



umicore

Jewellery & Industrial Metals

Ready-StockTM
Catalogue

Umicore Precious Metals Canada Inc. has been serving the North American precious metals industry with refining services and fabricated products since 1914.

It has differentiated itself by providing superior customer service and an unrivalled range of products and services. Our plants are ISO18001, ISO9001 and ISO14001 certified and strive for continuous improvement in quality and environmental performance.

The Ready-Stock™ Catalogue offers a selection of the most commonly used precious metals products, generally available for immediate shipment. The offering is updated regularly in order to reflect new products and our customers' most recent feedback and needs, while continuing our tradition of service and reliability. Should you be unable to find what you need in this catalogue then feel free to contact us and we'll be happy to assist you further.

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For Casting Grain Use Metal & Flask Temperatures

“Liquidus” is the temperature at which an alloy is fully liquid. “Solidus” is the temperature at which an alloy is fully solid. Between these temperatures is a 2 phase slushy region. To fill your flask, you need a superheat from 30° to 100°C/86° to 212°F above the liquidus. “Superheat” is how much hotter the melt should be to flow into the flask. A general guideline to follow is +30°C/86°F for large pieces, +60°C/140°F for medium pieces and +100°C/212°F for small pieces or intricate pieces. Corresponding flask temperatures of 482°C/900°F, 538°C/1000°F and 593°C/1100°F respectively are also recommended. Models with complex geometry may warrant changes to these guidelines...so be prepared to experiment and adapt to the uniqueness of your particular style! Density is provided to allow for wax compensation.

Palladium – White Gold

Palladium-white gold alloys are unique. They benefit from significant additions of palladium to create nickel-free white golds that provide the most attractive white colour and the most ease of use in fabrication. Simply adding palladium to a white alloy formula does not necessarily yield optimum results. The objective is to create a nickel-free, malleable, platinum-white material that resolves complaints long associated with the nickel-white alloys currently populating our industry.

Umicore’s palladium-white gold is nickel free, exhibits the whitest colour of any gold product on the market, and has the best performance in all types of jewellery manufacturing. All Umicore palladium white alloys are Grade 1 on the World Gold Council whiteness index.

Fine Metal

Umicore supplies fine metal in the form of grain (Au or Ag) or mini bars (Au only). If you alloy your own metal and are confident in controlling the sensitive alloying techniques, Umicore is your source for fine gold and silver.

CASTING GRAIN SPECIFICATIONS

PART NO.	ALLOY	LIQUIDUS	SOLIDUS	DENSITY (g/cm ³ - dwt/in ³)
GR10YAMP000	10K Yellow	908°C/1666°F	881°C/1618°F	11.28-119.0
GR10RRED000	10K Red	982°C/1800°F	973°C/1783°F	11.44-120.7
GR10KW601000	10K Nickel-White	1073°C/1963°F	1030°C/1886°F	11.23-116.4
GR14YAMP000	14K Yellow	910°C/1670°F	870°C/1598°F	12.79-134.9
GR14GNB000	14K Green	912°C/1674°F	880°C/1616°F	14.02-147.9
GR14RRED000	14K Red	947°C/1737°F	937°C/1719°F	12.92-136.3
GR14KW601000	14K Nickel-White	1030°C/1886°F	1000°C/1832°F	12.73-132.7
GR14DWPD000	14K Palladium-White	1094°C/2001°F	1079°C/1974°F	14.22-150.0
GR18YY08000	18K Yellow	874°C/1605°F	854°C/1569°F	15.32-161.6
GR18W601000	18K Nickel-White	948°C/1738°F	916°C/1681°F	14.78-155.9
GR18GNGC000	18K Green	952°C/1746°F	935°C/1715°F	15.68-165.4
GR18RRED000	18K Red	920°C/1688°F	880°C/1616°F	15.10-159.3
GR18DWPD000	18K Palladium-White	1074°C/1965°F	1064°C/1947°F	15.80-166.7
GR19W601000	19K Nickel-White	920°C/1688°F	902°C/1656°F	15.20-160.4
GR22YY08000	22K Yellow	979°C/1794°F	950°C/1742°F	17.79-187.7
GR90WIR0000	90% Platinum-10% Iridium	1790°C/3254°F	1770°C/3218°F	21.54-227.2
GR95WIR0000	95% Platinum-5% Iridium	1825°C/3317°F	1800°C/3272°F	21.49-226.7
GR95WRU000	95% Platinum-5% Ruthenium	1795°C/3263°F	1780°C/3236°F	20.70-218.4
GRSSW000000	Sterling Silver	893°C/1639°F	810°C/1490°F	10.40-109.7
GRFSW000000	(99.9%) Fine Silver Grain	960°C/1760°F	960°C/1760°F	10.50-110.8
GRSSWANTI00	Arctic Fox™ Anti-tarnish Sterling Silver	867°C/1593°F	824°C/1515°F	10.25-108.2
GR24YFINE00	24K Fine Gold Grain	1064°C/1947.2 °F	1064°C/1947.2 °F	19.3-203.4



Umicore's Ready-Stock™ plate products meet the needs of both the high volume factory and the small volume bench jeweller. They are shipped in a half-hard temper allowing you to use them "as-is" or anneal them for a softer temper. Providing optimum ductility and strength, Ready-Stock™ plate provides superior performance in all stamping and forming operations, and adapts well to all jewellery manufacturing procedures and methods.

Our Gold and Silver Ready Stock plate come in 10.16cm (4 inch) widths and our Platinum Plate comes in 5.08cm (2 inch) widths.




Plate & Sheet























GOLD PLATE									
THICKNESS (mm/in.)	B & S GAUGE	10KY	10KW	14KY	14KW	18KY	18KW	18KW-Pd	19KW
0.25 / 0.010	30		•			•	•	•	•
0.32 / 0.013	28		•	•	•	•	•	•	•
0.35 / 0.014	27		•			•	•	•	•
0.4 / 0.016	26		•		•	•	•	•	•
0.5 / 0.020	24						•	•	•
0.75 / 0.030		•	•				•	•	•
1 / 0.039	18							•	
1.2 / 0.047			•				•	•	•
1.5 / 0.059								•	
1.75 / 0.069		•	•		•	•	•	•	•
2 / 0.079	12								
2.5 / 0.098			•	•	•	•	•	•	•






Available in 1 - 2 business days (minimums apply)
 • Available in 6 - 7 business days (minimums apply)

Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.

Plate & Sheet

PLATINUM PLATE		
THICKNESS (mm/in.)	B & S GAUGE	90W
2 / 0.079	12	
2.5 / 0.098		
 Available in 1 - 2 business days (minimums apply)		
Other Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.		

SILVER PLATE		
THICKNESS (mm/in.)	B & S GAUGE	Sterling Silver
0.25 / 0.010	30	
0.3 / 0.012		
0.32 / 0.013	28	
0.35 / 0.014	27	
0.4 / 0.016	26	
0.5 / 0.020	24	
0.6 / 0.024		
0.64 / 0.025		
0.7 / 0.028		
0.75 / 0.030		
0.8 / 0.031		
0.9 / 0.035		
1 / 0.039	18	
1.1 / 0.043		
1.2 / 0.047		
1.3 / 0.051		
1.5 / 0.059		
1.75 / 0.069		
2 / 0.079	12	
2.5 / 0.098		
3 / 0.118		
 Available in 1 - 2 business days (minimums apply)		
Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.		

ANTI-TARNISH SILVER PLATE		
THICKNESS (mm/in.)	B & S GAUGE	Anti-Tarnish Silver
0.5 / 0.020	24	
0.8 / 0.031		
1 / 0.039	18	
1.5 / 0.059		
 Available in 1 - 2 business days (minimums apply)		
Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.		

You will be certain to find a solder suited to your requirements in Umicore's wide range of Ready Stock solder coupons. Although technically brazing alloys based on their melting ranges, the jewellery industry traditionally refers to this set of alloys as solders.

Each alloy in this set has been designed to flow, wet and bond fabricating and or casting alloy segments together, at appropriate superheat over the liquidus temperature shown when standard metal joining techniques and procedures are used.

Each lot of solder alloy manufactured at Umicore is checked to confirm it is Cadmium and Lead free (< 50 ppm each) by current definitions. In addition, the Nickel content is also determined for each lot processed to ensure it is under 100 ppm in solder alloys that do not include Nickel as an alloying component. This provides options for your consideration when you need to ensure soldered items remain Nickel free after joining. Please refer to the MSDS to determine which alloys contain Ni.

In addition:

Karat gold solders

- Are plumb for the karat ordered to help ensure Hallmarking regulations are met for the final assembled item.
- Are available in several colours for each karat. Since a trace of solder often remains and could therefore be visible between the two pieces joined, this provides options for your consideration when designing the assembled item.
- Are available in the standard flow range classifications (extra easy, easy, medium, and hard) for step soldering applications. Approximate coupon weight is 1.5 – 2 grams.

