



Test Report issued under the responsibility of:



TEST REPORT

IEC 60745-2-3

Hand-held motor-operated electric tools - Safety Part 2: Particular requirements for grinders, polishers and disk-type sanders

Report Reference No.: 3121650.50B

Date of issue: 2012-8-1

Total number of pages.....: 17 pages

Applicant's name.....: LEE YEONG INDUSTRIAL CO., LTD.

Address: No.2, Kejia Rd., Douliu City, Yunlin County 64057, Taiwan

Test specification:

Standard: IEC 60745-2-3:2006 (2nd edition) + A1: 2010 to be used in conjunction with IEC 60745-1: 2006 Fourth Edition

Test procedure: CB Scheme

Non-standard test method: N/A

Test Report Form No.: IEC60745_2_3C

TRF Originator: Underwriters Laboratories Inc.

Master TRF.....: Dated 2010-12

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Test item description.: Electric Drywall Sander

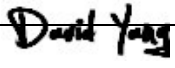
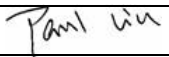
Trademark: AGP

Manufacturer.....: LEE YEONG INDUSTRIAL CO., LTD.

No.2, Kejia Rd., Douliu City, Yunlin County 64057, Taiwan

Model/Type reference: GS9FE, GS9FSE, GS9UE, GS9USE, GS9GE, GS9GSE, FM225U, FM225US, GS225U, GS225US, GS225G, GS225GS, GS9U, GS9US, GS9G, GS9GS, DWS225, DWS225S

Ratings: 110-120 V or 220-240 V; 50-60 Hz; 550 W; Ø225 mm; M14;
n=650-1800 min⁻¹, Class II

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	DEKRA Testing and Certification China Ltd.
Testing location/ address		10F #250 Jiangchangsan Road, Building 16 Headquarter Economy Park Shibe Hi-Tech Park, Zhabei District Shanghai 200436 CHINA
<input type="checkbox"/>	Associated CB Laboratory:	
Testing location/ address		
Tested by (name + signature).....:		David Yang 
Approved by (name + signature)....:		Paul Liu 
<input type="checkbox"/>	Testing procedure: TMP	
Testing location/ address		
Tested by (name + signature).....:		
Approved by (name + signature)....:		
<input type="checkbox"/>	Testing procedure: WMT	
Testing location/ address		
Tested by (name + signature).....:		
Witnessed by (name + signature) ..:		
Approved by (name + signature)....:		
<input type="checkbox"/>	Testing procedure: SMT	
Testing location/ address		
Tested by (name + signature).....:		
Approved by (name + signature)....:		
Supervised by (name + signature):		
<input type="checkbox"/>	Testing procedure: RMT	
Testing location/ address		
Tested by (name + signature).....:		
Approved by (name + signature)....:		
Supervised by (name + signature):		

List of Attachments (including a total number of pages in each attachment):

See part 1

Summary of testing:**Tests performed (name of test and test clause):**

See part 1

Testing location:

See part 1


Summary of compliance with National Differences

See part 1

Copy of marking plate

See part 1

Test item particulars:	
Type of tool	disk-type sander
Operating conditions	Continuous
Class of equipment	Class II
Supply connection	Type X
Mass of equipment (kg)	4,7 kg
Protection against moisture	-
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement	Pass (P)
- test object does not meet the requirement	Fail (F)
Testing	
Date of receipt of test items	2011-10-07
Date(s) of performance of tests	2011-10-07 to 2012-07-27
General remarks:	
<p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report, a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator. Note: This TRF should be used for grinders, with a rated speed not exceeding a peripheral speed of the accessory of 80 m/s at rated capacity, polishers and disk-type sanders, including angle, straight and vertical. It is intended to be used for tools with a rated capacity not exceeding 230 mm. It is not intended to be used for random-orbit polishers and random-orbit sanders.</p>	
Manufacturer's Declaration per sub-clause 6.2.5 of IEC60745-2-3C:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable	
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)	
See part 1	
General product information	
See part 1	

