UDC 629.11:621.3:62-75:62-78 DEUTSCHE NORM May 1993

	Road vehicles Degrees of Protection (IP Code) Protection against foreign objects, water and access Electrical Equipment	DIN 40 050 Part 9

Supersedes edition of 02.75

For connection with IEC 529, 2nd edition 1989, see Explanatory Notes

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1 Scope

This standard applies to degrees of protection (IP code) for electrical equipment in road vehicles.

Translator note: for purposes of conformity with IEC 529, throughout the translation I have translated both "Schutzart" and "Schutzgrad" as "degree of protection". This is the standard translation for both these words in this context and they appear to be used interchangeably in the original German version of this standard. Also for purposes of consistency with IEC 529, I have translated "Berühren" as "access" rather than contact.

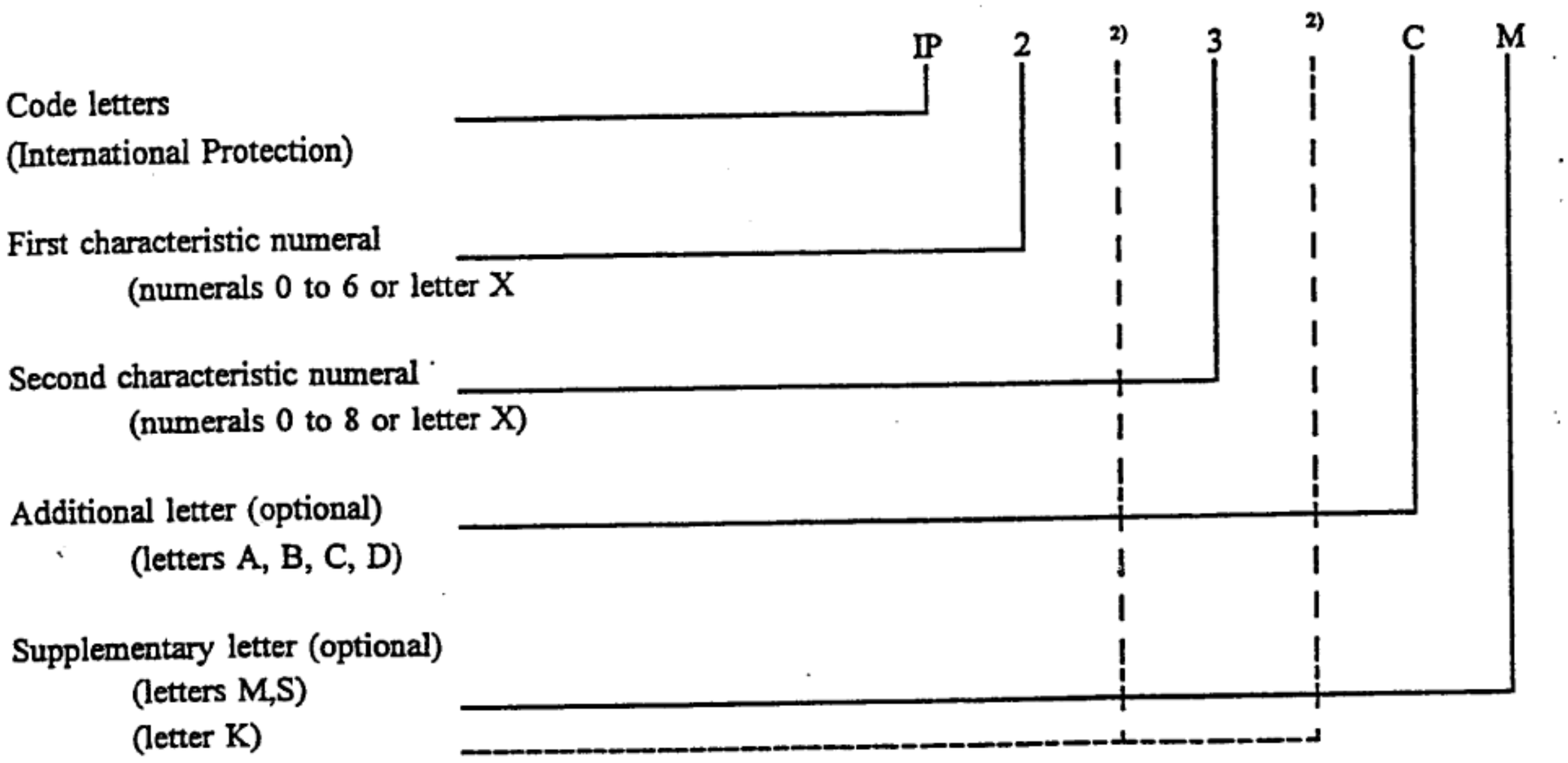
2 Purpose

This standard specifies the following:

- Designations and definitions for IP degrees of protection provided by enclosures for the electrical equipment in road vehicles for:
  - protecting the electrical equipment inside the enclosure against the effects of the ingress of solid foreign objects, including dust (protection against foreign objects)
  - protecting the electrical equipment inside the enclosure against the effects of the ingress of water (protection against water)
  - protecting people against access to hazardous parts[1)] inside the enclosure (protection against access)
- Requirements for each degree of protection
- The tests which are to be performed to confirm that the enclosure meets the requirements for the degree of protection in question.

3 Construction and meaning of the IP code

3.1 Construction of the code



1) For the purposes of this standard, hazardous parts are moving, mechanical parts, except for plain shafts

2) When combined with the first characteristic numerals 5 and 6 and the second characteristic numerals 4, 6 and 9, the supplementary letter K is placed directly behind the relevant characteristic numeral

If a characteristic numeral is not specified, it shall be replaced by the letter X ("XX" if neither characterising numeral is specified).

Additional letters and/or supplementary letters may be omitted without replacement.

Letters in a direct sequence shall be arranged in alphabetical order (except for K; see [2]).

If the degree of protection for part of an enclosure or of the electrical equipment differs from the degree of protection for the rest of the piece, the two degrees of protection shall be specified separately.

Example of designation, see clause 6.

3.2 Meaning of the IP code

Table 1 is an overview of the elements of the IP code.

COMMENT: the supplementary letter K is used to designate the special specifications for road vehicles regarding protection against dust (first characteristic numerals 5 and 6) and protection against water (second characteristic numerals 4, 6 and 9).

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 protection against foreign objects and protection against access. In this case, both are designated by the first characterising numeral only.

Different degrees of protection for the two types of protection may be specified by using the extra letters, in this case the first characteristic numeral only describes the protection against foreign objects and the extra letter only describes the protection against access.

Extra letters may only be used if:

- the degree of protection against access is higher than that indicated by the first characteristic numeral

  or

- only the degree of protection against access is to be specified (first characteristic numeral replaced by X).

The specification of a degree of protection for protection against access and foreign objects includes all lower degrees of protection.

5 Degrees of protection against the ingress of water

Table 4 is a brief description of the degrees of protection and the associated requirements.

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.

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.

