



Sound Speeds and Pipe Size Data

Installation Reference



GE Infrastructure
Sensing

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Installation Reference

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Sound Speed Data

The values in Table 1 below are reproduced with permission: shear wave values from the *American Institute of Physics Handbook*, Smithsonian Tables; longitudinal values from the *Nondestructive Testing Handbook*, 2nd edition, Volume 7, *Ultrasonic Testing*. ©1991, The American Society of Nondestructive Testing.

Table 1: Sound Speeds in Solids

Material	Sound Speed* Shear Wave (25°C)		Sound Speed* Long. Wave (25°C)	
	m/s	ft/s	mm/μs	in./μs
Steel, 1% Carbon, hardened	3,150	10,335	5.88	0.2315
Carbon Steel	3,230	10,598	5.89	0.2319
Mild Steel	3,235	10,614	5.89	0.2319
Steel, 1% Carbon	3,220	10,565		
302 Stainless Steel	3,120	10,236	5.690	0.224
303 Stainless Steel	3,120	10,236	5.640	0.222
304 Stainless Steel	3,141	10,306	5.920	0.233
304L Stainless Steel	3,070	10,073	5.790	0.228
316 Stainless Steel	3,272	10,735	5.720	0.225
347 Stainless Steel	3,095	10,512	5.720	0.225
Aluminum	3,100	10,171	6.32	0.2488
Aluminum (rolled)	3,040	9,974		
Copper	2,260	7,415	4.66	0.1835
Copper (annealed)	2,325	7,628		
Copper (rolled)	2,270	7,448		
CuNi (70%Cu 30%Ni)	2,540	8,334	5.03	0.1980
CuNi (90%Cu 10%Ni)	2,060	6,759	4.01	0.1579
Brass (Naval)	2,120	6,923	4.43	0.1744
Gold (hard-drawn)	1,200	3,937	3.24	0.1276
Inconel	3,020	9,909	5.82	0.2291
Iron (electrolytic)	3,240	10,630	5.90	0.2323
*Please note these values are to be considered nominal. Solids may be inhomogenous and anisotropic. Actual values depend on exact composition, temperature, and to a lesser extent, on pressure or stress.				

Table 1: Sound Speeds in Solids (cont.)

Material	Sound Speed* Shear Wave (25°C)		Sound Speed* Long. Wave (25°C)	
	m/s	ft/s	mm/μs	in./μs
Iron (Armco)	3,240	10,630	5.90	0.2323
Ductile Iron	3,000	9,843		
Cast Iron	2,500	8,203	4.55	0.1791
Monel	2,720	8,924	5.35	0.2106
Nickel	2,960	9,712	5.63	0.2217
Tin, rolled	1,670	5,479	3.32	0.1307
Titanium	3,125	10,253	6.10	0.2402
Tungsten, annealed	2,890	9,482	5.18	0.2039
Tungsten, drawn	2,640	8,661		
Tungsten, carbide	3,980	13,058		
Zinc, rolled	2,440	8,005	4.17	0.1642
Glass, Pyrex	3,280	10,761	5.61	0.2209
Glass, heavy silicate flint	2,380	7,808		
Glass, light borate crown	2,840	9,318	5.26	0.2071
Nylon	1,150	3,772	2.40	0.0945
Nylon, 6-6	1,070	3,510		
Polyethylene (HD)			2.31	0.0909
Polyethylene (LD)	540	1,772	1.94	0.0764
PVC, CPVC	1,060	3,477	2.40	0.0945
Acrylic	1,430	4,690	2.73	0.1075
Asbestos Cement			2.20	0.0866
Tar Epoxy			2.00	0.0787
Mortar			2.50	0.0984
Rubber			1.90	0.0748

**Please note these values are to be considered nominal. Solids may be inhomogenous and anisotropic. Actual values depend on exact composition, temperature, and to a lesser extent, on pressure or stress.*

Table 2: Sound Speeds in Fluids

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s	m/s/ $^\circ\text{C}$	m ² /s	ft ² /s
Acetic anhydride (22)	(CH ₃ CO) ₂ O	1.082 (20°C)	1,180	3,871.4	2.5	0.769	8.274
Acetic acid, anhydride (22)	(CH ₃ CO) ₂ O	1.082 (20°C)	1,180	3,871.4	2.5	0.769	8.274
Acetic acid, nitrile	C ₂ H ₃ N	0.783	1,290	4,232.3	4.1	0.441	4.745
Acetic acid, ethyl ester (33)	C ₄ H ₈ O ₂	0.901	1,085	3,559.7	4.4	0.467	5.025
Acetic acid, methyl ester	C ₃ H ₆ O ₂	0.934	1,211	3,973.1		0.407	4.379
Acetone	C ₃ H ₆ O	0.791	1,174	3,851.7	4.5	0.399	4.293
Acetonitrile	C ₂ H ₃ N	0.783	1,290	4,232.3	4.1	0.441	4.745
Acetylacetone	C ₆ H ₁₀ O ₂	0.729	1,399	4,589.9	3.6		
Acetylen dichloride	C ₂ H ₂ Cl ₂	1.26	1,015	3,330.1	3.8	0.400	4.304
Acetylene tetrabromide (47)	C ₂ H ₂ Br ₄	2.966	1,027	3,369.4			
Acetylene tetrachloride (47)	C ₂ H ₂ Cl ₄	1.595	1,147	3,763.1		1.156 (15°C)	12.438 (59°F)
Alcohol	C ₂ H ₆ O	0.789	1,207	3,960	4.0	1.396	15.02
Alkazene-13	C ₁₅ H ₂₄	0.86	1,317	4,320.9	3.9		
Alkazene-25	C ₁₀ H ₁₂ Cl ₂	1.20	1,307	4,288.1	3.4		
2-Amino-ethanol	C ₂ H ₇ NO	1.018	1,724	5,656.2	3.4		
2-Aminotolidine (46)	C ₇ H ₉ N	0.999 (20°C)	1,618	5,308.4		4.394 (20°C)	47.279 (68°F)
4-Aminotolidine (46)	C ₇ H ₉ N	0.966 (45°C)	1,480	4,855.6		1.863 (50°C)	20.045 (122°F)
Ammonia (35)	NH ₃	0.771	1,729 (-33°C)	5,672.6 (-27°F)	6.68	0.292 (-33°C)	3.141 (-27°F)
Amorphous Polyolefin		0.98	962.6 (190°C)	3158.2 (374°F)		26,600	286,000
t-Amyl alcohol	C ₅ H ₁₂ O	0.81	1,204	3,950.1		4.374	47.064
Aminobenzene (41)	C ₆ H ₅ NO ₂	1.022	1,639	5,377.3	4.0	3.63	39.058
Aniline (41)	C ₆ H ₅ NO ₂	1.022	1,639	5,377.3	4.0	3.63	39.058
Argon (45)	Ar	1.400 (-188°C)	853 (-188°C)	2798.6 (-306°F)			

