

**GSA Data Sheet**  
**General Properties**

Wire Diameter (um)	15	18	20	23	25	28	30	32	35	38										
Tolerance (um)	+/- 1.0																			
Weight (mg/200mm)	0.595-0.777	0.877-1.096	1.096-1.338	1.469-1.748	1.748-2.052	2.212-2.552	2.552-2.916	2.916-3.305	3.508-3.933	4.155-4.616										
Breaking Load (gf)	Room Temp.																			
Elongation (%)	2.5 - 5.3		3.6 - 7.6		4.5 - 9.4		5.9 - 12.4		7.0 - 14.7		8.7 - 18.4		10.0 - 21.2		11.4 - 24.1		13.6 - 28.8		16.1 - 34.0	
	1.0 - 6.0			1.0 - 7.0						1.5 - 8.5										

**Physical Property**

Hardness (HV)	Free Air Ball	35 - 55									
	HAZ	45 - 70									
	Wire	60 - 80									
Density (g/cm <sup>3</sup> )	19.32										
Resistivity (uΩ cm) @ 20°C	2.3										
Fusing Current (A, Length=3mm,10sec)	0.3	0.4	0.5	0.7	0.8	1.1	1.2	1.4	1.7	2.0	
Electrical resistance (Ω, Length 10mm, Room Temp.)	1.14 - 1.49	0.81 - 1.01	0.66 - 0.81	0.51 - 0.61	0.43 - 0.51	0.35 - 0.40	0.30 - 0.35	0.27 - 0.30	0.23 - 0.25	0.19 - 0.21	
Thermal Conductivity @ 20°C (W/m/K)	315.5										
Linear Expansion Coefficient (0-100°C) (ppm/K)	14.1										
Elastic Modulus (GPa)	60 - 80										
Melting Point (°C)	1,063										

TDS GSA rev.3 20230524

**GSA Data Sheet**  
**General Properties**

Wire Diameter (um)	15	18	20	23	25	28	30	32	35	38										
Tolerance (um)	+/- 1.0																			
Weight (mg/200mm)	0.595-0.777	0.877-1.096	1.096-1.338	1.469-1.748	1.748-2.052	2.212-2.552	2.552-2.916	2.916-3.305	3.508-3.933	4.155-4.616										
Breaking Load (gf)	Room Temp.																			
Elongation (%)	2.9 - 5.7		4.2 - 8.2		5.2 - 10.1		6.9 - 13.4		8.1 - 15.9		10.2 - 19.9		11.7 - 22.8		13.3 - 26.0		15.9 - 31.1		18.8 - 36.6	
	1.0 - 6.0			1.0 - 7.0						1.5 - 8.5										

**Physical Property**

Hardness (HV)	Free Air Ball	35 - 55									
	HAZ	45 - 80									
	Wire	70 - 90									
Density (g/cm <sup>3</sup> )	19.32										
Resistivity (uΩ cm) @ 20°C	2.3										
Fusing Current (A, Length=3mm,10sec)	0.3*	0.4	0.5	0.7	0.8	1.1	1.2	1.4	1.7	2.0	
Electrical resistance (Ω, Length 10mm, Room Temp.)	1.14 - 1.49	0.81 - 1.01	0.66 - 0.81	0.51 - 0.61	0.43 - 0.51	0.35 - 0.40	0.30 - 0.35	0.27 - 0.30	0.23 - 0.25	0.19 - 0.21	
Thermal Conductivity @ 20°C (W/m/K)	315.5										
Linear Expansion Coefficient (0-100°C) (ppm/K)	14.1										
Elastic Modulus (GPa)	70 - 90										
Melting Point (°C)	1,063										

TDS GSB rev.3 20230524

**GBC Data Sheet**  
**General Properties**

Wire Diameter (um)	15	18	20	23	25	28	30	32	35	38
Tolerance (um)	+/- 1.0									
Weight (mg/200mm)	0.591-0.772	0.872-1.089	1.089-1.330	1.460-1.737	1.737-2.039	2.199-2.536	2.536-2.898	2.898-3.284	3.486-3.909	4.129-4.587
Breaking Load (gf)	≥ 5.2	≥ 7.5	≥ 9.3	≥ 12.3	≥ 14.5	≥ 18.2	≥ 20.9	≥ 23.8	≥ 28.4	≥ 33.5
Elongation (%)	1.5 - 4.0			1.5 - 5.0				1.5 - 6.0		

