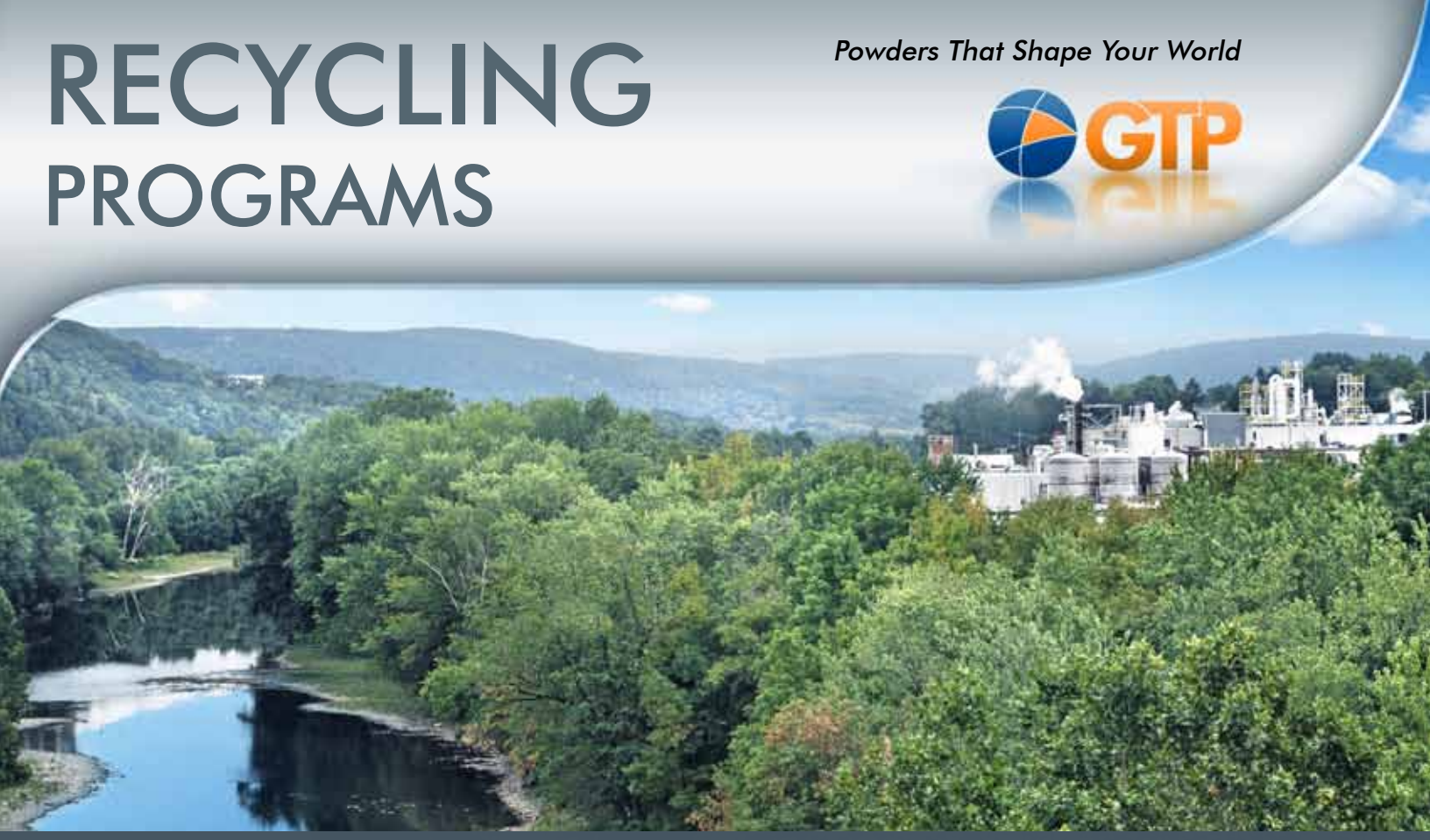
RECYCLING PROGRAMS

Powders That Shape Your World

GTP



At GTP we take our commitment to the environment seriously. We believe recycling is a key component of that responsibility. With recycling in mind, two ideals guide our efforts, preservation of the environment and recovery of critical natural resources. The value of both of these items should not be underestimated. From a business standpoint, recycling helps maintain a stable and secure supply of raw materials. Equally important, GTP believes in preserving our natural surroundings for future generations; the benefit of which speaks for itself. It is GTP's belief that smart business practices and the environment go hand in hand.

GTP has the capability to process:


Grinding Sludge


Large Hard Scrap


Shavings and Turnings


Sweepings and Powder


Used Inserts


Punches and Dies

For 70 years, Global Tungsten & Powders has been manufacturing tungsten powders and specialty products. For more than 40 of those years, GTP has been recycling tungsten based materials. GTP has the capability to recycle hard and soft tungsten scrap using both chemical and zinc reclaim processes.


GTP Headquarters - Towanda, PA, USA
Chemical Recycling

Through our chemical recycling process, we make the old new again. We can take secondary raw material (SRM) and break it down into its key components including tungsten, cobalt, tantalum and nickel sludge. From scrap we produce tungsten chemicals and powders that are indistinguishable from those manufactured using virgin raw material.

In addition to our chemical recycling processs, through our Tikomet location in Jyväskylä, Finland, we have the capability to recycle secondary raw material using the zinc reclaim process. Using the zinc process we produce tungsten based powders, of varying composition, that can be used in the production of ready-to-press grade powders for a wide variety of industries.


