JX金属株式会社　銅合金(条)材料一覧　JX Nippon Mining & Metals Corporation Copper alloys list

UPDATED January, 2020

			Hyper Phosphor Bronze ハイパーりん青銅		Phosphor Bronze 一般りん青銅					TiCu チタン銅				Cu-Ni-Si コルソン合金										High Conductivity Copper Alloy 高導電シリーズ		Hyper Eco Alloy ハイパーエコアロイ	Brass 黄銅		Nickel Silver 洋白	
Copper Alloy Name 製品名			C5210 (HP)	C5240 (HP)	C5111	C5102	C5191	C5212	C5210	C1990	C1990 (HP)	C1990 (HC)	NKT322	C7025	NKC286	NKC286S	NKC1816	NKC388	NKC184	NKC184E	NKC4419	NKC4820	NKE010	NKE012	NKB032	C2600	C2680	C7521	C7701
Chemical Composition (wt%) 化学組成			Cu : Bal. Sn : 8.0 P : 0.2	Cu : Bal. Sn : 10.0 P : 0.15	Cu : Bal. Sn : 4.0 P : 0.08	Cu : Bal. Sn : 5.0 P : 0.2	Cu : Bal. Sn : 6.0 P : 0.2	Cu : Bal. Sn : 8.0 P : 0.2	Cu : Bal. Sn : 8.0 P : 0.2	Cu : Bal. Ti : 3.0	Cu : Bal. Ti : 3.0	Cu : Bal. Ti : 3.0	Cu : Bal. Ti : 3.2 Fe : 0.2	Cu : Bal. Ni : 3.0 Si : 0.65 Mg : 0.15	Cu : Bal. Ni : 2.8 Si : 0.6 Sn : 0.5 Zn : 0.4	Cu : Bal. Ni : 2.8 Si : 0.6 Sn : 0.5 Zn : 0.4	Cu : Bal. Ni : 1.0～2.0 Co : 1.0～2.0 Si : 0.5～1.0 Cr : 0.09～0.2	Cu : Bal. Ni : 3.8 Si : 0.8 Mg : 0.1 Mn : 0.13	Cu : Bal. Ni : 1.6 Si : 0.4 Sn : 0.5 Zn : 0.4	Cu : Bal. Ni : 1.6 Si : 0.35	Cu : Bal. Co : 1.9 Si : 0.44	Cu : Bal. Ni : 1.5 Co : 0.5 Si : 0.48	Cu : Bal. Zr : 0.1	Cu : Bal. Sn : 0.12	Cu : Bal. Zn : 3.0 Sn : 0.2	Cu : 70.0 Zn : 30.0	Cu : 65.0 Zn : 35.0	Cu : 64.0 Zn : 18.0 Ni : 18.0	Cu : 56.0 Zn : 26.0 Ni : 18.0
Physical Properties 物理的性質	Specific Gravity 比重　g/cm^3		8.80	8.78	8.87	8.86	8.83	8.80	8.80	8.70	8.70	8.70	8.70	8.82	8.87	8.87	8.72	8.82	8.87	8.89	8.85	8.86	8.90	8.92	8.91	8.53	8.47	8.73	8.70
	Modulus of Elasticity 縦弾性係数　GPa		110	100	110	110	110	110	110	127	127 XSH,USH:115	127	120	131	127	110	125	123 XSH: 135 (TD*) USH: 120 USH: 140 (TD*)	127	120	127	120	ESH: 113 SH:123	128	111	110	103	125	125
	Electrical Conductivity 導電率　%IACS　(@20℃)		12	10	17	15	14	13	13	12	12 XSH,USH,GSH:10	20	12	45 TM04S:50	41	41	50	SH: 38 ESH, XSH, USH: 34	43	55	65	60	ESH:85 SH:93	90	60	28	27	6	5
	Specific Resistance 体積抵抗率　nΩ・m (@20℃)		144	157	87	115	133	–	–	144	144 XSH,USH,GSH:172	86	144	38 TM04S:34	42	42	34	SH: 45 ESH, XSH, USH: 51	40	30	27	29	ESH:20 SH:19	19	29	62	64	287	314
	Thermal Conductivity 熱伝導率　W/(m・K)		63	50	84	71	67	–	–	54	54 XSH,USH,GSH:47	84	54	180 TM04S:200	165	165	200	SH: 160 ESH, XSH, USH: 143	170	240	260	245	ESH:337 SH:363	350	245	121	117	33	29
