TLF AIR PARTITION

If the door or the gate of the cooled room is open, the expensive cold air is streaming forth and the external warm air sweeps in.

Fig.: Air change between the external and the internal area

The open doors and gates mean a great loss of heat. The cool internal air is streaming out of the cooling chamber near to the floor level, whilst the external warm air sweeps in the cooled area at the upper part of the open door or gate. Thus the temperature of the room is growing. This phenomenon is increased by the wind, the air pressure caused by the fans of the refrigerating equipment and the possible untightness of the building, respectively. The warm air streaming in must be cooled down to the temperature of the internal area, which means a high additional energy consumption.

Fig.: A = WORKING BLOW OFF LENGTH
B = OVERALL LENGTH
C = OVERALL LENGTH WITH ONE FAN

Type identification

Explanation of air partition type identification: e.g.: TLF 2 – 3

Type identification
Number of engines
Working blow off length [m]

Principle explanation of electrical design with engine arrangement on the right side (facing the door opening).

The air jet of the installed air partition equipment blocks the intensive air change commencing through the open doors, ensuring the following advantages for the user:

- decreases the loss of energy,
- blocks entering of dust and other contaminants,
- keeps off the higher humidity of the external air (sweating out on the goods when cooling down),
- prevents warming up of the goods arranged next to the doors.

Table: **Comprehensive table of TLF type air partition**

Construction

The TLF air partition family is designed for a top blow off mode. They are to be mounted horizontally above the external side of the doors of the area to be protected.

They have a simple construction, assembled from typical panels.
The air partition is a plate cylinder opened at one or both ends having a tangential blow off opening in the full length of its generating line.

A similarly cylindrical reinforced fan housing is connected to the flanges of the open end by means of bolted joint. In these housings axial fans producing the air jet are placed. The impellers are mounted directly onto the electric engines' shaft. The fans facing each other have a contrary rotation direction. The electric engines are of three phase, short-circuit type.

In the blow off opening there are guide-blades ensuring the air jet speed stability at whole length of the blow off opening.

The body of the air partition is made of unalloyed aluminium plate, scaled or painted, or of stainless steel plate, respectively. Hereby the longtime endurance of the equipment is ensured.
The intake of larger foreign pieces and the incidental touching of the impellers is prevented by means of protective grids.

Assortment

The air partition can be manufactured in a standard form with a diameter of 400 mm and a working blow off length of 2; 2,5; 3; 3,5; 4; 4,5 meters according to the dimensions of the gate or the door, as well as in compliance with the installation possibilites. They are manufactured with one or two fans. The one fan types may be purchased with right-hand and left-hand arrangement. On the standard type the fan is mounted on the right side.
In case of special demands individually designed and constructed air partition can be manufactured, as well.

Operation

Our air partition is developed with accurate design and experimental labour. Its parameters make it suitable for general use in refrigerating plants up to a door height of appr. 3,5 m.
In other cases it is expedient to consult the manufacturer!

Fig.: Neutral fibre

The air partition means inevitalble accessories of the refrigerating plants, cold-storage plants and cold-stores. By means of this significant energy saving can be achieved and it prevents considerably the undesirable air change between the external and internal area.

MIRELTA makes efforts to provide the honoured customers and purchasers with the **best** services in every respect, in compliance with their demands.

To meet this requirement our company has introduced in the year 1997 the

QUALITY ASSURANCE SYSTEM
ÖNORM EN ISO 9002

which **is used** in the field of

- **production**
- **installation**
- **customers' service**

complying with the prescribed requirements.

Our specialist are available for our kind customers for further informations at any time.

THT COOLING TOWERS

Principle of operation

In the cooling process the water is sprayed onto specially shaped plastic water film cartridges with large surface.
The water running down on the cartridge surface meets the air circulated in counter-stream by the fans. As a result of the heat exchange taking place the water cools down, while a part of it evaporates. When getting in contact with the air the water washes out the dust and the contaminants from the air, at the same time the concentration of foreign materials in the water rises continuously due to evaporation. If this increase of the amount of contaminants gives rise to troubles during operation, a closed-circuit refrigerating plant should be used.

