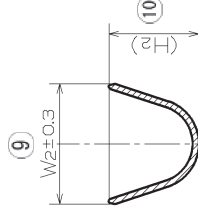
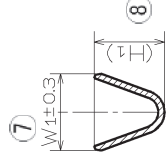
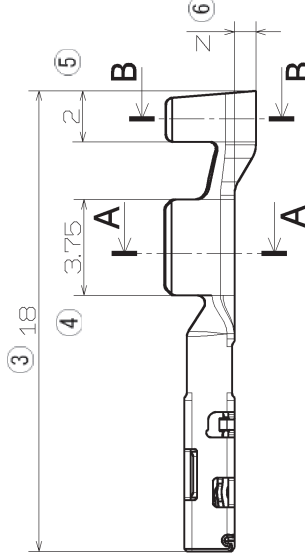
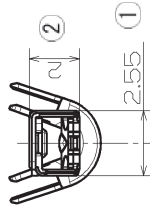
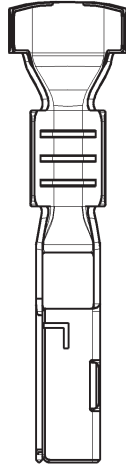


DIMENSION OF CRIMPING WING

符号 ISS.	サイズ SIZE	H1	H2	W1	W2	N
①	S	(2.2)	(3.4)	2.6	4.3	0.75
②	M	(2.8)	(4.0)	3.0	4.95	0.85
③	S2	(2.2)	(3.8)	2.6	4.7	0.85



SECTION A-A

SECTION B-B

③	12 SEALED 2PIECES, FEMALE TERMINAL 5/2 SIZE (Ag)			8240-0686	TER-WUS120FSAG2
②	12 SEALED 2PIECES FEMALE TERMINAL M SIZE (Ag)			8240-0512	TER-WUS120FMAG
①	12 SEALED 2PIECES FEMALE TERMINAL S SIZE (Ag)			8240-0511	TER-WUS120FSAG
符 号 ISS	名 称 DESCRIPTION	数 量 QTY	材 質 MATERIAL	部 品 番 号 PART NO.	登 録 名 称 PART NAME

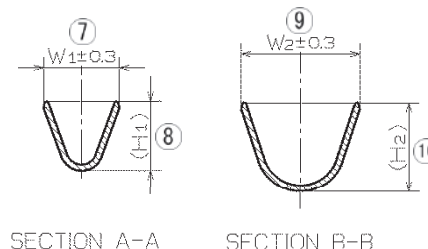
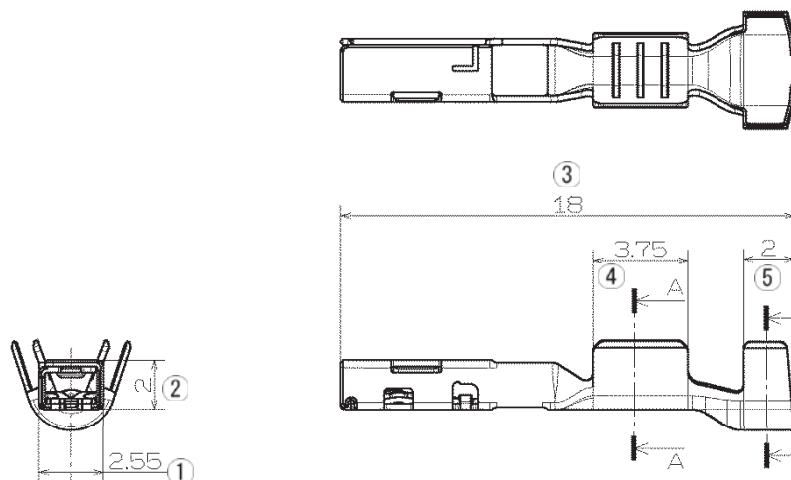
[illegible]

圧着部寸法
DIMENTION OF CRIMPING WING

符号 ISS.	サイズ SIZE	H1	H2	W1	W2	N
①	S	(2.2)	(3.4)	2.6	4.3	0.75
②	M	(2.8)	(4.0)	3.0	4.95	0.85

適用電線表
APPLICABLE WIRE SIZE

符号 ISS.	サイズ SIZE	電線種 WIRE TYPE	電線サイズ WIRE SIZE
①	S	TXL (AWG)	22~20
		CHFUS (ISO)	0.35~0.5mm ²
②	M	TXL (AWG)	18~16
		CHFUS (ISO)	0.75~1.0mm ²
		AESSX (JASO)	1.25mm ²



SECTION A-A

SECTION B-B

②	12 SEALED 2PIECES FEMALE TERMINAL M SIZE (Ag)				8240-0512	TER-WUS120FMAG
①	12 SEALED 2PIECES FEMALE TERMINAL S SIZE (Ag)				8240-0511	TER-WUS120FSAG
符号 ISS.	名 称 DESCRIPTION	数量 QTY	材 質 MATERIAL	色 相 COLOR	部 品 番 号 PART NO.	登 録 名 称 PART NAME

材 質 MATERIAL BODY : C2600R-H SPRING : C7035-EH		板 厚 THICKNESS BODY : 0.25 SPRING : 0.2		登 録 名 称 PART NAME	
仕 上 FINISH Ag PLATING		尺 度 SCALE 5:1		上 記 参 照 SEE ABOVE TABLE	
色 相 COLOR		質 量 MASS		管 理 番 号 REFERENCE NO.	
承 認 APPROVED 16.01.09 K.Yamashita		検 図 CHECKED 16.01.09 K.Uezono		部 品 番 号 PART NO.	
		設 計 DESIGNED 2016/01/08 Y.KITAGAWA		名 称 DESCRIPTION	
		製 図 DRAWN 2016/01/08 H.KANGYU		1.2mm防水メス端子(Ag)	
				12 SEALED 2PIECES FEMALE TERMINAL(Ag)	
角 度 ANGLE		三 角 法 THIRD ANGLE PROJECTION		Sumitomo Wiring Systems, Ltd.	

