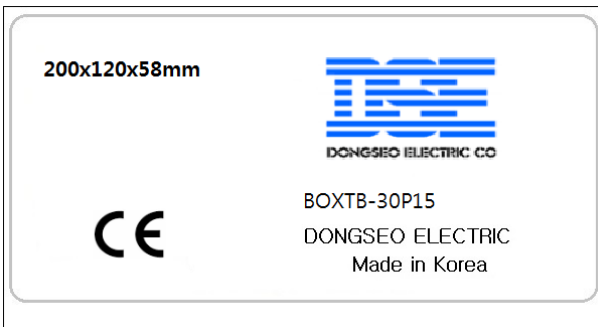
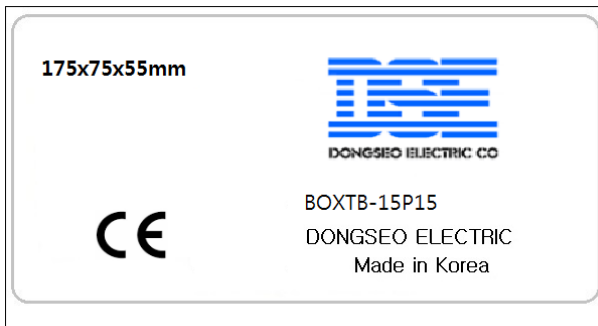
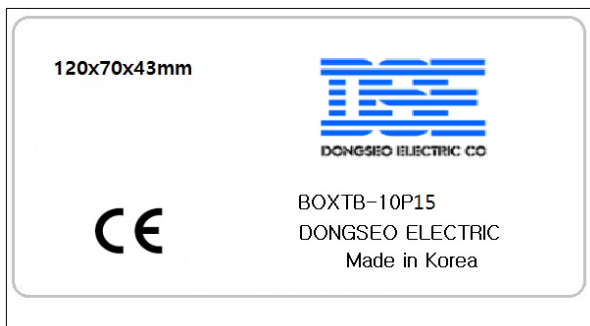
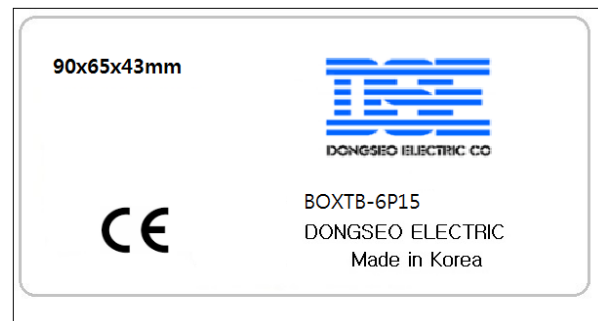


TEST REPORT IEC 62208 Empty enclosures for low-voltage switchgear and controlgear assemblies – General requirements	
Report Number	SR-22-0353
Tested by (name+signature)	T. Y. Sun
Approved by (name+signature) ..	S. J. Lee
Date of issue	2022-11-10
Total number of pages	30 pages
Testing Laboratory	Standard Labs
Address	#46, LS-ro, 91 beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14119, Korea
Applicant's name	DONGSEO ELECTRIC CO.
Address	163, Heyri-ro, Tanhyeon-myeon, Paju-si, Gyeonggi-do, Korea
Test specification:	
Standard	IEC 62208:2011 (Second Edition)
Test procedure.....	CB Scheme
Non-standard test method.....	N/A
Test Report Form No.....	IEC62208B
Test Report Form(s) Originator....	OVE
Master TRF	Dated 2013-01
Copyright © 2013 Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components (IECEE), Geneva, Switzerland. All rights reserved.	
Test item description	Empty Enclosure (for terminal block)
Trade Mark	 DONGSEO ELECTRIC CO
Manufacturer	Same as client
Model/Type reference.....	BOXTB-xP15 series
Ratings.....	IP65, IK08.

Copy of marking plate:



Summary of testing:

- Tightening torque test (Column II) applied according to Table 4 by EN60947-1
- All tests were performed on a basic model.
- Models difference : The number of terminal blocks and the external size are different.

Models covered by this test report

Type designation :


Model covered : BOXTB-xP15 series

x stands for terminal block : number of pole : 3, 4, 6, 10, 15, 20

Test samples

BOXTB-10P15 and BOXTB-20P15

Test item particulars	Classification
Type of material	insulating
Method of fixing	floor standing / wall mounting
Intended location	Indoor
Degree of protection	IP65 / IK07
Rated insulation voltage (if applicable)	400V for terminal block, 690V for the the plastic enclosure.
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	11.10.2022
Date (s) of performance of tests	17.10.2022 ~ 28.10.2022
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 <input type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC60068-2-1:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)	DONGSEO ELECTRIC CO. 163, Heyri-ro, Tanhyeon-myeon, Paju-si, Gyeonggi-do, Korea
General product information:	
The product is plastic enclosures incorporating terminal blocks inside.	

