Table 9. Weights of Black and Galvanized Sheets

U. S. Std. Gage	Black Sheets				Galvanized Sheets[a]			
	Approximate Thickness, In.		Weight Per Square Foot		Approximate Thickness, In.		Weight Per Square Foot	
	Steel	Iron	Ounces	Pounds	Steel	Iron	Ounces	Pounds
30	0.0123	0.0125	8	0.500	0.0163	0.0165	10.5	0.656
28	0.0153	0.0156	10	0.625	0.0193	0.0196	12.5	0.781
26	0.0184	0.0188	12	0.750	0.0224	0.0228	14.5	0.906
24	0.0245	0.0250	16	1.000	0.0285	0.0290	18.5	1.156
22	0.0306	0.0313	20	1.250	0.0346	0.0353	22.5	1.406
20	0.0368	0.0375	24	1.500	0.0408	0.0415	26.5	1.656
18	0.0490	0.0500	32	2.000	0.0530	0.0540	34.5	2.156
16	0.0613	0.0625	40	2.500	0.0653	0.0665	42.5	2.656
14	0.0766	0.0781	50	3.125	0.0806	0.0821	52.5	3.281
12	0.1072	0.1094	70	4.375	0.1112	0.1134	72.5	4.531
11	0.1225	0.1250	80	5.000	0.1265	0.1290	82.5	5.156
10	0.1379	0.1406	90	5.625	0.1419	0.1446	92.5	5.781

[a] Galvanized sheets are gaged before galvanizing and are therefore approximately 0.004 in. thicker.

Table 10. Weights and Thicknesses of 2S Aluminum (Density 0.098 lb/cu in.)

B. & S. Gage	Thickness, Inches		Weight per Square Foot	
	Decimal	Nearest Fraction	Ounces	Pounds
28	0.012	1/64	2.7	0.169
26	0.016	1/64	3.6	0.226
24	0.020	1/64	4.5	0.282
22	0.025	1/32	5.4	0.353
20	0.032	1/32	7.2	0.452
18	0.040	3/64	9.0	0.563
16	0.051	3/64	11.5	0.720
14	0.064	1/16	14.4	0.903

Table 11. Weights and Thicknesses of Standard Copper Sheets[a]
Rolled to Weight

Weight per Square Foot		Thickness, Inches		Nearest Gage No.		
Ounces	Pounds	Decimal Equivalent	Nearest Fraction	B. & S.	Stubs	U. S. Std.
10	0.625	0.0135	1/64	27	29	29
12	0.750	0.0162	1/64	26	27	28
14	0.875	0.0189	1/64	25	26	26
16	1.000	0.0216	1/32	23	24	25
18	1.125	0.0243	1/32	22	23	24
20	1.250	0.0270	1/32	21	22	23
24	1.500	0.0324	1/32	20	21	22
28	1.750	0.0378	1/32	19	20	20
32	2.000	0.0432	3/64	17	19	19
36	2.250	0.0486	3/64	16	18	18
40	2.500	0.0540	3/64	15	17	17
44	2.750	0.0594	1/16	15	17	17
48	3.000	0.0648	1/16	14	16	16
56	3.500	0.0756	5/64	13	15	14
64	4.000	0.0864	5/64	11	14	13

[a] Variations from these weights must be expected in practice.

ment. Aluminum of 16 B. & S. gage or heavier can readily be welded by the metallic arc or acetylene process. Soldering is difficult and is not generally recommended. Riveting is done in the same manner as in iron or steel sheet. Self-tapping screws tend to loosen because of the softness of aluminum.

HEAT LOSSES FROM DUCTS

In designing duct systems, the heat gains or losses of the ducts can be quite considerable, not only if the duct passes through unconditioned space, but also on long duct runs within conditioned space. Proper insulation will remedy this situation considerably, but sometimes a redistribution of the supply air is necessary in order to compensate for the heat exchanges that occur.

The heat loss from a given length of duct can be expressed by:

$$Q_w = UPl\left[\left(\frac{t_1 + t_2}{2}\right) - t_3\right] \tag{14}$$

where

Q_w = heat loss through duct walls, Btu per hour.
P = perimeter of duct, feet.
l = length of duct, feet.
t_1 = temperature of air entering duct, Fahrenheit.
t_2 = temperature of air leaving duct, Fahrenheit.
t_3 = temperature of air surrounding duct, Fahrenheit.

To obtain the temperature drop in warm air for a given distance of transmission, or the temperature rise if the duct carries air cooler than the room through which it passes, the following formulas can be used:

$$t_1 = \frac{t_2(y+1) - 2t_3}{(y-1)} \tag{15}$$

$$t_2 = \frac{t_1(y-1) + 2t_3}{(y+1)} \tag{16}$$

where

$$y = \frac{28.8AV\rho}{UPl} \text{ for rectangular ducts or,}$$

$$y = \frac{7.2DV\rho}{Ul} \text{ for round ducts,}$$

A = cross-sectional area of duct, square feet.
ρ = density of air, pounds per cubic foot.
V = mean velocity of fluid, feet per minute.
D = diameter of round duct, feet.

In using Equations 15 and 16, one of the duct air temperatures will be unknown and will be obtained by substitution of the other known or assumed values.

Heat loss coefficients for insulated ducts with various conductivities are given in Fig. 16. The conductivities of various materials, which are based on mean temperatures, about 70 F, will be found in Table 4 of Chapter 9. For cases where the mean temperature is other than that at which the test was conducted, a correction should be made. However, in most cases the effect of this factor will be small and may be neglected.

Example 7: Determine the entering air temperature and heat loss for a duct 24 ×