INNOVATIVE TEST & MEASUREMENT SYSTEMS

TECHNICAL DESCRIPTION

STEAM JET TESTER DWT

FULFILLED STANDARDS AND REGULATIONS –DWT SERIES

The iTS steam jet tester from the DWT series enable standard-compliant testing of the resistance of coatings to pressure water-jetting. Depending on the test component or standard, options may be required. Further test specifications according to OEM specifications can be integrated (e.g. TPJLR Jaguar / Land Rover).

Standards and regulations	Included	Optional	Option
DIN EN ISO 16925:2014	X		
DBL 5416	X		
BMW AA-0136 (comply with DIN EN ISO 16925)	X		
Scania STD4234		X	DWT.OP-010
Ford FLTM BO 160-04		X	DWT.OP-020
VW PV 1503	X	X	DWT.OP-303 DWT.OP-304

STANDARD SCOPE OF DELIVERY – DWT SERIES

The steam jet tester DWT is a self-contained system and can be easily positioned in the test room via castors. After connecting the system, reproducible tests can be carried out repeatedly. The necessary equipment for this is included in the test chamber.

DWT - series	DWT 500	DWT 1000
Internal test chamber W x D x H [mm]	900 x 900 x 1000	1180 x 1180 x 1500
Door cut-out W x H [mm]	795 x 790	1000 x 1000
Number of doors	1	1
Size viewing window W x H [mm]	630x 690	890 x 840
External test chamber W x D x H [mm]	1350 x 920 x 2300 D without control panel H incl. exhaust air fan	1600 x 1200 x 2400 D without control panel H incl. exhaust air fan
Test chamber lighting	Yes / LED	
Position of control panel	right	
Painting	Cladding sheets: RAL 7035 (light grey)	
Edelstahlflächen	polished surface	

Weight [kg]	500	650

STANDARD SCOPE OF DELIVERY – DWT SERIES

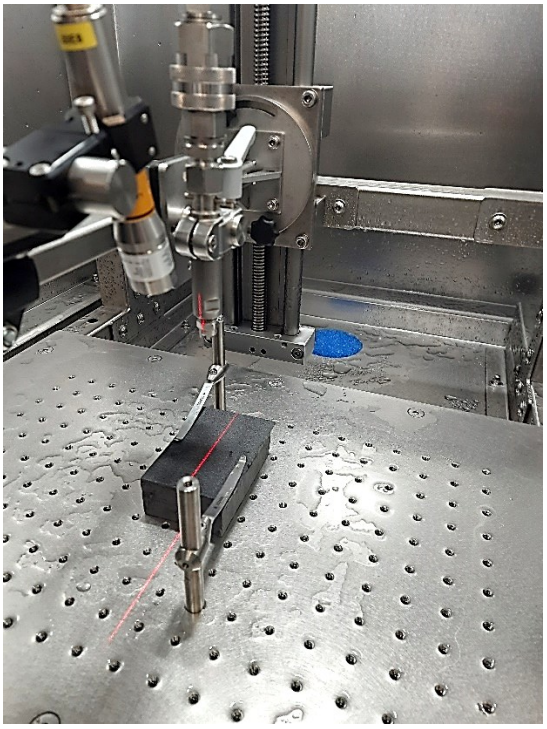
Functional description DWT test room

- **The test lance is positioned in the centre above the clamping table. The height can be adjusted with a handwheel. This height adjustment optimises the distance between the nozzle and the test specimen. The test lance has a standard adjustment range of 600 mm. Larger ranges can be realised on request.**

Interior view of the tester

- **A spacer block is used to set the distance, which is held between the specimen and the nozzle. The standard scope of delivery includes spacer blocks with a height of 100 mm and 130 mm.**
- **The nozzle can also be rotated 60° to the left or right. This means that the sample can also be irradiated at an angle.**
- **A line laser attached to the nozzle indicates the point of impact of the water jet on the clamping table. This makes it very easy to position the scribed sample.**
- **The test chamber has a clamping table with a 30 x 30 mm grid of holes for fixing the sample. If required, the grid can also be selected differently. All holes of the hole grid are provided with an M6 thread. This makes it very easy to mount different clamping elements for fastening the samples and the sample can be optimally fixed. The scope of delivery includes 2 quick-release clamps for fastening.**

