



**Tantung For Metalworking  
and Woodworking**



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Note: Tantung is a registered trademark of VRWesson, inc.

# Company Information & History



Since its early beginnings in the early 1930's, VRWesson has been relentlessly dedicated to quality. Our close attention to detail and customer satisfaction, combined with reinvesting in the latest technology has provided VRWesson continual growth consistently throughout the decades. Today we offer a full line standard and special inserts, toolholders, milling cutters, manufacturing and resharping services along with VRWesson's proprietary patented Tantung G toolbits. We here at VRWesson will always ensure you consistent quality using the latest version of the ISO 9001:2015 quality procedures.

As our product line continues to grow, we are building on our reputation as a respected supplier to broad sectors of the manufacturing industry, including:

- Aerospace
- Automotive
- Steelmaking
- Agricultural Equipment
- Construction Equipment
- Mining Equipment
- Marine, Sport and Recreational Engines
- Oil and Gas Industries



As a leading cutting tool manufacturer servicing domestic and global markets, we pride ourselves by providing you with world-class quality any service that VR/Wesson has provided for over 75 years.

# ABOUT TANTUNG

Tantung is a cast alloy cutting tool material composed principally of chromium, tungsten, columbium and carbon in a cobalt matrix. These elements combined in the proper proportions and cast in chill molds give Tantung its most important characteristic - the ability to retain its cutting hardness at red heat temperatures up to 1500°F. It is neither high speed steel nor carbide. It is unique.

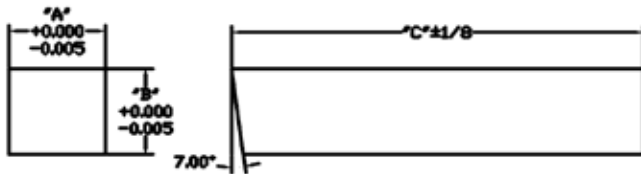
Tantung has a high transverse rupture strength, low coefficient of friction and excellent resistance to corrosion. It is tough, readily absorbs shock and impact and is non-magnetic . . . it likes to work.

As a cutting tool, it is ideal for all turning, facing, boring, milling and cut-off applications on nearly every type of metal and non-metallics. Tantung performs best at speeds of 100-250 SFPM and can be used as an excellent advantage on machines where speed, power and rigidity are limited. In addition, it will not anneal or lose its cutting edge as will H.S.S. when subjected to high-red heats generated during the cutting cycle.

Tantung G is recommended for general purpose machining of both ferrous and non-ferrous metals and general woodworking operations. For catalog items, Tantung's G Hardness is 60 to 63 Rockwell C and Transverse Rupture Strength is 300,000 psi minimum.

## SOLID SQUARE TOOL BITS

TANTUNG G



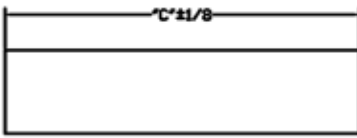
DIMENSIONS		
A Width	B Height	C Length
3/16	3/16	1
		2
		2-1/2
1/4	1/4	3
		2-1/8
		2-1/2
5/16	5/16	3
		3-1/2
		4
		6
		2-1/4
		2-1/2
3		
3-1/2		
4		
5		
6		

DIMENSIONS		
A Width	B Height	C Length
3/8	3/8	2
		2-1/2
		2-3/4
7/16	7/16	3
		3-1/2
		4
		6
		2-1/2
		3
1/2	1/2	3-1/2
		4
		6
		2-1/2
		3
		3-1/2
4		
4-1/2		
5		
6		

DIMENSIONS		
A Width	B Height	C Length
5/8	5/8	3
		3-1/2
		4
		4-1/2
		5
		6
3/4	3/4	3
		4
		4-1/2
		5
		6
		7/8
1	1	5
		6

# SOLID ROUND TOOL BITS

TANTUNG G



Furnished centerless ground with both ends ground square.

DIMENSIONS	
A Width	C Length
1/8	3 4
3/16	3 4
1/4	1 2 3 4

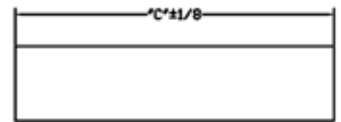
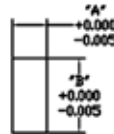
DIMENSIONS	
A Width	C Length
5/16	1 2 3 4
3/8	1 2 3 4 5
7/16	4 5 6