**Physical Property**

Hardness (HV)	Free Air Ball	40 - 60									
	HAZ	50 - 110									
	Wire	100 - 120									
Density (g/cm <sup>3</sup> )	19.20										
Resistivity (uΩ cm) @ 20°C	3.0										
Fusing Current (A, Length=3mm,10sec)	0.3	0.4	0.5	0.6	0.7	0.9	1.1	1.2	1.5	1.8	
Electrical resistance (Ω, Length 10mm, Room Temp.)	1.49 - 1.95	1.06 - 1.32	0.87 - 1.06	0.66 - 0.79	0.57 - 0.66	0.45 - 0.52	0.40 - 0.45	0.35 - 0.40	0.29 - 0.33	0.25 - 0.28	
Thermal Conductivity @ 20°C (W/m/K)	240										
Linear Expansion Coefficient (0-100°C) (ppm/K)	14.4										
Elastic Modulus (GPa)	95 - 115										
Melting Point (°C)	1,070										

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**GBE Data Sheet**  
**General Properties**

Wire Diameter (um)	15	18	20	23	25	28	30	32	35	38
Tolerance (um)	+/- 1.0									
Weight (mg/200mm)	0.595-0.777	0.877-1.096	1.096-1.338	1.469-1.748	1.748-2.052	2.212-2.552	2.552-2.916	2.916-3.305	3.508-3.933	4.155-4.616
Breaking Load (gf)	≥ 4.5	≥ 6.5	≥ 8.0	≥ 10.6	≥ 12.6	≥ 15.8	≥ 18.1	≥ 20.6	≥ 24.6	≥ 29.0
Elongation (%)	1.0 - 4.0			1.0 - 5.0				1.0 - 6.0		

**Physical Property**

Hardness (HV)	Free Air Ball	35 - 55									
	HAZ	45 - 100									
	Wire	90 - 110									
Density (g/cm <sup>3</sup> )	19.32										
Resistivity (uΩ cm) @ 20°C	2.3										
Fusing Current (A, Length=3mm,10sec)	0.3	0.4	0.5	0.7	0.8	1.1	1.2	1.4	1.7	2.0	
Electrical resistance (Ω, Length 10mm, Room Temp.)	1.14 - 1.49	0.81 - 1.01	0.66 - 0.81	0.51 - 0.61	0.43 - 0.51	0.35 - 0.40	0.30 - 0.35	0.27 - 0.30	0.23 - 0.25	0.19 - 0.21	
Thermal Conductivity @ 20°C (W/m/K)	315.5										
Linear Expansion Coefficient (0-100°C) (ppm/K)	14.1										
Elastic Modulus (GPa)	70 - 90										
Melting Point (°C)	1,063										

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**GFC Data Sheet**  
**General Properties**

Wire Diameter (um)	15	18	20	23	25	28	30	32	35	38
Tolerance (um)	+/- 1.0									
Weight (mg/200mm)	0.595-0.777	0.877-1.096	1.096-1.338	1.469-1.748	1.748-2.052	2.212-2.552	2.552-2.916	2.916-3.305	3.508-3.933	4.155-4.616
Breaking Load (gf)	2.8 - 5.6	4.0 - 8.0	5.0 - 9.9	6.5 - 13.1	7.7 - 15.5	9.7 - 19.4	11.1 - 22.3	12.7 - 25.3	15.2 - 30.3	17.9 - 35.7
Elongation (%)	Room Temp. 1.0 - 7.0			2.0 - 7.0				2.0 - 8.0		

**Physical Property**

Hardness (HV)	Free Air Ball	35 - 55									
	HAZ	45 - 75									
	Wire	65 - 85									
Density (g/cm <sup>3</sup> )	19.32										
Resistivity (uΩ cm) @ 20°C	2.3										
Fusing Current (A, Length=3mm,10sec)	0.3	0.4	0.5	0.7	0.8	1.1	1.2	1.4	1.7	2.0	
Electrical resistance (Ω, Length 10mm, Room Temp.)	1.14 - 1.49	0.81 - 1.01	0.66 - 0.81	0.51 - 0.61	0.43 - 0.51	0.35 - 0.40	0.30 - 0.35	0.27 - 0.30	0.23 - 0.25	0.19 - 0.21	
Thermal Conductivity @ 20°C (W/m/K)	315.5										
Linear Expansion Coefficient (0-100°C) (ppm/K)	14.1										
Elastic Modulus (GPa)	65 - 85										
Melting Point (°C)	1,063										

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**GFD Data Sheet**  
**General Properties**

