

Additions and Corrections

The following presents additional information and technical errors found between June 15, 2022, and February 18, 2026, in the I-P editions of the 2022, 2023, 2024, and 2025 *ASHRAE Handbook* volumes. Occasional typographical errors and nonstandard symbol labels will be corrected in future volumes. The most current list of Handbook additions and corrections is on the ASHRAE website (www.ashrae.org).

The authors and editor encourage you to notify them if you find other technical errors. Please send corrections to: Handbook Editor, ASHRAE, 180 Technology Parkway, Peachtree Corners, GA, 30092, or e-mail hkennedy@ashrae.org.

2023 HVAC APPLICATIONS

p. 41.9, Figure 3. The bottom of this figure was cut off. The complete version is supplied below.

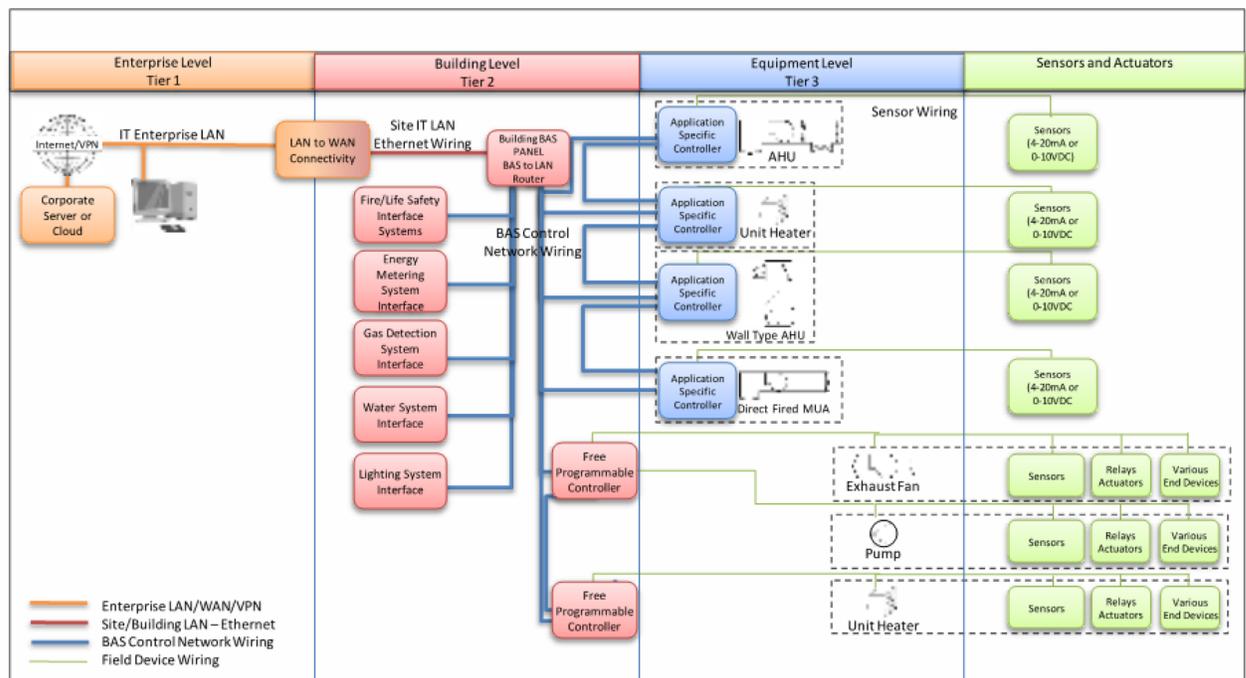


Fig. 3 Tiers of BAS
(ASHRAE *Guideline 13*)
2023 HVAC Applications, Ch. 41, p. 9

p.49.46, Table 47. “Floor span” here refers to the floor’s largest dimension: for example, if length > width, floor span = length.

2025 FUNDAMENTALS

p. 1.14, Eq. (25). The second m_{da} should be n_{da} .

pp. 1.16 and 32. Add citation “(Aute 2021)” to Equation (40), and in the References, add the following:

Aute, V.C. 2021. Personal communication to TC 1.1. Center for Environmental Energy Engineering, University of Maryland, College Park.

p. 22.18, Table 18. In the rows for ABS 1210, 1316, and 2112, the modulus of elasticity and coefficient of expansion values appeared in the incorrect columns. Please see the highlighted values in the extract from Table 18 on p. A.2.

p. 31.15, Table 6. The SI table was inadvertently used in the I-P chapter. Please use the one on p. A.2 instead.