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	<i>All data given at 25°C (77°F) unless otherwise noted.</i>					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s	m/s/°C	m ² /s	ft ² /s
Azine	C ₆ H ₅ N	0.982	1,415	4,642.4	4.1	0.992 (20°C)	10.673 (68°F)
Benzene (29, 40, 41)	C ₆ H ₆	0.879	1,306	4,284.8	4.65	0.711	7.65
Benzol (29, 40, 41)	C ₆ H ₆	0.879	1,306	4,284.8	4.65	0.711	7.65
Bromine (21)	Br ₂	2.928	889	2,916.7	3.0	0.323	3.475
Bromo-benzene (46)	C ₆ H ₅ Br	1.522	1,170 (20°C)	3,838.6 (68°F)		0.693	7.456
1-Bromo-butane (46)	C ₄ H ₉ Br	1.276 (20°C)	1,019 (20°C)	3,343.2 (68°F)		0.49 (15°C)	5.272 (59°F)
Bromo-ethane (46)	C ₂ H ₅ Br	1.460 (20°C)	900 (20°C)	2,952.8 (68°F)		0.275	2.959
Bromoform (46, 47)	CHBr ₃	2.89 (20°C)	918	3,011.8	3.1	0.654	7.037
n-Butane (2)	C ₄ H ₁₀	0.601 (0°C)	1,085 (-5°C)	3,559.7 (23°F)	5.8		
2-Butanol	C ₄ H ₁₀ O	0.81	1,240	4,068.2	3.3	3.239	34.851
sec-Butylalcohol	C ₄ H ₁₀ O	0.81	1,240	4,068.2	3.3	3.239	34.851
n-Butyl bromide (46)	C ₄ H ₉ Br	1.276 (20°C)	1,019 (20°C)	3,343.2 (68°F)		0.49 (15°C)	5.272 (59°F)
n-Butyl chloride (22, 46)	C ₄ H ₉ Cl	0.887	1,140	3,740.2	4.57	0.529 (15°C)	5.692 (59°F)
tert Butyl chloride	C ₄ H ₉ Cl	0.84	984	3,228.3	4.2	0.646	6.95
Butyl oleate	C ₂₂ H ₄₂ O ₂		1,404	4,606.3	3.0		
2, 3 Butylene glycol	C ₄ H ₁₀ O ₂	1.019	1,484	4,868.8	1.51		
Cadmium (7)	Cd		2,237.7 (400°C)	7,341.5 (752°F)		1.355cp (440°C)	14.579 (824°F)
Carbinol (40, 41)	CH ₄ O	0.791 (20°C)	1,076	3,530.2	2.92	0.695	7.478
Carbitol	C ₆ H ₁₄ O ₃	0.988	1,458	4,783.5			
Carbon dioxide (26)	CO ₂	1.101 (-37°C)	839 (-37°C)	2,752.6 (-35°F)	7.71	0.137 (-37°C)	1.474 (-35°F)
Carbon disulphide	CS ₂	1.261 (22°C)	1,149	3,769.7		0.278	2.991

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$ m/s/°C	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s		m ² /s	ft ² /s
Carbon tetrachloride (33, 35, 47)	CCl ₄	1.595 (20°C)	926	3038.1	2.48	0.607	6.531
Carbon tetrafluoride (14) (Freon 14)	CF ₄	1.75 (-150°C)	875.2 (-150°C)	2,871.5 (-238°F)	6.61		
Cetane (23)	C ₁₆ H ₃₄	0.773 (20°C)	1,338	4,389.8	3.71	4.32	46.483
Chloro-benzene	C ₆ H ₅ Cl	1.106	1,273	4,176.5	3.6	0.722	7.768
1-Chloro-butane (22, 46)	C ₄ H ₉ Cl	0.887	1,140	3,740.2	4.57	0.529 (15°C)	5.692 (59°F)
Chloro-diFluoromethane (3) (Freon 22)	CHClF ₂	1.491 (-69°C)	893.9 (-50°C)	2,932.7 (-58°F)	4.79		
Chloroform (47)	CHCl ₃	1.489	979	3,211.9	3.4	0.55	5.918
1-Chloro-propane (47)	C ₃ H ₇ Cl	0.892	1,058	3,471.1		0.378	4.067
Chlorotrifluoromethane (5)	CClF ₃		724 (-82°C)	2,375.3 (-116°F)	5.26		
Cinnamaldehyde	C ₉ H ₈ O	1.112	1,554	5,098.4	3.2		
Cinnamic aldehyde	C ₉ H ₈ O	1.112	1,554	5,098.4	3.2		
Colamine	C ₂ H ₇ NO	1.018	1,724	5,656.2	3.4		
o-Cresol (46)	C ₇ H ₈ O	1.047 (20°C)	1,541 (20°C)	5,055.8 (68°F)		4.29 (40°C)	46.16 (104°F)
m-Cresol (46)	C ₇ H ₈ O	1.034 (20°C)	1,500 (20°C)	4,921.3 (68°F)		5.979 (40°C)	64.334 (104°F)
Cyanomethane	C ₂ H ₃ N	0.783	1,290	4,232.3	4.1	0.441	4.745
Cyclohexane (15)	C ₆ H ₁₂	0.779 (20°C)	1,248	4,094.5	5.41	1.31 (17°C)	14.095 (63°F)
Cyclohexanol	C ₆ H ₁₂ O	0.962	1,454	4,770.3	3.6	0.071 (17°C)	0.764 (63°F)
Cyclohexanone	C ₆ H ₁₀ O	0.948	1,423	4,668.6	4.0		
Decane (46)	C ₁₀ H ₂₂	0.730	1,252	4,107.6		1.26 (20°C)	13.55 (68°F)
1-Decene (27)	C ₁₀ H ₂₀	0.746	1,235	4,051.8	4.0		
n-Decylene (27)	C ₁₀ H ₂₀	0.746	1,235	4,051.8	4.0		
Diacetyl	C ₄ H ₆ O ₂	0.99	1,236	4,055.1	4.6		

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$ m/s/°C	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s		m ² /s	ft ² /s
Diamylamine	C ₁₀ H ₂₃ N		1,256	4,120.7	3.9		
1,2-Dibromo-ethane (47)	C ₂ H ₄ Br ₂	2.18	995	3,264.4		0.79 (20°C)	8.5 (68°F)
trans-1,2-Dibromoethene (47)	C ₂ H ₂ Br ₂	2.231	935	3,067.6			
Dibutyl phthalate	C ₈ H ₂₂ O ₄		1,408	4,619.4			
Dichloro-t-butyl alcohol	C ₄ H ₈ Cl ₂ O		1,304	4,278.2	3.8		
2,3 Dichlorodioxane	C ₂ H ₆ Cl ₂ O ₂		1,391	4,563.6	3.7		
Dichlorodifluoromethane (3) (Freon 12)	CCl ₂ F ₂	1.516 (40°C)	774.1	2,539.7	4.24		
1,2 Dichloro ethane (47)	C ₂ H ₄ Cl ₂	1.253	1,193	3,914		0.61	6.563
cis1,2-Dichloro-ethene (3, 47)	C ₂ H ₂ Cl ₂	1.284	1,061	3,481			
trans1,2-Dichloro-ethene (3, 47)	C ₂ H ₂ Cl ₂	1.257	1,010	3,313.6			
Dichloro-fluoromethane (3) (Freon 21)	CHCl ₂ F	1.426 (0°C)	891 (0°C)	2,923.2 (32°F)	3.97		
1-2-Dichlorohexafluoro-cyclobutane (47)	C ₄ Cl ₂ F ₆	1.654	669	2,194.9			
1-3-Dichloro-isobutane	C ₄ H ₈ Cl ₂	1.14	1,220	4,002.6	3.4		
Dichloro methane (3)	CH ₂ Cl ₂	1.327	1,070	3,510.5	3.94	0.31	3.335
1,1-Dichloro-1,2,2,2 tetra fluoroethane	CClF ₂ -CClF ₂	1.455	665.3 (-10°C)	2,182.7 (14°F)	3.73		
Diethyl ether	C ₄ H ₁₀ O	0.713	985	3,231.6	4.87	0.311	3.346
Diethylene glycol	C ₄ H ₁₀ O ₃	1.116	1,586	5,203.4	2.4		
Diethylene glycol, monoethyl ether	C ₆ H ₁₄ O ₃	0.988	1,458	4,783.5			
Diethylenimide oxide	C ₄ H ₉ NO	1.00	1,442	4,731	3.8		
1,2-bis(DiFluoramino) butane (43)	C ₄ H ₈ (NF ₂) ₂	1.216	1,000	3,280.8			
1,2-bis(DiFluoramino)-2-methylpropane (43)	C ₄ H ₉ (NF ₂) ₂	1.213	900	2,952.8			
1,2-bis(DiFluoramino) propane (43)	C ₃ H ₆ (NF ₂) ₂	1.265	960	3,149.6			

