

TEST REPORT

IEC 60529:1989+A1:1999
EN 60529:1991+A1:2000

Degrees of protection provided by enclosures (IP code)

Report reference No.: 272761-3c

Tested by: Antero Piironen
(printed name and signature).....: Senior Testing Engineer



Approved by: Markus Kajander
(printed name and signature).....: Testing Engineer



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Contents: 9 pages

Testing Laboratory Name: SGS Fimko Ltd

Address: P.O. Box 30, FI-00211 HELSINKI, FINLAND

Testing location/procedure: CBTL ☒ SMT ☐ FI ☐

Address: Särkiniementie 3, FI-00210 HELSINKI, FINLAND

Applicant's Name: Trelleborg Industrial Products Finland Oy

Address.....: Kikkerläntie 72, FI-38300 SASTAMALA, FINLAND

Test specification

Standard: IEC 60529:1989+A1:1999 / EN 60529:1991+A1:2000

Test procedure: NCS scheme

Procedure deviation.....: N.A.

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

Test Report Form No.: IECEN60529eA

TRF originator: SGS FIMKO

Master TRF: 2005-03

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Test item description: Membrane gland

Trademark: MC

Model and / or type reference.....: VET3-5, VET5-7, VET7-10, VET10-14, VET14-20, VET20-26, VET26-35

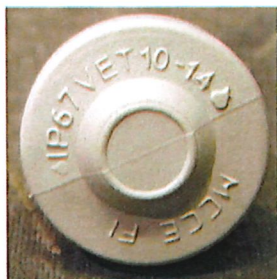
Manufacturer.....: Trelleborg Industrial Products Finland Oy

Technical data: Ø 3-35 mm, IP67

.....:

Copy of marking plate EXAMPLE:

MC CE FI IP67 VET10-14



VET 3-5, VET 5-7, VET 7-10, VET 10-14, VET 14-20, VET 20-26, VET 26-35

See also Photographic documentation in Attachment 2.

Summary of testing

All relevant tests performed on samples.

For SFS 4698 test results, see Test Report 272761-3a

For EN 60670-1, see Test Report 272761-3b.

For general product information and information of manufacturing site, see page 7.

Attachment 1 (1 page) Testing and Measuring Equipment

Attachment 2 (5 pages) Photographic documentation

General product information:

See test report 272761-3a

Manufacturing site : Trelleborg Industrial Products Finland Oy
Address : Kikkerläntie 72
 : 38300 SASTAMALA
 : FINLAND

Particulars: test item vs. test requirements

Degree of protection:

- enclosure is asked to be tested for IP: **IP67**

Dust test IP5X according to clause 13.4: -

- category 1 / 2 (vacuum / no vacuum).....: **category 1**

Test case verdicts

Test case does not apply to the test object.....: **N(.A.)**

Test item does meet the requirement: **P(ass)**

Test item does not meet the requirement.....: **F(ail)**

Test case is not carried out for the test object **N.C.**

Testing

Date of receipt of test item: **2013-11-15**

Date(s) of performance of test: **2013-12-11**

General remarks

This test report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by a NCB in accordance with IEC 60529.

The test results presented in this report relate only to the item(s) tested.

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

"(see Annex #)" refers to an annex appended to the report.

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

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

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Unless otherwise stated: (a) the results shown in this document refer only to the sample(s) tested and (b) such sample(s) are retained for 3 months. This document cannot be reproduced except in full, without prior approval of the company.

