

# Tungsten Carbide Burs for Tough Applications



**TRUST BLUE**

- Design optimized for hand-held applications
- Special cut patterns minimize tooth chipping/breakage, splintering and bur head failures
- Developed specifically for applications involving high impact loads

# Tungsten Carbide Burs for Tough Applications

## Application Examples, Cut Patterns, Packaging



Tungsten carbide burs for tough applications represent a PFERD product line developed for users whose required applications result in tooth breakage and bur failure, rather than normal wear. Designed especially for hand-held applications in tough operating conditions common to shipyards, foundries and on steel fabrication.

### Advantages

- Innovative, special cuts providing exceptional impact resistance.
- These extremely durable, high-performance cut patterns minimize tooth chipping/breakage, splintering and bur head failures.
- The 3R and 3RS cuts can be used on materials up to 55 HRC.
- These products can also be used at low speeds.

- Their extremely high impact resistance means that they are perfectly suited for use as long shank variants. Available in 5" (150 mm) and 8" (200 mm) shaft lengths.
- Developed specifically for applications involving high impact loads, the new 3R and 3RS cuts are the latest addition to the existing PFERD range.

### Application Examples

- High-impact applications due to long shank design.
- Heavy-duty applications, due to angled working.
- High angle of surface contact.
- Milling of narrow contours.

For the complete line of tungsten carbide burs please refer to our PFERD Tool Manual, catalogue 202.

## The new 3R and 3RS Cut Patterns Minimize Tooth Breakage on Tungsten Carbide Burs

### Problem

Chipping, tooth failures and major bur damage are sometimes encountered in applications involving high impact loads.

Thanks to perfectly matched production parameters, the new 3R and 3RS cut patterns will substantially reduce tooth failures on tungsten carbide burs.

### Solutions and Advantages

#### Cut 3R



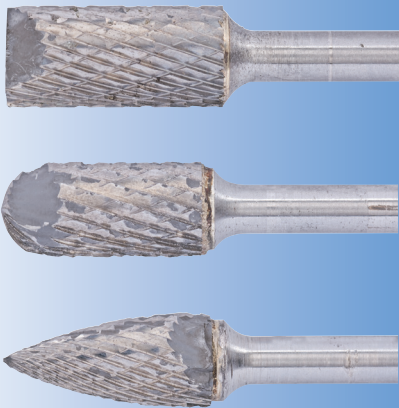
- Cross cut.
- Coarse and aggressive machining with high stock removal, even at low RPM.

#### Cut 3RS



- Cross cut.
- Coarse machining with smoother bur operation, even at low RPM.
- Less aggressive than 3R cut.

### Tooth Chipping / Failure



### Distribution in Single-Bur Packs

Tungsten carbide burs featuring the new 3R and 3RS cut patterns are supplied in single-unit packs. The proven plastic box ensures an optimum protection of bur teeth.



### Recommended Rotational Speed Range [RPM]

To determine the recommended cutting speed [SPFM], please proceed as follows:

- ① Select the workpiece material.
- ② Determine the type of application.
- ③ Select the cut.
- ④ Establish the cutting speed range.

To determine the recommended rotational speed [RPM], please proceed as follows:

- ⑤ Select the required bur diameter.
- ⑥ The cutting speed range and the bur diameter determine the recommended rotational speed range [RPM].

① Workpiece Material/Colour Code		② Application	③ Cut	④ Cutting Speed
Steel, cast steel	Non-hardened, non-heat treated steels up to 38 HRC (< 1200 N/mm <sup>2</sup> )	Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels	Double (3R)	850 - 2,000 SFPM
			Diamond (3RS)	
	Hardened, heat-treated steels exceeding 38 HRC (> 1200 N/mm <sup>2</sup> )	Tool steels, tempering steels, alloyed steels, cast steels	Double (3R)	850 - 1,150 SFPM
			Diamond (3RS)	
Non-ferrous metals	High-temperature resistant materials	Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction)	Double (3R)	850 - 1,500 SFPM
			Diamond (3RS)	
Cast iron	Grey cast iron, white cast iron	Cast iron with flake graphite, with nodular graphite cast iron, white annealed cast iron, black cast iron	Double (3R)	850 - 2,000 SFPM
			Diamond (3RS)	

#### Example:

Tungsten Carbide Bur, Cut 3R, 1/2" Head Diameter, Coarse machining of non-hardened and non heat-treated steels.

