پرکننده نوع ترکیبی TURBO splash PAC® PANEL

ساخت شرکت توان افزار تحت لیسانس شرکت NERI ایتالیا

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TURBOsplash PAC®

TURBOsplash PAC® - EVAPORATION PANELS FOR ALL COOLING TOWERS
ADVANTAGES

MORE SECURE - MORE EFFICIENT - UNIVERSAL

- **The best for dirty and clean water applications**
- **Less resistance to the air saves electrical energy**
- **No clogging**
- **Resists to high temperatures up to 110℃**
- **Works well with different chemical agents**
- **Strong structure permits several cleanings**
- **Easy assembling by snap-together system**
- **No glue is used**
- **Different configuration for different performance**
- **High efficiency**
- **For revamping of all existing towers**
- **Made of Polypropylene that can be recycled**
- **Occupies little space during transport and storage**
- **Protected by Patent in most industrialized countries**
- **Can be installed in all Cooling towers**

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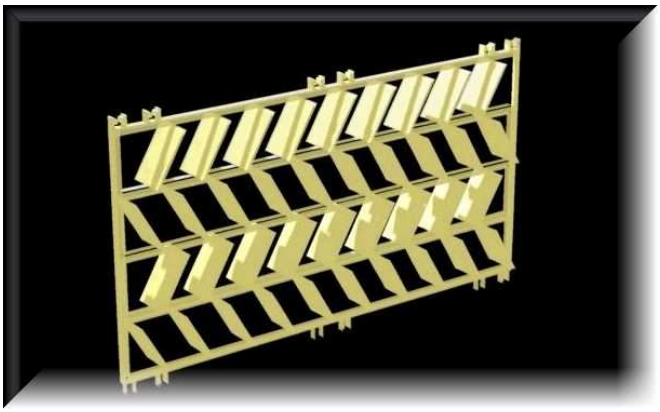
TURBOsplash PAC® - EVAPORATION PANELS FOR ALL COOLING TOWER WHAT IS IT?

THE DESIGN OF THE PANELS

The TURBOsplashPAC® Evaporation Panel System is an injection molded, Polypropylene, 30 cm by 60 cm, (1ft by 2 ft) "U Channel" frame made with four sections and a total of 38 blades molded perpendicularly to this framework. The blades are positioned as leaves are attached to the branch of a tree, and are used as surface area to be wet with a water film, as a series of steps over which water is splashed falling from one blade to the next, and as air conduits directing a reciprocating or spiraling air flow that helps to further break the water droplets and create a mist or fog condition that transfers a maximum of heat from the surface of the water to the air.



ONE SINGLE PANNEL

THE SYSTEM OF CONNECTION

Mechanical attachment points are provided on the long 60 cm (2ft) sides of the panel in the form of a male/female snap-together system which faces both inside and outside in order to connect two panels together face to face and then connect these double units together back to back. On each short 30 cm (1ft) side of the panel there is a molded pin and a tear-off perforated strap.

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PANEL FEATURES YIELD USER BENEFITS

BENEFITS IN TOWER OPERATION

Blade angles are designed not only to spread and splash water but to move air in vortices, which mixes air and water droplets with maximum effect. With superior air/water mixing the air passages can be as wide as 50 mm and still the pack yields cooling capacity similar to tighter traditional fill packs.

Wider air passages remain open even under worst case encrustation conditions, which for traditional packs close off the air flow and radically alter the liquid to gas ratio. The cooling capacity of a tower with the TURBOsplash panels isn't reduced below original design parameters.

Polypropylene material withstands even boiling water so these fill packs can function under extreme temperature conditions.

Less resistance to the movement of air (wider passages) absorbs less fan energy to obtain the same L/G ratio and thus saves considerable electrical energy.
Less resistance creates less noise and lowers the cost of sound-proofing.

BENEFITS IN TOWER MAINTENANCE

Panel modules are assembled with a snap-together system and are made with a sturdy, temperature resistant polypropylene plastic. Therefore fill modules can be cleaned with high pressure water or steam jets, and/or the panels can be easily disassembled, mechanically or chemically cleaned, and reassembled to re-use in the tower.

BENEFITS DURING CONSTRUCTION AND MOVEMENT

One standard panel makes all of the different fill module configurations so that different fill materials don't need to be stocked or ordered specially when jobs with different parameters are executed. The 60cm x 30cm (2ft x 1ft) panel size is ideal for building fill modules which will retrofit existing towers. Panels not yet assembled in fill modules nest tightly for shipping and storage requiring less space in the warehouse and less volume during the transport.