一 般 公 差 表 GENERAL TOLERANCES		
以 上 OR OVER	未 満 LESS THAN	
10	10	±0.2
	50	±0.3

Supplier

Sumitomo Wiring Systems, Ltd.

Part Certification

PROCESS FLOW DIAGRAM

Family name		Date (Orig)		17.Nov.'14		Prepared by		Sumitomo Wiring Systems, Ltd.	
Part Number		Date (Rev)		N/A		Title		N/A	
8240-0511		Page				Phone Number		81-59-382-8867	
Part Name		TER-WUS120FSAG							
Cross Functional Team Members									
Engineer Section D.Hirasawa Y.Hattori									
QA Section M.Hayakawa K.Takahashi									
Step	Fab	Move	Store	Insp	Operation description	Item #	Product Characteristics	Item #	Control Characteristics
1	◆	●	▲	■	Receipt of material and receiving inspection	1	Product name	1	Material ledger
	◆	●		■		2	Quantity	2	↑
						3	Condition of packing	3	↑
						4	Material characteristics	4	Inspection report
2	◆				Try of stamping	1	Machine check	1	Daily report
						2	product condition	2	↑
3				■	Initial inspection	1	Dimension	1	Inspection report
						2	Appearance	2	↑
						3	function	3	↑
4	◆				Stamping	1	Quantity	1	Daily report
5				■		Final inspection	1	Dimension	1
					2		Appearance	2	↑
					3		function	3	↑
6	◆	●			Packing	1	part name and code	1	Daily report
						2	Quantity	2	↑
7			▲		Shipment	1	Part name and code	1	Inventory book
						2	Quantity	2	↑
						3	Shipping destination	3	↑

T. Okazaki

Gage Repeatability and Reproducibility Data Sheet (Calipers)

Appraiser / Trial #		1	2	3	4	5	6	7	8	9	10	AVERAGE	
1 A	1	23.37	23.39	23.33	23.33	23.38	23.36	23.35	23.35	23.38	23.38	23.3620	
2	2	23.37	23.38	23.33	23.33	23.38	23.36	23.35	23.35	23.38	23.38	23.3610	
3	3	23.37	23.38	23.33	23.33	23.38	23.36	23.35	23.35	23.38	23.38	23.3610	
4	Avarage	23.370	23.383	23.330	23.330	23.380	23.360	23.350	23.350	23.380	23.380	Xbar A	23.3613
5	Range	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Rbar A	0.0010
6 B	1	23.37	23.39	23.33	23.32	23.39	23.36	23.35	23.36	23.38	23.38	23.3630	
7	2	23.37	23.39	23.33	23.32	23.39	23.36	23.35	23.36	23.38	23.38	23.3630	
8	3	23.38	23.39	23.34	23.32	23.39	23.36	23.35	23.36	23.38	23.38	23.3650	
9	Avarage	23.373	23.390	23.333	23.320	23.390	23.360	23.350	23.360	23.380	23.380	Xbar B	23.3637
10	Range	0.010	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Rbar B	0.0020
11 C	1	23.37	23.38	23.33	23.32	23.38	23.35	23.35	23.36	23.38	23.39	23.3610	
12	2	23.37	23.38	23.33	23.32	23.38	23.35	23.35	23.36	23.38	23.38	23.3600	
13	3	23.38	23.38	23.33	23.32	23.38	23.35	23.35	23.36	23.38	23.38	23.3610	
14	Avarage	23.373	23.380	23.330	23.320	23.380	23.350	23.350	23.360	23.380	23.383	Xbar C	23.3607
15	Range	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	Rbar C	0.0020
16 Part												Xbar-bar	23.3619
Average (X p)		23.372	23.384	23.331	23.323	23.383	23.357	23.350	23.357	23.380	23.381	R p	0.0611
17	(Rbar A + Rbar B + Rbar C)/(# of Appraisers = 3)											Rbar-bar	0.0017
18	(Max Xbar)-(Min Xbar) = Xbar DIFF												0.0030
19	(R bar-bar)*(D4=2.58)=UCL R												0.00
20	(R bar-bar)*(D3=0.00)=LCL R												0.00

Gage Repeatability and Reproducibility Report							Date 01.Apr.'20
Part No, and Name	Measurement sample for Gage R&R use			Gage Name	Calipers		Performed by Taniguchi Kato Abe
Characteristics	Dimension			Gage No,	YA1C0817, YA1C0896, YA1C0897, YA1C1004		
Tolerance	0.3 Units mm			Gage Type	Calipers		
Tolerance (T)	T= 0.3						
From data sheet	Rbar-bar=	0.00167		Xbar DIFF=	0.00300	R p=	0.0611
Measurement Unit Analysis							Based on the TOLERANCE Method
Repeatability - Equipment Variation (EV)							% EV= (EV*6/T) * 100 = 1.97 %
EV = Rbar-bar * K1 = 0.0010				Trials	K1		
				2	0.8862		
				3	0.5908		
Reproducibility - Appraiser Variation (AV)							% AV= (AV*6/T) * 100 = 3.12 % n = number of parts r = number of trials
AV= SQRT((Xbar DIFF * K2)^2 - (EV^2/nr)) = 0.001559							
				Appraisers	2	3	
				K2	0.7071	0.5231	
Repeatability & Reproducibility (R&R)							% R&R= (R&R*6/T) * 100 = 3.69 % Gage system OK
R&R= SQRT(EV^2 + AV^2) = 0.00184				Parts	K3		
				2	0.7071		
				3	0.5231		
Part Variation (PV)							% PV= (PV*6/T) * 100 = 38.45 %
PV= R p * K3 = 0.0192				4	0.4467		
				5	0.4030		
				6	0.3742		
Total Variation (TV)							ndc= 1.41(PV/GRR) = 14 Gage discrimination acceptable
TV= SQRT(R&R^2 + PV^2) = 0.0193				7	0.3534		
				8	0.3375		
				9	0.3249		
				10	0.3146		

T.Okazaki

Gage Repeatability and Reproducibility Data Sheet (Projector)