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
8	MARKING AND INSTRUCTIONS		
8.1	Tool also marked with the following:		P
	- rated speed in revolutions per minute :	650-1800 min ⁻¹	P
	- rated capacity in mm :	Ø 225 mm	P
	- tool provided with a threaded spindle marked with spindle thread size :	M 14	P
	 "WARNING Always wear eye protection", or sign M004 of ISO 7010, or appropriate safety sign		P
	The eye protection symbol, optionally, modified by adding other personal protective equipment such as ear protection, dust mask, etc..... :	WEEE	P
8.6	If units or technical data are expressed by symbols then "n" is used for rated speed		P
8.12.1	For the following safety instructions specified in 8.12.1.101 to 8.12.1.107, terms such as grinding/grinder, sanding/sander, wire brushing/wire brush, polishing/polisher, or cutting off/cut-off tool selected as recommended by the manufacturer		P
	These terms in the warnings and headings are consistently used or deleted based on the selected operations		P
	The "and"/"or" conjunctions, optionally, used as appropriate		P
8.12.1.101	Safety instructions for all operations		P
	a) This power tool is intended to function as a grinder, sander, wire brush, polisher or cut-off tool. Read all safety warnings, instructions, illustrations and specifications provided with this power tool. Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury.		P
	b) "Operations, such as grinding, sanding, wire brushing, polishing or cutting-off are not recommended to be performed with this power tool. Operations for which the power tool was not designed may create a hazard and cause personal injury."		P
	c) Do not use accessories, which are not specifically designed and recommended by the tool manufacturer. Just because the accessory can be attached to your power tool, it does not assure safe operation.		P

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	d) The rated speed of the accessory must be at least equal to the maximum speed marked on the power tool. Accessories running faster than their rated speed can break and fly apart.		P
	e) The outside diameter and the thickness of your accessory must be within the capacity rating of your power tool. Incorrectly sized accessories cannot be adequately guarded or controlled.		P
	f) The arbour size of wheels, flanges, backing pads or any other accessory must properly fit the spindle of the power tool. Accessories with arbour holes that do not match the mounting hardware of the power tool will run out of balance, vibrate excessively and may cause loss of control.		P
	g) Do not use a damaged accessory. Before each use, inspect the accessory such as abrasive wheels for chips and cracks, backing pad for cracks, tear or excess wear, wire brush for loose or cracked wires. If power tool or accessory is dropped, inspect for damage or install an undamaged accessory. After inspecting and installing an accessory, position yourself and bystanders away from the plane of the rotating accessory and run the power tool at maximum no-load speed for one minute. Damaged accessories will normally break apart during this test time.		P
	h) Wear personal protective equipment. Depending on application, use a face shield, safety goggles or safety glasses. As appropriate, wear dust mask, hearing protectors, gloves and workshop apron capable of stopping small abrasive or workpiece fragments. The eye protection must be capable of stopping flying debris generated by various operations. The dust mask or respirator must be capable of filtering particles generated by your operation. Prolonged exposure to high intensity noise may cause hearing loss.		P
	i) Keep bystanders a safe distance away from work area. Anyone entering the work area must wear personal protective equipment. Fragments of workpiece or of a broken accessory may fly away and cause injury beyond immediate area of operation.		P
	j) "Hold power tool by insulated gripping surfaces only, when performing an operation where the cutting accessory may contact hidden wiring or its own cord. Cutting accessory contacting a "live" wire may make exposed metal parts of the power tool "live" and could give the operator an electric shock."		P