Wire Diameter (um)	15	18	20	23	25	28	30	32	35	38
Tolerance (um)	+/- 1.0									
Weight (mg/200mm)	0.595-0.777	0.877-1.096	1.096-1.338	1.469-1.748	1.748-2.052	2.212-2.552	2.552-2.916	2.916-3.305	3.508-3.933	4.155-4.616
Breaking Load (gf)	3.3 - 6.1	4.8 - 8.8	5.9 - 10.8	7.8 - 14.3	9.2 - 16.9	11.5 - 21.2	13.2 - 24.4	15.1 - 27.7	18.0 - 33.2	21.2 - 39.1
Elongation (%)	Room Temp. 1.0 - 7.0			2.0 - 7.0				2.0 - 8.0		

**Physical Property**

Hardness (HV)	Free Air Ball	35 - 55									
	HAZ	45 - 85									
	Wire	75 - 95									
Density (g/cm <sup>3</sup> )	19.32										
Resistivity (uΩ cm) @ 20°C	2.3										
Fusing Current (A, Length=3mm,10sec)	0.3 <sup>※</sup>	0.4	0.5	0.7	0.8	1.1	1.2	1.4	1.7	2.0	
Electrical resistance (Ω, Length 10mm, Room Temp.)	1.14 - 1.49	0.81 - 1.01	0.66 - 0.81	0.51 - 0.61	0.43 - 0.51	0.35 - 0.40	0.30 - 0.35	0.27 - 0.30	0.23 - 0.25	0.19 - 0.21	
Thermal Conductivity @ 20°C (W/m/K)	315.5										
Linear Expansion Coefficient (0-100°C) (ppm/K)	14.1										
Elastic Modulus (GPa)	75 - 95										
Melting Point (°C)	1,063										

TDS GFD rev.2 20230524

**GMG Data Sheet**  
**General Properties**

Wire Diameter (um)	15	18	20	23	25	28	30	32	35	38
Tolerance (um)	+/- 1.0									
Weight (mg/200mm)	0.595-0.777	0.877-1.096	1.096-1.338	1.469-1.748	1.748-2.052	2.212-2.552	2.552-2.916	2.916-3.305	3.508-3.933	4.155-4.616
Breaking Load (gf)	3.6 - 6.4	5.1 - 9.1	6.3 - 11.3	8.4 - 14.9	9.9 - 17.6	12.4 - 22.1	14.3 - 25.4	16.2 - 28.9	19.4 - 34.6	22.9 - 40.8
Elongation (%)	Room Temp. 1.0 - 7.0			2.0 - 7.0				2.0 - 8.0		

**Physical Property**

Hardness (HV)	Free Air Ball	35 - 55									
	HAZ	45 - 85									
	Wire	75 - 95									
Density (g/cm <sup>3</sup> )	19.32										
Resistivity (u Ω cm) @ 20°C	2.3										
Fusing Current (A, Length=3mm,10sec)	0.3	0.4	0.5	0.7	0.8	1.1	1.2	1.4	1.7	2.0	
Electrical resistance (Ω, Length 10mm, Room Temp.)	1.14 - 1.49	0.81 - 1.01	0.66 - 0.81	0.51 - 0.61	0.43 - 0.51	0.35 - 0.40	0.30 - 0.35	0.27 - 0.30	0.23 - 0.25	0.19 - 0.21	
Thermal Conductivity @ 20°C (W/m/K)	315.5										
Linear Expansion Coefficient (0-100°C) (ppm/K)	14.1										
Elastic Modulus (GPa)	75 - 95										
Melting Point (°C)	1,063										

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**GLF Data Sheet**  
**General Properties**

Wire Diameter (um)	15	18	20	23	25	28	30	32	35	38
Tolerance (um)	+/- 1.0									
Weight (mg/200mm)	0.595-0.777	0.877-1.096	1.096-1.338	1.469-1.748	1.748-2.052	2.212-2.552	2.552-2.916	2.916-3.305	3.508-3.933	4.155-4.616
Breaking Load (gf)	3.1 - 5.9	4.5 - 8.5	5.6 - 10.5	7.4 - 13.9	8.7 - 16.4	10.9 - 20.6	12.5 - 23.7	14.3 - 26.9	17.1 - 32.2	20.1 - 38.0
Elongation (%)	Room Temp. 2.0 - 6.0		2.0 - 7.0				2.0 - 9.0			

