TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**28105318_002**	**Seite 1 von 24** *Page 1 of 24*

Gegenstand der Prüfung: *Test item:*	Extinguisher plastic container		
Bezeichnung: *Identification:*	---	**Serien-Nr.:** *Serial No.:*	Prototypes
Wareneingangs-Nr.: *Receipt No.:*	---	**Eingangsdatum:** *Date of receipt:*	12th July 2012
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	As delivered by the customer		
Prüfort: *Testing location:*	**TÜV Rheinland Italia S.r.l.** Via Mattei, 3 - 20010 Pogliano Milanese (MI) - Italy		
Prüfgrundlage: *Test specification:*	DIN 40 050 Part 9:1993-05		
Prüfergebnis: *Test Result*	**Der Prüfgegenstand nicht vollständig entsprichtoben genannter Prüfgrundlage(n).** *The test item not completed pass the test specification(s).*		
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland Italia S.r.l.** Via Mattei, 3 - 20010 Pogliano Milanese (MI) - Italy		

geprüft/ *tested by:*			**kontrolliert/** *reviewed by:*		
Roberta C. Paderno			Paolo Frigerio		
26th Sptember 2012 R. C. Paderno			26th September 2012 Paolo Frigerio		
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges/ *Other Aspects:*

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*
	F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*
	N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*
	N/T	=	*nicht getestet*		*N/T*	=	*not tested*

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
This test report relates to the a. m. test item. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

TEST REPORT
DIN 40 050 Part 9
Road vehicles - Degrees of protection (IP code).
Protection against foreign objects, water and access.
Electrical equipment.

Report Reference No.	28105318_002
Date of issue	26th September 2012
Total number of pages	29
Testing Laboratory	TUV Rheinland Italia S.r.l.
Address	Via E. Mattei,3 20010 Pogliano Milanese (MI) - Italy
Test specification:	
Standard	DIN 40 050 Part 9: 1993-05
Test procedure	---
Non-standard test method	---
Testing	
Date of receipt of test item(s)	12th July 2012
Dates tests performed	Start 13th August 2012 end 25th September 2012
Test Report Form No.	---
Test Report Form(s) Originator	TUV Rheinland Italia S.r.l.
Master TRF	---

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

IECEE 02.

Test item description	**Extinguisher plastic container**
Model/Type reference:	Extinguisher container for 6 kg Extinguisher container for 9kg Extinguisher container for 12kg
Ratings	---

Copy of marking plate



Fig. 1 Family of the devices under test

Photo documentation





Fig. 2 Example of sample

Photo documentation





Fig. 3 Intern of the samples

Photo documentation



Fig. 4 Before dust test



Fig.5 After dust test

Photo documentation





Fig. 6 Sample before and during IPX4 test

Photo documentation



Fig. 7 Sample before the IPX9k test



Fig. 8a Sample during the test

Photo documentation



Fig. 8b Sample during the test



Fig. 8c Sample during the test

Photo documentation



Fig. 8d Sample during the test



Fig. 8e Sample during the test

4	**DEGREES OF PROTECTION AGAINST THE INGRESS OF SOLID FOREIGN OBJECTS (INCLUDING DUST) AND ACCESS TO HAZARDOUS PARTS**			—
	Tables 2 and 3 are brief descriptions of the degrees of protection and the associated requirements.			—
	The following is valid as a general rule: same degree of protection (same characterising numeral) for the protection against foreign objects and protection against access. In this case, both are designed by the first characterising numeral only.			P
	Different degree of protection for two types of protection may be specified by using the extra letters, in this case the first characteristics numeral only describes the protection against foreign objects and extra letter only describes the protection against access.			P
	Extra letters may only be used if: -The degree of protection against access is higher than that indicated by the first characteristic numeral			N/A
	or -Only the degree of protection against access is to be specified (first characteristic numeral replaced by X).			N/A
	The specification of a degree of protection for protection against access and foreign objects includes all lower degrees of protection.			P
5	**DEGREE OF PROTECTION AGAINST THE INGRESS OF WATER**			—
	Tab. 4 is a brief descriptions of the degrees of protection and the associated requirements.			P
	The degrees of protection 1 to 6K for protection against water include all the lower degrees of protection. Due to different physical effects, this does not automatically have to apply to water protection grades 7, 8 and 9K.			P
	However, if it does still apply, the lower type of protection included shall be indicated separately, e.g. IPX4K/IPX7, IPX5/IPX7, IPX6K/IPX8, IPX6K/IPX9K			P
	Tab. 1 **Overview of the elements of the IP code**			—
	First characteristic Numeral/supplementary letter	***Meaning for the protection***		—
	0	Not protected		-
	1	with ∅ ≥ 50 mm		-
	2	with ∅ ≥ 12,5 mm		-
	3	with ∅ ≥ 2.5 mm		-
	4	with ∅ ≥ 1.0 mm		-
	5K	Dust-protected	See annex 1	P

