feed systems, water supply systems, and for other purposes where corrosion is an important consideration.

Corrosion is caused by the chemical interaction between the oxygen of the atmosphere and the metallic surfaces. In the case of closed water systems this applies also to the oxygen of the air dissolved in the water. This type of corrosion or oxidation is universal and is the chief cause of the deterioration and decay of metals and alloys used in engineering. Other types of corrosion or chemical decomposition frequently occur and are very often due to the action of acids on the metals.

In cities sulphur dioxide, chlorides, sulphides and other ingredients also have a distinct corrosive influence.

Copper or brass piping does not discolor the water, which it conveys, with rust. Due to its maintenance of a smooth, unrusted interior, full flow and pressure are continued throughout the life of the system, and piping friction losses do not increase with age of the system.

Certain special conditions conducive to corrosion may require special mixtures, in order to obtain for the piping systems the longest life. Where unusual factors of corrosion are present, the engineer or contractor should heed the recommendations of the pipe manufacturer. In all cases, pipe fittings should have approximately the same composition as the metal of the pipe itself.

FITTINGS

Fig. 1 shows the usual method of designating fittings.

The dimensions of cast-iron and malleable screw fittings should be in accordance with the standards approved by the *American Engineering Standards Committee*. Fig. 2 indicates the roughing-in dimensions for radiator valves and traps adopted as standard by the *Heating and Piping Contractors' National Association*.

CHAPTER XXII

DESIGN AND OPERATING DATA FOR MECHANICAL EQUIPMENT OF FEDERAL BUILDINGS UNDER CONTROL OF U. S. TREASURY DEPARTMENT

Heating Requirements, Boiler Capacity, Electric Requirements, Water Requirements, Elevator Requirements, Sanitary Equipment, Isolated Plants, Janitorial Service.

THE following data have been compiled by Nelson Thompson, Chief Mechanical and Electrical Engineer, Office of the Supervising Architect, U. S. Treasury Department, Washington, D. C., to show the principles upon which the installation and operation of the mechanical equipment of Federal Buildings under the control of the United States Treasury Department are based.

It is not intended to be of a highly technical or research character, but of a more practical nature, for the use of the busy architect or engineer in the general planning or arranging of mechanical equipment for buildings of this character.

While much of the data referred to do not pertain strictly to heating and ventilating, it is so related so as to come within the scope and practice of heating and ventilating engineers and will, it is hoped, be of general interest to those engaged in this field of work.

TABLE 1. APPROXIMATIONS USED IN STUDY AND DESIGN OF PLUMBING EQUIPMENT FOR SMALLER U. S. POST OFFICE AND COURT HOUSE BUILDINGS

FIXTURES	SMALL BUILDINGS 25 OR LESS EMPLOYEES	MEDIUM BUILDINGS 26 to 100 EMPLOYEES	LARGE BUILDINGS OVER 100 EMPLOYEES
Water closets	1 to 10	1 to 20	1 to 23
Urinals	1 to 25	1 to 30	1 to 46
Lavatories	1 to 15	1 to 20	1 to 30
Shower baths	1 to 50	1 to 50	1 to 50

In the smaller buildings toilet facilities for office floors where the number of employees is not known are estimated on the basis of one employee for each 100 sq. ft. of net office space, divided, about 70 per cent for men and 30 per cent for women.

Private toilets are always provided for the postmaster, judge and petit juries. They may also be provided for other officials in special cases.

Lavatories are installed in all office rooms or suites.

Fire hose are not installed in the small one story buildings. Where installed in larger buildings they are so located that no room is over 75 ft. from the hose cabinet.

Material for this Chapter was prepared especially for THE GUIDE by Nelson S. Thompson.