Table 1: Overview of the elements of the IP code

Element	Numeral Letter	Meaning for the protection of electrical equipment	Meaning for the protection of persons
First characteristic numeral/supplementary letter		Against the ingress of solid foreign objects (including dust):	Against access to hazardous parts (unless described by extra letters) with
	0	not protected:	not protected
	1	with ∅ ≥ 50 mm	with back of hand
	2	with ∅ ≥ 12.5 mm	with finger
	3	with ∅ ≥ 2.5 mm	with tool
	4	with ∅ ≥ 1.0 mm	with wire
	5K	dust-protected	with wire
	6K	dust-tight	with wire

(continued)

Table 1: (continued) **Overview of the elements of the IP code**

Element	Numeral Letter	Meaning for the protection of electrical equipment	Meaning for the protection of persons
Second numeral / supplementary letter		Against the ingress of water:	
	0	not protected:	
	1	vertical dripping	
	2	dripping (inclined 15 °)	
	3	spraying	
	4	splashing	
	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	
Additional letter (optional)		Meaning for the protection of electrical equipment	Against access to hazardous parts (unless described by first characteristic numeral):
	A[3]		with back of hand
	B		with finger
	C		with tool
	D		with wire
Supplementary letter (optional)	M	Movement of moving parts[5] during water test	
	S	Standstill of moving parts[5] during water test	
	K[4]	Specifically for the electrical equipment in road vehicles	

3) New meaning for letter A in IEC 529, 2nd edition of 1989

4) In DIN 40 050 Part 9, edition of 2.75 designated with A with regard to water protection

5) E.g. the rotor in an electrical machine

Table 2: Degrees of protection against the ingress of foreign objects (including dust)

First characteristic numeral / supplementary letter	Brief description	
	Protection against ingress of ...	Requirements
0	not protected	none
1	solid foreign objects $\varnothing \geq 50$ mm	Sphere of 50 mm $\varnothing$ shall not fully penetrate
2	solid foreign objects $\varnothing \geq 12.5$ mm	Sphere of 12.5 mm $\varnothing$ shall not fully penetrate
3	solid foreign objects $\varnothing \geq 2.5$ mm	Rod of 2.5 mm $\varnothing$ shall not penetrate
4	solid foreign objects $\varnothing \geq 1.0$ mm	Wire of 1.0 mm $\varnothing$ shall not penetrate
5K	Dust	The ingress of dust shall only be in amounts which do not impair function or safety
6K	Dust	No ingress of dust

Table 3: Degrees of protection against access to hazardous parts

First characteristic numeral	Additional letter	Brief description	
or		Protection against ingress of ...	Requirements
0	-	not protected	none
1	A	Back of hand (no protection against intentional access)	Sphere of 50 mm Ø shall not fully penetrate and shall have an adequate clearance from hazardous parts
2	B	Finger	Jointed finger of 12 mm Ø may fully penetrate but shall have adequate clearance from hazardous parts
3	C	Tool (e.g. screwdriver)	Rod of 2.5 mm Ø, 100 mm length may fully penetrate, but shall have adequate clearance from hazardous parts
4	D	Wire	Wire of 1.0 mm Ø, 100 m 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	Protection against the 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
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 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[6)]	Water with high-pressure/steam jet cleaning	Water directed at a high pressure against the enclosure from any direction shall have no harmful effects

[6)] A water protection grade 9 without a supplementary letter has not yet been specified

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

If an enclosure is designated with the IP code IP34K this means:

(3) - Protection of the electrical equipment inside the enclosure against the ingress of solid foreign objects with a diameter of more than 2.5 mm (protection against foreign objects)

and

- Protection of persons handling rods with diameters of 2.5 mm and greater against access to hazardous parts inside the enclosure (protection against access)

(4K) - Protection of the electrical equipment inside an enclosure against the harmful effects of water splashed at high pressure against the enclosure (protection against water).

6.2 IP code using the extra letter B and the supplementary letter K for protection against water

If an enclosure is designated with the IP code IP16KB this means:

(1) - Protection of the electrical equipment inside the enclosure against the ingress of solid foreign objects with a diameter of more than 50 mm (protection against foreign objects)

(6K) - Protection of the electrical equipment inside an enclosure against the harmful effects of water projected in powerful jets at high pressure against the enclosure (protection against water).

(B) Protection of persons against access with the finger to hazardous parts inside the enclosure (protection against access)

6.3 Different IP codes for different parts of a whole using the supplementary letter K for protection against dust

The designation

IP2X for the whole enclosure

IP5KX for a shield for a part inside the whole enclosure

means:

(2) - Protection of the electrical equipment inside the whole enclosure against the ingress of solid foreign objects with a diameter of more than 12.5 mm (protection against foreign objects)

and

- Protection of persons against access with the finger to hazardous parts inside the enclosure (protection against access)

(X) - No information on the degree of protection against water for the whole enclosure and in addition

(5K) - Protection of part against harmful effects from the ingress of dust (protection against foreign objects)

COMMENT: if none of the other parts will be harmed by the ingress of the dust, in addition to the degree of protection against foreign objects characterised by numeral 2, there is also insensitivity to dust inside the whole enclosure

and

- Protection of persons handling wires with diameters of 1 mm and greater against access to hazardous parts within the shield for this part (protection against access)

COMMENT: This higher degree of protection against access for the shield for the part inside the enclosure has no meaning with regard to the higher-ranking whole enclosure for which the lower degree of protection characterised by numeral 2 is applicable.

(X) - No information on the degree of protection against water for the whole enclosure.

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

Relative humidity: 25 % to 75 %

Air pressure: 86 kPa to106 kPa (860 mbar to 1060 mbar).

7.2 Test samples

Unless agreed otherwise, the test samples shall be unused and cleaned.

Other specifications regarding the test samples may be agreed.

7.3 Requirements and tests for the 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 shown in Table 6.

Note on Table 6, spheres with diameters of 50 mm or 12.5 mm.

If the guard and handle are found to present an obstacle in a practical test, only the sphere shall be used in the tests.

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 (example: Figure 2) may be used by agreement according to DIN V 40 046 Part 48.

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 the 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.

If a dust chamber as shown in Figure 1 is used, about 2 kg of test dust per m^3 chamber volume shall be poured in and kept in suspension during the test. With dust chambers as shown in Figure 2 according to DIN V 40 046 Part 48, a density of the air/dust mixture of (5 ± 2) g/m^3 and a flow speed of 1.5 m/s shall be maintained (unless agreed otherwise).

