

Attached Table 1.3 Fundamental permissible stresses of nonferrous metal materials
(for 1st-class vessels) (SI units)

(Copper)

Classification	Class	Temper.	Symbol	Specified min. tensile proof stress N/mm ²	Specified min. proof stress N/mm ²	Dimension (mm) mm ²	Base metal No.	Group No.	Note	Fundamental permissible stress at each temperature °C N/mm ²																									Symbol
										-268	-196	-125	-80	-60	-45	-30	-10	0	40	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	
JIS H 3100	1100	O	C 1100 P.O.	195	-	-	31	-	44	-	46	46	46	46	46	46	46	46	39	37	36	35	-	-	-	-	-	-	-	-	-	-	-	C 1100 P.O.	
	1100		C 1100 R.O.																														C 1100 R.O.		
	1220		C 1220 P.O.																														C 1220 P.O.		
	1220		C 1220 R.O.																															C 1220 R.O.	
	4640	F	C 4640 P-F	345 315	-	Thickness: 75 or under Thickness: Over 75 to incl. 125	32	-	45	-	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	C 4640 P-F
	6140	O	C 6140 P-O	480 450		Thickness: 50 or under Thickness: Over 50 to incl. 125	35	-	49	-	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	138 129	C 6140 P-O
	7060	F	C 7060 P-F	275	-	Thickness: 60 or under	34	-	46	-	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	69 69	C 7060 P-F	
	7150	F	C 7150 P-F	345 310		Thickness: 60 or under Thickness: Over 60 to incl. 125	34	-	47	-	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	92 82	C 7150 P-F
JIS H 3250	1020	O	C 1020 BD-O	195	-	-	31	-	44	-	46	46	46	46	46	46	46	46	39	37	36	35	-	-	-	-	-	-	-	-	-	-	-	C 1020 BD-O	
	1100		C 1100 BD-O																															C 1100 BD-O	
	1201		C 1201 BD-O																															C 1201 BD-O	
	1220		C 1220 BD-O																															C 1220 BD-O	
JIS H 3300	2800	O	C 2800 T-O C 2800 TS-O	315	-	-	32	-	45	(2)	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	C 2800 T-O C 2800 TS-O
	4430	O	C 4430 T-O C 4430 TS-O	315	-	-	32	-	45	(2)	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	C 4430 T-O C 4430 TS-O	
	7060	O	C 7060 T-O C 7060 TS-O	275	-	-	34	-	46	-	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	C 7060 T-O C 7060 TS-O	
	7150	O	C 7150 T-O C 7150 TS-O	365	-	-	34	-	47	-	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	C 7150 T-O C 7150 TS-O
JIS H 4551	NCu	O	NCuP-O	485	195	-	42	-	28	-	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	NCuP-O	
JIS H 4552	NCu																																		
	NCu	O	NCuT-O	485	195	-	42	-	28	-	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	129	NCuT-O	
	SR	NCuT-SR	590	380	-	-	42	-	28	-	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	NCuT-SR	

Attached Table 1.3 (SI units) (cont'd)

(Aluminium)

Classification	Class	Temp.	Symbol	Specified min. tensile strength N/mm ²	Specified min. proof stress N/mm ²	Dimension (mm)	Base metal No.	Grout and reinforcement No.	Notes	Fundamental permissible stress at each temperature °C N/mm ²																				Symbol																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
										-268	-196	-125	-80	-60	-45	-30	-10	0	40	75	100	125	150	175	200	225	250	275	300		325	350	375	400	425	450	475	500																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
JIS H 4000	3003 3203	O	A 3003 P-O	95	35	Thickness: Over 0.8 to incl. 75	21	—	—	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23

Attached Table 1.3 (SI units) (cont'd)

(Aluminium)

Classification	Case Temper.	Symbol	Specified min. tensile strength N/mm ²	Specified min. proof stress N/mm ²	Dimension (mm) mm ²	Base metal No.	Group	Internal heat treatment chart No.	Fundamental permissible stress at each temperature °C N/mm ²																												Symbol																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
									-268	-196	-125	-80	-60	-45	-30	-10	0	40	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
JIS H 4000	6061	T 4 A 6061 P-T 4	205	110	Thickness: Over 0.5 to incl. 6	23	—	24	(20)	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	6

