



# CGS TEST HİZMETLERİ TEKNİK KONTROL VE BELGELENDİRME ANONİM ŞİRKETİ

Kayışdağı Mah. Gülçin Sok. No:2/2 Ataşehir  
İstanbul/TURKİYE  
Deney Raporu  
Test Report



**Müşterinin adı /adresi:**  
Customer name/address

**Mutlusan Plastik Elektrik San. ve Tic. A.Ş.**  
**İOSB Mah. Enkoop Cad. No: 7 Başakşehir / İstanbul**

**İstek Numarası :**  
Order no.

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**Numunenin Adı ve Tarifi :**  
Name and identity of test item

**001 046 078585 00 00 ; Thermoplastic Box**

**Numunenin Kabul tarihi :**  
The date of receipt of test item

**06.01.2022**

**Açıklamalar :**  
Remarks

**DGC'ye EN 60670-22 Standardı uyarınca Güvenlik Deneyleri yapılmıştır.**  
Safety tests have been applied to EUT according to EN 60670-22 on page three.

**Deneyin yapıldığı tarih :**  
Date of Test

**06.01.2022 to 06.02.2022**

**Raporun Sayfa Sayısı:**  
Number of pages of the Report

**22 sayfa / pages**

**Deney ve /veya ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri ( olması halinde ) ve deney metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir.**

The test and/or measurement results, the uncertainties ( if applicable ) with confidence probability and test methods are given on the following pages which are part of this report.

**Mühür/Kaşe**  
Seal

**Tarih**  
Date

**Deney Sorumlusu**  
Person in charge of test

**Onaylayan**  
Approval

**10.02.2022**

**Bedran ÖNDEŞ**

**Naim Koralp KARAKOÇ**



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## Test Report EN 60670-22

Boxes and enclosures for electrical accessories for household and similar fixed electrical installations - Part 22: Particular requirements for connecting boxes and enclosures

Report Number .....: LVD-183-83

Date of issue .....: 10.02.2022

Total number of pages .....: 22 pages

Applicant's name .....: Mutlusan Plastik Elektrik San. ve Tic. A.Ş.

Address .....: IOSB Mah. Enkoop Cad. No: 7 Başakşehir / İstanbul

Manufacturer .....: Mutlusan Plastik Elektrik San. ve Tic. A.Ş.

Address .....: IOSB Mah. Enkoop Cad. No: 7 Başakşehir / İstanbul

### Test specification:

Standard .....: EN 60670-1:2005/A1:2013  
EN 60670-22:2006

Test procedure .....: Type Test

Non-standard test method .....: N/A

Test Report Form No .....: F510\_35

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Test item description .....: Thermoplastic Box

Trade Mark .....:



Manufacturer .....: Mutlusan Plastik Elektrik San. ve Tic. A.Ş.

Model/Type reference .....: 001 046 078585 00 00

Ratings .....: 250-450V AC ; IP40

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

Test report: 22 pages

Annex-1: Identity declaration: 1 page

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

CI. MARKING

CI. 10 PROTECTION AGAINST ELECTRIC SHOCK

CI. 12 CONSTRUCTION

CI. 13 RESISTANCE TO AGEING, PROTECTION AGAINST INGRESS OF SOLID OBJECTS AND AGAINST HARMFUL INGRESS OF WATER

CI. 14 INSULATION RESISTANCE AND ELECTRIC STRENGTH

CI. 15 MECHANICAL STRENGTH

CI. 16 RESISTANCE TO HEAT

CI. 18 RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT AND FIRE

**Testing location:**

CGS TEST HİZMETLERİ TEKNİK KONTROL VE BELGELENDİRME ANONİM ŞİRKETİ  
Oruçreis Mahallesi Tekstilkent Caddesi Tekstilkent  
A21 10/1 102 Esenler-İstanbul/TURKİYE

