

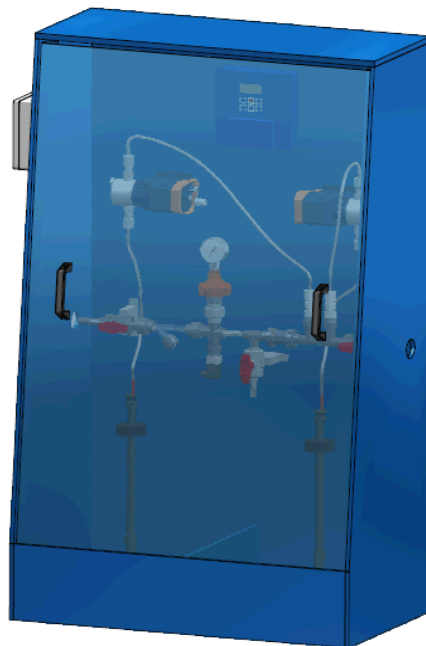
WATER TREATMENT SYSTEM

SCAM T.P.E. SWT-1



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1. PURPOSE OF SUPPLY

Sometimes the water consumption of an operating cooling tower has a significant impact and it is determined by: evaporated water + driven water (through the drift eliminators, but normally less than 0.002% of the water circulating in the tower) + washout water (based on the concentration cycles), the consumed water is periodically re-integrated. The water level in the collecting tank is controlled by an automatic replenishing valve with an independent float (SCAM/VL). As explained the water consumption causes an increase in the salinity. This entails the opening of a washout valve at regular intervals to restore the correct salt concentration of the solution. At the same time the following dosages are effected:

- an anti-scaling (paragraph 3.2) in proportion to the volume of re-integrated water in the circuit in order to prevent the precipitation of the dissolved salts;
- a biocide (paragraph 3.3) through a timed method in proportion to the volume of water in the circuit through regular shock dosages to prevent the proliferation of micro-organisms within the system.

THE WATER TREATMENT SYSTEM SWT-1 (WASHOUT + DOSAGE) consists of a panel that measures the conductivity (SCAM/WCNT) through an automatic control of the chemical products washout and dosage, namely by:

- No. 1 measuring system SCAM WATER CONTROL (SCAM/WCNT) having a conductivity analysis sensor to control an automatic motorised valve of washout on the conductivity of the tower water;
- No. 1 hydraulic components set (PVC pipes, manual interception valves, Y filter, taking of samples, manometer, non return valve) coupling for the pre-installed conductivity sensor;
- No. 1 supply switchboard having a protection breaker;
- No. 1 spherical 2-way solenoid (for washout).
- No. 1 anti-scaling dosage system having an electromagnetic pump complete with a tank aspiration set and a flowmeter (to be installed on the tower water replenishment) and minimum level switch to block the pumps in the absence of the chemical product (low level);
- No. 1 biocide dosage system with an electromagnetic pump complete with a tank aspiration set and minimum level switch to block the pumps in the absence of the chemical product (low level).