IEC 60529 and EN 60529			
Clause	Prescribed - Test	Observed	Verdict

11	GENERAL REQUIREMENTS FOR TESTS		
11.1	Atmospheric conditions for tests		
	- as described in product standard		P
	as described in IEC 60068-1:		
	- temperature range 15 °C to 35 °C	23°C	P
	- relative humidity 25 % to 75 %	50 %	P
	- air pressure 86 kPa to 106 kPa	100 kPa	P
11.2	Enclosures under test shall be:		
	- clean and new condition		P
	- complete with all their parts in place		P
	The enclosure to be tested:		
	- complete, normal size		P
	- smaller having the same full-scale design details		N/A
	- representative parts of the enclosure		P
	Specification for the test samples:		
	- specified in the relevant product standard		P
	- as agreed with the manufacturer		P
	- as the test laboratory has considered		P
	- the number of samples to be tested:		P
	Conditions for mounting, assembling and positioning of the samples		
	- pre-conditioning		P
	- samples energized or not energized	no	P
	- samples in motion or not in motion	no	P
11.3	Application of test requirements and interpretation of test results		
	- according to standard	IEC EN 60529	P
	- according to the product standard	SFS 4698	P
11.4	Test conditions for the first characteristic numeral		
	- all test conditions shall have met		P
11.5	Empty enclosures		
	- according to standard		P
	- as indicated by the enclosure manufacturer		P

IEC 60529 and EN 60529			
Clause	Prescribed - Test	Observed	Verdict
12	TESTS FOR PROTECTION AGAINST ACCESS TO HAZARDOUS PARTS, INDICATED BY <u>THE FIRST CHARACTERISTIC NUMERAL</u>		
12.1	Access probes		
	- the access probe for numeral 6 as specified in table VI		P
12.2	Test conditions		
	- the access probe is pushed with force ($N \pm 10 \%$)	1 N	P
	- contact indication with the signal lamp		P
12.3	Acceptance conditions		
	- adequate clearance as specified in sub-clauses 12.3.1 - 12.3.3 shall be kept		N/A
	- for numeral IP1X , access probe \varnothing 50 mm shall not completely pass through the opening		N/A
	- for numeral IP2X the stop face of the test finger shall not pass through the opening		N/A

13	TESTS FOR PROTECTION AGAINST SOLID FOREIGN OBJECTS, INDICATED BY <u>THE FIRST CHARACTERISTIC NUMERAL</u>		
13.1	Test means		
	- the test mean for numeral 6 as specified in table VII		P
13.2	Test conditions		
	First characteristic numeral 1 : object probe 1:		
	- test sphere \varnothing 50 mm, force $50 N \pm 10 \%$		N/A
	First characteristic numeral 2 , object probe 2:		
	- test sphere \varnothing 12,5 mm, force $30 N \pm 10 \%$		N/A
	First characteristic numeral 3 , object probe 3:		
	- test rod \varnothing 2,5 mm, force $3 N \pm 10\%$		N/A
	First characteristic numeral 4 , object probe 4		
	- test wire \varnothing 1,0 mm, force $1 N \pm 10\%$		N/A
13.3	Acceptance conditions		
	- for numeral IP 1X, -2X, -3X and -4X, the full diameter of probe shall not pass through any opening		N/A
13.4	Dust test for first characteristic numerals 5 and 6:		
	- test chamber as shown in fig. 2		P
	- talcum powder $< 75 \mu m$		P
	Category specified in the product standard		P
	Category informed by the manufacturer		N/A

IEC 60529 and EN 60529			
Clause	Prescribed - Test	Observed	Verdict
	Category 1: vacuum ≤ 2 kPa		P
	Category 2: no vacuum pump		N/A
	A volume of air 80 times the volume of the sample is tried to draw into the enclosure / max. 60 volumes per hour / depression ≤ 2 kPa		P
	Test continued (h)	8 h	P
	The volume of air drawn in the test (dm ³)	dm ³	P
13.5	Special conditions for first characteristic numeral 5:		N/A
13.5.1	Test conditions:		
	category 1		N/A
	category 2 as in the product standard		N/A
13.5.2	Acceptance conditions:		
	- talcum powder shall not have accumulated such that it could interfere with the correct operation of the equipment or impair safety		N/A
	- as specified in the product standard		N/A
13.6	Special conditions for first characteristic numeral 6:		
13.6.1	Test conditions: category 1		N/A
13.6.2	Acceptance conditions:		
	- dust shall not have deposited inside the enclosure	See pages 8-10	N/A

