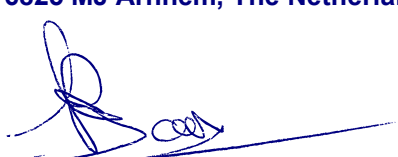
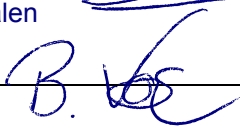




Test Report issued under the responsibility of:



<b>TEST REPORT</b> <b>IEC 60670-24</b> <b>Boxes and enclosures for electrical accessories for household and similar fixed electrical installations</b> <b>Part 24: Particular requirements for enclosures for housing protective devices and similar power consuming devices</b>	
<b>Report Reference No.</b> .....	2162982.51
<b>Date of issue</b> .....	2013-12-06
<b>Total number of pages</b> .....	21
<b>CB Testing Laboratory</b> .....	DEKRA Certification B.V.
<b>Address</b> .....	Meander 1051, 6825 MJ Arnhem, The Netherlands
<b>Applicant's name</b> .....	ABB B.V.
<b>Address</b> .....	Frankeneng 15, 6716 AA Ede, The Netherlands
<b>Test specification:</b>	
<b>Standard</b> .....	IEC 60670-24: 2005 (1 <sup>st</sup> Edition) with IEC 60 670-1:2002 (1 <sup>st</sup> Edition) + corrigendum 2003
<b>Test procedure</b> .....	CB
<b>Non-standard test method</b> .....	N/A
<b>Test Report Form No.</b> .....	IEC60670_24A
<b>Test Report Form(s) Originator</b> .....	IMQ
<b>Master TRF</b> .....	Dated 2007-03
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<b>This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.</b>	
<b>Test item description</b> .....	Enclosure for electrical accessories for fixed electrical installation
<b>Trade Mark</b> .....	ABB
<b>Manufacturer</b> .....	ABB B.V.
<b>Models/Type reference</b> .....	1R2M,1R4M,1R8M,1R12M,2R12M,3R12M,4R12M, 1R18M, 2R18M, 3R18M, 4R18M
<b>Code and ratings</b> .....	IP 41, IK 08 / 400 V~, up to 63 A
<b>Maximum capability to dissipate power (<math>P_{de}</math>)</b> .....	ABB ref. no. 347.230713 of 28 October 2013
<b>Dimension sheet(s), if any</b> .....	See manufacturers product info ABB ref. no. 1SPY002415D0701

Testing procedure and testing location:	
<input checked="" type="checkbox"/> <b>CB Testing Laboratory:</b>	
Testing location/ address .....	<b>DEKRA Certification B.V. Meander 1051, 6825 MJ Arnhem, The Netherlands</b>
<input type="checkbox"/> Associated CB Test Laboratory:	
Testing location/ address .....	
Tested by (name + signature).....	R. van Daalen 
Approved by (+ signature).....	B. Vos 
<input type="checkbox"/> Testing procedure: TMP	
Tested by (name + signature).....	
Approved by (+ signature).....	
Testing location/ address .....	
<input type="checkbox"/> Testing procedure: WMT	
Tested by (name + signature).....	
Witnessed by (+ signature).....	
Approved by (+ signature).....	
Testing location/ address .....	
<input type="checkbox"/> Testing procedure: SMT	
Tested by (name + signature).....	
Approved by (+ signature).....	
Supervised by (+ signature) .....	
Testing location/ address .....	
<input type="checkbox"/> Testing procedure: RMT	
Tested by (name + signature).....	
Approved by (+ signature).....	
Supervised by (+ signature) .....	
Testing location/ address .....	