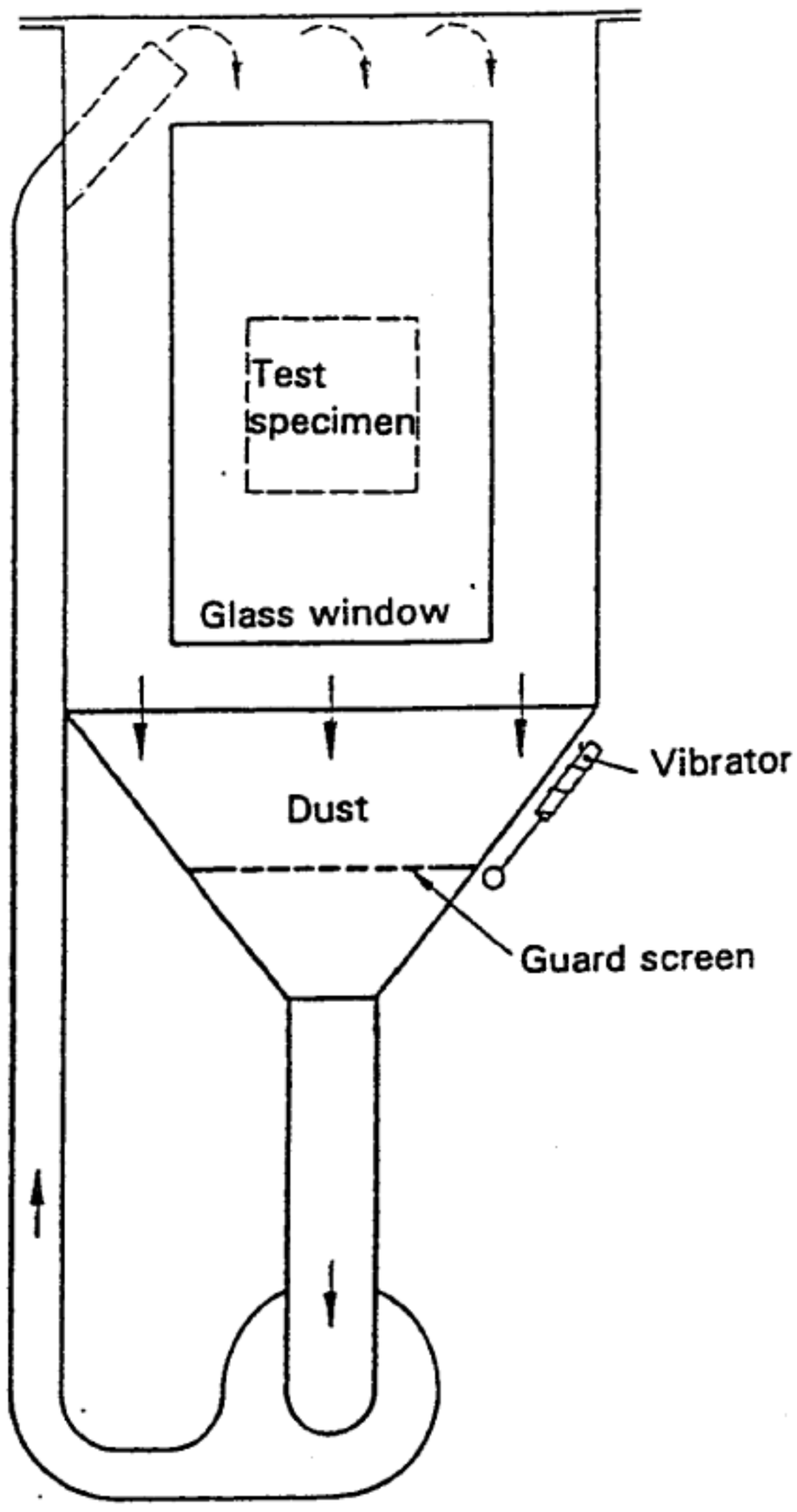


Figure 1: Test device to verify protection against dust (example showing a dust chamber with vertical direction of flow of the dust/air mixture; the picture shows a direction of flow from top to bottom); degrees of protection against solid bodies designated 5K and 6K

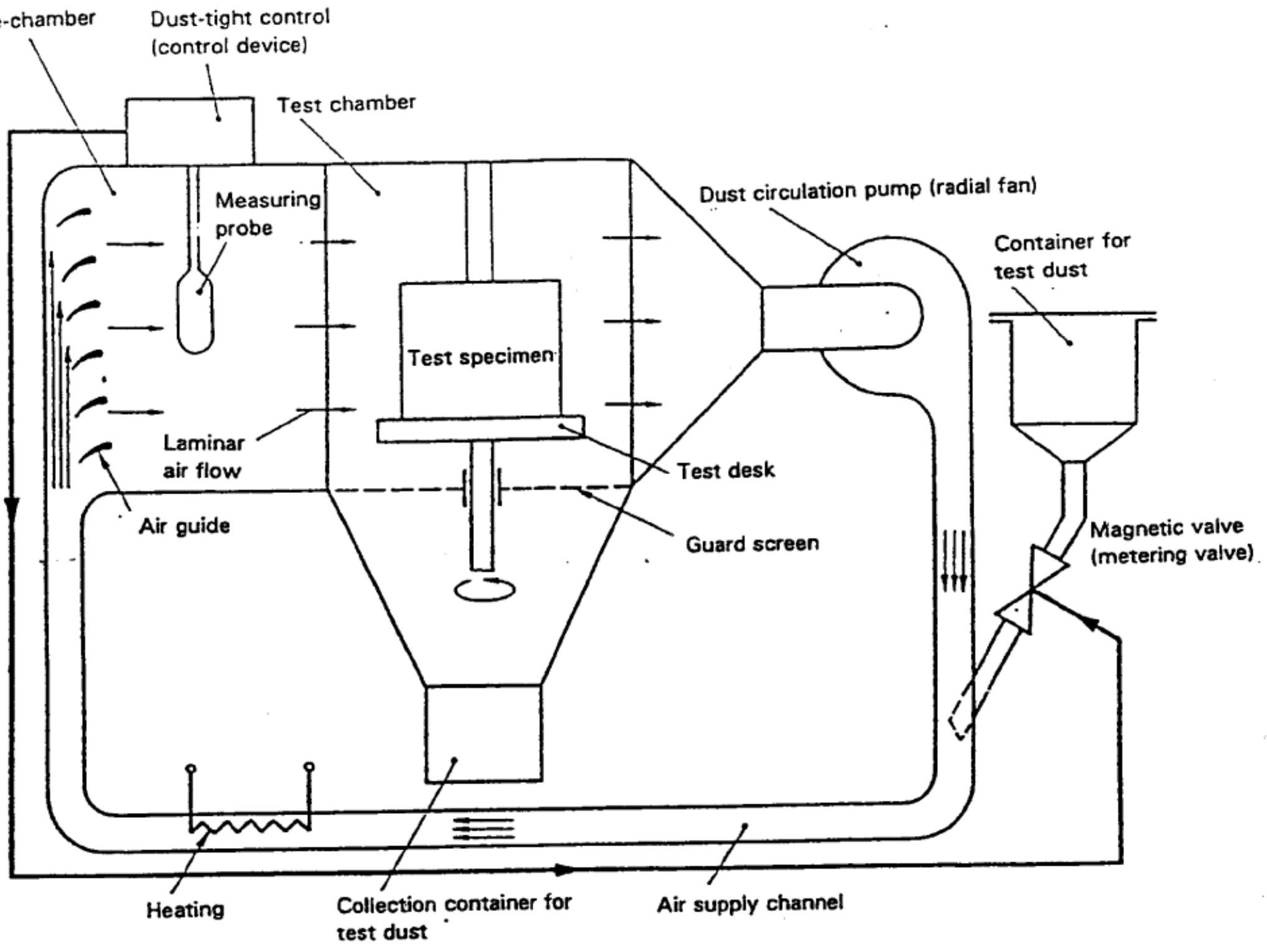
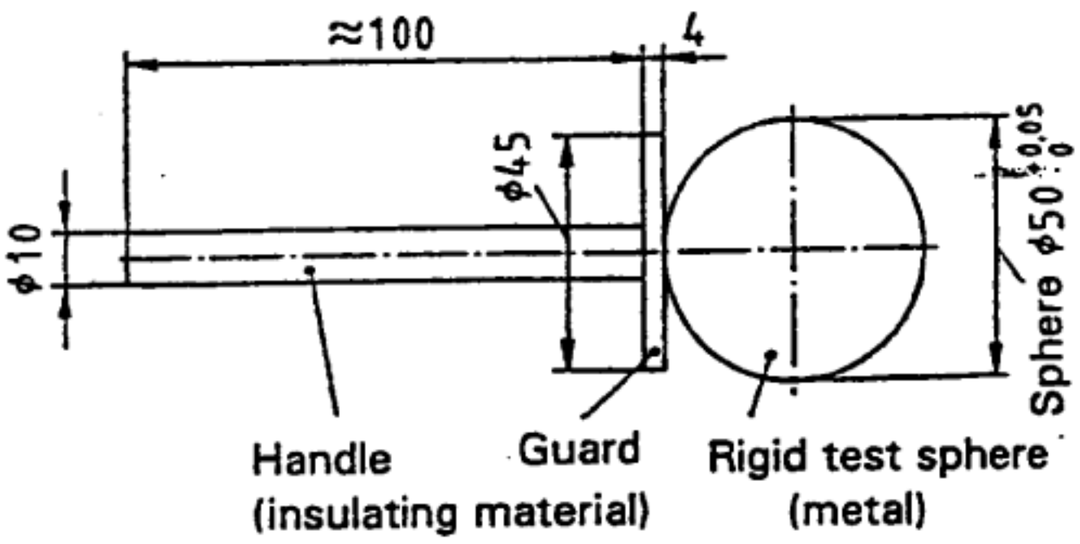
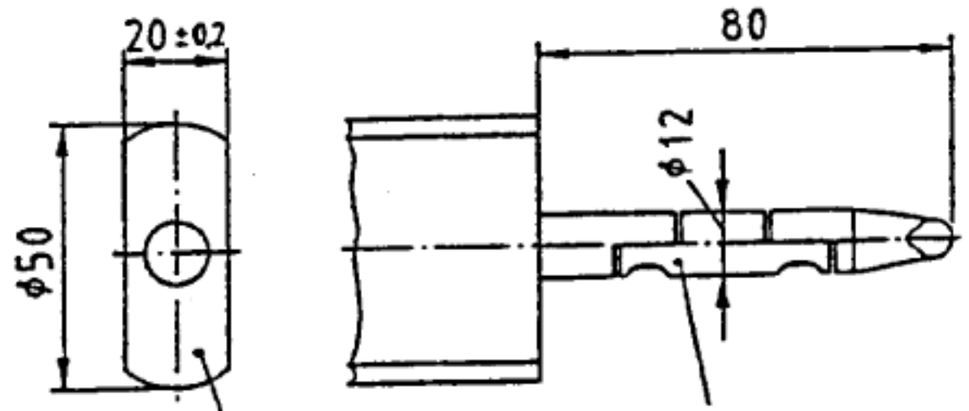
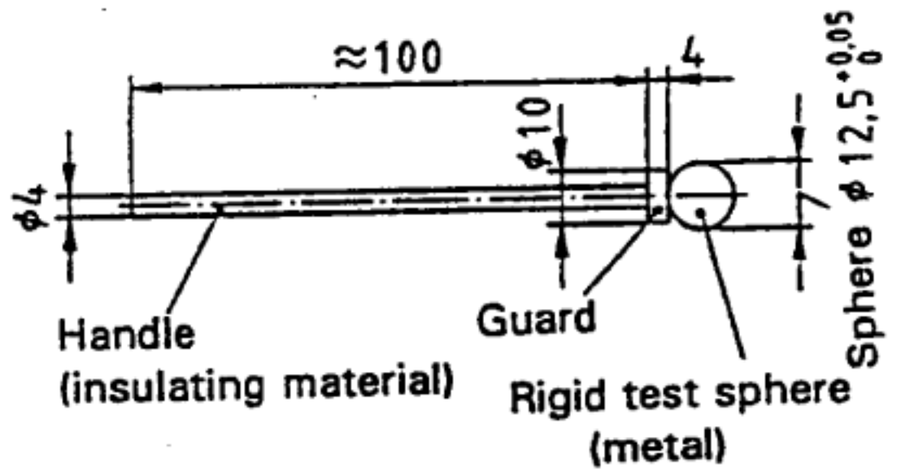