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	k) Position the cord clear of the spinning accessory. If you lose control, the cord may be cut or snagged and your hand or arm may be pulled into the spinning accessory.		P
	l) Never lay the power tool down until the accessory has come to a complete stop. The spinning accessory may grab the surface and pull the power tool out of your control.		P
	m) Do not run the power tool while carrying it at your side. Accidental contact with the spinning accessory could snag your clothing, pulling the accessory into your body.		P
	n) Regularly clean the power tool's air vents. The motor's fan will draw the dust inside the housing and excessive accumulation of powdered metal may cause electrical hazards.		P
	o) Do not operate the power tool near flammable materials. Sparks could ignite these materials.		P
	p) Do not use accessories that require liquid coolants. Using water or other liquid coolants may result in electrocution or shock.		P
8.12.1.102	Kickback prevention is addressed by providing precautions a) to e), or equivalent		P
	a) Maintain a firm grip on the power tool and position your body and arm to allow you to resist kickback forces. Always use auxiliary handle, if provided, for maximum control over kickback or torque reaction during start-up. The operator can control torque reactions or kickback forces, if proper precautions are taken.		P
	b) Never place your hand near the rotating accessory. Accessory may kickback over your hand.		P
	c) Do not position your body in the area where power tool will move if kickback occurs. Kickback will propel the tool in direction opposite to the wheel's movement at the point of snagging.		P
	d) Use special care when working corners, sharp edges etc. Avoid bouncing and snagging the accessory. Corners, sharp edges or bouncing have a tendency to snag the rotating accessory and cause loss of control or kickback.		P
	e) Do not attach a saw chain woodcarving blade or toothed saw blade. Such blades create frequent kickback and loss of control.		P
8.12.1.103	Additional safety instructions for grinding and cutting-off operations		N/A

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	a) Use only wheel types that are recommended for your power tool and the specific guard designed for the selected wheel. Wheels for which the power tool was not designed cannot be adequately guarded and are unsafe.		N/A
	b) "The guard must be securely attached to the power tool and positioned for maximum safety, so the least amount of wheel is exposed towards the operator. The guard helps to protect operator from broken wheel fragments and accidental contact with wheel and sparks that could ignite clothing."		N/A
	c) Wheels must be used only for recommended applications. For example: do not grind with the side of cut-off wheel. Abrasive cut-off wheels are intended for peripheral grinding, side forces applied to these wheels may cause them to shatter.		N/A
	d) Always use undamaged wheel flanges that are of correct size and shape for your selected wheel. Proper wheel flanges support the wheel thus reducing the possibility of wheel breakage. Flanges for cut-off wheels may be different from grinding wheel flanges.		N/A
	e) Do not use worn down wheels from larger power tools. Wheel intended for larger power tool is not suitable for the higher speed of a smaller tool and may burst.		N/A
8.12.1.104	Additional safety instructions for cutting-off operations		N/A
	a) Do not "jam" the cut-off wheel or apply excessive pressure. Do not attempt to make an excessive depth of cut. Overstressing the wheel increases the loading and susceptibility to twisting or binding of the wheel in the cut and the possibility of kickback or wheel breakage.		N/A
	b) Do not position your body in line with and behind the rotating wheel. When the wheel, at the point of operation, is moving away from your body, the possible kickback may propel the spinning wheel and the power tool directly at you.		N/A
	c) When wheel is binding or when interrupting a cut for any reason, switch off the power tool and hold the power tool motionless until the wheel comes to a complete stop. Never attempt to remove the cut-off wheel from the cut while the wheel is in motion otherwise kickback may occur. Investigate and take corrective action to eliminate the cause of wheel binding.		N/A