2025 Fundamentals, Ch. 22, Table 18 Extract Properties of Pipe Materials

Designation	Material		Tensile Strength, psi (at 73°F)	Hydrostatic ^b Design Stress, psi (at 73°F)		Upper Temperature Limit, °F		HDS ^b Upper Limit, psi	Specific Gravity ^c	Impact Strength, ft·lb/in (at 73°F)	Modulus of Elasticity, psi (at 73°F)	Coefficient of Expansion, in/10 ⁶ in·°F	Thermal Conductivity, Btu·in/h·ft ² ·°F	Relative Pipe Cost ^d
	Type and Grade	Cell No.		Mfr.	ASME B31	Mfr.	ASME B31							
ABS 1210	T I,G2	5-2-2	1,000		180	640					250,000	55.0		
ABS 1316	T I,G3	3-5-5	1,600		180	1,000					340,000	40.0		
ABS 2112	T II,G1	4-4-5	1,250		180	800						40.0		

2025 Fundamentals, Ch. 31, Table 6 Specific Heat of Aqueous Solutions of Inhibited Propylene Glycol, Btu/lb·°F

Temperature, °F	Propylene Glycol, weight %								
	**10	**20	30	40	50	60	**70	**80	**90
-40						0.677	0.600	0.516	0.426
-30						0.684	0.608	0.526	0.436
-20					0.759	0.691	0.616	0.535	0.447
-10					0.765	0.698	0.625	0.544	0.457
0				0.830	0.771	0.705	0.633	0.554	0.468
10			0.885	0.834	0.777	0.712	0.641	0.563	0.478
20		0.932	0.889	0.839	0.783	0.719	0.649	0.572	0.489
30	0.969	0.934	0.893	0.844	0.789	0.727	0.658	0.582	0.499
40	0.971	0.937	0.896	0.849	0.795	0.734	0.666	0.591	0.510
50	0.972	0.939	0.900	0.854	0.801	0.741	0.674	0.601	0.520
60	0.974	0.942	0.904	0.859	0.807	0.748	0.682	0.610	0.531
70	0.975	0.945	0.908	0.864	0.813	0.755	0.691	0.619	0.541
80	0.976	0.947	0.911	0.868	0.819	0.762	0.699	0.629	0.552
90	0.978	0.950	0.915	0.873	0.825	0.769	0.707	0.638	0.562
100	0.979	0.952	0.919	0.878	0.831	0.776	0.715	0.647	0.573
110	0.981	0.955	0.922	0.883	0.837	0.783	0.724	0.657	0.583
120	0.982	0.958	0.926	0.888	0.843	0.791	0.732	0.666	0.594
130	0.984	0.960	0.930	0.893	0.849	0.798	0.740	0.675	0.604
140	0.985	0.963	0.934	0.898	0.855	0.805	0.748	0.685	0.615
150	0.987	0.965	0.937	0.902	0.861	0.812	0.756	0.694	0.625
160	0.988	0.968	0.941	0.907	0.867	0.819	0.765	0.704	0.636
170	0.990	0.971	0.945	0.912	0.873	0.826	0.773	0.713	0.646
180	0.991	0.973	0.949	0.917	0.879	0.833	0.781	0.722	0.657
190	0.993	0.976	0.952	0.922	0.884	0.840	0.789	0.732	0.667
200	0.994	0.978	0.956	0.927	0.890	0.847	0.798	0.741	0.678
210	0.996	0.981	0.960	0.931	0.896	0.855	0.806	0.750	0.688
220	0.997	0.984	0.963	0.936	0.902	0.862	0.814	0.760	0.699
230	0.999	0.986	0.967	0.941	0.908	0.869	0.822	0.769	0.709
240	1.000	0.989	0.971	0.946	0.914	0.876	0.831	0.779	0.720
250	1.000	0.991	0.975	0.951	0.920	0.883	0.839	0.788	0.730
Propylene Glycol, vol. %	9.1	18.5	28.2	38.1	48.3	58.7	69.2	79.9	90.7
Freeze Point, °F	26.2	17.9	6.7	-8.1	-28.9	-54.9	<-60	-52.2	-21.6

*Conversion from weight % to volume % propylene glycol (PG) is dependent upon the additives present in the inhibited heat transfer fluid. Viscosity is also impacted by additives and will vary by manufacturer and formulation.

**Heat transfer fluids should not be used at these concentrations due to the risk of microbial growth at concentrations below ~25% and heat transfer impedance above 60%.

Temperature is below the freezing point of the heat transfer fluid

Temperature is above the boiling point of the heat transfer fluid. Pressure at all points in the system should be at least 5 psi (35 kPa) greater than the vapor pressure exerted by the fluid to avoid localized boiling and additive precipitation.

Note: Specific Heat in Btu/lb·°F

Source: Dow Chemical (2024)