**Physical Property**

Hardness (HV)	Free Air Ball	35 - 55									
	HAZ	45 - 85									
	Wire	75 - 95									
Density (g/cm <sup>3</sup> )	19.32										
Resistivity (u Ω cm) @ 20°C	2.3										
Fusing Current (A, Length=3mm,10sec)	0.3	0.4	0.5	0.7	0.8	1.1	1.2	1.4	1.7	2.0	
Electrical resistance (Ω, Length 10mm, Room Temp.)	1.14 - 1.49	0.81 - 1.01	0.66 - 0.81	0.51 - 0.61	0.43 - 0.51	0.35 - 0.40	0.30 - 0.35	0.27 - 0.30	0.23 - 0.25	0.19 - 0.21	
Thermal Conductivity @ 20°C (W/m/K)	315.5										
Linear Expansion Coefficient (0-100°C) (ppm/K)	14.1										
Elastic Modulus (GPa)	70 - 90										
Melting Point (°C)	1,063										

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**GPH Data Sheet**  
**General Properties**

Wire Diameter (um)	15	18	20	23	25	28	30	32	35	38
Tolerance (um)	+/- 1.0									
Weight (mg/200mm)	0.595-0.777	0.877-1.095	1.096-1.338	1.468-1.747	1.747-2.050	2.211-2.551	2.551-2.915	2.915-3.303	3.506-3.931	4.152-4.614
Breaking Load (gf)	3.3 - 6.1	4.8 - 8.8	5.9 - 10.8	7.8 - 14.3	9.2 - 16.9	11.5 - 21.2	13.2 - 24.4	15.1 - 27.7	18.0 - 33.2	21.2 - 39.1
Elongation (%)	Room Temp. 1.0 - 7.0			2.0 - 8.0						

**Physical Property**

Hardness (HV)	Free Air Ball	40 - 60									
	HAZ	50 - 85									
	Wire	75 - 95									
Density (g/cm <sup>3</sup> )	19.31										
Resistivity (u Ω cm) @ 20°C	3.1										
Fusing Current (A, Length=3mm,10sec)	0.2	0.3	0.4	0.5	0.7	0.8	1.0	1.1	1.3	1.6	
Electrical resistance (Ω, Length 10mm, Room Temp.)	1.54 - 2.01	1.09 - 1.37	0.90 - 1.09	0.69 - 0.82	0.58 - 0.69	0.47 - 0.54	0.41 - 0.47	0.36 - 0.41	0.30 - 0.34	0.26 - 0.29	
Thermal Conductivity @ 20°C (W/m/K)	240										
Linear Expansion Coefficient (0-100°C) (ppm/K)	14.4										
Elastic Modulus (GPa)	75 - 95										
Melting Point (°C)	1,065										

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**GPG Data Sheet**  
**General Properties**

Wire Diameter (um)	15	18	20	23	25	28	30	32	35	38
Tolerance (um)	+/- 1.0									
Weight (mg/200mm)	0.591-0.772	0.872-1.089	1.089-1.330	1.460-1.737	1.737-2.039	2.199-2.536	2.536-2.898	2.898-3.284	3.486-3.909	4.129-4.587
Breaking Load (gf)	3.7 - 5.7	5.4 - 8.1	6.7 - 10.1	8.8 - 13.3	10.4 - 15.7	13.0 - 19.7	15.0 - 22.6	17.0 - 25.7	20.4 - 30.8	24.0 - 36.3
Elongation (%)	Room Temp. 1.0 - 7.0			2.0 - 7.0				2.0 - 8.0		

**Physical Property**

Hardness (HV)	Free Air Ball	40 - 60									
	HAZ	50 - 85									
	Wire	75 - 95									
Density (g/cm <sup>3</sup> )	19.20										
Resistivity (u Ω cm) @ 20°C	3.0										
Fusing Current (A, Length=3mm,10sec)	0.2	0.3	0.4	0.6	0.7	0.8	1.0	1.1	1.3	1.6	
Electrical resistance (Ω, Length 10mm, Room Temp.)	1.49 - 1.95	1.06 - 1.32	0.87 - 1.06	0.66 - 0.79	0.57 - 0.66	0.45 - 0.52	0.40 - 0.45	0.35 - 0.40	0.29 - 0.33	0.25 - 0.28	
Thermal Conductivity @ 20°C (W/m/K)	240										
Linear Expansion Coefficient (0-100°C) (ppm/K)	14.4										
Elastic Modulus (GPa)	75 - 95										
Melting Point (°C)	1,070										

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