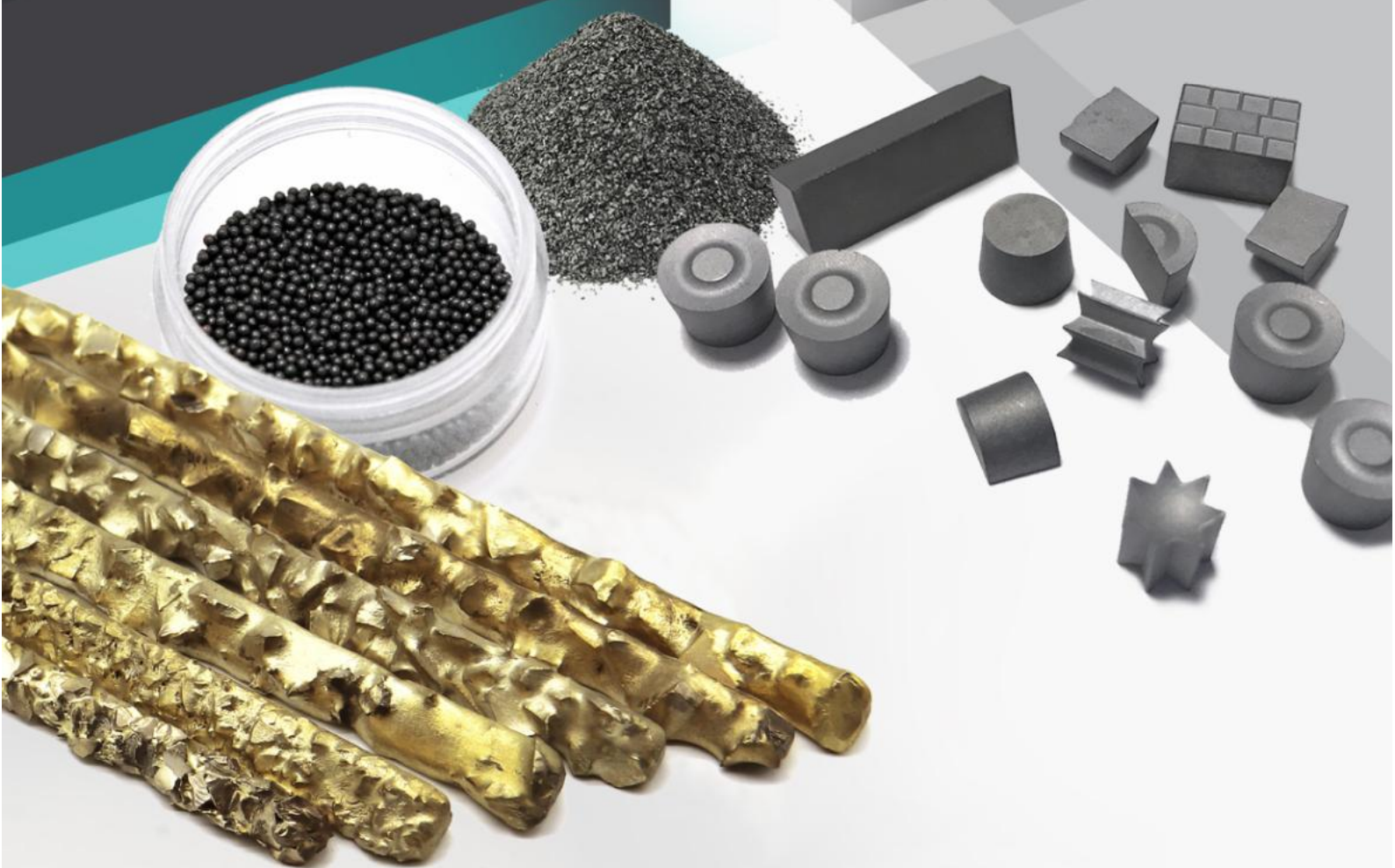


# Hardfacing Material





# About ZZBETTER

Zhuzhou Better Tungsten Carbide Co.,Ltd has been manufacturing hard-facing material for over 15 years and has poured our experience and knowledge into increasing the performance of the hard-facing material.

With the presence of ZZbetter throughout the world, we are well equipped to serve the market. Our team is made up of knowledgeable hard-facing material specialists in the field and qualified sales team. We are trying our best to provide satisfactory service to our customers during the procurement process.

