

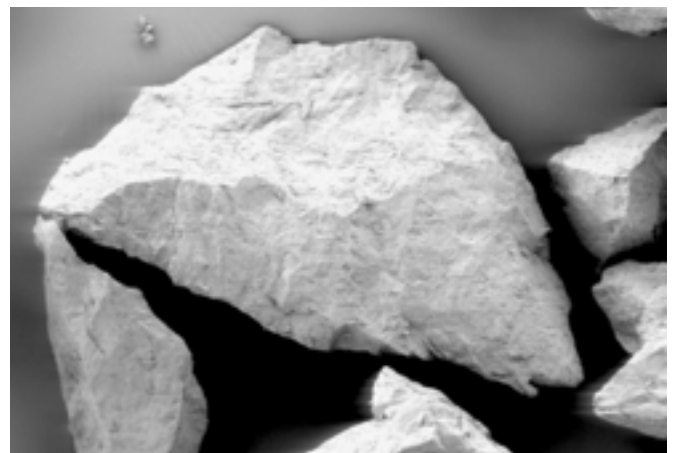
## Tungsten Carbide Powders: DURMAT® FTC

**Fused Tungsten Carbide (FTC) is an extremely hard, wear resistant material. Its abrasion resistance is superior in terms of wear resistance to all other commercially available materials except diamond.**

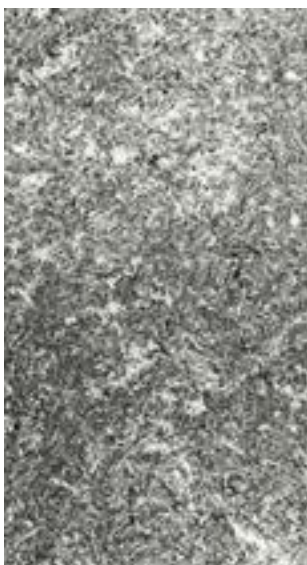
It is far superior to any of the Chromium Carbide products presently in use and will always deliver very positive test results by comparison. This material forms the basis of all DURUM's abrasion-resisting products.

The properties of the FTC are very much dependent on its structure. FTC which demonstrates at least an 80% "feather" structure has a macro-hardness of approximately 1,980 HV<sub>30</sub>. The micro-hardness of this material has been measured at 2,300 - 2,500 HV<sub>0.4</sub>.

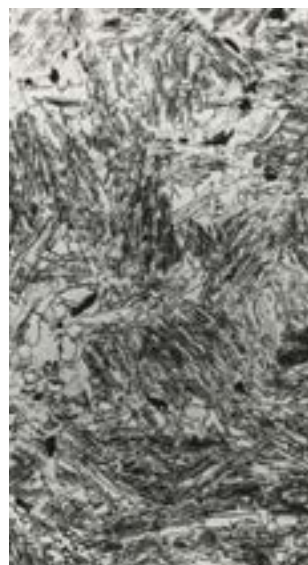
FTC has a carbon content of 3.8 - 4.1%. This corresponds to a ratio of 78 - 80% W<sub>2</sub>C and 20 - 22% WC. Careful attention must be paid during the processing and application of products containing FTC, that the temperature does not exceed 1,800 °C. Higher temperatures would cause an alteration in the structure resulting in a loss of hardness. If this excessive overheating occurs during the welding procedure, a non-proportionately high amount of FTC will be dissolved in the iron matrix, which would also result in a reduction of the material's superior ability to resist wear.



DURMAT® FTC



FTC: 80% feather structure



FTC: 20% feather structure

Properties	DURMAT® FTC	DURMAT® SFTC
Alloy type	WC - W <sub>2</sub> C	WC - W <sub>2</sub> C
C <sub>TOTAL</sub>	3.8 - 4.1%	3.8 - 4.1%
C <sub>FREE</sub>	0.05% max.	0.05% max.
02 <sub>SIEVE RANGE</sub>	0.05% max.	0.05% max.
02 <sub>SUB SIEVE RANGE</sub>	0.2% max.	0.2% max.
Fe	0.3% max.	0.3% max.
Co	0.3% max.	0.3% max.
Hardness	≈ 2,360 HV <sub>0.4</sub>	> 3,000 HV <sub>0.4</sub>
Structure	mainly feather	fine
Density	16 - 17 g/cm <sup>3</sup>	16 - 17 g/cm <sup>3</sup>
Melting point	2,860 °C / 5,176 °F	2,860 °C / 5,176 °F