Silver Solders

- Three solders are offered, one each in the easy, medium and hard melting range class.
- The silver content of each alloy is over 60% to help ensure Hallmarking regulations are met for the final assembled item. Approximate coupon weight is 16 to 16.5 grams.

Platinum Solders

- We carry the typical range of alloys for the Platinum jewellery industry, i.e the name of the solder is its liquidus temperature. Approximate coupon weight is 2 to 2.5 grams.

PLATINUM SOLDER SPECIFICATIONS				
PART NO.	ALLOY	LIQUIDUS	SOLIDUS	DENSITY gr/cm ³
SC90W000000	P1000	1000°C/1832°F	980°C/1796°F	10.24
SCPTS000000	P1100	1090°C/1994°F	1080°C/1976°F	13.34
SCPTS000000	P1200	1200°C/2192°F	1150°C/2102°F	13.53
SCPTS000000	P1300	1305°C/2381°F	1260°C/2300°F	17.89
SCPTS000000	P1400	1400°C/2552°F	1390°C/2534°F	16.25
SCPTS000000	P1500	1510°C/2750°F	1480°C/2696°F	15.50
SC95W000000	P1650 (95% platinum)	1650°C/3002°F	1550°C/2822°F	19.23

GOLD SOLDER SPECIFICATIONS				
PART NO.	ALLOY	LIQUIDUS	SOLIDUS	DENSITY gr/cm ³
SC10YEE0000	10K Yellow Extra-Easy	708°C/1306°F	654°C/1209°F	11.69
SC10YE00000	10K Yellow Easy	730°C/1346°F	705°C/1301°F	11.76
SC10YM00000	10K Yellow Medium	763°C/1369°F	743°C/1369°F	11.95
SC10YH00000	10K Yellow Hard	795°C/1463°F	777°C/1431°F	12.27
SC10WE00000	10K White Easy	794°C/1461°F	772°C/1422°F	11.93
SC10WH00000	10K White Hard	925°C/1697°F	860°C/1580°F	11.66
SC14YEE0000	*NEW 14K Yellow Extra-Easy	690°C/1275°F	622°C/1152°F	12.90
SC14YE00000	14K Yellow Easy	728°C/1342°F	685°C/1265°F	12.77
SC14YM00000	14K Yellow Medium	774°C/1425°F	757°C/1395°F	13.13
SC14YH00000	14K Yellow Hard	807°C/1485°F	795°C/1463°F	13.44
SC14WE00000	14K White Easy	738°C/1360°F	712°C/1314°F	12.72
SC14WH00000	14K White Hard	865°C/1589°F	800°C/1472°F	12.40
SC14GM00000	14K Green	776°C/1429°F	750°C/1382°F	13.02
SC14RM00000	14K Red Medium	865°C/1589°F	850°C/1562°F	13.36
SC18YE00000	18K Yellow Easy	750°C/1382°F	726°C/1339°F	14.53
SC18YM00000	18K Yellow Medium	781°C/1438°F	765°C/1409°F	14.66
SC18YH00000	18K Yellow Hard	804°C/1479°F	797°C/1467°F	14.71
SC18WE00000	18K White Easy	834°C/1533°F	803°C/1477°F	14.26
SC18WM00000	18K White Medium	888°C/1630°F	832°C/1530°F	14.43
SC18WH00000	18K White Hard	902°C/1656°F	888°C/1630°F	14.51
SC18RM00000	18K Red Medium	856°C/1573°F	827°C/1521°F	14.77
SC19WM00000	19K White	877°C/1611°F	827°C/1521°F	15.62

SILVER SOLDER SPECIFICATIONS				
PART NO.	ALLOY	LIQUIDUS	SOLIDUS	DENSITY gr/cm ³
SCSSWI04E00	I04 Easy	680°C/1256°F	640°C/1249°F	9.18
SCSSWI02M00	I02M Medium	730°C/1346°F	720°C/1328°F	9.68
SCSSWI03H00	I03H Hard	786°C/1446°F	764°C/1407°F	9.98



Umicore's Ready-Stock™ wire products are designed to meet the needs of both the high volume factory and the small volume bench jeweller. They are shipped in a half-hard state allowing you to use them "as-is" or anneal them for a softer temper. Providing optimum ductility and strength as well as superior performance, Ready-Stock™ wire products are made to exact dimensions and are drawn through dedicated precision finishing dies. They offer the finest quality and the best surface finish with tight tolerance controls, and come in a wide range of sizes. Thanks to our same-day delivery service, Ready-Stock™ wire is ideal for "just-in-time" fabrication, repair and sizing, and ensures your creations not only start off perfect but also finish that way.

Round Wire

Our processing ensures consistency of chemistry and mechanical properties along the length of wire or sheet. Our multi-die in-line drawing equipment applies the best reduction schedules interspaced with precise annealing processes. The end result is consistent physical properties for the temper ordered as well as exceptional cleanliness for the best wire quality available. See our Technical Tips section for more details.

NOTE: All Ready-Stock™ round wire up to 2 mm in diameter is available coiled. Thicker diameters are stocked in 30 cm/12" straight lengths. Minimums may apply. Annealing is available at extra charge.

GOLD ROUND WIRE									
DIAMETER (mm/in.)	B & S GAUGE	10KY	10KW	14KY	14KW	14KW-Pd	18KY	18KW	19KW
0.25 / 0.010	30	●	●	●	●	•	•	●	•
0.3 / 0.012	29	•	•	●	●	•	•	•	•
0.4 / 0.016	26	•	•	•	•	•	●	•	•
0.5 / 0.020	24	●	•	●	●	•	●	•	•
0.65 / 0.026		●	•	●	•	•	•	•	•
0.75 / 0.030		●	●	●	●	•	●	•	•
0.8 / 0.031		●	•	●	●	•	•	•	•
0.9 / 0.035		●	•	•	•	•	•	•	•
1 / 0.039	18	●	●	●	●	●	●	●	•
1.3 / 0.051		●	•	●	•	•	•	•	•
1.5 / 0.059		●	•	●	●	•	●	●	●
2 / 0.079	12	●	●	●	●	•	●	•	•

● Available in 1 - 2 business days (minimums apply) • Available in 6 - 7 business days (minimums apply)

Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.

SILVER ROUND WIRE		
DIAMETER (mm/in.)	B & S GAUGE	Sterling Silver
0.25 / 0.010	30	●
0.30 / 0.012	29	●
0.32 / 0.013	28	●
0.35 / 0.014	27	●
0.4 / 0.016	26	●
0.5 / 0.020	24	●
0.57 / 0.022	23	●
0.6 / 0.024		●
0.65 / 0.026	22	●
0.7 / 0.028		●
0.72 / 0.028	21	●
0.75 / 0.030		●
0.8 / 0.031	20	●
0.85 / 0.033		●
0.9 / 0.035	19	●
1 / 0.039	18	●
1.1 / 0.043		●
1.15 / 0.045	17	●
1.25 / 0.049		●
1.3 / 0.051	16	●
1.4 / 0.055		●
1.5 / 0.059		●
1.6 / 0.063		●
1.65 / 0.065	14	●
1.75 / 0.069		●
2 / 0.079	12	●
2.3 / 0.091	11	●
2.5 / 0.098		●
2.6 / 0.102	10	●
3 / 0.118		●
3.25 / 0.128	8	●
3.5 / 0.138		●
4 / 0.157		●
● Available in 1 - 2 business days (minimums apply)		
Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.		

14K RED ROUND WIRE		
DIAMETER (mm/in.)	B & S GAUGE	14KR
1 / 0.039	18	●
1.5 / 0.059		●
2 / 0.079	12	●
● Available in 1 - 2 business days (minimums apply)		

ANTI-TARNISH SILVER ROUND WIRE		
DIAMETER (mm/in.)	B & S GAUGE	Anti-Tarnish Silver
0.75 / 0.030		●
0.8 / 0.031	20	●
1 / 0.039	18	●
1.25 / 0.049		●
1.5 / 0.059		●
2 / 0.079	12	●
● Available in 1 - 2 business days (minimums apply)		
Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.		

FINE SILVER ROUND WIRE		
DIAMETER (mm/in.)	B & S GAUGE	FS
1.6 / 0.063		●
● Available in 1 - 2 business days (minimums apply)		
Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.		

PLATINUM ROUND WIRE		
DIAMETER (mm/in.)	B & S GAUGE	90W
0.25 / 0.010	30	●
0.5 / 0.020	24	●
1.0 / 0.039	18	●
2 / 0.079	12	●
● Available in 1 - 2 business days (minimums apply)		
Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.		