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

**Declared**

Test item particulars:	Plastic opaque cover board
7.1 Nature of materials	<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 or floors <input type="checkbox"/> 7.2.1.2 Combustible walls, ceiling or floors <input type="checkbox"/> 7.2.1.3 Hollow walls, hollow ceiling, 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, ceiling, floors or furniture <input type="checkbox"/> 7.2.2.2 Combustible walls, ceiling, 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 into concrete
7.3 Nature of material	<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 or corrugated 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 With inlets. Inlets opening will be 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 conduits <input checked="" type="checkbox"/> 7.4.4 With clamping means
7.5 Minimum and maximum temperatures during installation	<input type="checkbox"/> 7.5.1 -5 °C to +60 °C <input type="checkbox"/> 7.5.2 -15 °C to +60 °C <input checked="" type="checkbox"/> 7.5.3 -25 °C to +60 °C
7.6 Maximum temperature during the during the casting process	<input checked="" 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"/> 7.7.2 Class Hb <input type="checkbox"/> 7.7.2.1 for walls <input type="checkbox"/> 7.7.2.2 for ceilings <input checked="" type="checkbox"/> 7.7.3 degree of protection of the part mounted in the hollow wall <input type="checkbox"/> 7.7.3.1 IP2X <input checked="" type="checkbox"/> 7.7.3.2 >IP2X
7.8 The provision for fixing accessories to boxes	<input checked="" type="checkbox"/> 7.8.1 Boxes supplied with screws <input checked="" type="checkbox"/> 7.8.2 Boxes intended to receive screws <input type="checkbox"/> 7.8.3 Boxes intended to receive claws <input type="checkbox"/> 7.8.4 Boxes intended to receive other means
7.101 Method of fixing the terminals or connecting box	<input type="checkbox"/> 7.101.1 With integrated clamping units <input type="checkbox"/> 7.101.2 With incorporated terminals or connecting devices <input type="checkbox"/> 7.101.3 With provisions for subsequent incorporation of terminals or connecting devices <input checked="" type="checkbox"/> 7.101.4 Without fixing (for floating terminals or connecting devices)
IP code:	IP 40
Rated insulation voltage:	400V
Rated voltage of integrated or incorporated connecting device:	---
Rated connecting capacity:	---
Maximum number of conductors to be placed in the box (if marked or declared)	---
Dimension sheet(s), if any:	---

Clause	Requirement + Test	Result – Remark	P
<b>8</b>	<b>MARKING</b>		P
8.1	Boxes and enclosures are marked with:		P
	a) name, trade mark or identification mark of the manufacturer or the responsible vendor .....		P
	Enclosures are marked in addition with:		P
	b) IP code against ingress of solid objects if higher than IP2X .....	IP4X	P
	c) IP code against harmful ingress of water if higher than IPX0 .....	IPX0	P
	d) marking on cover of flush enclosures for rough surfaces and where IP is dependent on the surface (Fig. 5).....	IP40 ^^^	P
	IP code is marked on the outside of the enclosure so as to be easily discernible when the enclosure is mounted and wired as for normal use		P
	e) type reference, which may be a catalogue number .....	001 046 078585 00 00	P
	Information marked on the boxes and enclosures or provided by the manufacturer on the smallest package unit or in the instructions of the manufacturer:		P
	f) maximum temperature during the building process if 90 °C .....		N/A
	g) necessary information concerning the openings which can be made during installation for boxes and enclosures classified according to 7.3.7 .....		N/A
	h) minimum temperature during installation for boxes classified according to 7.5.2 and 7.5.3.....	-25 °C	P
	i) minimum internal volume in cm <sup>3</sup> for boxes and enclosures classified according to 7.7.2, inside the box or enclosure, legible after installation of the box but before installation of wiring devices and wiring :		N/A
	j) symbol Ha for boxes classified according to 7.7.1, symbol Hb for boxes classified according to 7.7.2. :		N/A
	k) the mass in kg, if the test force declared by the manufacturer is greater than 250 N for boxes and enclosures classified according to 7.101.1 .....		N/A
	Further information given in the manufacturer's catalogue or in an instruction sheet .....		N/A
	Higher degree of protection achieved by the use of special parts: an instruction sheet is provided and it indicates the higher degree of protection		N/A
8.2	Marking is durable and easily legible		P
	Rubbing test 15 s with water and 15 s with petroleum spirit		P