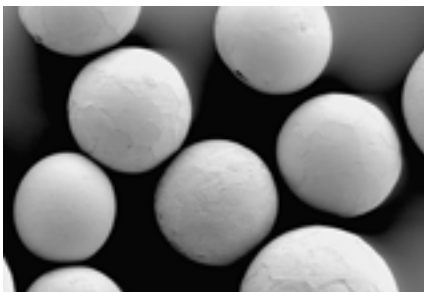
## Tungsten Carbide Powders

### DURMAT® SFTC

DURMAT® Spherical Fused Tungsten Carbide (SFTC) is the most wear resistant Fused Tungsten Carbide we can offer.

These Spherical Fused Tungsten Carbide particles show a fine non-acicular structure with a higher hardness than conventional FTC ( $>3,000\text{HV}_{0.4}$ ). The increased apparent density combined with a better flowability enables an increase of hard particles in wear resistant coatings and components produced by infiltration.

Using powder metallurgical processes, it is possible to produce parts of nearly any shape, which can contain hard materials or diamonds together with a metal binder and SFTC, reinforcing the hardness of diamond tools. Excellent for deep well drilling tools and rods, crusher jaws, mixers, concrete and stone saws, hot-pressed tools, screens and conveyors, extrusion housings and hard additives to diamond bits and saws.



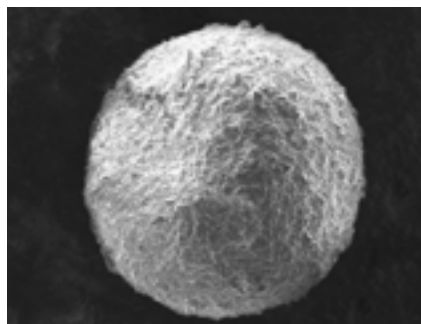
DURMAT® SFTC

### DURMAT® RF 13

According to their outstanding mechanical properties, hard-facing alloys based on Tungsten Carbide and cobalt

take a central position in wear protection. The high demands, placed on the wear resistance of such alloys these days, have led to increasingly finer micro structures with optimized compositions, allowing improved, higher performance alloys to be achieved.

Their fine-structured composition with crystallite grain sizes of max. 400 nm is their trademark and a guarantee for high wear resistance. Compared to common Tungsten Carbide-Cobalt alloys we have achieved better wear resistance, by using smaller WC structure. Our DURMAT® RF13 development using fine-structured WC has resulted in hardness of approximately  $1,750\text{HV}_{0.5}$ . The higher hardness of the nano-scale hard-facing alloy associated with the decreasing WC grain size reduces wear from abrasion considerably. The harder "hard metal" counters abrasion with a greater resistance. Wear progresses significantly slower, as the binding metal layer between the fine grain crystallites is exceptionally thin, making it harder to wash out. Only very small particles are torn out. The spherical shape represents a further form of protection, which is further stabilized by the small grain size; a lot more energy has to be applied for fragmentation of small particles compared to large particles due



DURMAT® RF 13

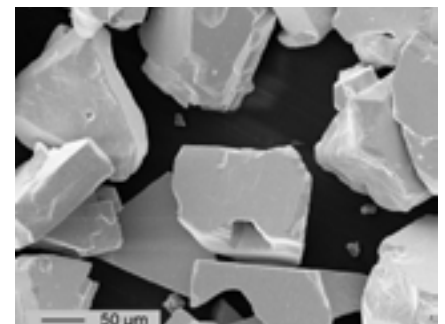
to the presence of less defects. A characteristic, higher wear resistance also occurs with regard to corrosive wear. As a result of the nano-structure and in particular the significantly reduced intermediate binding metal layer, the corrosive media can only reach the cobalt with difficulty, leading to considerable delays in wear. In turn, only the smallest hard-facing particles escape, corrosion is slowed down considerably.

### DURMAT® MCWC

The Macro-Crystalline Tungsten Carbide (DURMAT® MCWC) is a fully carburized stoichiometric compound with a carbon content of 6.14% by weight.

