COUNTERSINK FEEDS & SPEEDS

To determine optimum speed, start at the lower end of the speed range, then increase the speed until performance is maximised. It is important not to operate at an excessive RPM as chattering may occur and the cutting area can overheat and become prematurely dull.

$$\text{Countersink RPM formula} = \frac{\text{Cutting Speed x 318.057}}{\text{Diameter of cutter (mm)}}$$

For example, to cut aluminium with a 20.5mm 3 flute countersink

$$= \frac{45 \times 318.057}{20.5}$$

$$= 698 \text{ RPM}$$

MATERIAL	M/MIN.
Aluminium/Aluminium Alloys	**45 – 75**
Brass / Bronze (ordinary)	**25 – 40**
Magnesium/Magnesium Alloys	**40 – 75**
Iron – Cast (soft)	**25 – 40**
Iron – Cast (medium hard)	**15 – 30**
Iron – Hard Chilled	**3 – 10**
Iron – Malleable	**25 – 30**
Monel, High Nickel Steel	**10 – 15**
Steel – Mild (0.2 – 0.3 carbon)	**25 – 30**
Steel – Mild (0.4 – 0.5 carbon)	**20 – 25**
Tool Steels (1.2 carbon)	**15 – 20**
Steel – Forgings	**10 – 15**
Steel – Alloys (300 – 400 Brinnell)	**5 – 10**
Steel – High Tensile (35 – 40 Re)	**10 – 15**
Steel – High Tensile (40 – 45 Re)	**8 – 15**
Steel – High Tensile (45 – 50 Re)	**5 – 10**
Steel – High Tensile (50 – 55 Re)	**2 – 5**
Stainless Steel – Free Machining	**10 – 25**
Stainless Steel – Work Hardening	**5 – 10**
Plastics, Bakelite	**30 – 75**

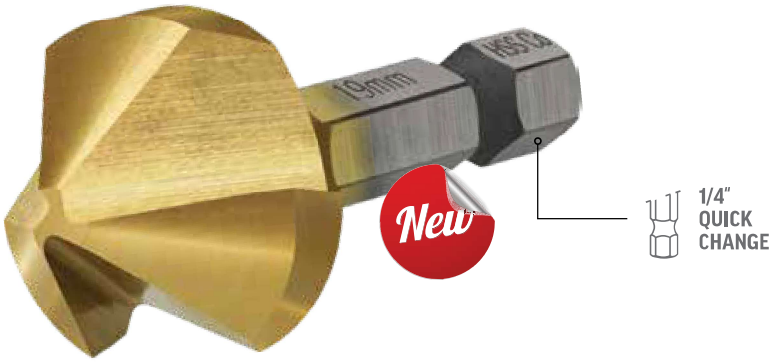
COUNTERSINKING TROUBLE SHOOTING

PROBLEM	CAUSE	SOLUTION
Excessive cutting edge wear	Incorrect feeds and speeds	Increase feed - especially when machining ductile or free machining materials, also try reducing speed
	Rough cutting edge	Lightly hone cutting edge with fine grit diamond hone
	Insufficient coolant	Increase coolant flow – review type of coolant
Chipping	Poor chip removal	Use tool with larger flute space – larger diameter or fewer flutes reducing speed
	Re-cutting work hardened chips	Increase coolant flow
	Vibration	Increase rigidity of set-up, especially worn tool holders
Short tool life	Excessive cratering	Increase speed or decrease feed flutes reducing speed
	Abrasive material	Decrease speed and increase feed and/or increase coolant flow
	Hard materials	Reduce speed – rigidity very important
	Insufficient chip room	Use larger diameter tool
	Delayed resharpening	Prompt resharpening to original geometry will increase tool life
Glazed finish	Feed too light	Increase feed
	Dull cutting edge	Resharpen tool to original geometry
	Insufficient clearance	Resharpen tool with more clearance
Rough finish	Dull cutting edge	Resharpen to original tool geometry
	Wrong feeds and speeds	Increase speed – also try reducing feed
Chattering	Insufficient machine horsepower	Use tool with fewer flutes as correct feeds and speeds must be maintained
	Wrong feeds and speeds	Resharpen tool with more clearance