	After the test: marking still legible	Appropriate	P
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<b>10</b>	<b>PROTECTION AGAINST ELECTRIC SHOCK</b>		P
	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
	Test probe 11 of IEC 61032 applied for 1 min with a force of 20 N do not penetrate in the internal volume of the enclosure, as show in figure 26, which are accessible after installation		P
	Additional test at $(35 \pm 2)$ °C with probe 11 of IEC 61032 on enclosures according to 7.1.1 and 7.1.3 with parts of thermoplastic or electrometric 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		P

<b>12</b>	<b>CONSTRUCTION</b>		P
	Boxes and enclosures are constructed without sharp edges		P
	The inner and outer surfaces of a box or cover have the following characteristics:		P
	- not subject to peeling, scaling or flaking, and		P
	- smooth and free from blisters, crack and other defects		P
12.1	Lids, covers or cover-plates or part of them		P
	Lids, covers or cover-plates or parts of them, such as protective membranes, which are intended to ensure protection against electric shock, are held in place effectively		P
12.1.1	Screw-type fixing		N/A
	Box or enclosure intended to accept a lid, cover or cover plate by means of screw fixing is provided with means to accommodate the intended screws		N/A
	Lids, covers or cover-plates whose fixing is of the screw-type		N/A
12.1.2	Non-screw-type fixing operable without the use of a tool or a key		N/A
	Lids, covers or cover-plates whose fixing is not dependent on screws and whose removal is obtained by applying a force according to Table 2 in a direction approximately perpendicular to the mounting/supportingsurface:		N/A
	- removal give access (with test probe A of IEC 61032) to live parts		N/A
	- removal give access (with test probe A of IEC 61032) to non-earthed conductive parts separated from live parts by basic insulation		N/A
	- removal give access (with test probe A of IEC 61032) only to insulating parts, earthed conductive parts, conductive parts separated from live parts by double or		N/A

	reinforced insulation, or live parts of SELV circuits according to IEC 61140 having a voltage $\leq 25$ V a.c. or 60 V d.c.		
12.1.2.1	Verification of the non removal of the lids, covers or cover-plates		N/A
	Force according to Table 2 applied for 1 min in a direction perpendicular to the mounting surface... :	10 N / 20 N / 40 N / 80 N	N/A
	Lids, covers or cover-plates not come off		N/A
	For flush-mounting boxes or enclosures, test repeated on new specimens with a sheet of hard material, $(1 \pm 0,1)$ mm thick, fitted on the wall around the supporting frame according to figure 12		N/A
	Lids, covers or cover-plates not come off		N/A
12.1.2.2	Verification of the removal of the lids, covers or cover-plates		N/A
	Force not exceeding 120 N applied 10 times in a direction perpendicular to the mounting/supporting surface: lids, covers or cover-plates come off		N/A
	After the test: no damage		N/A
	For flush-mounting boxes or enclosures, test repeated on new specimens with a sheet of hard material, $(1 \pm 0,1)$ mm thick, fitted on the wall around the supporting frame according to figure 12		N/A
	Force not exceeding 120 N applied 10 times in a direction perpendicular to the mounting/supporting surface: lids, covers or cover-plates come off		N/A
	Lids, covers or cover-plates come off		N/A
	After the test: no damage		N/A
12.1.2.3	Verification of the outline of lids, covers and cover-plates		N/A
	Gauge of figure 13 applied according to figure 14 for verification of the outline of lids, covers or cover-plates: distances between face C of gauge and outline of side under test, not decrease .....	complying / not complying	↓
12.1.2.4	Verification of grooves, holes and reverse tapers		N/A
	Gauge of figure 16 applied according to figure 17 with a force of $(1 \pm 0,2)$ N: gauge not enter more than 1 mm .....	complying / not complying	↓
12.1.3	Non screw-type fixing operable with the use of a tool or key		P
	Lids, covers or cover-plates whose fixing is not dependent on screws and whose removal is obtained by using a tool and/or a key according to the manufacturer's instructions: tests according to 12.1.2		P
	Force not exceeding 120 N applied in a direction perpendicular to the mounting/supporting surface: lids, covers or cover-plates need not come off		P
	For flush-mounting boxes or enclosures, test repeated on new specimens with a sheet of hard material, $(1 \pm 0,1)$ mm thick, fitted on the wall around the supporting frame according to figure 12		N/A
	Lids, covers or cover-plates not come off		N/A
12.2	Drain holes		N/A