Half-Round Wire

Half-Round Wire is primarily used to size “tiffany-shaped” rings that cannot be sized up by stretching. Stretching of up to one full finger size is possible with seamless wedding bands but not with bands made from wire. Umicore’s half-round wire exhibits a full tiffany shape with minimal flat-side on its edge. This wire configuration is more difficult to shape but the end result is worth the effort, as it matches the shape of the ring more closely. Both you and your customer will appreciate the difference! Wire is available in 12 inch straight lengths; coils are available through custom order. See the Technical Tips section of this catalogue for more details.

SILVER HALF ROUND WIRE	
DIMENSIONS (height x width) (mm / in.)	Sterling Silver
0.50 x 1.0 / 0.020 x 0.039	☺
0.75 X 1.5 / 0.030 x 0.059	☺
1.0 X 1.5 / 0.039 x 0.059	☺
1.0 X 2.0 / 0.039 x 0.079	☺
1.0 X 2.5 / 0.039 x 0.098	☺
1.0 X 4.0 / 0.039 x 0.157	☺
1.0 X 5.0 / 0.039 x 0.197	☺
1.5 X 2.0 / 0.059 x 0.079	☺
1.5 X 2.5 / 0.059 x 0.098	☺
1.5 X 3.0 / 0.059 x 0.118	☺
1.5 X 3.5 / 0.059 x 0.138	☺
1.5 X 4.0 / 0.059 x 0.157	☺
1.5 X 5.0 / 0.059 x 0.197	☺
1.5 X 6.0 / 0.059 x 0.236	☺
1.5 X 7.0 / 0.059 x 0.276	☺
2.0 X 3.0 / 0.079 x 0.118	☺
2.0 X 4.0 / 0.079 x 0.157	☺
2.0 X 5.0 / 0.079 x 0.197	☺
2.0 X 6.0 / 0.079 x 0.236	☺
2.0 X 8.0 / 0.079 x 0.315	☺
☺ Available in 1 - 2 business days (minimums apply)	• Available in 6 - 7 business days (minimums apply)
Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.	

Rectangular (Flat) Wire

Rectangular wire dies are a true test of any diemaker's ability. Ready-Stock™ rectangular wire features parallel sides and corners with the smallest radius, allowing you to achieve a balance between something that is “too sharp to handle” and something that is “too rounded to use”. Another obstacle that we have to overcome is the tendency of rectangular wire to twist or “helix” during production. With Umicore, you are assured flat wire with minimal helixing and the quality finish you expect. Wire is available in 12 inch straight lengths; coils are available through custom order.

See the Technical Tips section of this catalogue for more details.

GOLD RECTANGULAR WIRE						
DIMENSIONS (height x width) (mm / in.)	10KY	10KW	14KY	14KW	18KY	18KW
1.0 X 2.0 / 0.039 x 0.079	■	•	•	•	•	•
1.0 X 2.5 / 0.039 x 0.098	■	•	•	•	•	•
1.0 X 3.0 / 0.039 x 0.118	■	•	■	•	•	•
1.0 X 4.0 / 0.039 x 0.157	■	•	•	•	•	•
1.0 X 4.5 / 0.039 x 0.177	■	•	•	•	•	•
1.0 X 5.0 / 0.039 x 0.197	■	•	•	•	•	•
1.0 X 6.0 / 0.039 x 0.236	■	•	•	•	•	•
1.5 X 2.0 / 0.059 x 0.079	■	■	■	■	•	•
1.5 X 2.5 / 0.059 x 0.098	■	■	•	•	•	•
1.5 X 3.0 / 0.059 x 0.118	■	■	■	■	•	■
1.5 X 4.0 / 0.059 x 0.157	■	■	■	■	■	■
1.5 X 5.0 / 0.059 x 0.197	■	■	■	■	•	•
1.5 X 6.0 / 0.059 x 0.236	■	■	■	•	•	•
2.0 X 3.0 / 0.079 x 0.118	■	•	■	■	•	•
2.0 X 4.0 / 0.079 x 0.157	■	•	■	•	•	•
2.0 X 5.0 / 0.079 x 0.197	■	•	■	■	•	•
2.0 X 6.0 / 0.079 x 0.236	■	•	■	■	■	■

■ Available in 1 - 2 business days (minimums apply) • Available in 6 - 7 business days (minimums apply)

Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.

SILVER RECTANGULAR WIRE

DIMENSIONS (height x width) (mm / in.)	Sterling Silver
1.0 x 2.0 / 0.039 x 0.079	■ ■
1.0 x 2.5 / 0.039 x 0.098	■ ■
1.0 x 3.0 / 0.039 x 0.118	■ ■
1.0 x 4.0 / 0.039 x 0.157	■ ■
1.0 x 4.5 / 0.039 x 0.177	■ ■
1.0 x 5.0 / 0.039 x 0.197	■ ■
1.0 x 6.0 / 0.039 x 0.236	■ ■
1.0 x 7.0 / 0.039 x 0.276	■ ■
1.0 x 8.0 / 0.039 x 0.315	■ ■
1.5 x 2.0 / 0.059 x 0.079	■ ■
1.5 x 2.5 / 0.059 x 0.098	■ ■
1.5 x 3.0 / 0.059 x 0.118	■ ■
1.5 x 3.5 / 0.059 x 0.138	■ ■
1.5 x 4.0 / 0.059 x 0.157	■ ■
1.5 x 5.0 / 0.059 x 0.197	■ ■
1.5 x 6.0 / 0.059 x 0.236	■ ■
2.0 x 3.0 / 0.079 x 0.118	■ ■
2.0 x 3.5 / 0.079 x 0.138	■ ■
2.0 x 4.0 / 0.079 x 0.157	■ ■
2.0 x 4.5 / 0.079 x 0.177	■ ■
2.0 x 5.0 / 0.079 x 0.197	■ ■
2.0 x 6.0 / 0.079 x 0.236	■ ■
2.5 x 4.0 / 0.098 x 0.157	■ ■
2.5 x 6.0 / 0.098 x 0.236	■ ■

■ ■ Available in 1 - 2 business days (minimums apply)

Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.

Square Wire

Umicore's Ready-Stock™ square wire exhibits the perfect balance between crisp 90° corners and corners with just enough relief to prevent breakage. This quality allows you to start your creations with the sharpness you need and the ability to soften them as desired. Wire is available in 12 inch straight lengths; coils are available through custom order. Please note our 19K white is only available in soft temper.

See the Technical Tips section of this catalogue for more details.

GOLD SQUARE WIRE									
DIAMETER (mm/in.)	10KY	10KW	14KY	14KW	14KD	18KY	18KW	18KW-Pd	19KW
1.5 / 0.059	•	•	■	•	•	•	•	•	•
2 / 0.079	■	■	■	■	•	■	■	•	•
3 / 0.118	■	■	■	■	•	■	■	■	■
4 / 0.157	■	■	■	■	■	■	■	■	■
5 / 0.197	•	•	■	•	•	•	■	•	•
6 / 0.236	■	•	■	■	•	•	•	■	•

■ Available in 1 - 2 business days (minimums apply) • Available in 6 - 7 business days (minimums apply)

Other Custom Sizes Available. Please contact our Customer Service Department for all other sizes and delivery time.

SILVER SQUARE WIRE	
DIAMETER (mm/in.)	Sterling Silver
0.75 / 0.030	■
1 / 0.039	■
1.25 / 0.049	■
1.5 / 0.059	■
1.75 / 0.069	■
2 / 0.079	■
2.5 / 0.098	■
2.75 / 0.108	■
3 / 0.118	■
4 / 0.157	■
5 / 0.197	■
6 / 0.236	■

■ Available in 1 - 2 business days (minimums apply)

Other Custom Sizes Available. Please contact our Customer Service Department

ANTI-TARNISH SILVER SQUARE WIRE		
DIAMETER (mm/in.)	B & S GAUGE	Anti-Tarnish Silver
1.5 / 0.059		■
2 / 0.079	12	■

■ Available in 1 - 2 business days (minimums apply)

Other Custom Sizes Available. Please contact our Customer Service Department

PLATINUM SQUARE WIRE		
DIAMETER (mm/in.)	B & S GAUGE	90W
2 / 0.079	12	■
3 / 0.118		■
4 / 1.157		■

■ Available in 1 - 2 business days (minimums apply)

Other Custom Sizes Available. Please contact our Customer Service Department

Umicore's standard nickel white alloys are all Grade 1 on the World Gold Council whiteness index. Specifically for square wires Umicore also carries other nickel white alloys that exhibit a superior ease of working and are especially well suited for traditional metal working techniques. These alloys are Grade 2 on the whiteness index. They are available by custom order. Please contact us for your requirements.



Umicore's Ready-Stock™ findings consist of butterflies and posts made using our own quality plate and wire stock. Each butterfly carries our traditional IRSCO stamp as well as a stamp to warranty the karated metal.

Findings

Our butterflies are stamped with consistent hole diameter and matching of both “pinching curls” to securely fit over the associated post. Quality control tests are routinely conducted to ensure that the assemblies of all Umicore posts and butterflies have the strength to hold together.