Attached Table 1.3 (SI units) (cont'd)

(Aluminium)

Classification	Class Temp. °C	Symbol	Specified min. tensile strength N/mm ²	Specified min. yield strength N/mm ²	Dimension (mm) mm ²	Base metal No.	Group No.	Note	Fundamental permissible stress at each temperature °C N/mm ²																								Symbol				
									-265	-196	-125	-80	-60	-45	-30	0	40	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425		450	475	500	
JIS H 4030	320C	A 3003 TEH112 A 3203 TEH112	95	35	—	21	13 (10)	—	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	A 3003 TEH112 A 3203 TEH112	
		O A 3003 TD-O A 3203 TD-O	95	35	Wall thickness: 0.4 or over to incl. 12	21	13	—	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	A 3003 TD-O A 3203 TD-O	
	5052H 112	A 5052 TEH112	175	65	—	22	17 (10)	—	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	A 5052 TEH112	
		O A 5052 TE-O	175	65	—	22	17	—	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	A 5052 TE-O		
	5052H 112	A 5052 TD-O	175	70	Wall thickness: 0.6 or over to incl. 12	22	17	—	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	A 5052 TD-O	
		O A 5154 TEH112	205	75	—	22	20	—	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	A 5154 TEH112		
	5154H 112	A 5154 TE-O	205	75	—	22	20	—	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	A 5154 TE-O	
		O A 5154 TD-O	205	75	Wall thickness: 0.6 or over to incl. 12	22	20	—	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	A 5154 TD-O	
	5454H 112	A 5454 TEH112	215	85	Cross sectional area: 200 max.	22	21	—	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	A 5454 TEH112
		O A 5454 TE-O	215	85	Cross sectional area: 200 max.	22	21	—	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	A 5454 TE-O	
	5056H 112	A 5056 TEH112	245	100	—	25	—	(10)	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	A 5056 TEH112	
O A 5083 TE-O		275	110	Cross sectional area: 200 max.	25	18	—	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	A 5083 TE-O		
5083H 112	A 5083 TEH112	275	110	—	25	18	—	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	A 5083 TE-O	
	O A 5083 TD-O	275	110	Wall thickness: 0.6 or over to incl. 12	25	18	—	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	A 5083 TD-O		
6061	T 4	A 6061 TE-T 4	175	110	—	23	24 (20)	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	A 6061 TE-T 4		
		T 6	A 6061 TE-T 6	165	105	—	23	24 (10)	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	A 6061 TE-T 6		
	T 4	A 6061 TD-T 4	205	110	Wall thickness: 0.6 or over to incl. 12	23	24 (20)	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	A 6061 TD-T 4	
		T 6	A 6061 TD-T 6	165	105	—	23	24 (10)	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	A 6061 TD-T 6		
	T 4	A 6061 TE-T 4	205	110	—	23	24 (20)	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	A 6061 TE-T 4	
		T 6	A 6061 TE-T 6	165	105	—	23	24 (10)	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55	A 6061 TE-T 6	
	T 4	A 6061 TD-T 4	205	110	Wall thickness: 0.6 or over to incl. 12	23	24 (20)	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	A 6061 TD-T 4
		T 6	A 6061 TD-T 6	165	105	—	23	24 (10)	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	A 6061 TD-T 6	
	T 4	A 6063 TE-T 4	135	110	Wall thickness: 12 max.	23	—	(20)	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	A 6063 TE-T 4	
		T 6	A 6063 TE-T 6	120	—	—	23	—	(10)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	A 6063 TE-T 6	
	T 4	A 6063 TD-T 4	145	110	Wall thickness: Over 12 to incl. 25	23	—	(20)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	A 6063 TD-T 4
T 6		A 6063 TD-T 6	120	—	—	23	—	(10)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	A 6063 TD-T 6		
T 4	A 6063 TE-T 4	205	175	Wall thickness: 25 max.	23	—	(20)	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	A 6063 TE-T 4	
	T 6	A 6063 TE-T 6	120	—	—	23	—	(10)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	A 6063 TE-T 6		
T 4	A 6063 TD-T 4	225	195	Wall thickness: 0.6 or over to incl. 12	23	—	(20)	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	A 6063 TD-T 4	
	T 6	A 6063 TD-T 6	120	—	—	23	—	(10)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	A 6063 TD-T 6		

