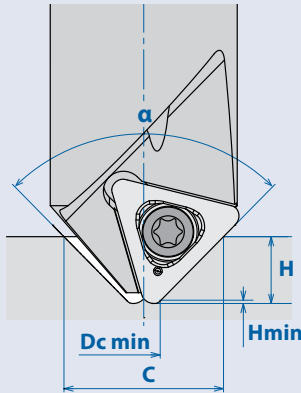


List 52512 & 78034 - PHOENIX® PLDS
List 78134 - PHOENIX® PLDS SF

	Work Material	Tensile Strength - Hardness	Cutting Speed Vc (SFM)	Feed Rate f (in/rev)	
				Centering	Countersinking
P	Mild Steels, Carbon Steels (1010, 1018)	~180 HB	260 (200 - 400)	0.0025 (0.001 - 0.003)	0.003 (0.002 - 0.0045)
	Carbon Steels, Alloy Steels (1050, 4140)	~280 HB	260 (200 - 400)	0.0025 (0.001 - 0.003)	0.003 (0.002 - 0.0045)
	Die Steels (H13, D2)	~280 HB	260 (200 - 400)	0.0025 (0.001 - 0.003)	0.003 (0.002 - 0.0045)
M	Stainless Steels (304, 420)	~250 HB	260 (200 - 330)	0.0025 (0.001 - 0.003)	0.003 (0.002 - 0.0045)
K	Cast Iron (No. 35 B)	~350 N/mm ²	330 (200 - 460)	0.0025 (0.001 - 0.003)	0.003 (0.002 - 0.0045)
	Ductile Cast Iron (60-40-18)	~800 N/mm ²	330 (200 - 460)	0.0025 (0.001 - 0.003)	0.003 (0.002 - 0.0045)
N	Aluminum Alloys (6061, 7075)	~13% Si	500 (330 - 650)	0.0025 (0.001 - 0.003)	0.003 (0.002 - 0.0045)
S	Heat Resistant Alloys (Inconel 718)	-	115 (80 - 200)	0.0015 (0.001 - 0.0025)	0.003 (0.002 - 0.0045)
	Titanium Alloy (Ti-6Al-4V)	-	130 (100 - 330)	0.0025 (0.001 - 0.003)	0.003 (0.002 - 0.0045)
H	Pre-hardened Steel (P20, Stavax)	40 - 43 Hrc	200 (165 - 260)	0.0025 (0.001 - 0.003)	0.003 (0.002 - 0.0045)
	Hardened Steels (D2)	43 - 48 Hrc	165 (130 - 260)	0.0025 (0.001 - 0.003)	0.003 (0.002 - 0.0045)

1. For V slotting, use 80% of the Countersinking feed rate shown in the above table.

Standard Centering Depth (H)



When Point Angle (α) = 90°
Min. Centering Depth (H min) = 0.25mm
Min. Drill Hole Diameter (Dc min) = Ø2.5mm

$$H = (C - Dc \text{ min}) \div 2 + Hmin$$

H = Centering Depth (in mm)
C = Countersink Diameter (in mm)

Ex: If Point Angle (α) = 90° and Countersink Diameter (C) = Ø10mm, Centering Depth (H) = 4mm

When Point Angle (α) = 120°
Min. Centering Depth (H min) = 0.1mm
Min. Drill Hole Diameter (Dc min) = Ø2.4mm

$$H = (C - Dc \text{ min}) \div 3.46 + Hmin$$

H = Centering Depth (in mm)
C = Countersink Diameter (in mm)

