

FAS / FASF SERIES – WATER COOLING TOWER

TECHNICAL SPECIFICATIONS



The FAS / FASF series (the last one with double FRP layer insulated with poliuretanum with a total thickness of 22 mm) are dedicated to every industrial sector with a modular conception with an high versatility and reduced assembly period. These models are characterized by SCAM T.P.E. well defined standards with performances over 15 MW and are supplied with a preassembled structure in hot galvanized steel according to EN ISO 1461 standard with purity UNI1179. The cooling tower body is thus composed by several assembled modules that composed together give shape to a single structure. The FAS /

FASF series are equipped with sandwich insulated walls (22-26 mm thick), made of an expanded polymer covered by an external layer in FRP, which guarantees an excellent aesthetics and a higher durability.

The stacks and the collecting basin are supplied with an hybrid treatment effected on wrought carpentry SCAMBOND/HYB made up of a first galvanizing coat on blasted surfaces Sa3 ISO8501-1 plus a specific epoxy-polyamidic bi-component cycle and further applying on it another coat of aliphatic-polyurethanic bi-component type, with dimensions compatible with road and ocean trasport. The ordinary maintenance and sometimes even the straordinary one is ensured by oversized ispection doors

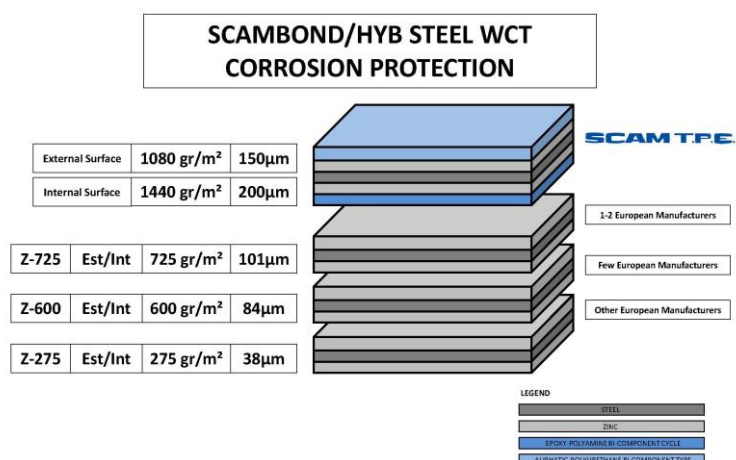


placed for every cell / fan unit and to a removable maintenance wall with straps for a secure hand grip. The fan units are planned for a long life and with components of utmost quality, with a very easy maintenance program.

The SCAMBOND/HYB protection system is among the most complete exterior protection cycle available on the market without having to pass to the stainless steel (which has, in any case, various limitations due to its metallurgy), developed during several decades of experience and many tests on field.

What is it ? It's an hybrid treatment effected on wrought carpentry made up of a first galvanizing coat on blasted surfaces Sa3 ISO8501-1 plus a specific epoxy-polyamidic bi-component cycle and further

applying on it another coat of aliphatic-polyurethanic bi-component type. FASF serie is



characterized by a basin with DURABOND/HYB protection cycle instead of SCAMBOND/HYB. This protection system, on internal surface, consists of three fiberglass layers on wrought and blast cleaned surfaces, which guarantees an excellent corrosion resistance.

COOLING TOWER STRUCTURE

The structure is characterized by profiles made of galvanized steel using hot immersion process according to UNI EN ISO 1461 standard with purity UNI1179. The main features are stainless steel bolts, lightness and solidity of the main structure. This structure typology envisages the utilization of lateral cover panels realized in FRP, in galvanized/painted steel, in aluminum or insulated sandwich 22-26 mm (FAS execution

with best acoustic qualities) allowing an easy extraordinary maintenance and allowing moreover the tower renewal both in a functioning way and an aesthetic way, which

COMPOSIZIONE

Vetroresina rinforzata con fibre di vetro in mat, stuoia o mat+stuoia. Trattamento superficiale in gelcoat (resina isoftalica) ad altissima protezione verso gli agenti atmosferici / chimici / raggi UV e idonea al contatto con

Polistirene estruso / espanso. Degrado termico e meccanico nel tempo trascurabile.

Possibilità di inserimento lastre in plywood e rinforzi in piastre o tubolari di ferro e alluminio come da disegno del cliente.