Based on its stable single-phase micro-structure, nearly no dissolution of the Macro-Crystalline Tungsten Carbides is observed after the welding process. MCWC has good weldability with nickel-based alloys during the PTA application process. The thermodynamically more stable MCWC has a blocky shape with low decarburization during processing.

The DURMAT® MCWC hardness amounts  $1,700-2,000\text{HV}_{0.1}$  and carbides can stay in service up to  $500^\circ\text{C}$  ( $930^\circ\text{F}$ ).



DURMAT® MCWC

## Tungsten Carbide Products: Overview

		Product	Typical chemical composition	Information
Nickel based products	Flux-Cored Wires	<b>DURMAT® NIFD</b>	NiCrBSi + DURMAT® FTC	Page 7
		<b>DURMAT® NIFD - PLUS</b>	NiCrBSi + DURMAT® SFTC	Page 7
		<b>DURMAT® NI 2</b>	NiCrBSi + DURMAT® FTC + Special Carbides (SC)	Page 8
		<b>DURMAT® NI 2 - PLUS</b>	NiCrBSi + DURMAT® SFTC + Special Carbides (SC)	-
		<b>DURMAT® NICRW</b>	NiCrBSi + DURMAT® FTC	Page 8
		<b>DURMAT® FD 773</b>	NiCrBSi + DURMAT® RF 13	Page 9
		<b>DURMAT® FD 774</b>	Ni-matrix + DURMAT® RF 13	Page 9
		<b>DURMAT® FD 778</b>	NiFe-matrix + DURMAT® FTC	Page 9
		<b>DURMAT® FD 780</b>	NiFe-matrix + DURMAT® MCWC	Page 9
		<b>DURMAT® FD 789</b>	NiBSi + DURMAT® RF 13	Page 9
	Oxy-acetylene welding	<b>DURMAT® B</b>	NiCrBSi + DURMAT® FTC	Page 10
		<b>DURMAT® BK</b>	NiCrBSi + DURMAT® SFTC	Page 10
		<b>DURMAT® NIA</b>	NiCrBSi + DURMAT® FTC	Page 12
		<b>DURMAT® NIA - PLUS</b>	NiCrBSi + DURMAT® SFTC	Page 12
	Stick Electrodes	<b>DURMAT® NISE</b>	Ni + DURMAT® FTC	Page 13
		<b>DURMAT® NISE - PLUS</b>	Ni-matrix + DURMAT® SFTC	Page 14
<b>DURMAT® NI 3</b>		Ni-matrix + DURMAT® FTC + Special Carbides (SC)	Page 14	
Iron based products	Flux-Cored Wires	<b>DURMAT® OA</b>	Fe-matrix + DURMAT® FTC	Page 15
		<b>DURMAT® OAM</b>	Fe-matrix + DURMAT® MCWC	Page 15
	Oxy-acetylene welding	<b>DURMAT® A</b>	Fe-matrix + DURMAT® FTC	Page 16
		<b>DURMAT® A - PLUS</b>	Fe-matrix + DURMAT® SFTC	-
	Stick Electrodes	<b>DURMAT® E</b>	Fe-matrix + DURMAT® FTC	Page 17
		<b>DURMAT® E - PLUS</b>	Fe-matrix + DURMAT® SFTC	-
Products for special application	<b>DURMAT® CS</b>	Cu-Ni-Zn matrix + WC	Page 18	
	<b>DURMAT® TINNING ROD</b>	Nickel-bronze	Page 19	
	<b>BRAZING FLUX</b>	Boric acid and tetraborate of sodium decahydrate	Page 19	

# Tungsten Carbide Products: Flux-Cored Wires



## DURMAT® NIFD

DIN EN 14700: Ni20 / DIN 8555: MF21-55-CGZ

### General characteristics:

DURMAT® NIFD is a Flux-Cored Wire filled with Fused Tungsten Carbide (FTC) and self-fluxing Nickelmatrix for semi-automatic welding application. It was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The deposit alloy consists of approximately 60% FTC and 35-40% matrix. The alloy has a low melting range of 900-1050 °C (1,652-1,922 °F) and feature a self fluxing characteristic producing a smooth and clean surface. The matrix is highly resistant to acids, bases, lye and other corrosive media.