Our main hard facing products:

- Crushed Carbide Grits
- Carbide Composite Rods
- Carbide Wear Inserts
- Carbide Welding Pellets
- Carbide Pellets Welding Rods
- Hard-facing Rods
- Tinning Rods
- Flexible Welding Rods
- Cast Tungsten Carbide Powder
- Cast Tungsten Carbide Welding Rods

We offer a number of options covering a range of types and sizes of hard-facing material. Our dedicated and knowledgeable sales team can help you decide which solution will work best for the job at hand.





## Tungsten Carbide Wear Inserts

ZZbetter tungsten carbide wear inserts are manufactured in our special grade, providing a heavy-duty metal cutting grade of tungsten carbide. Its extreme toughness is well suited to downhole applications, providing excellent performance when cutting steel.

Type	Part No.	Dimensions (inches)			Photos
		Dia. / Width	Thick. / Height	Length	
Round	BW001	0.366	3/16	/	
	BW002	3/8	1/4	/	
Half Round	BW003	0.366	3/16	/	
	BW004	3/8	1/4	/	
8-Sided	BW005	1/4	3/16	/	
	BW006	3/8	1/4	/	
Square	BW007	3/8	3/16	/	
Star	BW008	3/16	3/16	/	
	BW009	1/4	1/4	/	
	BW010	5/16	5/16	/	
	BW011	3/8	3/8	/	
Pyramid	BW012	0.238	0.370	/	
Rectangle	BW013	12/97	1/5	1	
	BW014	1/8	1/5	1/2	
Rectangle	BW015	3/8	1/4	1/2	
	BW016	3/8	3/8	1/4	



## Tungsten Carbide Grits

Tungsten carbide grit provides long lasting wear protection in areas of high abrasive wear. It is used to protect costly parts such as bulldozer blades, bucket teeth, wood grinding hammers, trencher teeth, and a wide variety of other consumable components. Tungsten Carbide grit is an efficient means of protecting machinery and machinery parts by providing a significant increase in the longevity of those parts. This decreases downtime and reduces the cost involved with unprotected parts.

### 1 Uniform and pure particles



### 2 Consistent particle size for easy application



### 3 Angular grit with sharp points for extremely aggressive cutting or grinding surface

Grade	Cobalt (%)	Hardness (HRA)	Partical Size (mm)	Partical Size (mesh)	Application
BTD	7.5~8.5	89.5~91.5	1.6~3.2	1~3, 3~5	<ul style="list-style-type: none"> <li>• Mining teeth</li> <li>• Hammer mill blades</li> <li>• Tub grinder tips</li> <li>• Components for grinding</li> <li>• Shredding and sawing</li> <li>• Gripping and mixing</li> </ul>
			3.2~4.8	5~8, 8~10	
BTG	5.5~12.5	87.0~92.5	4.8~6.4	10~20, 20~30	
			6.4~7.9	30~40, 40~60	
			7.9~9.5	60~80, 80~100	
BTT	4.0~12.0	89.5~93.5	9.5~11.0	100~200	
			11.0~12.7	200~325	

We can produce different partical sizes according to your demands.



## Tungsten Carbide Composite Rods

ZZbetter composite rods contain tungsten carbide chips of various sizes and morphology designed for wear and milling / cutting applications.

- ◆ Made with high tensile brazing alloy
- ◆ Carbide anvil crushed grits to keep the stable physical performance.
- ◆ Incorporates intact tungsten carbide particles for maximum abrasion resistance



Grade	Chemical compositions (%)		Applications
	Hard Phase	Bonding Phase	
BT-Cu-30	Carbide grits 70%	30% Bonding (Cu 56~66%, Iron 0.5% Max, Tin 0.5% Max, Zin Balance)	<ul style="list-style-type: none"> <li>• Reamers</li> <li>• Openers</li> <li>• Fishing Tools</li> <li>• Casing Cutters</li> <li>• Milling Tools</li> <li>• Coring Tools</li> <li>• Stabilizers</li> <li>• Screw Feeders</li> <li>• Slurry Paddles</li> <li>• Construction Drilling</li> <li>• Foundry Sand Mixing</li> <li>• General Abrasive Wear Prevention</li> </ul>
BT-Cu-40	Carbide grits 60%	40% Bonding (Cu 56~66%, Iron 0.5% Max, Tin 0.5% Max, Zin Balance)	
BT-Ni-30	Carbide grits 70%	30% Bonding (Cu 47~50%, Ni 11%, Iron 0.5%Max, Tin 0.5% Max, Zin Balance)	
BT-Ni-40	Carbide grits 60%	40% Bonding (Cu 47~50%, Ni 11%, Iron 0.5%Max, Tin 0.5% Max, Zin Balance)	