14	TESTS FOR PROTECTION AGAINST WATER, INDICATED BY <u>THE SECOND CHARACTERISTIC NUMERAL</u>		
14.1	Test means:		
	Test mean for numeral 7 as specified in table VIII		P
14.2	Test conditions:		
	Test conditions for numeral as specified in table VIII		N/A
	- surface area of enclosure (m ²)	<1 m ²	P
14.2.1	IPX1 drip box / fig. 3, duration 10 min		N/A
14.2.2	IPX2 drip box / fig. 3, duration 4x2,5 min		N/A
14.2.3	IPX3 a) oscillating tube fig. 4, duration >10 min	min	N/A
	IPX3 b) hand-held device fig. 5, duration >5 min	min	N/A
14.2.4	IPX4 a) oscillating tube fig. 4, duration >10 min	min	N/A
	IPX4 b) hand-held device fig. 5, duration >5 min	min	N/A
14.2.5	IPX5 water jet hose nozzle fig. 6: Ø 6,3 mm, >3 min	min	N/A
14.2.6	IPX6 water jet hose nozzle fig. 6: Ø 12,5 mm, >3 min	min	N/A

IEC 60529 and EN 60529			
Clause	Prescribed - Test	Observed	Verdict
14.2.7	IPX7 immersion tank, duration 30 min;	30 min	P
14.2.8	IPX8 immersion tank by agreement: water level: above top (m); above bottom (m); test duration (h); pressure (kPa)	m; m; h; kPa	N/A
14.3	Acceptance conditions:		
	- as specified in the product standard		P
	- as specified in sub-clause 14.3		P
	- water shall not have entered, or		P
	- water shall not have influence to the correct operation, and		P
	- it shall not have impaired safety, and		P
	- it shall not have deposited on insulation parts, not reached live parts or windings, nor accumulated near the cable end or entered the cable.	See pages 8-10	P
	- drain holes shall be effective		N/A

15	TESTS FOR PROTECTION AGAINST ACCESS TO HAZARDOUS PARTS INDICATED BY <u>THE ADDITIONAL LETTER</u>		
15.1	Access probes as given in the table VI		
15.2	Test conditions:		
	Additional letter A : access probe A: test sphere Ø 50 mm, force 50 N ± 10 %		N/A
	Additional letter B , access probe B, jointed test finger Ø 12 mm / 80 mm, force 10 N ± 10 %		N/A
	Additional letter C , access probe C, test rod Ø 2,5 mm / 100 mm, stop face sphere Ø 35 mm, force 10 N ± 10 %		N/A
	Additional letter D , access probe D, test rod Ø 2,5 mm / 100 mm, stop face sphere Ø 35 mm, force 10 N ± 10 %		N/A
15.3	Acceptance conditions:		
	- adequate clearance shall be kept between the access probe and hazardous parts,		N/A
	- the stop face of the probe shall not fully penetrate through the opening		N/A