Appraiser / Trial #		1	2	3	4	5	6	7	8	9	10	AVERAGE	
1 A	1	20.24	20.29	20.26	20.25	20.21	20.25	20.28	20.30	20.27	20.25	20.2600	
2	2	20.24	20.29	20.26	20.25	20.21	20.25	20.28	20.30	20.27	20.25	20.2600	
3	3	20.24	20.29	20.25	20.25	20.21	20.25	20.28	20.29	20.27	20.25	20.2580	
4	Avarage	20.240	20.290	20.257	20.250	20.210	20.250	20.280	20.297	20.270	20.250	Xbar A	20.2593
5	Range	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.010	0.000	0.000	Rbar A	0.0020
6 B	1	20.24	20.29	20.26	20.25	20.21	20.26	20.27	20.30	20.27	20.25	20.2600	
7	2	20.24	20.29	20.27	20.25	20.21	20.26	20.27	20.30	20.27	20.25	20.2610	
8	3	20.25	20.29	20.27	20.25	20.20	20.26	20.27	20.30	20.27	20.26	20.2620	
9	Avarage	20.243	20.290	20.267	20.250	20.207	20.260	20.270	20.300	20.270	20.253	Xbar B	20.2610
10	Range	0.010	0.000	0.010	0.000	0.010	0.000	0.000	0.000	0.000	0.010	Rbar B	0.0040
11 C	1	20.24	20.28	20.27	20.25	20.21	20.26	20.27	20.30	20.26	20.25	20.2590	
12	2	20.24	20.28	20.27	20.25	20.21	20.26	20.27	20.30	20.26	20.25	20.2590	
13	3	20.24	20.28	20.27	20.26	20.21	20.26	20.28	20.30	20.27	20.25	20.2620	
14	Avarage	20.240	20.280	20.270	20.253	20.210	20.260	20.273	20.300	20.263	20.250	Xbar C	20.2600
15	Range	0.000	0.000	0.000	0.010	0.000	0.000	0.010	0.000	0.010	0.000	Rbar C	0.0030
16 Part												Xbar-bar	20.2601
Average (X p)		20.241	20.287	20.264	20.251	20.209	20.257	20.274	20.299	20.268	20.251	R p	0.0900
17	(Rbar A + Rbar B + Rbar C)/(# of Appraisers = 3)											Rbar-bar	0.0030
18	(Max Xbar)-(Min Xbar) = Xbar DIFF												0.0017
19	(R bar-bar)*(D4=2.58)=UCL R												0.01
20	(R bar-bar)*(D3=0.00)=LCL R												0.00

Gage Repeatability and Reproducibility Report							Date 01.Apr.'20			
Part No, and Name	Measurement sample for Gage R&R use			Gage Name	Projector		Performed by Taniguchi Katou Abe			
Characteristics	Dimension			Gage No,	YA1H0028					
Tolerance	0.6	Units	mm	Gage Type	Projector					
Tolerance (T)	T= 0.6									
From data sheet	Rbar-bar=	0.00300		Xbar DIFF=	0.00167	R p= 0.0900				
Measurement Unit Analysis							Based on the TOLERANCE			
Repeatability - Equipment Variation (EV) EV = Rbar-bar * K1 = 0.00177							% EV=(EV*6/T) * 100 = 1.77 %			
								Trials		K1
								2		0.8862
								3		0.5908
Reproducibility - Appraiser Variation (AV) AV= SQRT((Xbar DIFF * K2)^2 - (EV^2/nr)) = 0.000810							% AV= (AV*6/T) * 100 = 0.81 %			
				Appraisers		2	3	n = number of parts r = number of trials		
				K2		0.7071	0.5231			
Repeatability & Reproducibility (R&R) R&R= SQRT(EV^2 + AV^2) = 0.00195							% R&R= (R&R*6/T) * 100 = 1.95 % Gage system OK			
Part Variation (PV) PV= R p * K3 = 0.02831				Parts		K3	% PV= (PV*6/T) * 100 = 28.31 %			
				2		0.7071				
				3		0.5231				
				4		0.4467				
Total Variation (TV) TV= SQRT(R&R^2 + PV^2) = 0.02838				5		0.4030	ndc= 1.41(PV/GRR) = 20 Gage discrimination acceptable			
				6		0.3742				
				7		0.3534				
				8		0.3375				
				9		0.3249				
				10		0.3146				

Supplier

SUMITOMO WIRING SYSTEMS

PART INSPECTION REPORT

1 of 1

Part Certification

Mold:L7141

Part Number	8240-0511	ECL	7	Part Name	TER-WUS120FSAG
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Dim No	Figure Code	Drawing Dimension	Acceptance		PARTS/TOOL CAVITIES CHECKED								OK	NOT OK	
			Lower	Upper	1	2	3	4	5	6	7	8			
1		2.55	2.35	2.75	2.53	2.53							O		
2		2	1.8	2.2	2.00	1.99							O		
3		18	17.7	18.3	18.15	18.15							O		
4		3.75	3.55	3.95	3.75	3.76							O		
5		2	1.8	2.2	2.03	2.02							O		
6		0.75	0.55	0.95	0.68	0.70							O		
7		2.6	2.3	2.9	2.68	2.67							O		
8		(2.2)	Ref		2.15	2.16							-		
9		4.3	4.0	4.6	4.20	4.19							O		
10		(3.8)	Ref		3.32	3.32							-		
11															
12															
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Inspection Source Company Name

Inspected by	Y.Hattori	Title	QA STAFF	Inspection Report Date	18.Feb.'21
Inspctor Supervisor		Title		Date	
Approved by	7.Okazaki	Title	Components Gr. QA Dep. Manager	Date	18.Feb.'21