Grade	Carbide Grits Size		Appearance	Rod Weight and Length
	(mm)	(inch)		
BTW	1.6~3.2	1/16" x 1/8"	Bare or Fluxed-coating	<ul style="list-style-type: none"> <li>• Weight: 225g / 450g (standard) / 650g</li> <li>• Length: 450mm (standard)</li> <li>• Accept customized weights and sizes</li> </ul>
	3.2~4.8	1/8" x 3/16"		
	1.0~2.0	/		
	2.0~4.0	/		
BTC	4.8~6.4	3/16" x 1/4"		
	6.4~8.0	1/4" x 5/16"		
	8.0~9.5	5/16" x 3/8"		
	9.5~12.7	3/8" x 1/2"		



## Special Carbide Composite Rods

ZZbetter composite rods contain tungsten carbide chips of various sizes and morphology designed for wear and milling / cutting applications.

### Composite Rods with Carbide Inserts

**ZZBETTER premium grade of tungsten carbide inserts**

- ▲ Provide **very sharp and aggressive** cutting structures
- ▲ To **maximise** cutting profile
- ▲ **Easy** to apply



These high performance composite rods use our carbide inserts providing you with sharp aggressive cutting edges and the robustness required on crucial areas of your milling tool.

### Sintered Carbide Composite Rods

Sintered carbide composite rods have been the hardfacing and repair of fixed cutter bits and as wear protection for stabilizers and reamers in the oil and gas industry. The large tungsten carbide pellets provide abrasion resistance while finer pellets protect the matrix from wear and erosion. The nickel matrix provides high-temperature corrosion resistance, protecting the bit body and allowing for cutter refurbishment and drill head reuse.

Can be used to address challenging wear situations in industries such as:

- Oil and gas exploration and drilling
- Mining
- Mineral processing
- Construction
- Material handling





## Flexible Welding Rope

Flexible welding rope is made from cast tungsten carbide, spherical cast tungsten carbide, or a mixture of the two as hard phase, self-fluxing nickel alloy powder for the bonding phase. And these two phases mix, bond, extrusion mold, dry, and manufacture on the nickel wire according to a certain proportion.

- ◆ The welding layer has an extremely effective protection against erosive and abrasive attack
- ◆ Suitable for oxyacetylene welding process
- ◆ Excellent fluidity and molding control at low deposition temperature of 1050 °C



Grade	Chemical compositions (%)		Applications
	Hard Phase	Bonding Phase	
BT-2100	Cast Tungsten Carbide 65%	Self-Fluxing Nickel Alloy 35%	<ul style="list-style-type: none"> <li>• Augers</li> <li>• Impellers</li> <li>• Stabilizers and other oil-field equipment</li> </ul>
BT-2200	Spherical Cast Tungsten Carbide 65%	Self-Fluxing Nickel Alloy 35%	<ul style="list-style-type: none"> <li>• Mixer plates used for brick and clay manufacturing</li> <li>• Food and chemical processing decanter screws</li> </ul>

Specification	Diameter (mm)	Length	N.W. / spool (kg)
BTWR-1	ø 4.0	Spool	15.0±0.5
BTWR-2	ø 5.0	Spool	15.0±0.5
BTWR-3	ø 6.0	Spool	15.0±0.5
BTWR-4	ø 8.0	Spool	15.0±0.5



## Nickel Silver Tinning Rods

Nickle silver tinning rods are general-purpose oxyacetylene rods for welding various ferrous and non-ferrous metals, such as steel, cast iron, malleable iron, and some nickel alloys. Commonly used for fusion welding of brass, bronze, and copper alloys as well as for building up worn surfaces.