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$ m/s/°C	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s		m ² /s	ft ² /s
2,2-bis(DiFluoramino propane (43))	C ₃ H ₆ (NF ₂) ₂	1.254	890	2920			
2,2-Dihydroxydiethyl ether	C ₄ H ₁₀ O ₃	1.116	1,586	5,203.4	2.4		
Dihydroxyethane	C ₂ H ₆ O ₂	1.113	1,658	5,439.6	2.1		
1,3-Dimethyl-benzene (46)	C ₈ H ₁₀	0.868 (15°C)	1,343 (20°C)	4,406.2 (68°F)		0.749 (15°C)	8.059 (59°F)
1,2-Dimethyl-benzene (29, 46)	C ₈ H ₁₀	0.897 (20°C)	1,331.5	4,368.4	4.1	0.903 (20°C)	9.716 (68°F)
1,4-Dimethyl-benzene (46)	C ₈ H ₁₀		1,334 (20°C)	4,376.6 (68°F)		0.662	7.123
2,2-Dimethyl-butane (29, 33)	C ₆ H ₁₄	0.649 (20°C)	1,079	3,540			
Dimethyl ketone	C ₃ H ₆ O	0.791	1,174	3,851.7	4.5	0.399	4.293
Dimethyl pentane (47)	C ₇ H ₁₆	0.674	1,063	3,487.5			
Dimethyl phthalate	C ₈ H ₁₀ O ₄	1.2	1,463	4,799.9			
Diiodo-methane	CH ₂ I ₂	3.235	980	3,215.2			
Dioxane	C ₄ H ₈ O ₂	1.033	1,376	4,514.4			
Dodecane (23)	C ₁₂ H ₂₆	0.749	1,279	4,196.2	3.85	1.80	19.368
1,2-Ethandiol	C ₂ H ₆ O ₂	1.113	1,658	5,439.6	2.1		
Ethanenitrile	C ₂ H ₃ N	0.783	1,290	4,232.3		0.441	4.745
Ethanoic anhydride (22)	(CH ₃ CO) ₂ O	1.082	1,180	3,871.4		0.769	8.274
Ethanol	C ₂ H ₆ O	0.789	1,207	3,960	4.0	1.39	14.956
Ethanol amide	C ₂ H ₇ NO	1.018	1,724	5,656.2	3.4		
Ethoxyethane	C ₄ H ₁₀ O	0.713	985	3,231.6	4.87	0.311	3.346
Ethyl acetate (33)	C ₄ H ₈ O ₂	0.901	1,085	3,559.7	4.4	0.489	5.263
Ethyl alcohol	C ₂ H ₆ O	0.789	1,207	3,960	4.0	1.396	15.020
Ethyl benzene (46)	C ₈ H ₁₀	0.867 (20°C)	1,338 (20°C)	4,389.8 (68°F)		0.797 (17°C)	8.575 (63°F)
Ethyl Bromide (46)	C ₂ H ₅ Br	1.461 (20°C)	900 (20°C)	2,952.8 (68°F)		0.275 (20°C)	2.959 (68°F)
Ethyl iodide (46)	C ₂ H ₅ I	1.950 (20°C)	876 (20°C)	2874 (68°F)		0.29	3.12

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$ m/s/°C	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s		m ² /s	ft ² /s
Ether	C ₄ H ₁₀ O	0.713	985	3231.6	4.87	0.311	3.346
Ethyl ether	C ₄ H ₁₀ O	0.713	985	3231.6	4.87	0.311	3.346
Ethylene bromide (47)	C ₂ H ₄ Br ₂	2.18	995	3264.4		0.79	8.5
Ethylene chloride (47)	C ₂ H ₄ Cl ₂	1.253	1,193	3914		0.61	6.563
Ethylene glycol	C ₂ H ₆ O ₂	1.113	1,658	5439.6	2.1	17.208 (20°C)	185.158 (68°F)
d-Fenochone	C ₁₀ H ₁₆ O	0.947	1,320	4330.7		0.22	2.367
d-2-Fenochanone	C ₁₀ H ₁₆ O	0.947	1,320	4330.7		0.22	2.367
Fluorine	F	0.545 (-143°C)	403 (-143°C)	1322.2 (-225°F)	11.31		
Fluoro-benzene (46)	C ₆ H ₅ F	1.024 (20°C)	1,189	3900.9		0.584 (20°C)	6.283 (68°F)
Formaldehyde, methyl ester	C ₂ H ₄ O ₂	0.974	1,127	3697.5	4.02		
Formamide	CH ₃ NO	1.134 (20°C)	1,622	5321.5	2.2	2.91	31.311
Formic acid, amide	CH ₃ NO	1.134 (20°C)	1,622	5321.5		2.91	31.311
Freon R12			774.2	2540			
Furfural	C ₅ H ₄ O ₂	1.157	1,444	4737.5	3.7		
Furfuryl alcohol	C ₅ H ₆ O ₂	1.135	1,450	4757.2	3.4		
Fural	C ₅ H ₄ O ₂	1.157	1,444	4737.5	3.7		
2-Furaldehyde	C ₅ H ₄ O ₂	1.157	1,444	4737.5	3.7		
2-Furancarboxaldehyde	C ₅ H ₄ O ₂	1.157	1,444	4737.5	3.7		
2-Furyl-Methanol	C ₅ H ₆ O ₂	1.135	1,450	4757.2	3.4		
Gallium	Ga	6.095	2,870 (30°C)	9416 (86°F)			
Glycerin	C ₃ H ₈ O ₃	1.26	1,904	6246.7	2.2	757.1	8,081.836
Glycerol	C ₃ H ₈ O ₃	1.26	1,904	6246.7	2.2	757.1	8,081.836
Glycol	C ₂ H ₆ O ₂	1.113	1658	5439.6	2.1		
50% Glycol / 50% H ₂ O			1,578	5,177			

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$ m/s/°C	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s		m ² /s	ft ² /s
Helium (45)	He ₄	0.125 (-269°C)	183 (-269°C)	600.4 (-452°F)		0.025	.269
Heptane (22, 23)	C ₇ H ₁₆	0.684 (20°C)	1,131	3,710.6	4.25	0.598 (20°C)	6.434 (68°F)
n-Heptane (29, 33)	C ₇ H ₁₆	0.684 (20°C)	1,180	3,871.3	4.0		
Hexachloro- Cyclopentadiene (47)	C ₅ Cl ₆	1.7180	1,150	3,773			
Hexadecane (23)	C ₁₆ H ₃₄	0.773 (20°C)	1,338	4,389.8	3.71	4.32 (20°C)	46.483 (68°F)
Hexalin	C ₆ H ₁₂ O	0.962	1,454	4,770.3	3.6	70.69 (17°C)	760.882 (63°F)
Hexane (16, 22, 23)	C ₆ H ₁₄	0.659	1,112	3,648.3	2.71	0.446	4.798
n-Hexane (29, 33)	C ₆ H ₁₄	0.649 (20°C)	1,079	3,540	4.53		
2,5-Hexanedione	C ₆ H ₁₀ O ₂	0.729	1,399	4,589.9	3.6		
n-Hexanol	C ₆ H ₁₄ O	0.819	1,300	4,265.1	3.8		
Hexahydrobenzene (15)	C ₆ H ₁₂	0.779	1,248	4,094.5	5.41	1.31 (17°C)	14.095 (63°F)
Hexahydrophenol	C ₆ H ₁₂ O	0.962	1,454	4,770.3	3.6		
Hexamethylene (15)	C ₆ H ₁₂	0.779	1,248	4,094.5	5.41	1.31 (17°C)	14.095 (63°F)
Hydrogen (45)	H ₂	0.071 (-256°C)	1,187 (-256°C)	3,894.4 (-429°F)		0.003 (-256°C)	0.032 (-429°F)
2-Hydroxy-toluene (46)	C ₇ H ₈ O	1.047 (20°C)	1,541 (20°C)	5,055.8 (68°F)		4.29 (40°C)	46.16 (104°F)
3-Hydroxy-toluene (46)	C ₇ H ₈ O	1.034 (20°C)	1,500 (20°C)	4,921.3 (68°F)		5.979 (40°C)	64.334 (104°F)
Iodo-benzene (46)	C ₆ H ₅ I	1.823	1,114 (20°C)	3,654.9 (68°F)		0.954	
Iodo-ethane (46)	C ₂ H ₅ I	1.950 (20°C)	876 (20°C)	2,874 (68°F)		0.29	3.12
Iodo-methane	CH ₃ I	2.28 (20°C)	978	3,208.7		0.211	2.27
Isobutyl acetate (22)	C ₆ H ₁₂ O		1,180 (27°C)	3,871.4 (81°F)	4.85		