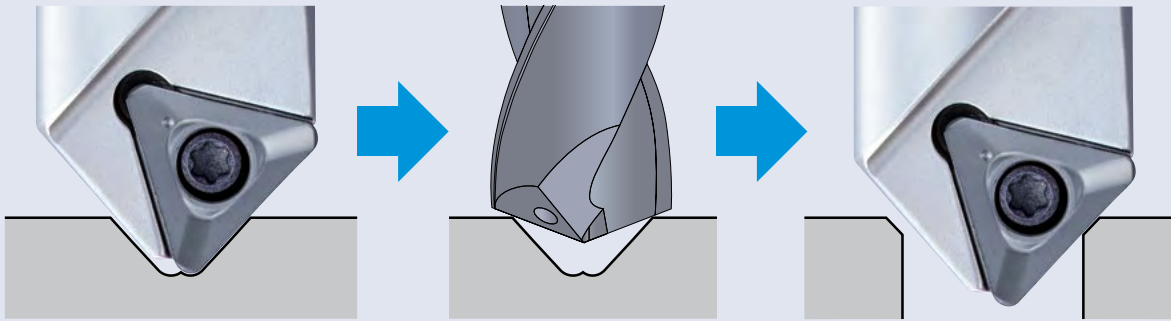
Ex: If Point Angle (α) = 120° and Countersink Diameter (C) = Ø10mm, Centering Depth (H) = 2.3mm





Machining Tips

For Centering, Make the Centering Diameter Smaller than the Drill Diameter



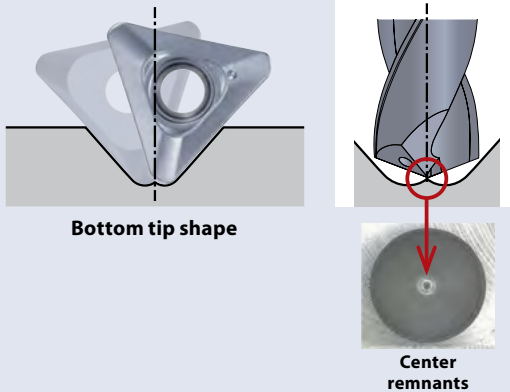
Centering

Drilling

Countersinking

Inappropriate Center Diameter Relative to the Drill Diameter

Center remnants may occur at the bottom of the hole due to the shape of the insert, which may adversely affect the drilling process.

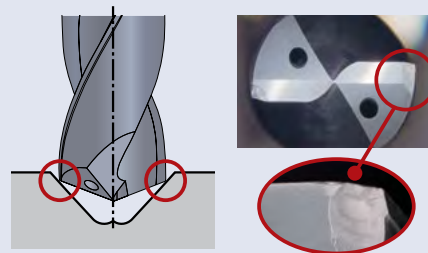


Bottom tip shape

Center remnants

Centering that Also Serves as Countersinking

When the centering diameter becomes larger than the drill diameter, the shoulder of the drill will collide with the workpiece, which may cause chipping on the cutting edge.



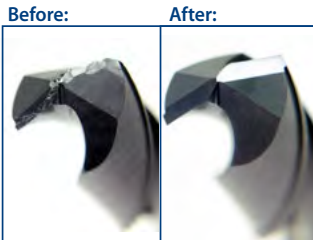
Drill Reconditioning





OSG Tool Reconditioning

OSG's Bensenville facility is the special cutting tool and regrinding authority based in the Chicago area. Through accurate and expedient regrinds of high-end cutting tools, OSG helps customers extend tool life and save money by restoring their used cutting tools to their original condition. In addition to regrinding, the Bensenville facility also manufactures custom drills, reamers, and other special cutting tools, performs product modifications and provides premium coating services.



As part of the OSG Corporation (headquartered in Japan), the regrind facility is the only OSG authorized regrinding source in America. The regrinding program uses the same OSG manufacturing drawings, adheres to OSG's strict quality control standards and uses the same equipment for OSG manufacturing and inspection procedures. As one of the world's leading cutting tool manufacturers, OSG offers a global network of support to our customers.