Grade	Chemical Compositions				Applications
	Cu	Ni	Si	Zn	
RBCuZn-D	46~50%	9~11%	0.25% Max	Balance	<ul style="list-style-type: none"> <li>• Deposits on drilling tools and equipment used in oil &amp; gas well drilling</li> <li>• For tinning &amp; filling in combination with carbide grits</li> </ul>

### Physical characteristics

Sizes	Hardness	Melting point	Average tensile strength	Apperance
D1/8" D3/16"	120HB	915°C	80,000~100,000 PSI	Coated or Bare

\* Sizes can be customized





## Tungsten Carbide Pellets

Tungsten carbide pellets are made of sintered tungsten carbide with a cobalt binder. They are widely used in hardfacing on the surface of various tools and parts to form a hardened layer, which can significantly improve surface hardness, wear resistance and corrosion resistance.

**1** Hardbanding drill pipe collars



Building up of oil field drill bits **2**



**3** Welding in steel substrate in various wear resistant applications

Grade	WC (%)	Co (%)	Density (g/cm <sup>3</sup> )	Hardness (HRA)	Size
BTQ01	≥85	14-15	13.9-14.1	≥87.5	10~100 mesh (0.15~2.0 mm)
BTQ02	≥90	9-10	14.3-14.5	≥88.5	
BTQ03	≥92	7-8	14.6-14.8	≥89.5	
BTQ04	≥94	5-6	14.8-15.0	≥90.5	

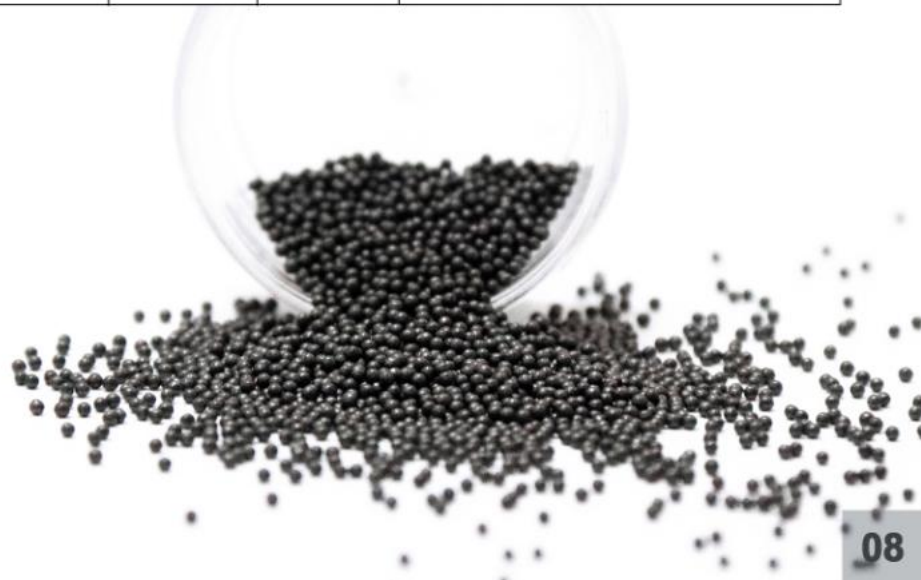


## Tungsten Carbide Pellet Welding Rods

Compared with cast tungsten carbide powder, tungsten carbide pellets have better impact and wear resistance. They have the characteristics of one-time welding without reflow soldering. The pellets are spherical, the friction coefficient is small, which can reduce casing wear and cost-effective.



Type	Range of Pellet Size (mesh)	Pipe O.D (mm)	Pipe Length (mm)	Pellet (%)	Steel Pipe (%)	Application
BTP-1	10~20	7~7.15	390/600	55~65	55~65	<ul style="list-style-type: none"><li>• PDC drills</li><li>• Inserted bit drills</li><li>• Steel bit cone</li><li>• Steel bit underreamer</li></ul>
BTP-2	20~40	6~6.15	390/600	55~65	55~65	
BTP-3	40~60	5~5.15	390/600	55~65	55~65	
BTP-4	60~100	4~4.15	390/600	55~65	55~65	





## Cast Tungsten Carbide Powder

Cast tungsten carbide powder, commonly referred to as W2C, is an extremely hard material used in a variety of applications. With eutectic structure and high melting point and hardness, cast tungsten carbide powder can improve wear resistance. The material is manufactured from a blend of carbon, tungsten and tungsten carbide powder in silver / grey color with a sharp blocky particle shape.