	Surface and semi-flush mounting enclosures having IPX1 to IPX6 allow the opening of a drain hole $\geq 5$ mm in diameter (mm $\varnothing$ ) or 20 mm <sup>2</sup> in area (mm <sup>2</sup> ) with a width or length $\geq 3$ mm (mm)..... :	No drain holes	N/A
	Drain holes: effective		N/A
12.3	Mounting of enclosures		N/A
	Enclosures have provisions for their suitable attachment according to the method of installation		P
	Conductive parts of fixing means inside the box or enclosure 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		N/A
	Inlets (outlets) provided in boxes and enclosures classified according to 7.3.2, the flexible cables can be easily introduced, and		N/A
	- no damage the flexible cable where it enter, or		N/A
	- enclosure impairing its further use		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:	No cable	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)		N/A
	In boxes and enclosures classified according to 7.4.2 the connection of the conductors of the flexible cable are relieved from strain	No cable anchorage	N/A
	Clear how relief from strain and prevention of twisting is intended to be effected		N/A
	Cable anchorages are:		N/A
	- suitable for the different types of flexible cable	No 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)..... :	No cable anchorage	↓



	- 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) .....		N/A
	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	No cable retention means	N/A
	Boxes and enclosures according to 7.5.2 or 7.5.3, tested at (-15 ± 2) °C and (-15 ± 2) °C respectively		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 ± 1) N applied for 1 min:		N/A
	Type of cable/maximum nominal cross-sectional area (mm <sup>2</sup> ) .....		↓
	After the test: displacement ≤ 3 mm (mm).....		N/A
	Type of cable/minimum nominal cross-sectional area (mm <sup>2</sup> ) .....		↓
	After the test: displacement ≤ 3 mm (mm).....		N/A
12.8	Knock-out inlets (outlets) intended to be removed by mechanical impact		
12.8.1	General		
	It is possible to remove knock-out by mechanical impact without damaging the box	No such parts	N/A
	Chips or burrs are not accepted in knock-out for cables		N/A
	Chips and burrs are disregarded in knock-out for conduits and/or for use with a grommet or a membrane		N/A
	In order to close an open knock-out in a box or an enclosure according 7.1.2 a blanking-plug used without a locknut:		
	- not become dislodged, and		N/A
	- its effectiveness not be impaired, and		N/A
	- it fullfil all requirements for knock-outs		N/A
12.8.2	Knock-out retention		P
	Boxes and enclosures having knock-outs, accessible after installation by means of a 6 mm diameter mandrel with a flat end that:		P