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	<i>All data given at 25°C (77°F) unless otherwise noted.</i>					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s	m/s/°C	m ² /s	ft ² /s
Isobutanol	C ₄ H ₁₀ O	0.81 (20°C)	1,212	3,976.4			
Iso-Butane			1,219.8	4002			
Isopentane (36)	C ₅ H ₁₂	0.62 (20°C)	980	3,215.2	4.8	0.34	3.658
Isopropanol (46)	C ₃ H ₈ O	0.785 (20°C)	1,170 (20°C)	3,838.6 (68°F)		2.718	29.245
Isopropyl alcohol (46)	C ₃ H ₈ O	0.785 (20°C)	1,170 (20°C)	3,838.6 (68°F)		2.718	29.245
Kerosene		0.81	1,324	4,343.8	3.6		
Ketohexamethylene	C ₆ H ₁₀ O	0.948	1,423	4,668.6	4.0		
Lithium fluoride (42)	LiF		2,485 (900°C)	8,152.9 (1652°F)	1.29		
Mercury (45)	Hg	13.594	1,449 (24°C)	4,753.9 (75°F)		0.114	1.226
Mesityloxide	C ₆ H ₁₆ O	0.85	1,310	4,297.9			
Methane (25, 28, 38, 39)	CH ₄	0.162 (-89°C)	405 (-89°C)	1,328.7 (-128°F)	17.5		
Methanol (40, 41)	CH ₄ O	0.791 (20°C)	1,076	3,530.2	2.92	0.695	7.478
Methyl acetate	C ₃ H ₆ O ₂	0.934	1,211	3,973.1		0.407	4.379
o-Methylaniline (46)	C ₇ H ₉ N	0.999 (20°C)	1,618	5,308.4		4.394 (20°C)	47.279 (68°F)
4-Methylaniline (46)	C ₇ H ₉ N	0.966 (45°C)	1,480	4,855.6		1.863 (50°C)	20.095 (122°F)
Methyl alcohol (40, 44)	CH ₄ O	0.791 (20°C)	1,076	3,530.2	2.92	0.695	7.478
Methyl benzene (16, 52)	C ₇ H ₈	0.867	1,328 (20°C)	4,357 (68°F)	4.27	0.644	7.144
2-Methyl-butane (36)	C ₅ H ₁₂	0.62 (20°C)	980	3,215.2		0.34	3.658
Methyl carbinol	C ₂ H ₆ O	0.789	1,207	3,960	4.0	1.396	
Methyl-chloroform (47)	C ₂ H ₃ Cl ₃	1.33	985	3,231.6		0.902 (20°C)	9.705 (68°F)
Methyl-cyanide	C ₂ H ₃ N	0.783	1,290	4,232.3		0.441	4.745
3-Methyl cyclohexanol	C ₇ H ₁₄ O	0.92	1,400	4,593.2			

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s	m/s/°C	m ² /s	ft ² /s
Methylene chloride (3)	CH ₂ Cl ₂	1.327	1,070	3,510.5	3.94	0.31	3.335
Methylene iodide	CH ₂ I ₂	3.235	980	3,215.2			
Methyl formate (22)	C ₂ H ₄ O ₂	0.974 (20°C)	1,127	3,697.5	4.02		
Methyl iodide	CH ₃ I	2.28 (20°C)	978	3,208.7		0.211	2.27
α -Methyl naphthalene	C ₁₁ H ₁₀	1.090	1,510	4,954.1	3.7		
2-Methylphenol (46)	C ₇ H ₈ O	1.047 (20°C)	1,541 (20°C)	5,055.8 (68°F)		4.29 (40°C)	46.16 (104°F)
3-Methylphenol (46)	C ₇ H ₈ O	1.034 (20°C)	1,500 (20°C)	4,921.3 (68°F)		5.979 (40°C)	64.334 (104°F)
Milk, homogenized			1,548	5,080			
Morpholine	C ₄ H ₉ NO	1.00	1,442	4,731	3.8		
Naphtha		0.76	1,225	4,019			
Natural Gas (37)		0.316 (-103°C)	753 (-103°C)	2,470.5 (-153°F)			
Neon (45)	Ne	1.207 (-246°C)	595 (-246°C)	1,952.1 (-411°F)			
Nitrobenzene (46)	C ₆ H ₅ NO ₂	1.204 (20°C)	1,415 (20°C)	4,642.4 (68°F)		1.514	16.29
Nitrogen (45)	N ₂	0.808 (-199°C)	962 (-199°C)	3,156.2 (-326°F)		0.217 (-199°C)	2.334 (-326°F)
Nitromethane (43)	CH ₃ NO ₂	1.135	1,300	4,265.1	4.0	0.549	5.907
Nonane (23)	C ₉ H ₂₀	0.718 (20°C)	1,207	3,960	4.04	0.99 (20°C)	10.652 (68°F)
1-Nonene (27)	C ₉ H ₁₈	0.736 (20°C)	1,207	3,960	4.0		
Octane (23)	C ₈ H ₁₈	0.703	1,172	3,845.1	4.14	0.73	7.857
n-Octane (29)	C ₈ H ₁₈	0.704 (20°C)	1,212.5	3,978	3.50	0.737	.930
1-Octene (27)	C ₈ H ₁₆	0.723 (20°C)	1,175.5	3,856.6	4.10		
Oil of Camphor Sassafrassy			1,390	4,560.4	3.8		
Oil, Car (SAE 20a.30)		1.74	870	2,854.3		190	2,045.093
Oil, Castor	C ₁₁ H ₁₀ O ₁₀	0.969	1,477	4,845.8	3.6	0.670	7.209