6	INFORMATION TO BE GIVEN REGARDING THE ENCLOSURE		
6.2	Marking		
	The enclosure shall be marked as follows:		
	- Name, trade mark or identification mark of the enclosure manufacturer.	 DONGSEO ELECTRIC CO.	P
	- Type designation or identification number of the enclosure.	See page 3	P
	The marking shall be durable and easily legible and may be inside the enclosure.		P
	Compliance is checked according to the test of 9.3 and by inspection.		P
	The marking for recycling of plastic parts follows ISO 11469.		N/A
6.3	Documentation		
6.3.1	General		
	The manufacturer's documentation includes:		
	- relevant constructional and mechanical characteristics	IK07	P
	- enclosure classification (see Clause 4)	See page 3	P
	- instruction necessary for the correct handling, assembling, mounting and service conditions of the enclosure		P
6.3.2	- dimension		P
6.3.3	- mounting arrangements		P
6.3.4	- permissible loads		N/A
6.3.5	- lifting devices, if necessary		N/A
6.3.6	- provisions for protection against electric shock		N/A
	- applicable service conditions (see Clause 7);		P
	- location and size of protected space		N/A
	- data of thermal power dissipation capability;		N/A
	- rated insulation voltage of enclosures constructed of an insulating material	690V	P
	- degree of protection (IK code, see 8.7)	IK07	P
	- degree of protection (IP code, see 8.8)	IP65	P
	Data for the thermal power dissipation capability		N/A
7	SERVICE CONDITIONS		
7.1	Manufacturer has specified the locations for which the enclosure is intended	Indoor use only	P
7.2	Normal service conditions		

7.2.1	Ambient air temperature		
7.2.1.1	- for indoor locations (max. +40°C, average over 24 h \leq 35°C; lower limit : -5°C)		P
7.2.1.2	- for outdoor locations (max. +40°C, average over 24 h \leq 35°C; lower limit : -25°C)		N/A
7.2.2	Humidity conditions		
7.2.2.1	- for indoor locations (\leq 50% RH at max. +40°C or for example 90% RH at +20°C)		N/A
7.2.2.2	- for outdoor locations (up to 100% RH at max. +25°C)		P
7.3	Special service conditions, if applicable		N/A
7.4	Conditions during transport and storage, if applicable	Using the Normal service	P
8	DESIGN AND CONSTRUCTION		
8.1	General		
	The enclosure constructed of materials capable of withstanding the mechanical, electrical and thermal stresses, as specified in clause 9, as well as the effects of humidity which are likely to be encountered in normal use.		P
	Protection against corrosion checked by the test of 9.13		P
	For enclosures or parts of enclosures made of insulating materials, thermal stability, resistance to heat, fire and weathering shall be verified according to tests of 9.9 and 9.12		P
8.2	Static loads		
	Compliance of the permissible load that the enclosure and its doors are able to carry is checked according to the test of 9.4		P
8.3	Lifting and transport support		
	Where required, enclosures are provided with appropriate lifting devices or transport means (according to the test of 9.5)	No Lifting and transport support	N/A
8.4	Access to the interior of the enclosure		
	Doors or removable covers allow adequate access to the protected space. Access may be restricted by the use of a key or tool	Can open the cover by user	P
	Cable gland plates and covers which are removable from the outside require the use of a tool.		P
8.5	Protective circuit		
	Metallic enclosures shall ensure the electric continuity		
	- by conductive structural parts of the enclosure	All non-metal enclosure	N/A
	- by separate protective conductor to earth		N/A

	After remove of a removable part protective circuit of the remainder shall not be interrupted		N/A
	For lids, doors, removable covers and the like, the usual metal screwed connections and metal hinges may ensure continuity of the protective circuit provided no electrical equipment is attached to them		N/A
	Where these are intended for mounting electrical equipment, additional means shall be provided to ensure the continuity of the protective circuit.		N/A
	Compliance is checked according to the test of 9.11		N/A
	The enclosure manufacturer shall provide means to facilitate the connection of the external protective conductor by the final assembly manufacturer. The location and the designed I ² t withstand capacity under fault conditions of such means shall be indicated in the enclosures manufacturers' documentation.		N/A
8.6	Dielectric strength		
	Enclosure constructed of an insulating material fulfil the dielectric test of 9.10		P
8.7	Degree of protection (IK-Code)		
	Degree of protection according to IEC 62262	IK08	P
	Compliance is checked according to the test of 9.7	Compliance to 9.7	P
8.10	Degree of protection (IP-Code)		
	Degree of protection according to IEC 60529	IP65	P
	Compliance is checked according to the test of 9.8		P
9	TYPE TESTS		
9.2	General conditions of tests		
	The enclosures under test are mounted and installed as in normal use according to the enclosure manufacturer's instructions		N/A
	Unless otherwise specified, the tests shall be carried out at an ambient temperature of between +10 °C and +40 °C		P
	Number of samples and order of test per sample according to Table 1	See Table 1	P
9.3	Marking		
	Markings made by moulding, pressing or similar and labels with a laminated plastic covering are not submitted to this test		
	Test: 15 s rubbing with water and then 15 s rubbing with petroleum spirit		P
	After the test markings easily legible		P
9.4	Static loads		