Attached Table 1.3 (SI units) (cont'd)

Classification	Class	Temper.	Symbol	Specified min. tensile strength N/mm ²	Specified min. proof stress N/mm ²	Dimension (mm) mm ²	Base metal	Group No.	Note	Fundamental permissible stress at each temperature °C N/mm ²																												Symbol																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
										Fundamental permissible stress at each temperature °C N/mm ²																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
										-268	-196	-125	-80	-60	-45	-30	10	40	75	100	125	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
JIS H 4100	3003	H 112A	3003 SH 112, O 3203	95	35	-	21	-	-	-23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23

(Titanium)
Attached Table 1.3 (SI units) (cont'd)

Classification	Class	Temper	Symbol	Specified min tensile strength N/mm ²	Specified min yield strength N/mm ²	Dimension (mm) mm ²	Base metal No	Group No	Note	Fundamental permissible stress at each temperature °C N/mm ²																	Symbol																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
										-268	-196	125	80	-60	-45	-30	-10	0	40	75	100	125	150	175	200	225		250	275	300	325	350	375	400	425	450	475	500																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
JIS H 4636	Class 12		TTH 35 PdD	345	275	—	51	—	32																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		

Notes (18) The fundamental permissible stress to be used for weld shall be the value of temper O.

(19) The values of this column indicate the fundamental permissible stresses to be used for welds.

(20) Those which have welded or cut by melting, this value shall not be used.

(21) Convert reading of 40°C into 66°C.

(22) For the base metal of cladding, this value can be used.

(23) The maximum temperature in external pressure design shall be 177°C or lower.

(24) For obtaining the value of fundamental permissible stress of this material, the quality factor 0.85 is being applied.

Remarks: In Attached Table 1.3, the value of fundamental permissible stress at the middle of each temperature shall be calculated by the rule of three sum.

Attached Table 1.3 Fundamental permissible stresses of nonferrous metal materials
(for 1st-class vessels) (conventional units)

Attached Table 1.3 (conventional units) (cont'd)

(Aluminium)

Classification	Class	Temper.	Symbol	Specified min. tensile strength, kg/mm ²	Dimension (mm) mm ²	Base metal No.	Group No.	Note	Fundamental permissible stress at each temperature °C kg/mm ²																			Symbol																																																																																																																																																																																																																																																																																																														
									-268	-196	-125	-80	-45	-30	-10	0	40	75	100	125	150	175	200	225	250	275	300		325	350	375	400	425	450	475	500																																																																																																																																																																																																																																																																																																						
JIS H 4000	3003	O A 3003 P-O A 3203 P-O	9.5	Thickness: Over 0.8 to incl. 75	21			--	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	--	--	--	--	--	--	--	--	--	--	--	--	--	A 3003 P-O A 3203 P-O																																																																																																																																																																																																																																																																																																									
									H 112 A 3003 PH 112 A 3203 PH 112	12	7.0	Thickness: 4 or over to incl. 13	21	--	(18)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.7	--	--	--	--	--	--	--	--	--	--	A 3003 PH 112 A 3203 PH 112																																																																																																																																																																																																																																																																																																					
																11	4.0	Thickness: Over 13 to incl. 50			2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.4	--	--	--	--	--	--	--	--	--	--	--																																																																																																																																																																																																																																																																																																
																					10	4.0	Thickness: Over 50 to incl. 75			2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.6	2.4	--	--	--	--	--	--	--	--	--	--	--																																																																																																																																																																																																																																																																																													
	3004	O A 3004 P-O	20	6.0	Thickness: Over 0.8 to incl. 3	22	--	16	--	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	A 3004 P-O																																																																																																																																																																																																																																																																																																										
									5052 5652	O A 5052 P-O A 5652 P-O	18	6.5	Thickness: Over 0.3 to incl. 75	22	--	17 (22)	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	A 5052 P-O A 5652 P-O																																																																																																																																																																																																																																																																																																					
	H 112 A 5052 PH 112 A 5652 PH 112	20	11	Thickness: 4 or over to incl. 13	22		17 (18)	6.7									6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	A 5052 PH 112 A 5652 PH 112																																																																																																																																																																																																																																																																																																					
								5454	O A 5454 P-O	22	8.5	Thickness: Over 0.3 to incl. 75	22	--	17	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	A 5454 P-O																																																																																																																																																																																																																																																																																																					
	5083	O A 5083 P-O	28	13	Thickness: Over 0.5 to incl. 40	25										18 (21) (22)	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	A 5083 P-O																																																																																																																																																																																																																																																																																																			
								H 112 A 5083 PH 112	27	11	Thickness: Over 40 to incl. 80																																																																																																																																																																																																																																																																																																																															