Umicore posts are precisely shaped with a rounded “bullet nose” and notch for comfort and safety. Tight control of the wire diameter and the size and depth of the safety notch also ensure secure matching of the post and its related butterfly.

GOLD AND SILVER BUTTERFLIES					
PART NO.	10KY	10KW	14KY	14KW	Sterling Silver
A17					
A18					

Available in Ready-Stock Please note: Minimum order is 24 pieces.

GOLD POSTS					
PART NO.	10KY	10KW	14KY	14KW	Sterling Silver
7538					

Available in Ready-Stock Please note: Minimum order is 24 pieces.

Findings



Ring Tube

Starting with vertical continuous cast tube, we combine swaging, plug drawing, bright annealing, quench annealing and state of the art straightening to provide consistent wall thickness and a bright die drawn finish on both ID and OD surfaces.

The tube is the optimal feed stock for ring blanks, finished ring CNC protocol and broad industrial applications.

Available in a variety of white, yellow, red and green karat gold alloys, sterling silver, Arctic Fox™ anti-tarnish silver, platinum and palladium.

Please note that Ring Tube is only available by custom order.

Ring Tube



Resilient Elegance

Explore Umicore's Arctic Fox™ Anti-Tarnish Silver Grain, Tube, Wire and Plate

This complete range of Arctic Fox™ products allows you to create timeless jewellery that fully exploits the pristine elegance of silver.

The exceptional 92.7% silver content bestows on them a feeling of exclusive luxury.

Arctic Fox™ anti-tarnish silver products are available from stock through our Ready-Stock™ program.



Arctic Fox™ Anti-Tarnish Silver



Umicore’s sustainable development approach comes in first instance from The Umicore Way.

Umicore’s sustainable development approach comes in first instance from The Umicore Way. This document sets out the vision of the Group and the values we seek to promote and serves as a reference point for all our employees. Supplementary to The Umicore Way, we have also developed a comprehensive framework for ethical business practice through our Code of Conduct and a document which sets out our management philosophy and governance principles -the Corporate Governance Charter.

Further detailed information can be found by clicking on the following link:

<http://www.sustainabledevelopment.umicore.com>. Umicore believes that success depends upon creating and maintaining a relationship of trust and professionalism with its main stakeholders namely its employees, commercial partners, shareholders, government authorities and the public. In 2012 Umicore has been rated one of the most ethical companies in the world and one of the 100 most sustainable corporations. Umicore wants to produce Materials for a Better Life. All manufacturing sites of the business unit Jewellery and Industrial Metals are therefore ISO14001 (environment) certified and certified members of the Responsible Jewellery Council. In addition to this, our jewellery products for the North American market comply with the most strict guidelines with respect to jewellery for children.

IMPURITY LEVELS FOR ALL JEWELLERY PRODUCTS		
NICKEL	LEAD	CADMIUM
100 ppm (For alloys without nickel as alloying element)	50 ppm	50 ppm

The minimum and maximum amount of cold-working that metal can be subjected to prior to annealing are critical features associated with successful processing of precious metal alloys. Insufficient deformation and over-annealing can cause excessive grain growth and “orange peel” defects. Over-working can cause stress cracking.

Fabricated Product Only

COLD-WORKING REDUCTION SCHEDULE				
TEMPER	INCREASE IN B&S GAUGE	PLATE REDUCTION IN THICKNESS	ROUND WIRE REDUCTION IN DIAMETER	ROUND WIRE REDUCTION IN AREA
Soft	0	0.00%	0.00%	0.00%
1/4 Hard	1	10.9%	10.9%	20.7%
1/2 Hard	2	20.7%	20.7%	37.1%
3/4 Hard	3	29.4%	29.4%	50.1%
Hard	4	37.1%	37.1%	60.5%
Extra Hard	6	50.1%	50.1%	75.1%
Spring	8	60.5%	60.5%	84.4%
Extra Spring	10	68.6%	68.6%	90.2%
Special Spring	12	75.1%	75.1%	93.8%
Maximum Cold-Work Yellow Gold Plate	20	89.9%		

COLD-WORKING & ANNEALING SPECIFICATIONS			
KARAT	COLOUR	% COLD WORK	NOTES & ANNEALING TEMPERATURES
10K	Yellow	70 - 90%	Anneal all at 700C/1292F, Furnace cool reducing atmosphere
14K	Yellow	70 - 90%	Anneal all at 700C/1292F, Furnace cool reducing atmosphere
18K	Yellow	70 - 90%	Anneal all at 700C/1292F, Furnace cool reducing atmosphere
10K	Nickel-White	60 - 75%	Cold work soft materials at least 60% before annealing to help avoid fire cracking. Anneal all at 800C/1472F , Water quench
14K	Nickel-White	60 - 75%	Cold work soft materials at least 60% before annealing to help avoid fire cracking. Anneal all at 800C/1472F , Water quench
18K	Nickel-White	60 - 75%	Cold work soft materials at least 60% before annealing to help avoid fire cracking. Anneal all at 800C/1472F , Water quench
14D	Palladium-White	60 - 75%	Anneal all at 800°C / 1472°F, quench at 750°C / 1382°F
18D	Palladium-White	60 - 75%	
Pt10lr	White	70 - 90%	Anneal at 1000° - 1100°C / 1832° - 2012°F
Pt5Ru	White	70 - 90%	Anneal at 1000° - 1100°C / 1832° - 2012°F
Pt5HTA	White	40 - 50%	Anneal at 1000° - 1100°C / 1832° - 2012°F with quench
Sterling Silver	White	70 - 90%	Anneal at 650° 700°C / 1202° - 1292°F

ALLOY WEIGHT CONVERSIONS

METAL ON HAND	Pt10lr	Pt5Ru	95PtHTA	24K	22K	18K	18D	14K	14D	10K	FINE SILVER	STERLING SILVER
Pt10lr	1.00	0.96	0.89	0.90	0.83	0.72	0.73	0.60	0.66	0.53	0.49	0.48
Pt5Ru	1.04	1.00	0.93	0.93	0.86	0.75	0.76	0.63	0.69	0.56	0.51	0.50
95PtHTA	1.12	1.08	1.00	1.00	0.93	0.80	0.82	0.68	0.74	0.60	0.55	0.54
24K	1.12	1.07	1.00	1.00	0.92	0.80	0.82	0.67	0.74	0.60	0.54	0.54
22K	1.21	1.16	1.08	1.08	1.00	0.87	0.89	0.73	0.80	0.65	0.59	0.58
18K	1.39	1.34	1.24	1.25	1.15	1.00	1.02	0.84	0.92	0.74	0.68	0.67
18D	1.36	1.31	1.22	1.22	1.13	0.98	1.00	0.82	0.90	0.73	0.66	0.66
14K	1.66	1.59	1.48	1.49	1.37	1.19	1.22	1.00	1.09	0.88	0.81	0.80
14D	1.51	1.46	1.35	1.36	1.25	1.09	1.11	0.91	1.00	0.81	0.74	0.73
10K	1.87	1.80	1.67	1.68	1.55	1.35	1.38	1.13	1.24	1.00	0.91	0.90
FINE SILVER	2.05	1.97	1.83	1.84	1.69	1.47	1.50	1.24	1.35	1.09	1.00	0.99
STERLING SILVER	2.08	2.00	1.86	1.86	1.72	1.49	1.53	1.25	1.37	1.11	1.01	1.00
BRASS	2.60	2.49	2.32	2.33	2.14	1.86	1.90	1.57	1.71	1.38	1.27	1.25
WAX	22.67	21.80	20.27	20.27	18.75	16.00	16.68	13.80	14.93	12.01	11.01	10.90

B&S GAUGE CONVERSION

B&S GAUGE	MILLIMETERS	INCHES DECIMAL	INCHES FRACTION	B&S GAUGE	MILLIMETERS	INCHES DECIMAL	INCHES FRACTION	B&S GAUGE	MILLIMETERS	INCHES DECIMAL	INCHES FRACTION
1	7.348 mm	.2893"			3.175 mm	.1250"	1/8"	19	0.912 mm	.0359"	
2	6.543 mm	.2576"		9	2.906 mm	.1144"		20	0.812 mm	.0320"	
	6.350 mm	.2500"	1/4"		2.778 mm	.1094"	7/64"		0.795 mm	.0313"	1/32"
	5.953 mm	.2344"	15/64"	10	2.588 mm	.1019"		21	0.723 mm	.0285"	
3	5.827 mm	.2294"			2.381 mm	.0937"	3/32"	22	0.642 mm	.0253"	
	5.556 mm	.2187"	7/32"	11	2.304 mm	.0907"		23	0.573 mm	.0226"	
4	5.189 mm	.2043"		12	2.052 mm	.0808"		24	0.511 mm	.0201"	
	5.154 mm	.2031"	11/64"		1.984 mm	.0781"	5/64"	25	0.455 mm	.0179"	
	4.762 mm	.1875"	3/16"	13	1.828 mm	.0720"		26	0.405 mm	.0159"	
5	4.621 mm	.1819"		14	1.628 mm	.0641"			0.396 mm	.0156"	1/64"
	4.366 mm	.1719"	11/64"		1.588 mm	.0625"	1/16"	27	0.360 mm	.0142"	
6	4.115 mm	.1620"		15	1.449 mm	.0571"		28	0.321 mm	.0126"	
	3.969 mm	.1562"	5/32"	16	1.291 mm	.0508"		29	0.286 mm	.0113"	
7	3.664 mm	.1443"			1.191 mm	.0469"	3/64"	30	0.255 mm	.0100"	
	3.572 mm	.1406"	9/64"	17	1.149 mm	.0453"					
8	3.263 mm	.1285"		18	1.024 mm	.0403"					