CARATTERISTICHE TECNICHE COMPONENTI

Vetroresina - VTR		Proprietà nucleo	
Grammatura fibra di vetro	300~1125 gr/mq	Temperatura di esercizio	-50 / 75
Spessori	1~2 mm	Densità	30 – 35 – 40
Colore standard	Ral 9016	Resistenza al fuoco	Euro classe E
A richiesta	Vari colori RAL Certificazioni		



inevitably deteriorates in the passage of time.

FAN UNIT

For FAS / FASF series of classic induced execution towers, the choice about the type of fan is almost obliged. For the dimension in length upto 3,6 mt, the electric motor is placed inside the saturated air flow, the motor foreseen for utilization in saturated ambient is asynchronous three-phase TEFC with SKF bearings type 2RSC3, with watertight oiled, IP55 which ensures durability. On the same an axial fan in fiberglass or in aluminum alloy is placed. In case of higher dimensions (for example over 4,4-4,8 in length) the electric motors is placed outside the flow of saturated air, gear shafts which activate speed reduction units with orthogonal axes, onto which light alloy or glass reinforced plastic fans are keyed, diffusers with or without dynamic recovery, and central lubrication taken outside the diffuser are the main features.



Axial fans : With multiblade solution, have the function to ensure the cooling tower with the necessary air volume. The axial fan is placed on the cell high section (levelled with tower planking level) and it is directly coupled on the motor drive shaft or, as explain on

the low speed velocity shaft of the reducer (indirect coupling). The high efficiency blades are of asymmetric profile “NACA” aeronautic type, balanced with “PALA MASTER” system; all the blades are equipped with the adjustable incidence solution with still fan in order to better optimize the tower performances and the electric power consumption. The constituent materials are the galvanized steel for the hub and the 6060T5 aluminum (or FRP) for the blades.

Electric motors : are planned for severe conditions with continuous working type S1 asynchronous three-phase TEFC with SKF bearings type 2RSC3 with watertight oiled IP55 + SCAM specifications placed inside the flow crossing the truncated cone stacks for a better fluo-dynamic distribution. In case of indirect transmission the electric motor is high efficiency IEC3 like new european norm IEC 60034-30 (in this case the motors are located outside the wet steam air flowing in the GRP fan stack). The electric motors frames are designed to transfer the dynamic loads to the cooling tower structure, minimising vibrations and allowing an easy and intuitive maintenance. All the rotating parts outside the stack are protected against accidental interferences in accordance with the most updated safety standards.



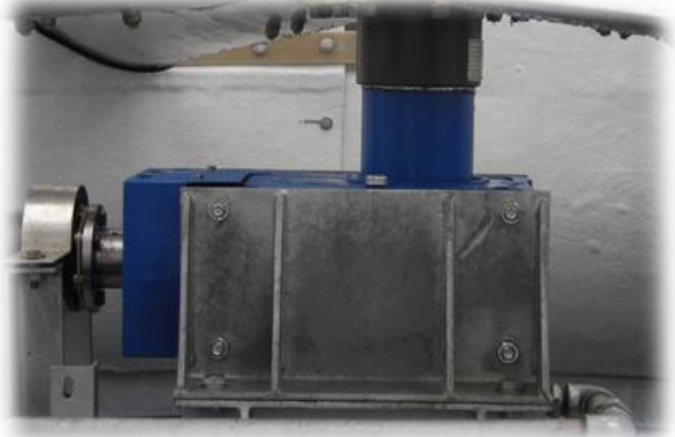
Drive shafts (with indirect transmission): They transmit the movement from the electric motor to the gear-box. The supplied floating type has the primary function to accommodate the slight shaft misalignments which can happen in service; to absorb shocks, vibrations and pulsations; minimise installation and maintenance difficulties.



Gear boxes (with indirect transmission) : The gear box is geared to reduce speed of the electric motor to speed required by axial flow fan. The box is perfectly waterproof to avoid any leak of water; seals on slow shaft and high velocity shaft are of labyrinth type.