Supplier

SUMITOMO WIRING SYSTEMS

PART INSPECTION REPORT

1 of 1

Part Certification

Mold:L7155

Part Number	8240-0511	ECL	7	Part Name	TER-WUS120FSAG
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Dim No	Figure Code	Drawing Dimension	Acceptance		PARTS/TOOL CAVITIES CHECKED								OK	NOT OK	
			Lower	Upper	1	2	3	4	5	6	7	8			
1		2.55	2.35	2.75	2.52	2.53							O		
2		2	1.8	2.2	1.97	1.97							O		
3		18	17.7	18.3	18.14	18.15							O		
4		3.75	3.55	3.95	3.76	3.75							O		
5		2	1.8	2.2	1.98	2.01							O		
6		0.75	0.55	0.95	0.73	0.73							O		
7		2.6	2.3	2.9	2.59	2.57							O		
8		(2.2)	Ref		2.19	2.20							-		
9		4.3	4.0	4.6	4.20	4.22							O		
10		(3.8)	Ref		3.32	3.32							-		
11															
12															
13															
14															
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Inspection Source Company Name

Inspected by	Y.Hattori	Title	QA STAFF	Inspection Report Date	18.Feb.'21
Inspctor Supervisor		Title		Date	
Approved by	7.Okazaki	Title	Components Gr. QA Dep. Manager	Date	18.Feb.'21

MATERIAL TEST RESULTS

Supplier Part Certification

SUMITOMO WIRING SYSTEMS Ltd.

Mold:L7141

Page 1 of 1

Supplier	SUMITOMO WIRING SYSTEMS Ltd.
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Part Number
8240-0511

Name of Laboratory
SUMITOMO WIRING SYSTEMS Ltd.

Part Name
TER-WUS120FSAG

[illegible]

Signature *7. Okazaki*

7. Okazaki

Title	Components Gr. QA Dep. Manager
-------	--------------------------------

Components Gr. QA Dep. Manager

Date	18.Feb.'21
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18.Feb.'21

MATERIAL TEST RESULTS

Supplier Part Certification

SUMITOMO WIRING SYSTEMS Ltd.

Mold:L7155

Page

1 of 1

Supplier	Part Number
SUMITOMO WIRING SYSTEMS Ltd.	8240-0511
Name of Laboratory	Part Name
SUMITOMO WIRING SYSTEMS Ltd.	TER-WUS120FSAG

[illegible]

Signature

7. Okazaki

Title

Components Gr. QA Dep. Manager

Date

18.Feb.'21

Process Capavility Data

Part Name: TER-WUS120FSAG

Part No: 8240-0511

Mold:L7141

Measureme nt Place	1															
Standard	2.55															
Standard(Max)	2.75															
Standard(Min)	2.35															
n 1	2.530	2.530	2.530	2.530												
n 2	2.530	2.530	2.530	2.520												
n 3	2.530	2.540	2.530	2.530												
n 4	2.530	2.540	2.530	2.520												
n 5	2.530	2.540	2.530	2.530												
n 6	2.530	2.540	2.530	2.520												
n 7	2.530	2.530	2.530	2.530												
n 8	2.530	2.530	2.530	2.530												
n 9	2.530	2.530	2.530	2.540												
n 10	2.530	2.530	2.530	2.540												
n 11	2.530	2.540	2.530	2.540												
n 12	2.530	2.530	2.530	2.540												
n 13	2.530	2.530	2.540	2.530												
n 14	2.530	2.530	2.530	2.540												
n 15	2.530	2.540	2.530	2.530												
n 16	2.530	2.530	2.530	2.530												
n 17	2.530	2.530	2.530	2.540												
n 18	2.540	2.520	2.530	2.530												
n 19	2.540	2.530	2.530	2.530												
n 20	2.530	2.540	2.530	2.530												
n 21	2.520	2.540	2.530	2.530												
n 22	2.530	2.560	2.530	2.530												
n 23	2.520	2.530	2.530	2.530												
n 24	2.530	2.530	2.540	2.520												
n 25(=100)	2.520	2.520	2.540	2.530												
x	2.530															
MAX	2.560															
MIN	2.520															
δ	0.006															
CP	11.219															
CPK	10.170															

Measurement Place

Please refer to an attached sheet drawing

Process Capavility Data

Part Name: TER-WUS120FSAG

Part No: 8240-0511

Mold:L7155

Measureme nt Place	1															
Standard	2.55															
Standard(Max)	2.75															
Standard(Min)	2.35															
n 1	2.520	2.520	2.530	2.520												
n 2	2.520	2.520	2.530	2.530												
n 3	2.520	2.520	2.530	2.530												
n 4	2.520	2.520	2.530	2.520												
n 5	2.550	2.520	2.530	2.530												
n 6	2.520	2.520	2.520	2.580												
n 7	2.530	2.520	2.560	2.520												
n 8	2.520	2.520	2.510	2.530												
n 9	2.520	2.520	2.570	2.520												
n 10	2.520	2.520	2.530	2.520												
n 11	2.520	2.520	2.530	2.530												
n 12	2.520	2.520	2.530	2.530												
n 13	2.520	2.520	2.530	2.530												
n 14	2.520	2.520	2.530	2.530												
n 15	2.520	2.520	2.530	2.530												
n 16	2.520	2.520	2.520	2.530												
n 17	2.520	2.530	2.530	2.520												
n 18	2.520	2.520	2.530	2.530												
n 19	2.520	2.520	2.520	2.530												
n 20	2.520	2.520	2.520	2.530												
n 21	2.510	2.520	2.530	2.530												
n 22	2.520	2.520	2.530	2.530												
n 23	2.520	2.510	2.530	2.520												
n 24	2.520	2.520	2.550	2.530												
n 25(=100)	2.520	2.520	2.520	2.530												
x	2.530															
MAX	2.580															
MIN	2.510															
δ	0.010															
CP	6.509															
CPK	5.705															