GIVEN	REQUIRED	*OR/	FACTOR
WEIGHT			
dwt	grams	multiply	1.5552
dwt	kg	divide	643.004
Dwt	oz	divide	20
grams	dwt	divide	1.5552
grams	kg	divide	1000
grams	oz	divide	31.1035
kg	dwt	multiply	643.004
kg	grams	multiply	1000
kg	oz	multiply	32.1035
oz	dwt	multiply	20
oz	grams	multiply	31.1035
oz	kg	divide	32.1507
\$/Unit Weight			
\$/dwt	\$/grams	divide	1.5552
\$/dwt	\$/kg	multiply	643.004
\$/dwt	\$/oz	multiply	20
\$/grams	\$/dwt	multiply	1.5552
\$/grams	\$/kg	multiply	1000
\$/grams	\$/oz	multiply	31.1035
\$/kg	\$/dwt	divide	643.004
\$/kg	\$/grams	divide	1000
\$/kg	\$/oz	divide	32.1507
\$/oz	\$/dwt	divide	20
\$/oz	\$/grams	divide	31.1035
\$/oz	\$/kg	multiply	32.1507
Length			
mm	cm	divide	10
mm	metres	divide	1000
mm	inches	divide	25.4
mm	feet	divide	304.8
cm	mm	multiply	10
cm	metres	divide	100
cm	inches	divide	2.54
cm	feet	divide	30.48
metres	mm	multiply	1000
metres	cm	multiply	100
metres	inches	multiply	39.37
metres	feet	divide	0.3048
inches	mm	multiply	25.4
inches	cm	multiply	2.54
inches	metres	divide	39.37
inches	feet	divide	12
feet	mm	multiply	304.8
feet	cm	multiply	30.48
feet	metres	multiply	0.3048
feet	inches	multiply	12



Metallic Refining Services

Gold	3-Day or 7-Day Settlements
Silver	2-Week Settlement
Platinum Group Metals (PGM)	4-Week Settlement
Dental Alloys	4-Week Settlement

Stone Recovery

Recovery of precious stones and refining of gold and silver from jewellery.

Sweeps Refining Services

Gold/Silver	12 Day or 4 Week Settlements
PGM	6-Week Settlement

Assay Services

Fire Assay, Silver Titration, Gravimetric, Atomic Absorption, ICP

Return Options

- Ready-Stock™ Catalogue Products
- Custom Products
- Fine Metal
- Payment By Cheque or Wire Transfer
- Credit to Your Account (towards product or Accounts Receivable)
- Credit to Consignment (to be returned as product, fine metal or sold at a future market price)
- Investment Bars

Services

The constant pursuit of exceptional customer service consists of much more than a catchy advertising headline or a flashy sales brochure. It's a philosophy...a commitment...a code of ethics...that a company lives by every day at every level in everything it does.

At Umicore, we've adopted a policy of continuous improvement because we're not content to settle for something that is just "good enough". We believe there's always room for improvement, and we want to do an even better job to achieve the highest level of quality and service that is possible.

We trust this ongoing dedication to serving your needs with quality; reliability and integrity will continue to deserve your loyalty and trust.

At Umicore, we're committed to providing superior customer service and to offering the most technologically advanced products in the industry.

Feel free to put us to the test for quality, service and value for all your precious metal needs. Our goal is to exceed your expectations at every opportunity!

FULL METAL DESCRIPTION LEGEND				
10KY = 10K Yellow Gold	10KW = 10K White Gold	14KY = 14K Yellow Gold	14KW = 14K White Gold	14KW-Pd = 14K Palladium-White
18KY = 18K Yellow Gold	18KW = 18K White Gold	18KW-Pd = 18K Palladium-White	19KW = 19K White Gold	90W = 90/10 Platinum-Iridium
SSW = Sterling Silver FSW = Fine Silver SSA = Anti-Tarnish Silver Fine PD = Fine Palladium				

When ordering by Full Description, your order will look like this:

PRODUCT	KARAT	COLOUR	DIMENSIONS	QUANTITY**
Half-round wire	10K	Yellow	2.00 x 4.00 mm	15 cm

Shipping Information

Whether you're ordering by phone, fax or e-mail, most Ready-Stock™ items are shipped the same-day if the order is received before 3:00PM EST (except Friday, received before 1pm). Orders received after 3:00PM EST (Fridays after 1pm) are shipped the following business day. Annealing and coiling or spooling of our wire products may require an additional day. When an order notes mixed priority delivery—some items marked same-day and other items marked next-day—you can either "split your order" to receive individual items as soon as possible, or choose to have the entire order "shipped complete". In an effort to save you multiple shipping charges, in the event an item is out of stock, Umicore's standard practice is to ship mixed priority orders complete. Please specify your particular preference at the time of ordering. Your Ready-Stock™ order will be shipped via any of our approved courier services with whom we have established security and discounted rates throughout North America.

Customer Care

PRODUCT TERMS AND CONDITIONS OF SALE

1. Entire Agreement. The terms and conditions (collectively “Terms”) set forth herein govern the sale of the products by Umicore Precious Metals Canada Inc., Imperial Smelting and Refining Company of Canada Ltd. and/or Umicore Precious Metals USA Inc. (the “Seller”) (the “Products”) and any written or verbal sales contract by the Seller for the Sale of Products (“Contract”) is expressly made conditional on Buyer’s assent to these Terms to the exclusion of all other terms. Contracts, together with these Terms, constitute the sole, entire and exclusive agreement between Buyer and Seller for the sale of the Products and supersedes all prior discussions, proposals, negotiations, representations and agreements. Seller objects to and will not be bound by any additional, different or inconsistent terms in Buyer’s purchase order or other documents from Buyer, and shipment or delivery pursuant to a purchase order of Buyer that contains additional, different or inconsistent terms does not constitute acceptance of such terms. No terms, conditions, understandings or agreements purporting to waive, modify, or vary these Terms will be binding unless made in accordance with section 14 below.

2. Prices. The price of the Products is based on actual weights, precious metal content of materials and on e of the following precious metal markets, unless otherwise agreed to between Buyer and Seller, plus surcharges: (i) account customers (custom and Ready-Stock™): precious metal markets in effect on the next business day after the order is shipped (ii) C.O.D. customers: (a) custom orders: precious metal markets in effect on the business day the order is shipped, (b) Ready-Stock™: precious metal market in effect at the time of order entry. The price of the Products includes charges for manufacturing, alloying, processing, set-up, engineering, packaging and any other directly attributed costs and profit allowances. The price of the Products is subject to change to the price in effect at the time of each delivery of Products (as specified in section 4 below). Any sales or other tax or duty which Seller may be required to collect or pay upon the sale of Products will be added to the price of the Products and will be paid by Buyer.

3. Payment. Following each delivery of Products, Seller shall submit invoices to Buyer stating amounts due. Unless otherwise specified in the Contract, payment of all invoices is due in full within 30 days of the statement, which is issued on the last day of the month for all shipments during that month. Overdue accounts are subject to a late payment charge at prevailing interest rates. Any claim concerning invoice amounts shall be made within ten (10) business days from the date of receipt of invoice by Buyer, or shall be deemed void. If at any time Seller becomes insecure about Buyer’s ability to perform under this Contract, Seller may in writing demand from Buyer adequate assurance of Buyer’s ability to perform, and Seller may, at Seller’s option, suspend delivery of Products until Seller has received such assurance from Buyer in writing, or may require cash or other security before delivery of Products to Buyer. In addition to any other legal remedy, if Buyers fails to fulfill the terms of payment or is in default with respect to any other Term, Seller may, at its option, cancel all further deliveries of Products to Buyer. Buyer agrees to pay all costs and expenses, including reasonable attorneys’ fees, incurred by Seller in the collection of any sum due Seller from Buyer.

