

Protection Tests (IP Code)



Content

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Test unit SWT

Configuration

Equipment

Technical data

Principle

Design



Spray and Splash Water Test



Content

IP = International Protection-Code

Nomenclature

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Test unit SWT

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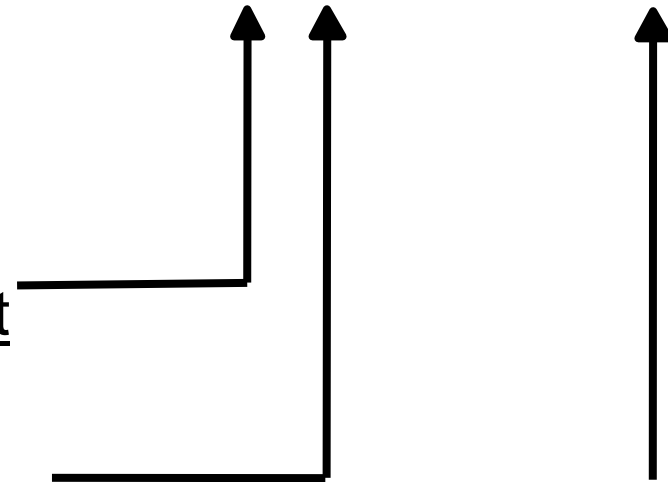
Principle

Design

IP 2 3 + Supplement

First figure
Ingress of solid substances, dust

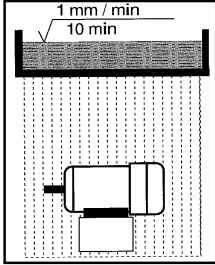
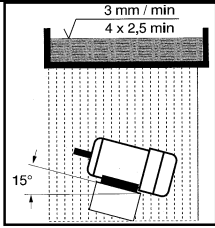
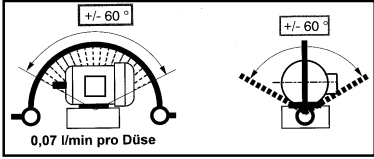
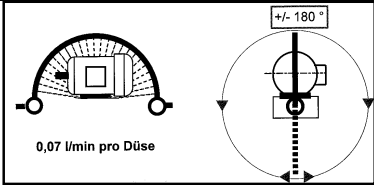
Second figure
Ingress of water



- Ingress of a wire (A, B, C, D)
- Mobile substances in operation during the spray and splash water test (M, S, or H, M, S, W)

Spray and Splash Water Tests, 2nd figure: IP XX



	Prot. grade, 2nd figure	Test accessories	Graphics	Protection against ...	Water volume flow	Test duration
Content	0	No test required	---	---	---	---
Nomenclature	1	dripping unit, unit on a rotation table		Condensation	1 mm/min	10 min
Figures						
Test unit SWT	2	dripping unit, housing in 4 stable, 15° inclined positions		Dripping	3 mm/min	2,5 min for every incline
Configuration						
Equipment	3	swivelling tube, spraying +/- 60° from the vertical, max. distance 200 mm or jet nozzle,		Rain	0,07 l/min +/- 5% per opening, multiplied with No. of openings; sprinkler 10 l/min +/- 5%	10 min, sprinkler 1 min/m², mini 5 min
Technical data						
Principle	4	as figure 3 spraying +/- 180° from the vertical		Spray dust	as figure 3	as figure 3
Design						



Spray and Splash Water Tests, 2nd figure: IP XX



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5	jet nozzle nozzle 6,3 mm Ø distance 2,5 to 3 m	<p>qv = 12,5 l / min p ~ 0,3 bar t = 1 min / m² > 3 min</p>	Water purging	12,5 l/min +/- 5%	1 min/m ² , mini. 3 min
6	jet nozzle, nozzle 12,5 mm Ø distance 2,5 to 3 m	<p>qv = 100 l / min p ~ 1 bar t = 1 min / m² > 3 min</p>	Extended water purging	100 l/min +/- 5%	1 min/m ² , mind. 3 min
7	immersion basin water level above the housing: 0,15 m from upper border, 1 m from lower border		Water ingress		30 min
8	immersion basin water level: as agreed		Water ingress		as agreed
9	rotation table (5 (+/-1) /min), for housings in road vehicles, flat steel nozzle with high-pressure/steam jet cleaning distance 100 to 150 mm, pressure 8.000 to 10.000 Kpa angle 0, 30, 60, 90°		Water ingress	14 to 16 l/min 80°C water temperature	30 sec for every position



Spray and Splash Water Test Units

Content

- Reproducible testing of the resistibility of electro-technical products against water
- Determination of IP-protection types

Nomenclature

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Test unit SWT

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Principle

Design

Advantages

- Chambers meet important test standards
- Ready for connection
- Easy to operate
- Easy to service
- Two sizes with circulation system



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Test unit SWT

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Design

Design features

- Test room made of corrosion-resistant steel
- Glass door with wiper
- Specimen support, adjustable in height
- Pneumatic drive of swivel tube
- Adjustable swivel angle
- Replaceable swivel tubes
- Nozzle fittings can be swivelled and replaced
- Adjustable water volume flow and measuring
- Control of test duration

Content

Nomenclature

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Test unit SWT

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Principle

Design

Additional equipment

- Different swivel tubes
- Circulation system
- Rotation table, height-adjustable
- Modification for additional protection codes
- Modification for tests
as per DIN, MIL, VTL, IEC, BSI, JIS

