

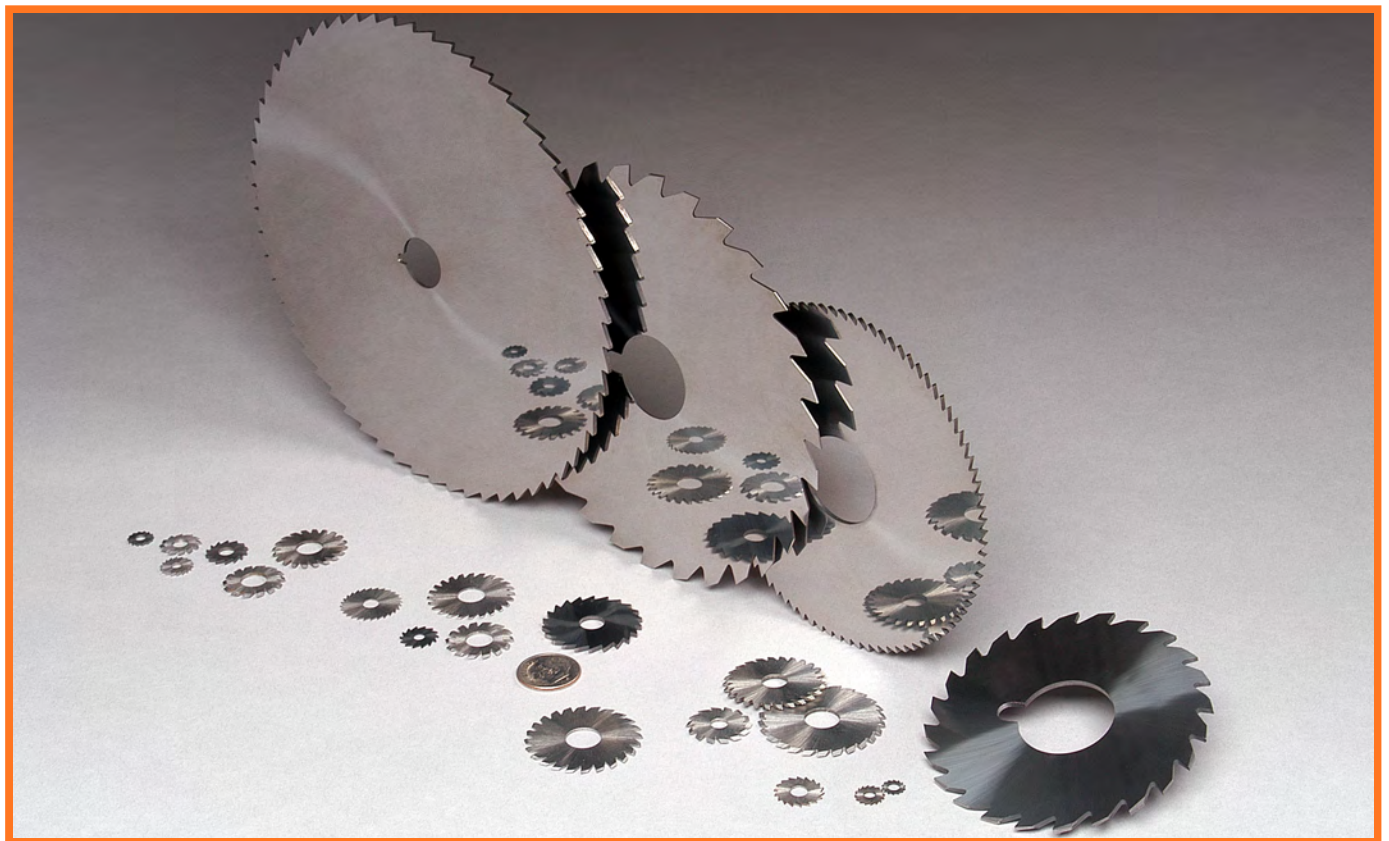
MARTINDALE

Saws

Solid
Carbide

High-Speed
Steel

- *Cut-Off*
- *Slotting / Slitting*
- *Screw Slotting*
- *Jeweler's*
- *Joyal®*
- *Copper Notching & Slitting*



Reliable Solutions Today!



MARTINDALE • 1375 Hird Ave • Cleveland, OH 44107
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02/05



Over 100 Years of Service.

Martindale Electric Co. started in the electric motor maintenance tool manufacturing business in 1913. From the start, we put emphasis on quality materials and workmanship — and on dedicated customer service.



Our approach worked. We prospered and grew. Gradually, we added new products to our line, including mica undercutting saw blades. This saw blade line eventually grew to what it is today.

Martindale is stocked and staffed to promptly meet your sawing needs. Each and every employee adheres to the standards of product quality and customer service that has kept us the one stop shop for circular saw blades and electric motor repair tools for more than 100 years!



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TYPE SS SCREW SLOTTING SAWS

Used for cutting-off, slitting and slotting of Steel.
(Similar to slots in screw heads).

Ground Teeth

M-2 High Speed Steel

Hollow Ground For
Side Clearance

Rake Angle
of Teeth: 0°

Metric Sizes
Available

NOTE:

Saws in schedule are stocked for immediate shipment. For thicknesses not shown, use next higher price in schedule (plus a slight grinding charge for smaller quantities).

Other diameters from 1/4" to 6" are also available, as well as other hole sizes, numbers of teeth, rake angles and bevels.

Cutting Stainless Steel requires more side clearance — specify "for stainless" when ordering.

Specify number of teeth when ordering.

Tolerances: O.D. ±.005; Thickness ±.001; I.D. +.001 -.000
Closer tolerances available at additional cost.

RESHARPENING SERVICE

Complete resharpening service is available.
Prices on application.

COATING SERVICE

TiN, TiCN and other surface coatings are available.
Prices on application.

**SAWS
AVAILABLE
IN
M-42
MATERIAL,
UPON
REQUEST**

STOCK SAWS

| Thickness | O.D. | 1-3/4" | 2-1/4" | 2-3/4" | 3" | 4" | 5" | 6" |
|------------------------------------|-------|---------|---------|------------------|------------------|--------------|-------------------|---------------|
| B&S Gage No. and Fraction | Hole | 5/8" | 5/8" | 1" | 1" | 1" | 1" | 1" |
| No. of Teeth | | 64, 90 | 60 | 36, 44 56, 72 | 36, 44 56, 72 | 60, 72 90 | 60, 72 90, 110 | 72, 90 120 |
| 3/16" | .187" | | | OSSD187 | OSSD187 | OSSE187 | OSSF187 | OSSG187 |
| 5 | .182" | | | OSSC182 | OSSD182 | OSSE182 | OSSF182 | OSSG182 |
| 11/64" | .172" | | | OSSC172 | OSSD172 | OSSE172 | OSSF172 | OSSG172 |
| 6 | .162" | | | OSSC162 | OSSD162 | OSSE162 | OSSF162 | OSSG162 |
| 5/32" | .156" | | | OSSC156 | OSSD156 | OSSE156 | OSSF156 | OSSG156 |
| 7 | .144" | | | OSSC144 | OSSD144 | OSSE144 | OSSF144 | OSSG144 |
| 9/64" | .141" | | | OSSC141 | OSSD141 | OSSE141 | OSSF141 | OSSG141 |
| 8 | .128" | | | OSSC128 | OSSD128 | OSSE128 | OSSF128 | OSSG128 |
| 1/8" | .125" | | OSSB125 | OSSC125 | OSSD125 | OSSE125 | OSSF125 | OSSG125 |
| 9 | .114" | | OSSB114 | OSSC114 | OSSD114 | OSSE114 | OSSF114 | OSSG114 |
| 7/64" | .109" | | OSSB109 | OSSC109 | OSSD109 | OSSE109 | OSSF109 | OSSG109 |
| 10 | .102" | | OSSB102 | OSSC102 | OSSD102 | OSSE102 | OSSF102 | OSSG102 |
| 3/32" | .094" | | OSSB094 | OSSC094 | OSSD094 | OSSE094 | OSSF094 | OSSG094 |
| 11 | .091" | | OSSB091 | OSSC091 | OSSD091 | OSSE091 | OSSF091 | OSSG091 |
| 12 | .081" | | OSSB081 | OSSC081 | OSSD081 | OSSE081 | OSSF081 | OSSG081 |
| 5/64" | .078" | | OSSB078 | OSSC078 | OSSD078 | OSSE078 | OSSF078 | OSSG078 |
| 13 | .072" | OSSA072 | OSSB072 | OSSC072 | OSSD072 | OSSE072 | OSSF072 | OSSG072 |
| 14 | .064" | OSSA064 | OSSB064 | OSSC064 | OSSD064 | OSSE064 | OSSF064 | OSSG064 |
| 1/16" | .062" | OSSA062 | OSSB062 | OSSC062 | OSSD062 | OSSE062 | OSSF062 | OSSG062 |
| 15 | .057" | OSSA057 | OSSB057 | OSSC057 | OSSD057 | OSSE057 | OSSF057 | OSSG057 |
| 16 | .051" | OSSA051 | OSSB051 | OSSC051 | OSSD051 | OSSE051 | OSSF051 | OSSG051 |
| 3/64" | .047" | OSSA047 | OSSB047 | OSSC047 | OSSD047 | OSSE047 | OSSF047 | OSSG047 |
| 17 | .045" | OSSA045 | OSSB045 | OSSC045 | OSSD045 | OSSE045 | OSSF045 | OSSG045 |
| 18 | .040" | OSSA040 | OSSB040 | OSSC040 | OSSD040 | OSSE040 | OSSF040 | OSSG040 |
| 19 | .036" | OSSA036 | OSSB036 | OSSC036 | OSSD036 | OSSE036 | | |
| 20 | .032" | OSSA032 | OSSB032 | OSSC032 | OSSD032 | OSSE032 | | |
| 1/32" | .031" | OSSA031 | OSSB031 | OSSC031 | OSSD031 | OSSE031 | | |
| 21 | .028" | OSSA028 | OSSB028 | OSSC028 | OSSD028 | OSSE028 | | |
| 22 | .025" | OSSA025 | OSSB025 | OSSC025 | OSSD025 | OSSE025 | | |
| 23 | .023" | OSSA023 | OSSB023 | OSSC023 | OSSD023 | OSSE023 | | |
| 24 | .020" | OSSA020 | OSSB020 | OSSC020 | OSSD020 | OSSE020 | | |

