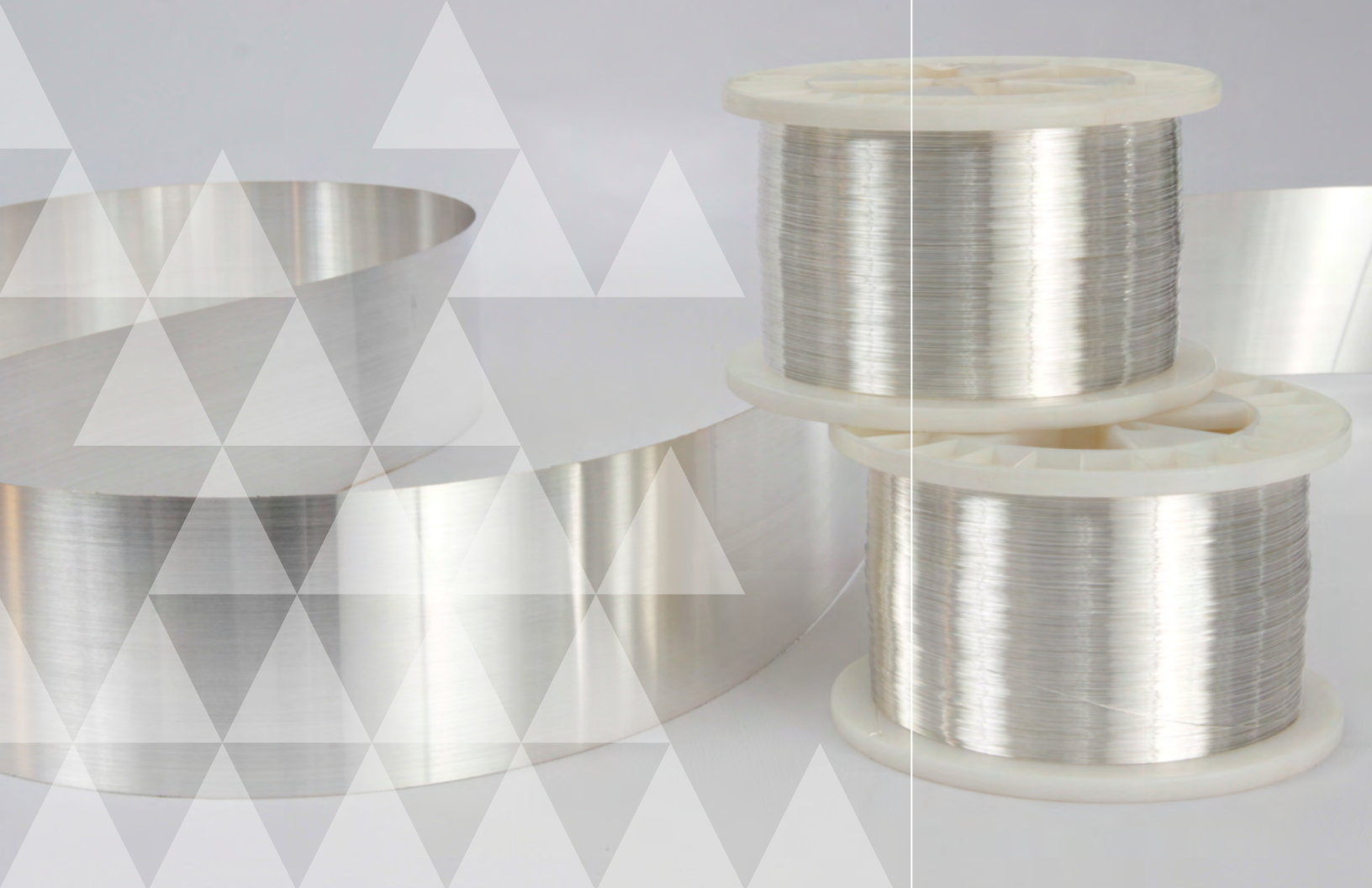




**MATERION**



**ADVANCED  
MATERIALS GROUP**

Industrial  
Products

# Industrial Products

## The Challenge

To ensure optimal performance for demanding consumer and industrial applications, metal and metal alloy products must be of superior quality, purity and strength. The products must be able to withstand harsh climatic conditions such as extreme temperature ranges – even under water! In addition to customizable shapes, sizes and configurations, offering lead-free options is a necessity. Multiple product choices will fulfill individual customer needs, whether for solder alloys, silver metal sheet, casting grain, catalysts or shaped wire.