Cutting Rate: 850 - 2,000 SFPM

**Rotational Speed: 7,000 - 16,000 RPM**

⑤ Dia. [Inches]	⑥ Cutting Speed [SFPM]							
	850	1,000	1,150	1,300	1,500	1,650	2,000	2,950
	Rotational Speed [RPM]							
3/8	8,000	10,000	11,000	13,000	14,000	16,000	19,000	39,000
1/2	7,000	8,000	9,000	11,000	12,000	13,000	16,000	24,000
5/8	5,000	6,000	7,000	8,000	9,000	10,000	12,000	18,000

**When working with long shank burs, the bur must be in contact with the workpiece (or inserted in the bore or slot to be machined) before the machine is turned on. As a rule, the tool must remain in contact with the workpiece for as long as the machine is running.** Failure to observe this procedure may result in shank failure and hence, an increased accident risk.

If the continuous contact between the tool and the workpiece is not guaranteed, the **idling speeds** ⑦ stated in the table should **not be exceeded**.

For safety reasons, drive speeds ⑧ **with contact to workpiece** require a reduction in the recommended standard length bur speed from the speeds stated in the table below. Proceed as follows:

- ① Determine the workpiece material to be machined.
- ② Select application.
- ③ Select the cut.
- ⑤ Select the bur diameter.
- ⑧ For the recommended reduced speed [RPM] with workpiece contact, please refer to the right-hand side of the table.

⑤ Dia. [Inches]	⑦ Maximum Rotational Free Speed [RPM] (No contact to the workpiece)	⑧ Recommended Reduced Rotational Application Speed [RPM] (With contact to the workpiece)
	Shank Length [Inches]	
	L6 (6")	L6 (6")
3/8	4,500	9,000
1/2	3,000	7,000

### Safety Recommendations

-  = Wear eye protection!
-  = Use ear protection!
-  = Read the instructions!

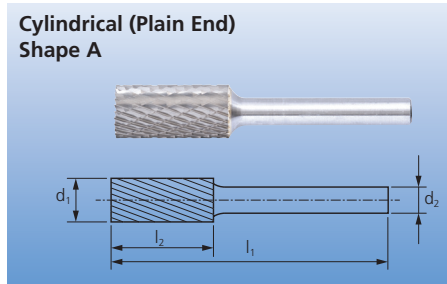
For safety reasons, **tungsten carbide burs with longer shanks** must be operated at substantially lower RPM levels.

Use only **rigid clamping systems and power tools** to avoid safety hazards!



# Tungsten Carbide Burs for Tough Applications

1/4" Shank



Cylindrical bur with plain end (uncut).

**Application**

- Deburring

**PFERD Specification Number**

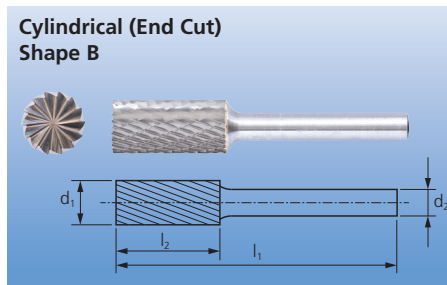
ZYA



Head Dia. x Length $d_1 \times l_2$ [Inches]	SCTI No.	Shank Dia. $d_2$ [Inches]	Overall Length $l_1$ [Inches]	Cut Type and EDP Number		
				Double (3R) 	Diamond (3RS) 	

Shank Dia. 1/4"

3/8 x 3/4	SA-3	1/4	2-1/2	22152	22153	1
1/2 x 1	SA-5	1/4	2-3/4	22156	22157	1



Cylindrical bur with end cut.

**Application**

- Interior contour work, i.e., peripheral and face milling

**PFERD Specification Number**

ZYAS



Head Dia. x Length $d_1 \times l_2$ [Inches]	SCTI No.	Shank Dia. $d_2$ [Inches]	Overall Length $l_1$ [Inches]	Cut Type and EDP Number		
				Double (3R) 	Diamond (3RS) 	

Shank Dia. 1/4"

3/8 x 3/4	SB-3	1/4	2-1/2	22182	–	1
1/2 x 1	SB-5	1/4	2-3/4	22186	22187	1





Cylindrical bur with radius end.