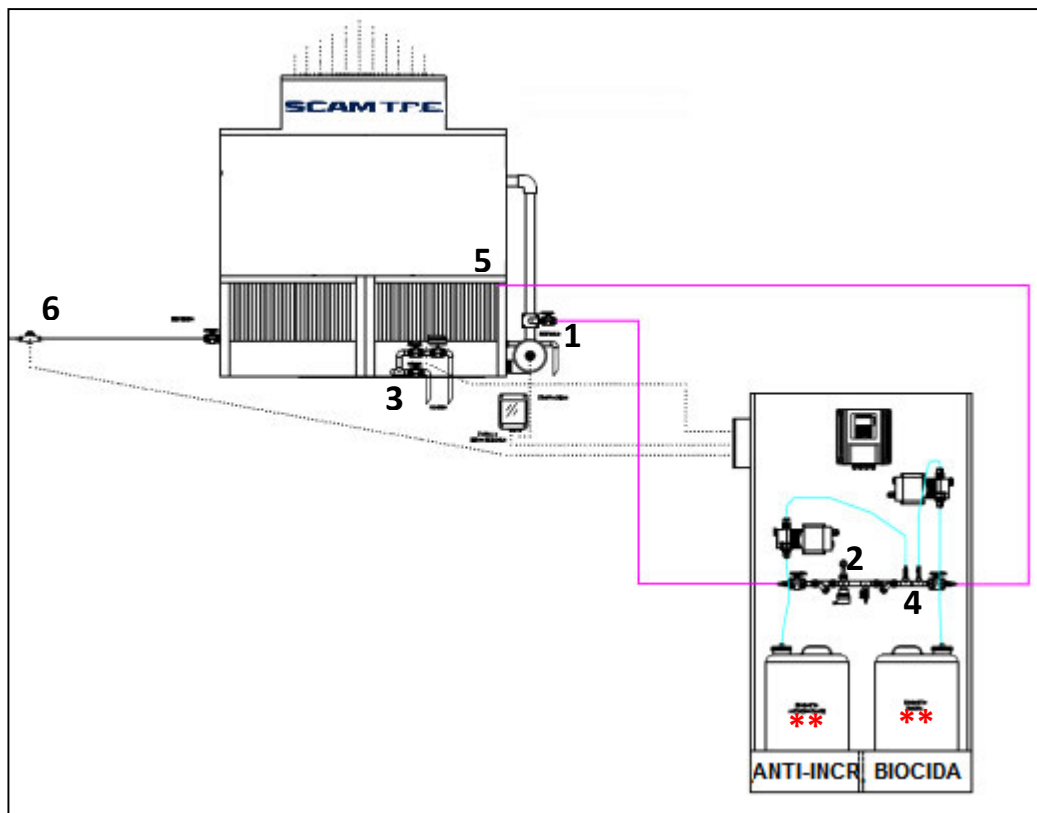
The purpose of supply does not include the biocide and anti-scaling storage tanks that can be quoted and supplied on client's request (normally this is not required since the storage tanks are provided by the chemical products suppliers). The water treatment system can be managed onsite; on client's

request it is possible to manage this remotely by DCS SCAM/SWT-1/DCS (please refer to the separate quote).

2. SYSTEM FUNCTIONING

IN THE WATER TREATMENT SYSTEM SWT-1 the water obtained from the tower circuit spillage (pos. 1) passes through an intercepting manual valve. It will immediately meet a Y filter that withholds any possible impurities, and then comes into the basin, including the probe, where the conductivity meter is placed.

The conductivity sensor (pos. 2), that is equipped with a compensation temperature sensor, measures the conductivity value of the circulating water and compares it to the limit value determined by the user (set-point). If the measurement exceeds the said set-point then the panel proceeds to the opening of the solenoid at 230V in order to also drain the saturated water (pos. 3). The water flowing out of the sensor basin will pass through a sample taking zone and a non return valve before meeting the chemical products injection section (pos. 4), and then being introduced once again in the recycling circuit of the evaporating tower (pos. 5).



** Supplied on request.

Figure 1 – SWT-1 system schematic representation (WASHOUT + DOSAGE).

The two available dosage pumps are placed on the system support panel to carry out:

- 1) the anti-scaling dosage (inhibitor);
- 2) the biocide dosage;

The SCAM/CNPaNPB pump, injects the biocide (pos. 4) periodically, and can be programmed through its own internal timer to enable the product to flow into the circuit in accordance to the desired quantities.

The SCAM/CNPaPPE pump injects (pos. 4) the corrosion inhibiting product in proportion to the replenishing water volume in accordance to the impulses received from the water meter (pos. 6).

3. SYSTEM COMPONENTS

The monobloc skid for the washout control and the chemical products dosage SCAM/SWT-1 and SCAM/SWT-1/DCS is composed of the following components;

Pos.	Description
1	Supply electrical panel with circuit breaker switch
2	Control instrument of COOLCONTROL type
3	Biocide dosage pump
4	Anti-scaling dosage pump
5	Water sample entry point DN 20
6	Spherical valve in PVC
7	Y filter
8	Pressure control manometer
9	Conductivity sensor mod. LMT1
10	Sample taking
11	Non return valve
12	Anti-scaling dosage valve
13	Biocide dosage valve
14	Spherical valve in PVC
15	Water sample exit point DN 20
16	Aspiration set for inhibitor tank
17	Aspiration set for biocide tank
18	Anti-scaling tank (not included)
19	Biocide tank (not included)
20	Skid in PE (RAL 5012) with a protective plastic screen
21	Replenishment water meter
22	Motorised valve for water washout