STANDARD SCOPE OF DELIVERY – DWT SERIES



Clamping table with laser for positioning the point of impact

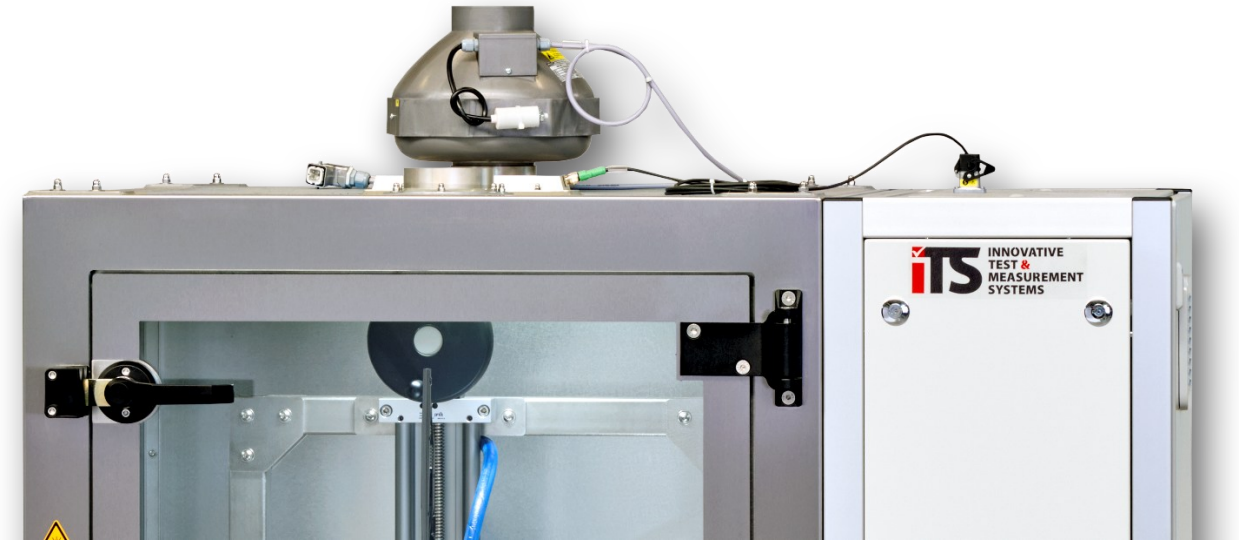
- **The test nozzle is supplied with a measurement report of the jet power.**
- **A stainless-steel tank holding approx. 100 litres of water with electric resistance heating (approx. 16 kW) is used to generate hot water. The hot water tank is equipped with overtemperature protection.**
- **The high-pressure pump is controlled by a frequency converter. The necessary feed water pressure for the high-pressure pump is achieved by a separate pre-pressure pump.**
- **The water temperature, water pressure and spraying duration can be preselected via the control unit.**
- **The heating time of the water in the tank is 25 minutes from 20°C to 60°C.**

DWT - series	Adjustment range
Water temperature [°C]	25 – 85
Water pressure (with pressure control) [bar]	20 – 120
Water volume (with flow control) [l/min]	8 – 18

- **Note: The test water should never exceed a water hardness of 6°dH for this test, as this will result in increased limescale precipitation during heating. This increased limescale precipitation leads to a significantly shorter service life of the high-pressure pump and the heating elements in the hot water cylinder. To increase the service life of the nozzle, we recommend using demineralised water.**