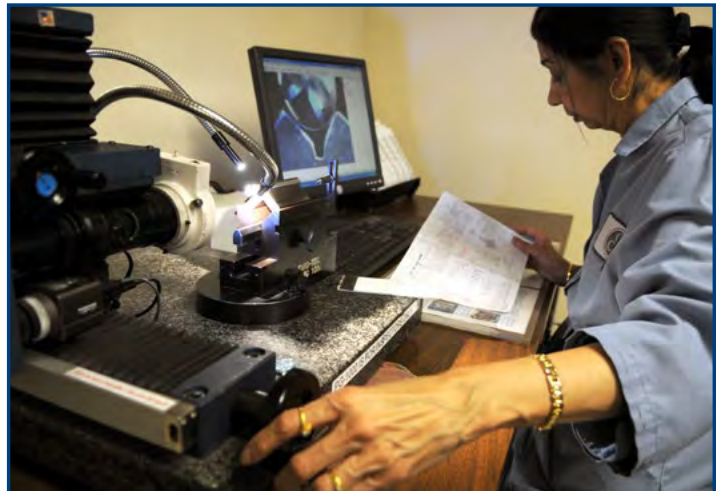
Tool Reconditioning Lowers Costs

The primary benefit of tool reconditioning is clear: the reduction in overall tooling costs. As part of normal production, tool wear, chipping and breakage occurs often affecting tool performance and increasing manufacturing costs. By reconditioning high performance drills, end mills and taps, OSG helps manufacturers realize substantial cost savings through extended tool life without jeopardizing production quality or performance. Because OSG's reconditioned tools are manufactured to the same high level of quality and held to the same exacting standards that new tools are, customers of OSG's tool reconditioning services can expect the same high performance and quality they are accustomed with OSG's new tools even after regrinding multiple times.

Engineering & Sales Support

OSG reconditions OSG tools using the same prints as the original tools made in our plants around the world. By using original part drawings, tools are accurately reconditioned to the original specifications, so customers are assured that reconditioned tools realize the same high level of performance. Manufacturers can also work directly with OSG design engineers to customize tools for enhanced performance or to meet specific requirements.

OSG's national sales team provides tooling expertise in the field for onsite evaluations and recommendations for manufacturers to implement a customized reconditioning program. The goal is to help manufacturers reduce tool costs and inventory, optimize performance and enhance overall profits.



Contact your OSG representative or distributor to review your tool reconditioning program.





CNC Training

OSG CNC technicians are extensively trained on proper setup methodologies and reconditioning processes by an on-staff CNC trainer. Through their development, the CNC Technician training program moves operators through three levels where they are diligently monitored and certified/reevaluated annually to maintain consistency and quality in our tools. Technicians are also trained and certified/reevaluated annually by Quality Assurance to perform inspections to print on first piece and in process tools.

Inspector Training

In order to guarantee that our tools are reconditioned to the highest standards, inspectors also undergo annual training and certifications which involve standardized procedures. These are the same methods that are used in the OSG manufacturing facilities in Japan and around the world. Inspectors are trained to inspect and measure tools completely to the original tool prints.

Throughout the reconditioning process, the tools are also continuously inspected until 100% visual inspection ensures that no chipped or defective tools are received by the customer. The high tech inspection equipment used at the reconditioning facility is the same equipment used at all OSG locations. This includes in-house

developed tool analyzers and state-of-the-art equipment with up to 300x magnification capabilities. The key to inspecting high performance, accurate reconditioned tools is assuring that they are held to the same inspection standards through the use of the same inspection methods as new OSG tools.

The Bensenville plant is subject to OSG's stringent JQA regrinding standards and is certified regularly by OSG Japan.

Equipment and Facility

In 2015, OSG opened a reconditioning facility which is equipped with state-of-the-art production and inspection equipment. The facility uses high precision 5-Axis CNC grinders throughout the reconditioning process for improved repeatability and precision.

OSG's weekly equipment Preventive Maintenance (PM) program ensures consistency and accuracy throughout the reconditioning process. Through this PM program, OSG's tool reconditioning performance will be consistent year after year.