	The enclosure fitted with all its required components to support the permissible load is loaded with a weight of 1,25 times the permissible load as declared by the manufacturer	100N x 1.25 = 125N	P
	The loads are arranged on the mounting plate or switchgear and controlgear supports and on the door evenly distributed as specified by the enclosure manufacturer		P
	Loads retained for 1h in the closed position		P
	Enclosure constructed of insulating material and metallic enclosures with parts (hinges, locks, etc.) of insulating material tested at 70°C		P
	Closed door opened 5 times through 90°		P
	Resting in open position: 1 min.		P
	For enclosures constructed of insulating material and metallic enclosures with parts (hinges, locks, etc.) of insulating material, this part of the test may be carried out at ambient temperature external to the heating cabinet		P
	After the test enclosure shows no cracks or permanent distortions		P
	During the test no deflections which could impair any of its characteristics		P
9.5	Lifting		
	Enclosure loaded as in 9.4 with its door closed, lifted with the specified lifting means and in the manner defined by the manufacturer	No Lifting and transport support	N/A
	3 times: from standstill position in a vertical plane, returning to standstill position		N/A
	From standstill position to a height of ≥ 1 m for 30 min, without any movement		N/A
	3 times: from standstill position to a height of ≥ 1 m and moved $10 \pm 0,5$ m horizontally; then set down. One cycle: 1 min \pm 5 s at uniform speed		N/A
	After the test enclosure shows no cracks or permanent distortions		N/A
	During the test no deflections which could impair any of its characteristics		
9.6	Axial loads of metal inserts		
	Axial load according to table 2 applied for 10s	Size: M	Load: N
	After the test:		
	- the insert is in its original position		N/A
	- no sign of movement		N/A
	- no cracks and splits in the material		N/A
9.7	Degree of protection against external mechanical impacts (IK code)		

	- according to IEC 62282 by means of a test hammer suitable for the dimensions of the enclosure, the enclosure is fixed on a rigid support as for normal use		P
	The impact energy shall be applied:	IK07 / Impact Energy = 2J	P
	- 3 times to each exposed surfaces in normal use whose largest dimensions is not above 1m		P
	- 5 times to each exposed surfaces in normal use whose largest dimensions is greater than 1m	Not more than 1m	N/A
	Impacts applied with even distributed over the faces of the enclosure		P
	After the test:		
	- enclosure continue to provide the IP code and dielectric strength		P
	- removable covers are removed and reinstalled		P
	- doors opened and closed		P
9.8	Degree of protection (IP-Code)		
9.8.1	Degree of protection against access to hazardous parts and against the ingress of solid foreign objects indicated by first characteristic numeral		
9.8.1.1	Protection against access to hazardous parts		
	Subclauses 12.1 and 12.2 of IEC 60529 apply	Not access to hazard parts	N/A
	Access probe shall not enter the protected space		N/A
9.8.1.2	Degree of protection against the ingress of solid foreign objects		
	For enclosures IP2X, IP3X, IP4X, 13.2 and 13.3 of IEC 60529 apply.		N/A
	For IP 5X enclosures, 13.4, category 2 (without vacuum pump) and 13.5 (without vacuum pump) of IEC 60529 apply. Ingress of talcum powder into protected space is verified as described		N/A
	For enclosures IP6X, 13.6 of IEC 60529 apply. No talcum powder shall be observable inside the enclosure at the end of the test	IP65	P
9.8.2	Degree of protection against ingress of water as indicated by the second characteristic numeral		
	Test according to clauses 14.1 and 14.2 of IEC 60529	IP65	P
	After the test, water has not ingressed into the protected space		P
9.8.3	Degree of protection against hazardous parts as indicated by additional letter.		
	Test according to clause 15 of IEC 60529	No indicated by additional letter	N/A
	The access probe does not touch the surface of the protected space.		N/A
9.9	Properties of insulating materials		

9.9.1	Thermal stability		
	Test according to IEC 60068-2-2 Test Bb, temperature 70°C, with natural air circulation, for a duration of 168 h	Tested to 7 days	P
	After the treatment:		
	Enclosures are kept at ambient temperature and relative humidity between 45% and 55% for 4 days (96h)	Tested to 4 days	P
	- enclosure shows no crack without additional magnifications		P
	- material became not sticky or greasy		P
	The forefinger wrapped in a dry piece of rough close is pressed with a force of 5N against the enclosure.		P
	No traces of the cloth remain to the enclosure and the material of the enclosure doesn't stick to the cloth.		P
9.9.2	Resistance to normal heat		
	The suitability of the insulating materials to resist effects of heat shall be verified either by reference to the insulation temperature index (determined e.g. by the methods of IEC 60216 series), or by compliance to IEC 60085		P
9.9.3	Resistance to abnormal heat and to fire		
	Test in accordance with the principles of IEC 60695-2-10 and the details of IEC 60695-2-11.	Compliance to glow wire test and needle flame test	P
	Tested as described in clause 4 of IEC 60695-2-11		P
	Apparatus used as described in clause 5 of IEC 60695-2-11		P
	Preconditioning of the samples:		
	Storage at 15-35°C / RH 35-45 % for 24h		P
	Thermocouple of test apparatus calibrated in accordance with clause 6 of IEC 60695-2-10		P
	During test:		
	- clause 8 of IEC 60695-2-10 followed		P
	- clause 10 of IEC 60695-2-11 followed		P
	Temperature of the tip of the glow wire:		
	- for parts retaining current-carrying parts in position: $960 \pm 15^\circ\text{C}$		N/A
	Time at which sample ignited:	$t_i = 1 \text{ s}$	
	Time when sample extinguished:	$t_e = < 36 \text{ s}$	
	- for parts intended to be installed in hollow Walls: $850 \pm 15^\circ\text{C}$		P