Steam extraction

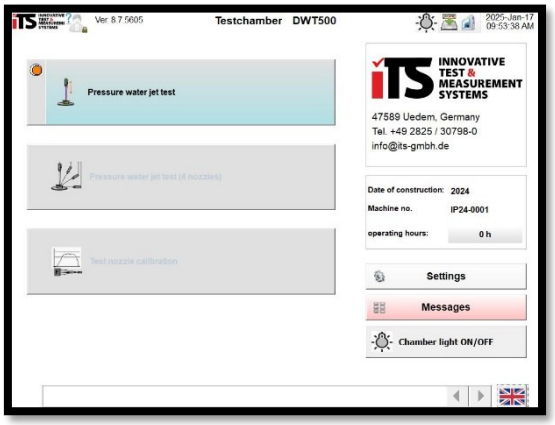
- **An exhaust fan is installed in the roof of the test chamber, which extracts the steam from the test chamber.**
- **The exhaust fan produces a volume flow of 230m³/h. The exhaust air fan must be connected to a DN 100 exhaust air pipe on site (the maximum length of the exhaust air pipe must not exceed 10 metres).**
- **The fan is integrated into the control system of the test chamber. The fan starts automatically when a test is started. A run-on time can be set in the operating software so that the exhaust fan clears the test chamber of steam at the end of the test.**



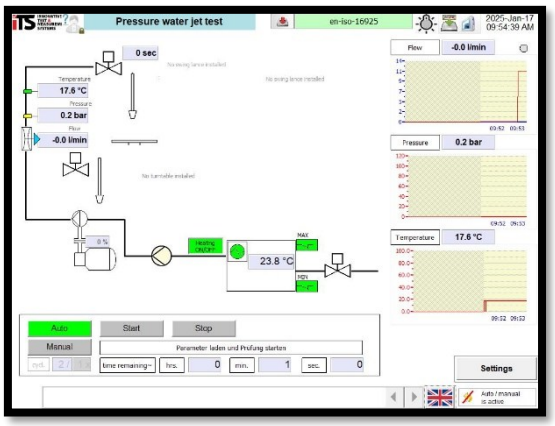
Exhaust fan in the test chamber roof

Control system

- **The DWT steam jet tester have a PLC control system. All required test parameters are entered via a 15’ touch panel.**
- **Predefined parameter sets are available for tests in accordance with ISO 16925 and for the delivery specifications of most automotive manufacturers (standard-based test parameter sets cannot be changed) and can be selected directly on the start screen. The DWT can be operated in manual and automatic mode.**
- **The operator can compile their own user-defined tests at any time and save them as a new parameter set.**
- **The language can be switched via touch function. The following languages are stored in the DWT control unit: German, English, French, Polish. (other languages available on request)**
- **During a running test, pressure, temperature and flow values are displayed on the screen as numbers and diagrams.**
- **If any error messages occur, they are shown in plain text on the display.**
- **Optionally, the data can be recorded and analysed with the iTS COMPANION APP.**



Start screen of the DWT series



Pressure water jet test screen

GENERAL REQUIREMENTS ON SITE – DWT SERIES

Climatic conditions	DWT 500 / DWT 1000
Ambient temperature [°C]	10 - 30
Relative humidity max. [%] - non condensing	70

Electrical power supply	DWT 500 / DWT 1000
Power supply	3 x 400 Volt /50Hz N/PE
Power consumption up to [kW]	22
Installed load max. [A]	32
Electrical connection via	Direct wiring / connection via CEE plug
Ethernet (Optional)	RJ 45 socket

- **Note: If connected via a CEE socket outlet, this must be protected by a separate residual current device (RCD) of TYPE B (AC/DC sensitive).**

Compressed air supply	DWT 500 / DWT 1000
Compressed air [bar]	3-6, max. 40 l/min
Compressed air quality	ISO 8573-1:2010 [3:3:4]
Compressed air connection	Via quick-release coupling NW 7,2

- **Note: The adapter for the connection is included in the scope of delivery.**

GENERAL REQUIREMENTS ON SITE – DWT SERIES

Water supply	DWT 500 / DWT 1000
Water quality	Municipal water with a minimum conductivity of 30 µS/cm
Water filter (customer supply) micronage [µm]	100
Max. water pressure [bar]	3
Water connection	Via hose connection for hose 13 mm inside
Max. water hardness [dH]	6

- **Note: The test water for this test should not exceed a water hardness of 6°dH, as otherwise increased limescale precipitation will occur during heating. This increased limescale precipitation leads to a significantly shorter service life of the high-pressure pump and the heating rods in the hot water tank. To increase the service life of the nozzle, we recommend the use of demineralised water or a softening system (see options).**

Waste water connection	DWT 500 / DWT 1000
Max. waste water temperature [°C]	70
Waste water junction	Hose connection NW 13

- **Note: The waste water is actively pumped (up to max. 1.3 m). Otherwise, the test chamber is emptied via a manual drain valve.**

All connections are located on the back of the water jet tester.