HSS COBALT with TiN coating

3x LIFE GOLD Series

Designed for long-lasting results in the toughest materials



Suits: Non-hammer action portable power & pedestal drills

HSS COBALT TiN COATING

3 Flute 90° **Countersink**

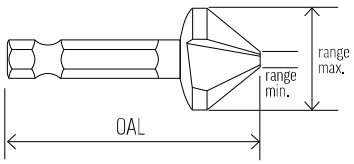
- Fully ground M2 HSS-Co8 increases strength and countersink life
- Titanium nitride coating reduces heat and increases lubricity for extended life
- 3 flute design provides clean and fast countersinking and deburring with a cordless drill

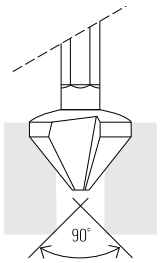
CARDED

METRIC

Head ø mm	Head ø inches	OAL mm	Shank ø inches	Range min – max	CARDED 1 PCE
13	33/64	42.0	1/4	2 – 13	CS3-13QR
16	5/8	43.0	1/4	3 – 16	CS3-16QR
19	3/4	45.5	1/4	4 – 19	CS3-19QR

CARDED – 1 PCE
Supplied in hangable card





HSS COBALT
1 Flute 90° Countersink

- Simple to sharpen by grinding the face of the flute
- Fully ground M42 HSS-Co8 increases strength and countersink life

Single flute construction provides less aggressive and slower cutting than multi-flutes, therefore reducing the risk of chattering permitting optimum performance for the handyman and portable power tools

GENERAL PURPOSE countersinking and deburring in low density materials:

Fully ground **HSS COBALT** for increased strength & longer life

○ Mild Steel	✖ Cast Iron	● Softwood
✖ Hard Steel	✖ Brass	○ Hardwood
● Aluminium	✖ Stainless Steel	● Soft Plastic
		○ Hard Plastic

Legend: ● Optimal ○ Effective ✖ Not recommended

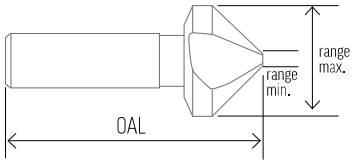
Productivity speed
Power drill suitability
Machine use suitability

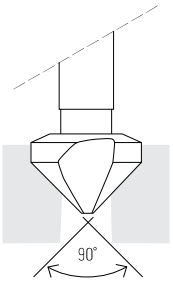
BULK

METRIC

Head ø mm	Head ø inches	OAL mm	Shank ø mm	Range min – max	BULK 1 PCE
10.0	5/16	46.0	6	1 – 10	CS1-10
16.0	5/8	46.5	8	2 – 16	CS1-16
20.0	3/4	47.0	10	2 – 20	CS1-20
25.0	1	51.0	10	3 – 25	CS1-25
30.0	1 3/16	71.0	12	3 – 30	CS1-30

BULK – 1 PCE Supplied in hangable plastic pack





HSS COBALT
3 Flute 90° Countersink

- Fully ground M42 HSS-Co8 increases strength and countersink life

Three flute construction reduces chip load and controls chatter, which permits higher feed rates. Recommended machine use for accurate speed and feed rates for optimum results.

GENERAL PURPOSE countersinking and deburring in high density materials:

Fully ground **HSS COBALT** for increased strength & longer life

● Mild Steel	✖ Cast Iron	○ Softwood
✖ Hard Steel	✖ Brass	● Hardwood
● Aluminium	✖ Stainless Steel	○ Soft Plastic
		● Hard Plastic

Legend: ● Optimal ○ Effective ✖ Not recommended

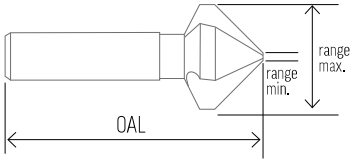
Productivity speed
Power drill suitability
Machine use suitability