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	d) "Do not restart the cutting operation in the workpiece. Let the wheel reach full speed and carefully re-enter the cut. The wheel may bind, walk up or kickback if the power tool is restarted in the workpiece."		N/A
	e) Support panels or any oversized workpiece to minimize the risk of wheel pinching and kickback. Large work pieces tend to sag under their own weight. Supports must be placed under the workpiece near the line of cut and near the edge of the workpiece on both sides of the wheel.		N/A
	f) Use extra caution when making a "pocket cut" into existing walls or other blind areas. The protruding wheel may cut gas or water pipes, electrical wiring or objects that can cause kickback.		N/A
8.12.1.105	Safety instructions for sanding operations are provided, if these operations are recommended by the manufacturer		P
	a) Do not use excessively oversized sanding disc paper. Follow manufacturers recommendations, when selecting sanding paper. Larger sanding paper extending beyond the sanding pad presents a laceration hazard and may cause snagging, tearing of the disc or kickback.		P
8.12.1.106	Safety instructions for polishing operations are provided, if these operations are recommended by the manufacturer		N/A
	a) Do not allow any loose portion of the polishing bonnet or its attachment strings to spin freely. Tuck away or trim any loose attachment strings. Loose and spinning attachment strings can entangle your fingers or snag on the workpiece.		N/A
8.12.1.107	Safety instructions from a) and b) for wire-brushing operations are provided, if these operations are recommended by the manufacturer		N/A
	a) Be aware that wire bristles are thrown by the brush even during ordinary operation. Do not overstress the wires by applying excessive load to the brush. The wire bristles can easily penetrate light clothing and/or skin.		N/A
	b) If the use of a guard is recommended for wire brushing, do not allow any interference of the wire wheel or brush with the guard. Wire wheel or brush may expand in diameter due to workload and centrifugal forces.		N/A
8.12.2 a)	101) Types of accessories in accordance with 8.12.1.101 a).....:		N/A
	102) Thickness and diameter of grinding wheels		N/A

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.12.2 b)	The Instruction Manual provided with the Operating Instructions		N/A
	101) Proper use of blotters, when they are provided with the bonded abrasive product		N/A
	102) Mounting of accessories and use of the correct flanges, use and care of the abrasive product		N/A
	For reversible flanges, the correct method of fitting the flanges		N/A
	103) Instruction to the operator on the use of all the different types of wheels specified in the instructions in accordance with 8.12.2 a) 101) (e.g., side grinding, peripheral grinding)		N/A
	104) Instruction for the proper type of guard for the type of wheel being used		N/A
	105) Instruction for the mounting and securing of the guard identifying allowable adjustments to ensure maximum protection of the operator		N/A
	106) Proper support for the workpiece		N/A
	107) In case of cup-wheels, cones or plugs with a threaded hole intended to be mounted on the machine spindle, critical dimensions and other data shall be given in order to prevent the spindle end from touching the bottom of the hole of the abrasive product		N/A
	108) For disk-type sanders exclusively intended for sanding wooden floors, an instruction stating how to connect the external dust collection equipment where applicable		N/A
8.101	Tool marked with an indication of direction of rotation of the spindle, indicated by an arrow, raised or sunk, or by any other means no less visible and indelible		P
8.12.2 c)	The Instruction Manual provided with instructions regarding Maintenance and Servicing: 101) Storage and handling of recommended accessories		P
12	HEATING		
12.4	The tool operated at rated input or rated current for 30 minutes; the temperature rises measured at the end of the 30 min		P
18	ABNORMAL OPERATION		
18.10.4	During the tests, the speed of the spindle did not exceed 120 % of the rated speed (Rev min ⁻¹).....:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The accessory in accordance with 8.12.2 a) 101) resulting in the maximum speed installed		P
19	MECHANICAL HAZARDS		
19.4	Tools with a rated capacity exceeding 100 mm have at least two handles		P
19.101	Grinders with a rated capacity exceeding 55 mm provided with a wheel guard to protect the user during normal use against the following events:		N/A
	– accidental contact with the abrasive product		N/A
	– ejection of fragments of the abrasive product		N/A
	– sparks and other debris		N/A
	The wheel guard is, optionally, removable either with the aid of a tool or by fulfilling requirements below:		N/A
	– two separate and dissimilar actions required to remove the guard(e.g., pushing a lever and turning the guard)		N/A
	– for removal, the guard is turned to a position that does not occur in normal operation.		N/A
	- the guard is designed so that in case of a wheel burst, the guard reduces the risk of injury to the operator and remains attached to the grinder and comply with the test of 20.101		N/A
	- it is not necessary to remove the guard from the tool to change the abrasive wheel		N/A
	- the risk of an accidental contact between the operator and the wheel during normal use is minimized		N/A
	To prevent the installation of an oversized wheel, the clearance between the inside of the guard and the periphery of a new abrasive product according to 8.12.2 a) 101) is 8 mm max. in at least one location for tools with a rated capacity ≥ 130 mm (mm).....:		N/A
	10 mm maximum for tools with a rated capacity exceeding 130 mm (mm).....:		N/A
	For wheel Type 1 (grinding wheels) and wheel Types 41 and 42 (cutting-off wheels), the guard covers at least 175° of the abrasive wheel periphery and both sides of the wheel		N/A
	The front curtain is designed to facilitate easy replacement of the wheel		N/A
	Enclosure of the spindle end, nut, and the locking flange not required (Fig 101)		N/A

