Technical Construction File

EN IEC 60670-1:2021/A11:2021

Boxes and enclosures for electrical accessories for household and similar fixed electrical installations -- Part 1: General requirements

EN 60670-22:2006

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

Report

Report reference No.....:	TLGW24071159983
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Approved by (+ signature)..... :	
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Testing laboratory

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Reviewing location.....:	Same as above

Client

Name .....:	NETCON ENTERPRISE PVT LTD
Address.....:	Industrial Estate, Chennai, Tamil Nadu- 600066

Test specification

Standard..... :	EN IEC 60670-1:2021/A11:2021, EN 60670-22:2006
Review procedure .....:	CE-LVD
Procedure deviation..... :	N.A.
Non-standard test method.....:	N.A.

Review report form/blank test report

Review report form No.....	EN IEC 60670-1, EN 60670-22
TRF modified by.....	Shanghai Global Testing Services Co., Ltd
Master TRF.....:	PS_INFO\2-ELS.MES\REPORTS\CCA
Copyright blank test report.....:	This report is based on a blank test report prepared by **Shanghai Global Testing Services Co., Ltd** using information obtained from the TRF originator.

Review item	
Type of test object ……..:	Network Cabinet
Trademark ……..:	/
Review model ……..:	NTF42U801004F, NTSW4U60451FC1, NTSW6U60451FC1, NTSW6U60601FC1, NTSW9U60601FC1, NTSW12U60601FC1, NTSW15U60601FC1, NTSW18U60601FC1, NTSW22U60601FC1, NTF12U60602F, NTF15U60602F, NTF18U60602F, NTF22U60602F, NTF12U60802F, NTF15U60802F, NTF18U60802F, NTF22U60802F, NTF27U80804F, NTF42U80804F, NTF47U801004F, NTF47U801204F, NT47U 1000*1200
Manufacturer ……..:	NETCON ENTERPRISE PVT LTD Industrial Estate, Chennai, Tamil Nadu- 600066
Rating ……..:	IP20
Reviewing	
Date of receipt of test item……...:	July 09,2024
Date(s) of performance of test…..:	July 09,2024 to July 19,2024

Possible test case verdicts	
Review case does not apply to the test object..... :	N(.A.)
Review object does meet the requirement..... :	P(ass)
Review object does not meet the requirement.....:	F(ail)

General remarks

"(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report.

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

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 testing laboratory.

Brief description of the tested sample(s):

Ambient temperature :25℃~28℃, humidity:55%~65%.

A representative sample of the product covered by this report has been tested and complies with the applicable requirements of this standard.

EN IEC 60670-1			
Clause	Requirement-Test	Result-Remark	Verdict
7	Classification		P
7.1	The nature of their material		P
7.1.1	Insulating		N
7.1.2	Metallic		P
1.1.3	Composite		N
7.2	The method of installation		P
7.2.1	Flush, semi-flush or embedded in		N
7.2.2	Surface mounting on		N
7.2.3	Placement		P
7.3	The type(s) of inlets (outlets)		P
7.3.1	With inlets for sheathed cables for fixed installations		N
7.3.2	With inlets for flexible cables		N
7.3.3	With inlets for plain or corrugated conduits		N
7.3.4	With inlets for threaded conduits		N
7.3.5	With inlets for other types of conductors/cables or conduits		P
7.3.6	With spouts (hub)		P
7.3.7	Without inlets. Inlet openings will be made during installation		N
7.4	The clamping means		P
7.4.1	With cable retention		N
7.4.2	With cable anchorage		N
7.4.3	With clamping means for flexible conduit		N
7.4.4	Without clamping means		P
7.5	The minimum and maximum temperatures during installation		P
7.6	The maximum temperature +60 °C during the casting process		P
7.7	Boxes and enclosures for hollow walls and the like according to 7.2.1.3 are classified as		P
7.8	The provision for fixing accessories to boxes		P
7.8.1	Boxes supplied with screws		P