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$ m/s/°C	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s		m ² /s	ft ² /s
Oil, Diesel		0.80	1,250	4,101			
Oil, Fuel AA gravity		0.99	1,485	4,872	3.7		
Oil (Lubricating X200)			1,530	5,019.9			
Oil (Olive)		0.912	1,431	4,694.9	2.75	100	1,076.365
Oil (Peanut)		0.936	1,458	4,783.5			
Oil (Sperm)		0.88	1,440	4,724.4			
Oil, 6			1,509 (22°C)	4,951 (72°F)			
2,2-Oxydiethanol	C ₄ H ₁₀ O ₃	1.116	1,586	5,203.4	2.4		
Oxygen (45)	O ₂	1.155 (-186°C)	952 (-186°C)	3,123.4 (-303°F)		0.173	1.861
Pentachloro-ethane (47)	C ₂ HCl ₅	1.687	1,082	3,549.9			
Pentalin (47)	C ₂ HCl ₅	1.687	1,082	3,549.9			
Pentane (36)	C ₅ H ₁₂	0.626 (20°C)	1,020	3,346.5		0.363	3.905
n-Pentane (47)	C ₅ H ₁₂	0.557	1,006	3,300.5		0.41	4.413
Perchlorocyclopentadiene (47)	C ₅ Cl ₆	1.718	1,150	3,773			
Perchloro-ethylene (47)	C ₂ Cl ₄	1.632	1,036	3,399			
Perfluoro-1-Hepten (47)	C ₇ F ₁₄	1.67	583	1,912.7			
Perfluoro-n-Hexane (47)	C ₆ F ₁₄	1.672	508	1,666.7			
Phene (29, 40, 41)	C ₆ H ₆	0.879	1,306	4,284.8	4.65	0.711	7.65
b -Phenyl acrolein	C ₉ H ₈ O	1.112	1,554	5,098.4	3.2		
Phenylamine (41)	C ₆ H ₅ NO ₂	1.022	1,639	5,377.3	4.0	3.63	39.058
Phenyl bromide (46)	C ₆ H ₅ Br	1.522	1,170 (20°C)	3,838.6 (68°F)		0.693	7.456
Phenyl chloride	C ₆ H ₅ Cl	1.106	1,273	4,176.5	3.6	0.722	7.768
Phenyl iodide (46)	C ₆ H ₅ I	1.823	1,114 (20°C)	3,654.9 (68°F)		0.954 (15°C)	10.265 (59°F)
Phenyl methane (16, 52)	C ₇ H ₈	0.867 (20°C)	1,328 (20°C)	4,357 (68°F)	4.27	0.644	6.929
3-Phenyl propenal	C ₉ H ₈ O	1.112	1,554	5,098.4	3.2		

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s	m/s/°C	m ² /s	ft ² /s
Phthalardione	C ₈ H ₄ O ₃		1,125 (152°C)	3,691 (306°F)			
Phthalic acid, anhydride	C ₈ H ₄ O ₃		1,125 (152°C)	3,691 (306°F)			
Pthalic anhydride	C ₈ H ₄ O ₃		1,125 (152°C)	3,691 (306°F)			
Pimelic ketone	C ₆ H ₁₀ O	0.948	1,423	4,668.6	4.0		
Plexiglas, Lucite, Acrylic			2,651	8,698			
Polyterpene Resin		0.77	1,099.8 (190°C)	3,608.4 (374°F)		39,000	419,500
Potassium bromide (42)	KBr		1,169 (900°C)	3,835.3 (1652°F)	0.71	.715cp (900°C)	7.693 (1652°F)
Potassium fluoride (42)	KF		1,792 (900°C)	5,879.3 (1652°F)	1.03		
Potassium iodide (42)	KI		985 (900°C)	3,231.6 (1652°F)	0.64		
Potassium nitrate (48)	KNO ₃	1.859 (352°C)	1,740.1 (352°C)	5,709 (666°F)	1.1	1.19 (327°C)	12.804 (621°F)
Propane (2, 13) (-45° to -130°C)	C ₃ H ₈	0.585 (-45°C)	1,003 (-45°C)	3,290.6 (-49°F)	5.7		
1,2,3-Propanetriol	C ₃ H ₈ O ₃	1.26	1,904	6,246.7	2.2	.000757	
1-Propanol (46)	C ₃ H ₈ O	0.78 (20°C)	1,222 (20°C)	4,009.2 (68°F)			
2-Propanol (46)	C ₃ H ₈ O	0.785 (20°C)	1,170 (20°C)	3,838.6 (68°F)		2.718	29.245
2-Propanone	C ₃ H ₆ O	0.791	1,174	3,851.7	4.5	0.399	4.293
Propene (17, 18, 35)	C ₃ H ₆	0.563 (-13°C)	963 (-13°C)	3,159.4 (9°F)	6.32		
n-Propyl acetate (22)	C ₅ H ₁₀ O ₂		1,280 (2°C)	4,199 (36°F)	4.63		
n-Propyl-alcohol	C ₃ H ₈ O	0.78 (20°C)	1,222 (20°C)	4,009.2 (68°F)		2.549	27.427
Propylchloride (47)	C ₃ H ₇ Cl	0.892	1,058	3,471.1		0.378	4.067
Propylene (17, 18, 35)	C ₃ H ₆	0.563 (-13°C)	963 (-13°C)	(3159.4) (9°F)	6.32		

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$ m/s/°C	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s		m ² /s	ft ² /s
Pyridine	C ₆ H ₅ N	0.982	1,415	4,642.4	4.1	0.992 (20°C)	10.673 (68°F)
Refrigerant 11 (3, 4)	CCl ₃ F	1.49	828.3 (0°C)	2,717.5 (32°F)	3.56		
Refrigerant 12 (3)	CCl ₂ F ₂	1.516 (-40°C)	774.1 (-40°C)	2,539.7 (-40°F)	4.24		
Refrigerant 14 (14)	CF ₄	1.75 (-150°C)	875.24 (-150°C)	2,871.5 (-238°F)	6.61		
Refrigerant 21 (3)	CHCl ₂ F	1.426 (0°C)	891 (0°C)	2,923.2 (32°F)	3.97		
Refrigerant 22 (3)	CHClF ₂	1.491 (-69°C)	893.9 (50°C)	2,932.7 (122°F)	4.79		
Refrigerant 113 (3)	CCl ₂ F-CClF ₂	1.563	783.7 (0°C)	2,571.2 (32°F)	3.44		
Refrigerant 114 (3)	CClF ₂ -CClF ₂	1.455	665.3 (-10°C)	2,182.7 (14°F)	3.73		
Refrigerant 115 (3)	C ₂ ClF ₅		656.4 (-50°C)	2,153.5 (-58°F)	4.42		
Refrigerant C318 (3)	C ₄ F ₈	1.62 (-20°C)	574 (-10°C)	1,883.2 (14°F)	3.88		
Selenium (8)	Se		1,072 (250°C)	3,517.1 (482°F)	0.68		
Silicone (30 cp)		0.993	990	3,248		30	322.8
Sodium fluoride (42)	NaF	0.877	2,082 (1000°C)	6,830.7 (1832°F)	1.32		
Sodium nitrate (48)	NaNO ₃	1.884 (336°C)	1,763.3 (336°C)	5,785.1 (637°F)	0.74	1.37 (336°C)	14.74 (637°F)
Sodium nitrite (48)	NaNO ₂	1.805 (292°C)	1,876.8 (292°C)	6,157.5 (558°F)			
Solvesso #3		0.877	1,370	4,494.8	3.7		
Spirit of wine	C ₂ H ₆ O	0.789	1,207	3,960	4.0	1.396	15.02
Sulfur (7, 8, 10)	S		1,177 (250°C)	3,861.5 (482°F)	-1.13		
Sulfuric Acid (1)	H ₂ SO ₄	1.841	1,257.6	4,126	1.43	11.16	120.081
Tellurium (7)	Te		991 (450°C)	3,251.3 (842°F)	0.73		

