

CBN-/Diamond Grinding Tools, vitrified bonded

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Product line marking

Product lines are labelled in the table header with the appropriate tabs. Further information on page **14** and **15**.

Technical Information

Shanks

The various types of CBN mounted points in a vitrified bond are, without exception, supplied with tungsten carbide shanks; carbide has a module of elasticity three times greater than steel.

The elasticity module denotes the extent to which a body deforms under pressure. Carbide has a high module of elasticity and therefore the deflection of the tools resulting from grinding pressure is kept to a minimum.

There are considerable advantages, eg:

- Reduction of spark-out time; this means a shorter grinding cycle
- Considerable improvement in tool life
- Reduction in tooling and setting costs
- Improvement in surface finish of the workpiece
- Improvement in workpiece geometry

The following table illustrates the rigidity of steel and tungsten carbide shank material in relation to diameter and overhang. A 3 mm diameter steel shank with an overhang of 40 mm is used as the base rigidity value of „1“.

Dressing

There are two main reasons for dressing CBN/diamond tools:

1. To achieve geometrical accuracy.
2. To prevent dulling of the abrasive grain and to free the surface from loading, ie, to maintain a free-cutting tool.

These tools must be dressed wet with ample coolant!

Various dressing methods are used depending on the hardness of the tool. The softer wheel qualities can be dressed with either a single point diamond dresser, or a rotary silicon carbide/diamond wheel. Dressing infeeds are typically in the range of 0.2 mm.

The single point diamond dresser cannot be used for the „medium hard“ qualities. Dressing infeed is in the range of 50 – 200 µm. The harder specifications require dressing after only 50 – 500 workpieces depending on grinding parameters used. Dressing infeed is normally very small, ie, in the range of 2 to 10 microns.

A rotary diamond wheel dresser is used. Very hard qualities which require heavy dressing, need an additional dressing operation to „sharpen“ the tool; a soft silicon carbide rotary dresser is used. The cutting speed should not exceed 10 m/s.

Relative rigidity of steel/tungsten carbide shank

Steel shank 3 mm x 40 mm overhang represents the base rigidity value „1“

overhang mm	shank							
	3		6		8		10	
	Steel	TC	Steel	TC	Steel	TC	Steel	TC
10	64	183	1024	2932	3237	9266	7900	22635
20	8	23	128	367	405	1159	988	2828
40	1	2,9	16	46	51	145	123	354

unstable very stable

Technical Information

Selection of Qualities/CBN/Diamond abrasive tools, vitrified bonded

LUKAS vitrified bonded diamond tools are identified by a quality code which contains all data determining the specification. Please see below some typical specifications:

Quality code CBN	Size	Concentration	Characteristic
53.5*	B 46	C 175	medium
29*	B 54	C 150	universal
34.5	B 54	C 170	
71.1	B 54	C 185	
50.3*	B 64	C 200	very hard
70.7	B 76	C 190	hard
57.7*	B 76	C 175	fine
54.8*	B 91	C 140	medium
70.1	B 91	C 185	hard
46.3*	B 151	C 175	medium

Quality code Diamond	Size	Concentration	Characteristic
15 D	D 91	C 120	
15.4 D	D 91	C 165	hard
18 D*	D 151	C 120	

* = widely used specifications

LFG-bond = Low Force Grinding

We can recommend a suitable quality following receipt of application details.

Special features of the vitrified bond

Concentration

The letter "C" in the specification represents the grit concentration; this can vary quite considerably depending on the application. The concentration denotes the volume of ultrahard abrasive grain used in the tool; this determines the grinding effectiveness and the price.

The opposite table illustrates the range of concentration; the most popular are shown in bold figures.

