

	Coppers			High Performance Alloys						Brasses					
CDA No.	102	110	122	14415	155	18070	19210	194	197	210	220	230	260	268	272
Wieland Alloy	K11	K32	K19	K81	K04	K75	K80	K65	K85	M05	M10	M15	M30	M33	M37
Nominal Composition	99.95 Cu min. 0.001 O max.	99.90 Cu min. 0.005-0.040 O	99.90 Cu min. 0.015-0.040 P	99.85 Cu 0.15 Sn	99.75 Cu 0.11 Mg 0.064 Ag 0.06 P	99.5 Cu 0.3 Cr 0.1 Ti 0.02 Si	99.85 Cu 0.1 Fe 0.03 P	97.4 Cu 2.4 Fe 0.12 Zn 0.03 P	99 CU 0.6 Fe 0.05 Mg 0.2 P	95 Cu 5 Zn	90 Cu 10 Zn	85 Cu 15 Zn	70 Cu 30 Zn	67 Cu 33 Zn	63 Cu 37 Zn
Density	0.323	0.322	0.323	0.323	0.322	0.321	0.323	0.322	0.319	0.32	0.318	0.316	0.308	0.306	0.305
Mod. of Elasticity	17	17	17	19	17	20	19	17	17	17	17	17	16	15	16
Electr. Conductivity	101	101	85	88	90	80	90	60	80	56	44	37	28	27	26
Therm. Conductivity	226	226	196	202	200	180	200	150	185	135	109	92	70	67	69
Coef. of therm. Exp.	9.8	9.8	9.8	10	9.8	10	9.8	9.7	9.6	10	10.2	10.4	11.1	11.3	11.4
ASTM Spec. No.	<b>B152</b>			-	<b>B888</b>	-	<b>B888</b>	<b>B888</b>	<b>B888</b>	<b>B36</b>	<b>B36</b>	<b>B36</b>	<b>B36</b>	<b>B36</b>	-
Annealed (soft) (TM00)	Tensile	26 - 38		36 - 46	34 - 43		27 - 42	40 - 63	43 - 53	32 - 42	33 - 43	37 - 47	45 - 61	44 - 61	44 - 54
	Yield	10		> 29	> 15		> 16	> 16	> 16	10	12	12	21	22	< 26
	% Elong.	35		> 9	> 30		> 30	> 10	> 20	46	47	45	52	53	> 38
	Rockwell	57 F		83 F				46		46 F	64 F	70 F	75 F	75 F	75 F
1/4 Hard (H01) (TM01)	Tensile	34 - 42					43-53			37 - 47	40 - 50	44 - 54	49 - 59	49 - 59	
	Yield	32					> 20			30	32	34	34	34	
	% Elong.	24					> 20			34	28	26	44	43	
	Rockwell	68 F								20 - 48	27 - 52	33 - 58	40 - 61	40 - 61	
1/2 Hard (H02) (TM02)	Tensile	37 - 46		43 - 54	45 - 55	58 - 70	47 - 60	53 - 63	53 - 63	42 - 52	47 - 57	51 - 61	57 - 67	55 - 65	51 - 64
	Yield	36		> 36	> 38	> 44	> 44	> 36	> 36	44	46	47	46	45	> 24
	% Elong.	20		> 4	> 13	> 8	> 5	> 6	> 6	15	12	14	28	35	> 19
	Rockwell	82 F		89 F				57	62 - 68	40 - 56	50 - 63	56 - 68	56 - 66	57 - 71	
3/4 Hard (H03) (TM03)	Tensile	41 - 50					52 - 62			46 - 56	52 - 62	57 - 67	64 - 74	62 - 72	59 - 71
	Yield	43					> 50			50	54	55	61	54	> 43
	% Elong.	14					> 4			8	6	7	17	25	> 8
	Rockwell	87 F								50 - 61	59 - 68	66 - 73	65 - 70	70 - 77	
Hard (H04) (TM04)	Tensile	43 - 52		52 - 62	56 - 64	67 - 78	56 - 66		60 - 70	50 - 59	57 - 66	63 - 72	71 - 81	68 - 78	70 - 81
	Yield	46		> 44	> 50	> 54	> 54	> 53	> 53	52	57	62	72	57	> 62
	% Elong.	9		> 3	> 6	> 5	> 3	> 3	> 2	6	4	7	10	18	> 3
	Rockwell	89 F		94 F				70	65 - 70	57 - 64	65 - 72	72 - 78	70 - 73	76 - 82	
Extra Hard (H06) (TM06)	Tensile	47 - 56		61 - 71	63 - 72	77 - 88	60 - 70	67 - 73	67 - 73	56 - 64	64 - 72	72 - 80	83 - 92	79 - 89	80 - 93
	Yield	51		> 50	> 56	> 67	> 58	> 64	> 64	59	63	68	83	67	> 72
	% Elong.	4		> 2	> 5	> 2	> 2	> 2	> 2	> 2	2	4	3	7	
	Rockwell	91 F		100 F				75	68 - 71	64 - 70	72 - 77	78 - 83	74 - 76	83 - 87	
Spring (H08) (TM08)	Tensile	50 - 58			65 - 73	80 - 91	64 - 74	70 - 76	70 - 76	60 - 68	69 - 77	78 - 86	91 - 100	86 - 95	> 91
	Yield	53			> 60	> 75	> 62	> 67	> 67	63	68	72	87	71	> 87
	% Elong.	3			> 4	> 7	> 1	> 2	> 2	> 2	1	3	> 1	5	
	Rockwell	94 F						76	69 - 72	68 - 73	76 - 79	82 - 85	76 - 78	87 - 90	
Extra Spring (H10)	Tensile	> 52			68 - 75		> 66	73 - 80	73 - 80	61 - 69	72 - 80	82 - 90	95 - 104	90 - 99	
	Yield	> 51			> 63		> 64	> 70	> 70	64	71	77	90	74	
	% Elong.	2			> 3		> 1	> 1	> 1	> 2	< 1	> 2	> 1	3	
	Rockwell	> 92 F						77	70 - 74	69 - 74	78 - 81	84 - 87	77 - 79	88 - 91	