	- not provide access to live parts, a force of (30 ± 1) N applied for (15 ± 1) s		N/A
	- provide direct access to live parts, a force of (40 ± 1) N applied for (60 ± 1) s		N/A
	Box with multi-stage knock-outs, the force applied to the smallest		N/A
	During the test: knock-out remains in place		N/A
	Degree of protection unchanged 1 h after the test		N/A
12.8.3	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 h ± 10 min (boxes and enclosures according to 7.1.1 or 7.1.3)		---
	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	No screw fixing	N/A
	Screw or other fixing means made from insulating material without standardized thread are tested according to the manufacturer's instruction		N/A
	Thread-forming or thread-cutting screws used only if supplied together with one of the pieces with which they are intended to be inserted		N/A
	Verification of the mechanical strength of screws	See appended table 12.9	N/A
12.10	Fixing of boxes and enclosures classified according to 7.2.1.1 and 7.2.1.2		N/A
	Fixing means provided for flush type boxes and enclosures other than for hollow walls.....:		N/A
	Screws not supplied with box or enclosures can be provided according to the manufacturer's instruction		N/A
	Screws, additional mechanical supports or design features, are considered adequate fixing means		N/A
	Boxes and enclosures not fulfilling at least one of the above requirement and having an internal volume less than 400 cm <sup>3</sup> tested as follow:		
	- the block is filled by the following material.....:		N/A
	- assembly is kept at ambient temperature for 10 (+1/0) days		↓

	- auxiliary device described in figure 23 is mounted on the specimen and the screw are tightened with a torque equal to 2/3 of that specified in table 4 .....		↓
	After the test, according to figure Z3, displacement of the specimen from the mounting block $\leq 0,5$ mm:		N/A
12.11	Boxes and enclosures classified according to 7.7.1 (Class Ha)		
	Boxes and enclosures for hollow walls or the like classified according to 7.7.1 provide suitable means for fixing the box or the enclosure to hollow walls or the like	No such parts	N/A
	Fixing means not rely the on the cable management system		N/A
	Box or enclosure mounted in a test wall:		
	- according to the manufacturer's instructions		↓
	- sheet of plywood 500 mm wide x 500 mm high, (10 $\pm$ 1) mm thick		↓
	a) Pull and torque test: lever loaded with a torque of 3 Nm (Figure 18a) and a force of 100 N (Figure 18b) for 1 min		N/A
	After this tests: no damage, displacement of the lever no more than 2 ° (°) .....		N/A
	b) Displacement test: lever loaded with a torque of 3 Nm (Figure 18c) for 1 min		
	After the test: edge of the box not displaced by more than 1 mm (mm) .....		N/A
12.12	Fixing of boxes and enclosures classified according to 7.7.2 (Class Hb)		N/A
	Boxes and enclosures for hollow wall or like classified according to 7.7.2 provide suitable means for fixing the box or the enclosure to hollow walls or the like		N/A
	Fixing means not rely the on the cable management system		N/A
12.12.1	Boxes intended for mounting to a wood structural member of a wall		N/A
	Box mounted to a (45 x 90) mm wood structural member in a vertical position; force of 225 N applied for 5 min		N/A
	After the test: no pulling out of the nails or screws		N/A
	No movement of the face of the box of more than 3 mm (mm).....		N/A
12.12.2	Boxes intended for mounting to a wood structural member of a ceiling		N/A
	Box mounted to a (35 x 190) mm wood structural member in vertical position; force of 225 N applied for 1 min		N/A
	During the test: deflection of the face of the box does not exceed 6 mm (mm) .....		N/A
12.12.3	Boxes intended for mounting to a steel-stud structural member of a wall		N/A
	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)		N/A
	Verification of the declared internal volume for boxes, enclosures, raised covers and box extensions		N/A
	Verification of the volume of each partitioned section for box or enclosure with a partition		N/A
	Checked by the test of clause 12.15		N/A
12.12.5	Boxes intended for mounting in a finished structure		N/A
	Supporting means not crack or break nor the face of the box be permanently displaced more than 3,2 mm from the plane of the face of the test surface when measured 1 minute after the test load is removed		N/A
	Six boxes intended for use in walls or eight boxes intended for use in ceilings are installed in prescribed plywood sheet or in a finished surface in accordance with the manufacturer's instructions		↓
	Screws for the box supporting means are tightened as follow:		N/A
	- in accordance with the manufacturer's instructions or		N/A
	- in accordance with column 4 of Table 4.		N/A
	Following installation, a force of 222 N is applied for 5 min		N/A
12.13	Cable gland entry		N/A
	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		↓
12.14	Boxes and enclosures with inlets (outlets) for conduits or spouts (hubs)		N/A
	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
	Boxes and enclosures classified according to 7.4.3 withstand the tests of 12.14.1 and 12.14.2		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		N/A
	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 $(20 \pm 2)$ 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 $(100 \pm 2)$ N and loaded with a bending moment of 3 Nm for 1 min in six different directions with an interval of $(60 \pm 2)^\circ$	N/A
	During the test: inlet spout not come loose or damaged and conduit stays within the inlet spout	N/A
12.101	Screws for fixing accessories and/or covers are not considered as provision for suspension means, unless otherwise declared by the manufacturer	N/A
12.15	Internal volume of boxes and enclosures	N/A
	Declared internal volume of the box or enclosure and each partitioned section of a box or enclosure, raised cover and box extension is measured	N/A
	The volume of a side pocket provided to increase the volume of a box or enclosure is calculated using a depth-of-pocket not more than the smallest dimension of the opening into that side pocket	N/A
	Difference in the volume of water in the measuring cylinder measured before and after the filling of the box, enclosure or raised cover indicates the volume of the box .....	N/A