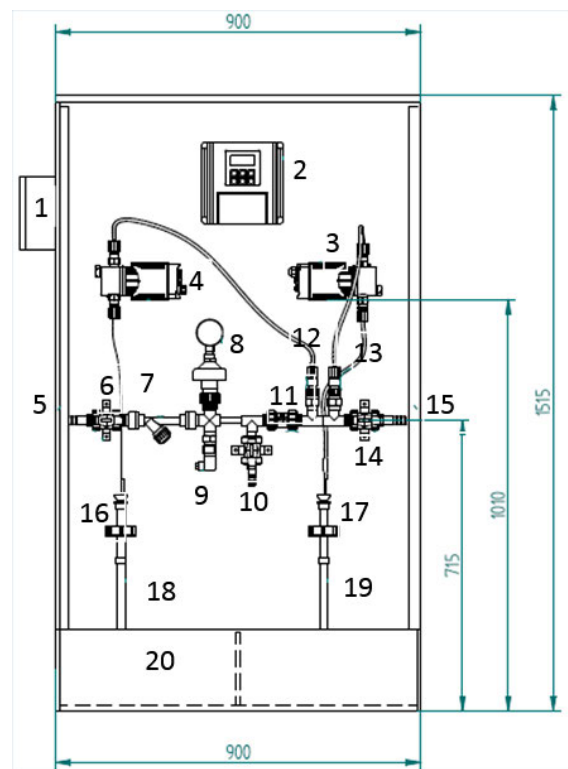


Figure 2 – SWT-1 treatment skid.

The skid has the approximate dimensions of 1100 x 500 x 1500 mm and does not need to be anchored to the wall, but it can be positioned on the floor (anchoring has to be done by the client). The replenishment flow counter and the washout valve are included in the supply in order to ensure the installation's proper functioning, and these have to be hydraulically mounted by the client on the installation and electrically wired (current setup) to the system SCAM/SWT-1 switchboard. The washout valve will not include electrical connecting cables, meanwhile the conductivity sensor and the dosing pumps will be already pre-wired to the electrical panel on the skid's side, that the client will have to electrically supply. The water meter will include 1 meter cable that can be extended, through a junction box, up to the skid by the client.

3.1. CONDUCTIVITY MEASUREMENT INSTRUMENT

The SCAM/ SWT-1 system has an electronic measuring and control instrument, namely SCAM WATER CONTROL SCAM/WCNT, which was purposely studied to be applied to evaporating towers, provides the conductivity measurement by means of a conductive sensor through a 4÷20 mA signal that automatically activates a washout electric valve (IP67, 230V-50/60Hz with threaded sockets). An LCD indicator allows the visualisation of the process signal value and its various parameters. The instrument operates through a conductivity electrode and a temperature sensor (sensor Pt100, 100 Ω at 0°C). The main functions allow the following possibilities:

- an alarm on the maximum opening time for the drainage valve;
- the blockage of the washout for a programmable determined period following the dosage of chemical products or the anticipated washout close to the chemical product dosage;



Figure 3 – Spherical motorised 2-way valve + SCAM WATER CONTROL.

Table 1 - Technical characteristics of the SCAM WATER CONTROL device

Conductivity entry

Measuring range	0.0...500/2000/5000 μ S/cm 20 mS/cm
Cell constant	0.006...12 cm ⁻¹
Accuracy	0.5% of the measuring range
Resolution	0.0625% of the measuring range

Input / Output

Block input	Washout block control when the pump is off
Electricity output	4.00...20.00 mA programmable and proportional to the cond.
Single relay output	contact 3A/250V through an electro-valve command

Overall dimensions

External dimensions	189x200x76H mm
Protection class	IP65 (for environments having a high humidity content)
Installation type	to a wall
Display type	Illuminated through a key protected access
Electric supply	230VAC / 50/60Hz

Table 2 - Technical characteristics of the conductivity sensor

Measurement scale	0.1...20 mS/cm
Cell constant	1 cm ⁻¹ \pm 5%
Temperature sensor	Pt100
Max. temperature	70°C
Max. pressure	16 bar (@ 50°C)
Electrodes/body materials	Steel 1.4571 / PP

3.2. INHIBITOR DOSAGE (ANTI-SCALING) THROUGH A PROPORTIONAL METHOD COMBINED WITH A WATER METER.

The **SWT-1 (WASHOUT + DOSAGE)** system, includes a SCAM/CNPapPE membrane electromagnetic dosage **pump** for the anti-scaling dosage, including a cast iron turbine water meter for cold water having a reed-switch impulsive outflow for the measurement of the volume of the water flowing by local modality on the panel mounted on a protective frame.