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

Type test according to IEC 60670-24  
and IEC 60670-1

**Testing location:**

DEKRA Certification B.V.  
Meander 1051, 6825 MJ Arnhem  
The Netherlands

**Summary of compliance with National Differences:-****Copy of marking plate :****Markings:**

ABB AC 400 V 2002-030

ABB AC 400 V 2002-034

Test item particulars..... :			
7.1	Nature of material	<input checked="" type="checkbox"/> 7.1.1	Insulating
		<input type="checkbox"/> 7.1.2	Metallic
		<input type="checkbox"/> 7.1.3	Composite
7.2	Method of installation	<input type="checkbox"/> 7.2.1	Flush, semi-flush or embedded in:
		<input type="checkbox"/> 7.2.1.1	Non combustible walls, ceilings or floors
		<input type="checkbox"/> 7.2.1.2	Combustible walls, ceilings or floors
		<input type="checkbox"/> 7.2.1.3	Hollow walls, hollow ceilings, hollow floors or furniture
		<input checked="" type="checkbox"/> 7.2.2	Surface mounting on:
		<input checked="" type="checkbox"/> 7.2.2.1	Non combustible walls
		<input checked="" type="checkbox"/> 7.2.2.2	Combustible walls, ceilings, floors or furniture
		<input type="checkbox"/> 7.2.3	Placement:
		<input type="checkbox"/> 7.2.3.1	Suitable for installation into concrete during the casting process (see 7.6)
		<input type="checkbox"/> 7.2.3.2	Suitable for all types of installation except into concrete
7.3	Type(s) of inlets (outlets)	<input type="checkbox"/> 7.3.1	With inlets for sheathed cables for fixed installations
		<input type="checkbox"/> 7.3.2	With inlets for flexible cables
		<input type="checkbox"/> 7.3.3	With inlets for plain or corrugated conduits
		<input type="checkbox"/> 7.3.4	With inlets for threaded conduits
		<input type="checkbox"/> 7.3.5	With inlets for other types of conductors/cables or conduits
		<input type="checkbox"/> 7.3.6	With spouts (hub)
		<input checked="" type="checkbox"/> 7.3.7	Without inlets. Inlet openings are made during installation
7.4	Clamping means	<input type="checkbox"/> 7.4.1	With cable retention
		<input type="checkbox"/> 7.4.2	With cable anchorage
		<input type="checkbox"/> 7.4.3	With clamping means for flexible conduit
		<input checked="" type="checkbox"/> 7.4.4	Without clamping means
7.5	Minimum and maximum temperatures during installation	<input type="checkbox"/> 7.5.1	-5 °C to +60 °C
		<input checked="" type="checkbox"/> 7.5.2	-15 °C to +60 °C
		<input type="checkbox"/> 7.5.3	-25 °C to +60 °C
7.6	Maximum temperature during the casting process	<input type="checkbox"/> 7.6.1	+60 °C
		<input type="checkbox"/> 7.6.2	+90 °C
7.7	Boxes and enclosures for hollow walls and the like according to 7.2.1.3	<input type="checkbox"/> 7.7.1	Class Ha
		<input type="checkbox"/> 7.7.3	degree of protection of the part mounted in the hollow wall:
		<input type="checkbox"/> 7.7.3.2	>IP2X
7.101	For empty boxes and enclosures	<input type="checkbox"/> 7.101.1	According to resistance of insulating material to fire
		<input checked="" type="checkbox"/> 7.101.1.1	650 °C
		<input checked="" type="checkbox"/> 7.101.1.2	750 °C
		<input type="checkbox"/> 7.101.1.3	960 °C

**Possible test case verdicts:**

- test case does not apply to the test object.....: N/A
- test object does meet the requirement .....: P (Pass)
- test object does not meet the requirement .....: F (Fail)

**Testing** .....

Date of receipt of test item .....: 2013-06-13

Date (s) of performance of tests.....: 2013-06-20 / 2013-07-30

**General remarks:**

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.

Throughout this report a comma (point) is used as the decimal separator.

**General product information:**

Boxes and enclosures for electrical accessories for household and similar fixed electrical installations.

<b>8</b>	<b>MARKING</b>		
8.1	Enclosures for housing protective devices are marked with:		
	a) name, trade mark or identification mark of the manufacturer or the responsible vendor.....:	ABB	P
	b) IP > 2XC and/or IP > X0 .....	IP 41	P
	IP code marked on the outside of the enclosure		N/A
	Visibility of IP code allowed after opening the door or the lid if the IP degree is maintained after opening		N/A
	IP code marked behind the door if the IP degree is maintained with the door opened		N/A
	c) rated voltage (V~).....:	400	P
	d) rated current/highest permanent incoming current as declared by the manufacturer .....		N/A
	e) the symbol for class II, if applicable .....		P
	f) standard reference number.....:		N/A
	g) type designation, reference number or catalogue number .....	See page 1 type reference	
	h) maximum temperature during the building process if 90 °C .....		N/A
	i) information concerning the opening that can be made during installation for boxes and enclosures without inlets (7.3.7) .....	See product info	
	j) maximum capability to dissipate power ( $P_{de}$ ).....:	See product info	
	k) usability for hollow wall installation (7.7) .....		N/A
	l) corresponding dimension sheet .....	See product info	
	Items c), d), f), h), i), j) and k) marked on the boxes or enclosures or provided by the manufacturer on the smallest package unit or in the instructions of the manufacturer		P
8.2	Marking is durable and easily legible	Moulded	P
	Rubbing test 15 s with water and 15 s with petroleum spirit		N/A
	After the test: marking still legible		N/A
8.101	Required data for instruction sheet and/or documentation		
	Manufacturer includes in the documentation accompanying the enclosures the necessary instructions for installation		P
	Manufacturer provides appropriate information regarding the means to be used to obtain the intended degree of protection		P