(ADD NO. OF TEETH TO CATALOG NUMBER WHEN ORDERING)

□ 3/4" hole available at no extra cost on 2-3/4" O.D. x 72-teeth. (Available at extra cost on all others.)



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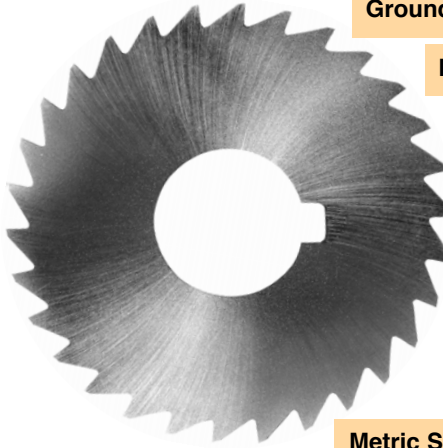
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02/05

TYPE MSL — METAL SLITTING SAWS

Used for deep-slotting of Steel and Cast Iron — also cast Brass and Aluminum and similar hard non-ferrous metals.
Has a stronger tooth and gives a better finish with less bur.



Ground Teeth

M-2 High Speed Steel

Hollow Ground For Side Clearance

Ground Land

Rake Angle of Teeth: 0°

Metric Sizes Available

NOTE:

Saws in schedule are stocked for immediate shipment. Intermediate thicknesses, use next higher price in schedule (plus a slight grinding charge for smaller quantities).

We'll gladly quote on other sizes, rake angles, tooth styles, hole sizes — just send us your print or sample saw.

Teeth can be alternately beveled if chips tend to stick in slot.

| Thickness | | O.D. | 2-1/2" | 3" | 4" | 5" | 6" |
|-----------|---------|--------------|-----------|-----------|-----------|-----------|-----------|
| | | Hole | 7/8" | 1" | 1" | 1" | 1" |
| Fraction | Decimal | No. of Teeth | 28 | 30 | 36 | 44 | 50 |
| 3/16" | .1875" | | | | OMSLE1875 | OMSLF1875 | OMSLG1875 |
| 5/32" | .1562" | | | OMSLD1562 | OMSLF1562 | OMSLG1562 | |
| 1/8" | .1250" | | OMSLH1250 | OMSLD1250 | OMSLF1250 | OMSLG1250 | |
| 3/32" | .0937" | | OMSLH0937 | OMSLD0937 | OMSLF0937 | OMSLG0937 | |
| 1/16" | .0625" | | OMSLH0625 | OMSLD0625 | OMSLF0625 | OMSLG0625 | |
| 3/64" | .0468" | | OMSLH0468 | OMSLD0468 | OMSLF0468 | OMSLG0468 | |
| 1/32" | .0312" | | OMSLH0312 | OMSLD0312 | OMSLF0312 | OMSLG0312 | |

Tolerances: O.D. ±.005; Thickness ±.0005; I.D. +.001 -.000
Closer tolerances available at additional cost.

RESHARPENING SERVICE

Complete resharpening service is available.
Prices on application.

COATING SERVICE

TiN, TiCN and other surface coatings are available.
Prices on application.

HIGH-SPEED STEEL JEWELERS SLOTTING SAWS

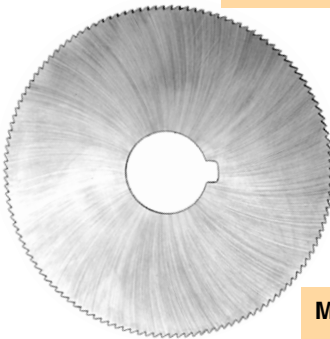
Ground Teeth

Hollow Ground For Side Clearance

M-2 High Speed Steel

Rake Angle of Teeth: 0°

Metric Sizes Available



Tolerances: O.D. ±.005; Thickness ±.001; I.D. +.001 -.000
Closer tolerances available at additional cost.
(Keyways provided on 1/2" & 1" I.D. saws, of .020" thickness and up.)

STOCK SAWS

| Thickness | | O.D. | 1-3/4" | 2" | 2-1/2" | 3" | 4" |
|---------------------------|---------|--------------|----------|----------|----------|-----------|-----------|
| | | Hole | 1/2" | 1/2" | 1/2" | *1/2", 1" | *1/2", 1" |
| B&S Gage No. and Fraction | Decimal | No. of Teeth | 132, 160 | 110, 152 | 140, 190 | 170, 224 | 224, 300 |
| 15 | .057" | | OJA057 | OJJ057 | OJH057 | OJD057 | OJE057 |
| 16 | .051" | | OJA051 | OJJ051 | OJH051 | OJD051 | OJE051 |
| 3/64" | .047" | | OJA047 | OJJ047 | OJH047 | OJD047 | OJE047 |
| 17 | .045" | | OJA045 | OJJ045 | OJH045 | OJD045 | OJE045 |
| 18 | .040" | | OJA040 | OJJ040 | OJH040 | OJD040 | OJE040 |
| 19 | .036" | | OJA036 | OJJ036 | OJH036 | OJD036 | OJE036 |
| 20 | .032" | | OJA032 | OJJ032 | OJH032 | OJD032 | OJE032 |
| 21 | .028" | | OJA028 | OJJ028 | OJH028 | OJD028 | OJE028 |
| 22 | .025" | | OJA025 | OJJ025 | OJH025 | OJD025 | OJE025 |
| 23 | .023" | | OJA023 | OJJ023 | OJH023 | OJD023 | OJE023 |
| 24 | .020" | | OJA020 | OJJ020 | OJH020 | OJD020 | OJE020 |
| 25 | .018" | | OJA018 | OJJ018 | OJH018 | OJD018 | OJE018 |
| 26 | .016" | | OJA016 | OJJ016 | OJH016 | OJD016 | OJE016 |
| 27 | .014" | | OJA014 | OJJ014 | OJH014 | OJD014 | OJE014 |
| 28 | .012" | | OJA012 | OJJ012 | OJH012 | OJD012 | OJE012 |
| 30 | .010" | | OJA010 | OJJ010 | OJH010 | OJD010 | OJE010 |
| 32 | .008" | | OJA008 | OJJ008 | OJH008 | — | — |

(ADD NO. OF TEETH TO CATALOG NUMBER WHEN ORDERING)

* (3" & 4" O.D.'s WITH 1/2" HOLES, ADD "H" AFTER THE PART NO.)



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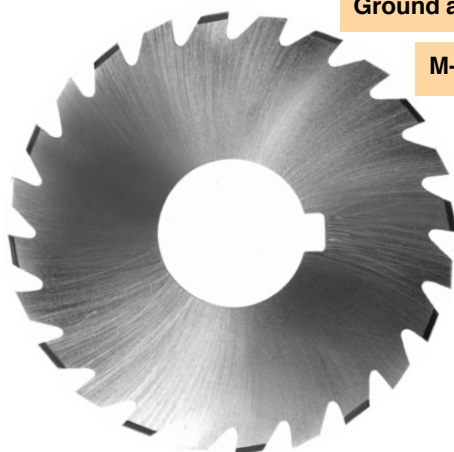
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03/09

HIGH SPEED STEEL - TYPE SMF COPPER SLITTING / RISER SLOTING SAWS

Used for cutting rolled Aluminum and Copper — materials that produce long, stringy chips.