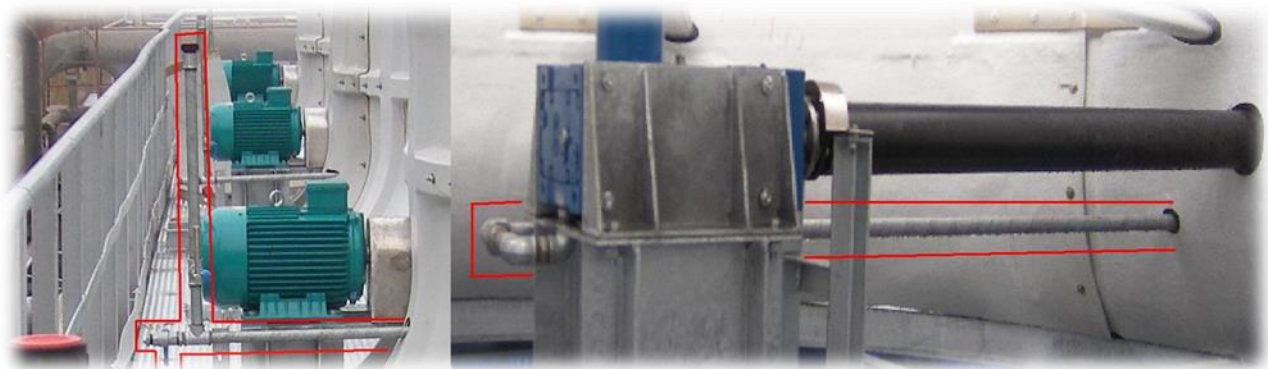
The box is properly stiffened to resist to the stresses that are acting during running, and to reject heat without any auxiliary cooling system.

The construction and sizing is in accordance with AGMA codes (at least AGMA 2 on the absorbed power).



OIL & GREASE PIPES (indirect transmission) : The mechanical system is provided with following oil and grease pipes:

- ✓ Reducer breather which is extended outside the fan stack to prevent oil contamination from water and steam coming out the cooling tower.
- ✓ Pipe for oil filling and draining; the same pipe is used for both operations with the help of a discharge valve on the fan deck.
- ✓ Level indicator on the fan deck which is perfectly aligned with the glass indicator existing on the box of the gear reducer.



Vibration cut-out :

All cells/ventilation unit is equipped with a switch that cut the supply power line in case of high vibrations and is located outside the fan stack on the gear box tank.



STACKS

Direct transmission : All the mechanical groups in each cooling tower cell has an high thickness steel stack with SCAMBOND/HYB protection. Each stack has a circular inlet junction and a pyramidal section, the outlet section is designed to reduce pressure and at the same time recover pressure obtaining an high efficiency of the axial fan. The stacks are fixed to the structure through dedicated bolts by securing them to the tower planking level.

Indirect transmission : Mechanical equipment in each cell of the tower has a fiberglass reinforced polyester fan stack. Each stack has a belled inlet and conical, diverging exit for reduced air pressure drop losses and pressure recovery for high axial flow fan efficiency. Fan stack sections are connected via lap joints allowing field adjustment of the stack diameter and control of the fan blade tip clearance maximixing fan performances. The axial flow fan



stacks are secured to the structure by through bolts attached to deck joints. Each stack has a removable access panel opening for maintenance on the fans and gears.

WATER DISTRIBUTION SYSTEM

Inside the cooling tower upper section is placed the distribution system “pressure” or “pressure” type. It is composed by a main channel connected to PVC/HDGS secondary ones whereon the spray nozzles are placed to ensure a water uniform distribution upon all the dispersion section. The a.m. nozzles are of **Eco** type. This innovative spray nozzle has been designed to reach the following main goals:



- ✓ Large square water distribution (approximately 1 m²) in order to avoid any possible overlapping of the nozzles distribution on the same dispersion surface.
- ✓ Uniform hydraulic load in order to avoid any air bypass where the load is low and not equally supplied.
- ✓ Lower distance between nozzle and filling (600mm) in order to reduce the pumping elevation.
- ✓ Low pressure of utilization in order to reduce the pumping elevation.
- ✓ Self cleaning surface by means of dedicated hydraulic impeller.
- ✓ Anti clogging.





LADDERS AND HANDRAILS

All cells of FAS / FASF SERIES are equipped with the following items, designed in accordance with the most updated safety regulations and to satisfy the most demanding plant standards:

- ✓ Back-up frame to mechanical groups.
- ✓ Safety handrails.
- ✓ Access ladder to deck.
- ✓ Inspection Hatch.

SPECIAL EXECUTIONS

The SCAM T.P.E. cooling towers might be supplied with SS304/SS316 structure and casing, where the needs of the project impose to use a special steel execution, in connection with the water corrosion.