	Manufacturer declares the maximum capability to dissipate power ( $P_{de}$ ) of the enclosure and provides appropriate documentation	See product info	P
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<b>9</b>	<b>DIMENSIONS</b>		
	Boxes and enclosures comply with the appropriate standard sheets, if any .....	See appended Annex	

<b>10</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		
	In boxes and enclosures assembled, equipped and installed as for normal use in accordance with the manufacturer's instructions: live parts are not accessible		P
	Enclosures have $IP \geq XXC$ when mounted and installed as for normal use		P
	Class II enclosures when mounted and installed as for normal use:		
	a) completely enclose the built-in devices in insulating material		P
	b) at no point are pierced by conducting parts		P
	c) do not have conductive parts (plates, cover plates or frames) connected to the protective circuit		P
	Test probe 11 of IEC 61032 applied for 1 min with a force of 20 N do not enter that parts which are accessible after installation where live parts are to be installed according to manufacturer's instructions		P
	Additional test at $(35 \pm 2) ^\circ C$ with probe 11 of IEC 61032 on enclosures according to 7.1.1 and 7.1.3 with parts of thermoplastic or elastomeric material applied to:		P
	- all places, except membranes or the like, where yielding of insulating material could impair the safety, with a force of 75 N		N/A
	- knock-outs with a force of 10 N		N/A

<b>11</b>	<b>PROVISION FOR EARTHING</b>		
11.1	Boxes and enclosures with exposed conductive parts		
	- provided with an earthing means of low resistance		N/A
	- have provision for the fitting of such an earthing means		N/A
	Exposed conductive parts of covers or cover-plates are connected through a low resistance connection to the earthing means		N/A
	Resistance $\leq 0,05 \Omega (\Omega)$ .....		N/A

11.2	Boxes and enclosures of insulating material classified according to 7.7.2 (Class Hb)		
	Provided with a minimum of one earthing strap with one screw terminal for earthing purposes with a connecting capacity $\geq 4 \text{ mm}^2$ according to Figure 2		N/A
	Design of earthing strap according to Figure 2		N/A
	Test conducted with test strap of Figure 3 on one specimen in the condition as delivered and on one specimen after it has been conditioned for 168 h at 90 °C and then cooled to room temperature		N/A
	Nominal diameter of earthing terminal screw thread (mm).....:		—
	Column of Table 4 .....		—
	Torque of Table 4 applied on screw (Nm) .....		—
	Threads of earthing terminal are not stripped		N/A
	Force of 45 N applied to the test strap for 5 min in the direction perpendicular to the open face of the specimen		N/A
	After each test the test strap did not have become loose or detached from the specimen		N/A

<b>12</b>	<b>CONSTRUCTION</b>		
12.1	Lids, covers or cover-plates or part of them		
	Lids, covers or cover-plates or parts of them, which are intended to ensure protection against electric shock:		—
	- are held in place effectively		P
	- are removable only by the use of a tool and/or a key		P
12.2	Drain holes		
	Surface and semi-flush mounting enclosures having IPX1 to IPX6 allow the opening of a drain hole $\geq 5 \text{ mm}$ in diameter (mm $\varnothing$ ) or $20 \text{ mm}^2$ in area (mm <sup>2</sup> ) with a width or length $\geq 3 \text{ mm}$ (mm) .....		N/A
	Drain holes: effective		N/A
12.3	Mounting of enclosures		
	Enclosures have provisions for their suitable attachment according to the method of installation (7.2)		P
	Conductive parts of internal fixing means are surrounded by insulation which projects above the top of the fixing means by an amount of $\geq 10 \%$ of the maximum width of the cavity for the fixing means (mm) .....	10% of mm $\geq$ mm	N/A
12.4	Boxes and enclosures with inlets for flexible cables		