	Thermal Expansion Coefficient 線膨張係数　×10^{-6} /K		18.2	18.4	17.8	17.8	18.0	–	–	18.6	18.6	18.6	18.0	17.6	17.4	17.4	–	17.6	17.6	17.7	17.8	17.6	17.7	17.7	17.1	19.9	20.3	16.2	16.7
	ポアソン比		0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Mechanical Properties 機械的性質	Tensile Strength 引張強さ (MPa)	O	–	–	295min	305min	315min	345min	–	–	–	–	–	– –	–	–	–	–	–	–	–	–	–	–	–	295–380	295–380	375min	–
		1/4H	–	–	345–440	375–470	390–510	390–510	–	735–930	–	–	–	– –	–	–	–	–	–	–	520–650(**600**)	–	–	–	–	325–410	325–410	–	–
		1/2H	–	–	410–510	470–570	490–610	490–610	470–610	–	–	–	–	TR02　607–726 (**650**)	710–840 (**780**)	730–870 (**800**)	–	–	560–680 (**640**)	–	–	–	–	–	–	355–440	355–440	440–570	540–655
		H	590–705 (**636**)	650–750 (**708**)	490–590	570–665	590–685	590–705	590–705	–	–	–	900–1000 (**950**)	TM02　650–740 (**725**)	760–890 (**830**)	800–940 (**880**)	–	–	620–740 (**680**)	590–680(**630**)	590–720(**670**)	–	–	375–475(**430**)	(**490**)	410–540	410–540	540min	630–735
		EH	685–785 (**729**)	750–850 (**805**)	570min	620min	635min	685min	685–785	885–1080	885–1080	(**950**)	920–1020 (**970**)	TM03　680–760 (**744**)	810–940 (**880**)	–	–	–	680–800 (**730**)	620–760(**690**)	–	(**740**)	–	410–600(**500**)	–	520min	520min	–	705–805
		SH	735–835 (**790**)	850–950 (**866**)	–	–	–	–	735–835	–	910–1110	–	970–1100 (**1020**)	TM04　750–840 (**814**)	–	–	(**840**)	890–990 (**940**)	–	–	–	–	400–540(**470**)	–	–	–	–	–	765–865
		ESH	770–885 (**853**)	950–1050 (**998**)	–	–	–	–	–	–	1000–1180	–	1010–1200 (**1070**)	TM04S　710–830 (**800**)	–	–	840–940(**880**)	930–1030 (**980**)	–	–	–	–	480–620(**550**)	–	–	–	–	–	–
		XSH	835–1000 (**918**)	1000–1200 (**1039**)	–	–	–	–	–	–	1050–1300(**1150**)	–	–	– –	–	–	–	970–1090(**1030**)	–	–	–	–	–	–	–	–	–	–	–
		USH	–	–	–	–	–	–	–	–	1200–1550(**1350**)	–	–	– –	–	–	–	970–1090 (**1030**) TD:1070–1190 (**1130**)	–	–	–	–	–	–	–	–	–	–	–
		GSH	–	–	–	–	–	–	–	–	1300–1600(**1400**)	–	–	– –	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	0.2% Yield Strength 0.2%耐力 (MPa)	O	–	–	–	–	–	–	–	–	–	–	–	– –	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		1/4H	–	–	–	–	–	–	–	–	–	–	–	– –	–	–	–	–	–	–	370–500(**480**)	–	–	–	–	–	–	–	–
		1/2H	–	–	–	–	–	–	–	–	–	–	–	TR02　550min (**575**)	690–830 (**760**)	695–835 (**765**)	–	–	520–670 (**610**)	–	–	–	–	–	–	–	–	–	–
		H	(**565**)	580–690 (**617**)	–	–	–	–	(**528**)	–	–	–	800–900 (**850**)	TM02　585min (**644**)	740–880 (**810**)	775–915 (**845**)	–	–	580–730 (**660**)	540–680(**610**)	570–700(**650**)	–	–	(**420**)	(**485**)	–	–	–	–