<b>13</b>	<b>RESISTANCE TO AGEING, PROTECTION AGAINST INGRESS OF SOLID OBJECTS AND AGAINST HARMFUL INGRESS OF WATER</b>		P
13.1	Resistance to ageing		P
13.1.1	Specimens of insulating and composite boxes and enclosures, glands, grommets and replaceable membranes placed in a heating cabinet at $(70 \pm 2)^\circ\text{C}$ for $(168 + 4)$ h and then 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	Approved	↓
13.1.2	Grommets, blanking-plug 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 $(40 \pm 2)^\circ\text{C}$ for $2\text{ h} \pm 15\text{ min}$		N/A
	Immediately after this period the tip of test probe 11 of IEC 61032 is applied for $(5 \pm 1)$ s with a force of $(30-2)$ N. During the tests: grommets, blanking-plug and/or membranes not deformed to such an extent that live parts of any included accessory become accessible		N/A

	Grommets, blanking-plug 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, blanking-plug 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, blanking-plug 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, blanking-plug and entry membranes in inlet openings of boxes and enclosures classified according to 7.5.2 and 7.5.3: introduction of the cables and conduit permitted when the ambient temperature is low		N/A
	Test on enclosures fitted with grommets, blanking-plug 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, blanking-plug and entry membranes and to introduce cables and conduit 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		P
	Enclosures provide a degree of protection 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:		N/A
	- 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) ..... : 15 mm-Ø		↓
	- largest diameter or dimensions (mm)..... : 21 mm-Ø		↓
	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) ..... :		↓
	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		N/A

	- IP $\leq$ 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		P
13.3	Protection against harmful ingress of water		P
13.3.1	Enclosures with IP>X0 provide a degree of protection against harmful ingress of water in accordance with the declared IP code .....	IPX0	P
	Enclosure dimensions: reference surface S (m <sup>2</sup> ) / perimeter (m) .....		↓
	Appropriate test performed on surface, flush or semi-flush enclosures as specified in IEC 60529 under the following conditions:		P
	- dimension S $\leq$ 0,04 m <sup>2</sup> or perimeter $\leq$ 0,8 m according to 13.3.2 and 13.3.3		N/A
	- dimension S > 0,04 m <sup>2</sup> and perimeter > 0,8 m according to 13.3.2 and 13.3.4	S=0,0875m <sup>2</sup> , 0ml	P
	Enclosures with screwed glands or grommets fitted with cables as declared by the manufacturer:		N/A
	- type of cable, smallest cross-sectional area (mm <sup>2</sup> ) .....	No cable	↓
	- 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:		N/A
	- smallest diameter or dimensions (mm) .....	15 mm $\emptyset$	↓
	- largest diameter or dimensions (mm).....	21 mm $\emptyset$	↓
	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) .....		↓
13.3.2	Surface-mounting enclosures mounted as for normal use		P
	Flush type and semi-flush type enclosures fixed in a test wall:		P
	- 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) .....	0ml	P
	Specimens withstand an electric strength test specified in 14.3 started within 5 min of the completion of IP test		N/A
13.3.4	Immediately after the test: indicator paper still dry		N/A