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s	m/s/ $^\circ\text{C}$	m ² /s	ft ² /s
1,1,2,2-Tetrabromo-ethane (47)	C ₂ H ₂ Br ₄	2.966	1,027	3,369.4			
1,1,2,2-Tetrachloro-ethane (67)	C ₂ H ₂ Cl ₄	1.595	1,147	3,763.1		1.156 (15°C)	12.438 (59°F)
Tetrachloroethane (46)	C ₂ H ₂ Cl ₄	1.553 (20°C)	1,170 (20°C)	3,838.6 (68°F)		1.19	12.804
Tetrachloro-ethene (47)	C ₂ Cl ₄	1.632	1,036	3,399			
Tetrachloro-Methane (33, 47)	CCl ₄	1.595 (20°C)	926	3,038.1		0.607	6.531
Tetradecane (46)	C ₁₄ H ₃₀	0.763 (20°C)	1,331 (20°C)	4,366.8 (68°F)		2.86 (20°C)	30.773 (68°F)
Tetraethylene glycol	C ₈ H ₁₈ O ₅	1.123	1,586	5,203.4	3.0		
Tetrafluoro-methane (14) (Freon 14)	CF ₄	1.75 (-150°C)	875.24 (-150°C)	2,871.5 (-238°F)	6.61		
Tetrahydro-1,4-isoxazine	C ₄ H ₉ NO	1.000	1,442	4,731	3.8		
Toluene (16, 52)	C ₇ H ₈	0.867 (20°C)	1,328 (20°C)	4,357 (68°F)	4.27	0.644	6.929
o-Toluidine (46)	C ₇ H ₉ N	0.999 (20°C)	1,618	5,308.4		4.394 (20°C)	47.279 (68°F)
p-Toluidine (46)	C ₇ H ₉ N	0.966 (45°C)	1,480	4,855.6		1.863 (50°C)	20.053 (122°F)
Toluol	C ₇ H ₈	0.866	1,308	4,291.3	4.2	0.58	6.24
Tribromo-methane (46, 47)	CHBr ₃	2.89 (20°C)	918	3,011.8		0.654	7.037
1,1,1-Trichloro-ethane (47)	C ₂ H ₃ Cl ₃	1.33	985	3,231.6		0.902 (20°C)	9.705 (68°F)
Trichloro-ethene (47)	C ₂ HCl ₃	1.464	1,028	3,372.7			
Trichloro-fluoromethane (3) (Freon 11)	CCl ₃ F	1.49	828.3 (0°C)	2,717.5 (32°F)	3.56		
Trichloro-methane (47)	CHCl ₃	1.489	979	3,211.9	3.4	0.55	5.918
1,1,2-Trichloro-1,2,2-Trifluoro-Etham	CCl ₂ F-CClF ₂	1.563	783.7 (0°C)	2,571.2 (32°F)			
Triethyl-amine (33)	C ₆ H ₁₅ N	0.726	1,123	3,684.4	4.47		
Triethylene glycol	C ₆ H ₁₄ O ₄	1.123	1,608	5,275.6	3.8		

Table 2: Sound Speeds in Fluids (cont.)

Substance	Chemical Formula	All data given at 25°C (77°F) unless otherwise noted.					
		Specific Gravity	Sound Speed		$\Delta v/^\circ\text{C}$ m/s/°C	Kinematic Viscosity $\times 10^{-6}$	
			m/s	ft/s		m ² /s	ft ² /s
1,1,1-Trifluoro-2-Chloro-2-Bromo-Ethane	C ₂ HClBrF ₃	1.869	693	2,273.6			
1,2,2-Trifluorotrichloro-ethane (Freon 113)	CCl ₂ F-CCLF ₂	1.563	783.7 (0°C)	2,571.2 (32°F)	3.44		
d-1,3,3-Trimethylnorcamphor	C ₁₀ H ₁₆ O	0.947	1,320	4,330.7		0.22	2.367
Trinitrotoluene (43)	C ₇ H ₅ (NO ₂) ₃	1.64	1,610 (81°C)	5,282.2 (178°F)			
Turpentine		0.88	1,255	4,117.5		1.4	15.064
Unisis 800		0.87	1,346	4,416			
Water, distilled (49, 50)	H ₂ O	0.996	1,498	4,914.7	-2.4	1.00	10.76
Water, heavy	D ² O		1,400	4,593			
Water, sea		1.025	1,531	5,023	-2.4	1.00	10.76
Wood Alcohol (40, 41)	CH ₄ O	0.791 (20°C)	1,076	3,530.2	2.92	0.695	7.478
Xenon (45)	Xe		630 (-109°C)	2,067 (-164°F)			
m-Xylene (46)	C ₈ H ₁₀	0.868 (15°C)	1,343 (20°C)	4,406.2 (68°F)		0.749 (15°C)	8.059 (59°F)
o-Xylene (29, 46)	C ₈ H ₁₀	0.897 (20°C)	1,331.5	4,368.4	4.1	0.903 (20°C)	9.716 (68°F)
p-Xylene (46)	C ₈ H ₁₀		1,334 (20°C)	4,376.6 (68°F)		0.662	7.123
Xylene hexafluoride	C ₈ H ₄ F ₆	1.37	879	2,883.9		0.613	6.595
Zinc (7)	Zn		3,298 (450°C)	10,820.2 (842°F)			

Note: For critical applications, the sources of sound speed data for pure liquids can generally be obtained from GE Infrastructure Sensing. Requests for sources must identify temperature and pressure range, and details of liquid composition.

Sound Speeds Data
(cont.)

The values in Table 3 below are reproduced (with permission) from
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Table 3: Sound Speeds in Water at Selected Temperatures

Temperature		Sound Speed in Water		Temperature		Sound Speed in Water	
°C	°F	m/s	ft/s	°C	°F	m/s	ft/s
0	32.0	1,402	4,600				
1	33.8	1,407	4,616	31	87.8	1,511	4,958
2	35.6	1,412	4,633	32	89.6	1,513	4,964
3	37.4	1,417	4,649	33	91.4	1,515	4,971
4	39.2	1,421	4,662	34	93.2	1,517	4,977
5	41.0	1,426	4,679	35	95.0	1,519	4,984
6	42.8	1,430	4,692	36	96.8	1,521	4,990
7	44.6	1,434	4,705	37	98.6	1,523	4,997
8	46.4	1,439	4,721	38	100.4	1,525	5,004
9	48.2	1,443	4,734	39	102.2	1,527	5,010
10	50.0	1,447	4,748	40	104.0	1,528	5,013
11	51.8	1,451	4,761	41	105.8	1,530	5,020
12	53.6	1,455	4,774	42	107.6	1,532	5,026
13	55.4	1,458	4,784	43	109.4	1,534	5,033
14	57.2	1,462	4,797	44	111.2	1,535	5,036
15	59.0	1,465	4,807	45	113.0	1,536	5,040
16	60.8	1,469	4,820	46	114.8	1,538	5,046
17	62.6	1,472	4,830	47	116.6	1,539	5,049
18	64.4	1,476	4,843	48	118.4	1,540	5,053
19	66.2	1,479	4,853	49	120.2	1,541	5,056
20	68.0	1,482	4,862	50	122.0	1,543	5,063
21	69.8	1,485	4,872	51	123.8	1,543	5,063
22	71.6	1,488	4,882	52	125.6	1,544	5,066
23	73.4	1,491	4,892	53	127.4	1,545	5,069
24	75.2	1,493	4,899	54	129.2	1,546	5,072
25	77.0	1,496	4,908	55	131.0	1,547	5,076
26	78.8	1,499	4,918	56	132.8	1,548	5,079
27	80.6	1,501	4,925	57	134.6	1,548	5,079
28	82.4	1,504	4,935	58	136.4	1,549	5,082
29	84.2	1,506	4,941	59	138.2	1,550	5,086
30	86.0	1,509	4,951	60	140.0	1,550	5,086

Table 3: Sound Speeds in Water at Selected Temperatures (cont.)