		EH	(**688**)	650–790 (**755**)	–	–	–	–	(**667**)	800–900	780–930	(**900**)	850–950 (**900**)	TM03　655min (**710**)	790–930 (**860**)	–	–	–	640–790 (**720**)	600–740(**670**)	–	(**710**)	–	(**490**)	–	–	–	–	–
		SH	(**760**)	780–920 (**813**)	–	–	–	–	(**710**)	–	810–960	–	900–1000 (**950**)	TM04　740min (**800**)	–	–	(**820**)	860–960 (**910**)	–	–	–	–	380–530(**450**)	–	–	–	–	–	–
		ESH	(**823**)	900–1030 (**935**)	–	–	–	–	–	–	950–1100	–	950–1050 (**1000**)	TM04S　700min (**780**)	–	–	810–910(**850**)	900–1000 (**950**)	–	–	–	–	460–600(**530**)	–	–	–	–	–	–
		XSH	(**879**)	950–1190 (**997**)	–	–	–	–	–	–	(**1120**)	–	–	– –	–	–	–	940–1060(**1000**)	–	–	–	–	–	–	–	–	–	–	–
		USH	–	–	–	–	–	–	–	–	(**1320**)	–	–	– –	–	–	–	940–1060 (**1000**) TD:1040–1160 (**1100**)	–	–	–	–	–	–	–	–	–	–	–
		GSH	–	–	–	–	–	–	–	–	(**1390**)	–	–	– –	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Elongation 伸び (%)	O	–	–	38min	40min	42min	45min	–	–	–	–	–	– –	–	–	–	–	–	–	–	–	–	–	–	40min	40min	20min	–
		1/4H	–	–	25min	28min	35min	40min	–	10min	–	–	–	– –	–	–	–	–	–	–	10min(**17**)	–	–	–	–	35min	35min	–	–
		1/2H	–	–	12min	15min	20min	30min	27min	–	–	–	–	TR02　6.0min (**10.0**)	3min (**6.0**)	3min (**7.0**)	–	–	5min (**8.0**)	–	–	–	–	–	–	28min	28min	5min	8min
		H	20min (**33.4**)	11min (**29.6**)	7min	7min	8min	12min	20min(**28.9**)	–	–	–	12.0min (**18.0**)	TM02　10.0min (**13.0**)	2min (**4.0**)	1min (**2.0**)	–	–	3min (**6.0**)	5min (**12**)	2min(**8**)	–	–	1min(**3**)	(**4.0**)	–	–	3min	4min
		EH	11min (**22.1**)	9min (**18.5**)	3min	4min	5min	5min	11min(**19.0**)	5min(**10.0**)	10min(**17.0**)	(**2.0**)	10.0min (**15.0**)	TM03　5.0min (**9.0**)	1min (**2.0**)	–	–	–	1min (**4.0**)	2min (**5**)	–	(**3**)	–	(**2**)	–	–	–	–	–
		SH	9min (**17.8**)	5min (**11.6**)	–	–	–	–	9min(**18.1**)	–	8min(**14.0**)	–	6.0min (**10.0**)	TM04　1.0min (**3.0**)	–	–	1.0min (**3.0**)	1.0min (**3.0**)	–	–	–	–	2min(**10**)	–	–	–	–	–	–
		ESH	5min (**12.0**)	1min (**2.8**)	–	–	–	–	–	–	(**3.0**)	–	3.0min (**5.0**)	TM04S　1.0min (**4.0**)	–	–	1.0min (**2.0**)	1.0min (**2.5**)	–	–	–	–	(**8**)	–	–	–	–	–	–
		XSH	1min (**2.8**)	(**1.1**)	–	–	–	–	–	–	–	–	–	– –	–	–	–	1.0min (**2.0**)	–	–	–	–	–	–	–	–	–	–	–
	Vickers Hardness 硬さ (Hv)	O	–	–	–	–	–	–	–	–	–	–	–	– –	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