	In inlets (outlets) provided in boxes and enclosures classified according to 7.3.2 the flexible cables can be easily introduced		N/A
12.5	Boxes and enclosures with inlets for applications other than flexible cables		
	Inlet openings classified according to 7.3 other than 7.3.2, if any, allow the introduction of:		N/A
	- a conduit or a suitable fitting, and/or		N/A
	- the protective covering of the cable		N/A
	Inlet opening for conduit entries:		N/A
	- capable of accepting either conduits of sizes, or a combination of sizes, according to IEC 60423 and/or IEC 60981		N/A
	- same requirement in at least two inlet openings if there are more than one		N/A
12.6	Boxes and enclosures with a cable anchorage(s)		
	In boxes and enclosures classified according to 7.4.2 the connection of the conductors of the flexible cable are relieved from strain		N/A
	Clear how relief from strain and prevention of twisting is intended to be effected		N/A
	Cable anchorages are:		
	- suitable for the different types of flexible cable		N/A
	- at least one part of it is integral with, or permanently fixed to, one of the component parts of the box		N/A
	- of insulating material or provided with an insulating lining fixed to the metal parts		N/A
	Test of effectiveness of the cable anchorage:		N/A
	- external dimensions of flexible cable (mm).....:		—
	- clamping screws tightened with a torque equal to 2/3 of that specified in Table 4 (Nm) .....		—
	- glands tightened with a torque equal to that specified in Table 5 .....		—
	It is not possible to push the flexible cable into the specimen by more than 1 mm with a force specified in Table 3 (N).....:		—
	Pull force as specified in Table 3 applied 50 times for 1 s (N) .....		—
	Torque as specified in Table 3 applied for (15 ± 1) s (Nm) .....		—
	After the test: displacement ≤ 2 mm (mm) .....		N/A
	Cable anchorage: no damage		N/A
12.7	Boxes and enclosures with cable retention means		

	Cable retention means of boxes and enclosures classified according to 7.4.1 retain the cable in place		N/A
	Test with cables as declared by the manufacturer, fitted according to the manufacturer's instructions and loaded with an axial force of $(20 \pm 1)$ N applied for 1 min:		N/A
	Type of cable/maximum nominal cross-sectional area (mm <sup>2</sup> ) .....		—
	After the test: displacement $\leq 3$ mm (mm) .....		N/A
	Type of cable/minimum nominal cross-sectional area (mm <sup>2</sup> ) .....		—
	After the test: displacement $\leq 3$ mm (mm) .....		N/A
12.8	Knock-out inlets (outlets) intended to be removed by mechanical impact		
	It is possible to remove knock-out inlets (outlets) by mechanical impact without damaging the box		N/A
	Chips or burrs are not accepted in knock-out inlets (outlets) for cables		N/A
	Chips and burrs are disregarded in knock-out inlets (outlets) for conduits and/or for use with a grommet or a membrane		N/A
12.8.1	Knock-out retention		
	Boxes and enclosures having knock-outs accessible after installation: force of $(30 \pm 1)$ N applied for $(15 \pm 1)$ s by means of a 6 mm diameter mandrel with a flat end		N/A
	During the test: knock-out remains in place		N/A
	Degree of protection unchanged 1 h after the test		N/A
12.8.2	Knock-out removal		
	Removal test of knock-outs with a tool as stated by the manufacturer, without conditioning:		
	During the test: no displacement of a larger stage of multi-stage knock-outs when a smaller stage is removed		N/A
	After the test: no sharp edges, box and enclosure is not damaged		N/A
	Removal test of knock-outs with a tool as stated by the manufacturer, immediately following a conditioning at the minimum temperature specified according to 7.5 for $5 \text{ h} \pm 10 \text{ min}$ (boxes and enclosures according to 7.1.1 or 7.1.3)		N/A
	Test temperature (°C) .....		—
	During the test: no displacement of a larger stage of multi-stage knock-outs when a smaller stage is removed		N/A
	After the test: no sharp edges, box and enclosure is not damaged		N/A
12.9	Screw fixings		