DWT 500 with connections in the lower area

(here: compressed air / water supply / waste water / electricity / network)

OVERVIEW: OPTIONS - DWT SERIES

Options number	Option	Checkbox
DWT.OP-010 (11780)	Pendulum stroke for water jet (Scania STD 4234)	☐
DWT.OP-020 (11779)	Parallel slides for the sample (Ford BO 160-04)	☐
DWT.OP-030 (11778)	Container (20l) for calibrating according to ISO 16925	☐
DWT.OP-040 (11781)	DAkkS calibration of sensors	☐
DWT.OP-050 (11782)	Factory calibration of sensors	☐
DWT.OP-060 (11783)	Measuring device for the force progression of the nozzle	☐
DWT.OP-200 (12302)	Data recording incl. iTS Companion App – Basic	☐
DWT.OP-210 (12301)	Ethernet interface for data storing incl. iTS Companion App - Pro	☐
DWT.OP-212 (14685)	iTS Companion App – Pro Plus	☐
DWT.OP-300 (14688)	Flat spray nozzle according to DIN EN 16925	☐
DWT.OP-301 (14689)	Flat spray nozzle according to DBL 5416	☐
DWT.OP-302 (14690)	Flat spray nozzle according to Ford BO 160-04	☐
DWT.OP-303 (14691)	Flat spray nozzle according to VW PV 1503-A	☐
DWT.OP-304 (14692)	Flat spray nozzle according to VW PV 1503-B/C	☐
DWT.OP-305 (14693)	Flat spray nozzle according to Scania STD 4234-MEG	☐
DWT.OP-306 (14694)	Flat spray nozzle according to Scania STD 4234-PMEG	☐
DWT.OP-700 (14695)	Water softening unit	☐

The individual options are described below.

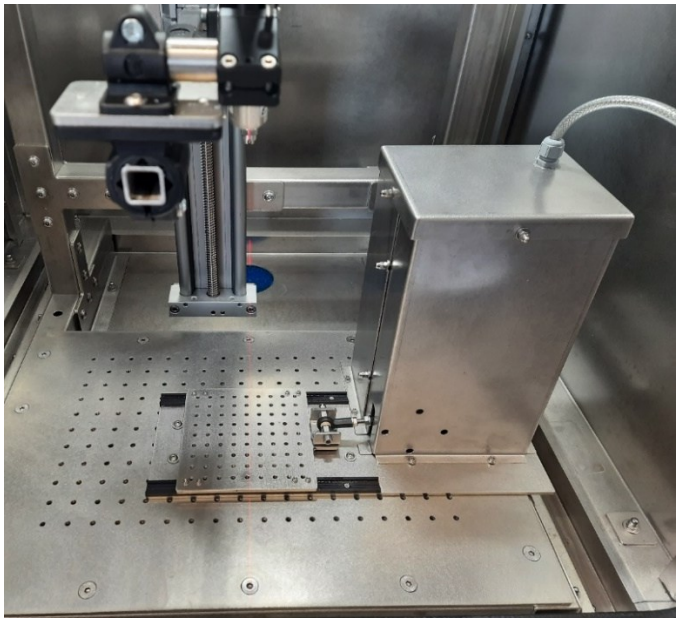
OPTIONS - DWT SERIES

DWT.OP-010 (11780) - Pendulum stroke for water jet (Scania STD 4234)

- **The nozzle is equipped with a pendulum device so that the pendulum device deflects 5.6° to the left and right at a distance of 100 mm between the nozzle and the test surface (corresponds to +/-20 mm)**
- **A PMEG 2506 nozzle from Spraying Systems is used. The required sample holder with 40mm hole is also included in the scope of delivery.**
- **The pendulum device swivels at a speed of 1sweep/s with a test duration of 30 seconds.**
- **The water temperature for this test is 55°C.**
- **A standard parameter set for the Volvo standard (corresponds to Scania STD 4234) is stored in the control system.**

DWT.OP-020 (11779) – Parallel slides for the sample (Ford BO 160-04)

