EFFECT OF ENCLOSURES, WITH CAST IRON RADIATORS

It is generally assumed that an enclosed radiator shows a decreased heat emission. This is borne out by results recently published by Kratz and Fahnestock, Table 8[a]. This data indicates that the heat emission from the enclosed radiator equals or exceeds that of an exposed radiator only in the case where the enclosure is much higher than the radiator so as to produce a pronounced chimney effect.

To accomplish best results, care must be exercised to follow certain rules in designing the enclosure, the most important of which are:

1. Enclosures should be insulated with 1 in. magnesia or asbestos block, lined with bright tin or non-corrosive sheet metal, placed next to the radiator.

2. The surface of the radiator should be painted flat black, maroon japan, white enamel or white zinc. If the radiator is entirely concealed it may be unpainted.

3. The free area of the grill or opening at the outlet should be not less than the free area through the sections of the radiator.

4. The free area of the grill or opening at the inlet should be not less than 80 per cent of the free area at the outlet.

5. If the outlet is in the face of the enclosure so that the air flow is horizontal, the free area of the outlet should be at least 150 per cent of the free area about the radiator, and the clear height between the top of the radiator and the underside of the top of the enclosure should be not less than the depth of the enclosure.

6. Best results are obtained with a tight fitting enclosure, provided the free area about the radiator at point of greatest restriction is not excessive. As a general rule the efficiency of the radiator is inversely proportional to the depth of the enclosure.

SPECIFICATION CLAUSES FOR CAST IRON RADIATORS

Specifications for radiation should contain the following clauses:

1. Manufacturers must guarantee that the heat emission per radiator shall not fall below the values given in their published literature.

2. Radiation must be free from flaws on surface and leaks at nipple connections, and guaranteed to stand a hydrostatic test of not less than 100 lb. per square inch.

3. Radiation must be thoroughly cleaned of all core sand, and if for vapor or modulation steam systems must be washed out and the openings plugged before shipment.

4. Radiation must not be placed where dirt can get into the interior and if to be placed in the weather or damp location must be given a priming coat of paint before shipment or immediately upon delivery at location.

5. Long or low radiators should be crated, and the crating not removed until placed in final location.

6. Radiators supported from the wall or ceiling shall be supported on steel or wrought-iron hangers.

[a]Effect of Enclosures on Radiator Performance by A. P. Kratz and M. K. Fahnestock, JOURNAL, AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, June, 1927.

CHAPTER III

STEAM HEATING SYSTEMS AND PIPING

Description of Systems; Influence of Length of Run, Pressure Drop, Critical Velocities and Heating-up Periods; Pipe Size Tables for One-Pipe, Two-Pipe, Vapor and Vacuum Systems, Details of Piping Connections.

INTRODUCTION

ONE of the serious design problems facing every heating engineer and contractor is the selection of proper pipe sizes for steam heating systems. Until recently no uniformity of practice existed, and of the numerous tables available to the profession many indefinite and variable factors entered into the calculations with the result that a concerted effort was made by committees of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS and the *Heating and Piping Contractors' National Association* to study the subject of pipe sizes and compile tables with a scientific basis.

For several years the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS' Research Laboratory has been investigating the flow of steam in pipes and the capacity of pipes for steam heating systems with the result that the reports of its Technical Advisory Committee on Pipe Sizes have been used by the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS' Guide Committee and the *Heating and Piping Contractors' National Association* Committee on Standardization in the compilation of Standard Tables for Pipe Sizes of Steam Heating Systems.

The information acquired through the cooperative effort of these two organizations provides engineers and contractors with a standard method of selecting pipe sizes for steam heating systems, thus facilitating the designing of plants that are scientifically correct. All data in this chapter are so arranged that the subject is covered under four general divisions: (1) a brief description of systems, (2) a discussion of steam distribution, (3) pipe size tables for steam heating systems and (4) examples to show correct use of tables.

Where data have not been available from research work, standard formulae have been applied so that the user of these tables may feel confident that the values given may be applied with safety.

Wherever the words radiator or radiation are used throughout this chapter, they are intended to refer not only to the older types of radiation, but also to the newer types of radiators, heaters, concealed or cabinet styles.

Wherever the words equivalent radiation are used they are intended to

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