	Fixing means effected by screws withstand mechanical stresses		—
	Thread-forming or thread-cutting screws used only if supplied together with the piece in which they are intended to be inserted		—
	Verification of the mechanical strength of screws	See appended table 12.9	P
12.10	Fixing of boxes and accessories		
	Boxes intended to receive accessories are provided with:		—
	- fixing means for their suitable attachment according to the method of installation		P
	- means to fix the accessories in order to remain fixed so that in normal use neither the boxes nor the accessories become displaced		P
12.11	Boxes and enclosures classified according to 7.7.1 (Class Ha)		
	Boxes and enclosures for hollow walls classified according to 7.7.1 provide suitable means for fixing the box or the enclosure to hollow walls		N/A
12.12	Boxes and enclosures classified according to 7.7.2 (Class Hb)		
	Boxes and enclosures classified according to 7.7.2 provide suitable means for fixing the box or the enclosure to hollow walls and the like		N/A
	Verification of the declared minimum internal volume (see 12.12.4)		N/A
12.12.1	Boxes intended for mounting to a wood structural member of a wall		
	Box mounted to a (45 x 90) mm wood structural member in a vertical position; force of 225 N applied for 5 min		P
	After the test: no pulling out of the nails or screws		P
	No movement of the face of the box of more than 3 mm (mm).....:		P
12.12.2	Boxes intended for mounting to a wood structural member of a ceiling		
	Box fastened to a (35 x 180) mm wood structural member in a horizontal position facing downwards; force of 225 N applied for 1 min		P
	During the test: deflection of the face of the box does not exceed 6 mm (mm) .....		P
12.12.3	Boxes intended for mounting to a steel-stud structural member of a wall		
	Box mounted to a steel-stud structural member according to Figure 19; force of 180 N applied for 5 min in the direction to push the box into the wall opening		N/A
	During the test with a force of 180 N applied for 5 min in the direction to push the box into the wall opening: deflection of the box does not exceed 2 mm (mm).....:		N/A

	During the test with a force of 180 N applied for 5 min in the direction to pull the box out of the wall opening: deflection of the box does not exceed 2 mm (mm).....:		N/A
12.12.4	Internal volume of boxes and enclosures classified according to 7.7.2 (Class Hb)		
	Difference in the volume of water in the measuring cylinder measured before and after the filling of the box, enclosure or raised cover (Figure 4) (cm <sup>3</sup> )...:		N/A
12.13	Cable gland entry		
	Torque test: glands provided with a metal rod tightened and loosened 10 times with a torque specified in Table 5 for 1 min ± 5 s		N/A
	- diameter of test rod (mm) .....		—
	- type of material (metal / insulating).....:		—
	- torque (Nm) .....		—
	After the test: no damage		N/A
12.14	Boxes and enclosures with inlets (outlets) for conduits or spouts (hubs)		
	Boxes and enclosures classified according to 7.3.4 and conical spouts as in 7.3.6 withstand the tests of 12.14.1, 12.14.2 and 12.14.3		N/A
12.14.1	Enclosures with inlet spout for conduits: a minimum size piece of conduit pressed for 1 min ± 5 s with a force of (100 ± 2) N		
	During the test: inlet spout prevents further entry of the conduit into the box		N/A
12.14.2	Pull-out test after the test according to 12.14.1: conduit with the minimum size corresponding to the insert opening loaded for 1 min with a tensile force of (20 ± 2) N		N/A
	During the test: conduit not come loose from the inlet spout of the enclosure		N/A
12.14.3	Resistance to bending strain of an inlet spout: piece of conduit inserted into the inlet spout with a compressible force of (100 ± 2) N and loaded with a bending moment of 3 Nm for 1 min in six different directions with an interval of (60 ± 2) °		N/A
	During the test: inlet spout not come loose or damaged and conduit stays within the inlet spout		N/A
12.101	Enclosures for hollow walls have provisions for retention means for cables or means to use a separate retention device or devices		N/A

<b>13</b>	<b>RESISTANCE TO AGEING, PROTECTION AGAINST INGRESS OF SOLID OBJECTS AND AGAINST HARMFUL INGRESS OF WATER</b>	
13.1	Resistance to ageing	
13.1.1	Specimens of insulating and composite boxes and enclosures, seals, grommets and replaceable membranes placed in a heating cabinet at (70 ± 2) °C for (168 + 4) h and than kept at room temperature for (96 + 4) h	P