- **A linear slide is integrated into the system to move the test specimen. The movement is performed by a positioning motor with rotary encoder.**
- **The set standard stroke is +/- 30 mm. This results in the required total stroke of 60 mm. The stroke is adjustable in the +/- direction.**
- **The movement takes place at a speed of 60 cycles/min, and the jet is positioned vertically above the sample.**
- **The water temperature for this test is 80°C.**
- **A standard parameter set for the Ford standard (corresponds to Ford BO 160-04) is stored in the control system.**



Linear slide for sample on the clamping table

DWT.OP-030 (11778) - Container (20l) for calibrating according to ISO 16925

- **A container with a volume of 20 litres is supplied. The container has a drain tap.**
- **The draining device is used to determine the water volume in accordance with ISO 16925.**

DWT.OP-040 (11781) - DAkkS calibration of sensors

- **The sensors for the pressurised water jet test are calibrated by an externally certified institute. The corresponding DAkkS calibration certificates confirm this for the flow meter, pressure sensor and temperature sensor of the pressurised water jet test.**

DWT.OP-050 (11782) - Factory calibration of sensors

- **The sensors for the pressurised water jet test are calibrated at iTS GmbH. The corresponding factory calibration certificates confirm this for the flow meter, pressure sensor and temperature sensor of the pressurised water jet test.**

Note on the calibration of the test chamber according to ISO 16925

The system is calibrated according to the procedure described in ISO 16925. The jet force of the nozzle is verified with the polystyrene rigid foam described in ISO 16925. The nozzle is also measured on a test stand. As a result of this measurement, the jet force of the nozzle is recorded in a protocol.

The flow rate is also determined in accordance with ISO 16925. In addition, the flow rate is permanently recorded and determined by the installed flow meter. This flow meter can also be supplied with a DAkkS calibration so that the flow rate can be measured traceably for every test.

DWT.OP-060 (11783) - Measuring device for the force progression of the nozzle

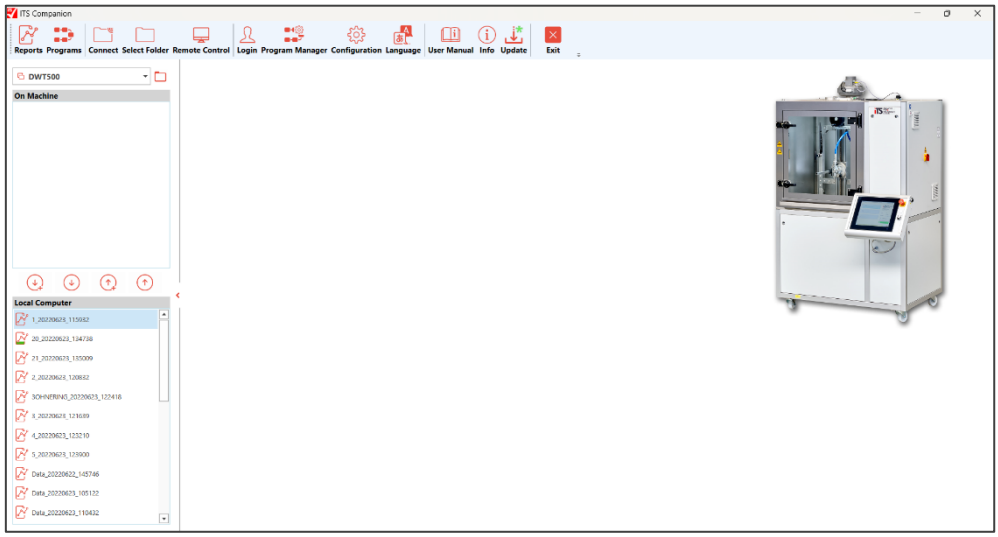
- **The measuring device can be attached in the chamber at a fixed position via quick-release clamps.**
- **The electrical connection is made via 2 watertight plug connectors so that the measuring device can be integrated into the control system of the overall system.**
- **The measuring device has a force transducer with a measuring range of 0-5 N. The geometry of the force transducer is designed according to the Daimler device. The force transducer is designed as a point transducer. The scaling of the sensor can be set in the control system.**
- **The control system automatically generates a diagram from the measured values that shows the force progression of the nozzle.**