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	For wheel Types 27, 28 and 29, the guard covers at least 175° of the abrasive wheel periphery and has a front lip of at least 3 mm from the intersect line of the top surface of the thickest recommended wheel with the inner surface of the guard, measured radially to the inner edge of the lip		N/A
	For diamond cutting-off wheels, one of the two guards above is provided		N/A
	- the face of the thickest recommended wheel is at least 2 mm axially from the inner surface of the lip; the ends of the lip protruding the thickest recommended wheel are, optionally, chamfered by not more than 45° (Figure 102)		N/A
	For wheel Types 6 and 11 (straight and flaring cup wheels), the guard covers at least 240° of the abrasive wheel periphery (Figure 103); the guard is adjustable axially to compensate for the wear of the largest permitted wheel and to restrict the axial exposure of the wheel to less than 3 mm		N/A
19.102	The tool is designed so as to prevent the abrasive product coming loose under normal use		N/A
	Grinders provided with flanges for mounting the grinding wheels to the spindle, and the flanges meet the requirements of 19.104 and 19.105, or are one of the following designs:		N/A
	- organic or inorganic bonded wheels secured to plain or threaded mandrels		N/A
	- non-reusable plate mount or threaded nut affixed to the wheel by the manufacturer		N/A
	- hole or modified cup wheels		N/A
19.103	Spindles designed to provide or aid in securing and driving the abrasive products designed for the tool		N/A
	The direction of spindle threads or the design of the equivalent securing means is such that any clamping device, collets or wheels with threaded hole tends to tighten during working		N/A
	In order to limit the unbalance of any rotating accessory, the eccentricity of the spindle is less than 0,1 mm (mm).....		N/A
	For tools that provide for mounting of the accessory through the flange or similar device, the total eccentricity of the combination of the spindle, the diameter of the flange bore and the diameter of the part of the flange is less than the allowed maximum		N/A
	Total eccentricity and rated speeds (mm), (min ⁻¹).....		—

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	For tools with flanges, the eccentricity of the flange in the worst off-centre position allowed by the mounting procedure measured		N/A
	For tools with collets and chucks, a true concentric steel pin mounted and its eccentricity measured at 10 mm and 20 mm from the mounting location		N/A
19.104	Flanges required by 19.102 designed so that they secure and locate the abrasive products to grinder		N/A
	At least one of the flanges is keyed, screwed, shrunk or otherwise secured to prevent rotation relative to the tool spindle		N/A
	Flanges are flat and have no sharp edges		N/A
	The flanges have the dimensions specified in 19.104.1 and 19.104.2 and illustrated in Figure 104 (i.e., D is the outside diameter of the abrasive wheel, G and W are the dimensions of the recess and D_f is the outside diameter of the flange clamping surface)		N/A
	Flanges for wheels under 55 mm diameter are, optionally, not recessed		N/A
	For wheels of any diameter with threaded inserts or projecting studs, the flanges are not recessed (i.e., $G = 0$)		N/A
	The backing and the locking flange have the same diameter D_f , or the overlap of the backing and locking flange bearing surfaces are at least equal to dimension C		N/A
	The locking flange and/or nut do not extend beyond the plane defined by the lip of the guard when mounted with the thickest recommended Type 27, 28 or 29 wheel.		N/A
19.104.1	The flange dimensions for wheel Type 1 is $D_f \geq 0,33 D$		N/A
	The flange diameter for wheel Types 6, 11, 27, 28, 29, 41 and 42 are as follows:		N/A
	- $D_f = (20 \pm 1)$ mm for $55 \text{ mm} \leq D < 80 \text{ mm}$		N/A
	- $D_f = (20 \pm 1)$ mm for $80 \text{ mm} \leq D < 105 \text{ mm}$ for wheels with a bore dia. of 10 mm (3/8 in UNC)		N/A
	- $D_f = (29 \pm 1)$ mm for $80 \text{ mm} \leq D < 105 \text{ mm}$ for wheels with a bore dia. of 16 mm (5/8 in UNC)		N/A
	- $D_f = (41 \pm 1)$ mm for $105 \text{ mm} \leq D \leq 230 \text{ mm}$		N/A
	For wheel Type 41, the D_f dimension, optionally, exceeds the above values (mm)		N/A