BENEFITS THAT RESPECT NEW ENVIRONMENTAL NORMS

Polypropylene material avoids the environmental problems associated with PVC and the injection molded PP can also be recycled, which means that if desired, the panels can have a recycled material content even when they are new.

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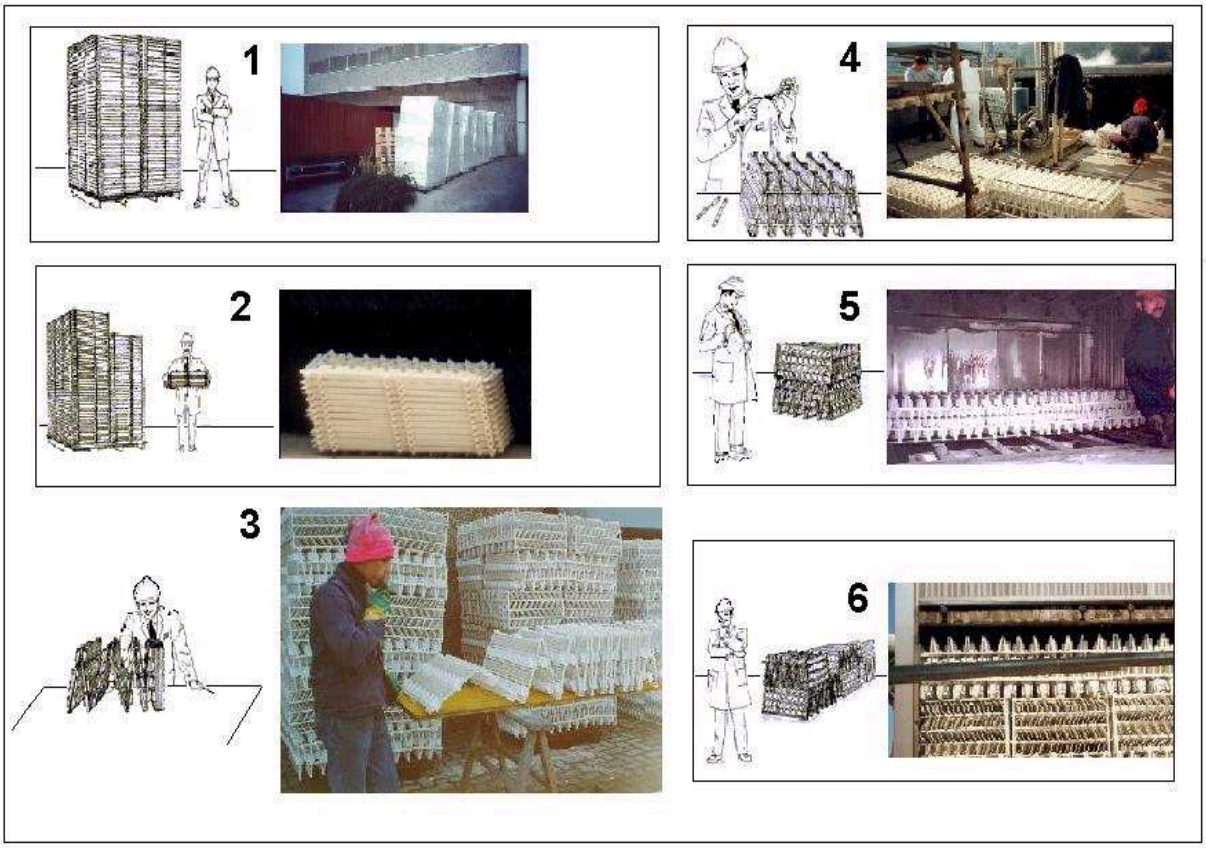
SERVICE SHIPPING UNFORLDING

OUR ENGINEERING SUPPORT
Our technical office can give you all data necessary to dimension and verify the functional conditions of Cooling Towers of any fabrication.

HOW WE SHIP THE PANELS
The TURBOsplash panels are shipped in packs of 24 panels already snapped together on the long side.
1000 panels fit on 1 pallet with dimensions of 100 x 130 x h 217cm (3.24 x 4 x h 7ft) and weight of 650 kg (1430 lb.)