DWT.OP-200 (12302) - Basic Data recording incl. ITS companion App - Basic

- **All relevant measured values and parameters are recorded in a CSV file.**
- **The data is downloaded from the control panel via a USB interface.**
- **The iTS Companion App Basic is included in the scope of delivery.**
- **With the iTS Companion App Basic, the CSV data can be analysed and automatically displayed in a test report.**
- **The user interface and the reports are available in German/English and are switchable between these languages.**

Note: A demo version can be downloaded from the following link:

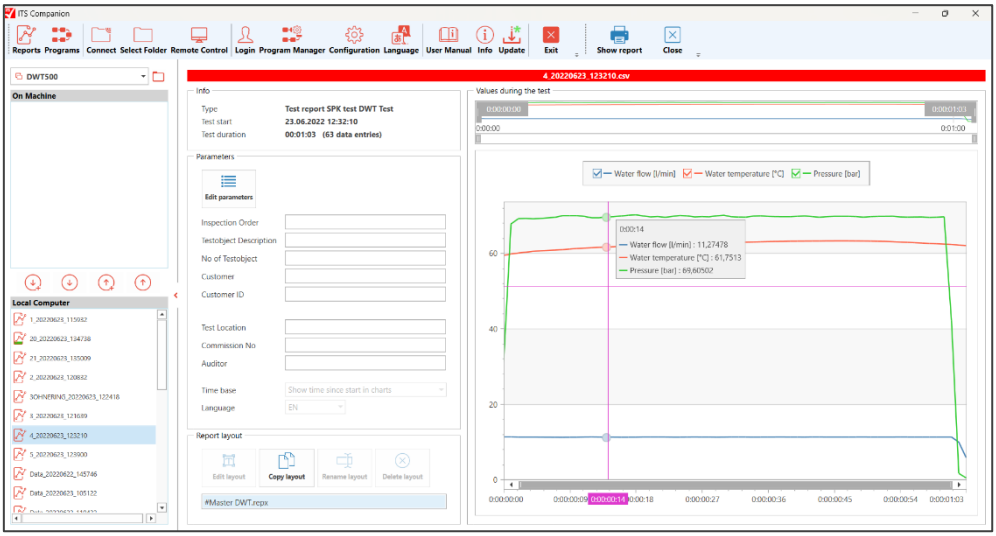
https://its-gmbh.de/wp-content/companion-app/ITS-Companion-v3-Install.zip



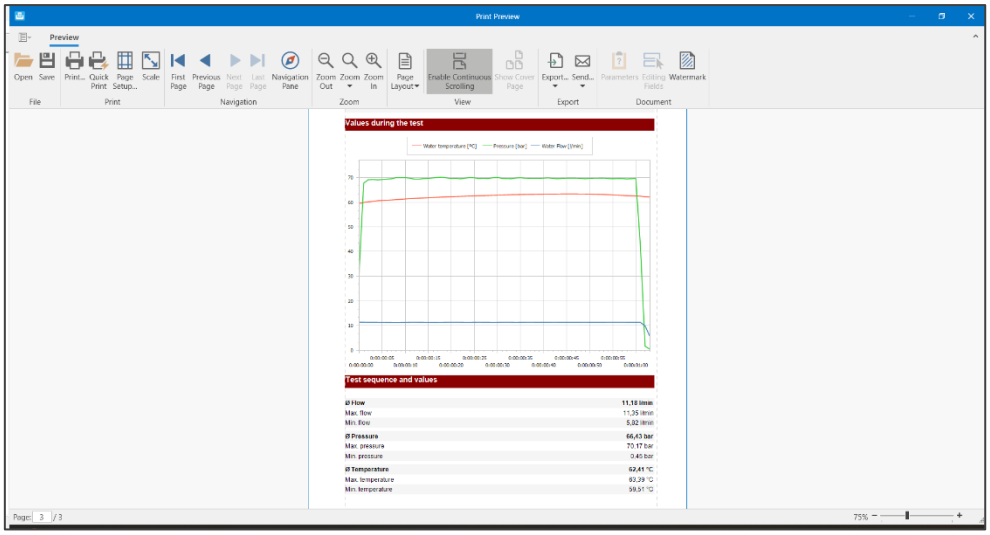
Start screen - iTS Companion App

DWT.OP-210 (12301) - Ethernet interface for data recording incl. iTS Companion App - Pro

