Underground Insulation

It is impossible to determine accurately the economic thickness of insulation to use for an underground installation owing to the many variables which are present such as depth of line, conductivity of ground, moisture conditions, etc. However, it is considered good practice to insulate underground lines with approximately ½ in. less thickness of insulation than for above ground installations under similar operating conditions.

It is necessary to keep the insulation absolutely dry if the efficiency is to be maintained, therefore, precautions should be taken thoroughly to weather-proof the insulation and to provide a drainage system for the water which may get into the conduit.

Chapter 13

DOMESTIC WATER REQUIREMENTS AND PIPE SIZES

Errors to be Avoided; Sizing of Mains and Risers; Sizing Mains and Headers; Sizing of Branch Pipes; Storage Tanks; Hot Water Tanks and Heaters; Hot Water Temperature; Additional Boiler Capacity.

THE duties of the heating engineer frequently include the design and layout of the water supply piping for buildings. Unlike heating and ventilating layouts, there are practically no definite data for estimating the quantity of water likely to be consumed or the probable rate of water flow at any particular moment.

Metered results in one building often show two or three times the metered amount in another building of the same size and with the same type of tenants. In hotels, one riser will often have an almost constant flow that may never be reached by another at peak load. In office buildings, the women's toilets show a far greater daily consumption than those of the men, yet at no time will they approach the hourly consumption of the men's toilet during the first hour of the day. This condition has led to a multiplicity of rules of practice which vary as much as the data used. All must of necessity be based on an assumed rate of consumption and on an assumed probability of simultaneous use, and while the formulae employed may have been derived on sound technical bases the assumptions are often in error.

To arrive at a safe standard, a similar set of hospital, hotel and apartment risers and headers was submitted to several leading architects, engineers and plumbing contractors for pipe sizing. From these a composite layout was made with corrections in the sections where untoward results had occurred in existing installations and from the composite plan the rules of procedure given in this chapter were formulated.

ERRORS TO BE AVOIDED

One of the most common causes of failure of domestic water supply systems is excessive loss of pressure in the mains or risers. An excessive pressure drop in the cold water riser may allow hot water to cross into the cold water piping. Cases have occurred where there was not only a total loss of pressure but a negative pressure was created, resulting in the siphoning of polluted water from bowls or basins through submerged faucets back into the supply pipes. This pressure drop is not always due to restricted risers but often may be due to over-size branches discharging at a much higher rate than that which the riser was designed to carry.