Type SWT – Technical Data



Content

Nomenclature

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Test unit SWT

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Principle

Design

Technical Data		SWT 200 / SWT 400		SWT 600 / SWT 800		SWT 1000
Test duration		adjustable from 3 sec and 30 h				
Specimen support		adjustable in height				
Velocity of swivelling tubes	[degree/sec]	60	60	60	60	high-pressure/flat jet nozzles
Swivelling angle adjustable	[degree]	0 to 180°				spray angle 0°, 30°, 60°, 90°
Interior dimensions	height [mm]	1015		1810		1015
	width [mm]	1000		1800		1000
	depth [mm]	1000		1800		1000
Exterior dimensions	height [mm]	1900		2400		2000
	width [mm]	1500		2200		1500
	depth [mm]	1100		1900		1050
Door opening	height [mm]	750		950		750
	width [mm]	650		950		650
Weight (without water storage)	[kg]	350		690		500
Water pressure		min. 3 bar				
Supply connections		400 V; 3 Ph + N + PE; 50 Hz				
Connected load		max. 0,7 kVA				approx. 24 kVA
Specimen support	[mm Ø]	300		500		300
Height adjustment to the bottom	[mm]	125		200		125



Type SWT 200/400 – Schematic Diagram



Content

Test: IP X3, 4, 4K

Nomenclature

Design

Figures

- Stainless steel test space
- Corrosion-resistant swivel tube
- Lateral water supply
- Electrical swivel engine
- Height adjustment of test table
- Various nozzle sizes for different tests

Test unit SWT

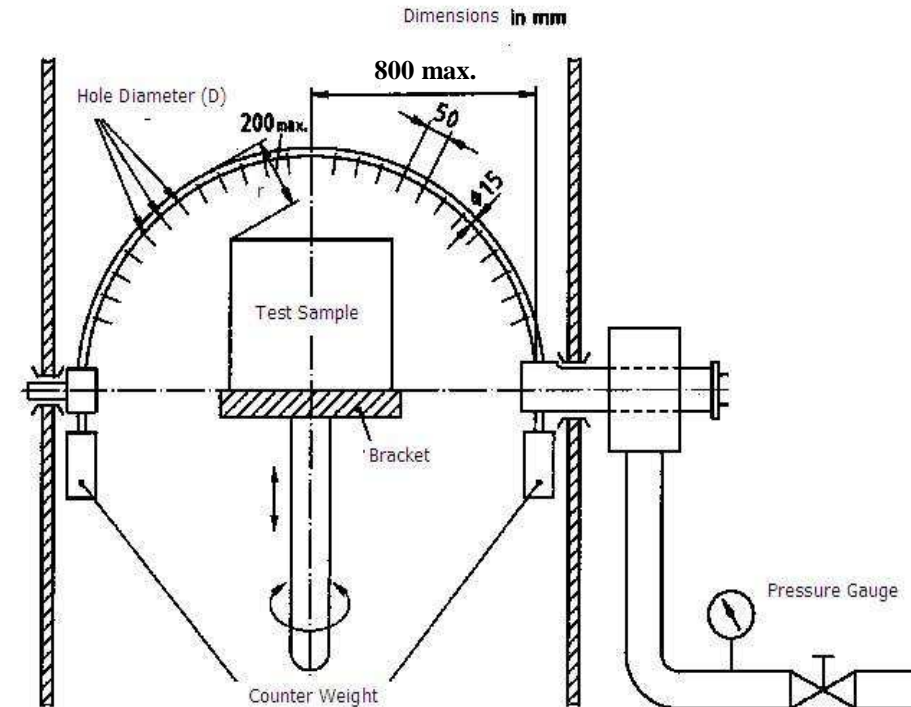
Configuration

Equipment

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Principle

Design



D = 0.4mm for the test with waterproofing grade 3 and 4.

D = 0.8mm for the test with waterproofing grade 4K.

r = 200, 400, 600 or 800mm; constrained by the test sample dimension

RPM speed is 1 upto 3 per minute

Types

Content

**Protection degree 1, 2
- Dripping**

Nomenclature

Figures

Test unit SWT

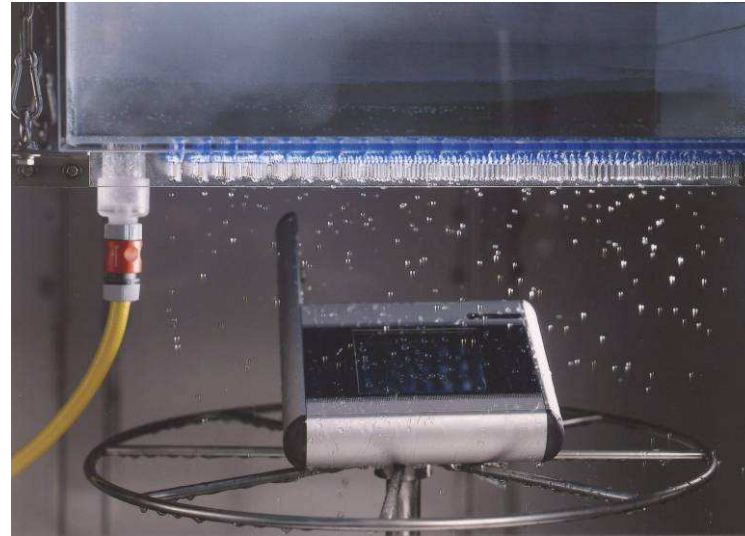
Configuration

Equipment

Technical data

Principle

Design



**Protection degree 5, 6
- Jet nozzle**



Content

**Protection degree 3, 4
- Rain, spray mist**

Nomenclature

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Test unit SWT

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Principle

Design



**Alternatively:
Sprinkler**

Spray radi: 200, 400, 600, 800 mm

Types

Content

Protection degree 9K - high pressure

Nomenclature

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