IP6X tests

Product	Wall thickness mm		Ageing	Cable size	Test result
VET 3-5 Light grey	4	hole Ø 12 mm	X	Ø 3 mm	P
VET 3-5 Grey	4		X	Ø 3 mm	P
VET 3-5 Black	4		X	Ø 3 mm	P
VET 3-5 Light grey	1		X	Ø 5 mm	P
VET 3-5 Grey	1		X	Ø 5 mm	P
VET 3-5 Black	1		X	Ø 5 mm	P
VET 5-7 Light grey	4	hole Ø 16 mm	X	Ø 5 mm	P
VET 5-7 Grey	4		X	Ø 7 mm	P
VET 5-7 Black	4		X	Ø 5 mm	P
VET 5-7 Light grey	1		X	Ø 7 mm	P
VET 5-7 Grey	1		X	Ø 5 mm	P
VET 5-7 Black	1		X	Ø 7 mm	P
VET 7-10 Light grey	4	hole Ø 19 mm	X	Ø 10 mm	P
VET 7-10 Grey	4		X	Ø 10 mm	P
VET 7-10 Black	4		X	Ø 7 mm	P
VET 7-10 Light grey	1		X	Ø 7 mm	P
VET 7-10 Grey	1		X	Ø 7 mm	P
VET 7-10 Black	1		X	Ø 10 mm	P
VET 10-14 Light grey	4	hole Ø 24 mm	X	Ø 10 mm	P
VET 10-14 Grey	4		X	Ø 10 mm	P
VET 10-14 Black	4		X	Ø 10 mm	P
VET 10-14 Light grey	1		X	Ø 14 mm	P
VET 10-14 Grey	1		X	Ø 14 mm	P
VET 10-14 Black	1		X	Ø 14 mm	P
VET 14-20 Light grey	4	hole Ø 29 mm	X	Ø 14 mm	P
VET 14-20 Grey	4		X	Ø 14 mm	P
VET 14-20 Black	4		X	Ø 20 mm	P
VET 14-20 Light grey	1		X	Ø 20 mm	P
VET 14-20 Grey	1		X	Ø 20 mm	P
VET 14-20 Black	1		X	Ø 14 mm	P
VET 20-26 Light grey	4	hole Ø 38 mm	X	Ø 26 mm	P
VET 20-26 Grey	4		X	Ø 26 mm	P
VET 20-26 Black	4		X	Ø 20 mm	P
VET 20-26 Light grey	1		X	Ø 20 mm	P
VET 20-26 Grey	1		X	Ø 20 mm	P
VET 20-26 Black	1		X	Ø 26 mm	P
VET 26-35 Light grey	1	hole Ø 48 mm	X	Ø 35 mm	P
VET 26-35 Grey	1		X	Ø 26 mm	P
VET 26-35 Black	1		X	Ø 35 mm	P

new material

Product	Wall thickness mm		Ageing	Cable size	Test result
VET10-14	1	hole Ø 23 mm	X	Ø 10 mm	P
VET10-14	1		X	Ø 14 mm	P
VET10-14	1		X	No cable	P

IPX7 tests

Product	Wall thickness mm		Ageing	Cable size	Test result
VET 3-5 Light grey	4	hole Ø 12 mm	X	Ø 3 mm	P
VET 3-5 Grey	4		X	Ø 3 mm	P
VET 3-5 Bblack	4		X	Ø 3 mm	P
VET 3-5 Light grey	1		X	Ø 5 mm	P
VET 3-5 Grey	1		X	Ø 5 mm	P
VET 3-5 Black	1		X	Ø 5 mm	P
VET 5-7 Light grey	4	hole Ø 16 mm	X	Ø 5 mm	P
VET 5-7 Grey	4		X	Ø 7 mm	P
VET 5-7 Black	4		X	Ø 5 mm	P
VET 5-7 Light grey	1		X	Ø 7 mm	P
VET 5-7 Grey	1		X	Ø 5 mm	P
VET 5-7 Black	1		X	Ø 7 mm	P
VET 7-10 Light grey	4	hole Ø 19 mm	X	Ø 10 mm	P
VET 7-10 Grey	4		X	Ø 10 mm	P
VET 7-10 Black	4		X	Ø 7 mm	P
VET 7-10 Light grey	1		X	Ø 7 mm	P
VET 7-10 Grey	1		X	Ø 7 mm	P
VET 7-10 Black	1		X	Ø 10 mm	P
VET 10-14 Light grey	4	hole Ø 24 mm	X	Ø 10 mm	P
VET 10-14 Grey	4		X	Ø 10 mm	P
VET 10-14 Black	4		X	Ø 10 mm	P
VET 10-14 Light grey	1		X	Ø 14 mm	P
VET 10-14 Grey	1		X	Ø 14 mm	P
VET 10-14 Black	1		X	Ø 14 mm	P
VET 14-20 Light grey	4	hole Ø 29 mm	X	Ø 14 mm	P
VET 14-20 Grey	4		X	Ø 14 mm	P
VET 14-20 Black	4		X	Ø 20 mm	P
VET 14-20 Light grey	1		X	Ø 20 mm	P
VET 14-20 Grey	1		X	Ø 20 mm	P
VET 14-20 Black	1		X	Ø 14 mm	P
VET 20-26 Light grey	4	hole Ø 38 mm	X	Ø 26 mm	P
VET 20-26 Grey	4		X	Ø 26 mm	P
VET 20-26 Black	4		X	Ø 20 mm	P
VET 20-26 Light grey	1		X	Ø 20 mm	P
VET 20-26 Grey	1		X	Ø 20 mm	P
VET 20-26 Black	1		X	Ø 26 mm	P
VET 26-35 Light grey	1	hole Ø 48 mm	X	Ø 35 mm	P
VET 26-35 Grey	1		X	Ø 26 mm	P
VET 26-35 Black	1		X	Ø 35 mm	P