Ground and Landed Teeth

M-2 High Speed Steel

**Hollow Ground For
Side Clearance**

Alternately Beveled Teeth



Alternately beveled teeth (see sketch) produce chips of less than the width of the slot being cut, eliminating the tendency of chips to clog.

NOTE:

For prices of thicknesses not shown, use next higher price in schedule (plus a slight grinding charge for smaller quantities). Other diameters, hole sizes, thicknesses, number of teeth, etc., also available on application.

**Rake Angle of
Teeth: 10° Positive**

**Metric
Sizes**

| Thickness | | O.D. | 2-1/2" | 3" | 4" | 5" | 6" |
|-----------|---------|-------------------------|-----------|-----------|-----------|-----------|-----------|
| Fraction | Decimal | Hole No. of Teeth | 7/8" | 1" | 1" | 1" | 1" |
| 3/16" | .1875" | | 20 | 24 | 26 | 32 | 36 |
| 5/32" | .1562" | | | OSMFD1562 | OSMFE1562 | OSMFF1562 | OSMFG1562 |
| 1/8" | .1250" | | OSMFH1250 | OSMFD1250 | OSMFE1250 | OSMFF1250 | OSMFG1250 |
| 3/32" | .0937" | | OSMFH0937 | OSMFD0937 | OSMFE0937 | OSMFF0937 | OSMFG0937 |
| 1/16" | .0625" | | OSMFH0625 | OSMFD0625 | OSMFE0625 | OSMFF0625 | OSMFG0625 |
| 3/64" | .0468" | | OSMFH0468 | OSMFD0468 | OSMFE0468 | OSMFF0468 | OSMFG0468 |
| 1/32" | .0312" | | OSMFH0312 | OSMFD0312 | OSMFE0312 | | |

Tolerances: O.D. $\pm .005$; Thickness $\pm .0005$; I.D. $+.001$ $-.000$
Closer tolerances available at additional cost.

RESHARPENING SERVICE

*Complete resharpening
service is available.
Prices on application.*

COATING SERVICE

*TiN, TiCN and other
surface coatings are
available.
Prices on application.*

HIGH SPEED STEEL PRECISION RISER SLOTING / COPPER SLITTING SAWS / (JOYAL®)

Used for slotting copper commutator risers and other materials that produce long, stringy chips.

The two styles of saws shown below are for Commutator Riser Slotting.

These saws are precision ground on all surfaces; dimensions are shown under the actual size illustrations at right. Formed teeth are on center, with a 15° back-off and 45° alternate bevel which is 1/3 the width of the tooth. Saws are hollow-ground to provide clearance between the periphery and the hole.

Catalog Number

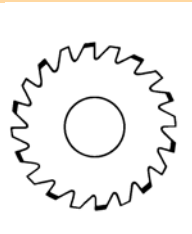
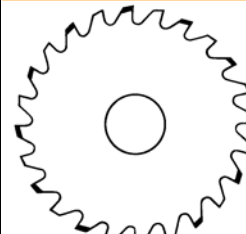
W-75-20FAB, 7/8" x 5/16", 20 Teeth OW7520 — — (*Specify Thickness)

W-105-30FAB, 1-1/4" x 5/16", 30 Teeth OW10530 — — (*Specify Thickness)

*Saws are stocked in thicknesses from .010" through .069" in .001" increments.

Specify Thicknesses when ordering.

M-2 High Speed Steel.

| Type W-75-20FAB | Type W-105-30FAB |
|---|---|
| 7/8" O.D. x 5/16" I.D. 20 Teeth | 1-1/4" O.D. x 5/16" I.D. 30 Teeth |
|  |  |

Thickness tolerances are $+.0000$ $-.0002$ ".



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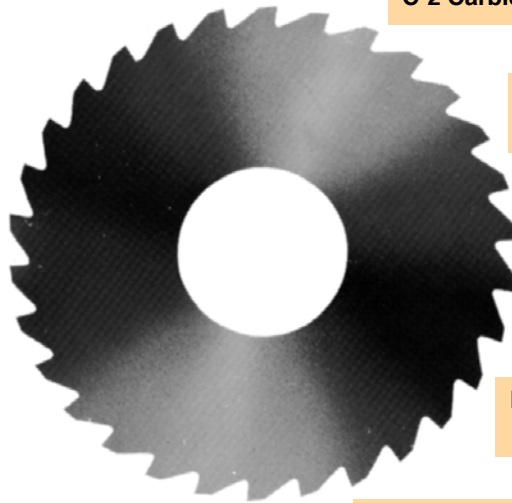
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Web Site: www.martindaleco.com

02/05

CARBIDE METAL-WORKING SAWS



C-2 Carbide

**Hollow Ground For
Side Clearance**

**Rake Angle
of Teeth:
5° Positive**

**Metric Sizes
Available**

Carbide metal-working saw blades have steadily gained in popularity for many applications. Carbide, harder and more wear resistant than High-Speed Steel, provides longer tool life and decreased cycle times. Slotting, Slitting, Cut-Off and many other uses benefit from the use of solid carbide saw blades. A rigid set up with proper speed and feed, using correct coolant and tooth geometry for the application, will ensure optimum performance of your solid carbide saws. Contact our sales department to discuss the correct circular saw blade for your specific application.

SPECIALS: An almost endless number of variations from the tooth types and specifications shown below can be furnished to suit your exact needs and at comparable prices. Let us know your particular Carbide Metal-Working Saw Blade requirements so we can quote price and delivery.

Specify thickness and number of teeth when ordering.

Tolerances: O.D. $\pm .005$; Thickness $\pm .0005$; I.D. $+.001$ $-.000$
Closer tolerances available at additional cost.

| | O.D. | 1-1/2" | 1-3/4" | 1-3/4" | 2" | 2" | 2-1/4" | 2-1/4" | 2-1/2" | 2-3/4" | 3" | 4" | 5" | 6" |
|--------------------|-----------------|--------|--------|--------|------|-------|--------|--------|--------|--------|------|------|------|------|
| | HOLE | 1/2" | 1/2" | 7/8" | 1/2" | 1" | 5/8" | 1" | 1" | 1" | 1" | 1" | 1" | 1" |
| Thickness Range | No. of Teeth | 36 | 38 | 38 | 40 | 40 | 44 | 44 | 48 | 60 | 72 | 80 | 100 | 120 |
| .010" - .019" | | X1I | X1A | X1AA | X1J | X1JJ | X1B | X1BB | X1H | X1C | X1D | — | — | — |
| .020" - .030" | | X2I | X2A | X2AA | X2J | X2JJ | X2B | X2BB | X2H | X2C | X2D | X2E | — | — |
| .031" - .050" | | X3I | X3A | X3AA | X3J | X3JJ | X3B | X3BB | X3H | X3C | X3D | X3E | X3F | X3G |
| .051" - .070" | | X4I | X4A | X4AA | X4J | X4JJ | X4B | X4BB | X4H | X4C | X4D | X4E | X4F | X4G |
| .071" - .090" | | X5I | X5A | X5AA | X5J | X5JJ | X5B | X5BB | X5H | X5C | X5D | X5E | X5F | X5G |
| .091" - .110" | | X6I | X6A | X6AA | X6J | X6JJ | X6B | X6BB | X6H | X6C | X6D | X6E | X6F | X6G |
| .111" - .130" | | X7I | X7A | X7AA | X7J | X7JJ | X7B | X7BB | X7H | X7C | X7D | X7E | X7F | X7G |
| .131" - .150" | | X8I | X8A | X8AA | X8J | X8JJ | X8B | X8BB | X8H | X8C | X8D | X8E | X8F | X8G |
| .151" - .170" | | X9I | X9A | X9AA | X9J | X9JJ | X9B | X9BB | X9H | X9C | X9D | X9E | X9F | X9G |
| .171" - .190" | | X10I | X10A | X10AA | X10J | X10JJ | X10B | X10BB | X10H | X10C | X10D | X10E | X10F | X10G |
| .191" - .210" | | X11I | X11A | X11AA | X11J | X11JJ | X11B | X11BB | X11H | X11C | X11D | X11E | X11F | X11G |
| .211" - .230" | | X12I | X12A | X12AA | X12J | X12JJ | X12B | X12BB | X12H | X12C | X12D | X12E | X12F | X12G |
| .231" - .250" | | X13I | X13A | X13AA | X13J | X13JJ | X13B | X13BB | X13H | X13C | X13D | X13E | X13F | X13G |

**Teeth shown
for general use.
A wide range of
teeth available.**

**Keyways are
optional at
extra cost.**

**Speed should be
approximately 50%
greater than HSS.**

Specify thickness and number of teeth when ordering.