## The Solution

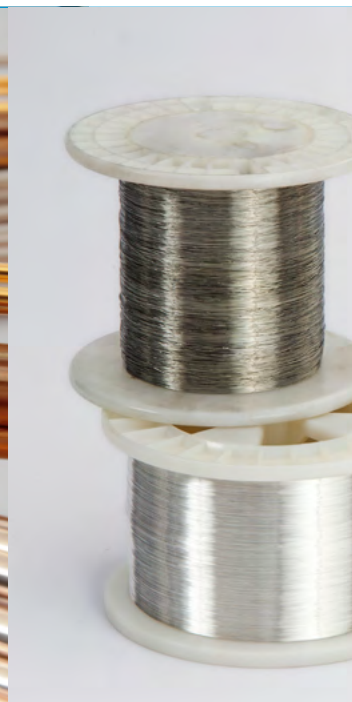
Materion satisfies the critical requirement for pure materials that possess good thermal conductivity, tensile strength, elongation and excellent surface finish. Whatever your application, we have a product for you.

- Precious metal alloys with superior strength
- Fine silver or karat gold casting grain compatible for all casting processes
- Lead-free braze materials
- Sterling sheet or silver braze alloys available in various widths & thicknesses
- Gold and silver alloys with excellent corrosion resistance
- 99.99% pure silver catalysts
- Preferred long length shaped wire

## BENEFITS

Materion offers multiple advantages:

- Technical expertise based on 100 years of experience in precious metals refining, recycling & recovery
- Among the largest silver refiners in the United States
- Metallurgists design custom alloys, sizes and configurations
- Simultaneously operating multiple slitters enable fastest & most reliable supplier of quality silver strip for stamping
- Higher yields reduce costs
- Higher metal returns & fast settlements



# Materion ... Materials to Advance the World's Technologies



## SOLDER ALLOYS

High quality solder alloys cast and fabricated to meet your exacting standards.

- Multiple shapes & preforms (disks, rectangles, frames, ribbon, rings) or customized to your specs
- Lead-free solders in wide variety of alloys: Au, Ag, AuSn, AuGe, AuSnCu, SnAgCu (SAC) and more
- Complete range of lead-containing solders with liquidus temperatures from 149 C to 327 C
- 8,000+ stamping tools in-house for design & production

## CASTING GRAIN

Our unique manufacturing process enables exceptional casting grain for optimal performance.

- Silver or karat gold alloys customized to your specific application
- Available in standard & anti-tarnish sterling silver, white karat gold alloys, yellow karat gold alloys, and .999 fine silver

## SHEET & STRIP

Our superior .999 fine silver sheet and sterling strip material are recognized worldwide.

- Available in myriad sizes, widths & thicknesses
- Known for its tailorable surface finish
- Wide coils slit into smaller coils to meet customer exacting requirement

## SILVER CATALYST

Our expertise in precious metals allows us to manufacture high purity silver catalyst.

- Available in crystalline form ("needle silver") processed to meet your requirements
- 99.99% silver with less than 100 ppm trace elements
- High surface area
- Long catalyst bed life
- Woven or knitted fine silver screens & gauzes to your specifications
- Lab-certified chemical analysis of new & refined catalyst

## WIRE & SHAPED WIRE

We produce a wide array of superior finish sterling silver and fine silver wire.

- Unparalleled surface wire quality for your application
- Available in coils or spools in sterling silver, .999fine silver, platinum alloys, and BAg alloys (silver brazing alloys)
- Assortment of sizes & alloys to meet your requirements
- Unique square & rectangular-formed wire, and half-round wire
- Excellent surface finish & tensile strength
- Other precious metal alloys available