Measurement Place

Please refer to an attached sheet drawing

2018		
Approval	Check	Charged
H.I.Nakano Manager 2018/3/9	K.Motoooka 2018/3/9	Y.Hanebuchi 2018/3/9

Laboratory Scope

Testing Items		Testing & Measurement Apparatus		Location		Instruction Manual No.	machine number	Capability of Testing & Measurement Apparatus																proof inspection																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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Vibration test Shock test Combined stress test Vibration/Mechanical Shock	Combined stress tester	●		SCD-35AG081	17	<table><tr><td colspan="2">Table-1</td><td>#1</td><td></td><td></td><td></td><td></td><td></td><td>#4</td><td>#5</td><td>#6</td><td>#7</td><td>#8</td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Exciting Force(kgf)</td><td></td><td>3800</td><td></td><td></td><td></td><td></td><td></td><td></td><td>2500</td><td>2000</td><td>2000</td><td>1400</td><td>1400</td><td></td><td></td><td></td></tr><tr><td colspan="2">Amplitude(mnP-P)</td><td></td><td>56</td><td></td><td></td><td></td><td></td><td></td><td></td><td>51</td><td>26</td><td>26</td><td>51</td><td>51</td><td></td><td></td><td></td></tr><tr><td colspan="2">Acceleration(m/s2)</td><td></td><td>980</td><td></td><td></td><td></td><td></td><td></td><td></td><td>940</td><td>980</td><td>980</td><td>911</td><td>911</td><td></td><td></td><td></td></tr><tr><td colspan="2">Frequency(Hz)</td><td></td><td>5 to 2000</td><td></td><td></td><td></td><td></td><td></td><td></td><td>5 to 2500</td><td>5 to 2500</td><td>5 to 2500</td><td>5 to 5000</td><td>5~5000</td><td></td><td></td><td></td></tr><tr><td colspan="2">Temperature(deg. C)</td><td></td><td>-40 to 200</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-40 to 200</td><td>-40 to 200</td><td>-40 to 200</td><td>-40 to 200</td><td>-40 to 200</td><td></td><td></td><td></td></tr><tr><td colspan="2">Humidity(%RH)</td><td></td><td>30 to 98</td><td></td><td></td><td></td><td></td><td></td><td></td><td>30 to 98</td><td>30 to 98</td><td>30 to 98</td><td>30 to 98</td><td>30 to 98</td><td></td><td></td><td></td></tr><tr><td colspan="2">Table-1 (cont.)</td><td></td><td></td><td></td><td></td><td></td><td></td><td>#13</td><td></td><td></td><td></td><td></td><td></td><td>#17</td><td>#18</td><td>#19</td><td>#20</td></tr><tr><td colspan="2">Exciting Force(kgf)</td><td></td><td></td><td></td><td></td><td></td><td></td><td>1400</td><td></td><td></td><td></td><td></td><td></td><td>2500</td><td>3823</td><td>2450</td><td>2651</td></tr><tr><td colspan="2">Amplitude(mnP-P)</td><td></td><td></td><td></td><td></td><td></td><td></td><td>100</td><td></td><td></td><td></td><td></td><td></td><td>60</td><td>56</td><td>51</td><td>60</td></tr><tr><td colspan="2">Acceleration(m/s2)</td><td></td><td></td><td></td><td></td><td></td><td></td><td>568</td><td></td><td></td><td></td><td></td><td></td><td>756</td><td>980</td><td>1142</td><td>963</td></tr><tr><td colspan="2">Frequency(Hz)</td><td></td><td></td><td></td><td></td><td></td><td></td><td>5 to 2000</td><td></td><td></td><td></td><td></td><td></td><td>5 to 2000</td><td>5 to 2000</td><td>5 to 2500</td><td>DC to 2500</td></tr><tr><td colspan="2">Temperature(deg. C)</td><td></td><td></td><td></td><td></td><td></td><td></td><td>-40 to 200</td><td></td><td></td><td></td><td></td><td></td><td>-40 to 200</td><td>-40 to 200</td><td>-60 to 180</td><td>-40 to 200</td></tr><tr><td colspan="2">Humidity(%RH)</td><td></td><td></td><td></td><td></td><td></td><td></td><td>30 to 98</td><td></td><td></td><td></td><td></td><td></td><td>30 to 98</td><td>30 to 98</td><td>30 to 98</td><td>30 to 98</td></tr><tr><td colspan="2">Table-1 (cont.)</td><td>#21</td><td>#22</td><td>#23</td><td>#24</td><td>#25</td><td>#26</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Exciting Force(kgf)</td><td>2500</td><td>2500</td><td>2500</td><td>2500</td><td>2447</td><td>4500</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Amplitude(mnP-P)</td><td>60</td><td>60</td><td>51</td><td>51</td><td>51</td><td>51</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Acceleration(m/s2)</td><td>963</td><td>963</td><td>1142</td><td>1142</td><td>1142</td><td>1000</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Frequency(Hz)</td><td>5 to 2500</td><td>5 to 2500</td><td>5 to 2600</td><td>5 to 2600</td><td>5 to 2600</td><td>5 to 2800</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Temperature(deg. C)</td><td>-40 to 200</td><td>-40 to 200</td><td>-60 to 180</td><td>-60 to 180</td><td>-60 to 180</td><td>-45 to 180</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Humidity(%RH)</td><td>30 to 98</td><td>30 to 98</td><td>30 to 98</td><td>30 to 98</td><td>30 to 98</td><td>30 to 98</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Table-2</td><td>#1</td><td>#2</td><td>#3</td><td>#4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Temperature(deg. C)</td><td>~35℃</td><td></td><td>~50℃</td><td>Max60℃</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Spray rate</td><td>1ml</td><td></td><td>1~2ml</td><td>—</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Table-3</td><td>#1</td><td>#2</td><td></td><td>#4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>#8</td><td>#9</td><td>#10</td><td></td></tr><tr><td colspan="2">Temp. Low(deg. C)</td><td>-70</td><td>-65</td><td></td><td>-65</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-70</td><td>-70</td><td>-70</td><td></td></tr><tr><td colspan="2">Temp. High(deg. C)</td><td>200</td><td>200</td><td></td><td>200</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>200</td><td>200</td><td>200</td><td></td></tr><tr><td colspan="2">Table-3 (cont.)