TOTAL TOOL LIFE CYCLE MANAGEMENT

MANAGE
your entire tool process with Star SU

SAVE
on your tool resharpening costs

On-time delivery
Understanding your process
Monitoring stock & availability
Analyzing cost savings potentials
Cost-per-piece strategy tailored to your needs
Monitoring of tool wear & servicing rates
Quality inspection & verification
Resharpen, recondition
Cleaning, recoating
On-time pickup

MINIMIZE
Your tool inventory and tool

REDUCE
Your overall tool cost-per-piece
Are you really in control of your per-piece tool costs?

Are you really considering all costs connected to your tool supply and maintenance efforts inhouse?

Are all of the steps in your process chain inhouse optimized?

Are you paying too much to maintain your tools?

Star SU offers total tool life cycle management services and equipment for every step of your manufacturing process, including individualized support services to keep your tools running efficiently.

WWW.STAR-SU.COM

With our new innovative cost/piece (CPU or PPU) approach you can control your perishable tool costs from a reliable and experienced source. We guarantee a certain cost/piece, taking away your worries about the actual tool cost, its potential life or future servicing processes.

Tools are delivered on time to your appropriate production facility, used tools are automatically picked up, re-sharpened, recoated and delivered according to your needs.

Finally, you choose our level of involvement: from supplying pure reconditioning services for existing single tools to complete service management with the purchase of the initial product.

Total tool life cycle management to match your production needs...

...by optimizing each step of the tool life cycle process...to minimize your tool cost-per-piece
DESIGN – FROM THE IDEA TO THE TOOL
You do not have to worry about the complexity of certain tool types. Specify what you need in a particular gear, spline or tooth form and our team of application and design engineers will do the rest: from quoting the product, designing the tool drawing, creating the roll-out to the final manufacturing of the tool. Our expert staff will work closely with you to make sure you are able to meet your requirements.

COATING
All Balzers thin film coatings are available to customers through the U.S., Canada, and Mexico. Coating types are tailored for different operating conditions.

- Titanium Nitride TiN
- Ti(C,N)
- SN (Al, Ti) N
- (Al, Ti) N

RECOATING
Bringing coated tools back to optimum life after resharpening by using the latest Balzers Coating Units, all types of PVD thin film coatings can be reapplied to greatly improve tool performance after resharpening. For the most demanding applications, enhanced coatings from the latest Balzers Coating Units are available.

RESHARPENING – ACHIEVING ORIGINAL TOOL PERFORMANCE
Star SU utilizes high precision, modern CNC grinding machines to restore hobs, shaper cutters, shaving cutters, master gears, milling cutters, rack cutters, saw cutters, bevel stick blades, as well as chamfering/deburring tools to their original sharpened quality, condition and performance.

The widest range of types, configurations, and sizes can be accommodated: from the smallest fine pitch hob to shaving cutters as large at 32” in diameter.

Overall, the services are fast, convenient and cost effective – with quality that is unmatched by any other regrind service.
TOTAL TOOL LIFE CYCLE MANAGEMENT

Production Costs per Workpiece = Total Costs per Workpiece + Machining Costs per Workpiece + Operator Costs per Workpiece

Cutting Tool Costs = Total Acquisition Cost + (Cost of Sharpen + Re-coat) x Number of Regrinds

Total Costs per Workpiece = Total Acquisition Cost + (Cost of Sharpen & Re-coat x Number of Regrinds) / Tool Life per Regrind (Number of Regrinds + 1)

Total Costs per Workpiece:
- Tool Acquisition Cost
- Number of Regrinds
- Possible Regrinds
- Costs for Sharpening and Re-coating

Proportion of tool costs on general manufacturing costs - 10%

APPLICATION SERVICES
Star SU provides the services to determine strategies to reduce cutting tool cost-per-piece through lower costs to sharpen and recoat. Recommendations for cutting speeds and feeds from experienced engineers will help you optimize your process through a design of tool review to possibilities to decrease tool change frequency and change over time.

FAST, FASTER, FASTEST
Our service centers in Michigan, Ohio, Illinois, South Carolina, and Saltillo provide you with fast turnaround of high precision sharpenings.