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Density: Lbs. per cubic inch @ 68°F      Therm. Cond.: BTU x ft. @ 68°F      Yield strength: KSI (0.2% offset) (x 1000PSI)  
 Mod. of Elast x 106 PSI, tension      Coef. Of the Exp.: Inches/inch/ °F x 10<sup>-6</sup> from 68°F      % Elongation: A2" (% in 2 inches)  
 Elect. Cond.: % IACS @ 68°F as annealed      Tensile strength: KSI (x 1000 PSI)      Rockwell: Rockwell B for gauge ≥.020"

Reference-values for alloy comparison purposes. Please find more details on our alloy data sheets. Other alloys and tempers are available.  
 For further information and technical support please contact [technical-support@wieland.com](mailto:technical-support@wieland.com).

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 The data given are no warranty that the product is of a specified quality and they cannot replace expert advice or the customer's own tests.

	Leaded Brass	Tin Brass	Phosphor Bronzes				HP Alloys			CuNiSn	Nickel Silvers		
CDA No.	353	425	510	511	519	521	688	7025	7026	725	757	764	770
Wieland Alloy	Z21	S12	B15	B14	B16	B18	S23	K55	K50	L49	N12	N18	N17
Nominal Composition	61.2 Cu 37 Zn 1.8 Pb	88 Cu 3 Sn 9 Zn	95 Cu 5 Sn	96 Cu 4 Sn	94 Cu 6 Sn	92 Cu 8 Sn	73.5 Cu 22.7 Zn 3.4 Al 0.4 Co	96.2 Cu 3 Ni 0.65 Si 0.15 Mg	97.1 Cu 2.4 Ni 0.5 Si	89 Cu 9 Ni 2 Sn	64 Cu 12 Ni 24 Zn	62 Cu 18 Ni 20 Zn	55 Cu 18 Ni 27 Zn
Density	0.305	0.317	0.320	0.320	0.319	0.318	0.296	0.319	0.32	0.321	0.313	0.315	0.314
Modulus of Elasticity	15	16	16	16	16	16	17	18.9	18.9	20	18	19	18
Electr. Conductivity	24	28	17	20	15	13	18	43	45	11	8	6	5.5
Therm. Conductivity	63	69	45	50	38	36	47	110	115	31	24	19	17
Coef. of therm. Exp.	11.3	10.2	9.9	9.9	10.0	10.1	10.1	9.8	9.4	9.2	10	9.8	9.3
ASTM Spec. No.	B121	B591	B103	B103	B103	B103	B592	B422	-	B122	-	-	B122
Annealed (soft) (TM00)	Tensile	46-54	41 - 47	43-58	46 - 54	48 - 60	56 - 65	77 - 87	90 - 110	66 - 85	45 - 65	52-62	61 - 76
	Yield	20	16	25	22	32	30	50	≥ 73	≥ 50	20	26	30
	% Elong.	55	46	55	45	50	62	33	≥ 10	≥ 16	33	45	45
	Rockwell	72 F	F65-79	77 F	76 F	79 F	85 F	69 F					86 F
1/4 Hard (H01) (TM01)	Tensile	49-59	49 - 59	49 - 61	46 - 58	53 - 66	63 - 75	87 - 101		84 - 95	55 - 75	55-65	69 - 87
	Yield	30	36	36	34	47	47	75		≥ 68	68	36	62