	Glands tightened with a torque equal to 2/3 of the torque applied during the test of 12.13 (Nm) .....		—
	Greater torque value stated by the manufacturer, if any (Nm) .....		—
	After the test: no harmful deformation or similar damage		P
13.1.2	Grommets and entry membranes in inlet openings and protecting membranes are reliably fixed and are not displaced by the mechanical and thermal stresses occurring in normal use		
	Specimens that have been subjected to the treatment specified in 13.1.1 placed in a heating cabinet at (40 ± 2) °C for 2 h ± 15 min		N/A
	Immediately after this period the tip of test probe 11 of IEC 61032 is applied for (5 ± 1) s with a force of (30 -2) N. During the tests: grommets and/or membranes not deformed to such an extent that live parts of any included accessory become accessible		N/A
	Grommets and/or membranes likely to be subjected to an axial pull: axial pull of (30 -2) N applied for (5 ± 1) s. During the tests: grommets and/or membranes not deformed to such an extent that live parts of any included accessory become accessible		N/A
	Test repeated on same enclosures fitted with grommets and/or membranes not subjected to any treatment		N/A
	After the test: no harmful deformation, cracks or similar damage		N/A
13.1.3	Grommets and entry membranes in inlet openings of boxes and enclosures classified according to 7.5.2 and 7.5.3: introduction of the cables permitted when the ambient temperature is low		
	Test on enclosures fitted with grommets and/or membranes not subjected to any ageing treatment kept for 2 h in a refrigerator		N/A
	Test temperature (°C) .....		—
	Immediately after conditioning: it is possible to pierce any blind grommets and entry membranes and to introduce cables of the maximum diameter intended		N/A
	After the test: no harmful deformation, cracks or similar damage		N/A
13.2	Protection against the ingress of solid objects		
	Enclosures provide a degree of protection IP≥3X against the ingress of solid objects in accordance with the declared IP code .....	IP4X	P
	Enclosures mounted as in normal use with screwed glands or grommets fitted with cables as declared by the manufacturer:		P

	- type of cable, smallest cross-sectional area (mm <sup>2</sup> ) .....:		—
	- type of cable, largest cross-sectional area (mm <sup>2</sup> ) .....:		—
	Enclosures mounted as in normal use with screwed glands or grommets fitted with conduits as declared by the manufacturer:		N/A
	- smallest diameter or dimensions (mm) .....		—
	- largest diameter or dimensions (mm).....:		—
	Fixing screws of the cover or cover-plate tightened with a torque equal to 2/3 of the value of Table 4 used for the test of 12.9 (Nm) .....		P
	Greater torque value stated by the manufacturer, if the relevant information is provided (Nm) .....		—
	- IP5X: test performed as specified in IEC 60529 category 2 with the drain holes, if any, not opened		N/A
	- IP≤4X: test probe does not pass through any opening other than drain holes		P
	- IP≤4X: test probe applied on drain holes does not touch live parts within the enclosure		N/A
	- IP5X: dust does not cover the whole inner surface		N/A
	- IP6X: there is no dust inside the box or enclosure		N/A
13.3	Protection against harmful ingress of water		
13.3.1	Enclosures with IP>X0 provide a degree of protection against harmful ingress of water in accordance with the declared IP code .....	IP X1	P
	Enclosure dimensions: reference surface S (m <sup>2</sup> ) / perimeter (m).....:	See product info	—
	Appropriate test performed on surface, flush or semi-flush enclosures as specified in IEC 60529 under the following conditions:		
	- dimension S ≤ 0,04 m <sup>2</sup> or perimeter ≤ 0,8 m according to 13.3.2 and 13.3.3		P
	- dimension S > 0,04 m <sup>2</sup> and perimeter > 0,8 m according to 13.3.2 and 13.3.4		P
	Enclosures with screwed glands or grommets fitted with cables as declared by the manufacturer:		
	- type of cable, smallest cross-sectional area (mm <sup>2</sup> ) .....:		—
	- type of cable, largest cross-sectional area (mm <sup>2</sup> ) .....:		—
	Enclosures with screwed glands or grommets fitted with conduits as declared by the manufacturer:		
	- smallest diameter or dimensions (mm) .....		—
	- largest diameter or dimensions (mm).....:		—

	Fixing screws of the cover or cover-plate tightened with a torque equal to 2/3 of the value of Table 4 used for the test of 12.9 (Nm) .....	See Table 12.9	P
13.3.2	Surface-mounting enclosures mounted as for normal use		N/A
	Flush type and semi-flush type enclosures fixed in a test wall:		N/A
	- according to the manufacturer's instructions		N/A
	- according to Figure 5		N/A
	Enclosures fitted with cables having conductors of the largest and smallest cross-sectional area as declared by the manufacturer .....		—
	IPX3 and IPX4 enclosures: use of oscillating tube (Figure 4) or spray nozzle according to IEC 60529 (Figure 5).....		—
13.3.3	Immediately after the test no more than 0,2 ml x S (cm <sup>2</sup> ) water in the enclosure (ml).....		P
	Specimens withstand an electric strength test specified in 14.3 started within 5 min of the completion of IP test		P
13.3.4	Immediately after the test: indicator paper still dry		P