UNFOLDING OF THE PANELS



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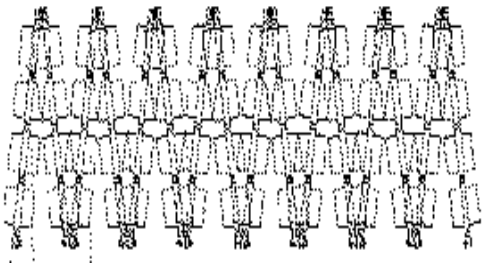
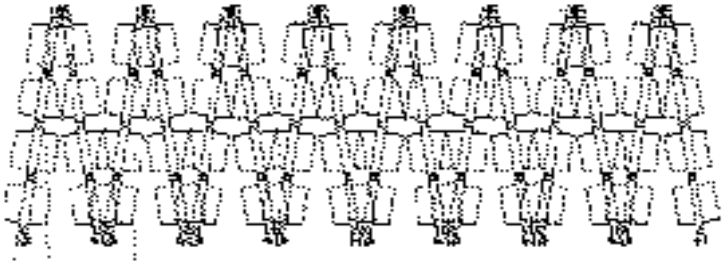
ASSEMBLING

HOW TO ASSEMBLE THE PANELS TO A FILL PACK

Take one pack module of 24 panels that are already snapped together on the long side, and then tear off the straps that are attached on the short side and fix them on the pins using the perforations and forming a variable spacer bar to hold in position a zig-zag fill pack. The zig-zag pattern is either held in an opened pattern or more closed, depending on which series of holes are selected in the spacer strap.



configuration AF 100



configuration AF 150

In this way the panels may be used to create customized fill packs to a variable “density", yielding the required cooling coefficient. The size of the pack module that is produced is 60 cm (2ft) wide by 30 cm (1ft) high by whatever length the zig-zag pattern is continued, (often 120 cm/4ft). Fill modules are placed side-by-side to cover the total floor area of the tower, and then stacked on a second level to make a double level (60 cm high/2ft), or a triple level 90 cm high/3ft), etc.

Panel configurations have been developed that are ideal for both cross flow and counter flow towers. Widely spaced configurations are best for dirty water conditions.

Tighter spaced configurations are best for achieving a minimum approach temperature.

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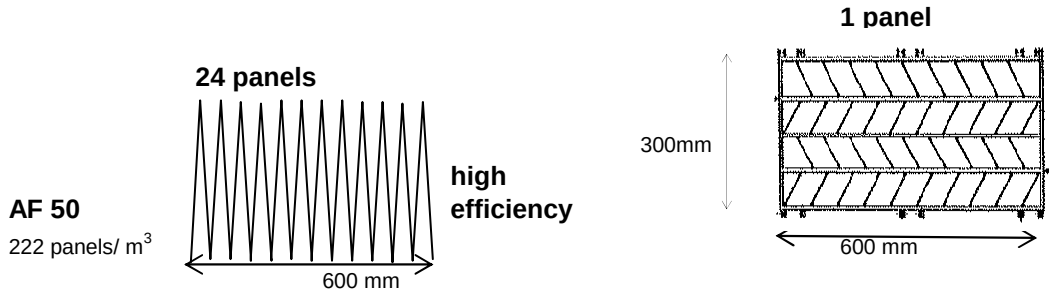

AF 50
222 panels/ m^3

high efficiency

AF 80
138 panels / m^3

AF 100
111 panels / m^3

standard conditions

AF 130
85 panels / m^3

AF 150
74 panels / m^3

dirty water conditions

AF 180
62 panels / m^3

TURBOsplash PAC® - EVAPORATION PANELS FOR ALL COOLING TOWERS
TESTS - OTHER USES - MARKETING CONSIDERATIONS

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TESTING

A test tower was built and inserted in parallel to other towers in a system, between the hot and cold water tank in a plastic injection molding plant, which operates 24 hours a day, 365 days per year.

The test tower was equipped with an inverter so that the fan speed could be varied and air velocity measured, and a control valve with flow measurement instrumentation was also installed on the hot water supply. Hot water temperature could be varied by shutting down different combinations of the parallel towers. Wet bulb temperature also varied because the tests ran for a period of a full year.

Tests were made on various prototypes and finally on the definitive panel, molded in plastic and assembled in the four different basic fill configurations. Parameters were varied according to the test schedule and all resulting data was collected on a computer logging system. This data was analyzed and efficiency (cooling capacity) curves were calculated for all of the configurations.

Later this data was incorporated into a computer program which automatically calculates the cooling obtained when varying any of the parameters.