DIMENSIONS	
A Width	C Length
1/2	2 3 4 5 6
9/16	6
5/8	3 4 5 6

DIMENSIONS	
A Width	C Length
11/16	6
3/4	3 4 5 6
7/8	4
1	4 6

# SOLID RECTANGULAR TOOL BITS

TANTUNG G



DIMENSIONS		
A Width	B Height	C Length
1/8	3/8	4
	1/2	3
	1/2	4
	1/2	6
	5/8	6
	11/16	6
	3/4	6
	13/16	6
	7/8	6
	1	6
3/16	1/4	2-1/2
	1/2	3
	1/2	4
	1/2	6
	5/8	6
	3/4	4
	3/4	6
	13/16	6
	1	6
	1-1/8	6
7/32	1/2	4
1/4	5/16	1-1/2
	3/8	2
	3/8	6
	1/2	4
	1/2	6
	5/8	6

DIMENSIONS		
A Width	B Height	C Length
1/4	3/4	6
	1	6
	1-1/4	6
5/16	3/8	3
	1/2	3
	1/2	4
	1/2	6
	5/8	4
	3/4	4
	3/4	6
	1	4
	1	6
	3/8	1/2
1/2		2-1/2
1/2		3
1/2		4
1/2		6
5/8		3
5/8		4
5/8		6
3/4		3
3/4		4
7/8	5	

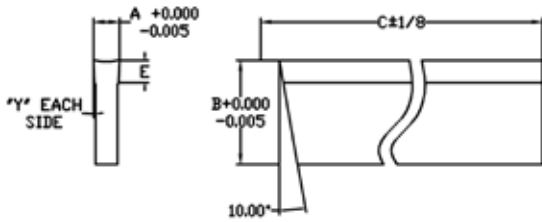
DIMENSIONS		
A Width	B Height	C Length
3/8	1	2-3/8
	1	3
	1	4
	1	4-1/2
1/2	1	6
	5/8	3
	5/8	4
	5/8	5
	3/4	3
	3/4	3-1/2
	3/4	4
	3/4	5
	3/4	6
	1	3
1	4	
1	5	
1	6	
5/8	3/4	3
	3/4	4
	3/4	5
	3/4	6
	1	4-1/2
	1	6
3/4	1	5
	1	6

All sizes are subject to change at the discretion of VRWesson Inc.

# CUT-OFF BLADES

## TAN-7000

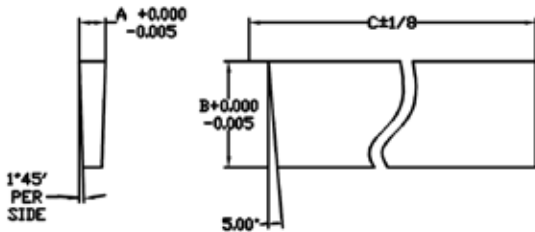
Blades are parallel type for use in Empire and Luers holders. Can be used in either a right hand or a left hand holder.



TAN-7000 - TANTUNG G						
BLADE DIMENSIONS					Y ANGLE	BLADE NUMBER
A Width	B Height	C Length	E			
3/32	.476	4-1/2	.095	3°	TAN-7000 TAN-7001	
	.676	5	.123	2°		
1/8	.476	4-1/2	.145	4°	TAN-7002 TAN-7003 TAN-7004 TAN-7005 TAN-7006	
	.676	5	.123	3°		
	.749	5	.167	3°		
	.874	6	.195	2°		
5/32	.676	5	.123	2°	TAN-7007 TAN-7009	
	.874	6	.195	3°		
3/16	.676	5-1/4	.123	4°	TAN-7010 TAN-7012 TAN-7013	
	.874	6	.195	4°		
	1.123	6-1/2	.195	4°		
1/4	1.123	6-1/2	.195	4°	TAN-7015	

## TAN-8000

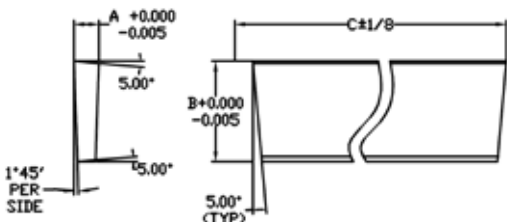
(Double Bevel)



TAN-8000 - TANTUNG G				BLADE NUMBER
BLADE DIMENSIONS				
A Width	B Height	C Length		
3/32	1/2	4-1/2	TAN-8005 TAN-8006	
	5/8	4-1/2		
1/8	5/8	4-1/2	TAN-8009 TAN-8000 TAN-8001	
	3/4	6		
	7/8	6		
5/32	5/8	6	TAN-8010 TAN-8011 TAN-8012	
	3/4	6		
	7/8	6		
3/16	3/4	6	TAN-8013 TAN-8014 TAN-8002 TAN-8003	
	7/8	6		
	1	6		
	1-1/8	6		
1/4	1	6	TAN-8016 TAN-8004	
	1-1/4	6		
5/16	1-1/4	6	TAN-8018	

## TAN-8500

Blades are double bevel for use in Brown and Sharpe type holders. Can be used in either a right hand or left hand holder.