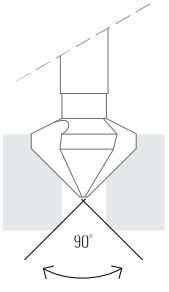
BULK

METRIC

Head ø mm	Head ø inches	OAL mm	Shank ø mm	Range min – max	BULK 1 PCE
6.3	1/4	46	5	1 – 6.3	CS3-6.3
8.3	21/64	46	6	1 – 8.3	CS3-8.3
10.4	13/32	54	6	1 – 10.4	CS3-10.4
12.4	1/2	54	8	2 – 12.4	CS3-12.4
14.4	9/16	56	8	2 – 14.4	CS3-14.4
16.5	21/32	60	10	2 – 16.5	CS3-16.5
20.5	13/16	63	10	2 – 20.5	CS3-20.5
25.0	1	51	10	3 – 25.0	CS3-25
30.0	1 3/16	71	12	3 – 30.0	CS3-30
40.0	1 9/16	80	13	3 – 40.0	CS3-40

BULK – 1 PCE Supplied in hangable plastic pack





HSS AL

5 Flute 90° **Countersink**

- Fully ground HSS-AL increases strength and countersink life

Five flute construction provide optimum stability in hard materials for fast productivity with a fine finish. Perfect for stainless steel. Recommended machine use for accurate speed and feed rates for optimum results.

GENERAL PURPOSE countersinking and deburring:

Fully ground **HSS AL** for increased strength & longer life

● Mild Steel	● Cast Iron	○ Softwood*
● Hard Steel	● Stainless Steel	○ Hardwood*
● Aluminium		○ Soft Plastic*
		○ Hard Plastic*

Legend: ● Optimal ○ Effective ✖ Not recommended

Productivity speed
Power drill suitability
Machine use suitability

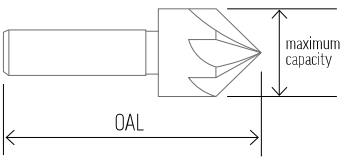
*Restrict speed to 85RPM for plastic and wood to avoid chattering

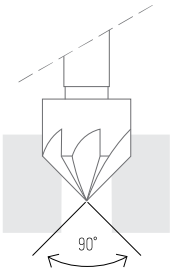
BULK

METRIC

Head ø mm	Head ø inches	OAL mm	Shank ø mm	Maximum capacity	BULK 1 PCE
8.0	5/16	35	5.00	8	CS5-8
12.0	1/2	39	6.35	12	CS5-12
16.0	5/8	52	8.00	16	CS5-16
20.0	3/4	58	10.00	20	CS5-20

BULK – 1 PCE Supplied in hangable plastic pack





HSS COBALT

Cross Hole 90° **Deburrer Countersink**

- Fully ground M42 HSS-Co8 increases strength and countersink life

The cross hole construction is the most universal product suiting the widest range of materials. Optimum deburrer results are obtained in ferrous and non-ferrous metals. Countersinking optimum results are obtained in softer materials such as wood or plastic, however fluted countersinks are more suited for countersinking hard metals.

GENERAL PURPOSE countersinking and deburring:

Fully ground **HSS COBALT** for increased strength & longer life

Deburring:

● Mild Steel	● Cast Iron	○ Softwood
● Hard Steel	● Stainless Steel	○ Hardwood
● Aluminium	● Brass	○ Soft Plastic
		○ Hard Plastic

Countersinking:

✖ Mild Steel	✖ Cast Iron	● Softwood
✖ Hard Steel	✖ Brass	● Hardwood
● Aluminium	✖ Stainless Steel	● Soft Plastic
		● Hard Plastic

Legend: ● Optimal ○ Effective ✖ Not recommended

Productivity speed
Power drill suitability
Machine use suitability

BULK

METRIC

Head ø mm	Head ø inches	OAL mm	Shank ø	Range min – max	BULK 1 PCE
10.0	5/16	46.0	6	4 – 9	CSCH-10
14.0	35/64	46.0	8	6 – 13	CSCH-14
21.5	27/32	64.5	10	8 – 19	CSCH-21
28.0	1 7/64	80.0	12	10 – 24	CSCH-28
35.0	1 3/8	97.0	15	12 – 32	CSCH-35
44.0	1 47/64	115.0	15	16 – 40	CSCH-44

BULK – 1 PCE Supplied in hangable plastic pack