It was found through testing that fill packs constructed with TURBOsplashPAC® panels could almost match the performance of the traditional fill material when they both were new, but that the TURBOsplash PAC® Evaporation Panel System could be far superior through time and when the operation conditions were less than ideal or water treatment was sporadically applied.

MARKETING CONSIDERATIONS

The TURBOsplash PAC® Evaporation Panel System is protected by Patent in the most industrialized countries, and the system cannot be copied or used by any other company unless by our official Licensees.

OTHER USES FOR TURBOsplash PAC®

mass transfer applications	oxygenating biologic waste
liquid concentrators	trickling filters
desert coolers	combustion waste scrubbers
NH_3 , CO_2 stripping	static mixers
decanting stations / coalescence	and others

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March 2008	♣	Actually over 25.000 m² of our European production, and about 20.000 m² of the production of our foreign Licensees of TURBOsplash PAC fill is installed and working in Cooling Towers in many Countries all over the world.
March 208	♦	Joint Venture in India of MM-NERIFILL Ltd.
2007	♣	Installations and revamping in cooling towers in Italy, Germany, Spain, Lebanon, + others
July 2006	♦	Agreement with MM AQUA for the manufacturing and sales in INDIA
March 2006	♠	Issue of the PATENT for Japan
2005	♣	installation in new Baltimore cooling tower at Wyeth Lederle and revamping of cooling tower at ST Microelectronics in Catania Sicily
Autumn 2003	♣	further installations made by Almeco in BELGIUM, Vestas in DENMARK, Technicas Evaporativas in SPAIN
Summer 2003	♣	more installations at Wyeth Lederle, Catania and other Industries in Sicily
January 2003	♣	EVAPCO starts using TURBOsplash PAC in the towers of their production
4 September 2002	♦	LICENSE AGREEMENT with TAVAN AZAR Co. for the manufacturing and commercializing in Afghanistan, Azerbaijan, United Arab Emirates, Iran, Kirghigistan, Kuwait, Pakistan, Turkey, Tajikistan, Turkmenistan, Uzbekistan
2002	♣	Installation in Middle East in a 360m² Cooling Tower and others
May 22, 2002	♠	TRADE MARK registration of TURBOsplash PAC in the U.S.A.
April 22, 2002	♠	TRADE MARK registration of TURBOsplash PAC in ITALY
2001	♣	Installations in Lebanon, Egypt, New Zealand, Spain, Belgium, Germany
Spring 2001	♣	Installation at WYETH LEDERLE, Catania/Italy
2000	♣	Installations in BELGIUM, FRANCE, NETHERLANDS, DENMARK, SPAIN
December 1999	♣	Installation at WINERY SAN GABRIELE, Vicenza/Italy
August 1999	♣	Second installation at PAPER MILL CARMIGMANO/Italy
February 2, 1999	♠	Issue of the U.S. PATENT with No. 5.865.242
February 1999	♣	Installation in Concrete Cooling Tower with Counter Flow of 900 m3/h
December 1998	♣	second installation by DI ZIO to complete installation in Spain
October 27,1998	♦	LICENSE AGREEMENT with “BRENTWOOD INDUSTRIES INC.” *, PA for the manufacturing and commercializing in the U.S.A., Canada and Mexico
June, 1998	♣	Installation by DIZIO/ITALY for customer in Spain
May 1998	♣	Installation in Cooling Tower for water with biological material at ROQUETTE/ITALY
May 1998	♣	Revamping Cooling Tower LUCCHINI/ITALY of 900 m3/h
February 4, 1998	♠	Issue of the EUROPEAN PATENT with No. 0759142 B1
July 15, 1997	♠	Issue of the ITALIAN PATENT with No. 01274171
May 1997	♠	Survey and calculation of PERFORMANCE TEST made in Test Cell by Escher Wyss, Lindau, Germany
February 1997	♠	Installation in Cross Flow Cooling Tower at TEXAS INSTRUMENTS, Texas U.S.A. for comparison with film fill for 2.000 m3/h water flow
January 1997	♦	Agreement with Technology Sales, Chicago to sell in the U.S.
October 1996	♣	First installation by TEVA in SPAIN
July 1996	♣	First Installation in the U.S. at MIDWEST MASHINERY , St. Louis
March 1996	♣	First installation by VESTAS/DENMARK
June 1995	♣	First installation by BOLDROCCHI T.E. /ITALY
March 1994	♠	First Thermal Tests on Prototype
December 1993	♠	Study for Probability of Success for the Project of a New Fill for Cooling Towers
	♣	Installations
	♠	Patents and Tests
	♦	Agreements