- **The iTS Companion App-Pro includes all the functions of the iTS Companion App-Basic.**
- **An Ethernet interface enables the chamber to be integrated into a customer network.**
- **The Ethernet interface is designed as an RJ45 socket on the back of the chamber.**
- **The interface can be used with a fixed IP address or DHCP.**
- **iTS Companion App Pro with the following additional functions compared to Basic:**
    - **Transmission of the recorded data via Ethernet interface**
    - **Creation, organisation and transfer of test programs**
    - **Remote connection via VNC for monitoring the test chamber**
- **Remote connection via VNC to control the test chamber**



Test sequence - iTS Companion App



Standard-Report - iTS Companion App

DWT.OP-212 (14685) – iTS Companion App- Pro Plus

- **All functions of the Basic/Pro version are retained, and an editor is also activated with which all reports can be customised by the customer.**
- **This is a onetime, unlimited activation for all iTS Companion App workstations in the company.**

Note: Only in conjunction with an iTS Companion Pro licence.

OPTIONS - DWT SERIES

DWT.OP-300 (14688) – Flat spray nozzle according to DIN EN 16925

- **The flat jet nozzle in accordance with DIN EN 16925 is calibrated via the jet pattern in a hard foam block at a defined pressure and mass flow.**

DWT.OP-301 (14689) – Flat spray nozzle according to DBL 5416

- **The flat jet nozzle in accordance with DBL 5416 is defined by the manufacturer Spraying Systems and the PowerWash Jet type specification. The ¼ PMEG 2506 is calibrated using the spray pattern in accordance with DIN 55662.**

DWT.OP-302 (14690) – Flat spray nozzle according to BO 160-04

- **The flat spray nozzle according to FORD BO 160-04 is determined by the manufacturer Spraying Systems (or comparable) and nozzle type QVVA 2506.**

DWT.OP-303 (14691) – Flat spray nozzle according to VW PV 1503-A

- **The flat jet nozzle according to VW PV 1503 for the test parameters 1503-A corresponds to a nozzle type EG 2505.**

DWT.OP-304 (14692) – Flat spray nozzle according to VW PV 1503-B/C

- **The flat jet nozzle according to VW PV 1503 for the test parameters 1503-B/C corresponds to a nozzle type ¼ PMEG 2506.**

DWT.OP-305 (14693) – Flat spray nozzle according to SCANIA STD 4234-MEG

- **The flat spray nozzle according to SCANIA STD 4234 corresponds to a nozzle type ¼ MEG 2506-1 at a pressure of 120 bar and a mass flow of 15 kg/min.**

DWT.OP-306 (14694) – Flat spray nozzle according to SCANIA STD 4234-PMEG

- **The flat spray nozzle according to SCANIA STD 4234 corresponds to a nozzle type ¼ PMEG 2506-1 at a pressure of 68 bar and a mass flow of 11.3 kg/min.**

OPTIONS - DWT SERIES

DWT.OP-700 (14695) – Water softening unit

- **A water softening unit is required if the municipal water has a hardness of >6°dH. Using the system prevents nozzles from becoming blocked by limescale and increases the service life of pumps.**
- **The scope of delivery includes a volume/computer-controlled individual softener pre-assembled on a frame with the following features:**
- **Capacity at 10°dH 6000 litres - at 15°dH 4500 litres - at 20°dH 3000 litres, water consumption per regeneration approx. 72 litres,**
- **Connection block with bypass function and blending device, sampling tap**
- **25kg regeneration salt in tablet form**

Note: Necessary power supply on site: 1Ph / 1N / PE / 230V - 50Hz.

NOTE

We reserve the right to make design and technical changes in the interests of further technical development. This applies to the entire technical description.

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VERSION

Version	Change reason	Released on	Released by
2025	New-creation	23.01.2025	CM
2025-01	Link Companion App Picture water softening unit	21.02.2025	CM
2025-2	Adaptation of the standards table	17.04.2025	CM