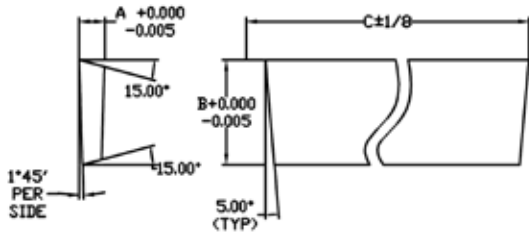


TAN-8500 - TANTUNG G				
BLADE DIMENSIONS			BLADE NUMBER	FOR USE IN BROWN AND SHARPE POST NUMBER
A Width	B Height	C Length		
3/32	1/2	4-1/2	TAN-8505 TAN-8506	OOD 10A, 10B, 11A, 12A, 20D AND 22D
	11/16	4-1/2		
1/8	11/16	4-1/2	TAN-8508 TAN-8509 TAN-8510	10A, 10B, 11A, 12A 20D and 22D 11A, 11B, 12A, 12B and No. 4 Auto. No. 6 Auto.
	13/16	6		
	1	6		
5/32	11/16	6	TAN-8515	No. 2 Auto.
3/16	11/16	6	TAN-8516 TAN-8513	No. 2 Auto. No. 6 Auto.
	1	6		
1/4	11/16	6	TAN-8517	No. 2 Auto.

# CUT-OFF BLADES

## TAN-9000

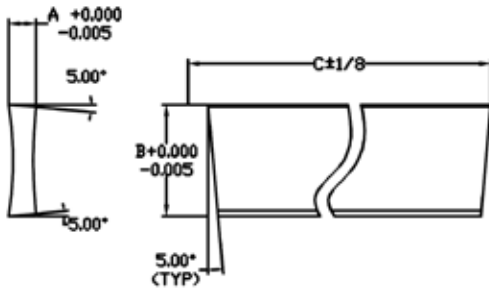
TAN-9000 Blades are double bevel for use in Armstrong type holders. Can be used in either a right hand or a left hand holder.



TAN-7000 - TANTUNG G					
BLADE DIMENSIONS			C Length	D	BLADE NUMBER
A Width	B Height				
	Nominal	Actual			
1/8	3/4	.715	6	1/16	TAN-9000
	7/8	.840	6	1/16	TAN-9001
3/16	1	.965	6	3/32	TAN-9002
	1-1/8	1.090	6	3/32	TAN-9003
1/4	1-1/4	1.175	6	1/8	TAN-9004

## TAN-9500

TAN-9500 Blades are hollow ground for use in Pratt and Whitney type holders. Can be used in either a right hand or a left hand holder.



TAN-8000 - TANTUNG G				
BLADE DIMENSIONS			BLADE NUMBER	FOR USE IN P & W HOLDER NUMBER
A Width	B Height	C Length		
1/16	1/2	4-1/2	TAN-9501	00
	11/16	4-1/2	TAN-9504	0
	53/54	4-1/2	TAN-9507	1 and 2
3/32	1/2	4-1/2	TAN-9503	00
	11/16	4-1/2	TAN-9505	0
	53/54	6	TAN-9508	1 and 2
1/8	11/16	4-1/2	TAN-9506	0
	53/54	6	TAN-9509	1 and 2
5/32	53/54	6	TAN-9510	1 and 2
3/16	53/54	6	TAN-9511	1 and 2
	1	6	TAN-9515	3 and 4

# How To Braze

Tantung is most satisfactorily joined to other metals by silver-solder brazing and the same principles of preparation apply whether the operation is accomplished by the oxyacetylene flame, in a furnace or by induction heating.

## Good Fit and Uniform Clearances

Joint clearances should be kept to a minimum. The strongest brace is of uniform thickness over the whole area. Prepare Tantung tip by grinding flat and machine shank recess smooth and flat.

## Cleaning

Only clean surfaces will braze securely. A ground surface or blasting with clean grip provides a good surface, but further cleaning with an oil-free solvent is recommended.

## Recommended Brazing Alloy and Flux

Handy and Harman's Handy Flux and Easy-Flo No. 3 (carbide type) are recommended or their equivalent. Silver-solder strip 0.005 in. thick by approximately 1 inch wide is a convenient size. This can be cut and used economically for most Tantung tool brazing.