Standard type

The bottom part of the cooling tower is a painted **drop tray** made of steel plate, on which the air intake grids and some elements of the water circulating system (water refilling, overflow, water suction stud) are arranged. At the bottom of the drop tray a **steel framework** is placed for fixing and supporting.
On the drop tray the middle is mounted part including the **plastic cooling cartridge and the water sprayer system**, coated with painted and zinc plate.
The air is directed by the **fans** from the bottom to the top. The fan housing is the highest element of the THT cooling tower.
The members of this type family differ only in the number of built-in cartridges and fans, when designing them the principle of box of bricks was used.
The **drop separating unit** is a special plastic cartridge, ensuring the satisfactory separation with a little air resistance.
The replacement of the small water quantity, casued by the evaporation and removed by the air stream is carried out automatically, by means of the water replacing **float valve**. The possibly occuring water excess is drained off by the overflow stud of the reservoir.

Options (with additional charge)

- silent fan
- noise insulation
- auxiliary water circuit pump
- fan rim heating
- electrical drop tray heating
- water treating equipment.

Transport and installation

In transport lifting can be carried out – after removing the air box – by means of the lifting rings on the top side of the modules using a rope (the minimum rope angle is 45°).
On the installation site the equipment must be lifted on the suitably prepared groundwork, or framework.
During installation it must be considered, that the air supply and the access for cleaning must be ensured. When connenting the water and voltage supply the effective standards must be considered. After completing the electrical installation the proper direction of fan rotation must be checked.

Fig.: **Selection reference**

The main data required for the selection are:
Quantity of water to be cooled: Mv [m^3/h]
Humid temperature of the environmental air: tn [°C]
Cooling zone: Δt_w [°C]
Δt_w: = $tw_1 - tw_2$, where
tw_1 is the temperature of the water to be cooled [°C]
tw_2 is the temperature of the cooled water [°C]
Δt_w = cooling zone = $t_{w1} - t_{w2}$ [°C]
On the basis of t_n and the cooling zone the temperature of the cooled water belonging to the given water quantity can be established by means of the diagram. The diagrams concern the modules THT-40 and THT-50. For selecting other units, or in case of different operational conditions, please, consult our company.

The THT cooling tower family is of modular construction, i.e. the different types are assembled from different combinations of both standard types THT-40 and THT-50.

Connecting studs:

C1 Pump
C2 Water sprayer
C3 Overflow stud
C4 Auxiliary water supply connection
C5 Drain stud

TABLE 1.

Type		
Max. water temperature		
Cooling zone		
Air stream		
Fan	standard type	
	standard type	
Water sprayer resistance		
Water quantity	nominal	
to be circulated	maximum	
	minimum	
Pump connection		
Water sprayer stud		
Net weight		
Noise level	standard type	1440 l/min
	noise insulated	1020 l/min

IN TABLE 1. the noise level of the THT type cooling towers is given for outdoor installation, at a distance of 30 m and a height of 1,5 m. In case of other distances the noise level can be determined by means of the correction factors of TABLE 2.

TEG CLOSED-SYSTEM EVAPORATIVE COOLERS

Principle of operation

The fluid to be cooled is cooled down in the pipe system of smooth pipes. The heat exchange taking place in the pipe system is of evaporative character, i.e. the fluid to be cooled transmits its heat through the pipe wall to the water sprayed on the external surface of the pipe and partially being evaporated there. The heat exchange between the evaporating water and the air takes place by evaporation and in a convective way. The „evacuation" of the drops taken away by the air from the sprayed water is prevented by a plastic drop separator.
The water running down from the pipe system is collected in the drop tray, it is to be returned from here to the spraying system.
Loss of water caused by the evaporation is replaced automatically by the water replacement float valve. The possible excess water is drained down by the overflow stud of the reservoir.
In case of danger of frost the equipment must be operated with antifreeze cooling fluid.

