

Jalal Engineering's Superior Method of Forming Film Fill Blocks

Generally counter-flow film fill sheets are bonded either chemically or mechanically. In chemical bonding, glues are used to hold the fill sheets together. Fill sheets that are held together through pressure sealing [shown in figure 1], or tying through strings [shown in figure 2] come under the domain of mechanical bonding.

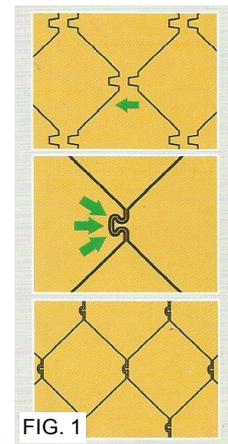
In order to grasp the pros and cons of each bonding method, one needs to understand why film fill is used in cooling towers. The purpose of film fill is to take the droplets of water -sprayed by showering nozzles- and spread them out in a very thin molecular film. By doing so, the air -moving through the tower- comes in contact with an extensive water surface. This intermixing of air and water facilitates latent and sensible heat exchange; air is able to take away a large amount of heat from the water.

The application of film fill can be called a success only when the heat exchange continues for an extended period of time. The continuation of an efficient heat exchange depends of two things: one, the film fill material remains intact and two, the film fill surface is kept clean.

The fill material should neither crack nor get deformed for a reasonable amount of time. And, on the other hand the fill blocks should not get clogged as this leads to drastic drop in tower performance. In whatever way film fill is applied in a cooling tower, these two factors play a key part in a successful film fill application.

In the area of fill bonding, fill sheets should be held together in such a way so that it neither reduces the life of the PVC material nor cause a hindrance in the cleaning of the fill blocks; another important aspect is that the installation and dismantling of the fill blocks can easily be performed.

Gluing of fill sheets is the least desirable method of fill bonding. Gluing compounds cause imbrittlement of PVC fill sheets. This not only causes reduction in tensile strength of the fill sheets, but also decreases fill life. With time, the glued points start to crack during maintenance. Flammability may also be affected by glue application. During flame-spread evaluations of cooling tower media, it has been noticed that excessive application of solvent glues may increase the flammability of the PVC.



The advantage of pressure sealing is that it tackles the problems of imbrittlement and flammability that is associated with gluing. Although, these two methods provide good beam strength to the fill blocks, the bonding does not allow free access to fill cleaning; in case of thorough cleaning requirement the fill sheets cannot be dismantled. In both of these methods, for fill cleaning water jet is used, which results in fill breakage and reduction in the life of fill.



Jalal Engineering uses a very simple method of holding the film fill sheets. To form fill blocks, film fill sheets are simply tied with Nylon strings. Jalal Engineering has been using this technique for over 40 years. Due to the use of this technique it has never faced any thermal performance or operational issues.

The only drawback of this technique is that, that extra beams are needed to support such fill blocks. In Jalal's cooling towers fill supports are provided at every feet of fill block length. These extra supports are of great utility during fill maintenance; the technicians can maneuver across the tower cell with the help of these close supports. Another advantage of close supports is that the lowest fill block layer is evenly supported; there are no high stress points in the lowest fill layer.

The major advantages of tying fill sheets with Nylon strings are as follows: 1) The block forming and dismantling time is much less than any other technique. 2) The fill blocks can easily be taken out of the tower and dismantled for cleaning. No water jets are required. 3) Due to the ease in fill dismantling, the damage to fill sheets is less during cleaning -as compared to bonded fill blocks. 4) No special equipment is needed at site for fill block forming.