Figure 2: Test device to verify protection against dust (example showing a dust chamber with horizontal direction of flow of the dust/air mixture); degrees of protection against solid bodies designated 5K and 6K

7.3.2 Requirements for tests with test probes

The requirements for the test with the test probes according to Table 6 are shown in Table 7.

Table 6: Test probes for testing with test probes

Degree of protection against solid bodies First characterising numeral	Degree of protection against access First characterising numeral or extra letter	Test probe Dimensions in mm
	or	
1	1 or A	Sphere Ø 50 
-	2 or B	Jointed test finger Ø 12, length 80[7] 
2	-	Sphere Ø 12.5 
7) See E DIN VDE 0470 Part 2		

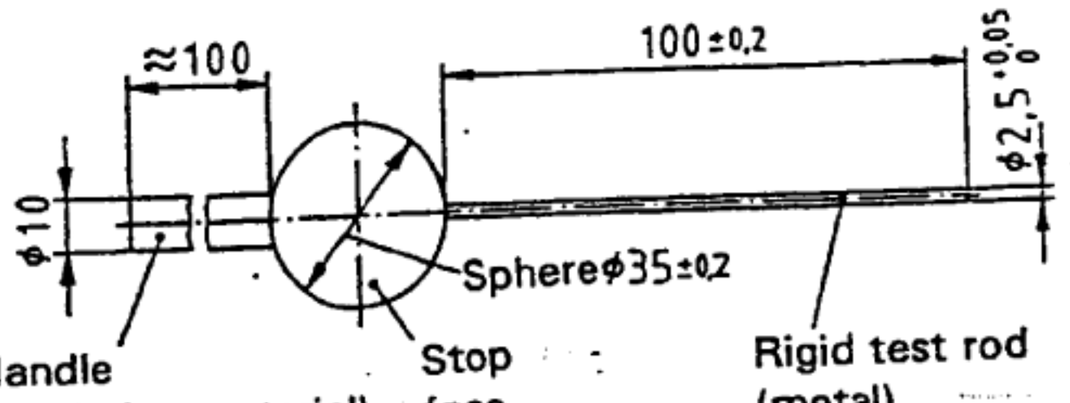
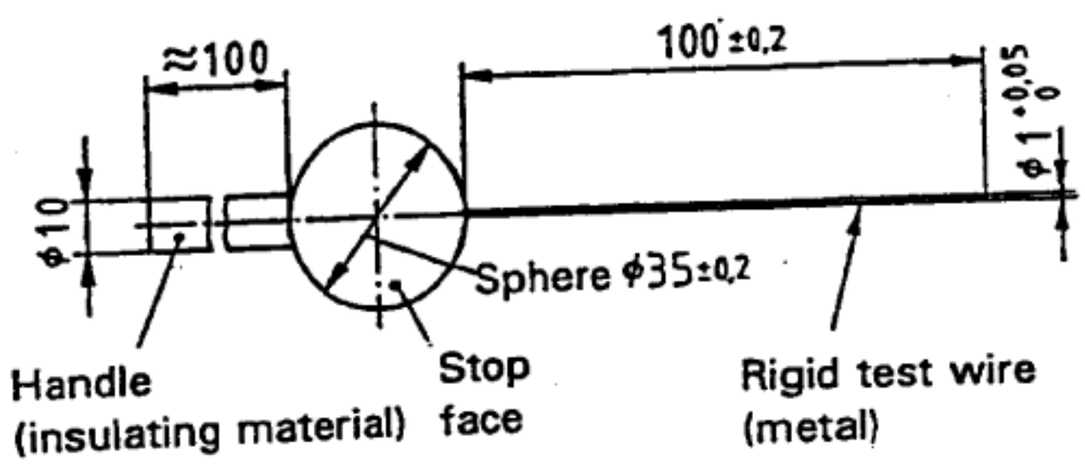
Degree of protection against solid bodies First characterising numeral	Degree of protection against access First characterising numeral or extra letter	Test probe Dimensions in mm
3	3 or C	Test rod Ø 2.5, length 100 
-	4/5/6 or D	Test wire Ø 1.0, length 100 

Table 7: Test conditions and requirements for testing the degrees of protection against solid bodies and access with test probes

Degree of protection against solid bodies First characteristic numeral	Degree of protection against access First characteristic numeral or extra letter	Test force N±10%	Requirements
0	0	-	none
-	1 or A	50	The sphere (Ø 50 mm) shall not fully penetrate and shall have an adequate clearance from hazardous parts
1	-		The sphere (Ø 50 mm) shall not fully penetrate.
-	2 or B	10	The jointed test finger may penetrate to its full length of 80 mm but shall have an adequate clearance from hazardous parts, even when its joints are bent at any angle (up to 90 ° in relation to its axis) and it is placed in every possible position
2	-	30	The sphere (Ø 12.5 mm) shall not fully penetrate.
-	C	3	The rigid test rod ((Ø 2.5 mm, length 100 mm) shall not penetrate to its full length, but shall have an adequate clearance from hazardous parts in every possible angular position.
3			The rigid test rod (Ø 2.5 mm) shall not penetrate.
-	D	1	The rigid test rod (Ø 1.0 mm, length 100 mm) may penetrate to its full length of 100 mm but shall have an adequate clearance from hazardous parts in every possible angular position
4	4/5/6		The rigid test wire (Ø 1.0 mm) shall not penetrate.

NOTE on Table 7.: Here, adequate distance from hazardous parts is defined as follows: the access probe shall not touch any hazardous parts. During the test, hazardous mechanical parts shall be moved slowly.

7.3.3 Requirements for tests with dust

7.3.3.1 Requirements

The requirements should be taken from Table 2 and for degree of protection 5K there is usually a requirement for an agreed function test to be passed. In special cases, a permissible degree of dust or another test criterion may be agreed.

7.3.3.2 Performing the dust protection tests

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:

a) Test chamber according to Figure 1

- 6 s movement of the air/dust mixture
- pause of 15 minutes

There shall be 20 of these cycles, unless agreed otherwise.

b) Test chamber according to Figure 2

As agreed: stress duration 0.5 h to 24 h and rotational speed from 0 - 3 rpm.