GTP Tikomet - Jyväskylä, Finland
Zinc Recycling

From SRM, GTP Produces:


APT and AMT


Tungsten Oxide


Tungsten & Tungsten Carbide Powders


Grade and Spray Powders


Zinc Reclaim Powders

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Powders That Shape Your World

GTP Tungsten Recycling Facts:

- GTP obtains a significant percentage of its tungsten supply from secondary raw materials.
- GTP uses both a chemical and zinc reclaim processes to recycle secondary raw materials.
- GTP can recycle most forms of cemented carbide sintered parts.
- GTP can recycle water and oil based sludges.
- GTP regularly works with customers to "toll" process scrap or secondary raw material into high quality tungsten powders including tungsten carbide & ready-to-press grade powders.
- GTP is continually upgrading and investing in its recycling processes.
- GTP contracts scrap purchases as well as participates in the spot market to provide our customers with a stable, reliable and cost effective raw material supply.
- GTP Towanda and GTP Tikomet combine to offer the widest range of tungsten products and recycling capabilities in the hard materials industry.
- Contact GTP to discuss tungsten recycling opportunities and develop a program that best meets your needs.

GTP produces a wide range of tungsten based chemicals and powders from secondary raw material.

Materials	**APT**	**AMT**	**Oxide**	**WMP**	**WC**	**RTP**	**TSP**
Name	Ammonium Paratungstate	Ammonium Metatungstate	Tungsten Oxide	Tungsten Metal Powder	Tungsten Carbide	Ready-to-Press Powder	Thermal Spray Powder
Notes:	Typically 89.5% WO_3	Typically 92.5% WO_3	Four types, various O_2	Range from 0.6 μm to 40 μm	Range from 0.2 μm to 45 μm	Sub micron to Coarse, various formulas	W, Mo, Cr_3C_2
Uses / Markets	Feedstock for tungsten materials	Typically used as a catalyst for a variety of reactions	Used in the production of W & WC powders	Used in auto, energy exploration, electronics, aerospace, etc.	Used in auto, mining, wear parts, dies, etc.	Used in wear parts, cemented carbide tools, etc.	Wear coatings in aerospace, energy, plastics, etc.

GTP Tikomet powders are available in seven different types with each type targeting a specific market.

Type	**S**	**F**	**M**	**C**	**EC**	**TS**	**I**
Name	Sub-micron	Fine	Medium	Coarse	Extra Coarse	Tire Stud	Inserts
Grain Size	0.50	0.80	1.30	3.50	6.00	1.30	2.00
	0.80	1.30	3.50	6.00	10.00	3.50	3.00
Markets	hardmetal rods	hm rods, indexable inserts, wood working	wear parts, wood working	wear parts, mining tools	mining tools, road planing picks	pins for tire studs	indexable inserts

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Specifications related to Hard Scrap

Size	Maximum of 6 inch diameter (circular) or 6 inches on longest side (rectangular). Maximum weight of 25 pounds per piece unless weight limit is waived in the purchase requisition. Minimum size ¼".
Organics	The material may contain no organics. Any material containing organics will be returned at supplier's expense. Supplier will be responsible for damages incurred by GTP.
Tungsten-bearing solids	No non-tungsten material, in any form. Minimum density per piece of reclaim materials is 12.5 g/cm3.
Free Liquids	The material may contain no free liquids. Material containing free liquids will be returned at supplier's expense. Supplier will be responsible for damages incurred by GTP.

Specifications related to Soft Scrap

Organics	The soft reclaim material cannot contain liquids with a flash point below 140°F.
Tungsten-bearing solids	No non-tungsten material, in any form.
Free Liquids	No material with free liquids are to be shipped to GTP. Free liquids that separate during shipment are subject to the following requirements: 1. The liquid must have a flash point above 140°F. 2. pH of free liquids must be between 6 and 12.5. 3. MSDS required for fluids or cutting oils certifying number 1 and 2 above. Any liquids not meeting these requirements will be returned at the supplier's expense. The supplier will also be responsible for any damages incurred by GTP.

Specifications related to both Hard and Soft Scrap

Oxidizers	No materials considered a D001 oxidizer by DOT oxidizer test from Appendix F, 55 Federal Register 52402.
Chlorinated Materials	No chlorinated materials of any kind.
Floor Sweepings	Must be segregated and packaged separately.
Hazardous Waste	No material that meets the EPA or Pennsylvania DEP definition of hazardous waste. In signing the Purchase Order, supplier certifies to GTP that the material is NOT hazardous.
Radioactivity	No radioactive material.
Explosivity	Explosivity Meter must be calibrated for acetone. Explosivity must be less than 50% LEL. Containers having explosivity of 50% or higher will be returned at supplier's expense.
Trash	No filters, filter pads, paper, or other trash will be accepted.

Element	Max %	Min %
Al	1.000	-
Sb	0.010	-
As	0.003	-
Be	0.010	-
Bi	1.300	-

Element	Max %	Min %
B	0.100	-
Cd	0.0025	-
Ca	0.300	-
Cr	1.000	-
Cu	10.00	-

Element	Max %	Min %
Fe	20.00	-
Pb	0.100	-
Hg	0.010	-
Mo	0.200	-
P	0.100	-

Element	Max %	Min %
S	0.050	-
Sn	2.000	-
W	-	50
Zn	2.000	-

For additional information regarding shipment, packaging or to discuss how a recycling program with GTP can reduce your raw material costs and stabilize your supply, please don't hesitate to contact us at +1 (570) 268-5000 or via e-mail at info@globaltungsten.com. You can also visit us on the web at www.globaltungsten.com for more information.