RESHARPENING SERVICE

*Complete resharpening
service is available.
Prices on application.*

COATING SERVICE

*TiN, TiCN and other
surface coatings are
available.
Prices on application.*



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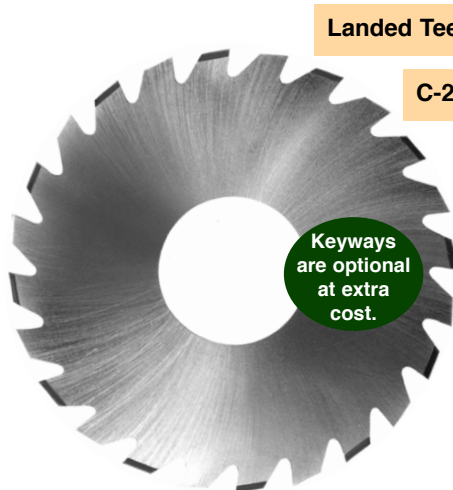
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SOLID CARBIDE - TYPE SMF COPPER SLITTING / RISER SLOTING SAWS

Used for cutting rolled Aluminum and Copper — materials that produce long, stringy chips.



Landed Teeth

C-2 Carbide

Hollow Ground For
Side Clearance

Keyways
are optional
at extra
cost.

Alternately Beveled Teeth



Alternately beveled teeth (see sketch) produce chips of less than the width of the slot being cut, eliminating the tendency of chips to clog.

NOTE:

For prices of thicknesses not shown, use next higher price in schedule. Other diameters, hole sizes, thicknesses, number of teeth, etc., also available on application.

Rake Angle of
Teeth: 10° Positive

Metric Sizes
Available

| Thickness | | O.D. | 2-1/2" | 3" | 4" | 5" | 6" |
|-----------|---------|--------|-----------|-----------|-----------|-----------|-----------|
| | | Hole | 7/8" | 1" | 1" | 1" | 1" |
| | | No. of | | | | | |
| Fraction | Decimal | Teeth | 20 | 24 | 26 | 32 | 36 |
| 3/16" | .1875" | | | | XSMFE1875 | XSMFF1875 | XSMFG1875 |
| 5/32" | .1562" | | | | XSMFE1562 | XSMFF1562 | XSMFG1562 |
| 1/8" | .1250" | | | XSMFD1250 | XSMFE1250 | XSMFF1250 | XSMFG1250 |
| 3/32" | .0937" | | XSMFH0937 | XSMFD0937 | XSMFE0937 | XSMFF0937 | XSMFG0937 |
| 1/16" | .0625" | | XSMFH0625 | XSMFD0625 | XSMFE0625 | XSMFF0625 | XSMFG0625 |
| 3/64" | .0468" | | XSMFH0468 | XSMFD0468 | XSMFE0468 | XSMFF0468 | XSMFG0468 |
| 1/32" | .0312" | | XSMFH0312 | XSMFD0312 | XSMFE0312 | | |

Tolerances: O.D. ±.005; Thickness ±.0005; I.D. +.001 -.000
Closer tolerances available at additional cost.

COATING SERVICE

TiN, TiCN and other
surface coatings are
available.
Prices on application.

RESHARPENING SERVICE

Complete resharpening
service is available.
Prices on application.

Speed should be
approximately 50%
greater than HSS.

SOLID CARBIDE PRECISION RISER SLOTING / COPPER SLITTING SAWS / (JOYAL®)

Used for slotting copper commutator risers and other materials that produce long, stringy chips.

The two styles of saws shown are for Commutator Riser Slotting.

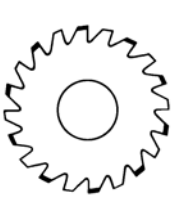
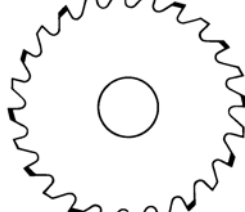
These saws are precision ground on all surfaces; dimensions are shown under the actual size illustrations at right. Formed teeth are on center, with a 15° back-off and 45° alternate bevel which is 1/3 the width of the tooth. Saws are hollow-ground to provide clearance between the periphery and the hole.

W-75-20FAB, 7/8" x 5/16", 18 TeethTUNSW7518__ __ __ (*Specify Thickness)
W-105-30FAB, 1-1/4" x 5/16", 22 TeethTUNSW10522__ __ __ (*Specify Thickness)

*Saws are stocked in thicknesses from .010" through .069" in .001" increments.

Specify Thicknesses when ordering.

C-2 Solid Carbide.

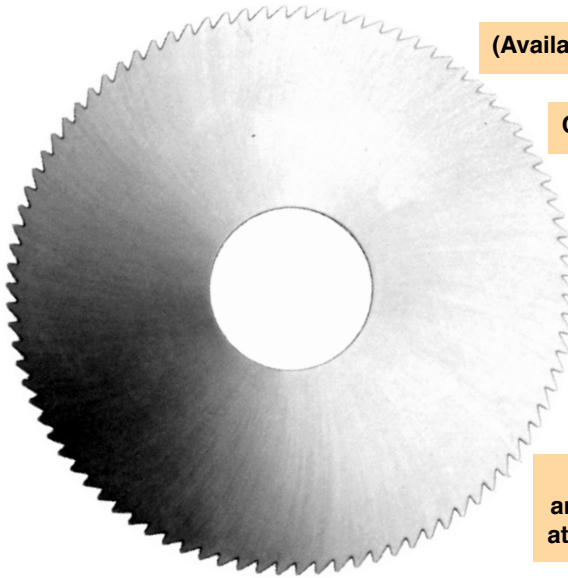
| Type W-75-18FAB | Type W-105-22FAB |
|--|---|
| 7/8" O.D. x 5/16" I.D. 18 Teeth | 1-1/4" O.D. x 5/16" I.D. 22 Teeth |
|  |  |

Thickness tolerances are ± .0005".



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CARBIDE CUT-OFF SAWS



(Available in High-Speed Steel, upon request.)

C-2 Carbide

**Hollow Ground
For Side
Clearance**

**Rake Angle
of Teeth: 5°**

**Keyways
are optional
at extra cost**

These saws are used for Rotary Cut-Off applications. The saws are made from C-2 Micro Grain Carbide and are produced to very close tolerances.

| STOCK SAWS | | | | | |
|------------|--------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | O.D. | 3" | 3-1/2" | 4" | 4-1/4" |
| | Hole | 1" | 1" | 1" | 1" |
| | No. of Teeth | 90, 120 | 90, 120 | 90, 120 | 90, 120 |
| Thickness | | | | | |
| .064" | | XSAD064 | XSAK064 | XSAE064 | XSAO064 |
| .045" | | XSAD045 | XSAK045 | XSAE045 | XSAO045 |
| .032" | | XSAD032 | XSAK032 | XSAE032 | XSAO032 |

**(ADD TO CATALOG NUMBER WHEN ORDERING:
NO. OF TEETH, HIGH SIDE OF SHEAR
ANGLE (R or L), AND DEGREE OF ANGLE.)**

Tolerances: O.D. $\pm .005$; Thickness $\pm .0005$;
I.D. $+.001$ $-.000$
Closer tolerances available at additional cost.

**5 - 10° Cut-Off Angle
(specify angle desired)**

High Side Right,
Top Teeth Coming
(Regular)

- OR -

**5 - 10° Cut-Off Angle
(specify angle desired)**

High Side Left,
Top Teeth Coming
(Reverse)

COATING SERVICE

*TiN, TiCN and other
surface coatings are
available.
Prices on application.*

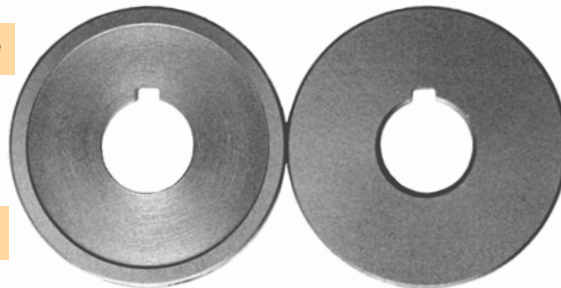
RESHARPENING SERVICE

*Complete resharpening
service is available.
Prices on application.*

SUPPORT WASHERS

Flanged Edge

Precision Ground



M-2 High-Speed Steel

Hardened

All saws, but especially those which are relatively thin, should be supported with as large as possible diameter flange support washers.

