

IEC 60529 Degrees of Protection Provided by Enclosures (IP Code) – IPX5 IPX6 Testing Equipment

Description

SOLIDS		WATER			
0		Non protected.	0		Non protected.
1		Protected against a solid object greater than 50mm, such as a hand.	1		Protected against vertical dripping water. Limited liquid entry.
2		Protected against a solid object greater than 12mm, such as a finger.	2		Protected against vertical dripping water when tilted up 15°. Limited liquid entry.
3		Protected against a solid object greater than 2.5mm, such as a screwdriver.	3		Protected against vertical spraying water at an angle up to 60°. Limited liquid entry.
4		Protected against a solid object greater than 1mm, such as most screws and wires.	4		Protected against vertical spraying water at an angle up to 60°. Limited liquid entry.
5		Dust protected. Prevents ingress of dust sufficient to cause harm.	5		Protected against jets of water from all directions. Limited liquid entry.
6		Dust tight. No ingress of dust.	6		Protected against strong jets water from all directions. Limited liquid entry.
<p>IP 65 EXAMPLE RATING</p> <p>IS PROTECTED FROM INTRUSION, DUST, ACCIDENTAL CONTACT AND WATER</p>		7		Protected against the effects of water immersion between 15cm & 1m.	
		8		Protected against the effects of water immersion between 15cm & 1m.	
		9		Protected against high temperature, high pressure water and steam.	

**Table 8 – Test means and main test conditions
for the tests for protection against water**

Second characteristic numeral	Test means	Water flow rate	Duration of test	Test conditions, see
0	No test required	–	–	–
1	Drip box Figure 3 Enclosure on turntable	$1^{+0,5}_0$ mm/min	10 min	14.2.1
2	Drip box Figure 3 Enclosure in 4 fixed positions of 15° tilt	$3^{+0,5}_0$ mm/min	2,5 min for each position of tilt	14.2.2
3	Oscillating tube Figure 4 Spray ± 60° from vertical, distance max. 200 mm	0,07 l/min ± 5 % per hole, multiplied by number of holes	10 min	14.2.3 a)
	or Spray nozzle Figure 5 Spray ± 60° from vertical	10 l/min ± 5 %	1 min/m ² at least 5 min	14.2.3 b)
4	As for numeral 3 Spray ± 180° from vertical	As for numeral 3		14.2.4
5	Water jet hose nozzle Figure 6 Nozzle 6,3 mm diameter, distance 2,5 m to 3 m	12,5 l/min ± 5 %	1 min/m ² at least 3 min	14.2.5
6	Water jet hose nozzle Figure 6 Nozzle 12,5 mm diameter, distance 2,5 m to 3 m	100 l/min ± 5 %	1 min/m ² at least 3 min	14.2.6
7	Immersion tank Water-level on enclosure: 0,15 m above top 1 m above bottom	–	30 min	14.2.7
8	Immersion tank Water-level: by agreement	–	by agreement	14.2.8
9	Fan jet nozzle Figure 7 Test of small enclosure on turntable Figure 12 Turntable speed (5 ± 1) r/min Spray at 0°, 30°, 60°, 90°	(15 ± 1) l/min	30 s per position	14.2.9 a)
	Or Test of large enclosures as per intended use Spray from all practical directions Distance (175 ± 25) mm		1 min/m ² at least 3 min	14.2.9 b)

14.2 Test conditions

During the tests for IPX1 to IPX6 the water temperature should not differ by more than 5 K from the temperature of the specimen under test. If the water temperature is more than 5 K below the temperature of the specimen a pressure balance shall be provided for the enclosure. Adequate safety precautions should be taken when testing the equipment in the energized condition.

14.2.5 Test for second characteristic numeral 5 with the 6,3 mm nozzle

The test is made by spraying the enclosure from all practicable directions with a stream of water from a standard test nozzle as shown in figure 6.

The conditions to be observed are as follows:

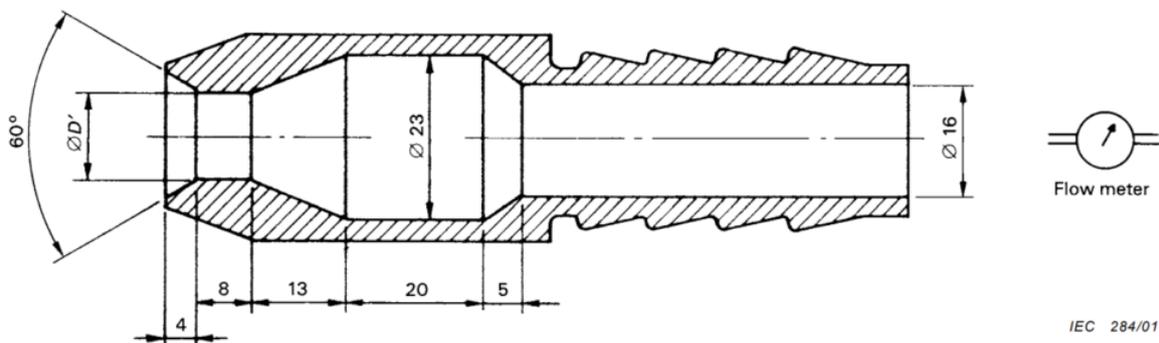
- internal diameter of the nozzle: 6,3 mm;
- delivery rate: 12,5 l/min \pm 5 %;
- water pressure: to be adjusted to achieve the specified delivery rate;
- core of the substantial stream: circle of approximately 40 mm diameter at 2,5 m distance from nozzle;
- test duration per square metre of enclosure surface area likely to be sprayed: 1 min;
- minimum test duration: 3 min;
- distance from nozzle to enclosure surface: between 2,5 m and 3 m.

14.2.6 Test for second characteristic numeral 6 with the 12,5 mm nozzle

The test is made by spraying the enclosure from all practicable directions with a stream of water from a standard test nozzle as shown in figure 6.

The conditions to be observed are as follows:

- internal diameter of the nozzle: 12,5 mm;
- delivery rate: 100 l/min \pm 5 %;
- water pressure: to be adjusted to achieve the specified delivery rate;
- core of the substantial stream: circle of approximately 120 mm diameter at 2,5 m distance from nozzle;
- test duration per square metre of enclosure surface area likely to be sprayed: 1 min;
- minimum test duration: 3 min;
- distance from nozzle to enclosure surface: between 2,5 m and 3 m.



Dimensions in millimetres

D' = 6,3 for the test of 14.2.5 (second characteristic numeral 5)

D' = 12,5 for the test of 14.2.6 (second characteristic numeral 6)

Figure 6 – Test device to verify protection against water jets (hose nozzle)



IPX5 IPX6 Rain Jet Test Chamber

- IP Rate: IPX5 IPX6;
- Water Flow Rate: 12.5L/min $\hat{A}\pm 5\%$; 100L/min $\hat{A}\pm 5\%$;
- Water Re-circulation System;
- Diameter of Turntable (mm): 400
- Turntable loads: 20kgs Max
- Turntable Rotation Speed: 0~7r/min (Adjustable)
- Internal Diameter of IPX5 Nozzle: 6.3mm
- Internal Diameter of IPX6 Nozzle: 12.5mm
- Chamber size: 600*600*600mm
- External cabin steel Plate with protective coating
- Internal chamber SS304
- Door with observing window
- Water purifier: mainly purification from water source to water tank
- Rotation of table: forward, reverse
- Regulate the pressure according to prescribed water flow
- Water jet distance: 2.5m (nozzle away from the center of the turntable)

Category

1. Equipment for Standards
2. Standards