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.

7.4.2 Requirements

The requirements are shown in Table 4; the permissible volume of penetrated water or any other test criterion (e.g. the requirement to pass a function test) shall be agreed.

7.4.3 Tests

The tests are listed in Table 8.

8. Instructions for the allocation of degrees of protection

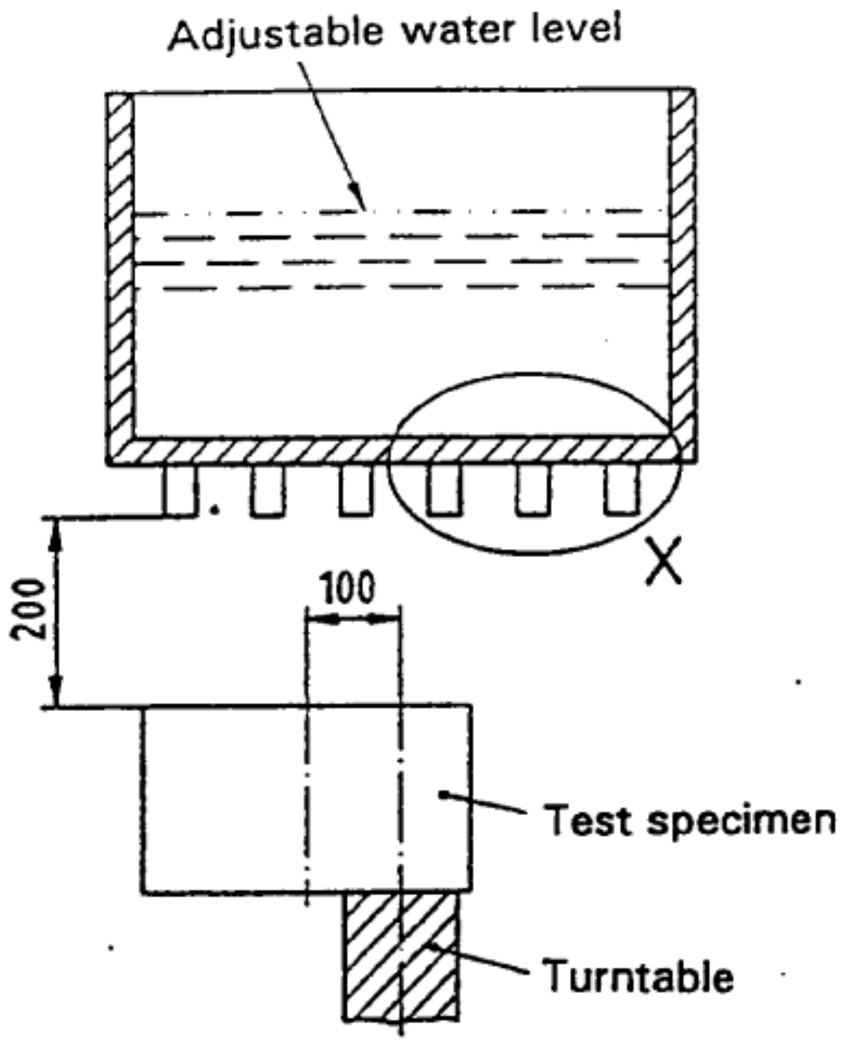
8.1 Allocation of degrees of protection against foreign objects and access

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.

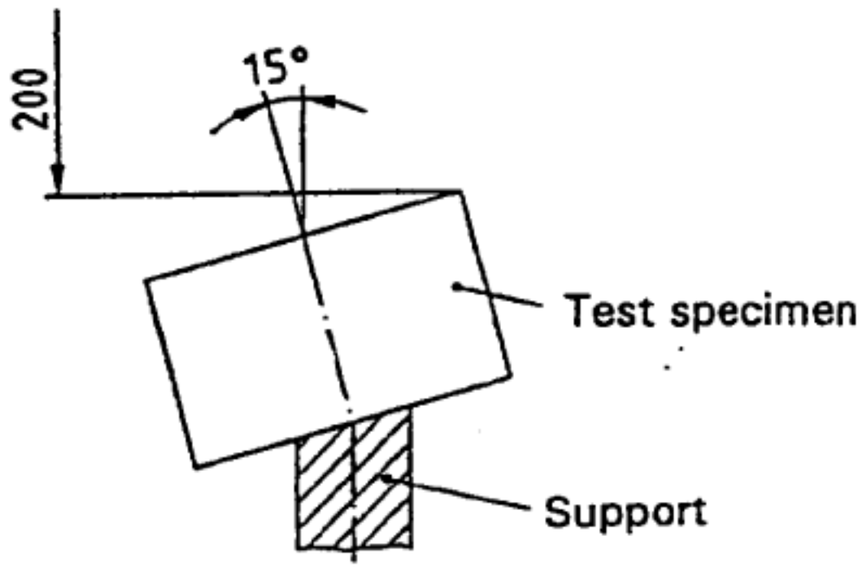
8.2 Allocation of degrees of protection against water

Examples are given in Table 9.