These side support washers distribute the clamping force evenly, provide additional stability, and lessen the chance for deflection in thinner blades.

| Size | | | |
|------|-----------|------|----------------------------|
| O.D. | Thickness | I.D. | Catalog Number |
| 2" | 1/8" | 1" | OWASH218K |
| 3" | 1/8" | 1" | OWASH318K |
| 3" | 3/16" | 1" | OWASH3316K |

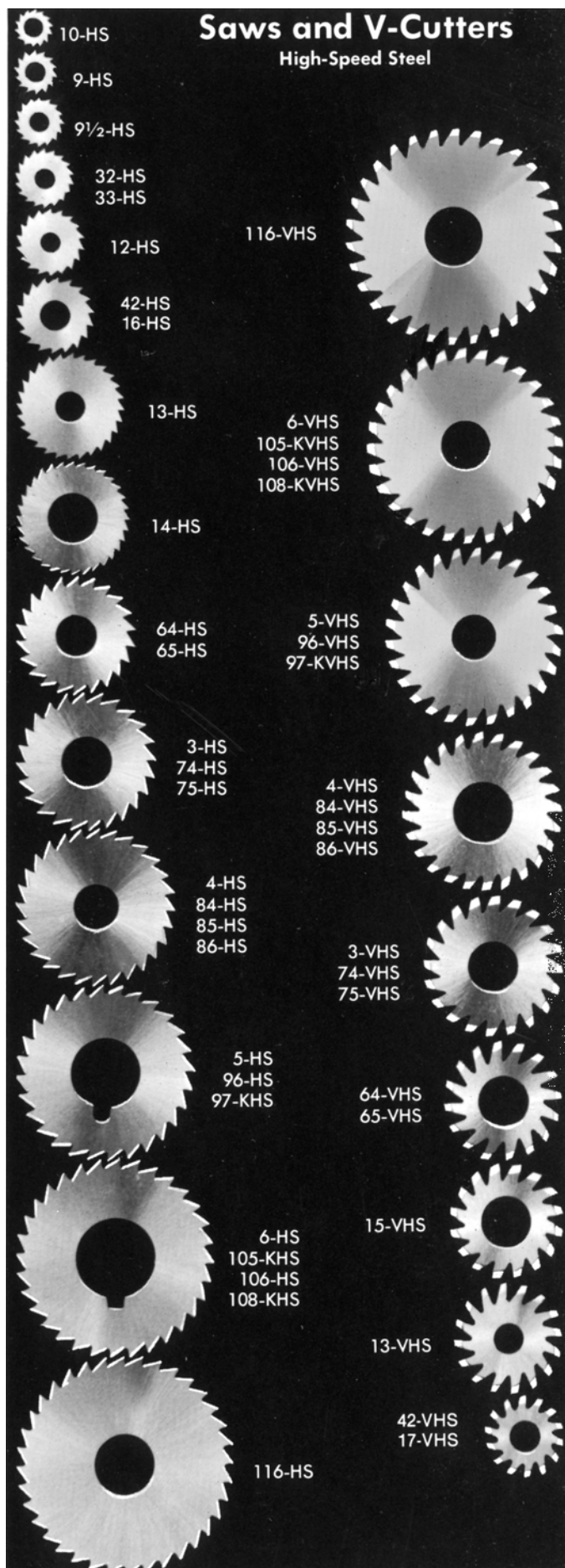


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Martindale Undercutting Saws

GENERAL

Martindale Undercutting Saws and V-Cutters are available in High-Speed Steel or Tungsten-Carbide. Both types are carefully designed as to tooth form, hollow grind, hardness, etc., and are manufactured to close tolerances in our own plant.

While used primarily for undercutting mica and slotting risers of commutators, Martindale Undercutting Saws and V-cutters are also used for cutting steel, aluminum, plastics, and other materials not requiring set teeth.

Undercutting differs from ordinary machining in that, instead of shearing, it is a combination of crushing, grinding, and conveying. Mica is very abrasive and varies in hardness, making necessary the very best design and production controls in the manufacture of undercutting saws.

HIGH-SPEED STEEL SAWS and V-CUTTERS

These can be used on either portable or stationary equipment with spindle speeds of 1,500 to 5,000 r.p.m.

(See Martindale Mica Undercutters for 16 Undercutters.)

SAWS ("U"-Slot)

Actual size illustrations at left; specifications below. **Saws stocked in these thicknesses:**

.015" .023" .028" .035" .043" .053" .060" (Other thicknesses available at extra cost.)
.018" .025" .030" .038" .045" .055" .063"
.020" .026" .032" .040" .050" .058" .065"

Be sure to specify thicknesses.

| Type Number | O.D. | Hole | No. Teeth | Catalog Number |
|-------------|--------|-------|-----------|----------------|
| 10-HS | 1/4" | 1/8" | 14 | HSMS10 |
| 9-HS | 9/32" | 1/8" | 14 | HSMS9 |
| 9-1/2-HS | 5/16" | 1/8" | 16 | HSMS9.5 |
| 32-HS | 3/8" | 1/8" | 18 | HSMS32 |
| 33-HS | 3/8" | 3/16" | 18 | HSMS33 |
| 12-HS | 7/16" | 1/8" | 18 | HSMS12 |
| 42-HS | 1/2" | 1/8" | 18 | HSMS42 |
| 16-HS | 1/2" | 3/16" | 18 | HSMS16 |
| 13-HS | 11/16" | 3/16" | 28 | HSMS13 |
| 14-HS | 23/32" | 5/16" | 32 | HSMS14 |
| 64-HS | 3/4" | 1/4" | 22 | HSMS64 |
| 65-HS | 3/4" | 5/16" | 22 | HSMS65 |
| 74-HS | 7/8" | 1/4" | 24 | HSMS74 |
| 3-HS | 7/8" | 9/32" | 24 | HSMS3 |
| 75-HS | 7/8" | 5/16" | 24 | HSMS75 |
| 84-HS | 1" | 1/4" | 28 | HSMS84 |
| 4-HS | 1" | 9/32" | 28 | HSMS4 |
| 85-HS | 1" | 5/16" | 28 | HSMS85 |
| 86-HS | 1" | 3/8" | 28 | HSMS86 |
| 5-HS | 1-1/8" | 9/32" | 28 | HSMS5 |
| 96-HS | 1-1/8" | 3/8" | 28 | HSMS96 |
| 97-KHS | 1-1/8" | 7/16" | 28 | HSMS97K |
| 6-HS | 1-1/4" | 9/32" | 32 | HSMS6 |
| 105-KHS | 1-1/4" | 5/16" | 32 | HSMS105K |
| 106-HS | 1-1/4" | 3/8" | 32 | HSMS106 |
| 108-KHS | 1-1/4" | 1/2" | 32 | HSMS108K |
| 116-HS | 1-3/8" | 3/8" | 36 | HSMS116 |

Metric Sizes
25 mm. O.D. x 7mm. I.D.
Saws in stock,
along with other metric
sizes upon request.

V-CUTTERS ("V"-Slot)

Actual size illustrations at left; specifications below. **These cutters are all .045" thick and stocked with 40°, 50°, and 60° angles between cutting edges.** 40° V-cutters are for thin mica, 50° for medium mica, 60° for thick mica.

Be sure to specify angle 40°, 50°, or 60°.

| Type Number | O.D. | Hole | No. Teeth | Catalog Number |
|-------------|--------|-------|-----------|----------------|
| 42-VHS | 1/2" | 1/8" | 12 | HSMSV42 |
| 17-VHS | 1/2" | 3/16" | 12 | HSMSV17 |
| 13-VHS | 11/16" | 3/16" | 14 | HSMSV13 |
| 15-VHS | 23/32" | 5/16" | 14 | HSMSV15 |
| 64-VHS | 3/4" | 1/4" | 14 | HSMSV64 |
| 65-VHS | 3/4" | 5/16" | 14 | HSMSV65 |
| 74-VHS | 7/8" | 1/4" | 18 | HSMSV74 |
| 3-VHS | 7/8" | 9/32" | 18 | HSMSV3 |
| 75-VHS | 7/8" | 5/16" | 18 | HSMSV75 |
| 84-VHS | 1" | 1/4" | 22 | HSMSV84 |
| 4-VHS | 1" | 9/32" | 22 | HSMSV4 |
| 85-VHS | 1" | 5/16" | 22 | HSMSV85 |
| 86-VHS | 1" | 3/8" | 22 | HSMSV86 |
| 5-VHS | 1-1/8" | 9/32" | 24 | HSMSV5 |
| 96-VHS | 1-1/8" | 3/8" | 24 | HSMSV96 |
| 97-KVHS | 1-1/8" | 7/16" | 24 | HSMSV97K |
| 6-VHS | 1-1/4" | 9/32" | 24 | HSMSV6 |
| 105-KVHS | 1-1/4" | 5/16" | 24 | HSMSV105K |
| 106-VHS | 1-1/4" | 3/8" | 24 | HSMSV106 |
| 108-KVHS | 1-1/4" | 1/2" | 24 | HSMSV108K |
| 116-VHS | 1-3/8" | 3/8" | 26 | HSMSV116 |

Metric Sizes
25 mm. O.D. x 7mm. I.D.
V-Cutters in stock,
along with other metric
sizes upon request.

TUNGSTEN-CARBIDE SAWS and V-CUTTERS

The teeth of both saws and V-cutters have a slight land to give strength to the cutting edge. Saws are hollow-ground for clearance, V-cutters have ample radial relief. When Carbide Saws are used on other equipment than our undercutters, steel supporting washers are recommended to reduce breakage. Spindle speeds may vary from 3,000 to 12,000 r.p.m., depending on Saw O.D. Martindale Carbide Saw Blades are harder than High Speed Steel Saws, therefore more brittle and should not be subjected to applications where shock may shorten the service life. Use on rigid stationary equipment.