EN IEC 60670-1			
Clause	Requirement-Test	Result-Remark	Verdict
7.8.2	Boxes intended to receive screws		N
7.8.3	Boxes intended to receive claws		N
7.8.4	Boxes intended to receive other means		N
8	Marking		P
8.1	Boxes and enclosures shall be marked with		P
	- the name, trade mark or identification mark of the manufacturer or the responsible vendor. In addition enclosures shall be marked with	NETCON ENTERPRISE PVT LTD	P
	- the IP code against ingress of solid objects if higher than IP2X in which case the second IP numeral shall also be marked;		N
	- the IP code against harmful ingress of water if higher than IPX0 in which case the first IP numeral shall also be marked.		N
	- the following marking IPXX on cover of flush enclosures intended to be mounted on rough surfaces and where the IP is dependent on the surface		P
	- the type reference,		P
	- the maximum temperature during the building process if 90 °C;		N
	- the necessary information concerning the openings which can be made during installation in the case of boxes and enclosures classified according to 7.3.7;		P
	- the minimum temperature during installation for boxes classified according to 7.5.2 and 7.5.3;		P
	- void		P
	- the letter H or information for boxes and enclosures classified according to 7.2.1.3.		P
8.2	The marking on the boxes and enclosures shall be durable and easily legible.	Durable and easily legible	P
9	Dimensions		P
10	Protection against electric shock		N
11	Provision for earthing		N
11.1	Boxes and enclosures with exposed conductive parts	No such components	N

EN IEC 60670-1			
Clause	Requirement-Test	Result-Remark	Verdict
12	Construction		P
12.1	Lids, covers or cover-plates or parts of them Lids, covers, or cover-plates or parts of them, which are intended to ensure protection against electric shock, shall be held in place effectively.		P
12..1.1	Screw-type fixing		P
12.1.2	Non-screw-type fixing operable without the use of a tool or a key	No such components	N
12.1.3	Other fixings	No such components	N
12.2	Drain holes		N
12.3	Mounting of enclosures		P
	Enclosures shall have provisions for their suitable attachment according to the method of installation (see 7.2).		P
	Enclosures of insulating material shall be constructed in such a way that any conductive parts of an internal fixing means intended to be used for mounting the enclosure are surrounded by insulation which projects above the top of the fixing means by an amount of at least 10 % of the maximum width of the cavity for the fixing means.		P
12.4	Boxes and enclosures with inlets for flexible cables		N
12.5	Boxes and enclosures with inlets for applications other than flexible cables		N
12.6	Boxes and enclosures with a cable anchorage(s)		N
12.7	Boxes and enclosures with cable retention means		N
12.8	Knock-out inlets (outlets) intended to be removed by mechanical impact		N
12.9	Screw fixings		P
12.10	Fixing of boxes and accessories		P
12.11	Boxes and enclosures classified according to 7.2.1.3		N
12.12	Text deleted		P
12.13	Cable gland entry		P
12.14	Boxes and enclosures with inlets		P

EN IEC 60670-1			
Clause	Requirement-Test	Result-Remark	Verdict
13	Resistance to ageing, protection against ingress of solid objects and against harmful ingress of water		P
13.1.1	Resistance to ageing		P
13.1.2	Grommets and entry membranes in inlet openings and protecting membranes shall be reliably fixed and shall not be displaced by the mechanical and thermal stresses occurring in normal use.		P
13.1.3	Grommets and entry membranes in inlet openings of boxes and enclosures classified according to 7.5.2 and 7.5.3 shall be so designed and made of such material that the introduction of the cables is permitted when ambient temperature is low.		P
13.2	Protection against the ingress of solid objects		P
13.3	Protection against harmful ingress of water		N
14	Insulation resistance and electric strength		N
15	Mechanical strength		P
15.1	Impact test at low temperature		P
15.2	Compression test		N
15.3	Impact test for boxes and enclosures		P
16	Resistance to heat		P
17	Creepage distances, clearances and distances through sealing compound		N
18	Resistance of insulating material to abnormal heat and fire		N
19	Resistance to tracking	No flashover or breakdown	P
20	Resistance to corrosion	No rust.	P
21	Electromagnetic compatibility (EMC)		N