Range of concentration

C	40	60	100	120	160	200	220
V*	100	150	250	300	400	500	550
Vol%	10	15	25	30	40	50	55

V* = Vol% x 10; this is also used to express concentration

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Industry

Selection of mounted point dimensions

Ordering example: CBN-Mounted Point, Quality 50.3, D 11 mm, Shank 8 x 70



* shank length, please see below

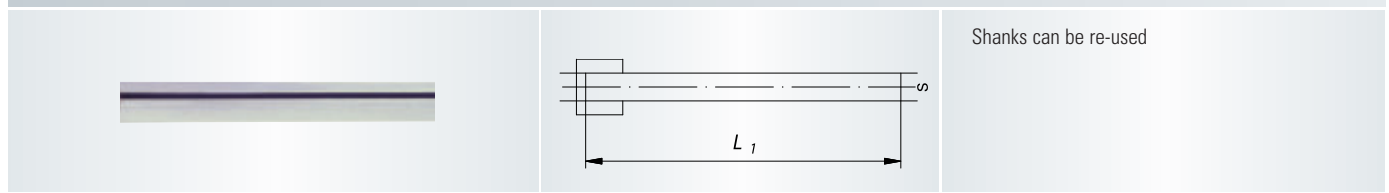
Diameter D	In Increments of	Width T	Shank options*/Diameter S
1,8 – 2,0 mm	0,1 mm	3 mm	2 – 3 mm
2,0 – 2,6 mm	0,1 mm	4 mm	2 – 3 mm
3,0 – 5,0 mm	0,1 mm	5 mm	2 – 5 mm
5,1 – 10,0 mm	0,1 mm	as D taken to nearest mm	4 – 10 mm
10,0 – 40,0 mm	1 mm	10 mm	4 – 12 mm



Industry

Chart for Tungsten carbide shanks

Ordering example: CBN-Mounted Point, Quality 50.3, D 11 mm, Shank 8 x 70

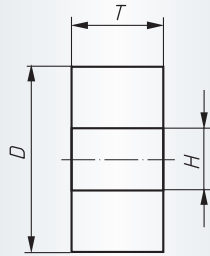
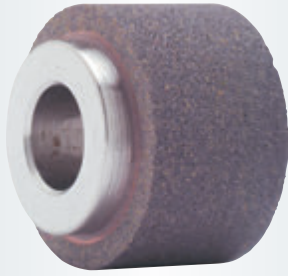


Shanks can be re-used

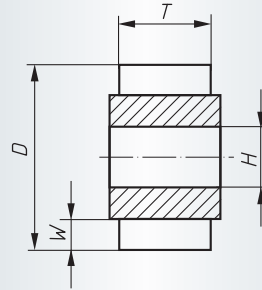
Shank-diameter S	Shank length (blank length) L ₁ mm									
	30	40	50	60	70	80	100	120	130	150
2 mm										
2,5 mm										
3 mm										
4 mm										
5 mm										
6 mm										
8 mm										
10 mm										
12 mm										

Bore and facegrinding possible see drawing above.

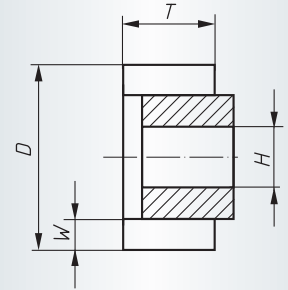
Selection of wheel dimensions and shapes



Type 1
unfinished (as fired)



Type 2
plain steel core



Type 3
steel core, 3 mm recessed

Due to technical reasons, the smallest dimensions for W is 5 mm.