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
19.104.2	The dimensions C, G, and W in Figure 104		N/A
	$C \geq 3 \text{ mm (mm)}$		N/A
	$W \geq G \geq 1 \text{ mm for } D_f < 50 \text{ mm (mm)}$		N/A
	$W \geq G \geq 1.5 \text{ mm for } D_f \geq 50 \text{ mm (mm)}$		N/A
19.104.3	The adaptor backing flange designed in accordance with Figure 105 is used in place of the backing flange to mount wheel Types 27, 28 and 29 with a diameter greater than 155 mm		N/A
	The adaptor backing flange extends beyond the central hub of the wheel and contacts the wheel by the bearing surface at C and the bearing surface at the periphery of the flange C1		N/A
19.105	Flanges required by 19.102 are designed so that they are of adequate strength		N/A
	Torques for testing flanges (Nm).....		—
19.106	The tool is designed so as to prevent excessive speed under normal use		P
	Speed of the tool did not exceed the rated speed under any operating condition (Rev min^{-1})	120V: 1750 min^{-1} 240V: 1745 min^{-1}	P
	The speed measured after the tool operated for a period of 5 min, and the recommended accessory producing the maximum speed was installed		P
	A tool provided with a load sensitive speed control was not supplied with an accessory to load the tool to find maximum speed		P
20	MECHANICAL STRENGTH		
20.5	Not applied to polishers and disk-type sanders not intended to be used as grinders per the instructions in accordance with 8.12.2		N/A
20.101	All wheel guards recommended by manufacturer have sufficient mechanical strength to prevent the wheel fragments from being ejected towards the operator in the event of the wheel breakage		N/A
	Three samples of any recommended guard subjected to test in Cl. 20.101.1 to 20.101.4	See Tables 20.101A, 20.101B, and 20.101.C	N/A
20.101.1	The guard securely mounted and fixed to the grinder in accordance with the instructions of 8.12.2 b) 105)		N/A
	Adjustable guard positioning (Figs. 106a and 106b)		N/A

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Maximum thickness grinding wheel recommended by the manufacturer with a diameter equal to the rated capacity of the grinder mounted to the spindle		N/A
	The grinder operated at rated voltage and no-load for a minimum of 5 minutes, and the speed of the wheel measured (Revolutions min ⁻¹)		N/A
20.101.2	Selected wheels notched into 4 segments with the extend of the notches such as to cause the wheels to disintegrate at the higher of speed established in 20.101.1 or 90 % of the rated speed (n/min)		—
20.101.3	At the midpoint of the side handle on each side of the grinder a mass of 0,5 kg and at the midpoint of switch handle a mass of 1 kg attached (Fig. 107)		N/A
	The grinder suspended at the midpoint of the gripping zone on each side handle and at the midpoint of the switch handle		N/A
	For grinders without side handles, a mass of 1 kg attached at the midpoint of switch handle		N/A
	An adaptor with means of suspension and weight attachment of 0,5 kg at each side provided		N/A
	The adaptor for the simulated side handles located at the midpoint of the front gripping zone for straight and vertical grinders (Fig. 109), and less than half the rated capacity distance behind the output spindle for angle grinders		N/A
	Mass and distance (kg, mm)	-	—
	The suspension point and weight attachment on the left and right side of the tool located at a distance from the centre of the spindle which is equivalent to rated capacity and at 90° to the centre line through the length of the tool		N/A
	The three suspension ropes anchored to a single point, and the tool positioned inside a test box (Figs. 110a - 110b)		N/A
	The test box with an outer shell capable of restraining the disintegrating wheel segments and the interior walls, lined with modelling clay had the clay walls free of any wheel segment impressions		N/A
	An angle grinder with the mounted guard and the notched wheel facing down in the horizontal plane positioned centrally, approximately 300 mm from the bottom of the test box (Fig. 110a)		N/A