<b>14</b>	<b>INSULATION RESISTANCE AND ELECTRIC STRENGTH</b>		
14.1	Insulation resistance and electric strength of enclosures classified according to 7.1.1 and 7.1.3 is adequate		
	Specimens placed in a humidity cabinet containing air with relative humidity between 91 % and 95 % and air temperature between 20 °C and 30 °C for:		—
	- 2 days (48 h) for enclosures classified IPX0		N/A
	- 7 days (168 h) for enclosures classified IP>X0		P
	After this treatment: no damage		P
14.2	Insulation resistance measured 1 min after application of 500 V d.c.	See appended table 14.2	P
14.3	Electric strength: a.c. test voltage applied for 1 min	See appended table 14.3	P

<b>15</b>	<b>MECHANICAL STRENGTH</b>		
	Boxes and enclosures have adequate mechanical strength		
15.1	Impact test at low temperature		
	Non-metallic boxes and enclosures for use in cast concrete according to 7.3.2.1: impact test with a vertical hammer test apparatus (Figure 8) placed together with the specimens for 2 h ± 15 min in a refrigerator at:		—
	- ( -5 ± 2) °C for boxes and enclosures classified according to 7.5.1		N/A

	- ( $-15 \pm 2$ ) °C for boxes and enclosures classified according to 7.5.2		P
	- ( $-25 \pm 2$ ) °C for boxes and enclosures classified according to 7.5.3		N/A
	Specimens subjected to 5 blows with a mass of 1 kg falling from a height of 100 mm: no damage	See Table 15.3	P
15.2	Compression test		
15.2.1	Boxes and enclosures according to 7.6.2: specimen placed in a heating cabinet at ( $90 \pm 5$ ) °C for ( $60 + 15$ ) min		N/A
	After cool down to ambient temperature: neither deformation nor damage		N/A
	Boxes and enclosures then placed between two flat hardwood plates and loaded with a force of ( $500 \pm 5$ ) N for 1 min $\pm$ 5 s		N/A
	No deformation or damage		N/A
15.2.2	Boxes and enclosures according to 7.7.2: tests are under consideration		
15.3	Impact test for boxes and enclosures		
	Specimens subjected to blows by means of an impact test apparatus as described in Annex D of IEC 60068-2-75 (Figures 7, 9 and 10)	See appended table 15.3	P
	After the test: no damage	As prescribed	P

<b>16</b>	<b>RESISTANCE TO HEAT</b>		
16.1	Parts of insulating material necessary to retain current-carrying parts and/or parts of the earthing circuit in position: ball-pressure test according to IEC 60695-10-2 at ( $125 \pm 2$ ) °C for ( $60 + 5$ ) min	See appended table 16.1-16.2	N/A
16.2	Parts of insulating material not necessary to retain current-carrying parts and/or parts of the earthing circuit in position, even though in contact with them, and parts necessary to retain earthing terminals in position: ball-pressure test according to 16.1 but at ( $70 \pm 2$ ) °C	See appended table 16.1-16.2	P
	Parts of insulating material of flush-mounted enclosures classified according to 7.6.2: ball-pressure test according to 16.1 but at ( $90 \pm 2$ ) °C	See appended table 16.1-16.2	N/A
16.3	Boxes and enclosures of insulating materials classified according to 7.7.2 (Class Hb): adequate mechanical strength at high temperature		N/A
	Rigid crossbar (Figure 20) secured across the face of the box with screws tightened with a torque according to Table 4 (Nm) .....		—
	Total force of 180 N applied for 24 h to the face of the box at:		N/A
	- ( $80 \pm 2$ ) °C for boxes and enclosures classified according to 7.7.2.1		N/A
	- ( $105 \pm 2$ ) °C for boxes and enclosures classified according to 7.7.2.2		N/A



	After the assembly has been cooled down to ambient temperature:		N/A
	- screws not have pulled out more than 6,3 mm (mm).....:		N/A
	- torque used for removal the screws not exceeding 2,3 Nm (Nm).....:		N/A

<b>17</b>	<b>CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND</b>		
	Void		—

<b>18</b>	<b>RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT AND FIRE</b>		
	Glow-wire test according to Clauses 4 to 10 if IEC 60695-2-11	See appended table 18	P