</td><td>#11</td><td>#12</td><td>#13</td><td>#14</td><td>#15</td><td>#16</td><td>#17</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Temp. Low(deg. C)</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Temp. High(deg. C)</td><td>200</td><td>200</td><td>200</td><td>200</td><td>200</td><td>200</td><td>200</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Table-4</td><td>#1</td><td>#2</td><td>#3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Temp. Low(deg. C)</td><td>-55</td><td>-55</td><td>-55</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Temp. High(deg. C)</td><td>200</td><td>200</td><td>200</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Humidity(%RH)</td><td>to 95</td><td>to 95</td><td>to 95</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="18">Temp. range : ambient temp. to 150deg. C JIS D0203 R1(1.9L/min)・R2(3.2L/min) JIS D0203 S1(24.5L/min)・S2(39.2L/min)</td></tr><tr><td colspan="2">Humidity resistance test Temperature/humidity cycling test Low temperature test</td><td>●</td><td></td><td>SCD-35AG037</td><td>13</td><td colspan="12"><table><tr><td colspan="2">Table-5</td><td></td><td></td><td></td><td>#3</td><td>#4</td><td>#5</td><td>#6</td><td>#7</td><td>#8</td><td>#9</td><td>#10</td></tr><tr><td colspan="2">Temp. Low(deg. C)</td><td></td><td></td><td></td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td></tr><tr><td colspan="2">Temp. High(deg. C)</td><td></td><td></td><td></td><td>180</td><td>180</td><td>150</td><td>150</td><td>150</td><td>180</td><td>150</td><td>150</td><td>150</td></tr><tr><td colspan="2">Humidity(%RH)</td><td></td><td></td><td></td><td>20~98</td><td>20~98</td><td>20~98</td><td>20~98</td><td>20~98</td><td>30~98</td><td>20~98</td><td>20~98</td><td>20~98</td></tr><tr><td colspan="2">Table-5 (cont.)</td><td>#11</td><td>#12</td><td>#13</td><td>#14</td><td>#15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Temp. Low(deg. C)</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Temp. High(deg. C)</td><td>150</td><td>150</td><td>150</td><td>150</td><td>150</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Humidity(%RH)</td><td>20~98</td><td>20~98</td><td>30~95</td><td>30~95</td><td>30~95</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></td><td>OK</td></tr><tr><td colspan="2">Oil resistance test Fluid Resistance</td><td>●</td><td></td><td>SCD-35AG106</td><td>2</td><td colspan="12">Max. 150deg. C(Aging oven : Max. 200deg. C)</td><td>OK</td></tr><tr><td colspan="2">Over current test Temperature rise Current cycle test</td><td>●</td><td></td><td>SCD-35AG078</td><td>15</td><td colspan="12">Max. 160deg. C Max. 500A</td><td>OK</td></tr></table>																Table-1		#1						#4	#5	#6	#7	#8					Exciting Force(kgf)			3800							2500	2000	2000	1400	1400				Amplitude(mnP-P)			56							51	26	26	51	51				Acceleration(m/s2)			980							940	980	980	911	911				Frequency(Hz)			5 to 2000							5 to 2500	5 to 2500	5 to 2500	5 to 5000	5~5000				Temperature(deg. C)			-40 to 200							-40 to 200	-40 to 200	-40 to 200	-40 to 200	-40 to 200				Humidity(%RH)			30 to 98							30 to 98	30 to 98	30 to 98	30 to 98	30 to 98				Table-1 (cont.)								#13						#17	#18	#19	#20	Exciting Force(kgf)								1400						2500	3823	2450	2651	Amplitude(mnP-P)								100						60	56	51	60	Acceleration(m/s2)								568						756	980	1142	963	Frequency(Hz)								5 to 2000						5 to 2000	5 to 2000	5 to 2500	DC to 2500	Temperature(deg. C)								-40 to 200						-40 to 200	-40 to 200	-60 to 180	-40 to 200	Humidity(%RH)								30 to 98						30 to 98	30 to 98	30 to 98	30 to 98	Table-1 (cont.)		#21	#22	#23	#24	#25	#26											Exciting Force(kgf)		2500	2500	2500	2500	2447	4500											Amplitude(mnP-P)		60	60	51	51	51	51											Acceleration(m/s2)		963	963	1142	1142	1142	1000											Frequency(Hz)		5 to 2500	5 to 2500	5 to 2600	5 to 2600	5 to 2600	5 to 2800											Temperature(deg. C)		-40 to 200	-40 to 200	-60 to 180	-60 to 180	-60 to 180	-45 to 180											Humidity(%RH)		30 to 98	30 to 98	30 to 98	30 to 98	30 to 98	30 to 98											Table-2		#1	#2	#3	#4													Temperature(deg. C)		~35℃		~50℃	Max60℃													Spray rate		1ml		1~2ml	—													Table-3		#1	#2		#4									#8	#9	#10		Temp. Low(deg. C)		-70	-65		-65									-70	-70	-70		Temp. High(deg. C)		200	200		200									200	200	200		Table-3 (cont.)		#11	#12	#13	#14	#15	#16	#17										Temp. Low(deg. C)		-70	-70	-70	-70	-70	-70	-70										Temp. High(deg. C)		200	200	200	200	200	200	200										Table-4		#1	#2	#3														Temp. Low(deg. C)		-55	-55	-55														Temp. High(deg. C)		200	200	200														Humidity(%RH)		to 95	to 95	to 95														Temp. range : ambient temp. to 150deg. C JIS D0203 R1(1.9L/min)・R2(3.2L/min) JIS D0203 S1(24.5L/min)・S2(39.2L/min)																		Humidity resistance test Temperature/humidity cycling test Low temperature test		●		SCD-35AG037	13	<table><tr><td colspan="2">Table-5</td><td></td><td></td><td></td><td>#3</td><td>#4</td><td>#5</td><td>#6</td><td>#7</td><td>#8</td><td>#9</td><td>#10</td></tr><tr><td colspan="2">Temp. Low(deg. C)</td><td></td><td></td><td></td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td></tr><tr><td colspan="2">Temp. High(deg. C)</td><td></td><td></td><td></td><td>180</td><td>180</td><td>150</td><td>150</td><td>150</td><td>180</td><td>150</td><td>150</td><td>150</td></tr><tr><td colspan="2">Humidity(%RH)</td><td></td><td></td><td></td><td>20~98</td><td>20~98</td><td>20~98</td><td>20~98</td><td>20~98</td><td>30~98</td><td>20~98</td><td>20~98</td><td>20~98</td></tr><tr><td colspan="2">Table-5 (cont.)</td><td>#11</td><td>#12</td><td>#13</td><td>#14</td><td>#15</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Temp. Low(deg. C)</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td>-70</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Temp. High(deg. C)</td><td>150</td><td>150</td><td>150</td><td>150</td><td>150</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">Humidity(%RH)</td><td>20~98</td><td>20~98</td><td>30~95</td><td>30~95</td><td>30~95</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>												Table-5					#3	#4	#5	#6	#7	#8	#9	#10	Temp. Low(deg. C)					-70	-70	-70	-70	-70	-70	-70	-70	-70	Temp. High(deg. C)					180	180	150	150	150	180	150	150	150	Humidity(%RH)					20~98	20~98	20~98	20~98	20~98	30~98	20~98	20~98	20~98	Table-5 (cont.)		#11	#12	#13	#14	#15								Temp. Low(deg. C)		-70	-70	-70	-70	-70								Temp. High(deg. C)		150	150	150	150	150								Humidity(%RH)		20~98	20~98	30~95	30~95	30~95								OK	Oil resistance test Fluid Resistance		●		SCD-35AG106	2	Max. 150deg. C(Aging oven : Max. 200deg. C)												OK	Over current test Temperature rise Current cycle test		●		SCD-35AG078	15	Max. 160deg. C Max. 500A												OK
Table-1		#1						#4	#5	#6	#7	#8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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Oil resistance test Fluid Resistance		●		SCD-35AG106	2	Max. 150deg. C(Aging oven : Max. 200deg. C)												OK																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Over current test Temperature rise Current cycle test		●		SCD-35AG078	15	Max. 160deg. C Max. 500A												OK																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