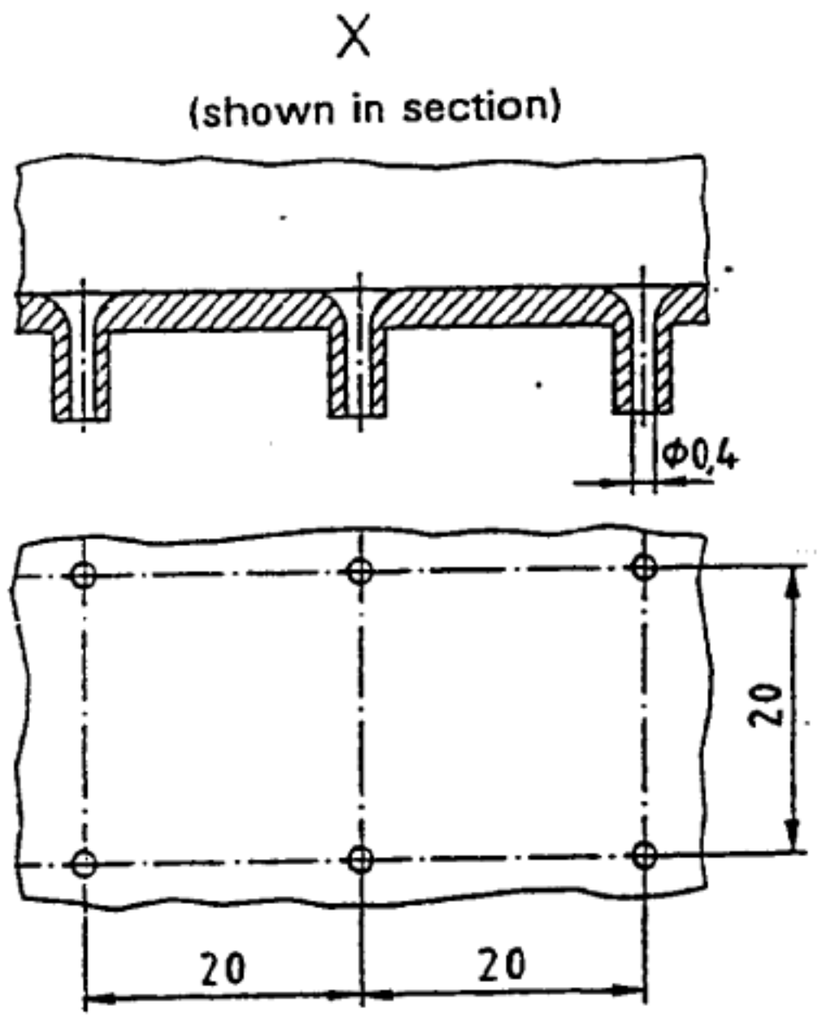
Dimensions in mm



a) Degree of protection against water 1



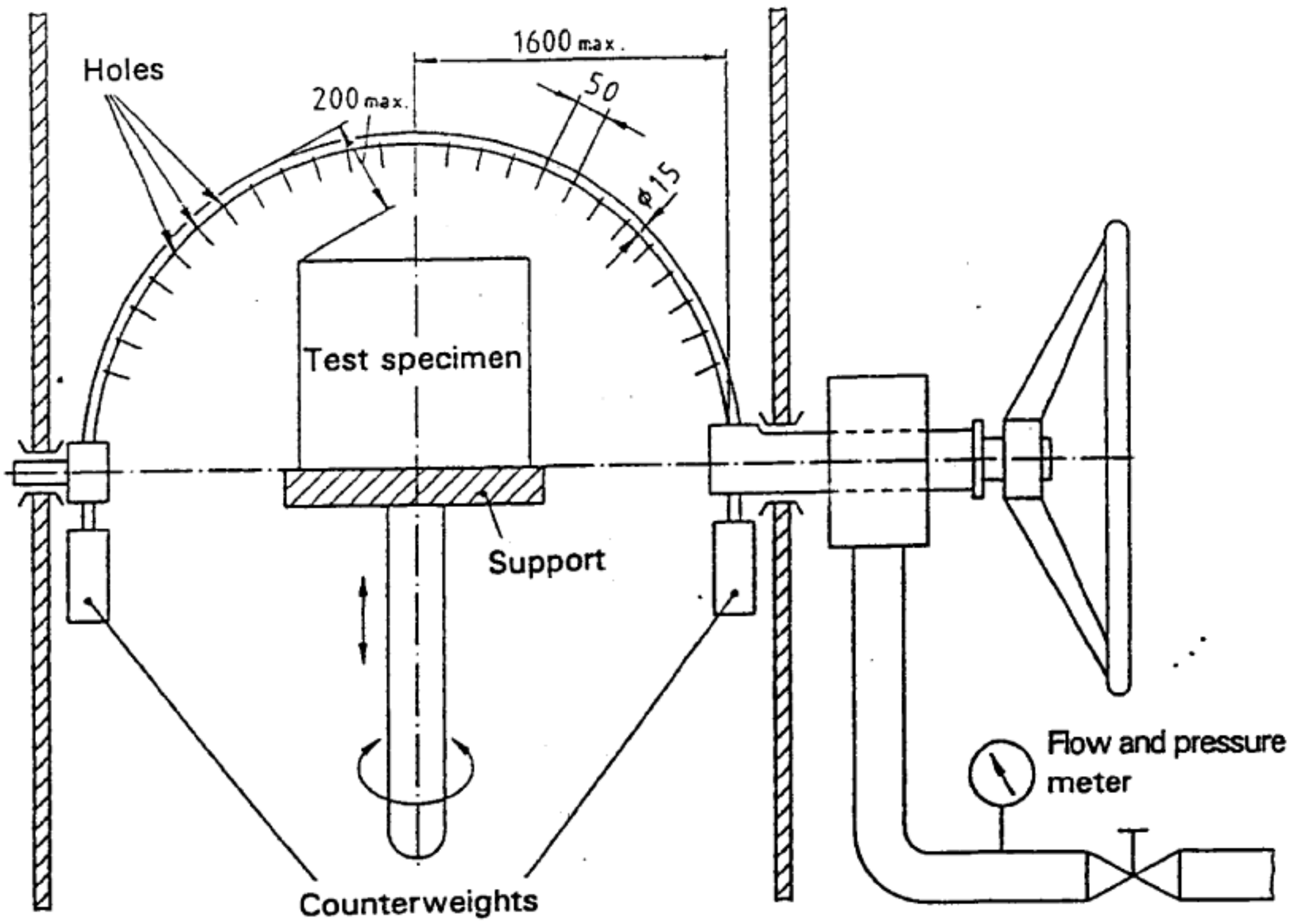
b) Degree of protection against water 2



Perforated grid

Figure 3. Test device to verify protection against vertically falling water drops (drip box). Degrees of protection against water designated 1 and 2

Dimensions in mm

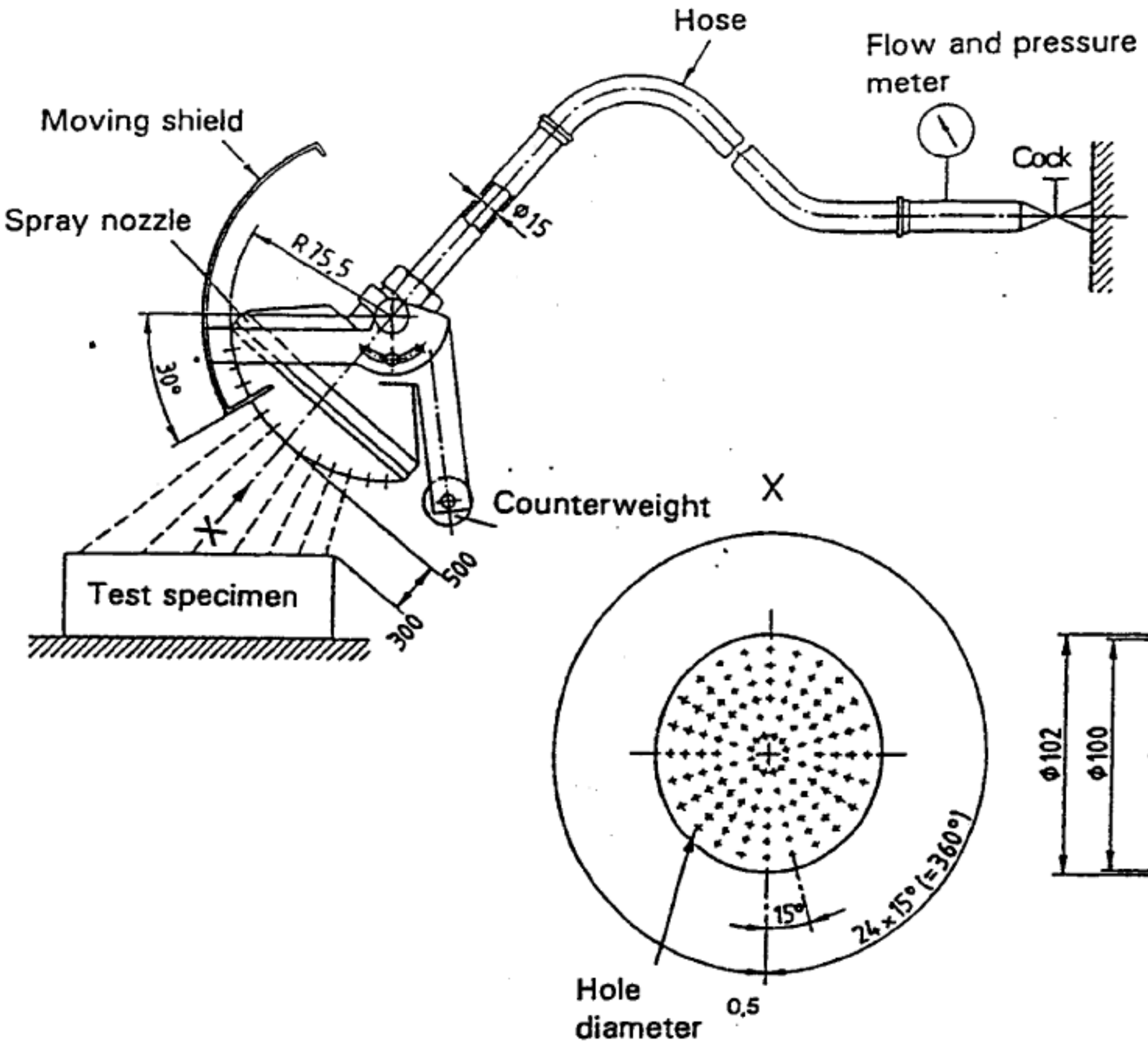


D = 0.4 for tests for the degrees of protection against water designated 3 and 4
D = 0.8 for tests for the degree of protection against water designated 4K
r = 200, 400, 600 or 800; the smallest radius shall be selected in relation to the size of the test specimen