EN 60670-22			
Clause	Requirement-Test	Result-Remark	Verdict
4	General requirements		P
	This clause of Part 1 is applicable.		P
5	General notes on tests		P
	This clause of Part 1 applies with the following addition:		P
5.2	Add at the end:		P
	Connecting boxes with provision for subsequent incorporation of terminals or connecting devices are tested with the terminals or connecting devices recommended by the manufacturer.		P
6	Ratings		P
	This clause of Part 1 is replaced by:		P
6.1	The preferred values of the rated voltage of the integrated or incorporated connecting devices are 130 V, 250 V, 450 V, 750V, 1 000 V ac. and 1 500 V dc.		P
6.2	The standard rated connecting capacities are 0,2 mm2, 0,34 mm2, 0,5 mm2, 0,75 mm2, 1 mm2, 1,5 mm2, 2,5 mm2, 4 mm2, 6 mm2, 10 mm2, 16 mm2, 25 mm2, 35 mm2.		P
NOTE 1	For the time being, designation by wire gauge may be used in some countries (for example AWG in US and CA), instead of the cross-sectional areas expressed in mm2.		P
NOTE 2	The approximate relation between mm2 and AWG sizes is given in Appendix A of IEC 60999-1.		P
NOTE 3	In UK, a standard connecting capacity of 1,25 mm2 is used.		P
NOTE 4	In Japan, standard connecting capacities of 0.9 mm2,1.25 mm2,2.0 mm2, 3.5 mm2, 5.5 mm2, 8 mm2, 14 mm2, 22 mm2 are used.		P
7	Classification		P
	This clause of Part 1 applies with the following addition:		P
	Add the following:		P

EN 60670-22			
Clause	Requirement-Test	Result-Remark	Verdict
7.101	The method of fixing the terminals or connecting devices in the connecting box		P
7.101.1	With integrated clamping units		P
7.101.2	With incorporated terminals or connecting devices		P
7.101.3	With provisions for subsequent incorporation of terminals or connecting devices		P
7.101.4	Without fixing (for floating terminals or connecting devices)		P
8	Marking		P
	This clause of Part 1 applies with the following additions:		P
8.1	Add after j):		P
k)	rated insulation voltage for boxes with integrated or incorporated terminals or connecting devices (see note 1),		P
l)	rated connecting capacity (see notes 1 and 2),		P
m)	maximum number of conductors to be placed in the box (see notes 1 and 2).		P
NOTE 1	In the case of:		P
–	integrated clamping units, k) and l) should be marked on the boxes,		P
–	incorporated terminals or connecting devices, the marking k) and l) if marked on the box or on the incorporated terminals or connecting devices, should be visible during installation,		P
–	empty boxes for floating terminals or connecting devices classified according to 7.101.4, the marking l) and m), if marked on the box, should be visible during installation.		P
NOTE 2	The manufacturer may mark or declare more than one combination of l) and m). This information is mandatory for boxes classified according to 7.101.4 in the following countries: DE and SE.		P
	Add the following subclause:		P
8.101	When symbols are used they shall be as follows:		P

EN 60670-22			
Clause	Requirement-Test	Result-Remark	Verdict
	Volt..... V		P
	Rated connecting capacity..... mm2 or □or AWG		P
9	Dimensions		-
	This clause of Part 1 applies.		P
10	Protection against electric shock		P
	This clause of Part 1 applies.		P
11	Provision for earthing		P
	This clause of Part 1 applies.		P
12	Construction		P
	This clause of Part 1 applies with the following modifications:		P
12.1	Add after the first paragraph:		P
	In connecting boxes where the fixing means of covers or cover-plates serve also to fix the connecting device, it shall maintain the connecting device in the correct position after removal of the cover or cover-plate.		P
	Compliance is checked by inspection.		P
	Add the following subclauses:		P
12.101	Connecting boxes shall have adequate space to allow the correct connection of conductors which are specified in the relevant sections of the particular requirements of Parts 2 of IEC 60998, concerning the number and cross-sectional area of the conductors.		P
	Compliance is checked by fitting the maximum number of conductors of the maximum crosssectional area if it is the worst case. If not, the most unfavourable combination shall be checked.		P
	This test shall be carried out in conjunction with that of 12.102.		P
	For boxes classified according to 7.101.4 the test is made only if l) and m) of 8.1 are marked or declared.		P

