TECHNICAL INFORMATION SHEET
ARGENTIUM 960 MILLFORM SILVER

Dated: August 2023

GENERAL INFORMATION

COMMERCIAL COMPOSITION

Silver:	96.2%
Copper	
Germanium	

MELTING TEMPERATURES

Liquidus:	915°C / 1679 °F
Solidus:	890°C / 1634°F
Melting range:	25°C / 77°F

FULL CHARACTERISATION DATA

COLOUR COORDINATES

L*	95.2
A*	-0.2
B*	3.9
C*	3.9
Yellow Index	7.2

AS CAST GRAIN SIZE [µm]: 315

DENSITY [g/cm^3]: 10.4

MECHANICAL CHARACTERISTICS

As cast hardness [HV 0.2]:	50
Hardness after 70% area reduction [HV 0.2]:	155
Hardness after annealing [HV 0.2]:	50
Single step precipitation hardening hardness [HV 0.2]:	85
Double step precipitation hardening hardness [HV 0.2]:	130
Tensile strength (Rm) [MPa]:	234
Yield strength: (Rp0.2) [MPa]:	135
Elongation at rupture: (A) [%]	40

PRODUCT APPLICATIONS

CNC and lathe production
Hand production
Continuous casting
Sheet production
Wire production
Torch and furnace fusible
Precipitation hardening
Solid wire chain production
Laser welded chain production
Hollow chain production
Bi-metal cladding
TIG tube production
Ingot casting
Stamping production

IMPORTANT: MAXIMISING ARGENTIUM SILVER'S TARNISH RESISTANCE

To initiate and optimise tarnish resistance the following processes are manadatory...

1) A simple, low-temperature heat treatment must be applied to increase hardness and optimise the surface for finishing - see 'PRECIPITATION/HEAT HARDENING PARAMETERS' instructions, page 2.

2) A grease-free surface must be achieved as a final finishing process - see 'CLEANING & RINSING' instructions, page 2.

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ARGENTIUM®
THE FINEST SILVER

MECHANICAL WORKING PARAMETERS

REDUCTIONS:	Sheet - area or thickness	70%
	Wire - diameter	45%
POURING TEMPERATURE - CONTINUOUS:	1020°C - 1100°C / 1868°F - 2012°F	
POURING TEMPERATURE - INGOT:	1000°C - 1040°C / 1832°F - 1904°F	

ANNEALING TEMPERATURES:	less than 1mm:	560°C - 620°C / 1040°F - 1148°F	for 20 minutes
	1mm - 5mm:	560°C - 620°C / 1040°F - 1148°F	for 25 minutes
	more than 5mm:	560°C - 620°C / 1040°F - 1148°F	for 30 minutes

CONTROLLED FURNACE ATMOSPHERE FOR ANNEALING: Ratio 95:5 or 90:10 nitrogen:hydrogen

QUENCHING: Quench in water (see HEAT/COLOUR RECOGNITION & COOLING ARGENTIUM SILVER' below).

PICKLING: 10% Sulphuric Acid solution or Sodium Bisulphate, weak Sparex, Phosphoric Acid (diluted as per supplier's instructions). Keep pickling time to a minimum. Do **NOT** use Hydrofluoric Acid.

PRECIPITATION/HEAT HARDENING PARAMETERS (to be carried out before final finishing processes)

SINGLE STEP HEAT HARDENING TREATMENT	Temp. [°C / °F]	Time	Cooling
Heat harden in air atmosphere:	300 / 572	90 mins	Slow cool in air or in furnace

DOUBLE STEP HEAT HARDENING TREATMENT	Temp. [°C / °F]	Time	Cooling
Step 1) Heat in a protective atmosphere:	700 / 1292	40 mins	Quench in water *
Step 2) Heat harden in air atmosphere:	300 / 572	60 mins	Slow cool in air or in furnace

HEAT/COLOUR RECOGNITION & COOLING ARGENTIUM SILVER

Argentium Silver glows a paler colour than standard Stering silver at red-hot temperatures. Take care not to overheat the metal. (Temperature/metal colour recognition is easier to judge working in a shaded area.)

*Argentium Silver retains its heat for longer than standard Sterling silver - allowances for a slower cool must be made when quenching.

FINISHING PROCESSES

POLISHING

Argentium Silver can be polished using traditional wheels or mass finishing processes. The use of separate polishing wheels for Argentium Silver items is advised - this prevents cross-contamination of another metal/alloy onto the surface of Argentium pieces, which can compromise tarnish resistance.

CLEANING & RINSING

To maximise Argentium Silver's tarnish resistance, a grease-free surface must be achieved using ultrasonic cleaning. We do **NOT** recommend electrolytic cleaning or steam cleaning.

Use of distilled water for cleaning / rinsing is recommended to prevent water marks. Please do **NOT** use deionised / reverse osmosis water with Argentium Silver.

NB. For high volume production, please refer to 'Argentium Cleaning Guidelines' document by Legor Group.

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