COOLING TOWER
CFS-3000

PRODUCT SPECIFICATION

The fill is to be manufactured by Brentwood Industries, or equal and will meet the following specifications:

1. Scope:
   ACCU-PAC® CFS-3000 (cross-fluted & scalloped) high-density sheet fill designed for cooling of power plant, petrochemical and other process cooling waters.

2. Material of Construction:
   A. General
      The fill shall be fabricated from rigid, corrugated PVC sheets that are conducive to cooling water and UV protected. The fill modules shall be resistant to rot, fungi, bacteria and inorganic/organic acids and alkalies as commonly found in cooling towers.

   B. PVC Sheets
      The PVC sheet shall be prime, rigid PVC conforming to commercial standard ASTM D1784:12454B with the following properties:

PROPERTIES	**ASTM TEST METHOD**	**UNIT**		**VALUE** (min. unless otherwise noted)	
		IP	SI	IP	SI
Specific Gravity	D792	Dimensionless		1.45 max.	
Tensile Strength	D638/D882	psi	mPa	6,000	41.4
Flexural Modulus	D790	psi	mPa	425,000	2931
Flexural Strength	D790	psi	mPa	11,000	75.9
Elastic Modulus	D638/D882	psi	mPa	360,000	2,483
Izod Impact	D256	ft-lbs/in	j/cm	1.0	0.534
Impact Resistance	D4226	in-lbs/mil	j/mm	1.2	5.34
Heat Deflection	D648	°F	°C	160	71
Flame Spread Rating	E-84	Dimensionless		less than 20	
Flammability	D635			Self-extinguishing <5 sec.	

C. Chemical Resistance

Resistance to Grease Fats, & Oils	Excellent	ASTM D722-45
Resistance to Acids	Excellent	ASTM D543
Resistance to Alkalies	Excellent	ASTM D543

D. Temperature Resistance

Material of Construction	Max. Continuous Operating Temperature		Max. Peak Temp.*	
	F	C	F	C
PVC	140	60	155	68
HPVC	150	66	165	74
* Duration of peak temperatures not to exceed 2 hours				

The PVC sheets shall be of uniform thickness and free from holes, air bubbles, foreign matter, undispersed raw material or other manufacturing defects, which may adversely affect their performance.

E. Fill Modules

1) The fill modules shall be fabricated from PVC sheets of quality stated above and completely corrugated at an angle of 60 degrees from the horizontal to form a cross-corrugated pattern between adjacent sheets providing a continuous and horizontal redistribution of air and water. The flute height for each corrugation shall be 1.20 inches. There shall be a minimum of 20 sheets per module of 24 inches wide, 24 inches high and 72 inches long. Fill sheets shall be assembled to insure that contact/glue points are within 1/2 inch from the top and bottom of the modules on all sheets. The flutes shall have molded-in scallops to augment the pack's stiffness.

2) The fill modules shall be 100% cross-fluted and ensure adequate contact and diffusion between liquid, air and biomass by providing a minimum of 180 mixing or redistribution points per cubic ft. of module. 'Random Media' or fill with horizontal corrugations will not be acceptable.

3) The fill modules shall measure 24 inches wide, 24 inches high and 72 inches long and provide a minimum surface area of 31 sq.ft./cu.ft. with a minimum of 95% void-to-volume ratio.

4) The self-supporting fill modules shall be made from corrugated sheets of above configuration and have a specific number of glue points tagged on each corrugated sheet. These corrugated sheets shall be bonded together to give a cross-corrugated pattern by application of glue only to these "dedicated glue joints" to provide a finite number of contact points and to form strong and homogenous fill modules. Fill modules made from random application of glue over the corrugated sheets shall not be acceptable.

5) Each module shall have a minimum bearing capacity of 400 lbs./sq.ft. Modules in the top layer shall have a minimum bearing capacity of 1000 lbs./sq.ft. In addition, fill modules shall be capable of withstanding a minimum loading of 40 lbs./sq.ft. per foot of fill height above the module. Fill modules in the bottom layer shall have the designed load bearing capacity as estimated by the loading of 40 lbs/sq.ft. per foot of fill height when placed on the support beams.

3. Installation:
The fill shall be installed as per the recommendation of the fill manufacturer and in accordance with the engineer's specification, which shall include the following:

A. The fill modules shall be carefully cut or trimmed to fit within 1/4 inch (or less) of any obstruction or sidewall to prevent air bypass.

B. The fill shall be conveyed to the top of the tower by mechanical conveyor or crane. Cranes shall be used or conveyors shall be constructed as necessary to transport the fill to the working level inside the tower, and the fill modules shall be moved by hand for final placement.

C. The shaping, cutting and trimming of the fill modules may be done in the tower provided that precaution is taken by the Contractor to prevent any chips, broken pieces, or debris from falling into the fill by using canvas tarpaulins or similar working materials to cover the fill modules. All fill modules shall be cleared of any such fallen material before a new layer of fill is added. The top layer of fill should also be completely protected from damage and such falling material due to any subsequent work until the "start up" of the system.

D. The fill module edges should be protected from damage due to workmen walking on them. To prevent such damage, the Contractor shall use plywood, pegboard or other suitable temporary planking.

E. The fill modules shall be placed in the tower to provide the closest possible fit with adjacent modules without damaging the modules. The module packing arrangement shall be as recommended by the cooling tower manufacturer and shown on the installation drawings. Fill modules within each layer shall be installed such that the sheets of all modules are parallel to each other. Modules in respective layers shall be installed at right angles to the layer immediately below and above.

F. The fill modules in the bottom layer shall be centered over the fill support system.