Temperature		Sound Speed in Water		Temperature		Sound Speed in Water	
°C	°F	m/s	ft/s	°C	°F	m/s	ft/s
61	141.8	1,551	5,089	96	204.8	1,546	5,072
62	143.6	1,552	5,092	97	206.6	1,545	5,069
63	145.4	1,552	5,092	98	208.4	1,544	5,066
64	147.2	1,553	5,095	99	210.2	1,543	5,063
65	149.0	1,553	5,095	100	212.0	1,543	5,063
66	150.8	1,553	5,095	104	220.0	1,538	5,046
67	152.6	1,554	5,099	110	230.0	1,532	5,026
68	154.4	1,554	5,099	116	240.0	1,524	5,000
69	156.2	1,554	5,099	121	250.0	1,526	5,007
70	158.0	1,554	5,099	127	260.0	1,507	4,944
71	159.8	1,554	5,099	132	270.0	1,497	4,912
72	161.6	1,555	5,102	138	280.0	1,487	4,879
73	163.4	1,555	5,102	143	290.0	1,476	4,843
74	165.2	1,555	5,102	149	300.0	1,465	4,807
75	167.0	1,555	5,102	154	310.0	1,453	4,767
76	168.8	1,555	5,102	160	320.0	1,440	4,725
77	170.6	1,554	5,099	166	330.0	1,426	4,679
78	172.4	1,554	5,099	171	340.0	1,412	4,633
79	174.2	1,554	5,099	177	350.0	1,398	4,587
80	176.0	1,554	5,099	182	360.0	1,383	4,538
81	177.8	1,554	5,099	188	370.0	1,368	4,488
82	179.6	1,553	5,095	193	380.0	1,353	4,439
83	181.4	1,553	5,095	199	390.0	1,337	4,387
84	183.2	1,553	5,095	204	400.0	1,320	4,331
85	185.0	1,552	5,092	210	410.0	1,302	4,272
86	186.8	1,552	5,092	216	420.0	1,283	4,210
87	188.6	1,552	5,092	221	430.0	1,264	4,147
88	190.4	1,551	5,089	227	440.0	1,244	4,082
89	192.2	1,551	5,089	232	450.0	1,220	4,003
90	194.0	1,550	5,086	238	460.0	1,200	3,937
91	195.8	1,549	5,082	243	470.0	1,180	3,872
92	197.6	1,549	5,082	249	480.0	1,160	3,806
93	199.4	1,548	5,079	254	490.0	1,140	3,740
94	201.2	1,547	5,076	260	500.0	1,110	3,642
95	203.0	1,547	5,076				

Pipe Size Data

In Table 4 below:

A is ANSI B 36.10 Steel pipe nominal wall thickness designation.**B** is ANSI B 36.10 Steel pipe schedule numbers.**C** is ANSI B 36.19 Stainless steel pipe schedule numbers.

Table 4: Standard ANSI Data for Carbon Steel and Stainless Steel Pipe

Nominal Pipe Size (in.)	Outside Diameter (in.)	Wall Thickness (in.)	A	B	C
			Carbon Steel Wall Thickness Desig.	Carbon Steel Schedule Number	Stainless Steel Schedule Number
1/8	0.405	0.049	-	-	10S
		0.068	STD	40	40S
		0.095	XS	80	80S
1/4	0.540	0.065	-	-	10S
		0.088	STD	40	40S
		0.119	XS	80	80S
3/8	0.675	0.065	-	-	10S
		0.091	STD	40	40S
		0.126	XS	80	80S
1/2	0.840	0.065	-	-	5S
		0.083	-	-	10S
		0.109	STD	40	40S
		0.147	XS	80	80S
		0.187	-	160	-
3/4	1.050	0.065	-	-	5S
		0.083	-	-	10S
		0.113	STD	40	40S
		0.154	XS	80	80S
		0.218	-	160	-
1	1.315	0.065	-	-	5S
		0.109	-	-	10S
		0.133	STD	40	40S
		0.179	XS	80	80S
		0.250	-	160	-
1 1/4	1.660	0.065	-	-	5S
		0.109	-	-	10S
		0.140	STD	40	40S
		0.191	XS	80	80S
		0.250	-	160	-
1 1/2	1.900	0.065	-	-	5S
		0.109	-	-	10S
		0.145	STD	40	40S
		0.200	XS	80	80S
		0.281	-	160	-
		0.400	XXS	-	-
Nominal Pipe Size (in.)	Outside Diameter (in.)	Wall Thickness (in.)	A	B	C
			Carbon Steel Wall Thickness Desig.	Carbon Steel Schedule Number	Stainless Steel Schedule Number
2	2.375	0.065	-	-	5S
		0.109	-	-	10S
		0.154	STD	40	40S
		0.218	XS	80	80S
		0.344	-	160	-
2 1/2	2.875	0.083	-	-	5S
		0.120	-	-	10S
		0.203	STD	40	40S
		0.276	XS	80	80S
		0.375	-	160	-
3	3.500	0.083	-	-	5S
		0.120	-	-	10S
		0.216	STD	40	40S
		0.300	XS	80	80S
		0.438	-	160	-
3 1/2	4.000	0.083	-	-	5S
		0.120	-	-	10S
		0.226	STD	40	40S
		0.318	XS	80	80S
		0.636	XXS	-	-
4	4.500	0.083	-	-	5S
		0.120	-	-	10S
		0.237	STD	40	40S
		0.337	XS	80	80S
		0.438	-	120	-
5	5.536	0.109	-	-	5S
		0.134	-	-	10S
		0.258	STD	40	40S
		0.375	XS	80	80S
		0.500	-	120	-
		0.625	-	160	-
		0.750	XXS	-	-

Table 4: Standard ANSI Data for Carbon Steel and Stainless Steel Pipe (cont.)

Nominal Pipe Size (in.)	Outside Diameter (in.)	Wall Thickness (in.)	A	B	C	Nominal Pipe Size (in.)	Outside Diameter (in.)	Wall Thickness (in.)	A	B	C	
			Carbon Steel	Carbon Steel	Stainless Steel				Carbon Steel	Carbon Steel	Stainless Steel	
			Wall Thickness Desig.	Schedule Number	Schedule Number				Wall Thickness Desig.	Schedule Number	Schedule Number	
6	6.625	0.109	-	-	5S	14	14.000	0.156	-	-	5S	
		0.134	-	-	10S			0.188	-	-	10S	
		0.280	STD	40	40S			0.250	-	10	-	
		0.432	XS	80	80S			0.312	-	20	-	
		0.562	-	120	-			0.375	STD	30	-	
		0.719	-	160	-			0.438	-	40	-	
		0.864	XXS	-	-			0.500	XS	-	-	
8	8.625	0.109	-	-	5S			0.594	-	60	-	
		0.148	-	-	10S			0.625	XXS	-	-	
		0.250	-	20	-			0.750	-	80	-	
		0.277	-	30	-			0.938	-	100	-	
		0.322	STD	40	40S			1.094	-	120	-	
		0.406	-	60	-			1.250	-	140	-	
		0.500	XS	80	80S			1.406	-	160	-	
		0.594	-	100	-		16	16.000	0.165	-	-	5S
		0.719	-	120	-				0.188	-	-	10S
		0.812	-	140	-				0.250	-	10	-
0.875	XXS	-	-	0.312	-				20	-		
0.906	-	160	-	0.375	STD				30	-		
10	10.750	0.134	-	-	5S				0.500	XS	40	-
		0.165	-	-	10S				0.656	-	60	-
		0.250	-	20	-	0.844			-	80	-	
		0.307	-	30	-	1.031			-	100	-	
		0.365	STD	40	40S	1.219			-	120	-	
		0.500	XS	60	80S	1.439	-	140	-			
		0.594	-	80	-	1.594	-	160	-			
		0.719	-	100	-	18	18.000	0.165	-	-	5S	
		0.844	-	120	-			0.188	-	-	10S	
		1.000	XXS	140	-			0.250	-	10	-	
12	12.750	0.156	-	-	5S			0.312	-	20	-	
		0.180	-	-	10S			0.375	STD	-	-	
		0.250	-	20	-			0.438	-	30	-	
		0.330	-	30	-			0.500	XS	-	-	
		0.375	STD	-	40S			0.562	-	40	-	
		0.406	-	40	-			0.750	-	60	-	
		0.500	XS	-	80S			0.938	-	80	-	
		0.562	-	60	-			1.156	-	100	-	
		0.688	-	80	-			1.375	-	120	-	
		0.844	-	100	-			1.562	-	140	-	
		1.000	XXS	120	-			1.781	-	160	-	
		1.125	-	140	-							
		1.312	-	160	-							

Table 4: Standard ANSI Data for Carbon Steel and Stainless Steel Pipe (cont.)

