

Badger Metal



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**MetalLife**

**COMPRESSIVE STRESS TEXTURING**

**V/S**

**PERISHABLE TOOL FAILURE**

**Taps**

**Drills**

**Hog Mills**

**Form Tools**

**Slitting Saws**

**Drawing Dies**

**Milling Cutters**

**Key Seat Cutters**

**Cold Forming Dies**

**Screw Machine Form Tools**

**Hobs**

**Endmills**

**Chasers**

**Broaches**

**Spade Drills**

**Stamping Dies**

**Punching Dies**

**Die Casting Dies**

**Spot Welding Tips**

**Thread Forming Dies**

**Badger Metal  Tech, Inc.**

Today's modern manufacturing methods demand extremely high productivity levels with as little downtime as possible. The **Metallife®** surface treatment provides a means for attaining this as well as helping to reduce manufacturing tooling costs.

**WHAT IS IT?** **Metallife®** utilizes a well known principle of metallurgy regarding compressive stress layer generation in metals. Such a layer tends to reduce fatigue failure, and help retard or prevent crack initiation and propagation.

The **Metallife®** treatment involves impacting a tooling surface with a controlled micro media to induce a beneficial compressive stress layer on the surface of the steel. Three important changes occur as a result.

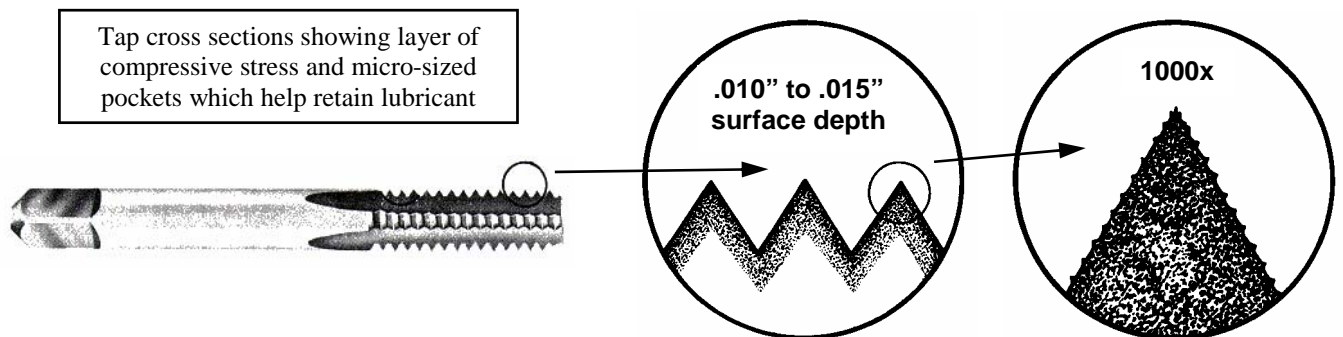
**ENCAPSULATING RESIDUAL LAYER** - The generated compressive stress layer slightly work hardens the tool while replacing the normal surface tensile stresses that are left in a tool after sharpening or finish grinding thus making the tool more resistant to fatigue cracking.

**MOST EXISTING GRAIN BOUNDARIES ELIMINATED** - The impaction of the tool helps obliterate most of the grain boundaries and stress risers which then prohibits micro-cracks from initiating or propagating in these areas. It is these cracks that lead to tool chipping or edge breakdown.

**ADDITIONAL COOLANT RESERVOIRS** - At the time of surface impaction, tiny microscopic pockets are created that act as coolant reservoirs. These pockets trap lubricant, thus allowing a cooler operating temperature which helps extend tool life.

The documented test results on the accompanying page indicate what some of our customers are experiencing regarding tool life improvement. Since **Metallife®** is not a coating or plating but an encapsulating metallurgical change in the tool's surface, the tool may be resharpened without the loss of the compressive stress benefit on the cutting edge.

Applications include all types of tool steel with the exception of carbide composition materials.



# Metallife. WINS

**WHAT IT CAN DO FOR YOU!** - Normal cutting tool life can be dramatically increased by 100, 200, 300, 400% or more. Chip removal is improved due to the added lubricity of the tool. Breaking of the tool in high stress areas such as cutting edges, shoulders, and fillets is dramatically reduced or eliminated.

**HOW IT IS DIFFERENT!** - Unlike other processes that are performed at elevated temperatures, Metallife is an ambient process assuring that no tool distortion will occur. It is not a coating, plating, nitriding, vapor blast, ion bombardment, oxidizing, freezing, heating, or any other type of CVD or PVD treating process. No tolerance allowances are needed. Since it is a metallurgical change to the surface of the tooling, the process cannot strip or peel which is sometimes the case with other coated processes.

**IN THE END, YOU AS A MANUFACTURER WIN** by improving productivity, generating less downtime from tooling failures, and by experiencing considerable perishable tooling cost savings. Call us TOLL FREE today at 1-800-366-1973 for details on how you may immediately start to enjoy these benefits.