<b>19</b>	<b>RESISTANCE TO TRACKING</b>		
	Parts of insulating material retaining live parts in position of boxes and enclosures having IP>X0: PTI 175, 50 drops, solution A of IEC 60112	See appended table 19	N/A

<b>20</b>	<b>RESISTANCE TO CORROSION</b>		
	Test made after having removed all grease by immersion in a degreasing agent for (10 ± 1) min, (10 ± 1) min in a 10 % solution of ammonium chloride, (10 ± 1) min in a box containing air saturated with moisture and (10 ± 1) min at (100 ± 5) °C		
	No signs of rust		N/A

<b>21</b>	<b>ELECTROMAGNETIC COMPATIBILITY (EMC)</b>		
	No tests necessary		—

<b>101</b>	<b>VERIFICATION OF THE MAXIMUM CAPABILITY TO DISSIPATE POWER (<math>P_{de}</math>)</b>		
	Enclosures have the capability to dissipate the declared power ( $P_{de}$ ) according to 8.101	See appended table 101	P

12.9	<b>TABLE: mechanical strength of screws</b>					
threaded part identification (e.g. fixing means for cover)	diameter of screw thread (mm)	column number – Table 4 (I, II, III or IV)	applied torque – Table 4 (Nm)	times (5/10)	no damage	
	4,1	I	0,80	10	P	
supplementary information:						

14.2	<b>TABLE: insulation resistance</b>			
test voltage applied between: in-/outside enclosure		measured (MΩ)	required (MΩ)	
		> 5	5 min.	
supplementary information:				

14.3	<b>TABLE: electric strength</b>			
	rated insulation voltage (V) .....			—
test voltage applied between: in-/outside enclosure		test voltage (V)	flashover / breakdown (Yes/No)	
		2500	No	
supplementary information:				

15.3	<b>TABLE: impact test</b>			
part of enclosure tested per Table 7 (A, B, C, D, E, F, G)	Total number of blows per part – Figure 10	height of fall per Table 8 (mm)	comments	
	5	300	P	
supplementary information: 1,7 kg, 300mm = 5J= IK 08				

16.1-16.2	<b>TABLE: ball pressure test of insulating materials</b>			
	allowed impression diameter (mm) .....	≤ 2 mm		—
part under test		test temperature (°C)	impression diameter (mm)	
		70	1,2 / 1,5	
supplementary information: 1h, 20N				

18	<b>TABLE: glow-wire test</b>					
part under test	material designation	test temperature (°C)	visible flame and sustained glowing (Y/N)	flames and glowing extinction time	ignition of the tissue paper (Y/N)	
	insulating	650 / 750	N	0	N	
supplementary information:						

19	<b>TABLE: resistance to tracking</b>			
part under test	material designation	test voltage (V)	flashover / breakdown (Yes/No)	
		175	N/A	
supplementary information:				

101	<b>TABLE: verification of the maximum capability to dissipate power.</b> (see page 20)						
Enclosures according to 7.2.1 and 7.2.3 cast:							
- in a concrete wall							
- in a wall of different material with equivalent thermal conductivity.....:							
- other declared mounting environments (correction factor and appropriate $P_{de}$ value declared in the documentation).....:							
Enclosures according to 7.2.2 mounted on 20 mm thick plywood painted black							
Position of the resistor(s) (Figure 103 / 104 / 105):							
article	number of modules	number of heating resistors used	power dissipated measured (W) <sup>(1)</sup>	declared power ( $P_{de}$ ) (W)	power dissipated measured <sup>(2)</sup> $\geq P_{de}$ (Y/N)	no damage or deformation	
supplementary information:							
<sup>(1)</sup> corresponding to a temperature rise in a steady state condition on the hottest accessible part $\leq 30$ K							
<sup>(2)</sup> value rounded to the next lower integer number							
Value calculated according to IEC 60890.							

## System Pro E comfort MISTRAL41®

**•Verification of the maximum capability to dissipate power ( $P_{de}$ )**

•Calculation method : IEC 60670-24 / IEC 60890

	2	4	8	12	24	36	48	18	36	54	72
H	222,5	222,5	262,12	262,12	387,13	512,13	659,33	262,12	387,13	512,13	659,33
B	64,2	100,2	206,6	296,6	296,6	296,6	296,6	386,63	386,63	386,63	386,63
D	90	90	105	105	105	105	105	105	105	105	105
<b>P<sub>de</sub> ( W )</b>	9,2	9,3	17,7	23,8	30,2	36,8	44,8	29,8	37,5	45,2	54,4