EN 60670-22			
Clause	Requirement-Test	Result-Remark	Verdict
12.102	Retention means for terminals or connecting devices shall withstand the mechanical stresses occurring during installation and normal use.		P
	Compliance is checked by connecting conductors in accordance with the relevant Part(s) 2 of IEC 60998 for the type of the connecting device used.		P
	After the test there shall be no harmful deformation, cracks or similar damage which would lead to non-compliance with this part.		P
12.103	Connecting boxes classified according to 7.101.1, 7.101.2 and 7.101.3 shall comply with the temperature rise requirements of Clause 16.102.		P
13	Resistance to ageing, protection against ingress of solid objects and against harmful ingress of water		P
	This clause of Part 1 applies with the following addition:		P
13.3.3	Replace the last paragraph by the following:		P
	The specimens, except connecting boxes classified according to 7.101.4, shall withstand an electric strength test specified in 14.2 which shall be started within 5 min of the completion of the test according to this subclause.		P
14	Insulation resistance and electric strength		P
	This clause of Part 1 applies with the following addition:		P
	Add the following:		P
14.2.101	For boxes with integrated or incorporated terminals or connecting devices, the measurements are made consecutively as indicated below.		P
	Each clamping unit of a connecting device shall be connected alternatively with conductors of the smallest and the largest cross-sectional area.		P

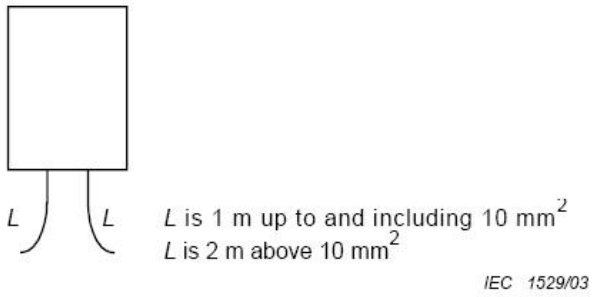
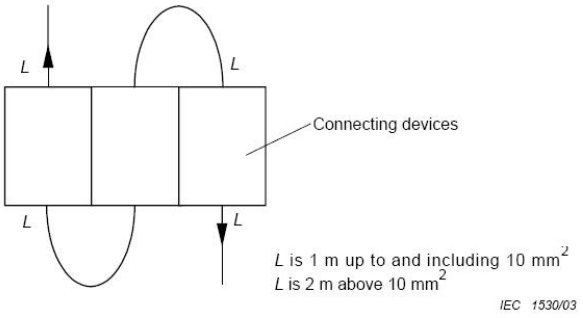
EN 60670-22			
Clause	Requirement-Test	Result-Remark	Verdict
	The insulation resistance is then measured with a dc. voltage of approximately 500 V applied, the measurement being made 1 min after application of the voltage.		P
a)	between all clamping units connected together and the body for connecting devices without fixing means or between all clamping units connected together and the mounting base for connecting devices with fixing means;		P
b)	between each clamping unit and all others connected to the body for connecting devices without fixing means or between each clamping unit and all others connected to the mounting base for connecting devices with fixing means.		P
	The metal foil is applied in such a way that the sealing compound, if any, is effectively tested.		P
15	Mechanical strength		P
	This clause of Part 1 applies with the following amendment:		P
15.1	Replace the note by:		P
NOTE	Damage to the finish, small dents which do not reduce creepage distances or clearances below the value specified in Table 102 and small chips which do not adversely affect the protection against electric shock or harmful ingress of water are disregarded.		P
16	Resistance to heat		P
	This clause of Part 1 applies with the following addition:		P
	Add the following sub clauses:		P
16.101	Connecting devices having parts of insulating material shall be sufficiently resistant to heat.		P
	Compliance is checked by the test of 16.101.1 to 16.101.3.		P