	Time at which sample ignited:	No ignition	
	Time when sample extinguished:	No ignition	
	All other parts: $650 \pm 15^{\circ}\text{C}$		N/A
	Time at which sample ignited:	$t_i = \quad \text{s}$	
	Time when sample extinguished:	$t_e = \dots \text{s}$	
	No visible flame, no sustained glowing or flames and glowing extinguish within $(30 \pm 1)\text{s}$		P
	No burning of the tissue paper, no scorching of the pinewood board		P
9.10	Verification of dielectric strength		
9.10.1	General		
	This test applies to enclosures where insulating material is used, even in combination with non-insulating materials		
9.10.2	Preconditioning		
	Enclosures are placed in a humidity cabinet (relative humidity between 91% and 95%) and an air temperature of $(40 \pm 2)^{\circ}\text{C}$ for 2 days (48h)		P
9.10.3	Enclosures without metal elements inside the protective space		
	An r.m.s voltage according to 10.9.4 of IEC 61439-1 is applied for 1 min between 2 metal foils, one in contact with the external surface and the other inside the enclosure at the limit of the protected space		P
	Applied voltage:	$U = 1\,500 \times 1.5 = 2\,250 \text{ V}$	P
9.10.4	Enclosure having metal elements in the protected space		
	All internal metallic parts are connected to a bar, a voltage according to 10.9.4 of IEC 61439-1 is applied for 1 min. between a metal foil in contact with the external surface and the bar.		P
	Applied voltage:	$U = 1\,500 \text{ V}$	P
9.10.5	Results to be obtained		
	- samples show no damage impairing their further use		P
	- no flashover or breakdown occurs during the test	No flashover, no breakdown	P
9.11	Continuity of the productive circuit		
	Exposed conductive parts of the enclosure connected to the protective circuit	No conductive parts of the enclosure	N/A
	Resistance not exceeding $0,1 \Omega$	Measured: Ω	N/A
9.12	Resistance to ultra-violet (UV) radiation		
	This test applies only to enclosures and external parts of enclosures intended to be installed outdoors and which are constructed of insulating materials or metals that are entirely coated by synthetic material. Representative samples of such parts shall be subjected to the following test		

	UV test according to ISO 4892-2 method A, cycle 1 with a total test period of 500 h		N/A
	For enclosures constructed of insulating materials compliance is checked by verification		
	- flexural strength (according to ISO 178) of insulating materials have 70% min. retention		N/A
	- charpy impact (according to ISO / EN ISO 179) of insulating materials have 70% min. retention		N/A
	After the test samples are subjected to the glow wire test of 9.9.3		N/A
	For compliance, enclosures constructed of metals entirely coated by synthetic material, the adherence of the insulating material shall have a minimum retention of category 3 according to ISO 2409 (a cross-cut area greater than 15 %, but not greater than 35 % is affected)		N/A
	Samples show no cracks or deterioration		N/A
9.13	Resistance to corrosion		
9.13.1	General		
	Metallic enclosures and external metallic parts of insulating and combined enclosures are tested to verify that they ensure protection against corrosion		N/A
	In all cases hinges, locks and fastenings have to be tested	The fastenings part was made of metal (enclosure cover)	P
9.13.2	Test procedure		
9.13.2.1	Severity test A		
	This test is applicable to:		
	- metallic indoor enclosures		N/A
	- external metallic parts of indoor enclosures		P
	- internal metallic parts of indoor and outdoor enclosures upon which intended mechanical operation may depend		N/A
	The test consists of:		
	- 6 cycles of 24 h each to damp heat cycling test according to IEC 60068-2-30 (Test Db) at (40 ± 3) °C and relative humidity of 95 %		P
	- 2 cycles of 24 h each to salt mist test according to IEC 60068-2-11; (Test Ka: Salt mist), at a temperature of (35 ± 2) °C		P
9.13.2.2	Severity test B		
	This test is applicable to:		
	- metallic outdoor enclosures		N/A
	- external metallic parts of outdoor enclosures		N/A

	The test comprises two identical 12 day periods		
	Each 12 day period comprises:		
	- 5 cycles of 24 h each to damp heat cycling test according to IEC 60068-2-30 (Test Db) at (40 ± 3) °C and relative humidity of 95 %		N/A
	- 7 cycles of 24 h each to salt mist test according to IEC 60068-2-11; (Test Ka: Salt mist), at a temperature of (35 ± 2) °C		N/A
9.13.3	Results to be obtained		
	After the test, the enclosure or samples shall be washed in running tap water for 5 min, rinsed in distilled or demineralized water then shaken or subjected to air blast to remove water droplets. The specimen under test shall then be stored under normal service conditions for 2 h		P
	Compliance is checked by visual inspection to determine that:		
	- there is no evidence of iron oxide, cracking or other deterioration more than that allowed by ISO 4628-3 for a degree of rusting Ri1		N/A
	- the mechanical integrity is not impaired		P
	- seals are not damaged		P
	- doors, hinges, locks, and fastenings work without abnormal effort		P
9.14	Thermal power dissipation capability		
	The thermal power dissipation data provided by the manufacturer (see 6.3.1) is determined by following test:		
	- either in accordance with 10.10.4.2.2 of IEC 61439-1:2011	Not exceed the temperature Limi. (see Table 6 of IEC 61439-1:2011)	P
	- or by a calculation method, e.g. according to IEC/TR 60890		N/A