	% Elong.	47	33	40	35	40	48	20		≥ 14	8	30	24
	Rockwell	40-65	46-71	57-63	40-52	67-75	70-78	86-95			< 85		70 - 88
1/2 Hard (H02) (TM02)	Tensile	55-65	57 - 69	58 - 73	55 - 70	64-79	69 - 84	97 - 112	94 - 113	90 - 105	65 - 80	62-74	65-75
	Yield	43	57	56	54	60	62	91	≥ 85	≥ 78	70	43	45
	% Elong.	35	20	24	20	25	38	8	≥ 7	≥ 13	8	11	12
	Rockwell	57-74	67-81	60-82	53-78	67-82	69-88	93-97			70-90		
3/4 Hard (H03) (TM03)	Tensile	62-72	62 - 74	68 - 79	67 - 82	72 - 86	80 - 92		100 - 116	98 - 113			88 - 101
	Yield	54	63	67	72	74	75		≥ 95	≥ 89			91
	% Elong.	20	14	14	10	14	25		≥ 5	≥ 10			7
	Rockwell	67-78	74-84	78-86	74-85	81-92	83-95						86 - 94
Hard (H04) (TM04)	Tensile	68-78	70 - 82	76 - 91	72 - 87	80 - 96	85 - 100	106 - 120	110 - 122		75 - 90	74-84	72-86
	Yield	66	72	80	77	81	84	100	≥ 105		80	65	67
	% Elong.	13	8	10	6	7	20	4	≥ 7		3	7	5
	Rockwell	76-84	81-88	84-91	80-86	87-96	89-95	96-98			75-90		
SUPRALLOY®	Temper				R580	R550	R590						
	Tensile				84 - 97	80-94	86-102						
	Yield				> 76	>72	> 78						
	% Elong.				> 13	>16	> 20						
Extra Hard (H06) (TM06)	Tensile	79-89	76 - 88	88 - 103	84 - 90	91 - 106	97 - 112	113 - 127			80 - 95	80-93	84-97
	Yield	78	78	92	86	95	98	107			86	77	80
	% Elong.	6	6	4	3	3	14	2			2	2	2
	Rockwell	83-89	86-92	89-95	86-92	91-99	93-98	97-99			80-95		
SUPRALLOY®	Temper				R660	R670	R685						
	Tensile				96-110	97-113	100-114						
	Yield				> 91	>95	> 94						
	% Elong.				> 7	>7	> 15						
Spring (H08) (TM08)	Tensile	86-95	84 - 94	95 - 110	91 - 106	98 - 113	105 - 119	123 - 133			85 - 100	90-102	93-106
	Yield	85	90	99	93	100	107	115			88	84	90
	% Elong.	3	4	2	3	2	5	1			1	1	1
	Rockwell	87-92	83-93	92-97	86-94	94-102	95-100	98-100			85-95		
SUPRALLOY®	Temper				R700	R735							
	Tensile				102-116	106-121							
	Yield				> 100	> 102							
	% Elong.				> 3	> 9							
Extra Spring (H10)	Tensile	90-99	> 92	100 - 114	96 - 108	102 - 117	110 - 122	> 125			90 - 105		> 116
	Yield	89	> 86	105	99	104	111	115			90		> 115
	% Elong.	2	1	2	2	1	3	1			1		< 1
	Rockwell	88-93	> 92	94-98	89-94	95-102	96-101	> 99			87-95		> 98
SUPRALLOY®	Temper						R800						
	Tensile						116-130						
	Yield						> 112						
	% Elong.						> 5						

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