IEC 60 745-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	The two side handles secured to the box with less than 5 N to align the grinder inside the box and to prevent the grinder from twisting during the wheel's acceleration		N/A
	For straight and vertical grinders, the test box turned on its side (i.e., axis of the box was horizontal)		N/A
	Grinder positioned with the wheel approximately in the centre of the box, with the plane of the wheel perpendicular to the clay walls of the box (Fig. 110b)		N/A
	The switch handle secured with less than 5 N to the box to restrain the grinder from excessive movement during the wheel's acceleration, such that, the movement of the midpoint of the switch handle did not exceed 30 mm from side to side		N/A
	Alternatively, a high-speed camera was used to fix the position of the tool just prior to the wheel burst		N/A
20.101.4	The wheel speed monitored with a tachometer, the voltage to the tool gradually increased until the speed specified in 20.101.2 is achieved and the wheel disintegrate (otherwise the length of the pre-cuts increased and test repeated until bursts)		N/A
	Dust and minor fragments remaining in the guard are ignored while the clay wall captured most of the four major segments. If any of the major segments rebound from the clay, the segment's impression has been identified.		N/A
20.101.5	The guard and the fasteners or the guard's mounting hardware remained in place		N/A
	As a result of the wheel's disintegration, the guard did not rotated in the direction of the wheel rotation by more than 90°		N/A
	The impression of the impact in the clay wall from the major segments was within the fragment zone		N/A
21	CONSTRUCTION		
21.18.1	The angle grinders with a rated capacity exceeding 100 mm and straight grinders with a rated capacity exceeding 55 mm, have a switch of momentary contact type		N/A
	A lock-on device is provided and two dissimilar actions are necessary to lock the switch in the "on" position and only a single motion to the switch is required to automatically return to the "off" position.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
21.18.2	The grinder or the disc type sander has a rated capacity greater than 55 mm diameter and its switches are such that inadvertent operation is unlikely to occur during lifting or carrying		P
	It is not possible to start the tool when a sphere with a diameter of (100 ± 1) mm is applied to the switch perpendicularly to the tool's surface where the switch is mounted; and		P
	- the grasping surface immediately in front of or behind the switch is minimum of 70 mm; or		P
	- the switch has two separate and dissimilar actions before the motor is switched on		N/A
21.32	Not applied to polishers and disk-type sanders not intended to be used as grinders per instructions in accordance with 8.12.2		N/A
24	SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CORDS		
24.4	The angle grinder with rated capacity greater than 155 mm, or the straight grinders with rated capacity greater than 130 mm, has supply cords not lighter than heavy polychloroprene-sheathed flexible cable (code 60245 IEC 66) or equivalent		N/A
29	RESISTANCE TO HEAT, FIRE AND TRACKING		
29.3	The grinder, or the disk-type sander, was subjected to severe duty conditions		P
ANNEX K	BATTERY TOOLS AND BATTERY PACKS		N/A
ANNEX L	BATTERY TOOLS AND BATTERY PACKS PROVIDED WITH MAINS CONNECTION OR NONISOLATED SOURCES		N/A
20.101A	TABLE: mechanical strength of wheel guards (Sample No. 1)		N/A
20.101B	TABLE: mechanical strength of wheel guards (Sample No.2)		N/A
20.101C	TABLE: mechanical strength of wheel guards (Sample No. 3)		N/A