Nominal Pipe Size (in.)	Outside Diameter (in.)	Wall Thickness (in.)	A	B	C	Nominal Pipe Size (in.)	Outside Diameter (in.)	Wall Thickness (in.)	A	B	C
			Carbon Steel	Carbon Steel	Stainless Steel				Carbon Steel	Carbon Steel	Stainless Steel
			Wall Thickness Desig.	Schedule Number	Schedule Number				Wall Thickness Desig.	Schedule Number	Schedule Number
20	20.000	0.188	-	-	5S	30	30.000	0.250	-	-	5S
		0.218	-	-	10S			0.312	-	10	10S
		0.250	-	10	-			0.375	STD	-	-
		0.375	STD	20	-			0.500	XS	20	-
		0.500	XS	30	-			0.625	-	30	-
		0.594	-	40	-			0.750	-	40	-
		0.812	-	60	-			32	32.000	0.312	-
		1.031	-	80	-	0.375	STD			-	-
		1.281	-	100	-	0.500	XS			20	-
		1.500	-	120	-	0.625	-			30	-
		1.750	-	140	-	0.688	-	40	-		
1.969	-	160	-	34	34.000	0.344	-	10	-		
22	22.000	0.188	-			-	5S	0.375	STD	-	-
		0.218	-			-	10S	0.500	XS	20	-
		0.250	-			10	-	0.625	-	30	-
		0.375	STD			20	-	0.688	-	40	-
		0.500	XS	30	-	36	36.000	0.312	-	10	-
		0.875	-	60	-			0.375	STD	-	-
		1.125	-	80	-			0.500	XS	20	-
		1.375	-	100	-			0.625	-	30	-
		1.625	-	120	-	0.750	-	40	-		
		1.875	-	140	-	42	42.000	0.375	STD	-	-
		2.125	-	160	-			0.500	XS	20	-
24	24.000	0.218	-	-	5S			0.625	-	30	-
		0.250	-	10	10S	0.750	-	40	-		
		0.375	STD	20	-	48	48.000	0.375	STD	-	-
		0.500	XS	-	-			0.500	XS	-	-
		0.562	-	30	-						
		0.688	-	40	-						
		0.969	-	60	-						
		1.219	-	80	-						
		1.531	-	100	-						
		1.812	-	120	-						
		2.062	-	140	-						
2.344	-	160	-								
26	26.000	0.312	-	10	-						
		0.375	STD	-	-						
		0.500	XS	20	-						
28	28.000	0.312	-	10	-						
		0.375	STD	-	-						
		0.500	XS	20	-						
		0.625	-	30	-						

Table 5: Cast Iron Pipe Data - Standard Classes

Nominal Pipe Size (in.)	Class A		Class B		Class C		Class D	
	Outside Diameter (in.)	Wall Thickness (in.)	Outside Diameter (in.)	Wall Thickness (in.)	Outside Diameter (in.)	Wall Thickness (in.)	Outside Diameter (in.)	Wall Thickness (in.)
3	3.80	0.39	3.96	0.42	3.96	0.45	3.96	0.48
4	4.80	0.42	5.00	0.45	5.00	0.40	5.00	0.52
6	6.90	0.44	7.10	0.48	7.10	0.51	7.10	0.55
8	9.05	0.46	9.05	0.51	9.30	0.56	9.30	0.60
10	11.10	0.50	11.10	0.57	11.40	0.62	11.40	0.68
12	13.20	0.54	13.20	0.62	13.50	0.68	13.50	0.75
14	15.30	0.57	15.30	0.66	15.65	0.74	15.65	0.82
16	17.40	0.60	17.40	0.70	17.80	0.80	17.80	0.89
18	19.50	0.64	19.50	0.75	19.92	0.87	19.92	0.96
20	21.60	0.67	21.60	0.80	22.06	0.92	22.06	1.03
24	25.80	0.76	25.80	0.89	26.32	1.05	26.32	1.16
30	31.74	0.88	32.00	1.03	32.40	1.20	32.74	1.37
32	37.96	0.99	38.30	1.15	38.70	1.36	39.16	1.58
42	44.20	1.10	44.50	1.28	45.10	1.54	45.58	1.78
48	50.50	1.26	50.80	1.42	51.40	1.71	51.98	1.99
54	56.66	1.35	57.10	1.55	57.80	1.90	58.40	2.23
60	62.80	1.39	63.40	1.67	64.20	2.00	64.82	2.38
72	75.34	1.62	76.00	1.95	76.88	2.39		
84	87.54	1.72	88.54	2.22				

Nominal Pipe Size (in.)	Class E		Class F		Class G		Class H	
	Outside Diameter (in.)	Wall Thickness (in.)	Outside Diameter (in.)	Wall Thickness (in.)	Outside Diameter (in.)	Wall Thickness (in.)	Outside Diameter (in.)	Wall Thickness (in.)
3								
4								
6	7.22	0.58	7.22	0.61	7.38	0.65	7.38	0.69
8	9.42	0.66	9.42	0.66	9.60	0.75	9.60	0.80
10	11.60	0.74	11.60	0.80	11.84	0.86	11.84	0.92
12	13.78	0.82	13.78	0.89	14.08	0.97	14.08	1.04
14	15.98	0.90	15.98	0.99	16.32	1.07	16.32	1.16
16	18.16	0.90	18.16	1.08	18.54	1.18	18.54	1.27
18	20.34	1.07	20.34	1.17	20.78	1.28	20.78	1.39
20	22.54	1.15	22.54	1.27	23.02	1.39	23.02	1.51
24	26.90	1.31	26.90	1.45	27.76	1.75	27.76	1.88
30	33.10	1.55	33.46	1.73				
32	39.60	1.80	40.04	2.02				
42								
48								
54								
60								
72								
84								

Table 6: Ductile Iron Pipe Data - Standard Classes

Nominal Pipe Size (in.)	Outside Diameter (in.)	Pipe Wall Thickness (in.)						
		Class 50	Class 51	Class 52	Class 53	Class 54	Class 55	Class 56
3	3.96		0.25	0.28	0.31	0.43	0.37	0.40
4	4.80		0.26	0.29	0.32	0.35	0.38	0.41
6	6.90	0.25	0.28	0.31	0.34	0.37	0.40	0.43
8	9.05	0.27	0.30	0.33	0.36	0.39	0.42	0.45
10	11.10	0.29	0.32	0.35	0.38	0.44	0.47	
12	13.20	0.31	0.34	0.37	0.40	0.43	0.46	0.49
14	15.30	0.33	0.36	0.39	0.42	0.45	0.48	0.51
16	17.40	0.34	0.37	0.40	0.43	0.46	0.49	0.52
18	19.50	0.35	0.38	0.41	0.44	0.47	0.50	0.53
20	21.60	0.36	0.39	0.42	0.45	0.48	0.51	0.54
24	25.80	0.38	0.41	0.44	0.47	0.50	0.53	0.56
30	32.00				0.51	0.55	0.59	0.63
36	38.30				0.58	0.63	0.68	0.73
42	44.50				0.65	0.71	0.77	0.83
48	50.80				0.72	0.79	0.86	0.93
54	57.10				0.81	0.89	0.97	1.05



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