Grade	Chemical compositions ( $\leq$ )								
	W	T.C.	F.C.	Ti	Ni	Co	Cr	V	Fe
BT-20101	95~96	3.8~4.1	0.05	0.1	0.1	0.1	0.1	0.1	0.3
BT-20102	Rest	3.8~4.1	0.05	0.1	3~6	0.1	0.1	0.1	0.3

Hardness (HRA)	Microhardness (kg/mm)	Density (g/cm <sup>3</sup> )	Melting point (°C)	Specific Density (g/cm <sup>3</sup> )
93.0~93.7	2500~3000	16.5	2525	15.8~16.7
<b>Characteristics:</b>	It has high temperature, wear and impact resistance properties for its high melting point, high hardness, and high wear resistance.			
<b>Particle size ranges:</b>	8~0.038mm			



## Cast Tungsten Carbide Welding Rods

Cast tungsten carbide welding rods are mainly used as pile-up welding on the surface of metal parts to enhance its wear ability.

- ◆ Generally YZ2 (-20~30 mesh) is used in thick electrode surfacing work and work requirements for scraping role of the parts and components
- ◆ If the required welding layer is 3~4 mm, using YZ3 (-30~40 mesh) multi-electrode
- ◆ If the surfacing request is thin layer formation, the best choice is YZ4 (-40~60 mesh) or more granular tubular alloy electrode



Type	Range of Particle Size (mesh)	Pipe o.D. (mm)	Pipe Length (mm)	Powder (%)	Steel Pipe (%)	Application
YZ2	-20~+30	7~7.15	390/600	60~70	40~30	<ul style="list-style-type: none"><li>• Diamond Drilling Tools</li><li>• Drill Pipe Stabilisers</li><li>• Agricultural Tools</li><li>• Industrial Diamond Tools</li><li>• Grinding Tools</li><li>• Wear Protection</li></ul>
YZ3	-30~+40	6~6.15	390/600	60~70	40~30	
YZ4	-40~+60	5~5.15	390/600	60~70	40~30	
YZ5	-60~+80	4~4.15	390/600	60~70	40~30	



## Welding Electrode Inconel 625 - NiCrMo-3

ENiCrMo-3 is a nickel-based alloy electrode with a low-hydrogen coating, and its chemical composition code is NiCr22Mo9Nb, deposited metal at high temperature and high temperature, has extremely high strength and great DC reverse connection, and can weld in all directions. corrosion resistance force. Mainly used for welding nickel-based alloys such as Inconel625, Incoloy800, Incoloy800H, Incoloy825, and welding of iron-nickel-based high-temperature corrosion-resistant alloys



### Chemical composition

	Chemical Compositions (%)					
	C	Mn	Fe	Si	Ni	Cu
Standard	≤0.10	≤2.0	≤7.0	≤0.80	≥55.0	≤0.50
Ours	0.017	0.50	5.00	0.35	60.20	0.05
	Nb	S	P	Cr	Mo	
Standard	3.0-4.2	≤0.015	≤0.020	20.0-23.0	8.0-10.0	/
Ours	3.30	0.006	0.009	21.00	8.50	/

### Physical Performance

Specification	Yield Strength Rel (MPa)		Tensile Strength Rm (MPa)	Elongation A/%	Impact energy -196°C Akv(J)
Standard	≥760	≥420	≥27	≥760	/
Ours	780	460	35	50	50

### Electrode specification and reference current (DC+)

Dia (mm)	∅2.5	∅3.2	∅4.0
Length (mm)	300	350	350
Welding current (A)	50-80	90-110	110-150

### Precautions

- The electrode must be baked at 300°C for 1 hour before welding, and it can be used as it is baked.
- Before welding, impurities such as rust, oil stains, and moisture on the surface of the weldment must be removed



## Tungsten Carbide Thermal Spray Powder

Thermal Spray Powder is a high-performance coating material used in thermal spray applications. It is a composite powder consisting of tungsten carbide (WC), chromium carbide (Cr<sub>3</sub>C<sub>2</sub>), nickel (Ni), and chromium (Cr). The particle size distribution ranges from 15 to 45 microns, making it suitable for a wide range of applications.

The powder is commonly used in the aerospace, automotive, and energy industries to enhance the wear, corrosion, and erosion resistance of metal surfaces. The addition of WC and Cr<sub>3</sub>C<sub>2</sub> provides high hardness, while the Ni and Cr offer excellent corrosion resistance.