		1/4H	–	–	80–150	90–160	100–160	100–160	–	250min	–	–	–	– –	–	–	–	–	–	–	160–210(**180**)	–	–	–	–	75–125	75–125	–	–
		1/2H	–	–	120–180	130–190	150–205	150–205	140–205	–	–	–	–	TR02　180–220 (**204**)	200–270 (**230**)	215–285 (**250**)	–	–	160–230 (**190**)	–	–	–	–	–	–	85–145	85–145	120–180	150–210
		H	185–235	200–240	150–200	170–220	180–230	180–235	185–235	–	–	–	(**300**)	TM02　190–240 (**215**)	210–280 (**245**)	250–320 (**285**)	–	–	170–240 (**200**)	160–220 (**200**)	180–220(**200**)	–	–	95–160(**130**)	(**153**)	105–175	105–175	150min	180–240
		EH	210–260	230–270	–	190min	200min	210min	210–260	280min	280min(**300**)	(**300**)	(**310**)	TM03　200–250 (**235**)	230–300 (**260**)	–	–	–	200–270 (**220**)	170–230 (**210**)	–	(**230**)	–	105–175(**145**)	–	145min	145min	–	210–260
		SH	230–270	250–290	–	–	–	–	230–270	–	300min(**320**)	–	(**320**)	TM04　225–275 (**248**)	–	–	(**250**)	250–310 (**280**)	–	–	–	–	125min(**140**)	–	–	–	–	–	230–270
		ESH	245–285	270–310	–	–	–	–	–	–	320min(**340**)	–	(**340**)	TM04S　210–260 (**246**)	–	–	(**270**)	265–325 (**295**)	–	–	–	–	(**150**)	–	–	–	–	–	–
		XSH	270–350	290min	–	–	–	–	–	–	(**340**)	–	–	– –	–	–	–	285–350 (**325**)	–	–	–	–	–	–	–	–	–	–	–
		USH	–	–	–	–	–	–	–	–	(**360**)	–	–	– –	–	–	–	285–350 (**325**)	–	–	–	–	–	–	–	–	–	–	–
		GSH	–	–	–	–	–	–	–	–	(**400**)	–	–	– –	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Bend Formability 曲げ加工性 ※Badway90° W bend Width=10mm data	Minimum Bend Radius / t Badway 安全曲げ半径 / 板厚	1/2H	–	–	–	–	–	–	–	–	–	–	–	TR02　4.0	0.0	0.0	–	–	0.0	–	1/4H : 0.0	–	–	–	–	–	–	–	–
		H	0.0	0.0 <t=0.1mm>	–	–	0.5	–	0.5	–	–	–	0.0	TM02　0.0	0.5	1.0 <t=0.08mm>	–	–	0.0	0.0	0.7	–	–	0.0	1.0	–	–	–	–
		EH	0.5	1.0 <t=0.1mm>	–	–	3.0	–	2.0	4.0	1.0	0.0 <t=0.1mm>	0.5	TM03　1.0	1.7	–	–	–	1.5	0.2	–	0.0 <t=0.08mm>	–	0.0	–	–	–	–	–
		SH	2.0	3.0 <t=0.1mm>	–	–	–	–	2.5	–	2.0	–	1.0	TM04　5.0	–	–	0.0 <t=0.08mm>	1.0	–	–	–	–	0.5<t=0.6mm>	–	–	–	–	–	–
		ESH	4.0	–	–	–	–	–	–	–	5.0min	–	2.0 <t=0.1mm>	TM04S　0.0<t=0.08mm>	–	–	2.0 <t=0.08mm>	3.0	–	–	–	–	1.0<t=0.2mm>	–	–	–	–	–	–

本表は材料リストです。在庫についてはJX金属営業担当に確認してください。
This sheet is a list of materials. Contact JX Nippon Mining & Metals Corp. representative for the materials availability.

※<> 内は測定した板厚。 ( )内の特性は代表値。
Number inside ( ) shows typical value. Number inside < > shows sheet thickness measured.
*TD:Transverse Direction(圧延直角方向)

※一般規格値
括弧内は代表値
※Standard specs.
(Typical values)