Testing Items	Testing & Measurement Apparatus	Location		Instruction Manual No.	machine number	Capability of Testing & Measurement Apparatus	proof inspection
		Technical Center					
		1 F	3 F				
Maximum Test Current Capability	recorder						
Terminal 1008 Hour Current Cycling	thermocouple						
High temperature Exposure	Aging Oven	●		SCD-35AG079	15	Max. 500deg. C	OK
High-pressure washing test	High-pressure washing machine	●		SCD-35AG096	1	Max. 150deg. C Table Reversal formula (angle 0~180) Nozzle angle 0, 30, 60, 90 Pressure MIN[Water pressure5Mpa→11.9L/min]: MAX[Water pressure10Mpa→16.3L/min] Nozzle toSample 100mm φ (Width8mm、Vertical injection angle30) Water temperature Normal temperature to 80℃ temp. & humidity range:40deg. C 70%RH to 98%RH SO2 : Max. 500ppm H2S : Max. 0. 1ppm NO2 : Max. 0. 2ppm CL2 : Max. 0. 02ppm	OK
Corrosive gas test	Gas Corrosion Chamber		●	SCD-35AG103	2	blowing interval: 1 to 30sec. quantity of dust: 5kg Max	OK
Dust resistance	Dust chamber	●		SCD-35AG123	1	Temperature low-temp-bath: -30℃~+100℃、high-temp-bath: ~+200℃、Immersion: +6~+80℃(150L) Concentration: 10%	OK
Frozen salt water test	Salt water immersion test machine	●		SCD-35AG172	1	Temperature in a tank : normal temperature to 100℃ Movement frequency : 1 to 10Hz Movement distance : ±0.02mm to ±0.5mm	OK
Fretting Corrosion	Fretting Corrosion Testing machine		●	SCD-35AG156	1	Rotational speed : 1~10rpm sensitivity : 1mV to 5V/div Sampling Speed : 1ns	OK
Rotary drum drop and impact test	Rotary drum drop and impact testing Machine	●		SCD-35AG195	1		OK
momentary shut-off	Power Supply, oscilloscope	●		SCD-35AG001	8		OK
Insertion & Retention force Terminal crimping force Terminal retention force Housing locking force Housing lock release force Twisting durability test Terminal strength Terminal to Terminal Engage/Disengage Force Terminal-Connector Insertion/Extraction Force Connector-Connector Mating/Ummating	Tensile & Comp. Tester/Push-Pull Tester		●	SCD-35AG063	2	Tensile & Comp. Tester speed(mm/min) 1 to 1000 load(N) 5,000	OK
Voltage drop	Measurement System	●		SCD-35AG031	4	precision voltage : 1uV, current : 10nA	OK
Dry Circuit Resistance							
Terminal Contact force	Terminal contact force meas. tester		●	SCD-35AG124	2	Load 0.1N to 100N, Speed 0.1mm/min to 1.0mm/min	OK
Insulation resistance	Insulation Resistance tester		●	SCD-35AG119	3	voltage : :10 to 1000V	OK
Waterproofness	Airleak Tester		●	SCD-35AG122	5	pressure : 1kPa to 500kPa、-10kPa to -200kPa	OK
Pressure/Vacuum Leakage							
Withstand voltage	Withstand voltage tester		●	SCD-35AG083	1	range :0 to 5KV	OK
Dimension	Projector		●	-	1	precision:1/1000mm magnification : 10	OK
Surface observation	stereomicroscope, metallurgical microscope		●	-	1	magnification : 1.5,5,10,20,40	OK
	Video microscope		●	-	1	magnification : 5~40、25~175、150~800	OK
			●	-	1	-	OK
Section cutting	cutting machine, grinder, polisher		●	-	1	-	OK
leakage current	Power supply, resister, recorder	●	●	-	A lot	-	OK

MATERIAL SAFETY DATA SHEET

Revision date: June 4, 2012
Revision No.: 2

1. Product and Company Information

Classification	Material name	Correspondence JIS number
Copper	Oxygen-free copper	C1020
	Tough-pitch copper	C1100
	Phosphorous-deoxidized copper	C1220
Copper Alloy	Brass	C2600,C2680,C2801