Grade	Co (%)	Cr (%)	T.C (%)	Fe (%)	Others	Tungsten	Hardness (HV <sub>0.3</sub> )	Partical Size (mesh)
WC-10Co4Cr	9.0-11.0	3.2-4.8	5.0-5.9	max0.8	max1.0	Rest	1150-1400	145-325 270-650 150-325
WC-12Co	11.5-12.5	0	5.0-5.4	max0.5	max0.8	Rest	1100-1300	
WC-6Co	5.5-7.0	0	5.6-5.9	max0.6	max0.66	Rest	1350-1500	
WC-8Co	7.5-8.5	0	5.6-5.8	max0.6	max0.66	Rest	1250-1350	

Grade	Ni (%)	Cr (%)	T.C (%)	Fe (%)	Others	Tungsten	Hardness (HV <sub>0.3</sub> )	Partical Size (mesh)
WC-10Ni	9.0-11.0	0	5.3-5.8	max0.2	max0.5	Rest	1050-1250	145-325 270-650 150-325
WC-10Ni	11.5-12.5	0	5.2-5.6	max0.2	max0.5	Rest	1000-1200	
WC-15NiCr	11.5-12.5	2.5-3.5	5.0-5.4	max0.5	max0.5	Rest	1000-1350	

- We can produce different partical sizes and grain sizes according to your demands.



# Hardfacing Material

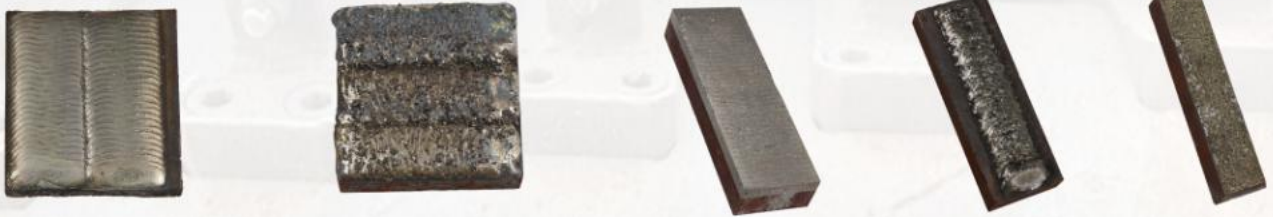
## Tub and Horizontal Grinder Wear Parts



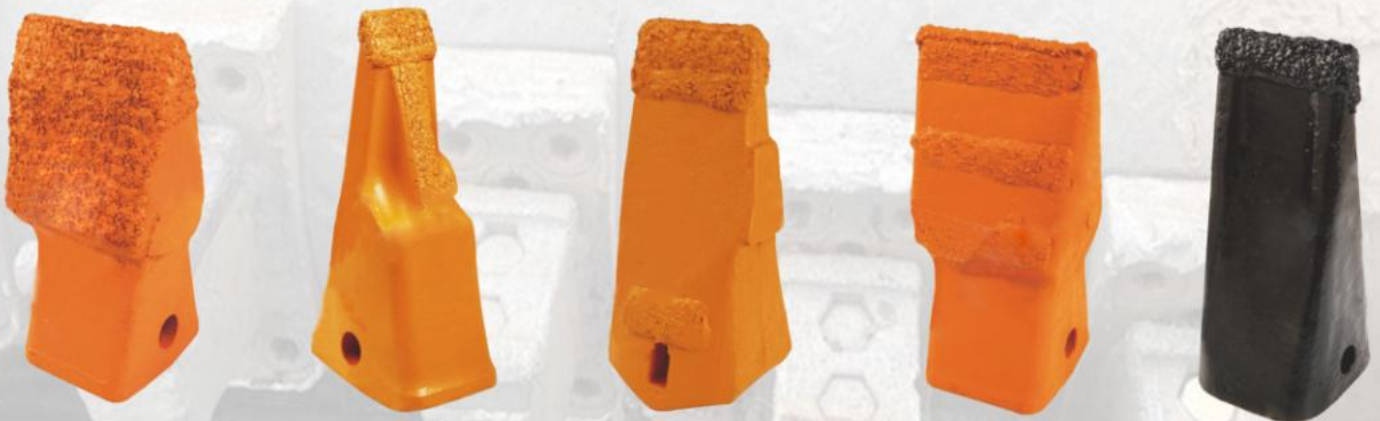
## Chocolate Bar Fitting to Grinder Machine



## Wear Plate for Mining Machine



## Bucket Teeth Fitting to Bucket Machine





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