EN 60670-22			
Clause	Requirement-Test	Result-Remark	Verdict
16.101.1	The specimens or portions of the specimens are kept for 1 h in a heating cabinet at a temperature of (85 ± 2)°C.		P
	During the test they shall not undergo any change impairing their further use and sealing compound if any, shall not flow to such an extent that live parts are exposed.		P
	After the test and after the specimens have been allowed to cool to approximately ambient temperature, there shall be no access to live parts which are normally not accessible when the specimens are mounted as in normal use, even if the test probe B of IEC 61032 is applied with a force not exceeding 5 N.		P
	After the test, markings shall still be legible.		P
16.101.2	Parts of the insulating material not necessary to retain current carrying parts and parts of the earthing circuit in position, even though they are in contact with them, are subjected to a ball-pressure test as described in clause 16.1 of Part 1 but at a temperature of (70 ± 2) °C or (40 ± 2) °C, plus the highest temperature rise determined for the relevant part during the test of 16.102.4, whichever is the higher.		P
16.101.3	Parts of the insulating material necessary to retain current carrying parts and parts of the earthing circuit in position are subjected to a ball pressure test in a heating cabinet at a temperature of (125 ± 2) °C.		P
16.102	Connecting devices integrated or incorporated in connecting boxes shall be so constructed that the temperature rise in normal use does not exceed the value specified in 16.102.4.		P
	Compliance is checked by the tests of 16.102.1 to 16.102.3.		P

EN 60670-22			
Clause	Requirement-Test	Result-Remark	Verdict
16.102.1	Connecting devices with a single terminal (see Figure 101) having one or more clamping units shall be connected to conductors in the intended manner and the most unfavourable conditions.		P
16.102.2	For multiway terminal devices a maximum of 3 adjacent terminals are connected in series. If single pole connecting devices are designed to be mounted side by side, 3 devices are placed in the intended manner and connected together (see Figure 102).		P
16.102.3	The connections are made with new rigid or flexible conductors of the largest cross-sectional area appropriate to the clamping units, the clamping units being connected according to the specifications of the relevant part of IEC 60998.		P
	Conductor length shall be 1 m for a cross-sectional area up to and including 10 mm2 and 2 m for a cross-sectional area above 10 mm2. Conductor length may be reduced in agreement with the manufacturer.		P
16.102.4	Temperature rise measurements are made when the device under test has reached thermal equilibrium. It is generally accepted that the temperature is stable when the temperature of the part under test does not increase by more than 1 K/h. During the test the devices are loaded with an alternating current having the value shown in Table 101 for the corresponding rated connecting capacity.		P
	The temperature is determined by means of colour changing indicators or thermocouples, so chosen and positioned that they have a negligible effect on the temperature being determined (e.g. on the metallic part in contact with the conductor).		P
	Table 101 – Relationship between rated connecting capacity and test current		-