<b>14</b>	<b>INSULATION RESISTANCE AND ELECTRIC STRENGTH</b>		P
14.1	Insulation resistance and electric strength of enclosures classified according to 7.1.1 and 7.1.3 is adequate		P
	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:		P
	- 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>		P
	Boxes and enclosures have adequate mechanical strength		P
15.1	Impact test at low temperature		P
	Non-metallic boxes and enclosures for use in cast concrete according to 7.2.3.1: impact test with a vertical hammer test apparatus (Figure 8) placed together with the specimens for 2 h ± 15 min in a refrigerator at:		P
	- (-5 ± 2) °C for boxes and enclosures classified according to 7.5.1		P
	- (-15 ± 2) °C for boxes and enclosures classified according to 7.5.2		N/A
	- (-25 ± 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		P
15.2	Compression test		N/A
15.2.1	Boxes and enclosures according to 7.2.3.1 and 7.6.2: specimen placed in a heating cabinet at (90 ± 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 ± 5) N for 1 min ± 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		P
	Specimens subjected to blows by means of an impact test apparatus as described in IEC 60068-2-75 (test EHA) with equivalent mass of 250 g		P
	Boxes classified according to 7.5.2 and 7.5.3 performed at the following temperature:		P
	- (-15 ± 2) °C for boxes classified according to 7.5.2		P
	- (-25 ± 2) °C for boxes classified according to 7.5.2		N/A

	After the test: no damage		P
<b>16</b>	<b>RESISTANCE TO HEAT</b>		P
16.1	Part of insulating material necessary to retain current-carrying parts		P
	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	Part of insulating material not necessary to retain current-carrying parts		P
	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		N/A
16.3.1	Mechanical strength		N/A
	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
16.3.2	Part of insulating material necessary to retain current-carrying parts of earthing circuit		N/A
	Parts of insulating material necessary to retain earthing strap subjected to a pull test of 45 N for 5 min as follow:		N/A
	- one specimen tested in the condition as delivered and		N/A
	- one specimen tested after conditioning at 90 °C for 168 h		N/A
	Thread of the earthing terminal not stripped when applying a torque according to Table 4 (Nm).....		N/A
	After each test: the earthing strap not become detached from the specimen		N/A

17	<b>CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND</b>	N/A
	see appendix EN 60670-22:2006	N/A

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

19	<b>RESISTANCE TO TRACKING</b>	N/A
	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

12.9	<b>TABLE: mechanical strength of screws</b>					N/A
	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
supplementary information: The cable gland for electrical installations is tested in VDE- Approval 40001040.						

14.2	<b>TABLE: insulation resistance</b>			P
	test voltage applied between:	measured (MΩ)	required (MΩ)	
	Enclosure	> 5MΩ	≥ 5MΩ	
supplementary information:				

14.3	<b>TABLE: electric strength</b>			P
	rated insulation voltage (V) .....	250-450 V		↓
	test voltage applied between:	test voltage (V)	flashover / breakdown (Yes/No)	
	Enclosure	2500	No	
supplementary information:				

15.3	<b>TABLE: impact test</b>			P
	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 (mm)	comments
	F	4	400	P
supplementary information:				

16.1-16.2	<b>TABLE: ball pressure test of insulating materials</b>	P
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	allowed impression diameter (mm) .....	≤ 2 mm	↓
part under test		test temperature (°C)	impression diameter (mm)
Enclosure		70	<1,0
supplementary information:			

18	<b>TABLE: glow-wire test</b>					P
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)	
Enclosure	Housing: thermoplastic Colour: Grey	650°C	N	---	N	
supplementary information:						