The following are just a sampling of applications where **MetaLife** has had proven success:

TOOL	SIZE	MACHINED MATERIAL	PIECES BEFORE	PIECES AFTER <b>MetaLife</b>	INCREASE
Hi-Helix Drill	7/64"	aluminum	500	2,000	500%
Center Drill	#8 (.199")	Remco B-Elec. Iron	150	1,200	800%
Center Drill	#2 (.221")	1040 Steel	6,000	15,000	250%
Drill	.272" x 7/16"	cast iron	900 holes	3,000 + *	333%
Subland Drill	.28" x .375"	1050 steel	1,600	3,200	200%
Drill	.375"	copper-buss bar	50-100	430-860	860%
Subland Drill	.391"	cold rolled	12,000	25,000	208%
Drill	1 9/32"	1045 forged	30-40	120-150	375%
Tap	6-32	20 GA. cold rolled	800-900	5,000 +	555%
Tap	4-40	Titanium Ti-Gal-4V	3-4	30	750%
Tap	10-24	grey iron	150	2,700 +	1,800%
Tap	1/8"-27	cast iron	600	2,100 average	350%
Tap	1/4"-18 NPT	1018 CRS	100	400 +	400%
Tap-roll frmng	5/16"-18	6061 aluminum	5,000	10,000	200%
Tap	3/8"-10 L.H.	brass	750	3,000 +	400%
Tap	3/8"-24 L.H.	12L14	10	1,000	10,000%
Tap	3/8"-16	aluminum	1,000	2,500 +	250%
Tap	3/8"-16	1049 forged	20-40	150	375%
Tap	7/16"-18	4145 Forging	7	63	900%
Tap	3/4"-10	304 S.S.	65-80	521	651%
Tap	3/4"-10	1018 CRS	200	2,380 +	1,190%
Tap	7/8"-9	1035 forged	50	400	800%
Pipe Tap	1 1/4" NPT	cast iron	25-35	650	1,857%
Tap	3"-16	grey iron	50	150 average*	300%
End Mill	5/32"	1010 mild steel	8	20	250%
End Mill	3/16"	8620	25	75	300%
Hog Mill	1/2"	A2 tool steel	1-8	35 +	437%
Cobalt E.M.	1.0"	316 S.S.	8-10	37 average*	370%
End Mill	1 1/4"	stainless	8	31 average*	387%
End Mill	1 3/8"	1018 mild	25	125	500%
End Mill	1 1/2"	316 S.S.	25	75*	300%
"T" Slot Mill	1/2" D	cast iron	25	100 +	400%
Shell Mill	2"D x 3"W	406 S.S.	28	125*	446%
Milling Cutter	3" x .437"	8620 forged	350	1,044 average*	298%
Milling Cutter	3"D x 1/4", 5/16", 3/8"	1018 CRS	60	305*	508%
Milling Cutter	4" x .095"	8620 forged	50	126 average*	252%
Milling Cutter	4" x 9/16"	1095 Hi Carbon	1,200	2,000*	167%
Milling Cutter	special	1050 steel	1,200	3,290	275%
Milling Cutter	special	1140 steel	2,500	4,800	192%
Hob	#60 3/4 N.P.	1045	100	200*	200%
Hob	3" dia. 9/8 pitch	hot roll tubing	3	12 average	400%
Hob	1 3/4"D x 2"	stress proof	60	120*	200%
Hob	S-815 1.5" pitch	cast iron	1,000	2,000 average	200%
Hob	3"D x 6"	4140	1	2*	200%
Hob	6"D x 8"	8620	190	350*	184%
Hob	special	1018 gear blank	364	1,630 average*	447%
Hob	special	brass	600	4,371 average*	728%
Chaser	3/8"	medium carbon	1,200-1,500	5,500 average*	333%
Broach-button	5/32"	12L14	2,500	7,500*	300%
Broach	3/8" keyway	phosphor/bronze	260	736*	283%
Broach-spline	1.6"D x 60"	8620	106	230*	217%
Broach-spline	2"D x 60"	8620	150	400*	260%
Form Tool	2" dia.	hard brass	4 regrinds/8 hr.	2 regrinds/8 hr.	200%
Form Tool	2 3/8" dia.	1010 cold head	4-6 regrinds/8 hr.	2 regrinds/8 hr.	300%
Form Tool	M-2 Type	1049 forging	35	75*	214%
Form Tool	special	C1046 forging	10	18*	180%
Draw Die	Swaging 1 1/2"D to 1.0" D	stainless	10	500	5,000%
Draw Die	11" x 20"-12" shut	CR AK DQ coil	400-800	8,400 average*	1,050%
Draw Die	16" x 16"-12 7/8" shut	CR AK DQ coil	2,250	4,600 average*	204%
Draw Die	7/8" I.D.	S.S. 300 series .035	1,000	20,000	2,000%
Die Casting	center core 3 1/2" dia.	380 alloy	4,000	60,000†	1,500%
† was having bad washout problems					
Stamping Die	1 1/2" x 3/8" punch	304 S.S. strip	1,000	20,000*	2,000%

\*Indicates life increase after multiple sharpenings, regrinds, or polishings.