Table 1 Number of samples to be tested and order of test per sample					
Subclause :	<i>Test</i>	Sample 1 Order / verdict	Sample 2 Order / verdict	Sample 3 Order / verdict	Representative sample (see 9.12) Verdict
9.4	Static loads	1 / Pass			
9.5	Lifting	N/A			
9.6	Axial loads of metal inserts	N/A			
9.7	Degree of protection against external mechanical impacts (IK code)	2 / Pass			
9.8	Degree of protection against access to hazardous parts and against ingress of solid objects and/or water (IP code)	3 / Pass			
9.9.1	Thermal stability		1 / Pass		
9.9.2	Resistance to heat		2 / Pass		
9.9.3	Resistance to abnormal heat and fire		3 / Pass		
9.10	Dielectric strength	4 / Pass			
9.11	Continuity of the protective circuit	N/A		N/A	
9.12	Resistance to ultra-violet (UV) radiation				N/A
9.13	Resistance to corrosion			N/A	
9.14	Thermal power dissipation capability			N/A	
9.3	Marking	5 / Pass			

<p>TEST REPORT IEC 60947-7-1 and EN 60947-7-1 Low-voltage switchgear and controlgear Part 7: Ancillary equipment Section One: Terminal blocks for copper conductors</p>	
<p>Report Reference No.....</p> <p>Date of issue</p> <p>Total number of pages</p>	<p>SR-22-0353</p> <p>See cover page.</p> <p>See cover page.</p>
<p>Applicant's name.....</p> <p>Address</p>	<p>See cover page.</p> <p>See cover page.</p>
<p>Test specification:</p> <p>Standard</p> <p>Test procedure</p> <p>Non-standard test method.....</p>	
<p>Test Report Form No.....</p> <p>Test Report Form(s) Originator</p> <p>Master TRF</p>	<p>IEC60947_7_1B</p> <p>DEKRA Certification B.V.</p> <p>Dated 2015-10</p>
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<p>Test item description</p> <p>Trade Mark</p> <p>Manufacturer</p> <p>Model/Type reference</p> <p>Ratings</p>	<p>Terminal Block</p>  <p>Same as client</p> <p>BOXTB-xP15 series</p> <p>250V, 1.5 mm²</p>

Test item particulars	Plastic Empty Enclosure with Terminal Block
Classification of installation and use	Category 2
Supply Connection	Connected to terminal block
Particulars: test item vs. test requirements	
- method of fixing	Floor standing / wall mounting
- number of poles	4, 6, 8, 10, 12, 16, 20
- type of clamping units	Screw type
- ability to receive conductors	Un-prepared flexible conductor
- number of terminals on terminal assembly	2
- rated cross-section (mm ²)	1.5 mm ²
- rated connecting capacity (mm ²)	1.5 mm ²
- rated insulation voltage (Ui)	250V
- rated impulse withstand voltage (Uimp)	4kV
- Conventional free air thermal current (I _{th})	17.5 A
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	11.10.2022
Date (s) of performance of tests	17.10.2022 ~ 28.10.2022
General remarks:	
<p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a point is used as the decimal separator.</p>	
General product information:	
Screw terminal block for unprepared flexible conductor	

IEC/EN 60947-7-1			
Clause	Requirement – Test	Result - Remark	Verdict
5.1	MARKING		P
	Terminal block shall be marked with:		P
	- manufacturer's name or trademark		P
	- type designation		P
5.2	The following information shall be stated by the manufacturer if applicable, e.g. in the manufacturer's data sheet, or his catalogue or on the packing unit:		P
	- manufacturer's claim for compliance with IEC 60947-7-1		P
	- rated cross-section	See page 16.	P
	- rated connecting capacity	See page 16.	P
	- rated insulation voltage (Ui)	See page 16.	P
	- rated impulse withstand voltage (Uimp)	See page 16.	P
	- conventional free air thermal current (Ith)	See page 16.	P
	- service conditions if different from those of Cl.6.		N/A
7.	CONSTRUCTION		P
7.1	Constructional requirements		P
7.1.1	Clamping units		P
7.1.7.1	All parts of clamping units which maintain contact and carry current shall be of metal having adequate mechanical strength		P
	Clamping units connections shall be such that necessary contact pressure is maintained		P
	Clamping units shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal		P
	Clamping units shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operation of equipment and the insulation voltage shall not be reduced below the rated value		P

IEC/EN 60947-7-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Clamping units shall allow the conductor to be connected by means ensuring that a reliable mechanical linkage and electrical contact is properly maintained		P
	Clamping units shall be able to withstand the forces that can be applied through the connected conductors		P
	Contact pressure is not transmitted through insulation materials		P
7.1.2	Mounting		P
	Terminal blocks shall be provided with means that allow them to be securely attached to a rail or a mounting surface (see 8.3.2)	Terminal blocks are located in enclosure inside, the support of the blocks, as one chemical body. Therefore, the mounting is considered secured from the construction.	P
7.1.3	Clearances and creepage distances		P
	For clearances and creepage distances see 8.4.2		P
7.1.4	Terminal identification and marking:		P
	- terminals intended exclusively for the neutral conductor		N/A
	- other terminals		P
	- terminal blocks shall have provision, or at least space, for identification marks or numbers for each terminal or terminal assembly to be related to the circuit of which it is to form a part		P
	- For the identification of the terminal block the colour combination green-yellow is not allowed	Not using the colour	P
7.1.5	Resistance to abnormal heat and fire		P
	Needle flame test for insulation materials of terminal blocks (see 8.5)	No burning	P