Pickup and delivery services are available in some areas, as well as complete CMS systems to minimize freight and logistics costs by advanced logistics planning.
ADVANTAGES OF TOOL SERVICE

- No capital cost
- No labor or indirect cost
- Reduced inventory
- Better tool life

SERVICES

- Resharpening of gundrills, reamers and solid carbide tools, including high performance points.
- Recoating of round tools
- Reworking/Retipping of PCD tools - Retip & Resharp Program
- Resharpening and recoating of bevel blades
- Gundrills and reamers
- Broach sharpening
- Round tool resharpening
- Retipping of gundrills and brazed reamers
- State-of-the-art inspection
<table>
<thead>
<tr>
<th>Coating Material (color)</th>
<th>Microhardness (HV 0.05)</th>
<th>Friction coefficient against steel (dry)</th>
<th>Max. service temperature (Deg. C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balinit A TiN (gold/yellow)</td>
<td>2300</td>
<td>0.4</td>
<td>600</td>
</tr>
<tr>
<td>Balinit ALCRONA AlCrN (blue/grey)</td>
<td>3200</td>
<td>.035</td>
<td>1100</td>
</tr>
<tr>
<td>Balinit B TiCN (blue-grey)</td>
<td>3000</td>
<td>0.4</td>
<td>400</td>
</tr>
<tr>
<td>Balinit C Star CrN+a-C:H:W (anthracite)</td>
<td>1000/1500</td>
<td>0.1 - 0.2</td>
<td>300</td>
</tr>
<tr>
<td>Balinit C WC/C (a-C:H:W) (anthracite)</td>
<td>1500/1000</td>
<td>0.1 - 0.2</td>
<td>300</td>
</tr>
<tr>
<td>Balinit Cast CrC (silver/grey)</td>
<td>2200</td>
<td>0.5</td>
<td>700</td>
</tr>
<tr>
<td>Balinit CNI CrN (silver/grey)</td>
<td>1750</td>
<td>0.5</td>
<td>700</td>
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<tr>
<td>Balinit CROVEGA CrN (silver/grey)</td>
<td>1750</td>
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<td>700</td>
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<tr>
<td>Balinit D CrN (silver/grey)</td>
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<td>0.5</td>
<td>700</td>
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<tr>
<td>Balinit DIAMOND PCD (grey)</td>
<td>&gt;8000</td>
<td>0.15 - 0.20</td>
<td>600</td>
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<tr>
<td>Balinit DLC STAR CrN+a-C:H (black)</td>
<td>&gt;2000</td>
<td>0.1 - 0.2</td>
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<tr>
<td>Balinit DLC a-C:H (black)</td>
<td>&gt;2000</td>
<td>0.1 - 0.2</td>
<td>350</td>
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<tr>
<td>Balinit FUTURA NANO TiAlN (violet/grey)</td>
<td>3300</td>
<td>0.30 - 0.35</td>
<td>900</td>
</tr>
<tr>
<td>Balinit FUTURA TOP TiAlN (violet/grey)</td>
<td>3300</td>
<td>0.25</td>
<td>900</td>
</tr>
<tr>
<td>Balinit G TiCN + TiN (gold/yellow)</td>
<td>3000</td>
<td>0.4</td>
<td>400</td>
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<tr>
<td>Balinit HARDLUBE TiAlN+WC/C (a-C:H:W) (dark grey)</td>
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<td>800</td>
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<tr>
<td>Balinit HELICA AlCr-based (copper)</td>
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<tr>
<td>Balinit LUMENA TiAlN (violet/grey)</td>
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<td>0.30 - 0.35</td>
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<tr>
<td>Balinit MICRAN TiAlN (violet/grey)</td>
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<td>Balinit TRITON a-C:H (black)</td>
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<tr>
<td>Balinit X.CEED TiAlN (blue/grey)</td>
<td>3300</td>
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<td>900</td>
</tr>
<tr>
<td>Balinit X.CELL TiCrN (dark grey)</td>
<td>2100</td>
<td>0.5</td>
<td>700</td>
</tr>
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</table>
APPLYING ADVANCED COATINGS

Constant improvement of existing coatings and research of the latest coating technology is a result of the collaboration between Star SU and Oerlikon Balzers Coating.

The Coating process is further optimized by using automated cleaning equipment to remove all oils and residues. Substrates are delivered for coating in a thoroughly clean condition to help guarantee the ultimate quality of the coated product.

Our Balzer coatings will improve abrasion, wear resistance and can increase life up to 5-10 times in certain applications.

- HSS and carbide tools
- Molds and dies
- Special tools
- Machined parts and other applications