



## Non-Destructive Testing for Moisture in Bur Systems

There are presently three known non-destructive systems or test methods in use in Canada for the determination of moisture. They are the Nuclear system, the Thermographic method and the Capacitance method.

The one common denominator in the three systems is that none of them measure moisture. They measure variations in either an element or a property of moisture. Unfortunately this element or property could also be present in the roofing system in other components than moisture.

The nuclear system measures changes in the hydrogen atom concentration. Hydrogen is a major element in other materials than water - bitumen, wood, some insulations. Bitumen quantities and insulation densities can vary over the roof area.

The thermographic method measures surface temperature differences. An obvious cause of the differences would be moisture in the roofing insulation but could also be air leakage through the system. Local sources of heat such as hot piping, unit heaters and light fixtures below deck would also give temperature variations.

The capacitance method projects a static electrical field through the assembly to measure differences in dielectric properties. These differences are co-related to variations in moisture. However the sensitivity decreases rapidly with depth making the interpretation of results difficult. As a result the method will not perform well in thick roof systems.

Some rather extravagant claims are being made for the three systems or methods. Unfortunately in new construction these are proving to be at the expense of the roofing contractor in a disappointing number of cases. In the opinion of the Canadian Roofing Contractors' Association this is due to the limitations of the particular system and often a lack of expertise on the part of the surveyors. Currently roofing contractors are too often penalized on new construction because the whole responsibility is on them to prove supposedly "wet" areas are really not "wet".

The Canadian Roofing Contractors' Association can see some advantages to be derived from the use of these systems. When used properly they could be of benefit to the whole industry. Since the presence of moisture in the system is a cause of premature failure, its early detection is desirable.

There are also some advantages to the roofing contractor: improper wall design or construction could be allowing moisture to damage the membrane even before the building goes into service; if the original survey shows no damaging moisture then any leaks that develop a year or so later could be the fault of others.

Since moisture surveys cannot always be depended on to indicate the presence of moisture, allowance should be made in new construction specifications so that the roofing contractor is not unfairly penalized. When a cut test shows moisture, the roofing contractor should either accept responsibility or be able to prove some other cause in which case he does not have to bear the expense of correction.

When a cut test shows no damaging moisture, as seems to be happening quite frequently, then the owner bears the cost of the cut test and its repair.