	6K	Dust-tight		-
	Tab. 1 **Overview of the elements of the IP code**			—
	Second characteristic Numeral/supplementary letter	***Meaning for the protection***		—
	0	Not protected		-
	1	Vertical dripping		-
	2	Dripping (inclined 15°)		-
	3	Spraying		-
	4	Splashing	See annex 3	P
	4K	Same with increased pressure		-
	5	Jetting		-
	6	Powerful jetting		-
	6K	Same at increased pressure		-
	7	Temporary immersion		-
	8	Continuous immersion		-
	9K	High-pressure/steam jet cleaning	See annex 4	P
	Additional letter (optional)	***Meaning for the protection***		—
	A			-
	B			-
	C			-
	D			-
	Supplementary letter (optional)	***Meaning for the protection***		—
	M	***Movement of moving parts during water test***		-
	S	***Standstill of moving parts during water test***		-
	K	***Specifically for the electrical equipment in road vehicles***		-

6	**EXAMPLES OF DESIGNATIONS**		—
	The IP code shall be used to designate the degree of protection.		—
6.1	IP code using the supplementary letter K for protection against water		—
6.2	IP code using the extra letter B and the supplementary letter K for protection against water		—
6.3	Different IP codes for different parts of a whole using the supplementary letter K for protection against dust		—
7	**REQUIREMENTS AND TESTS**		—
7.1	Atmospheric conditions		—
	Unless agreed otherwise, the tests shall be performed in the following ambient atmospheric conditions:		—
	Temperature range : (23 ± 5) °C	Measured 28,6 °C	P
	Relative humidity: 25% to 75%	Measured 50,2 % RH	P
	Air pressure: 86 kPa to 106 kPa (860 mbar to 1060 mbar)	Measured ....998 mbar	P
7.2	Test samples		—
	Unless agreed otherwise, the test samples shall be unused and cleaned.		P
	Other specifications regarding the test samples may be agreed.	Test small and big sample	P
7.3	Requirements and tests for degrees of protection against the ingress of solid foreign objects (including dust) and against access to hazardous parts		—
7.3.1	Test device		—
	The test probes for verifying the degrees of protection against access and against the ingress of solid foreign objects are comply with the images shown in Table 6.		P
	Note on Table 6, spheres with diameters of 50mm or 12.5mm		P
	If the guard and handle are found to present an obstacle in a practical test, only the sphere shall be used in the tests.		P
	Figure 1 shows a test device to verify the degrees of protection against solid bodies designated 5K and 6K (dust-protected or dust-tight) with a vertical direction of flow for the air-dust mixture. As an alternative a dust chamber with a horizontal direction of flow may be used by agreement according to DIN V 40 046 Part 48.		P