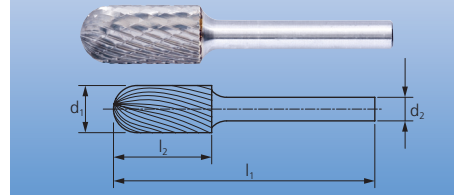
**Application**




- Surface milling
- Contouring

**PFERD Specification Number**

WRC

**Cylindrical (Radius End)  
Shape C**



Head Dia. x Length $d_1 \times l_2$ [Inches]	SCTI No.	Shank Dia. $d_2$ [Inches]	Overall Length $l_1$ [Inches]	Cut Type and EDP Number		
				Double (3R) 	Diamond (3RS) 	
Shank Dia. 1/4"						
3/8 x 3/4	SC-3	1/4	2-1/2	22212	—	1
1/2 x 1	SC-5	1/4	2-3/4	22216	22217	1
Shank Dia. 3/8"						
3/8 x 3/4	SC-3	3/8	2-1/2	22873	22874	1
1/2 x 1	SC-5	3/8	2-3/4	22875	22876	1
Extended Shank						
3/8 x 3/4	SC-3L6	1/4	6-5/8	22734	—	1



Ball-shaped bur.

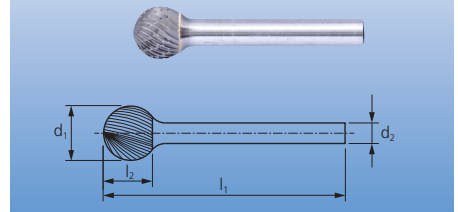
**Application**




- Contouring
- Bore deburring
- Milling in preparation of build-up welding

**PFERD Specification Number**

KUD

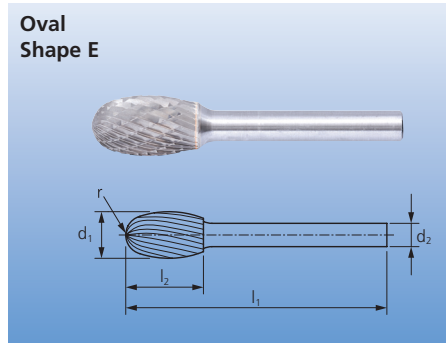
**Ball  
Shape D**



Head Dia. x Length $d_1 \times l_2$ [Inches]	SCTI No.	Shank Dia. $d_2$ [Inches]	Overall Length $l_1$ [Inches]	Cut Type and EDP Number		
				Double (3R) 	Diamond (3RS) 	
Shank Dia. 1/4"						
1/2 x 7/16	SD-5	1/4	2-3/16	22244	22245	1
5/8 x 9/16	SD-6	1/4	2-5/16	22246	—	1

# Tungsten Carbide Burs for Tough Applications

1/4" - 3/8" Shank



Oval-shaped bur.

**Application**

- Contouring

**PFERD Specification Number**

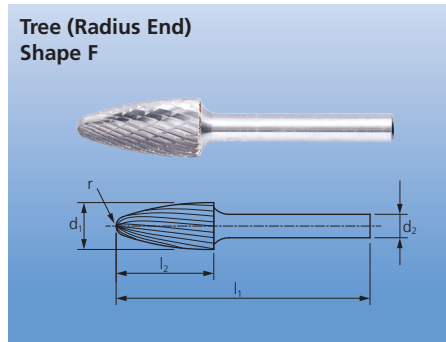
TRE



Head Dia. x Length $d_1 \times l_2$ [Inches]	SCTI No.	Shank Dia. $d_2$ [Inches]	Overall Length $l_1$ [Inches]	Cut Type and EDP Number Double (3R) 	
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Shank Dia. 1/4"

3/8 x 5/8	SE-3	1/4	2-3/4	22260	1
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Tree-shaped bur with radius end.