Industry

Dimensions

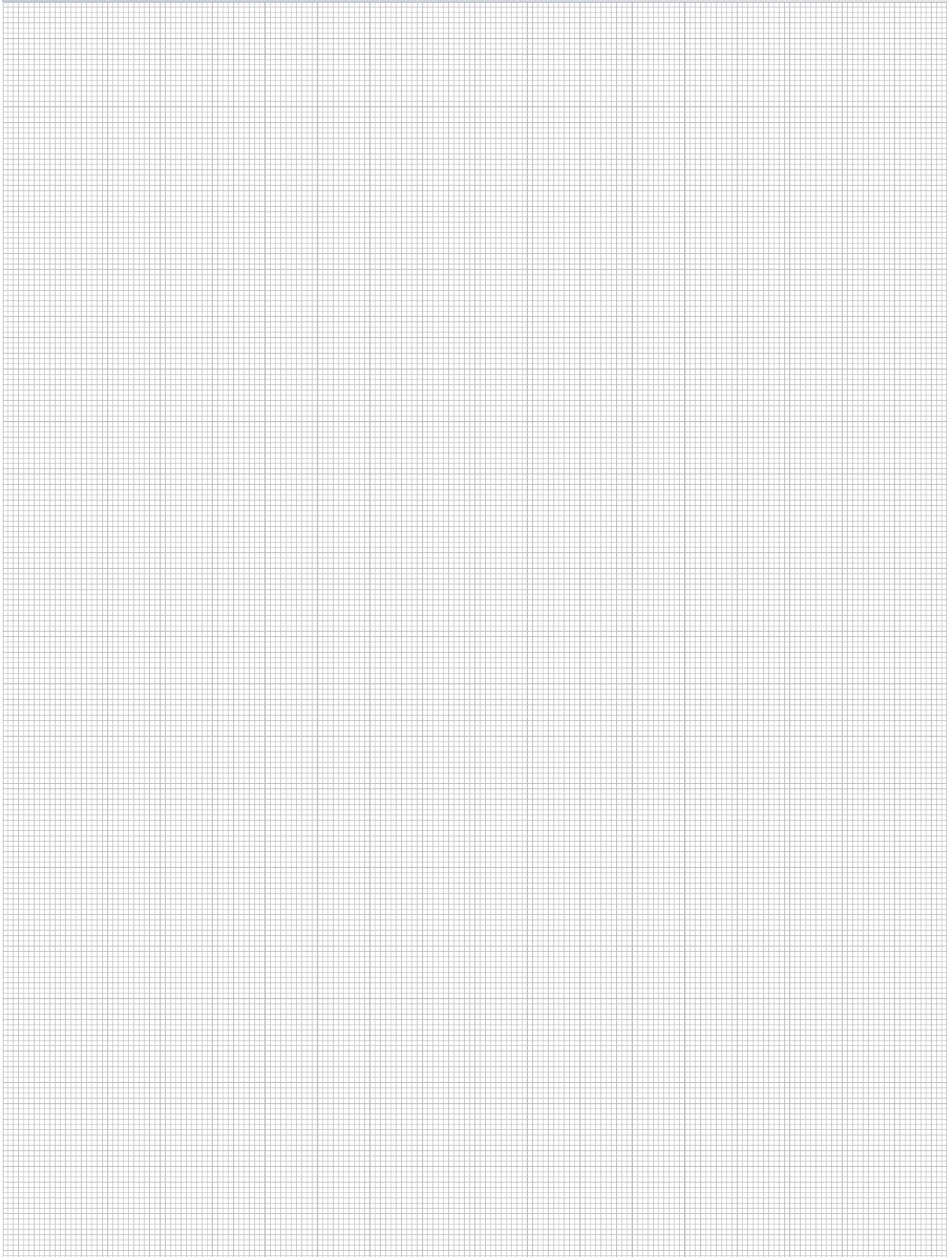
Ordering example: CBN Wheel, Quality B 54 C 150 29, Type 3: D 35 x 10 mm, H 8 mm

When ordering please specify bore size „H“.

Minimum order quantity 10 pieces

Dimension D	In increments of D	Width		
		10 mm	12 mm	15 mm
14 to 25 mm	1 mm	10 mm	12 mm	15 mm
25 to 40 mm	5 mm	10 mm	12 mm	15 mm

Notes

A large rectangular area filled with a fine grid pattern, intended for taking notes. A vertical yellow bar is visible on the left edge of the page.