	Unless agreed otherwise, the test dust used should be a mixture of 50% by weight limestone (with clay and sand), i.e. "raw Portland cement" and 50% fly ash with following particle size distribution (according to DIN V 40 046 Part 48): 33 parts by weight ≥ 32 µm 67 parts by weight > 32 µm but < 250 µm		N/A
	If a dust chamber as shown in Figure 1 is used, about 2kg of test dust per m3 chamber volume shall be poured in and kept in suspension during the test. With dust chambers as shown in Fig. 2 according to DIN V 40 046 Part 48, a density of air/dust mixture of (5 ± 2) g/m3 and a flow speed of 1.5 m/s shall be maintained (unless agreed otherwise).		P
7.3.2	Requirements for tests with test probes		—
	The requirements for the test probes according to Table 6 are shown in Table 7.		P
7.3.3	Requirements for tests with dust		—
7.3.3.1	Requirements		—
	The requirements should be taken from Tab. 2 and for degree of protection 5K there is usually a requirement for an agreed function test to be passed.	No test performed after the test. The sample are passive component.	P
	In special cases, a permissible degree of dust or another test criterion may be agreed.		N/A
7.3.3.2	Performing the dust protection tests		P
	The enclosure to be tested is placed in the test chamber in its usual operating position with all its barriers and shields and with open draining holes and subjected to the following stresses:	Vertical position. See fig.2 and 3.	P
	a) Test chamber according to Fig. 1 - 6 s movement of the air/dust mixture - Pause of 15 minutes There shall be 20 of these cycles, unless agreed otherwise.		P
	b) Test chamber according to Fig. 2 As agreed : stress duration 0.5 h to 24 h and rotational speed from 0 – 3 rpm.		N/A
7.4	Requirements and tests for degrees of protection against the ingress of water		—
7.4.1	Test device		—
	Figures 3 to 8 show the test devices and their spatial arrangement in relation to the test specimens.		N/A
7.4.2	Requirements		—

	The requirements are shown in Tab.4; the permissible volume of penetrated water or any other test criterion (e.g. the requirement to pass a function test) shall be agreed.		P
7.4.3	Tests		—
	The tests are listed in Table 8		—
8	INSTRUCTIONS FOR THE ALLOCATION OF DEGREES OF PROTECTION		—
8.1	Allocation of degrees of protection against foreign objects and access		—
	The determinant factor is the design of the enclosure and the effects of solid bodies which may be expected during the operation of the vehicle in question at the place of assembly or mounting.		P
8.2	Allocation of degrees of protection against water		—
	Examples are given in Table 9.		—

Table 2	**DEGREES OF PROTECTION AGAINST THE INGRESS OF FOREIGN OBJECTS (including dust)**			—
	First characteristic numeral/ suppl. letter	**Test for protection against**		
		Protection against ingress of...	**Requirements**	
	0	*Not protected*	*none*	-
	1	*Solid foreign objects Ø ≥ 50 mm*	*sphere of 50 mm Ø shall not fully penetrate*	-
	2	*Solid foreign objects Ø ≥ 12.5 mm*	*sphere of 12.5 mm Ø shall not fully penetrate*	-
	3	*Solid foreign objects Ø ≥ 2.5 mm*	*rod of 2.5 mm Ø shall not penetrate*	-
	4	*Solid foreign objects Ø ≥ 1.0 mm*	*wire of 1.0 mm Ø shall not penetrate*	-
	5K	*Dust*	*The ingress of dust shall only be in amounts which do not impair function or safety*	P
	6K	*Dust*	*No ingress of dust*	

Table 3	DEGREES OF PROTECTION AGAINST ACCESS TO HAZARDOUS PARTS				——
	First characteristic Numeral	**OR Additional letter**	**Protection against ingress of...**	**Requirements**	N/A
	0	-	*Not protected*	none	-
	1	A	*Back of hand (no protection against intentional access)*	*sphere of 50 mm diameter* shall not fully penetrate and shall have an adequate clearance from hazardous parts	-
	2	B	Finger	*Jointed finger of 12 mm diameter may fully penetrate but shall have adequate clearance from hazardous parts*	-
	3	C	*Tool (e.g. screwdriver)*	Rod of 2.5 mm diameter, 100 mm length may fully penetrate, but shall have adequate clearance from hazardous parts	-
	4	D	Wire	Wire of 1.0 mm diameter, 100 mm length may fully penetrate but shall have adequate clearance from hazardous parts	-
	5	D	Wire		-
	6	D	Wire		-