### Application:

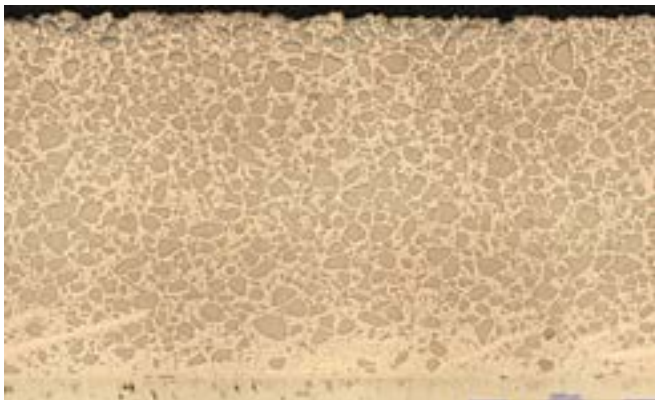
Repairing, hard-facing ferritic and austenitic steel tools and machine parts. Specially developed for semi and fully automatic welding on tool joints and stabilizers in the petroleum industry.

### Typical hardness:

DURMAT® FTC:                    ≈ 2.360 HV  
 Matrix:                                52 HRC

### Sales Units:

Ø [mm]	Ø [inch]	Coil	Voltage	Amperage
1.2	.045	BS 300 (15 kg)	16 - 20 A	100 - 160 V
1.6	1/16	BS 300 (15 kg)	18 - 20 A	110 - 170 V
2.0	5/64	BS 300 (15 kg)	19 - 21 A	120 - 200 V
2.4	3/32	B 435 (25 kg)	20 - 22 A	140 - 220 V
2.8	7/64	B 435 (25 kg)	21 - 23 A	160 - 240 V
3.2	1/8	B 435 (25 kg)	22 - 24 A	180 - 240 V



## DURMAT® NIFD - PLUS

DIN EN 14700: T Ni20 / DIN 8555: MF21-55-CGZ

### General characteristics:

DURMAT® NIFD-PLUS is a Flux-Cored Wire (NiCrBSi) filled with Spherical Fused Tungsten Carbide (SFTC) for semi-automatic welding application. These SFTC show a fine acicular structure with a higher hardness than FTC. DURMAT® NIFD-PLUS was developed to protect surfaces where extreme abrasive wear in combination with corrosion are encountered.

### Application:

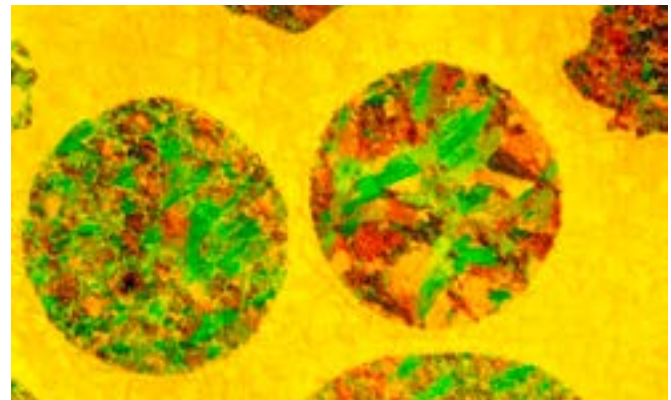
While having similar properties as DURMAT® NIFD, DURMAT® NIFD-PLUS can be applied in many NIFD applications when even superior wear protection through spherical SFTC is needed.

### Typical hardness:

DURMAT® SFTC:                    >3,000 HV  
 Matrix:                                450 - 480 HV

### Sales Units:

Ø [mm]	Ø [inch]	Coil	Voltage	Amperage
1.6	1/16	BS 300 (15 kg)	18 - 20 A	110 - 180 V
2.4	3/32	B 435 (25 kg)	21 - 23 A	140 - 230 V
2.8	7/64	B 435 (25 kg)	21 - 23 A	160 - 260 V
3.2	1/8	B 435 (25 kg)	23 - 25 A	200 - 280 V



# Tungsten Carbide Products: Flux-Cored Wires



## DURMAT® NI 2

DIN EN 14700: T Ni20 / DIN 8555: MF21-55-CGZ

### General characteristics:

DURMAT® NI 2 is a Flux-Cored Wire filled with a combination of very hard Special Carbides together with Fused Tungsten Carbides (FTC) and NiCrBSi for semi-automatic welding application. DURMAT® NI 2 was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The alloy has a low melting range of between 900 - 1,050 °C (1,652 - 1,922 °F) and features a self fluxing characteristic producing a smooth and clean surface. The matrix is highly resistant to acids, bases, lye and other corrosive media.