# MATERION SOLDER ALLOYS

WAM Solder	Nominal Composition Wt.%	Liquidus		Solidus		Density (g/cc)	Electrical Conductivity (% of IACS)	Thermal Conductivity (W/m <sup>2</sup> °C)	Thermal Coefficient of Expansion (Micro in/in/°C) (20C)	Tensile Strength (psi)
		C	F	C	F					
WS96*	30Pb, 18Sn, Bi52	96	205	96	205	9.58	3.2	15	38.0	3200
WS118	48Sn, 52In	118	244	118	244	7.30	11.7	34	20.0	1720
WS143	3Ag, 97In	143	290	143	290	7.38	4.5	73	22.0	800
WS145	58Sn, 42In	145	493	118	244	7.30	11.2	33	31.0	5900
WS149*	5Ag, 15Pb, 80In	149	300	149	288	7.85	6.7	43	28.0	2550
WS157	100In	157	315	157	315	7.31	5.6	82	24.8	575
WS174*	30Pb, 70In	174	347	165	329	8.19	8.8	38	28.0	3450
WS179	2Ag, 36Pb, 62Sn	179	354	179	354	8.41	1.9	42	27.0	6380
WS181*	37.5Pb, 37.5Sn, 25In	181	358	134	273	8.42	7.8	23	23.0	5260
WS183*	37Pb, 63Sn	183	361	183	361	8.34	11.8	51	25.0	7500
WS185*	40Pb, 60In	185	358	173	343	8.52	7.0	29	27.0	4150
WS186*	30Pb, 70Sn	186	367	183	361	8.17	12.5	53	27.0	7800
WS187	2.8Ag, 77.2Sn, 20In	187	369	175	347	7.25	9.8	54	28.0	6800
WS188*	40Pb, 60Sn	188	376	183	361	8.50	11.5	49	21.6	7610
WS199*	20Pb, 80Sn	199	39	183	361	7.85	13.8	59	24.5	5800
WS200*	45Pb, 55Sn	200	392	183	361	8.68	11.2	48	22.6	6800
WS205*	15Pb, 85Sn	205	401	183	361	7.70	13.6	58	22.0	5300
WS209*	50Pb, 50In	209	410	184	363	8.86	6.0	22	27.0	4670
WS212*	50Pb, 50Sn	212	414	183	361	8.87	10.9	47	23.6	6000
WS213*	10Pb, 90Sn	213	415	183	361	7.55	13.1	56	26.5	3300
WS217	10Au, 90Sn	217	423	217	423	7.73	10.2	28	14.0	15000
WS221	3.5Ag, 96.5Sn	221	430	221	430	7.36	16.0	33	30.2	5620
WS225*	60Pb, 40In	225	437	205	401	9.30	5.2	19	26.0	5000
WS226	3.5Ag, 95Sn, 1.5Sb	226	439	218	424	7.37	11.9	29	18.0	7300
WS226A	2.5Ag, 97.5Sn	226	439	221	430	7.34	11.2	28	19.5	6200
WS232	100Sn	232	450	232	450	7.28	15.6	73	23.5	1900
WS235	99Sn, 1Sb	235	455	235	455	7.27	12.3	29	22.0	2620
WS238*	60Pb, 40Sn	238	460	183	361	9.28	10.1	44	24.7	5400
WS238A	97Sn, 3Sb	238	460	232	450	9.28	12.1	28	25.0	4080
WS240	95Sn, 5Sb	240	464	232	450	7.25	11.9	28	27.0	5460
WS243*	63.2Pb, 35Sn, 1.8In	243	469	185	365	9.39	9.5	41	21.0	2900
WS257*	70Pb, 30Sn	257	495	183	361	9.66	9.3	41	25.6	5000
WS264*	75Pb, 25In	264	500	240	464	9.97	4.6	18	26.0	5450
WS280*	80Pb, 20Sn	280	536	183	361	10.04	8.7	37	26.5	4800
WS280A*	81Pb, 19In	280	536	270	518	10.27	4.5	17	27.0	5550
WS280B	80Au, 20Sn	280	536	280	536	14.51	7.7	57	15.9	40000
WS286*	88Pb, 8Bi, 4Sn, 1In, 1Ag	286	547	268	514	10.91	5.6	33	22.4	5317
WS288*	85Pb, 15Sn	288	550	183	361	10.48	8.5	37	27.2	4600
WS290*	2Ag, 88Pb, 10Sn	290	570	268	513	10.75	8.5	27	29.1	3260
WS292*	5Ag, 90Pb, 5Sn	292	558	292	558	11.00	7.7	26	26.0	5100
WS295*	95Pb, 5Sb	295	563	252	486	10.96	6.2	27	27.0	4200
WS296*	2.5Ag, 92.5Pb, 5Sn	296	565	287	549	11.02	7.6	26	24.0	3500
WS300*	2.5Ag, 92.5Pb, 5In	300	572	300	572	11.02	5.5	25	25.0	4560
WS302*	90Pb, 10Sn	302	576	275	527	10.50	8.2	36	27.9	4400
WS303*	2.5Ag, 97.5Pb	303	577	303	577	11.33	7.5	26	23.0	5900
WS304*	2.5Ag, 95.5Pb, 2Sn	304	579	299	570	11.20	7.6	26	23.0	3400
WS305	78Au, 22Sn	305	581	280	536	14.81	7.7	57	15.9	40000
WS309*	1.5Ag, 97.5Pb, 1Sn	309	588	309	588	11.28	6.0	23	30.4	4420
WS310*	5Ag, 90Pb, 5In	310	590	290	554	11.00	6.4	29	24.0	4500
WS341*	95Pb, 5In	314	597	300	572	11.06	5.1	21	29.0	4330
WS314A*	95Pb, 5Sn	314	597	310	590	10.80	8.1	35	28.4	4000
WS327*	100Pb	327	621	327	621	11.35	8.4	15	29.3	2750
WS361	88Au, 12Ge	361	682	361	682	14.67	11.4	44	13.4	26900
WS363	96.5Au, 3.15Si	363	685	363	685	15.70	46.4	27	12.3	37000
WS487	81Au, 19In	487	909	487	909	14.72	8.4	28	14.7	33700



**MATERION**

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**MATERION CORPORATION**  
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**MATERION ADVANCED MATERIALS GROUP** is a global advanced materials and services company, dedicated to providing solutions that enable our customers' technologies and drive their growth. Our products include precious and non-precious specialty metals, precision optical filters, inorganic chemicals and powders, specialty coatings, specialty-engineered beryllium alloys, beryllium and beryllium composites, and engineered clad and plated metal systems. The Materion business is structured to enhance our ability to provide customers with innovative, best total-cost solutions.