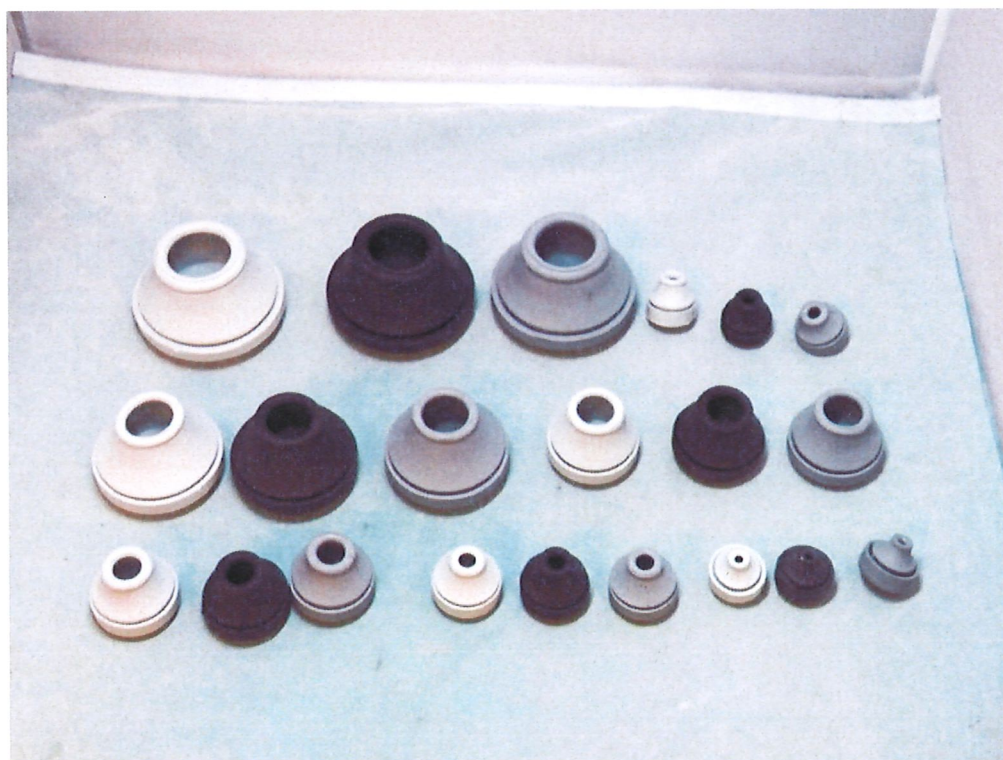
new material

Product	Wall thickness mm		Ageing	Cable size	Test result
VET10-14	1	hole Ø 23mm	X	Ø 10 mm	P
VET10-14	1		X	Ø 14 mm	P
VET10-14	1		-	No cable	P
VET10-14	3		-	Ø 10 mm	P
VET10-14	3		-	Ø 14 mm	P
VET10-14	3		-	No cable	P

Testing and Measuring Equipment for SFS 4698:2006				
Clause	Description	Instrument / Device	Type / Range	Inv. no
9.2	Heating cabinets	Heraeus	0...250 °C	4995
10.2/12.2	Degree of protection, first characteristic numeral	Test probe series	IEC 60529	4701
	Degree of protection first characteristic numeral	Dust chamber		1886
	Degree of protection second characteristic numeral	Tank	IPX7	E215
11.2	Low-temperature	Gram	H4344	4248
	Temperature	Fluke	51 II	5381
	Torque	Screwdriver	0-2.0 Nm	7387



Example of markings



All sizes