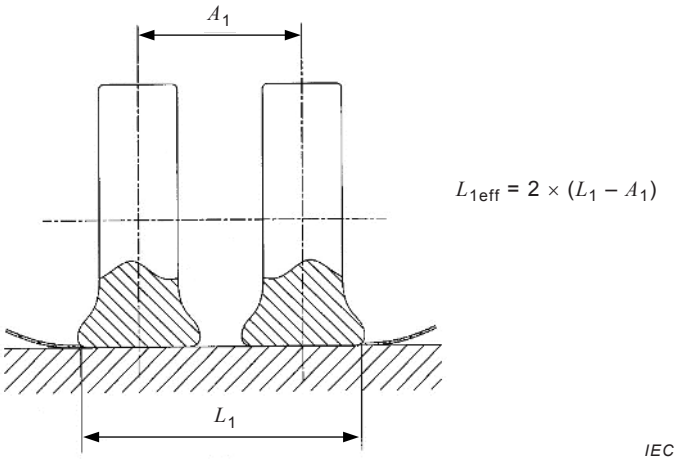

Figure A.2 – Method for evaluating the footprint of double-castors

A.4 Evaluation of the working load

The working load is a function of the weight of the operable machine in relation to the outer outline of the machine. The outer outline is the area calculated based on the dimensions of greatest length and greatest width of the machine in position of transport, measured using the fixed components as projected onto the floor, and additional area for the operator and for the moving of the machine.

- For walk-behind machines, the area used by the operator (greatest width × 0,5 m) or the area of the sulky shall be added to this projection.

2 The paper sheet shall be a "copy paper for dry toner imaging processes" according to EN 12281 with an area-related mass of 80 g/m^2 (paper sheets normally used in an office). This warrants a paper thickness of 100 μm ± 4 μm, which will result in sufficiently accurate measurements.

- For ride-on machines, an additional area for operating manoeuvrability of the machine of 1,0 times of A_{machine} shall be added

$$\overline{p}_{\text{machine}} = \frac{F_{\text{machine}}}{A_{\text{machine}}}$$

where

$\overline{p}_{\text{machine}}$ is the working load [N/m^2];

F_{machine} is the weight of the operable machine [N];

A_{machine} is the outer outline of the machine [m^2], which equals the greatest length times the greatest width plus the additional area for the operator/sulky/movement.

A.5 Data sheet

The data sheets shall contain the following specifications:

- the reference of this International Standard;
- date and signature;
- specifications to identify the machine;
- maximum running speed of the machine;
- weight of the operable machine;
- list of attached components (canopy, front end, etc.);
- identification of each wheel;
- kind of tyre equipment (number of wheels, double-castors/twin tyres, tyre material used);
- the manufacturer’s default air pressure in case of air-filled wheels;
- footprint of each wheel;
- the maximum mean pressure of all wheels (pursuant to Clause A.3);
- dimension of the machine at greatest length and greatest width;
- working load (pursuant to Clause A.4).

Annex B
(informative)

Traction batteries for cleaning machines

Annex B is under consideration.

Annex C
(informative)

Realistic productivity at each scrub setting

Annex C is under consideration and will be reviewed and updated.

Bibliography

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