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

<b>12</b>	<b>CONSTRUCTION</b>			N/A
12.101	Connecting boxes have adequate space to allow the correct connection of conductor specified in the relevant sections of Part 2 of IEC 60998			N/A
	Maximum number of conductors of maximum cross-sectional areas or the most unfavourable combination .....			N/A
	Test made on boxes classified according to 7.101.4 only if l) and m) of 8.1 are marked or declared			N/A
12.102	Retention means for terminals or connecting devices withstand the mechanical stresses			N/A
	Connected conductors in accordance with the relevant Part(s) 2 of IEC 60998 for the type of connecting device used .....			↓
	After the test: no harmful deformation, cracks or similar damage .....			N/A
12.103	Connecting boxes classified according to 7.101.1, 7.101.2 and 7.101.3 comply with temperature rise requirements of 16.102			N/A

16	<b>RESISTANCE TO HEAT</b>			P
16.101	Connecting devices having parts of insulating material are sufficiently resistant to heat			N/A
16.101.1	Specimens or portions of them kept for 1 h in a heating cabinet at (85 ± 2) °C			N/A

	During the test: no change impairing their further use and sealing compound, if any, not flow		N/A
	After the test:		N/A
	- no access to live parts with probe B of IEC 61032 applied with a force not exceeding 5 N		N/A
	- markings still legible		N/A
16.101.2	Parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position, even though in contact with them: ball-pressure test according to 16.1	See appended table 16.101.2	P
16.101.3	Parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position: ball-pressure test according to IEC 60695-10-2 at $(125 \pm 2) ^\circ\text{C}$ for $(60 \pm 5)$ min	See appended table 16.101.3	N/A
16.102	In connecting devices integrated or incorporated in connecting boxes the temperature rise in normal use do not exceed 45 K		N/A
	Temperature rise test	See appended table 16.102	N/A

<b>17</b>	<b>CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND</b>		N/A
	Creepage distances, clearances and distances through sealing compound are not less than the values shown in Table 102 (not applicable to boxes for floating terminals or connecting devices classified according to 7.101.4	See appended table 17	N/A

16.101.3	<b>TABLE: ball pressure test of insulating materials of connecting devices</b>		N/A
	allowed impression diameter (mm) .....	$\leq 2$ mm	↓
	part under test	test temperature (°C)	impression diameter (mm)
supplementary information:			

<b>17</b>	<b>TABLE: creepage distances, clearances and distances through sealing compound</b>						N/A
	rated voltage (V).....	---					↓
	creepage distance dcr, clearance cl and distance through sealing compound dtsc at/of:	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)	required dtsc (mm)	dtsc (mm)
supplementary information:							

**List of test equipment used:**

Equipment No	Kind of equipment	Model Type	Manufacturer	Last Cal Date	Next Cal Date	Last Ver Date	Next Ver Date	Test Clause
E-033	Temperature-Humidity Meter	30.3166.02.S2	TFA	19.10.2021	19.10.2022	---	---	---
E-037	Force gauge	SF-500	Geratech	6.10.2021	6.10.2022	---	---	---
E-005	Glow wire product	---	ULMEKA Mekatronik Sistemler	18.10.2021	18.10.2022	---	---	---
E-045	Ball mass	---	Teknik Mekatronik	22.03.2021	22.03.2023	---	---	---
E-034	Etüv oven	T12	Hereaus	18.10.2021	18.10.2022	---	---	---
E-054	CE compact tester	C.A 6160	Chauvin Arnoux	3.01.2022	3.01.2023	---	---	---
E-004	Humidity Chamber	---	ULMEKA Mekatronik Sistemler	18.10.2021	18.10.2022	---	---	---
E-052	IPX5/X6 Test Equipment	MTSN-2	MULTITECH	21.03.2022	21.03.2024	---	---	---
E-006	Dust Test Equipment	---	ULMEKA Mekatronik Sistemler	---	---	---	---	---

**Photo documentation:**



**Photo**