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Clause	Requirement – Test	Result - Remark	Verdict
7.1.6	Rated cross-section and rated connecting capacity		P
	Terminal blocks are so designed that conductors of the rated cross-section and/or the rated connecting capacity can be accepted	See 8.3.3.4	P
8	TESTS		P
8.3	Verification of mechanical characteristics		P
8.3.2	Attachment of the terminal block on its support		N/A
	mounting rail		—
	Tightening torque (Nm)		—
	steel pin diameter (mm)		—
	force (N)		—
	During the test, no terminal block shall work free from its rail or support, nor suffer any other damage		N/A
8.3.3	Mechanical properties of clamping units		P
8.3.3.1	Test of mechanical strength of clamping units		P
8.2.4.1	Mechanical strength of clamping units (IEC60947-1)		P
	rated cross-section of a rigid conductor (mm ²)	1.5mm ² . flexible only	—
	diameter of thread (mm)	3.0mm	—
	torque (Nm)	0.6Nm	—
	5 times on 2 clamping units at the centre terminal block out of 5 terminal blocks		P
	Voltage drop before and after mechanical strength test		P
	rated cross-section of a rigid conductor (mm ²)	1.5mm ² . flexible only	—
	test current (A) d.c.	1.75A	—
	voltage drop (mV) before mechanical strength test not exceeding 3,2 mV	1.56mV	P
	If the measured value exceeds 3,2 mV, the voltage drop is determined on each individual clamping unit separately, which shall not exceed 1,6 mV		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	voltage drop (mV) after mechanical strength test not exceeding 150% of the value measured before mechanical strength test :	1.58mV	P
	minimum cross-section of a flexible conductor (mm ²)		—
	test current (A) d.c.		—
	voltage drop (mV) before mechanical strength test not exceeding 3,2mV		N/A
	If the measured value exceeds 3,2 mV, the voltage drop is determined on each individual clamping unit separately, which shall not exceed 1,6 mV		N/A
	voltage drop (mV) after mechanical strength test not exceeding 150% of the value measured before mechanical strength test.....		N/A
8.3.3.2	Testing for damage to and accidental loosening of conductors of a terminal block (flexion test)		P
	conductor of the smallest cross-section (mm ²).....	1.0mm ²	—
	number of conductors of the smallest cross-section..... :		—
	torque (Nm).....	0.6Nm	—
	diameter of bushing hole (mm).....	6.5mm	—
	height between the equipment and the platen (mm)..... :	260	—
	mass at the conductor(s) (kg).....	0.4 kg	—
	135continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		P
	force (N).....	35N	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P

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Clause	Requirement – Test	Result - Remark	Verdict
	conductor of the rated cross-section (mm ²)..... :	1.5 mm ²	—
	number of conductors of the rated cross-section . :	1	—
	torque (Nm)..... :	0.8Nm	—
	diameter of bushing hole (mm)..... :	6.4mm	—
	height between the equipment and the platen (mm)..... :	260mm	—
	mass at the conductor(s) (kg)..... :	0.4kg	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	Pull-out test		P
	force (N)..... :	40 N	—
	1min, the conductor shall neither slip out of the terminal nor break near the clamping unit		P
	conductor of the largest cross-section (mm ²) :	No larger cross-section than rated	—
	number of conductors of the largest cross-section :		—
	torque (Nm)..... :		—
	diameter of bushing hole (mm)..... :		—
	height between the equipment and the platen (mm)..... :		—
	mass at the conductor(s) (kg)..... :		—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
	Pull-out test		N/A
	force (N)..... :		—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	conductor of the largest or smallest cross-section (mm ²).....:	Evaluated only rated cross-section	—
	number of conductors of the largest or smallest cross-section..... :		—
	torque (Nm).....:		—
	diameter of bushing hole (mm).....:		—
	height between the equipment and the platen (mm)..... :		—
	mass at the conductor(s) (kg).....:		—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
	Pull-out test		N/A
	force (N).....:		—
	1min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
8.3.3.4	Verification of rated cross section and rated connecting capacity		P
	One conductor of the two next smaller cross-sections can be unhindered and connected in each clamping unit of one terminal block (up to 35 mm ²)	1.5mm ²	P
8.4.2	Verification of clearances and creepage distances		P
	Conductor type and conductor cross-section	Flexible 1.5 mm ²	—
	Conductor end length (mm)	5	—
	Type of support	The terminal is steady connected to the enclosure	—
8.4.2.2	Clearances		P
	Case A (mm) :	See table 8.4.2	P
	Case B (mm) :		
	Measured (mm) :		
	Rated impulse withstand voltage U _{imp} (kV)	4	P

