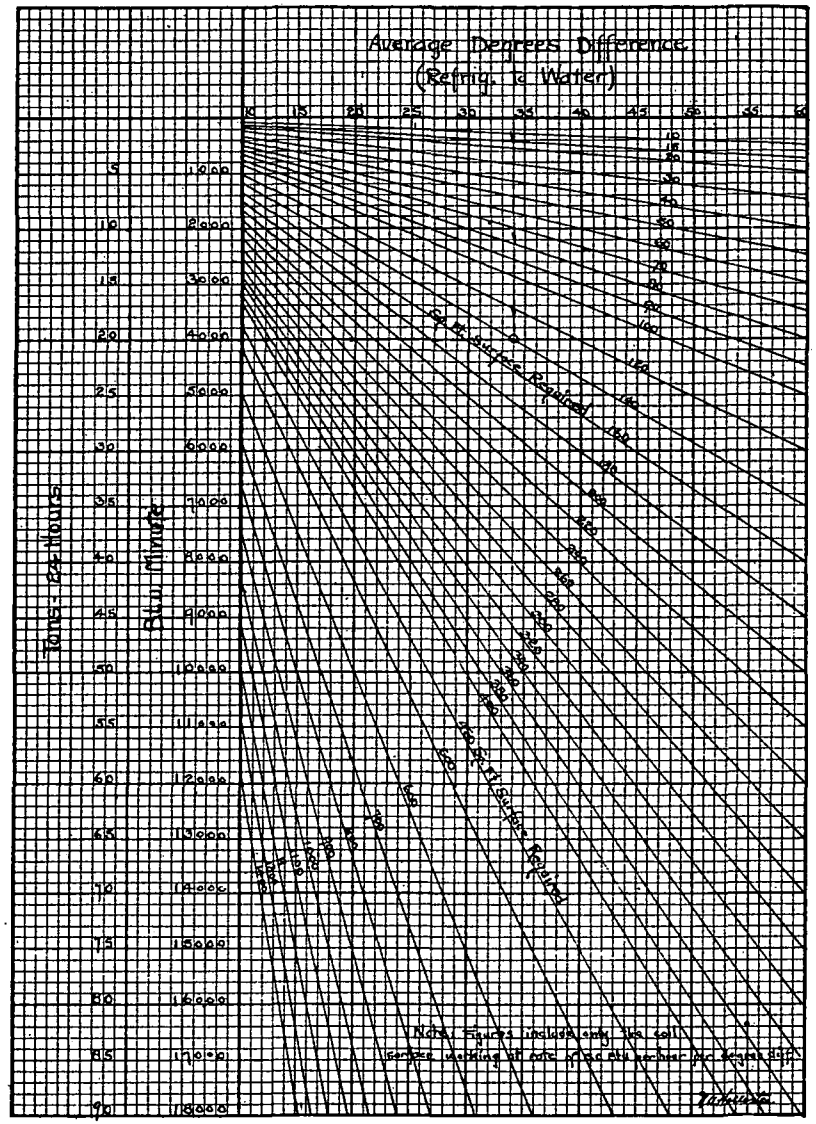

FIG. 2. SQUARE FEET WET COIL SURFACE

COLD SPRAYS VS. COLD COILS

A liquid spray which absorbs the heat from the air and transfers it to cooling coils is more frequently used than cooling coils in direct contact with the air, for the following reasons:

(1) An economic method of securing an enormous radiating surface for heat transfer from the air, (2) relatively small amount of cooling coils surface required, therefore, relatively low first cost, relatively small space and light weight, (3) economy in power for driving compressor, (4) ease of keeping unit clean, (5) ease of controlling effect on air, (6) securing of air cleaning at all times, (7) humidity control during all seasons of the year, (8) continuous cleaning radiating surface, unhampered by any frosting, with accompanied increase of heat transfer, (9) high heat transfer from liquid to air and from liquid to liquid cooling coils.

Water is generally used for spraying when the lowest liquid temperature is not too close to freezing. For lower temperature calcium or brine solutions of varying strengths, according to the requirements, are used.

With the comparatively small temperature differences encountered in such work, as 40 deg. water and 55 deg. air, the need of considerable heat absorbing surface is apparent. When water is sprayed the heat transfer must take place on the surface of the drops and the square feet of surface will depend upon how finely the water is divided. Ten gallons of water sprayed and divided into spheres of 0.25 in. diameter gives about 380 sq. ft. of drop surface. If divided into drops of 0.10 in. diameter spheres, the surface increases to about 1000 sq. ft. The water is divided into almost invisible drops and the square feet of radiating surface secured is correspondingly great.

With water flowing over the cooling coils the rate of heat transfer is many times that secured with air passing over or through the coils even when the coils are dry and not frosted. With the correct design and proportioning 40, 50, or even 60 B.t.u. per hour per sq. ft. per deg. difference may be obtained in practical commercial units as compared to the 2 B.t.u. or 6 B.t.u. from dry coils to air. The high transmission from water to coil, frosting disadvantages and other factors all combine to necessitate much less water-to-coil surface than coil-to-air surface with an accompanying saving of cost, space, and weight.

Many air conditioning installations are operated 24 hrs. per day and on every installation power used for operation is important. It should be understood that with the higher refrigerant temperatures operating at the higher refrigeration plane, the power used by the compressors will be lower per ton of refrigeration effect, than when operated at lower temperatures of refrigerant and at a lower refrigeration plane. This is true regardless of whether ammonia, carbon dioxide, or dielene or any of the other refrigerants are used.

CLEANING UNIT

When using the coil-to-air bunker room designs in order to get contact between the coils and air, the coils must be close together, arranged in some staggered form or with deflectors and baffles. Such arrangements make it almost impossible to allow for proper cleaning.