Table 4	DEGREES OF PROTECTION AGAINST THE INGRESS OF WATER			——
	Second characterising numeral / letter	Test for protection against		
		Protection against ingress of...	Requirements	
	0	Not protected	none	-
	1	Falling drops	Vertically falling drops shall have no harmful effects	-
	2	Falling drops when enclosure tilted up to 15°	Vertically falling drops shall have no harmful effects	-
	3	Spraying water	Water sprayed at any angle of up to 60° from the vertical shall have no harmful effects	-
	4	Splashing water	Water splashed against the enclosure from any direction shall have no harmful effects	P
	4K	Splashing water at high pressure	Water splashed at high pressure against the enclosure from any direction shall have no harmful effects	-
	5	Water jets	Water projected in powerful jets against the enclosure from any direction shall have no harmful effects	-
	6	Power water jets	Water projected in powerful jets against the enclosure from any direction shall have no harmful effects	-
	6K	Power water jets at high pressure	Water projected in powerful jets at high pressure against the enclosure from any direction shall have no harmful effects	-
	7	Water with temporary immersion	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water under specified conditions of pressure and time	-
	8	Water with continuous immersion	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is continuously immersed in water under specified conditions	-
	9K	Water with high-pressure/steam jet cleaning	Water directed at a high pressure against the enclosure from any direction shall have no harmful effects	P

Table 8	TEST DEVICES AND CONDITIONS FOR TESTS FOR DEGREES OF PROTECTION AGAINST WATER					—
	Second charact. Numeral/s uppl. Letter	Test means	Water flow rate	Duration of test	Water temperature	
	0	*No test required*	—	—	—	—
	1	*Drip box Fig.3* *Enclosure in 4 fixed positions inclined by 15°*	1mm/min (drop height)	10 min	Difference from the temperature of the test specimen not more than 5°C. If the water temperature is less than 5°C, measures to prevent condensation forming shall be agreed between the users of the standard	—
	2	*Drip box Fig.3* *Enclosure in 4 fixed positions of 15° tilt*	3mm/min	2,5 min for each position of tilt		—
	3	*Oscillating tube Fig. 4* *Spray ± 60° from vertical, distance max. 200 mm* *Spray ± 60° from vertical* *Or* *Spray nozzle, Fig.5* *spraying while manually swivelling the spray nozzle by ±60° from the vertical, distance max. 500 mm*	0,1 l/min ± 5% *per hole (mean value) pressure 80kPa* 10 l/min ± 5% Pressure 50kPa to 150kPa	10 min 5 min		—
	4	*Oscillating tube Fig. 4 as for Fig.3 but:* *Holes ± 90°,* *Spraying ± 180°* Or Spray nozzle, Fig.5 , but moving shield removed. *Spraying ± 180°*	*As for numeral 3*			P
	4K	*Oscillating tube Fig. 4 as for Fig.3 but:* *Holes of Ø0.8mm at ±90°* *Spraying ± 90°*	0.6 l/min ± 5% (about 400kPa)	10 min		—
	5	*Water jet nozzle Fig. 6* *Nozzle 6,3 mm diameter, distance 2,5 m to 3 m*	12.5 l/min ± 5%, about 30kPa	3 min		—
	6	*Water jet nozzle Fig. 6* *Nozzle 12,5 mm diameter, distance 2,5 m to 3 m*	100 l/min ± 5%, about 100kPa	3 min		—
	6K	*Water jet nozzle Fig. 6* *Nozzle 6,3 mm diameter, distance 2,5 m to 3 m*	75 l/min ± 5%, about 1000kPa	3 min		—
	7	*Immersion bowl* *Immersion depth:* *1 m (deepest point of enclosure, if enclosure height greater than 0.85m)*	-	30 min		—
	8	*Immersion bowl* *Water-level: as agreed between the users of the standard*	-	*By agreement*	-	—
	9K	*Fan nozzle, Fig.7* *Enclosure on turntable, Fig.8* *Rotational speed 5/min* *Spraying at distance of 0°, 30°, 60°, 90° (100 to 150 mm)*	14 l/min to 16l/min *(about 8000 to 10000kPa)*	*30 s per position*	80°C ± 5°C (different temperatures may be agreed)	P