Attached Table 1.3 (conventional units) (cont'd)

(Aluminium)

Classification	Class	Temper.	Symbol	Specified tensile strength min. kg/mm ²	Specified proof stress min. kg/mm ²	Dimension (mm) min ¹	Base metal No.	Note	Fundamental permissible stress at each temperature °C kg/mm ²																	Symbol																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
									-268 -196 -125 -60 -45 -30 -10 0 40 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

Attached Table 1.3 (conventional units) (cont'd)

(Aluminium)

Classification	Class	Temper.	Symbol	Specified tensile strength, kg/mm ²	Specified yield strength, kg/mm ²	Dimension (mm)	Base metal No.	Group	Note	Fundamental permissible stress at each temperature °C kg/mm ²															Symbol													
										-268	-196	-125	-80	-45	-30	-10	0	40	75	100	125	150	175	200		225	250	275	300	325	350	375	400	425	450	475	500	
JIS H 1010	6063	T 3	A 6063 H T 3	10	11	Diameter 12 max	23	—	(16)	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	4.8	4.3	—	—	—	—	—	—	—	—	—	—	—	—	A 6063 H T 3			
				12	—	—	23	—	(16)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	—	—			
				15	11	Diameter: Over 12 to incl. 25	23	—	(16)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	4.8	4.3	—	—	—	—	—	—	—	—	—	—	—	—	—	
				12	—	—	23	—	(16)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	—	—	
				21	13	Diameter: 25 max.	23	—	(16)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	6.9	6.3	5.0	—	—	—	—	—	—	—	—	—	—	—	—	A 6063 H T 6	
JIS H 1080	3003	H 112	A 3003 H 112	9.5	3.5	—	21	—	(13)	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	A 3003 H 112			
				—	—	—	21	—	(13)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 3003 H 112		
				0.5	3.5	Wall thickness: 0.6 or over to incl. 12	21	—	(13)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 3003 T4O	
				18	6.5	—	22	—	(16)	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	A 3003 T4O	
				18	6.5	—	22	—	(16)	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	A 3003 T4O
JIS H 1080	5052	H 112	A 5052 H 112	18	7.0	—	22	—	(16)	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	A 5052 H 112			
				21	7.5	—	22	—	(16)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	A 5052 T4O		
				—	—	—	22	—	(16)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 5052 T4O	
				21	7.5	—	22	—	(16)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 5052 T4O	
				21	7.5	—	22	—	(16)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 5052 T4O
JIS H 1080	5052	H 112	A 5052 H 112	22	8.5	Sectional area 200 max	22	—	(16)	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	A 5052 T4O		
				22	8.5	Sectional area 200 max	22	—	(16)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 5052 T4O	
				22	8.5	Sectional area 200 max	22	—	(16)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 5052 T4O
				25	10	—	25	—	(16)	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	A 5052 T4O
				28	11	Sectional area 200 max	25	—	(16)	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
JIS H 1080	5083	H 112	A 5083 H 112	28	11	Sectional area 200 max	25	—	(16)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 5083 T4O	
				28	11	Sectional area 200 max	25	—	(16)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 5083 T4O
				28	11	Sectional area 200 max	25	—	(16)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 5083 T4O
				28	11	Sectional area 200 max	25	—	(16)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	A 5083 T4O
				28	11	Sectional area 200 max	25	—	(16)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—