See Undercutters for 9 Martindale Undercutters for use with these saws: Close-Cut, Kut-Kwik, Utility, Bench-Type Model HV-3, Lathe-Type and Super Lathe-Type, Heavy-Duty Bench-Type Model H-9, Industrial Model HA-2, and Model UL Lathe Mounted Automatic.

SAWS ("U"-Slot)

Actual size illustrations; specifications below. **Thickness ranges as follows:**

1/4" - 9/16" O.D. from .010" to .045" thick
5/8" - 1-3/8" O.D. from .010" to .065" thick

Be sure to specify thicknesses.

| Type Number | O.D. | Hole | No. Teeth | Catalog Number |
|-------------|--------|-------|-----------|----------------|
| 10-TC | 1/4" | 1/8" | 12 | TUNS10 |
| 9-1/2-TC | 5/16" | 1/8" | 14 | TUNS9.5 |
| 32-TC | 3/8" | 1/8" | 14 | TUNS32 |
| 33-TC | 3/8" | 3/16" | 14 | TUNS33 |
| 12-TC | 7/16" | 1/8" | 14 | TUNS12 |
| 42-TC | 1/2" | 1/8" | 14 | TUNS42 |
| 16-TC | 1/2" | 3/16" | 14 | TUNS16 |
| 18-TC | 9/16" | 1/4" | 16 | TUNS18 |
| 54-TC | 5/8" | 1/4" | 16 | TUNS54 |
| 64-TC | 3/4" | 1/4" | 18 | TUNS64 |
| 65-TC | 3/4" | 5/16" | 18 | TUNS65 |
| 75-TC | 7/8" | 5/16" | 20 | TUNS75 |
| 4-TC | 1" | 9/32" | 20 | TUNS4 |
| 84-TC | 1" | 1/4" | 20 | TUNS84 |
| 85-TC | 1" | 5/16" | 20 | TUNS85 |
| 86-TC | 1" | 3/8" | 20 | TUNS86 |
| 95-TC | 1-1/8" | 5/16" | 22 | TUNS95 |
| 96-TC | 1-1/8" | 3/8" | 22 | TUNS96 |
| 105-TC | 1-1/4" | 5/16" | 24 | TUNS105 |
| 106-TC | 1-1/4" | 3/8" | 24 | TUNS106 |
| 108-TC | 1-1/4" | 1/2" | 24 | TUNS108 |
| 116-TC | 1-3/8" | 3/8" | 24 | TUNS116 |

COMPOUND-LAND SAWS

The compound-land feature, sketched at right, is available on tungsten-carbide "U"-slot saws 9/16" O.D. and up (#18-TC thru #116-TC) at a 30% premium in price. Because of this feature, each tooth cuts only 50% of full slot width, resulting in better chip clearance, cooler operation and production increases of up to 60% over the square-toothed Saw. To order, add "CL" to Catalog Number. Minimum thickness .015".

**V-CUTTERS ("V"-Slot)**

Actual size illustrations; specifications below. **Thickness ranges as follows:**

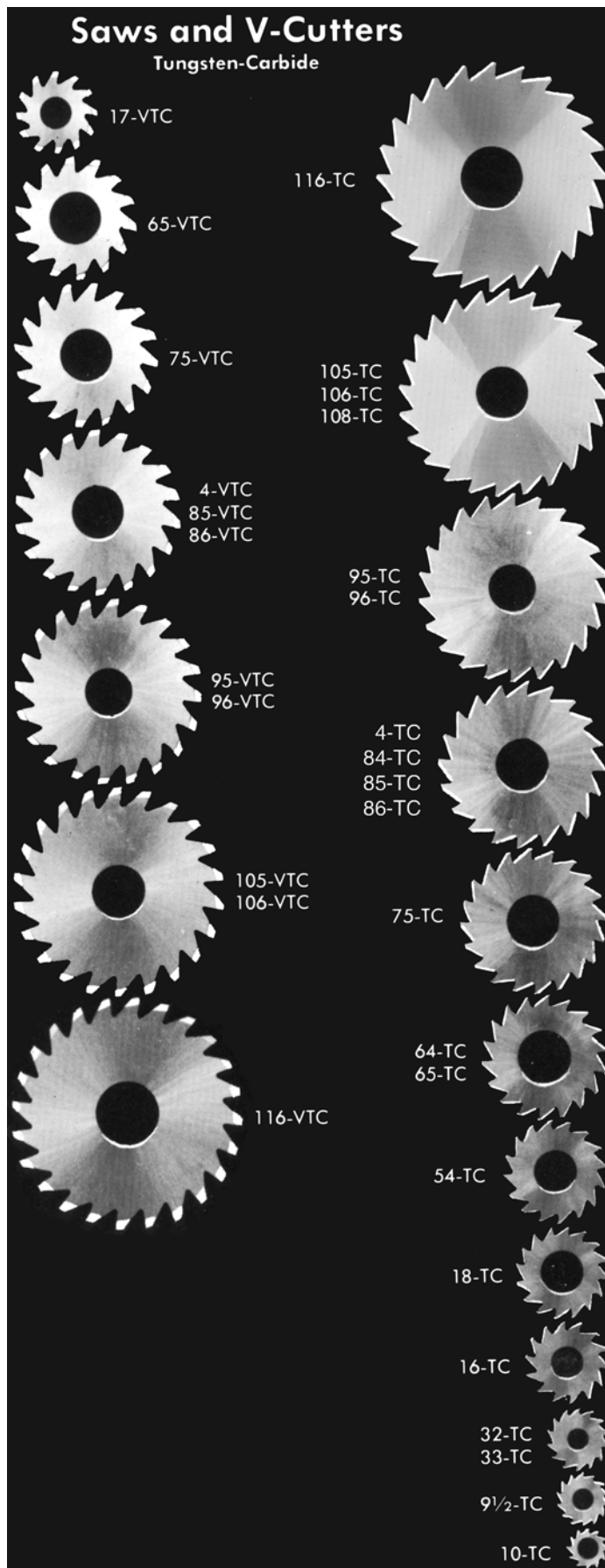
1/2" O.D. from .030" to .045" thick
3/4" - 1-3/8" O.D. from .030" to .065" thick

Angles between cutting edges can be 40°, 50°, and 60°. 40° V-cutters are for thin mica, 50° for medium mica, 60° for thick mica.

Be sure to specify thicknesses and angle, 40°, 50° or 60°.

| Type Number | O.D. | Hole | No. Teeth | Catalog Number |
|-------------|--------|-------|-----------|----------------|
| 42-VTC | 1/2" | 1/8" | 12 | TUNSV42 |
| 17-VTC | 1/2" | 3/16" | 12 | TUNSV17 |
| 65-VTC | 3/4" | 5/16" | 14 | TUNSV65 |
| 75-VTC | 7/8" | 5/16" | 16 | TUNSV75 |
| 4-VTC | 1" | 9/32" | 18 | TUNSV4 |
| 85-VTC | 1" | 5/16" | 18 | TUNSV85 |
| 86-VTC | 1" | 3/8" | 18 | TUNSV86 |
| 95-VTC | 1-1/8" | 5/16" | 20 | TUNSV95 |
| 96-VTC | 1-1/8" | 3/8" | 20 | TUNSV96 |
| 105-VTC | 1-1/4" | 5/16" | 22 | TUNSV105 |
| 106-VTC | 1-1/4" | 3/8" | 22 | TUNSV106 |
| 116-VTC | 1-3/8" | 3/8" | 22 | TUNSV116 |

SPECIALS — Your inquiries are invited for sizes not listed on the H.S.S. or Tungsten-Carbide Saw Pages.

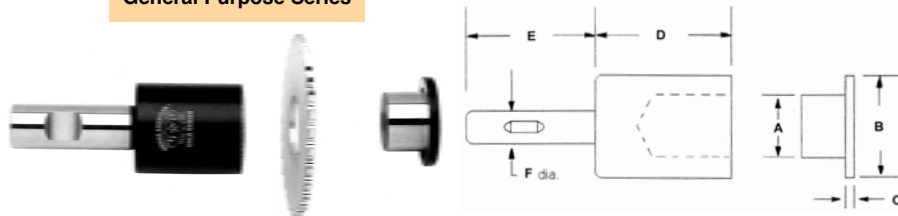


SAW ARBORS

General purpose slitting/slotting saw arbors. Hardened all over (58/60 Rc) for added toughness on cutter locating surfaces and shanks. Shanks ground to within .001 T.I.R. of cutter location diameter. Extra long, strong body with protective black oxide finish. Super low profile on caps allows cutter to reach areas inaccessible with conventional arbors. Stout plug: extra support, less vibration. Weldon style shanks.