4. Delivery, Shipment, and Packing. Unless otherwise agreed in writing, all Products shall be sold and delivered DDP Delivered Duty Paid (Incoterms 2010) Buyer’s factory. Title and risk of loss shall pass to Buyer simultaneously with delivery. Seller shall pack and mark the Products according to its standard procedures for domestic and/or export delivery. Should Seller be unable to meet the delivery schedule specified, Seller shall notify Buyer and shall have no liability to Buyer therefore. Buyer assumes all risk and liability for, and hereby agrees to indemnify Seller from and against, all losses, liabilities, damages and claims whatsoever (whether for personal injury, property damage or otherwise), arising out of the transportation, unloading, storage, handling or use of any Products after title passes to Buyer.

5. Warranty Terms. All Products are warranted to the original Buyer only at the time of delivery to conform to drawings and specifications mutually agreed upon in writing. Seller’s sole obligation, and Buyer’s exclusive remedy under the Contract is for Seller, at Seller’s option, to repair or replace defective Products or refund Buyer’s purchase price for any Product which fails to meet this warranty. This warranty does not apply to Products (i) which have been subjected to misuse, negligence, accident, or improper maintenance, installation, or application; (ii) which have been repaired or altered without Seller’s prior written consent; or (iii) which, based on Seller’s examination, do not disclose to Seller’s satisfaction non-conformance to this warranty. This warranty expires thirty (30) days after the date of delivery of the warranted Products. Before returning any Product covered by this warranty, Buyer must obtain a return authorization from Seller, which will be valid for thirty (30) days from the date of Seller’s issuance, provided that Seller receives the returned Product within the 30-day period. Buyer must prepay all freight, however, Seller will issue Buyer a credit for all reasonable freight for the foregoing purpose where Seller determines that nonconforming Product has been delivered. All risk of loss and damage to any item returned to the Seller under this Section 5. shall remain with the Buyer until receipt of the item by the Seller.

SELLER DISCLAIMS AND EXCLUDES ALL OTHER EXPRESS WARRANTIES AND ALL IMPLIED WARRANTIES IN CONNECTION WITH THE SALE OR USE OF THE PRODUCTS, WHETHER ARISING BY OPERATION OF LAW, COURSE OF DEALING OR USAGE OF TRADE, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

6. LIMITATION OF LIABILITY. The total liability of Seller with respect to the Products or otherwise arising in connection with the Contract, whether such liability is based on contract, warranty, negligence, strict liability, or otherwise, shall not exceed the purchase price of the Products in respect of which any claim is made. SELLER WILL IN NO EVENT BE LIABLE FOR LOSS OF PROFITS OR FOR ANY SPECIAL, INCIDENTAL, INDIRECT, PUNITIVE OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE DELIVERY, NON-DELIVERY, SALE, RESALE, OR USE OF THE PRODUCTS, WHETHER BASED ON CONTRACT, WARRANTY, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE. The Seller will make commercially reasonable efforts to meet the delivery date, however, such date is an estimate only and in no circumstances shall the Seller be liable for any loss of value, direct, indirect or consequential, sustained by the Buyer through market fluctuations or any other cause whatsoever arising out of late delivery or trading of metal by the Seller.

7. Product Changes. Seller agrees to notify Buyer of relevant changes in the design or specifications of Products, or of any decision to discontinue Products during the period covered by the Contract. Seller shall have no liability to Buyer for any costs, lost profits, or other damages resulting from any such design or specification change or Product discontinuance. If Buyer desires Product changes, Buyer shall submit a written request to Seller for consideration. Within a reasonable period thereafter, Seller shall notify Buyer of its acceptance or rejection of Buyer's request. If accepted, Seller shall provide Buyer with its charges for the Product change and a proposed implementation date.

8. Patents. Seller shall defend and indemnify Buyer against any claims or liabilities based on alleged patent infringement by reason of the sale or normal use of Products, provided Seller is promptly notified in writing of such claim of infringement and given full authority for the defense of such action. If Products are to be prepared or manufactured according to Buyer's specifications, Buyer shall defend and indemnify Seller against any claims or liabilities for patent or trademark infringement on account of Seller's preparation, manufacture and sale of such Products.

9. Technical Information. Neither Buyer nor Seller shall assert any claim against the other with respect to any technical information which has been or may hereafter be disclosed to the other in connection with the sale of Products, except claims for patent infringement as provided in section 8 above.

10. Government Approvals. Seller and Buyer, respectively, shall be responsible for compliance with and for obtaining such approvals and/or permits as may be required under national, state/provincial, and local laws, ordinances, regulations, and rules as may be applicable to the performance of their respective responsibilities and obligations under the Contract.

11. Force Majeure. Any delay or failure of Seller to perform its obligations under the Contract shall be excused to the extent such delay or failure is caused by an event or occurrence beyond Seller's reasonable control, such as, by way of example and not limitation, acts of God, acts of any governmental authority (whether valid or invalid), fires, floods, severe weather, explosions, riots, natural disasters, wars, sabotage, terrorism, embargoes, labour problems (including lockouts, strikes, and slowdowns) at Seller's facility or its source plants' or suppliers' facilities, or inability to obtain or delay in obtaining power, material, equipment, transportation or other critical materials and services.

12. Assignment. Neither Buyer nor Seller may assign any of its rights or obligations under the Contract without first obtaining the written consent of the other; provided, however, that Seller has the right to assign any of its rights or obligations under the Contract to any divisions, subsidiaries or affiliates.

13. Governing Law. All Contracts shall be governed by and construed under the laws of the State of North Carolina without regard to its conflicts of laws principles. Buyer and Seller agree that the United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Contract. Any lawsuit arising in connection with a Contract must be brought in the state or federal court sitting in Wake County, North Carolina.

14. Amendments. No amendment or modification to the Contract shall be binding upon either party unless it is in writing and is signed by both parties.

15. Severability. If any provision of this Contract is held to be invalid or unenforceable, that provision shall be valid and enforceable to the maximum extent permissible and the remaining provisions of the Contract shall be given full force and effect. Section headings here are for convenience of reference only and shall not affect the construction or interpretation of these Terms.

16. Waiver. Either party's failure to insist on strict compliance with any provision of the Contract in any instance shall not be deemed a waiver of that party's right to insist on strict compliance in any other instance. If an action by either party requires the consent or approval of the other, such consent or approval on any one occasion shall not be deemed consent or approval on a subsequent occasion or to any other action.

17. Cancellation. The Contract may not be cancelled by Buyer in whole or in part without Seller's written consent and payment to Seller of a sum sufficient to cover (a) the price in effect at time of delivery for all Products delivered, and the price in effect at time of cancellation for all Products ready for delivery; (b) the costs of work-in-process and raw materials incurred by Seller, its subcontractors or suppliers; and (c) the costs associated with development and engineering of the Products, including, but not limited to, tooling, facilitization, foreign exchange, and interest, to the extent such costs are properly allocable or apportionable under generally accepted accounting principles.

Within one hundred twenty (120) days from a notice of cancellation by Buyer, Seller shall submit documentation of the prices and costs described in (a), (b), and (c) above sufficient to permit Buyer's audit. Buyer shall have thirty (30) days in which to audit Seller's documentation and to request in writing any additional information from Seller reasonably necessary to support Seller's costs. Within ten (10) days after receiving the additional information, if any, requested of Seller, Buyer shall pay Seller in accordance with this section 17.

18. Updates. These Terms are valid as of 18 June 2012 and are subject to change. Updates are available on our website www.umicorepreciousmetals.com.

REFINING STANDARD TERMS AND CONDITIONS

THIS CONSTITUTES THE STANDARD TERMS AND CONDITIONS BY WHICH UMICORE PRECIOUS METALS CANADA Inc./IMPERIAL SMELTING & REFINING CO. OF CANADA LTD./UMICORE PRECIOUS METALS USA INC. ("REFINER") PERFORMS REFINING SERVICES FOR CUSTOMER(S). NO AMENDMENTS OR ADDITIONS SHALL BE BINDING ON THE REFINER UNLESS AGREED TO IN WRITING BY AN AUTHORIZED REPRESENTATIVE OF THE REFINER. IN ADDITION THE REFINER IS NOT BOUND BY ANY TERMS AND CONDITIONS OF THE CUSTOMER'S PURCHASE ORDERS OR ANY OTHER FORMS WHERE THEY ARE AT VARIANCE WITH THE TERMS AND CONDITIONS CONTAINED HEREIN.

1. General. The terms and conditions set forth below shall constitute the sole, complete and exclusive agreement between Refiner and Customer and shall not be modified or waived, except by written agreement by an authorized representative of the Refiner. All other terms, conditions, warranties, acceptances or other communications between Refiner and Customer are considered null and void to the extent they conflict with the terms and conditions set forth herein.