**Application**

- Work on narrow workpiece contours

**PFERD Specification Number**

RBF



Head Dia. x Length $d_1 \times l_2$ [Inches]	SCTI No.	Shank Dia. $d_2$ [Inches]	Overall Length $l_1$ [Inches]	Cut Type and EDP Number		
				Double (3R) 	Diamond (3RS) 	

Shank Dia. 1/4"

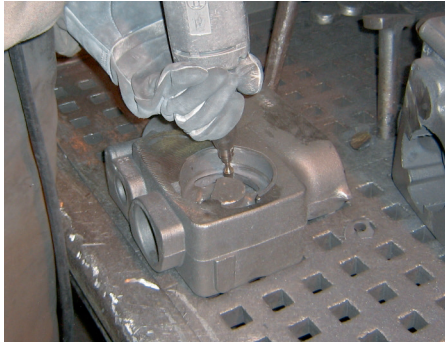
1/2 x 1	SF-5	1/4	2-3/4	22276	22277	1
5/8 x 1	SF-6	1/4	2-3/4	22278	-	1

Shank Dia. 3/8"

1/2 x 1	SF-5	3/8	2-3/4	22897	22898	1
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Extended Shank

1/2 x 1	SF-5L6	1/4	6-7/8	22754	-	1
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Tree-shaped bur with pointed end.

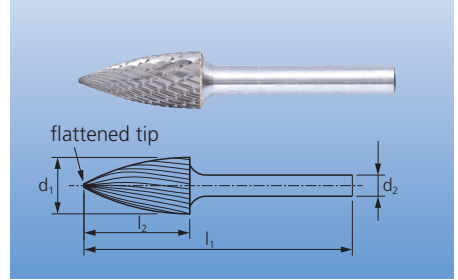
**Application**




- Work on narrow contours
- Milling of acute-angled surfaces

**PFERD Specification Number**

SPG

**Tree (Pointed End)  
Shape G**



Head Dia. x Length $d_1 \times l_2$ [Inches]	SCTI No.	Shank Dia. $d_2$ [Inches]	Overall Length $l_1$ [Inches]	Cut Type and EDP Number		
				Double (3R) 	Diamond (3RS) 	
Shank Dia. 1/4"						
3/8 x 3/4	SG-3	1/4	2-1/2	22294	—	1
1/2 x 1	SG-5	1/4	2-3/4	22296	22297	1
5/8 x 1	SG-6	1/4	2-3/4	22298	—	1
Extended Shank						
1/2 x 1	SG-5L6	1/4	6-7/8	22760	—	1



Taper bur with radius end.  
Angle  $\alpha = 14^\circ$

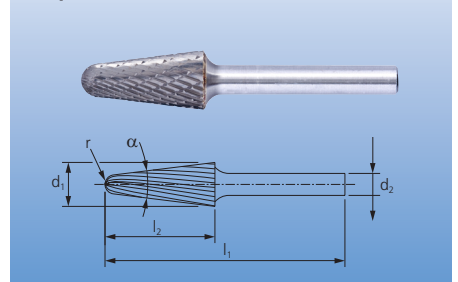
**Application**




- Work on narrow workpiece contours and surfaces

**PFERD Specification Number**

KEL

**14° Taper (Radius End)  
Shape L**



Head Dia. x Length $d_1 \times l_2$ [Inches]	SCTI No.	Shank Dia. $d_2$ [Inches]	Angle $\alpha$	Overall Length $l_1$ [Inches]	Cut Type and EDP Number		
					Double (3R) 	Diamond (3RS) 	
Shank Dia. 1/4"							
1/2 x 1-1/8	SL-4	1/4	14°	3-1/16	22346	22347	1
Extended Shank							
1/2 x 1-1/8	SL-4L6	1/4	14°	7-3/16	22774	—	1

# Tungsten Carbide Burs for Tough Applications



## Bur Set, Long Shank Versions, Special Ordering

### 5 Piece Tough Bur Set Double Cut



### 5 Piece Tough Bur Set 1/4" Shank (Plastic Case)

Contains 5 pcs. burs with 1/4" shank dia. and double cut (3R).