Martindale now offers a Gold Series reach arbor. These arbors are heat treated and ground to .0004" T.I.R. concentricity and squareness. They are engineered for use with carbide cutters or where accuracy is a must. This VIBRA-CORE design, along with the deep low profile caps, gives extra support and less vibration.

General Purpose Series



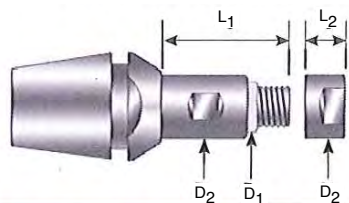
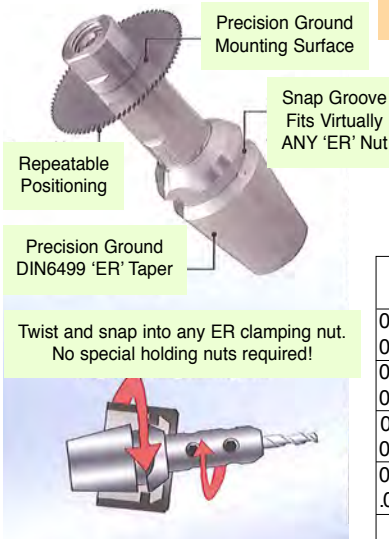
Gold Star Precision Series



| A | B | C | D | E | F | General Purpose Catalog Number | Gold Series Catalog Number |
|-------|-------|------|-------|-------|------|-----------------------------------|-------------------------------|
| 0.250 | 0.500 | .080 | 1.000 | 1.700 | .500 | ARBR0250 | ARBR0250P |
| 0.375 | 0.625 | .080 | 1.180 | 1.700 | .500 | ARBR0375 | ARBR0375P |
| 0.500 | 0.750 | .095 | 1.370 | 1.700 | .500 | ARBR0500 | ARBR0500P |
| 0.625 | 1.000 | .122 | 1.500 | 2.030 | .750 | ARBR0625 | ARBR0625P |
| 1.000 | 1.500 | .160 | 1.750 | 2.030 | .750 | ARBR1000 | ARBR1000P |

SAW ARBORS with ER16 Taper - Ti-Loc® Swiss Clamp System

Taper Integrated Tooling for Advanced Productivity



- Can be used in any machine that has ER collet live tooling.
- ER 16 taper arbors serve as their own collet, eliminating need for two piece arbor system.
- One piece design adds rigidity of set-up and improves total indicated run-out (TIR).
- Less expensive & more cost effective than comparable two piece arbor systems.

| D1 | D2 | L1 | L2 | Taper | Catalog Number |
|--|-------|------|-----|-------|----------------|
| 0.125" | 6.4mm | 25mm | 9mm | ER16 | ARBR318064250 |
| 0.125" | 6.4mm | 32mm | 9mm | ER16 | ARBR318064320 |
| 0.187" | 9.5mm | 25mm | 9mm | ER16 | ARBR476095250 |
| 0.187" | 9.5mm | 32mm | 9mm | ER16 | ARBR476095320 |
| 0.250 | 9.5mm | 25mm | 9mm | ER16 | ARBR635095250 |
| 0.250" | 9.5mm | 32mm | 9mm | ER16 | ARBR635095320 |
| 0.312" | 10mm | 25mm | 9mm | ER16 | ARBR794100250 |
| .0312" | 10mm | 32mm | 9mm | ER16 | ARBR794100320 |
| Recommended Maximum Saw Thickness ~.080" | | | | | |



GRINDING WHEEL

For Circular Saw Sharpening

For those who have indicated an interest in reshaping their own screw slotting saws. Many have found this wheel/spec to work well for sharpening the teeth of dull, hardened metal working saws, thereby giving new life to blades otherwise considered no longer useful.

Of course we offer a reshaping service for those who don't want to do the work themselves.



8" x 3/16" x 1-1/4" or
8" x 3/16" x 3/4" with
hole reducer.

Grinding Wheel..... **Catalog Number**
GRWHV13



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Helpful Hints For Saw Users (H.S.S. Metal-Working Saws)

These are general suggestions for conventional machines on where to start, and must be varied to meet a particular application. We do not assume any liability in the following statements.

These STOCK saws will do the job. Variations, such as number of teeth, rake angle, clearance angle, bevel, side clearance, material, land, etc. may do it better, but set-up charges and lead time must be considered.

- SPEEDS** — With a good set-up the speeds in the table below should be attainable
 — Reduce the speed for hard (over Rockwell c30) and abrasive materials, and for deep cuts.
 — Increase the speed for “free-machining” and non-ferrous metals.

Saws: M-2 Steel, Ground Teeth, 0° Rake Angle

| Material to be cut | Saw Diameter: | 1-3/4" | | 2-1/4" | | 2-3/4" | | 3" | | 4" | | Coolant |
|--------------------|---------------|--|--------|--------|--------|--------|--------|-------|--------|-------|--------|-------------|
| | | Teeth | R.P.M. | Teeth | R.P.M. | Teeth | R.P.M. | Teeth | R.P.M. | Teeth | R.P.M. | |
| Mild Steel | | 64 | - 450 | 60 | - 350 | 56 | - 275 | 56 | - 250 | 72 | - 200 | Cutting Oil |
| Alloy Steel | | 64 | - 200 | 60 | - 175 | 56 | - 150 | 56 | - 125 | 72 | - 100 | " |
| Stainless Steel | | 64 | - 200 | 60 | - 175 | 56 | - 150 | 56 | - 125 | 72 | - 100 | " |
| Steel Castings | | 64 | - 200 | 60 | - 175 | 44 | - 150 | 44 | - 125 | 60 | - 100 | " |
| Steel Forgings | | 64 | - 450 | 60 | - 350 | 56 | - 275 | 56 | - 250 | 72 | - 200 | " |
| Monel | | 64 | - 200 | 60 | - 175 | 56 | - 150 | 56 | - 125 | 72 | - 100 | " |
| Aluminum | | 64 | - 2000 | 60 | - 1750 | 44 | - 1350 | 44 | - 1250 | 60 | - 950 | Soluble Oil |
| Bronze | | 64 | - 750 | 60 | - 600 | 44 | - 500 | 44 | - 450 | 60 | - 350 | " |
| Yellow Brass | | 64 | - 2500 | 60 | - 2000 | 44 | - 1600 | 44 | - 1500 | 60 | - 1100 | " |
| Copper | | 64 | - 1750 | 60 | - 1350 | 44 | - 1100 | 44 | - 1000 | 60 | - 750 | " |
| Malleable Iron | | 64 | - 350 | 60 | - 250 | 56 | - 200 | 56 | - 200 | 72 | - 150 | " |
| Cast Iron | | 64 | - 450 | 60 | - 350 | 44 | - 275 | 44 | - 250 | 60 | - 200 | Dry |
| Die Castings | | 64 | - 2500 | 60 | - 2000 | 44 | - 1600 | 44 | - 1500 | 60 | - 1100 | " |
| Brittle Plastics | | 64 | - 1000 | 60 | - 900 | 56 | - 700 | 56 | - 650 | 72 | - 500 | " |
| Flexible Plastics | | Use Set Teeth (Hub saw with maximum side clearance for very thin cuts) | | | | | | | | | | |

(There should be at least 2 teeth engaged in the cut.)

Increase Number of Teeth For:

- Thin Material
- Thin Cuts (under .025")
- Slow Spindle Speeds
- Hard Material
- Sandy Castings
- Thin Castings
- Work Hardened
- Hard Spots

Decrease Number of Teeth For:

- Chip Clearance and Tooth Strength (Consider MSL & SMF type saws.)
- Deep Cuts (over 1/4")
- High Speeds
- Free Cutting Material

FEEDS — will vary from .0002" to .002" per tooth. We suggest starting with the cutter described above and trying to arrive at the condition described under “Cutting Fluids” by varying the Feed and Speed. A straw color is the limit. The saw loses its temper when it starts turning blue.

CUTTING FLUIDS — (to cool, lubricate, and wash the chips away. Use Flood. Do not use Mist Units.)

Cutting Oil — Follow Manufacturer's Instructions - or - use a 4% sulphur homogenized cutting oil.

Soluble Oil — Follow Manufacturer's Instructions - or - use 40-1 solution of soluble oil — (Mix thoroughly in a 4 - 1 solution before adding to tank.) **Increase speed and feed until the lubricant starts to give off a slight vapor (smoke).**
 Frequently saws are run too slow, causing rubbing and premature wear.

DISH — (Side-Clearance or Hollow Grind) Increase it for stainless steel and tenacious metals such as copper, zinc, tin or lead.

MOUNTING OF SAWS — Breakage — Wobble — Rubbing: These problems may be caused by the way the washers are mounted on either side of the saw. — Washers drive the saw, in the absence of a driving key, and must always be clean, flat and bur-free. A speck of dirt will let the saw wobble and cut oversize. If a saw breaks, it may score the washers. Check marks around the saw hole for: Dirt, Shiny Spots (as small as a pinpoint, indicating chips imbedded under the washers), and Circular Skid Marks, which indicate the nut is not tight. — Thin saws should especially be supported by washers as large as possible. — Nut must be wrench-tight. — If the saw blade pauses momentarily in its rotation while the feed advances, it will break. — Washers must be of equal diameter or they will flex out the dish and cause one side of the teeth to rub.