## Fluxing and Positioning Brazing Alloy

1. Brush flux (thinned with distilled water to a heavy cream consistency) generously onto the joint surfaces of both tip and shank.
2. From silver-solder strip 0.005 inches thick, cut pieces slightly oversize for all surfaces to be brazed.
3. Position the brazing alloy strip to surfaces to be brazed and set the fluxed Tantung tip on brazing strip ready for heating.

## Precautions in Heating

Sudden high-temperature application of heat will explode or crack Tantung tips. If difficulty is experienced with cracked or broken tips in brazing observe the following precautions. They are particularly important for large tips.

1. Preheat and assembled tip and shank on a gas burner plate or in oven to 500°F to 600°F.
2. In torch brazing, always apply flame to shank and not directly on Tantung tip; use a slightly reducing oxyacetylene flame.
3. Tantung should never be heated to a temperature above 1600°F for its hardness will be slightly lowered and its effectiveness as a cutting tool will be impaired.

## Heating to Melt Brazing Alloy

Heating methods are optional - torch, induction or furnace. Heat to a cherry red (about 1450°F). When the silver alloy flows freely, remove the source of heat. Position the tip with a pointed rod, then press it down just enough to squeeze out the excess flux and silver-solder. Allow the assembly to air cool to room temperature; do not quench.



# Tantung How To Grind

Tantung tools are not hard to grind but they can be cracked and checked by overlooking a few simple precautions.

The usual elements of good grinding practice should be observed as follows:

**DO** Select proper grinding wheel. It is desirable to use slightly softer wheel grades than you would for high speed steel.

Operate wheel in proper speed range. Refer to suggestions in table below.

Use liberal supply of coolant or none at all. Cut-off wheels should be run dry.

Traverse the work continually with respect to the wheel in order to avoid local overheating.

Dress the wheel as often as necessary to keep it free cutting.

**DON'T** Don't quench a tool after grinding.

Don't use excessively hard or glazed wheels.

Don't use too heavy pressure.

Don't use misting coolant.

Simple tools can be ground offhand. Machine grinding is preferable, especially for form tools and when accuracy is required. The machine should be provided with tool rests and fixtures graduated for correct angle measurement.

The cast-cutting alloys are heat sensitive. They can be damaged or ruined by poor grinding practice which causes checking of the surface.

GRINDING OPERATION	ABRASIVE	GRAIN SIZE	GRADE	STRUCTURE	BOND	WHEEL SPEED IN SURFACE FEET PER MINUTE
Offhand: Roughing	Aluminum Oxide	60	K	6	Vitrified	3800 - 4200
Offhand: Finishing	Aluminum Oxide	60	I	6	Vitrified	3800 - 4200
Machine: Roughing	Aluminum Oxide	60	I	8	Vitrified	3800 - 4200
Machine: Finishing	Aluminum Oxide	60	I	6	Vitrified	3800 - 4200
Forming	Aluminum Oxide	100	I	6	Vitrified	3800 - 4200
Crush Forming	Aluminum Oxide	220	J	13	Vitrified	3800 - 4200 User Liberal flow of No. 6 oil
Cutting Off	Aluminum Oxide	30	A	5	Rubber	11,000 (Grind Dry)

# Technical Data on Tantung Machining Speeds

Tantung cut-off tools are very appropriate for a wide range of metallic and non-metallic materials. The following charts list useful machining information.

## Speeds and Feeds for Tantung Turning Tools

Material Cut

Feed of .025 to .035 Inches Per revolution

Cutting Speed in F.P.M.

Feed of .025 to .035 Inches Per revolution	.004-1/32"	1/32-3/32	1/8-7/32	1/4-3/8"	3/8-1/2"	1/2-5/8"
Cast Iron: Soft	190	175	165	150	125	100
Cast Iron: Medium	150	140	135	120	100	75
Malleable Iron	250	225	200	175	140	100
Steel Cast: Soft	190	175	160	150	125	100
Steel Cast: Medium	150	135	120	110	100	70
Steel:						
SAE 1010-1040	250	220	180	150	125	100
SAE 1045-1070	175	160	140	120	100	75
SAE 1080-1095	155	140	120	100	75	60
Free Cutting	300	265	225	180	145	125
Manganese	150	120	100	80	65	50
SAE 2015-2515	130	140	125	100	80	60
SAE 3115-3450	135	125	115	100	75	50
SAE 4130-4820	150	135	125	100	80	60
SAE 6120-6145	120	115	100	85	75	60
SAE 52100	125	115	100	85	75	60
Tool Steel	125	115	100	80	75	50
Stainless Steel:						
Free Cutting	225	200	180	150	130	100
Aluminum	1250	1100	950	800	650	550
Brass	500	450	400	350	275	200
Bronze: Soft	200	175	150	125	100	75
Bronze: Hard	150	140	125	100	80	60

The speeds listed above are suggestions for trial. Tests at higher or lower speeds will indicate the most efficient speed from the standpoint of tool life and operation time. Tantung gives the most outstanding performance with heavier feeds and moderate speeds, rather than with high speeds and light feed. Speed should be lower for intermittent cuts than for continuous cuts. Speed may be increased when a coolant is used.