Rotational speed of test specimen from 1 to 3 rpm

Figure 4. Test device to verify protection against spraying and splashing water drops (oscillating tube). Degrees of protection against water designated 3, 4 and 4K

Dimensions in mm

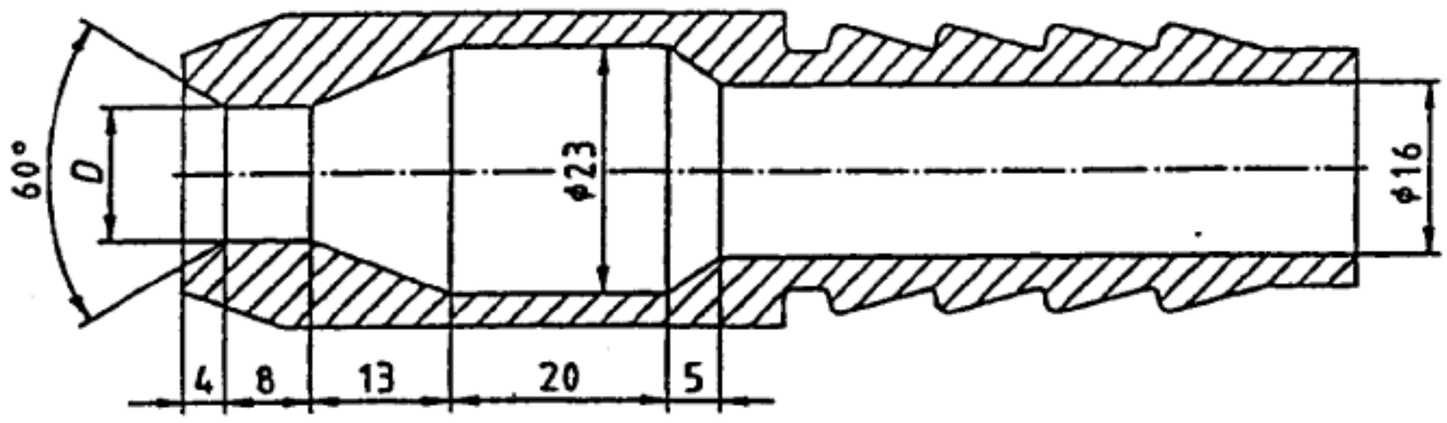


121 Holes with diameter 0.5:
- 1 hole in the centre
- 2 inner circles (12 holes with 30 ° pitch)
- 4 outer circles (24 holes with 15 ° pitch)

Moving shield: aluminium
Spray nozzle: copper-zinc-alloy (brass)

Figure 5: Hand-held test device to verify protection against spraying and splashing water (spray nozzle); degrees of protection against water 3 and 4

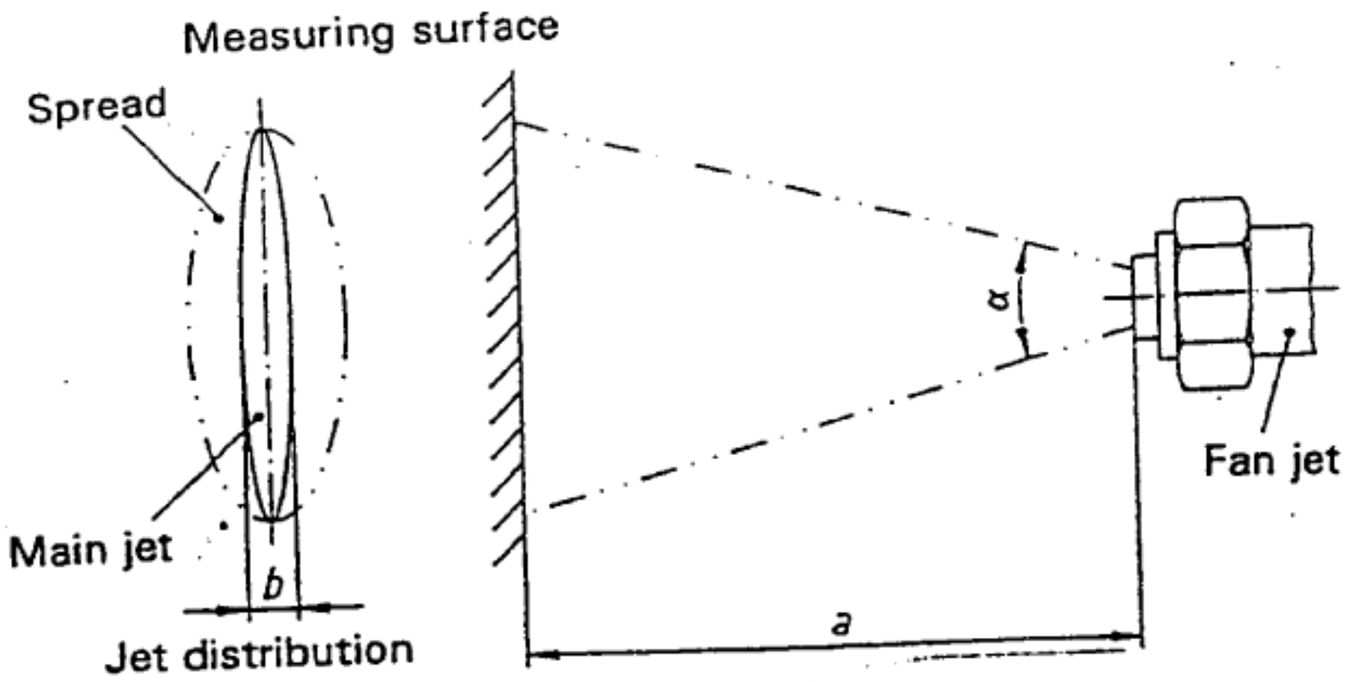
Dimensions in mm



D = 6.3 for tests for the degrees of protection against water designated 5 and 6K
D = 12.5 for tests for the degree of protection against water designated 6

Figure 6: Test device to verify protection against water jets (hose nozzle); degrees of protection against water 5, 6 and 6K

Dimensions in mm



a (mm)	b (mm)	α (·)
100	8 ± 2	30 ± 5
150	10 ± 2	

Figure 7: Fan jet and jet distribution for test device to verify protection against high pressure/steam jet cleaning; degree of protection against water designated 9K