Set Contents Shape	Head Dia. x Length d <sub>1</sub> x l <sub>2</sub> [Inches]	SCTI No.	Cut Type and Set EDP Number		
			Double (3R) 	Individual Bur EDP's in Set	
Cylindrical (Plain End)	1/2 x 1	SA-5	26551	22156	1
Cylindrical (Radius End)	1/2 x 1	SC-5		22216	1
Ball	1/2 x 7/16	SD-5		22244	1
Tree (Radius End)	1/2 x 1	SF-5		22276	1
Tree (Pointed End)	1/2 x 1	SG-5		22296	1

### Tungsten Carbide Burs with Special Shank Lengths



### Special Shapes and Long Shank Burs Available on Request

PFERD Tungsten carbide burs for tough applications are available in 6" (150 mm) and 8" (200 mm) shank lengths. These tools are particularly well suited for use in hard-to-reach areas. Because of their high impact-resistance characteristics, they represent an optimum combination of a tungsten carbide bur and a long shank or shank extension, respectively.

In addition, PFERD's full line of tungsten carbide burs can be special ordered with special shank diameters, shapes, head, lengths, diameters and cuts. Please inquire.

Burs with head diameter of 5/8" are available with 3/8" shank.

All burs are available with metric shanks by special order.

### Safety Notes

Special-length burs and burs with long shanks must be placed on the workpiece (or inserted in the bore or slot to be machined) before the machine is powered up. As a rule, the tool ought to remain in contact with the workpiece for as long as the machine is running. Failure to observe this procedure may result in shank failure and hence, an increased accident risk (see also page 3).



### PFERD's Full Line of Tungsten Carbide Burs

PFERD is pleased to offer a wide range of tungsten carbide burs and bur sets in standard shapes and cuts for machining materials of virtually any hardness. We apply our high standards of superior performance to key parameters such as shape, number of flutes, spiral angle, rake angle, and concentricity, to assure smooth operating, reduced power tool wear, and operator comfort and safety.

Call our Customer Service Department to order your copy of the "PFERD Tungsten Carbide Burs and Bi-Metal Hole Saws" catalogue today!

**Canada (866) 245-1555**  
**USA (800) 342-9015**





### Drive Spindle Extensions

Burs (shank dia. 1/8" and 1/4") can be extended with spindle extensions, allowing access to hard-to-reach areas. The extension is mounted in the collet chuck of the machine (air-powered or electric), or in the handpiece of the flexible shaft. In some applications spindle extensions are efficient alternatives to customized burs with long shanks.

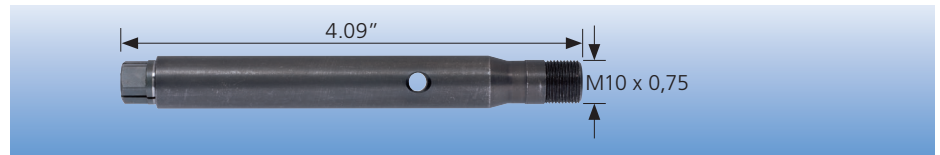
### Safety Note

**For safety reasons, it is not possible to use spindle extensions in combination with long shank burs.**  
**For more safety information, please refer to our PFERD Tool Manual, catalogue 209.**



= Read the instructions!

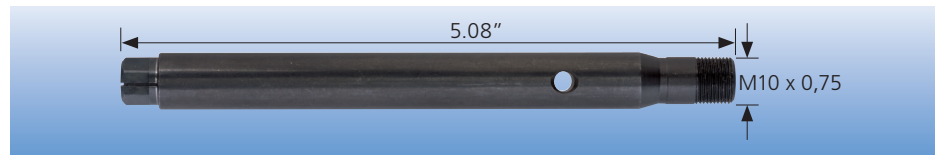
Extension SPV 75-1/4 SPG 6  
for 1/4" Shanks



Extension SPV 75-1/4 S3/8  
for 1/4" Shanks



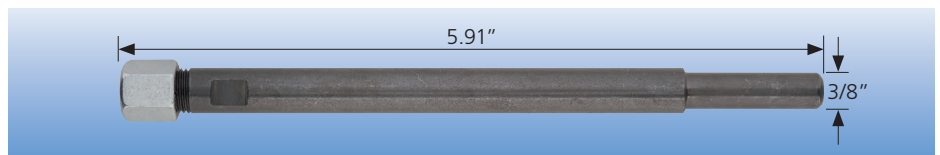
Extension SPV 100-1/4 SPG 6  
for 1/4" Shanks