<table>
<tr><td colspan="4">EN 60670-22</td></tr>
<tr><td>Clause</td><td>Requirement-Test</td><td>Result-Remark</td><td>Verdict</td></tr>
<tr><td></td><td>
<table>
<tr><th>Rated connecting capacity
mm²</th><th>Test current
A</th></tr>
<tr><td>0,2</td><td>4</td></tr>
<tr><td>0,34</td><td>5</td></tr>
<tr><td>0,5</td><td>6</td></tr>
<tr><td>0,75</td><td>9</td></tr>
<tr><td>1</td><td>13,5</td></tr>
<tr><td>1,5</td><td>17,5</td></tr>
<tr><td>2,5</td><td>24</td></tr>
<tr><td>4</td><td>32</td></tr>
<tr><td>6</td><td>41</td></tr>
<tr><td>10</td><td>57</td></tr>
<tr><td>16</td><td>76</td></tr>
<tr><td>25</td><td>101</td></tr>
<tr><td>35</td><td>125</td></tr>
</table>
</td><td></td><td>P</td></tr>
<tr><td></td><td>The temperature rise of current-carrying parts of the clamping unit shall not exceed 45 K, it being understood that in the case of an insulated device the temperature rise of the conductor shall be measured as close as possible to the clamping unit.</td><td></td><td>P</td></tr>
<tr><td>NOTE</td><td>For the purpose of the test of 16.101.2, the temperature rise of external parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position, even though they are in contact with them, is also determined.</td><td></td><td>P</td></tr>
<tr><td>17</td><td>Creepage distances, clearances and distances through sealing compound</td><td></td><td>P</td></tr>
<tr><td></td><td>Creepage distances, clearances and distances through sealing compound shall not be less than the value shown in Table 102.</td><td></td><td>P</td></tr>
<tr><td colspan="4">Table 102 – Creepage distances, clearances and distances through sealing compound</td></tr>
<tr><td></td><td>
<table>
<tr><th>Rated voltage V</th><th>Creepage distance, clearance and distance through sealing compound mm</th></tr>
<tr><td>≤130</td><td>1,5</td></tr>
<tr><td>>130 and ≤250</td><td>3,0</td></tr>
<tr><td>>250 and ≤450</td><td>4,0</td></tr>
<tr><td>>450 and ≤750</td><td>6,0</td></tr>
<tr><td>>750</td><td>8,0</td></tr>
</table>
</td><td></td><td>P</td></tr>
<tr><td></td><td>Compliance is checked by measurement between the following parts:</td><td></td><td>P</td></tr>
<tr><td></td><td>Creepage distances and clearances:</td><td></td><td>P</td></tr>
</table>

EN 60670-22			
Clause	Requirement-Test	Result-Remark	Verdict
	-between live parts of different polarity;		P
	-between live parts and		P
	.metal covers and boxes without insulating lining;		P
	·the surface on which the box is mounted.		P
	Distances through sealing compound:		P
	-between live parts covered with sealing compound and the surface on which the box is mounted.		P
	For multi-way terminal devices and terminals without fixing means but with protection, distances are measured between live parts and any opening which represents the closest point liable to touch any other part when the terminal is fitted with conductors having the largest cross-sectional area.		P
	This test does not apply to boxes for floating terminals or connecting devices classified according to 7.101.4.		P
	In cases where various terminals or connecting devices may be mounted in the box, the most unfavourable combinations shall be tested.		P
18	Resistance of insulating material to abnormal heat and to fire		P
	This clause of Part 1 applies.		P
19	Resistance to tracking		P
	This clause of Part 1 applies.		P
20	Resistance to corrosion		P
	This clause of Part 1 applies.		P
21	Electromagnetic compatibility (EMC)		P
	This clause of Part 1 applies.		P

EN 60670-22			
Clause	Requirement-Test	Result-Remark	Verdict
			P
	Figure 101 – Single terminal device		P
			P
	Figure 102 – Multiway terminal device		P

Type of equipment: Network Cabinet
Model: NTF42U801004F, NTSW4U60451FC1, NTSW6U60451FC1, NTSW6U60601FC1, NTSW9U60601FC1, NTSW12U60601FC1, NTSW15U60601FC1, NTSW18U60601FC1, NTSW22U60601FC1, NTF12U60602F, NTF15U60602F, NTF18U60602F, NTF22U60602F, NTF12U60802F, NTF15U60802F, NTF18U60802F, NTF22U60802F, NTF27U80804F, NTF42U80804F, NTF47U801004F, NTF47U801204F, NT47U 1000*1200

Details of:

View:

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- End of Annex I -