Standard type

The TEG type closed system evaporative cooling tower family was developed for fluid recooling tasks of industrial scale. The equipment is also suitable for liquefaction of steam.
The bottom part of the fluid cooler is a painted **drop tray** made of steel plate, on which the air intake grids and some elements of the cooling water circulating system (water refilling, overflow, water suction stud, cleaning stud) are arranged. At the bottom of the drop tray a **steel framework** is placed for fixing and supporting.
On the drop tray the middle part is mounted including the **heat exchangers and the water sprayer system**, coated with painted and zinc plate.
The air is directed by the **fans** from the bottom to the top. The fan housing is the highest element of the equipment.
The members of this type family differ only in the number of built-in cartridges and fans, when designing them the principle of box of bricks was used.
The **drop separating unit** is a special plastic cartridge, ensuring the satisfactory separation with a little air resistance.
The replacement of the water quantity, casued by the evaporation and possibly removed by the air stream is carried out automatically, by means of the water replacing **float valve**. The water excess occuring from time to time is drained off by the overflow stud of the reservoir.
The TEG type evaporative cooling tower is subjected to a 25 bar test pressure examination carried out by the manufacturer.

Options (with additional charge)

- Zinc plate pipe system
- Silent fan
- Noise insulation
- Axiliary water circuit pump
- Fan rim heating
- Drop tray heating
- Water treating equipment.

Transport and installation

On the installation site the equipment must be lifted on the suitably prepared groundwork, or framework.
During installation it must be considered, that the air supply and the access for cleaning must be ensured. When connenting the water and voltage supply the effective standards must be considered. After completing the electrical installation the proper direction of fan rotation must be checked.

Fig.: **Selection reference**

The volume flow rate correction factors are: TEG 30: 1, TEG 60: 2, TEG 90: 3, TEG 120: 4

The main data required for the selection are:
Quantity of water to be cooled: Mv [m^3/h]
Humid temperature of the environmental air: tn [°C]
Cooling zone: Δt_w [°C]
$\Delta t_w = tw_1 - tw_2$, where
tw_1 is the temperature of the water to be cooled [°C]
tw_2 is the temperature of the cooled water [°C]
Δt_w = cooling zone = $t_{w1} - t_{w2}$ [°C]
On the basis of t_n and the cooling zone the temperature of the cooled water belonging to the given water quantity can be established by the diagram. When making use of the diagrams the volume flow rate correction factors must be considered. In case of different operational conditions, please, consult our company.

The TEG closed system evaporative coolers are of modular construction, i.e. they are assembled from the combination of the standard type TEG 30.

Connecting studs:
C1 Pump
C2 Water spray
C3 Overflow stud
C4 Auxiliary water supply connection
C5 Drain stud
C6 Cooled medium in
C7 Cooled medium out

TABLE 1.

TYPE		
Air stream		
Fan	standard type	
	standard type	
Water sprayer resistance		
Quantity of	nominal	
cooled water	maximum	
	minimum	
Quantity of auxiliary water supply		
Cooled water stud		
Cooled water stud		
Pump connection		
Water sprayer stud		
Net weight		
Noise level	standard type	1440 l/min
	noise insulated	1020 l/min

IN TABLE 1. the noise level of the TEG type evaporative cooling towers is given for outdoor installation, at a distance of 30 m and a height of 1,5 m. In case of other distances the noise level can be determined by means of the correction factors of TABLE 2.

TEK EVAPORATIVE CONDENSERS

Principle of operation

The TEK type evaporative condenser is a heat exchanger unit built in cooling systems of industrial scale. The high pressure cooling medium coming from the cooling compressors is condensed in the smooth pipe **liquefaction pipe system**. The heat exchange taking place in the pipe system is of evaporative character, i.e. the cooling medium transmits its heat through the pipe wall to the water sprayed on the external surface of the pipe and partially being evaporated there. The heat exchange between the evaporating water and the air takes place by the evaporation itself and in a convective way. The cooled and condensated cooling medium can be drained off by the fluid studs. The water spray rising up is separated by a special plastic cartridge (drop separating unit).