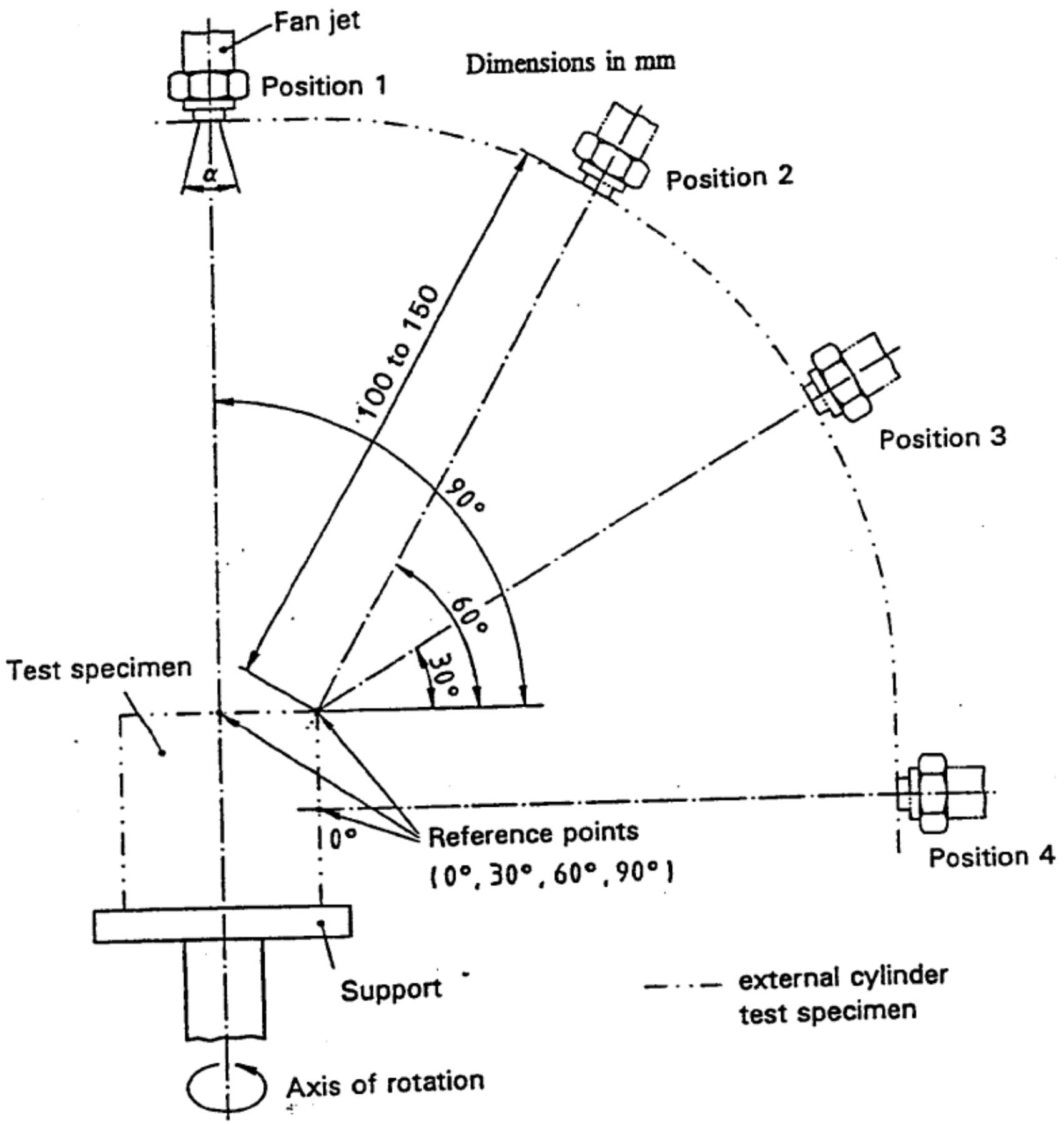


Figure 8: Test device to verify protection against high pressure/steam jet cleaning; degree of protection against water designated 9K

Table 8: Test devices and conditions for tests for degrees of protection against water

Second characterising numeral/ supplementary letter	Test device Test conditions	Water flow	Water pressure	Water temperature	Test duration
0	-	-	-	-	-
1	Drip box, Figure 3 Enclosure on turntable Rotational speed about 1/min	(1.0 + -0.5) mm/min (drop height)	-	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	10 min
2	Drip box, Figure 3 Enclosure in 4 fixed positions inclined by 15°	(3.0 + -0.5) mm/min (drop height)	-		2.5 min for each of the four positions
3	Oscillating tube, Figure 4 with holes of Ø 0.4 mm up to ± 60 ° from the vertical. Spraying while swivelling the oscillating tube by ± 60 ° from the vertical at about 1s/60 °. Maximum distance 200 mm	0.1 l/min ± 5 % per hole (mean value)	about 80 kPa (see note)		10 min (5 min in one position, 5 min in a position turned 90° horizontally to this)
	or spray nozzle, Figure 5 spraying while manually swivelling the spray nozzle by ± 60 ° from the vertical. Maximum distance 500 mm	or 10 l/min ± 5 %	(50 to 150) kPa		5 min
4	Oscillating tube, Figure 4 as for Figure 3 but: holes - ± 90° spraying - ± $(180°_{-20})°$	As number 3	As number 3		As number 3
	or spray nozzle, Figure 5, but moving shield removed, Spraying - ± 90 °				
4K	Oscillating tube, Figure 4 as for Figure 3 but: holes of Ø 0.8 mm at ± 90° spraying - ± $(180°_{-20})°$	0.6 l/min ± 5 % per hole (mean value)	about 400 kPa (see note)		10 min (5 min in one position, 5 min in a position 90° to this)
5	Water jet nozzle Figure 6 Nozzle 6.3 mm Ø Distance 2.5 to 3 m	12.5 l/min ± 5 %	about 30 kPa (see note)		3 min

Second characterising numeral/ supplementary letter	Test device Test conditions	Water flow	Water pressure	Water temperature	Test duration
6	Water jet nozzle, Figure 6 Nozzle 12.5 mm Ø Distance 2.5 to 3 m	100 l/min ± 5 %	about 100 kPa (see note)	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	3 min
6K	Water jet nozzle, Figure 6 Nozzle 6.3 mm Ø Distance 2.5 to 3 m	75 l/min ± 5 %	about 1000 kPa		min. 3 min
7	Immersion bowl Immersion depth: 1 m (deepest point of enclosure) 0.15 m (highest point of enclosure, if enclosure height greater than 0.85 m)	-	-		30 min
8	Immersion bowl Water level: as agreed between the users of the standard	-	-	-	by agreement
9K	Fan nozzle, Figure 7 Enclosure on turntable, Figure 8 Rotational speed (5 ± 1)/min Spraying at distance of 0°, 30°, 60°, 90°, (100 to 150 mm)	14 to 16 l/min	about 8000 to 10000 kPa (see note)	(80 ± 5) °C Different temperatures may be agreed	30 s per position

NOTE:

- The second characterising numeral for 3 to 6K usually specifies the required water pressure. Checks should be performed at suitable intervals to verify that the requirement water flow rate has been achieved and, if necessary, to match the operating pressure in the devices used.
- Water pressure or steam pressure shall be measured as close as possible to the outlet hole

Table 9: Examples of the allocation of degrees of protection against water to types of vehicles and installation conditions

Type of vehicle	Site of mounting or assembly	Exposure to water	Second characteristic numeral/ supplementary letter
Private car	Passenger area	Not particularly exposed	0
	Engine compartment shielded at the bottom	Not exposed to splashing water or water jets. Only light drizzle on individual insignificant points.	3
	Engine compartment open at the bottom, protected areas	Only indirectly exposed to splashing water or water jets	4
	Engine compartment open at the bottom, exposed areas	Directly exposed to splashing water or water jets.	4K
	External mounting	Directly exposed to splashing water or water jets.	4K
Buses and commercial trucks, special vehicles and traction machines for road vehicles and the associated trailers	Passenger compartment driver's cab	Not particularly exposed	0
	Front engine compartment with protected areas; enclosed rear engine compartment	Only indirectly exposed to splashing water or water jets (after being diverted)	4
	Front engine compartment, exposed areas; unprotected underfloor area	Directly exposed to splashing water or water jets.	4K
	Areas which are affected by extremely powerfully water jets (e.g. during cleaning, before repairs, inspections)	Water jets with particularly high pressure may be expected	6K
	External mounting	Directly exposed to splashing water or water jets.	4K
Tractors and the associated trailers	Instrument panels on covered tractors	Not particularly exposed	0
	Instrument panels on uncovered tractors	Exposed to rain	3
	Any uncovered areas (except for instrument panel)	Exposed to splashing water or water jets	4K
Motorcycles	Protected areas	Exposed to rain; Only indirectly exposed to splashing water or water jets (after diversion)	3
	Handlebars, instrument panels, lower area on frame	Directly exposed to splashing water or water jets. (rain at high speeds)	4K
Special-purpose vehicles	Chassis, lower areas of engine and body	Water pressure when driving through water	6, 7 or 8
All	Everywhere, except passenger compartment	Cleaning process using high-pressure/steam jet cleaning	9K

Quoted standards

DIN V 40 046 Part 48	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 Part 2[8)]	(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 withdrawn 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

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8) The numbering for the adoption of IEC 529, 2nd edition 1989 or IEC 70 (CO) 14 as a German standard is still under discussion

- 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.

This standard was developed by FAKRA, Working Committee 13 Electrical Equipment which represents the users and manufacturers of electrical equipment for road vehicles.