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Clause	Requirement – Test	Result - Remark	Verdict
8.4.2.3	Creepage distances:		P
	- pollution degree	3	—
	- comparative tracking index (V)	175V	—
	- material group.....	IIIb	—
	- rated insulation voltage U_i (V)	250V	—
	- minimum creepage distances (mm)	See table 8.4.2	—
	- measured creepage distances (mm).....	See table 8.4.2	—
8.4	Verification of electrical characteristics		P
8.4.3	Dielectric tests		P
	Dielectric test, U_{imp} indicated:		P
	- five terminal blocks connected with unfavourable cross-section (mm ²) / type / conductor end length (mm).....	1.5mm ² / crew-type clamping unit with indirect pressure / 5mm	—
	- rated impulse withstand voltage (kV)	4.0kV	—
	- test U_{imp} main circuits (kV).....	Clearance is suitable for case A	P
	Dielectric test, U_{imp} not indicated:		N/A
	- five terminal blocks connected with unfavourable cross-section (mm ²)/ type / conductor end length (mm):		—
	- rated insulation voltage (V).....	250V	—
	- test voltage for 5 sec (V).....	1500V	P
8.4.5	Temperature-rise test		P
	Temperature-rise conditions:		P
	- test current (A)	See table 8.4.5	—
	- cross-section of the conductor (mm ²)	See table 8.4.5	—
	- torque (Nm).....	See table 8.4.5	—
	- temperature-rise does not exceed 45K	See table 8.4.5	P
	Voltage drop before and after temperature-rise test:		P
	- test current (A) d.c.		—
	- voltage drop (mV) before temperature-rise test not exceeding 3,2 mV	See table 8.4.5	P

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Clause	Requirement – Test	Result - Remark	Verdict
	If the measured value exceeds 3,2 mV, the voltage drop is determined on each individual clamping unit separately, which shall not exceed 1,6 mV		N/A
	- voltage drop (mV) after temperature-rise test not exceeding 150% of the value measured before temperature-rise test.....:	See table 8.4.5	P
8.4.6	Short-time withstand current test		P
	- rated cross-section of the conductor (mm ²).....:	See table 8.4.6	—
	- torque (Nm).....:	See table 8.4.6	—
	- test current (A).....:	See table 8.4.6	—
	- duration of the test current (s).....:	1s	—
	At the end of the test, continuity shall exist on the test sample assembly and the terminal blocks shall not show any cracking, breakage or other critical damage		P
	Voltage drop before and after short-time withstand current test		P
	- test current (A) d.c.:	See table 8.4.6	—
	- voltage drop (mV) before short-time withstand current test not exceeding 3,2mV.....:	See table 8.4.6	P
	If the measured value exceeds 3,2 mV, the voltage drop is determined on each individual clamping unit separately, which shall not exceed 1,6 mV		N/A
	- voltage drop (mV) after short-time withstand current test not exceeding 150% of the value measured before short-time withstand current test.....:	See table 8.4.6	P
8.4.7	Ageing test (for screwless-type terminal blocks only)		N/A
	Maximum ambient temperature (°C).....:		—
	Rated cross-section rigid or stranded < 10 mm ² solid, > 10 mm ² stranded (mm ²).....:		—
	Test current (A) according 8.4.5.....:		—

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Clause	Requirement – Test	Result - Remark	Verdict
	Heating cabinet is increased, in each cycle to (°C) :		—
	Test current (A) d.c. for measurement of the voltage drop		—
	Voltage drop after 0cycles:		N/A
	- requirement: $\leq 3,2\text{mV}$ (mV)		N/A
	If the measured value exceeds 3,2 mV, the voltage drop is determined on each individual clamping unit separately, which shall not exceed 1,6 mV		N/A
	Voltage drop after the 24thcycle:		N/A
	- requirement: $4,8\text{mV}$ (mV)		N/A
	Voltage drop after the 48thcycle		N/A
	- requirement: $\leq 4,8\text{mV}$ or 1,5times the value measured after the 24thcycle (mV)		N/A
	Voltage drop after the 72 nd cycle:		N/A
	- requirement: $\leq 4,8$ mV or 1,5 times the value measured after the 24th cycle (mV).....		N/A
	Voltage drop after the 96th cycle:		N/A
	- requirement: $\leq 4,8$ mV or 1,5 times the value measured after the 24th cycle (mV).....		N/A
	Voltage drop after the 120th cycle:		N/A
	- requirement: $\leq 4,8$ mV or 1,5 times the value measured after the 24th cycle (mV)		N/A
	Voltage drop after the 144th cycle:		N/A
	- requirement: $\leq 4,8$ mV or 1,5 times the value measured after the 24th cycle (mV)		N/A
	Voltage drop after the 168th cycle:		N/A
	- requirement: $\leq 4,8$ mV or 1,5 times the value measured after the 24th cycle (mV)		N/A
	Voltage drop after the 192nd cycle:		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	- requirement: $\leq 4,8$ mV or 1,5 times the value measured after the 24th cycle (mV)		N/A
	Pull-out test		N/A
	force (N)		—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
8.5	Verification of thermal characteristics is checked by the needle flame test.	Test temperature : 700°C	P
	Before the test, the terminal blocks are stored for 24 h in an atmosphere having a temperature between 15°C and 35°C and a relative humidity between 45% and 75%	Preconditioning : 24h, 25°C, 60%R.H	P
	The flame is applied for 10 s. for insulation walls <1 mm and / or an area < 100 mm ² , the flame is applied for 5 s.	>100mm ² , 5s	P
	The terminal blocks are considered to have passed the test if the duration of burning is < 30s in case of ignition. Moreover, the tissue paper on the pinewood board shall not ignite if burning or glowing particles fall from the terminal block.	No burning	P
8.6	Verification of EMC characteristics		N/A
	Subclause 8.4 of IEC 60947-1 applies with the following addition:		N/A
8.6.1	Immunity		N/A
	Terminal blocks within the scope of this standard are not sensitive of electromagnetic disturbances and therefore no immunity tests are necessary.		N/A
8.6.2	Emission		N/A