Extension SPV 100-1/4 S3/8  
for 1/4" Shanks



Extension SPV 150-1/4 S3/8  
for 1/4" Shanks



EDP Number	PFERD Specification Number	Max. Speed [RPM]	Dia. Mounting Pin (Motor/Handpiece) [Inches]	Tool Mounting [Inches]	Overall Length [Inches]	Length Mounting Pin [Inches]	Outer Tool Holder Dia. [Inches]	Incl. Collet Dia. [Inches]	Collet Group
95821	SPV 75-1/4 SPG 6	20,000	SPG 6	1/4	4.09	Special	0.47	1/4	10*
95822	SPV 75-1/4 S3/8	20,000	3/8	1/4	4.72	1.18	0.47	1/4	10*
95823	SPV 100-1/4 SPG 6	20,000	SPG 6	1/4	5.08	Special	0.47	1/4	10*
95824	SPV 100-1/4 S3/8	20,000	3/8	1/4	5.67	1.18	0.47	1/4	10*
95826	SPV 150-1/4 S3/8	10,000	3/8	1/4	5.91	1.18	0.53	-	-

\* Refer to Tool Manual 21, catalogue 209, page 44 for information on available collets.

# Tungsten Carbide Burs for Tough Applications

## Suitable Power Tools



An optimum match between tool and power source is a necessary condition for the cost-efficient use of PFERD rotary tools.

Addressing diverse materials, workpieces and machining operations, PFERD offers a broad selection of options based on three different power tool types:

- Air-powered machines
- Electric machines
- Flexible shaft drives

**Straight air grinders** of lengthened design, with steel housing, are particularly suitable for heavy-duty milling in hard-to-reach spots. These machines provide accurate tool control. PFERD supplies straight air grinders which, in terms of output RPM, perfectly match the recommended cutting rates for our new special cut patterns.

Powerful **straight electric grinders** with stepless speed control are ideally suited for mobile use thanks to their compact and rugged design.

PFERD offers **flexible shaft drives** based on universal motors or three-phase a.c. machines designed for free-standing, suspended or mobile operation.

The output speeds [RPM] of these machines are variable either steplessly\*1 or in steps\*2. The overdrive unit ST 103, with its 1:3 transmission ratio, provides tool speeds of up to 36,000 RPM.

**For further information and a full description of our entire range of power tools please refer to our PFERD Tool Manual, catalogue 209.**

### Straight Air Grinders\*2

**PG 3/380 DH**

RPM: 38,000 RPM  
Output: 0.3 HP



**PGAS 8/250 E-HV**

RPM: 25,000 RPM  
Output: 0.8 HP



**PG 5/230 V-HV**

RPM with oil: 23,000 RPM  
RPM without oil: 18,000 RPM  
Output with oil: 0.5 HP  
Output without oil: 0.46 HP



**PG 3/210 DH**

RPM: 21,000 RPM  
Output: 0.3 HP



**PGAS 8/100 HV**

RPM: 10,000 RPM  
Output: 0.8 HP



**PWS 3/200 DH**

RPM: 20,000 RPM  
Output: 0.3 HP



### Electric Straight Grinders\*1

**UGER 11/330 SI 120 V**

RPM: 15,000 - 33,000 RPM  
Output: 0.9 HP



**UGER 5/250 SI 120V**

RPM: 11,000 - 25,000 RPM  
Output: 0.4 HP



**UGER 5/90 SI 120 V**

RPM: 4,000 - 9,000 RPM  
Output: 0.4 HP



### Flexible Shaft Drives\*3

**Multi-Speed Machine  
Mammoth MD 10**

RPM: 1,000 - 14.400 RPM  
Output: 1 HP



**Multi-Speed Machine  
RUER 10/250 SI 120 V US**

RPM: 11,000 - 25,000 RPM  
Output: 0.9 HP



**Multi-Speed Machine  
RUER 5/250 SI 120 V**

RPM: 11,000 - 25,000 RPM  
Output: 0.4 HP



\*3 with flexible shaft

A selection of flexible shafts is available in our PFERD Tool Manual 21, catalogue 209.







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