Figure 4 – Anti-scaling dosage pump and water meter (threaded sockets) with impulse emission.

Table 4 – Main characteristics of the anti-scaling dosage pump

Supply tension	100... 230 V ac – Single phase - 50/60 Hz ±10%				
Max. capacity	1 to 4	l/h	Max. Pressure	16	bar g.
Max./min. temperature	-10°C...+45°C		Connections:	Hose 6 x 4	
Dosage frequency	0 -180 injections/minute		Dosage per impulse	0.09 mL	
Regulation:	Manual 0-100%				
Note: IP65, power cable - plug EU (2 metres), head manual breather.					
Materials in contact with the liquid					
Head body:	PP		Diaphragm:	PTFE	
Valves:	PP		Seals:	EPDM	
Liquid dosage	ANTISCALING IN WATER SOLUTION				

3.3. BIOCIDES DOSAGE WITH A TIMED METHOD.

The **SWT-1 (WASHOUT + DOSAGE)** system, includes a SCMA/CNPa NPB membrane electromagnetic dosage **pump** for the biocide dosage having an internal timer.

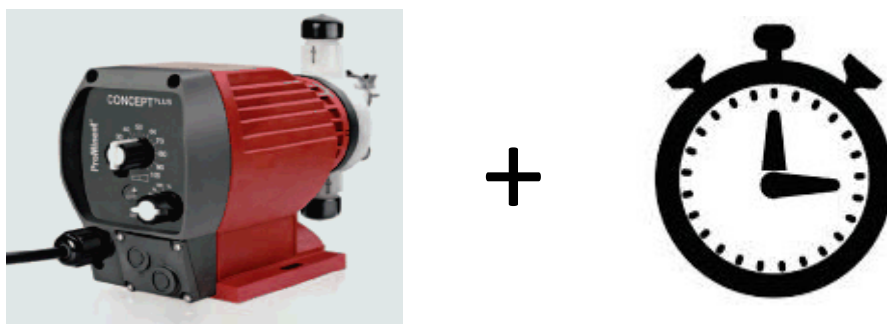


Figure 5 – Biocide dosage timing pump.

Table 5 – Main characteristics of the biocide dosage pump

Supply tension	100... 230 V ac – Single phase - 50/60 Hz ±10%				
Max. capacity	1 to 4	l/h	Max. Pressure	16	bar g.
Max./min. temperature	-10°C...+45°C		Connections:	Hose 6 x 4	
Dosage frequency	0 -180 injections/minute		Dosage per impulse	0.09 mL	
Regulation:	Manual 0-100%				
Note: IP65, power cable - plug EU (2 metres), head manual breather.					

Materials in contact with the liquid			
Head body:	Plexiglas	Diaphragm:	PTFE
Valves:	PVC	Seals:	Viton
Fluid measured out	BIOCIDE IN WATER SOLUTION		

4. CHEMICAL PRODUCTS DOSAGE

The suggested chemical products to be measured out inside the tower water circuit are respectively: a biocide and an anti-scaling, whose dosage depends on the water quality (chemical and biological characteristics) and on specific processing parameters. To ensure the best performance of the cooling tower in accordance to the specific operational conditions of the system, it is necessary to refer to the company providing the said products which remains entirely responsible for the treatment programme.

5. LIMITATIONS

The supply limitations for SCAM T.P.E. S.r.l. in relation to the SWT-1 (WASHOUT + DOSAGE) system are the following:

- The flanges on the aspiration tube and on the skid transmission one
- The terminal glands on the skid's electric cabinet

EXCLUSIONS FROM THE PURPOSE OF SUPPLY

- Supply of the anti-scaling and biocide storage tanks (only upon request).
- First supply of the chemical products.
- Provision and installation of all the components onsite.
- Wiring of the electrical supply connections.
- Electrical cables for the washout valve.

6. DOCUMENTATION

The documentation, which will be provided to the client, will include the user and maintenance manuals regarding the instruments and dosage pumps.

7. GUARANTEE

The contractual guarantee is deemed as starting from the provision of the materials for 24 months for all electronic parts; of 12 months for the hydraulic parts.

Damages due to force majeure are excluded from the guarantee as well as damages against third parties and/or suppliers. The guarantee does not cover transport costs and the workforce onsite.

For a specific quote, please contact SCAM T.P.E. S.r.l. Commercial Department.