2. Environment, health and safety. All material shipped to the Refiner must comply with D.O.T. and W.H.M.I.S. (for transport in Canada) and W.H.M.I.S., D.O.T. and R.T.K. (for transport in the USA) and other relevant regulations. The Customer shall not deliver material that is corrosive, explosive, flammable, radioactive, bio-hazardous, carcinogenic, hazardous, toxic or contain any of the following: chlorine, bromine, fluorine, selenium, mercury, arsenic, cadmium, tellurium, or plastic (compounds) etc. Should packaging be visibly damaged (oil or liquid soaked cardboard, tear or rip through container, cracked plastic container) when received, it will be quarantined and the customer contacted before opening to ensure contents have not been adversely affected during transit. Should a strong acidic or ammonia odour be noticed when the outer or inner package is opened, then the customer will be contacted before processing begins. All powder / dust lots are to be packaged in an inner sealed container to prevent unintended release of dust when the outer package is opened. All cost and liabilities arising out of the delivery of such material shall be the responsibility of the Customer.

3. Warranty. The Customer warrants that it is the sole legal beneficial owner of the material free from all liens, charges and encumbrances or other adverse rights or interests whatsoever and shall hold Refiner harmless from any and all suits, judgments or damages based upon a claim by third parties to the contrary.

4. Delivery. Refiner will make commercially reasonable efforts to meet the settlement date, however, such date is an estimate only and in no circumstances shall the Refiner be liable for any loss of value, direct, indirect or consequential, sustained by the customer through market fluctuations or any other cause whatsoever arising out of late settlement or trading of metal by Refiner.

5. Conditions of Purchase/Credit and Sale. The Customer is advised to provide written instructions to the Refiner by using the refining packing slip which is available on our websites. In case of verbal instructions the Refiner's records will be valid. Unless otherwise pre-agreed in writing standard pricing (including any applicable retentions, holding, storage, disposal, administration, handling, preparation or other charges) will apply. Pricing may be subject to change. Pricing information is available from our customer service team (contact details on our website). The Refiner reserves the right to determine the appropriate processing, sampling and assay techniques and procedures to evaluate contents of individual lots. The Refiner reserves the right to refuse the lot for refining upon inspection and analysis of the full lot, irrespective of any previously analyzed samples. Unless otherwise pre-agreed the Refiner's sample, processing, sampling and assay techniques and procedures will be used to determine the fine metal content and settlement amounts. Unless otherwise pre-agreed the Refiner reserves the right to process all material once sampling is complete. In case the customer desires to take back the material prior to refining, the Refiner reserves the right to charge for all services provided up to that point. The Refiner reserves the right to deduct refining charges and other appropriate charges and premiums from settlement amounts and hold consignment material pending receipt of assaying, refining and other charges. Interest charges are applicable on overdue accounts. The Annex to the Refining Standard Terms and Conditions, available on our website, details procedures for refining discrepancies and is part of this document. All inbound shipments are DDP Markham, ON (Incoterms 2010). Insurance, handling, freight, duty and taxes or any other charges on shipments will be charged to the account of the sender (originator – owner) of the material, unless otherwise mutually agreed to in writing.

6. Payment. Payment of all invoices is due in full within 30 days of the statement, which is issued on the last day of the month for all services during that month. Overdue accounts are subject to a late payment charge at prevailing interest rates. Any claim concerning invoice amounts shall be made within ten (10) business days from the date of receipt of invoice by Buyer, or shall be deemed void. If at any time Seller becomes insecure about Customer's ability to perform under this contract, Refiner may in writing demand from customer adequate assurance of customer's ability to perform, and Refiner may, at Refiner's option, suspend delivery of services until Refiner has received such assurance from Customer in writing, or may require cash or other security before delivery of services to Customer. In addition to any other legal remedy, if Customer fails to fulfill the terms of payment or is in default with respect to any other term, Refiner may, at its option, cancel all further deliveries of services to Customer. Customer agrees to pay all costs and expenses, including reasonable attorneys' fees, incurred by Refiner in the collection of any sum due by Customer to Refiner.

7. Limitation of Liability. IN NO EVENT SHALL REFINER BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES (WHETHER ARISING IN WARRANTY, CONTRACT, NEGLIGENCE, STRICT LIABILITY, ABSOLUTE LIABILITY, ACTUAL OR IMPUTED TORT, PATENT INFRINGEMENT OR OTHERWISE) including, but not limited to, loss of profits or revenue, loss of use of the item(s) delivered, loss of use of fine metal or cash/cheque (monies) received, cost of capital, or claims of clients of the Customer for such other damages, whether on account of any nonconformance or defect in any items furnished hereunder or delays in delivery thereof or services performed thereon or any other nonconformance by Refiner. Refiner's liability on any claim, whether in contract, negligence, actual or imputed, strict liability, absolute liability, tort or otherwise for any loss or damage arising out of, connected with, or resulting from this contract or the performance or breach thereof, or from the design, manufacture, sale, delivery, resale, repair, replacement, installation, inspection, operation or use of any items covered by or furnished under this contract shall in no case exceed the aggregate refining charges actually paid by the Customer to the Refiner in regard to the material or metals which give rise to this claim.

8. Force Majeure. The Refiner is not liable for loss from causes beyond its reasonable control. This includes actions by any provincial, federal, state or local government or any department or agency thereof; acts of God, natural disasters, fires, strikes, lockouts, embargoes, wars, riots, shortages in materials and labour, transportation, utilities and other critical materials and services. In the event of a delay due to these reasons, the date of delivery may be extended by a similar amount of time that is reasonable to compensate for the delay.

9. Applicable Law. All contracts and these terms and conditions shall be governed by and construed under the laws of the State of North Carolina without regard to its conflicts of laws principles. Buyer and Seller agree that the United Nations Convention on Contracts for the International Sale of Goods shall not apply. Any lawsuit arising in connection with a contract or these terms and conditions must be brought in the state or federal court sitting in Wake County, North Carolina.

10. Updates. These terms and conditions are valid as of May 15, 2012 and may be subject to change. Up to date information can be found on our website www.umicorepreciousmetals.com.

Terms & Conditions

METAL ACCOUNT TERMS AND CONDITIONS

1. Entire Agreement. The terms and conditions (collectively “Terms”) set forth herein govern the relationship between Umicore Precious Metals Canada, Inc./ Umicore Precious Metals USA, Inc. (collectively “Umicore”) and each Customer maintaining a metal pool account, weight account, or consignment account (individually, an “Account”). All Account transactions are expressly made conditional on Customer’s consent to these Terms. Umicore objects to and will not be bound by additional, different, or inconsistent terms. These terms constitute the sole, entire, and exclusive agreement between Umicore and Customer regarding the Account and supersede all prior discussions, proposals, negotiations, representations, and agreements.

2. Nature of Account. A separate Account shall be maintained for each Metal, and all obligations and undertakings herein with respect to any Metal shall be computed and performed separately for each Metal. “Metal” shall mean any precious metal, including but not limited to, gold, silver, platinum, palladium, rhodium, iridium, and ruthenium meeting the applicable specifications provided herein. Umicore may credit or debit quantities of Metal to an Account from time to time to reflect any mutually agreed transaction including, without limitation: (i) Umicore’s acceptance (in its discretion following sample, assay, and such other testing as Umicore deems appropriate) or release of Metal delivered by, to, or for, or on behalf of Customer; (ii) Customer’s purchase or sale of Metal from or to Umicore; (iii) a refining settlement with Customer; or (iv) transfer from or to another Account. Upon special arrangement with Umicore, Customer’s Account may reflect a negative balance. For any Account showing a negative balance, Umicore shall in its sole discretion be entitled to declare the negative balance due, set a reasonable period for repayment, and close the account at Customer’s cost. All Account instructions will be confirmed by Umicore in writing, and verbal instructions become binding upon Umicore’s written confirmation. Umicore shall not be liable for damages caused by misunderstandings or miscommunications resulting from verbal communications with Customer. Accounts are not depository or warehousing agreements, and Umicore does not undertake to maintain, identify, or allocate physical inventories for or to any Account. Customer acknowledges that Metal is fungible, and Umicore may deal with Metal in any manner it sees fit, including the commingling, consignment, lease, or disposition thereof subject to the undertakings provided herein.

3. Release of Metal. Umicore will release a quantity of Metal not exceeding the then-current credit balance (or as otherwise agreed by special arrangement) in Customer’s Account following receipt of instructions from Customer’s authorized representative. Any quantity so released will be made available Ex Works the Umicore Facility (or such other location as may be established by mutual agreement). Umicore will release such quantity as promptly as practicable following receipt of Customer’s instruction and, subject to Section 5, within no more than three (3) weeks within receipt of such instruction or as otherwise agreed. Customer may request that a quantity of Metal not exceeding the then-current credit balance in Customer’s Account (or as otherwise agreed by special arrangement) be transferred to the account of a third party or transferred for release to Customer at a location other than the Umicore Facility, and any such transfer shall be subject to the fees and terms then applied by Umicore to such transfers unless otherwise mutually agreed. Umicore may provide packaging, certification of assay, or other services in connection with release of Metal, all subject to the fees and terms then applied by Umicore to such services unless otherwise mutually agreed.