# Tantung Technical Data

Chemical Composition:	<b>"G"</b>
Cobalt .....	42-47%
Chromium .....	27-32%
Tungsten .....	14-19%
Carbon .....	2-4%

Chemical Composition:	<b>"G"</b>
Tantalum or Columbium .....	2-7%
Manganese .....	1-3%
Iron .....	2-5%
Nickel .....	7% max.

## Mechanical Properties

	<b>TANTUNG "G"</b>
Hardness-Rockwell C	60.0-63.0
Transverse Rupture Strength	300 x 10 <sup>3</sup> psi
Compressive Strength	400 x 10 <sup>3</sup> psi
Young's Modulus	41 x 10 <sup>6</sup> psi

## HOT HARDNESS (MUTUAL INDENTATION)

Temperature of test Degree F	<b>Brinell Hardness (3000 kgm. load for 30 seconds)</b>
Room	654
800	479
1200	479
1600	267
1800	114

Tantung is a material exclusively produced by VR/Wesson. Developed in 1939, it has achieved universal acceptance as a cutting tool to successfully bridge the gap between high speed steel and cemented carbides. Because of its particular composition, and through carefully controlled production techniques, the characteristics of Tantung are significantly superior to other materials that have been produced for similar application. In the all important properties of hardness and transverserupture strength, Tantung holds a distinct and clear advantage.

The high red hardness is a particularly distinct characteristic of Tantung. It retains its cutting hardness at red heat temperatures up to 1500°F, well above the range at which high speed steel burns up. Tantung possesses remarkable characteristics in hardness recovering. After being subjected to cutting temperatures, there is no loss in hardness value in returning to room temperature. Completely unlike high speed steel, Tantung can continue to recover its hardness throughout entire tool life. This characteristic also facilitates brazing of Tantung to steel without hardness loss.

Tantung maintains cutting effectiveness at speeds up to 450 SFPM. Where the speed of the cut-off process is limited by HSS blades, Tantung can help speed up operations by 30%, 50%, even 100%. A faster machining time means increased production and less investment per workpiece.

# Tantung at Work

## Still cuts at 1500°

- Tantung blades will not anneal at 1500°F
- Maintains cutting edge hardness throughout tool life.
- Longer tool life than HSS.

## Broad operating speeds

- Tantung works at speeds of up to 450 SFPM.
- Operates at speeds where HSS fails.
- Effective at speeds where cemented carbides load-up
- Won't chip like carbides at lower speeds.

## New life for older machines

- Tantung can be used on machines where speeds and rigidity are limited.
- With tantung tools, older machines can handle increased production loads and help reduce costs.
- Performs interrupted cuts significantly better than carbides.

# Tantung's Inherent Superiority

Tantung's chemical composition and manufacturing process amount for its wear resistance, toughness and red heat hardness.

Chemical Composition + Manufacturing Process = **TANTUNG**

Corrosion resistant non-magnetic alloys.

- Cobalt
- Chromium
- Tungsten
- Columbium
- Carbon

Melted in electric furnaces and cast in chill molds imparts:

- Rapid solidification for very fine grain structure
- High hardness
- Maximum strength

- Mass characteristics Density (72°F) 8.3<sup>3</sup>g/cm
- Thermal Properties Melting range: 2100-2200°F Thermal conductivity: 0.064 Cal/cm<sup>2</sup>/cm/K/sec Co-efficient of linear thermal expansion: (100-1200°F) 4.2 x 10<sup>6</sup> in/in/K
- Mechanical Properties Rockwell C hardness 60.0-63.0 Brinell hardness: 479 at 1200°F Transverse Rupture Strength 300x10<sup>3</sup> psi (almost twice that of other cast alloys) Compressive strength: 400x10<sup>3</sup> psi Youngs' Modulus: 41x10<sup>6</sup> psi

Tantungs\* low co-efficient of friction makes it an ideal cutting/slicing material.





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