Continued Next Page



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Helpful Hints For Saw Users (H.S.S. Metal-Working Saws) (Continued)

TEETH — Deep cuts and soft material require fewer teeth (for chip clearance) and stronger teeth (landed). — Thin material requires more teeth (at least 2 teeth engaged in cut). — Hard materials and narrow slots (under .025") likewise require more teeth. — Alternately beveled teeth keep chips from sticking in the cut and in the tooth gullets. — Rake Angles: On center for iron and steel, 5° negative for yellow brass, from 5° to 10° positive for other soft materials.

BREAKAGE — In addition to causes noted under "MOUNTING OF SAWS": Teeth break when starting a cut at too fast a feed, spindle bearings worn, drive belts loose or sheaves worn, indexing before saw has cleared the slot, work-piece not tight, or the saw is dull (even the best eventually wear out).

KEYWAYS — No keyways are furnished on saws under .020". Thin saws will warp in the heat treating and grinding processes. Locked up between good supporting washers, they will run true.

HUBS — will allow maximum side clearance when attempting to cut wood or plastics. They are helpful when spacing saws on an arbor.

RESHARPENING — In addition to grinding the tips of the teeth, all marks must be removed from the sides of the teeth. This can be done by grinding the diameter below the marks or, as we do, by grinding the tips and clean-up grinding the sides. Either way the thickness is reduced because of the hollow grind that is necessary for even the shallowest of cuts.

VIBRATION AND CHATTER — Arbor bent or worn undersize. — Work-piece improperly supported, particularly watch on thin material. — Teeth too coarse/fine. — Speed too slow. — Climb milling, "Up-milling" is preferred, but climb milling may help on small parts to keep them from being ripped from the clamping fixture. It may also reduce the bur. — Dull tool / Wrong clearance angles. — Feed too slow.

EXCESSIVE WEAR — Seizing: Not enough coolant in the right place. — Not enough side clearance. — Cutter speed too fast and feed too slow. The work may glaze and the saw will rub.

TOLERANCES — are expensive, don't over-specify.

STEELS — M-2 is the best if the set-up is proper. We do have available saws from M-42 along with various surface treatments such as Titanium Nitride.

SUGGESTION — If a saw is working well, send it to us and we will duplicate it. — If a saw is not working well, send us a used blade. We can sometimes make recommendations from the marks on the saw.

Helpful Hints For Saw Users (Mica Undercutting Saws & V-Cutters)

COMMUTATOR UNDERCUTTING

After the commutator has been satisfactorily resurfaced, the mica insulation separating the copper segments must be undercut. Undercutting is one operation that is most easily accomplished with the armature removed from the machine. Various tools are available, however, that enable undercutting to be performed on a commutator "in place" without undue hardship.

Of the various undercutting practices used, only the two most common methods will be discussed herein.

There are three basic types of slots that can be produced by the use of circular cutters. The U-slot, the V-slot and the Compound-angle slot.

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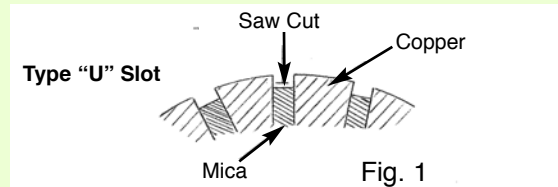
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Helpful Hints For Saw Users

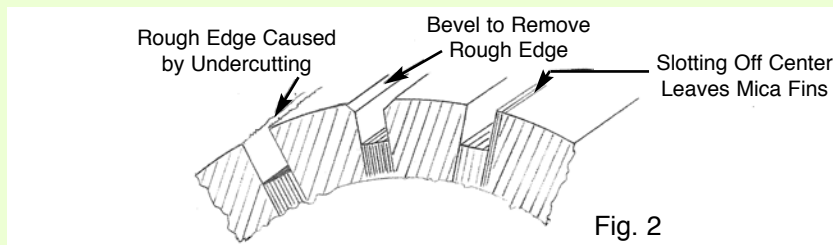
(Mica Undercutting Saws & V-Cutters) (Continued)

U-SLOT

The U-slot (as shown in Fig. 1) is generally preferred if the slots are accessible for easy cleaning. These slots have the advantage, if done carefully, of being effective until the commutator has worn down the full depth of the undercut. The slot should be cut to a depth of $1/32$ (.032) inch, or not more than $3/64$ (.046) inch. If cut too deep, accumulated dust will not be thrown out by the centrifugal action of the rotating commutator.



When using a circular cutter, the width of the cutter is chosen to exceed slightly the thickness of the mica. It is recommended that the **SAW THICKNESS** be figured on the basis of the mica thickness plus .003" (.08mm). This will allow the saw to remove the full width of the mica plus .0015" (.04mm) of copper on each side of the mica slot. If unable to determine the mica width, the use of a feeler gauge can best determine the required saw thickness. Consequently, some copper is cut or dragged off the bar during undercutting, (as shown in Fig. 2).



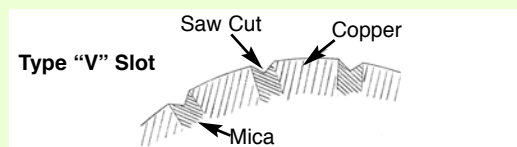
In addition to leaving a jagged edge projecting from the commutator bar, the edge of the bar becomes somewhat work-hardened and hence will not wear down uniformly. Therefore, the edges of the bars must be chamfered by using a suitable slotting file or a specialty shaped scraper. ** See Martindale slotting scrapers. **

A chamfered face of approximately $1/64$ inch is usually adequate to remove any roughness or edge hardening that could be disturbing to the brush faces.

V-SLOT

V-slots keep slots free from dust accumulations at low speeds, and do not require a separate operation for chamfering of the bar edges. V-slots are usually made with either a slotting file, or a "V" tooth circular cutter.

Usual practice is to use a circular cutter having an included angle between cutting edges such that a cut made $1/16$ inch deep will also leave $1/32$ inch free copper above the mica. The "V" tooth circular cutter are available with 40° , 50° or 60° angles between the cutting edges.



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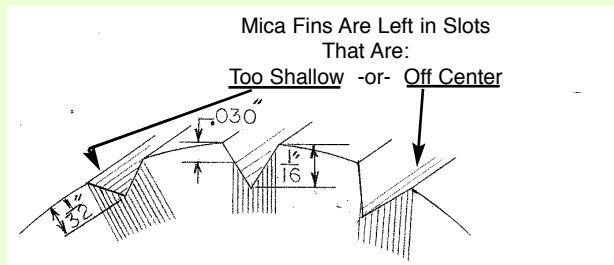
Helpful Hints For Saw Users

(Mica Undercutting Saws & V-Cutters) (Continued)

To obtain a 1/16 inch deep cut with 1/32 inch free copper above the mica, the following table may be used:

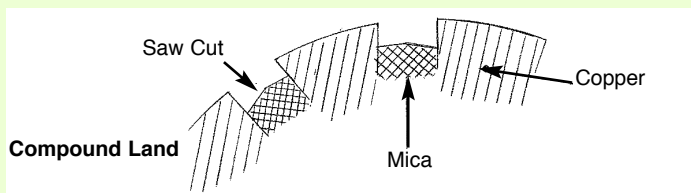
| <u>Thickness of Mica</u> | <u>Angle of "V"-cutter</u> |
|--------------------------|----------------------------|
| .023 inch | 40° |
| .029 inch | 50° |
| .036 inch | 60° |

The necessity of accurately centering the circular cutter on the mica is readily apparent. Mica fins in V-slots being wedge-shaped, are more difficult to remove than the fins of uniform thickness left at the sides of U-slots by inaccurate centering of the circular cutter.



COMPOUND LAND

The teeth on the compound land mica saw are alternately ground to a special taper which reduces the impact on each individual tooth and produces chips of just slightly over half the width of the mica slot thereby eliminating the tendency to clog. When undercutting with a compound land saw the bottom of the slot will appear to be flat. However, as a result of the reverse taper on alternate teeth, the slot will have a slight pyramid or convex surface. This type of saw operates cooler and cleans better thereby prolonging the saw life with resulting economy to the user.



After a commutator has been undercut, it should be very carefully inspected to assure that all copper particles have been removed, that the bars have been carefully chamfered, and that all sharp edges and burrs have been eliminated. Then each slot should be individually checked and reworked as necessary to remove any traces of fin or side mica.

Finally, the surface should be lightly polished with a fine-grain commutator stone. **A more popular method is the use of a rubber bond cleaning stone, which will properly finish the surface and leave the proper filming required.



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