



Location Of The Vapour Retarder In A Roof System When The Insulation Is Mechanically Fastened

The role of a vapour retarder in a roof system is, as its name implies, to retard the entry of water vapours into the roof system. Water vapours that are allowed to condense within the roof system will usually result in the following adverse conditions:

- a) may reduce the insulation efficiency of most insulation products, thus increasing the cost of the heating/cooling of the building
- b) may affect organic materials within the system
- c) may cause ridging of organic roof membranes
- d) may lead to the development of blisters in the roof membrane

To be effective the vapour retarder must be continuous with lap joints well sealed and be free of punctures. Furthermore, the vapour retarder must be compatible with the other elements in the roofing system and must have good adhesion to the deck and to the insulation in order to preserve the structural integrity of the roofing system.

Wind-Resistance Rated System

These systems in the past allowed the use of cold adhesives or hot asphalt to secure the vapour retarder to the steel deck and the roof insulation to the vapour retarder. It is now required that the first layer of the roof insulation be mechanically fastened to the steel deck. Since the vapour retarder is always placed on the warm side of the insulation, it will, under the above requirements, be perforated by all the fasteners (depending on the type of fasteners, there could be 3 to 5 perforations through each square metre of insulation). These perforations could seriously impair the efficiency of the vapour retarder. Furthermore, in single layered insulation application the metallic fastener could act as a thermal bridge and depending on the humidity conditions within the building could, during the winter season, lead to the formation of frost on the tip of each fastener protruding through the deck. It has also been reported that some fasteners have shown signs of rusting under the above circumstances and in time the rust could impair the holding power of the fasteners.

"Vapour Retarder Sandwich"

The mechanical fastening of roof insulation panels has been a growing practice in the United States for over two years and in order to eliminate the drawbacks that could result from the perforation of the vapour retarder, the National Roofing Contractors Association has been recommending the following type of installation for the vapour retarder: directly over the steel deck a layer of insulation is mechanically fastened. (Minimum thickness as called for by Factory Mutual and Engineering Corp. for fire rating purposes). Over this supporting layer of insulation the vapour retarder is set in hot asphalt. Then the second layer of insulation which serves as the main insulating mean of the system is set in hot asphalt. The thickness of the second layer of insulation is determined by the location of the dew-point temperature (must be above the vapour retarder).

When the vapour retarder is "sandwiched" between two layers of insulation, it is continuous, well supported, unperforated, compatible with the roof system, and since it is set and covered with hot asphalt, has a very low-perm rating.

The thermal bridging of the fasteners is eliminated, and so is the potential for rusting.

Other alternatives can be used to protect the integrity of the vapour retarder. A thermal barrier such as a fire-rated gypsum board is mechanically fixed to the steel deck. Over this, the vapour retarder is then set in hot asphalt followed by the rest of the elements in the roofing system.