4. Specifications. Metal released from an Account by Umicore on Customer’s instruction shall conform to the following specifications:

Metal	Gold	Silver	Platinum	Palladium	Rhodium	Iridium	Ruthenium
Form*	Bullion	Bullion	Sponge/Grain	Sponge/Grain	Sponge/Powder	Sponge/Powder	Sponge/Powder
Purity**	99.99%	99.90%	99.95%	99.95%	99.90%	99.90%	99.90%

*Where more than one form is listed, Umicore may release Metal in any listed form at its option unless otherwise mutually agreed.

**The credit to an Account, stated in troy ounces or grams, reflects the net weight (fine metal content) of Gold available for release and the gross weight for all other Metals.

5. Force Majeure. Any delays in or any failure of performance by Umicore shall not constitute default or give rise to any claims for damages if and to the extent caused by acts of God, acts of the Customer, acts, rules or regulations of governmental authority (civil or military executive, legislative, judicial, or otherwise), strikes or other concerted acts of workmen, lockout, labor difficulties, fires, floods, storm, accident, epidemics, war, riots, rebellion, sabotage, terrorism, insurrection, difficulties or delays in public transportation or in public or postal delivery services, car shortage, fuel shortage, inability to obtain from Umicore’s usual sources of supply (including disruptions precluding receipt of delivery against supply and futures contracts), inability to obtain suitable or sufficient energy, labor, machinery, facilities, supplies or materials, as and when required, or by any other circumstances beyond Umicore’s reasonable control, whether of a similar or dissimilar nature. Upon the occurrence of any of the following circumstances, Umicore may in its sole discretion elect to allocate its available deliveries, services, materials, or other resources among any or all customers (including Customer, purchasers, and counterparties generally) as well as departments, divisions, subsidiaries, and affiliates of Umicore, upon such basis as Umicore, in its sole discretion, may determine, without liability whatsoever, but shall have no obligation whatsoever to make any such allocation and shall not incur any liability for any failure of performance that may result therefrom.

6. Warranties. Umicore warrants that Metal released hereunder shall conform to the specifications provided In Section 4 above. Umicore's liability for breach of warranty shall be limited to replacing such Metal provided, however, that written notice of such defect or non-conformance is given to Umicore within thirty (30) days of release to Customer of such defective or non-conforming Metal and further provided that Customer shall return the defective or non-conforming Metal to Umicore strictly in accordance with Umicore's written instructions concerning handling, shipping, insurance, and mode of transportation at Umicore's expense. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY LAW OR CUSTOM INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

7. Limitation of Liability. The total liability of Umicore arising out of or relating to the transactions contemplated hereby, whether such liability is based on contract, warranty, negligence, strict liability, or otherwise, shall not exceed the aggregate net quantities of Metal properly credited to Customer's Account. UMICORE WILL IN NO EVENT BE LIABLE FOR LOSS OF PROFITS OR FOR ANY SPECIAL, INCIDENTAL, INDIRECT, PUNITIVE, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE DELIVERY, NON-DELIVERY, SALE, RESALE, USE OF THE METAL, OR PERFORMANCE UNDER THESE TERMS, WHETHER BASED ON CONTRACT, WARRANTY, NEGLIGENCE, STRICT LIABILITY, OR OTHERWISE.

8. Delivery Charges. Except as otherwise mutually agreed, all Metal is released Ex Works the Umicore Facility and all freight, insurance, or other delivery-related charges incurred by Umicore for alternate delivery arrangements at Customer's request will be prepaid or paid by Customer promptly on receipt of Umicore's invoice. Customer assumes all risk and liability for, and hereby agrees to indemnify Umicore from and against, all losses, liabilities, damages, and claims whatsoever (whether for personal injury, property damage, or otherwise), arising out of the transportation, unloading, storage, handling, or use of the Metal after title passes to Customer.

9. Communications and Statements. Account statements will be issued monthly, but no statement need to be issued on zero balance or inactive accounts. Customer should review each statement carefully and advise Umicore promptly of any error or discrepancy. Absent manifest error, books and records pertaining to any Account that are maintained in good faith by Umicore will be presumed accurate and statements (including corrections) issued in good faith by Umicore will be binding upon Customer, notwithstanding errors contained therein, unless Customer provides written notice of the error or discrepancy within sixty (60) days following the date of the applicable statement. Any notice or communication should be sent to 451 Denison St., Markham ON, L3R1B7, Canada. Customer will use reasonable efforts to respond promptly and accurately to requests for balance confirmation made by Umicore or its auditors. Any notice or communication to Customer will be effective upon receipt (actual or deemed) and will be deemed received on the fourth business day following transmittal by first class mail, postage prepaid to the last address provided by Customer.

10. Representations. Customer represents that: (i) Customer is a producer, processor, or commercial user in each Metal or by-product thereof for which it maintains an Account and utilizes its Account solely in connection with such uses or for investment or speculative purposes; (ii) Customer does not and will not assign, pledge, or encumber any Account or deal with any Account or any interest therein or statement thereof in such manner that it constitutes a security or futures contract; (iii) all actions taken by it in connection with any Account are duly and validly authorized and in compliance with applicable laws or regulations; and (iv) Customer will deal with its Accounts solely as a principal. Each individual acting for or on behalf of Customer represents that he or she is a representative of Customer, with full authority to act for Customer in all actions taken by such person for or in the name of Customer.

11. Taxes. Customer shall be liable and pay for any tax or other levy imposed anywhere with respect to the establishment, issuance, sale, transfer, or assignment of an Account or the purchase, sale, or delivery of any Metal credited thereto. Customer shall indemnify Umicore against any payments made by Umicore on account of said tax or levy, whether correctly or incorrectly asserted.

12. Set-Off. If Customer fails to timely pay or perform any other obligation to Umicore, Umicore may in its sole discretion: (A) terminate any and all contracts or other agreements, including but not limited to, all Forward Contracts then in effect with Customer; (B) Value any and all Metal owed or owing under any terminated contractual obligation to or from Customer (whether or not then due) at its fair market value in U.S. Dollars at the close of business New York, New York time on the day of such termination or, if not a business day, then the next business day; (C) Aggregate the value of all obligations to Customer under all terminated contracts (including any payment obligations converted to U.S. Dollars, where necessary, at the exchange rate in effect at the close of business New York, New York time on the day of termination or, if not a business day, then the next business day); (D) Set off the value of all such obligations against the value of all such obligations owing from Customer to Umicore computed on the same basis. The net obligation following exercise of such right of set-off shall be promptly paid in U.S. Dollars.

13. Account Closing. (a) If Customer becomes subject to bankruptcy or insolvency proceedings or admits its inability to pay its debts as they become due, Umicore will close the Customer's Account. If the closed account shows a negative balance, Umicore will issue an invoice to Customer for up to the value of the negative balance in the Account. (b) Umicore may also close the Customer's Account at any time by notice to the Customer specifying the effective date of the closing, which shall be no less than four (4) weeks following the date of the notice. A quantity of Metals equal to the credit balance remaining in any Account on such closing may, at Umicore's sole discretion

be: (i) held for release Ex Works the Umicore Facility; (ii) delivered to Customer's last known address with all freight and insurance charges payable by Customer on delivery; or (iii) purchased by Umicore at its fair market value at the close of business on the business day immediately preceding the effective date of the closing with a check for the net purchase price remitted to Customer within ten (10) days following such purchase.

14. Governing Law. These Terms shall be governed by and construed under the laws of the State of North Carolina without regard to its conflicts of laws principles. Umicore and Customer agree that the United Nations Convention on Contracts for the International Sale of Goods shall not apply. Any lawsuit arising in connection with these Terms must be brought in the state or federal court sitting in Wake County, North Carolina.

15. Compliance with Laws. Customer shall be responsible for compliance with and obtaining such approvals, permits, and licensing as may be required under national, state/provincial, and local laws, ordinances, regulations, and rules as may be applicable to performance under these Terms, and shall indemnify and hold harmless Umicore for Customer's failure to comply.

16. General. Neither Customer nor Umicore may assign any of the rights or obligations under these Terms without first obtaining the written consent of the other; provided, that Umicore has the right to assign any of its rights or obligations to any divisions, subsidiaries, or affiliates. If any provision of these Terms is held to be invalid or unenforceable, then that provision shall be valid and enforceable to the maximum extent permissible, and the remaining provisions of these Terms shall be given full force and effect. Either Party's failure to insist on strict compliance with any provisions herein in any instance shall not be deemed a waiver of that party's right to insist on strict compliance in any other instance. If an action by either part requires the consent or approval of the other, such consent or approval on any one occasion shall not be deemed consent or approval on a subsequent occasion or to any other action.

17. Updates. These terms and conditions are valid March 14, 2014 and may be subject to change. Updates are available on our website at www.umicorepreciousmetals.com.

For inquiries and additional information please contact

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