Supplier Company Name : DOWA METALTECH CO.,LTD
2630 Shingai, Iwata-shi, Shizuoka-ken, 438-0025 JAPAN
Tel: +81-538-37-5111, Fax: +81-538-37-0147

Manufacturer Company Name : DOWA METAL CO.,LTD
& Information Quality Control Dept.
767 Matsunokijima, Iwata-shi, Shizuoka-ken, 438-0125 JAPAN
Tel: +81-539-62-3131, Fax: +81-539-62-3996
E-mail:DML_MSDS@dowa.co.jp

2. Hazards Identification

2-1 Copper

GHS Classification

Physical Hazards

Explosives	: Not applicable
Flammable gases	: Not applicable
Flammable aerosols	: Not applicable
Oxidizing gases	: Not applicable
Gases under pressure	: Not applicable
Flammable liquids	: Not applicable
Flammable solids	: Classification not possible
Self-reactive substances and mixtures	: Not applicable
Pyrophoric liquids	: Not applicable
Pyrophoric solids	: Classification not possible
Self-heating substances and mixtures	: Classification not possible
Substances and mixture which, in contact with water, emit flammable gases	: Classification not possible
Oxidizing liquids	: Not applicable
Oxidizing solids	: Not applicable
Organic peroxides	: Not applicable
Corrosive to metals	: Classification not possible

Health Hazards

Acute toxicity (oral)	: Classification not possible
Acute toxicity (skin)	: Classification not possible
Acute toxicity (inhalation: gas)	: Not applicable
Acute toxicity (inhalation: vapor)	: Not applicable
Acute toxicity (inhalation: dust, mist)	: Classification not possible
Skin corrosion / irritation	: Classification not possible
Serious eye damage / eye irritation	: Classification not possible
Respiratory sensitization	: Classification not possible
Skin sensitization	: Classification not possible
Germ cell mutagenicity	: Classification not possible
Carcinogenicity	: Not classified

Reproductive toxicity	: Classification not possible
Specific target organ toxicity: single exposure	: Category3 (Respiratory tract irritation)
Specific target organ toxicity: repeated exposure	: Category1 (Liver)
Aspiration hazard	: Classification not possible
Environmental Hazards	
Aquatic toxicity (acute)	: Classification not possible
Aquatic toxicity (chronic)	: Category4
Pictogram	



3. Specification of substance

Chemical name : Cu,Cu-Zn alloy

Element	Cu	Pb	Fe	Zn	P
CAS No.	7440-50-8	7439-92-1	7439-89-6	7440-66-6	7723-14-0
Identification No. by PRTR Law	-	-	-	-	-
Enforcement Serial No. by Industrial Safety and Health Laws	Appendix No.9-379	-	-	-	-

Chemical Composition (wt%)

Element	Cu	Pb※	Fe※	Zn	P
C1020	≤99.96	-	-	-	-
C1100	≤99.90	-	-	-	-
C1220	≤99.90	-	-	-	0.015-0.040
C2600	68.5-71.5	≤0.05	≤0.05	Bal.	-
C2680	64.0-68.0	≤0.05	≤0.05	Bal.	-
C2801	59.0-62.0	≤0.1	≤0.07	Bal.	-

※No intentional addition.

4. First aid

4-1 Caught in the eyes:

Immediately flush out dust with sufficient clean water and seek physician's treatment for pain or uncomfortable feeling.

4-2 Struck to the skin: wash the affected area with soap.

4-3 Inhaled: If a large quantity of vapors and particles are inhaled, move the patient to a place of clean air immediately. Give the patient oxygen inhalation and have him/her seek immediate physician's treatments in case it seems to be necessary.

4-4 Swallowed: If large quantities of vapors and particles are swallowed, make him/her vomit and then have him/her seek physician's treatments immediately.

5. Action for fire

Extinguishing: -- (Incombustibles)

6. Action for leakage

No requirement for solid metal product.

7. Notes for handling and storage

Handling: To prevent the inhalation of vapors or particles, wear personal protection such as a mask during welding or grinding processes.

The cut ends or edges of the strip are sharp enough to slice, so take sufficient care when handling.

Storage: Do not store together with acids.

8. Avoidance of exposure

Acceptable concentration :

Japan Society for Occupational Health: No Requirement

ACGIH TWA * Cu 1mg/m³ (dust)

Cu 0.2mg/m³ (fume or vapor)

Protective outfit

For mouth: Dustproof mask

For eyes: Dustproof glasses

For hands: Rubber or plastic gloves

For body: --

* ACGIH TWA: American Conference of Governmental Industrial Hygienists

Time Weighted Average

9. Physical / chemical properties

	C1020	C1100	C1220	C2600	C2680	C2801
Appearance	Metallic brightness					
Melting point(degree C)	1083	1083	1083	955	930	905
Specific gravity(g/cm ³)	8.94	8.89-8.94	8.94	8.53	8.47	8.39

10. Hazardous information

Stability / reactivity: Stable under normal handling conditions.

11. Toxicological information

(No information about the alloy, but information on each element is shown below.)

Acute toxicity:

Orally administered · mouse LD₅₀ >4000mg/kg (Copper dusts)

Carcinogenicity:

Japan Society for Occupational Health: No Classification

12. Ecological Information

(No information about the alloy, but information on each element is shown below.)

Water Pollution Control Law:

Life environment clause (for Copper)

13. Note for scrapping

Should be collected and recycled as a metal.

Contact scrapping agent.

14. Note for transportation

Handle with care when transporting as follows:

Take care not to allow the air to cause corrosion. Do not drop or damage packaging.

15. Applicable legislation

(No information about the alloy, but information on each element is shown below.)

Water Pollution Control Law:

Life environment clause (for Copper)

NB-series does not correspond to Poisons, Deleterious Substances, Specific Deleterious Substances, in Poisonous and Deleterious Substances Control Law.

16. Other Information

We have tried to make it as accurate and useful as possible, but can take no responsibility for its use, misuse or accuracy. We have not verified this information, and can not guarantee that it is up-to-date.