Standard type

The bottom part of the condenser is a painted **drop tray** made of steel plate, on which the air intake grids and some elements of the water circulating system (water refilling, overflow, water suction stud) are arranged. At the bottom of the drop tray a **steel framework** is placed for fixing and supporting.

On the drop tray the middle part is mounted including the **heat exchanger and the water sprayer system**, coated with painted and zinc plate. The air is directed by the **fans** from the bottom to the top. The **fan housing** is the highest element of the TEK type condenser. The members of this type family differ only in the number of built-in cartridges and fans, when designing them the principle of box of bricks was used. The **drop separating unit** is a special plastic artridge, ensuring the satisfactory separation with a little air resistance.

Caution: On the TEK type and the TKA type a drop separating unit is used in the standard design instead of the former steam pre-cooler.

The water running down from the pipes is collected in the drop tray, it is to be returned from here to the spraying system by means of pumps. The replacement of the small water quantity, casued by the evaporation and removed by the air stream is carried out automatically, by means of the water replacing **float valve**. The possibly occuring excess water is drained off by the overflow stud of the drop tray.

The TEK type evaporative condenser is subjected to a 25 bar test pressure examination carried out by the manufacturer.

Options (with additional charge)

- Zinc plate pipe system
- Silent fan
- Noise insulation
- Axiliary water circuit pump
- Fan rim heating
- Drop tray heating
- Water treating equipment.
- Steam pre-cooler

Transport and installation

In transport lifting can be carried out – after removing the air box – by means of the lifting rings on the top side of the modules using a rope (the minimum rope angle is 45°). On the installation site the equipment must be lifted on the suitably prepared groundwork, or framework. During installation it must be considered, that the air supply and the access for cleaning must be ensured. When connenting of water, NH_3 and voltage supply the effective safety standards and regulations must be considered. After completing the electrical installation the proper direction of fan rotation must be checked.

The resistance on the internal side of the condensers is less than 0,35 bar, thus it is enough to use a connection of a 70 cm loop pipe on the fluid side.

Fig.: **Selection reference**

In TABLE 1. the nominal performance (Q_n) of TEK evaporative condensers regards a cooling system operating with a screw compressor. The data apply to t_n = + 18 °C environmental humid temperature (+ 27,3 °C dry temperature and 40 % humidity) and t = + 35 °C condensation temperature (in clean conditions).
The specifications in the table are based on the data determined in measurements carried out under practical conditions. For other temperature conditions the performance can be determined by means of factors f_1 and f_2 given by the diagrams.
In evaporative operation the actual performance of the condenser is: $Q = f_1 \times f_3 \times Q_n$.
Without operating the water sprayer system: $Q = f_2 \times f_3 \times Q_n$.
When using piston compressors a performance surplus of 5 to 10 % can be sonsidered compared to the catalogue specifications, i.e. f_3 = 1,05 to 1,1.

The TEK condensator family is of modular construction, i.e. the different types are assembled from the combination of both standard types TEK-55 and TEK-85.

Fig.:
C1 NH_3-steam
C2 NH_3-fluid
C3 Water sprayer
C4 Pump
C5 Auxiliary water connection
C6 Overflow stud
C7 Drain stud

TABLE 1.

TYPE		
Nominal cooling performance	1440l/min	
	960l/min	
Maximum secondary water consumption		
Air stream		
Fan	standard type	
	standard type	
Quantity of water to be circulated		
Water sprayer resistance		
NH_3 connection	pressure pipe	
	fluid pipe	
Pump connection		
Water sprayer stud		
Net weight		
Noise level	standard type	1440 l/min
	noise insulated	1020 l/min

IN TABLE 1. the noise level of the TEK type evaporative condensers is given for outdoor installation, at a distance of 30 m and a height of 1,5 m. In case of other distances the noise level can be determined by means of the correction factors of TABLE 2.