IEC/EN 60947-7-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Terminal blocks within the scope of this standard do not generate electromagnetic disturbances and therefore no emission tests are necessary.		N/A

IEC/EN 60947-7-1			
Clause	Requirement – Test	Result - Remark	Verdict

Table 8.4.2	Verification of clearances and creepage distances									P
Model	Ui (V)	OC	Uimp	PD	Clearance		MG	Creepage distance		-
					Req.	Meas.		Req.	Meas.	
BOXTB-20P15	250	III	4 kV	3	3.0	5.0	IIIb	4.0	5.0	P
BOXTB-10P15	250	III	4 kV	3	3.0	5.0	IIIb	4.0	5.0	P

OC: Overvoltage category, PD: Pollution degree, MsG: Material group, Req.: Required, Meas: Measured

Table 8.4.2	TABLE : Dielectric Strength			P
Test voltage applied between		Test potential applied (V)		Breakdown / flashover (Yes / No)
Pole-Pole		1500		No
Live Part – mounting support		1500		No

Table 8.4.2	Temperature rise test					
Model	Cross-sectional area (mm ²)	Test current (A)	Torque (Nm)	Measured temp.(K)	Limit (K)	Result
BOXTB-20P15	1.5	17.5	0.8	31.5	45	P
BOXTB-10P15	1.5	17.5	0.8	28.9	45	P
Model	Voltage drop (mV) after temperature rise test					
		Current	Required	Measured	Result	
BOXTB-20P15	Before	1.75	3.2	1.56	P	
	After	1.75	2.34	1.58	P	
BOXTB-10P15	Before	1.75	3.2	1.42	P	
	After	1.75	2.13	1.45	P	

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Clause	Requirement – Test	Result - Remark	Verdict

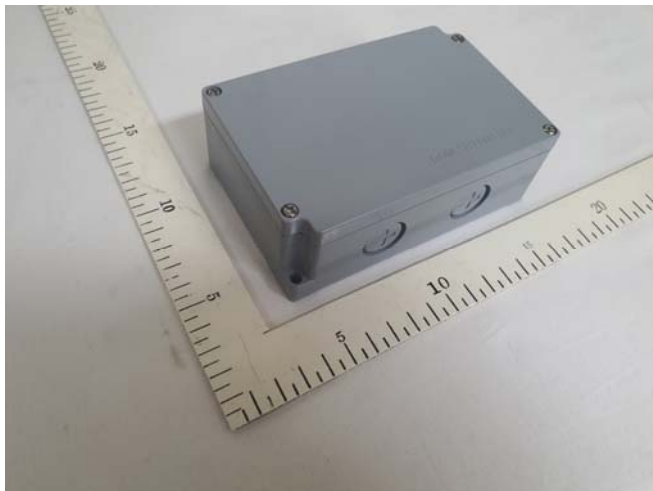
Table 8.4.6	Short-time withstand current test			P	
Model	Rated cross-sectional area (mm)	Test current (A)	Torque (Nm)	-	
BOXTB-20P15	1.5	180	0.8	P	
BOXTB-10P15	1.5	180	0.8	P	
Model	Voltage drop (mV) after Short-time withstand current test				
		Test current	Required	Measured	-
BOXTB-20P15	Before	1.75	3.2	1.52	P
	After	1.75	2.28	1.62	P
BOXTB-20P15	Before	1.75	3.2	1.48	P
	After	1.75	2.22	1.54	P

	TABLE: Critical components information				P
Object / part No.	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of conformity
Body (Plastic)	KOREA KUMHO PETROCHEMICAL CO. LTD	HFA-707	V-0, Min. thickness 2.0mm	UL94	UL / E65424

Product Pictures:



< BOXTB-20P15 >



< BOXTB-10P15 >

Measurement Equipment List:

No.	Equipment	Manufacturer	Model	Serial No.	Calibration Valid Date
1	Electronic Load	Daegil	EL-800NS	2806303	27.06. 2023
2	Hybrid Recorder	Yokogawa	DR230	7700GD785	27.06. 2023
3	Clamp on Tester	Yokogawa	CL255	TKC6318	21.01. 2023
4	Digital Multi meter	Agilent Technologies	34401A	45030992	27.06. 2023
5	Voltage Withstanding Tester	Kikusui	TOS5051	DJ001291	27.06. 2023
6	Digimatic Calipers	Mitutoyo	500-181-30	15395988	28.06. 2023
7	Push-Pull Gauge	M.H.M Co., Ltd.	AEF-30	112834	21.01. 2023
8	Torque Gauge	Tohnichi	FTD200CN2-S	413212T	13.11. 2022
9	Dust test chamber	Rehoboth testing	RH18501C	RH0290817	14.01. 2023
10	Water spray test device	Rehoboth testing	RH18104	RH5060917	21.01. 2023
11	Water supply system	Rehoboth testing	RH18109B	RH0300817	14.01. 2023
12	Steel ball (500g)	Myung Sung Procision	0.5kg-		25.11. 2023
13	Bench Scale	CAS	DB-150	CPA30	28.06. 2023
14	Temperature & Humidity chamber	Sung Woon	SL-TH1	-	27.06. 2023
15	Stop watch	Casio	HS-3	812565	28.06. 2024

END OF TEST REPORT