QUOTED STANDARDS		—
DIN V 40 046 Part48	Electrical engineering; basic environmental test procedures; test group L; dust and sand; Test Lc: effect of sand with horizontal direction of flow	—
DIN 40 050	IP degrees of protection; protection of electrical equipment against access, solid bodies and water	—
DIN 40 052	IP degrees of protection; testing protection against solid bodies, dust chamber	—
DIN VDE 0470 Part2	(still in draft) IP degrees of protection; protection of electrical equipment against access, solid bodies and water	—
IEC 529	Degree of protection by enclosures (IP Code)	—
Earlier editions		—
DIN 40 050 Part 9	02.75	—
Amendments		—
	The following amendments were made to the edition of February 1975: - Fully revised (see Explanatory Notes).	—
Explanatory notes		—
	The revised standard DIN 40 050 Part 9 is based on the specifications in the new edition of IEC 529, 2nd edition of 1989, supplemented and adapted to meet the special requirements for electrical equipment for road vehicles.	—
	Standard DIN 40 050 Part 9, edition 2.75 required revision because:	—
	- the previous basic standard, DIN 40 050 will be width drawn when the basic International standard IEC 529, 2nd edition is adopted as a German standard.	—
	- IEC 529, 2nd edition 1989 also contains the requirements and tests (which were previously in DIN 40 051, DIN 40 052, DIN 40 053 Parts 1 to 4, which also have been/will be withdrawn).	—
	- the relationship between degrees of protection against foreign objects and access was modified in DIN IEC 529, edition 1989.	—
	- other, sometimes increased, stresses on the electrical equipment in road vehicles had to be taken into account	—
	-the extra letter A for degrees of protection against water in DIN 40 050 Part 9, 2.75 had been given another meaning in IEC 529, edition of 1989 and had to be replaced.	—
	For purposes of greater clarity and simplified handling, the revised standard DIN 40 050 Part 9 contains all the main specifications, i.e. in addition to the specifications for electrical equipment for road vehicles, it also contains the content of specifications adopted from IEC 529, 2nd edition 1989 and other basic standards. DIN 40 050 Part 9 now also includes requirements and tests.	—
	The special requirements for the electrical equipment for road vehicles with regard to protection against dust and water are now designated by the supplementary letter K directly behind the first or second characterising numeral.	—

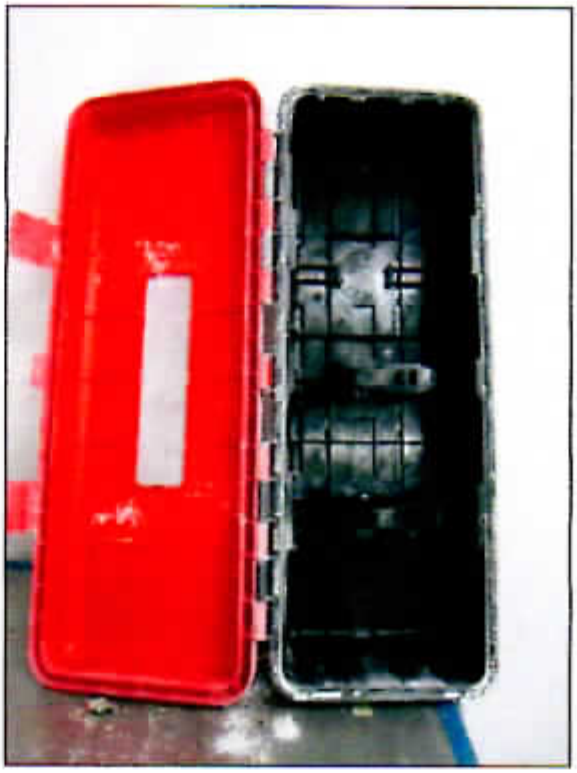
Clause		Annex 1
§ 5	**Photo documentation: dust test**	





Small sample after the test (6 kg)

Clause		Annex 1
§ 5	**Photo documentation: dust test**	





Big sample after the test (12 kg)

Clause		Annex 2
§ 5	**Photo documentation: IPX4**	





Sample after the test

Clause		Annex 3
§ 5	**Photo documentation: IPX9k**	





Sample after the test

List of used instruments:

Description	Manufacturer	Model	TÜV internal Cod.
Dust chamber	Perani	IPP1000	87020097
Water system	Toshiba Corporation	M01	87020072
IPX5 device	ATS Galbusera	03.39-C	87010090
High pressure device	Lavor	LKX	87020148
Chronometer	Oregon Scientific	C510	87020144

----------END OF THE TEST REPORT----------