### Application:

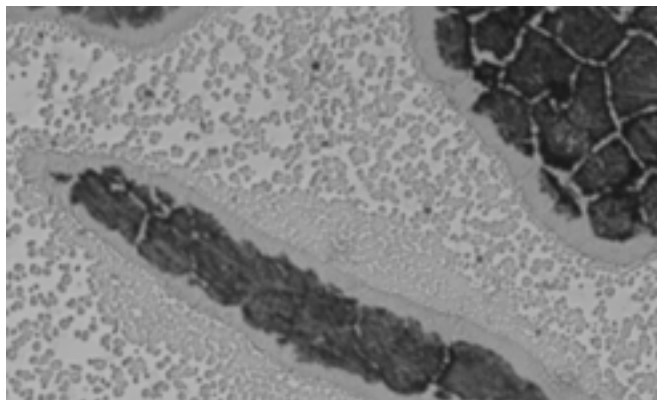
While having similar properties as DURMAT® NIFD, DURMAT® NI-2 can be applied in many NIFD applications when extra matrix protection is needed. This is the case with parts prone to aggressive erosion attack with direct particle impact.

### Typical hardness:

DURMAT® FTC:	≈ 2,360 HV
Other carbides:	≈ 2,900 HV
Matrix:	450 - 480 HV

### Sales Units:

Ø [mm]	Ø [inch]	Coil	Voltage	Amperage
1.6	1/16	BS 300 (15 kg)	18 - 20 A	110 - 180 V
2.4	3/32	B 435 (25 kg)	21 - 23 A	140 - 230 V
2.8	7/64	B 435 (25 kg)	21 - 23 A	160 - 260 V
3.2	1/8	B 435 (25 kg)	23 - 25 A	200 - 280 V



## DURMAT® NICRW

DIN EN 14700: T Ni20 / DIN 8555: MF21-55-CGZ

### General characteristics:

DURMAT® NICRW is a Flux-Cored Wire with approx. 50% FTC and 40% NiCrBSi-matrix, similar DURMAT® NIFD, but containing higher Chrome content. Good corrosion protection against chloride media. DURMAT® NICRW was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The alloy has a low melting range of between 900 - 1,050 °C (1,652 - 1,922 °F) and feature self fluxing characteristic producing a smooth and clean surface. The matrix is highly resistant to acids, bases, lye's and other corrosive media.

### Application:

While having similar properties as DURMAT® NIFD, NICRW can be applied in many NIFD applications when even superior wear protection to acids, bases, lye's and other corrosive media is needed.

### Typical hardness:

DURMAT® FTC:	≈ 2,360 HV
Matrix:	490 - 540 HV

### Sales Units:

Ø [mm]	Ø [inch]	Coil	Voltage	Amperage
1.6	1/16	BS 300 (15 kg)	18 - 20 A	160 - 180 V
2.4	3/32	B 435 (25 kg)	21 - 23 A	200 - 230 V
2.8	7/64	B 435 (2<5 kg)	21 - 23 A	220 - 260 V

## Tungsten Carbide Products: Flux-Cored Wires



### DURMAT® FD 773

DIN EN 14700: T Ni20 / DIN 8555: MF21-55-CGZ

DURMAT® FD 773 is a Flux-Cored Wire with approx. 50% DURMAT® RF13 and 40% NiCrBSi-matrix. Good corrosion protection against chloride media. DURMAT® FD 773 was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks.

**Typical hardness:**

DURMAT® RF 13: >1,950 HV  
 Matrix: 490 - 540 HV

### DURMAT® FD 774

DIN EN 14700: T Ni20 / DIN 8555: MF21-55-CGZ

DURMAT® FD 774 is a Flux-Cored Wire with approx. 50% DURMAT® RF13 and 40% Co-matrix. Good corrosion protection against chloride media. DURMAT® FD 774 was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks.

**Typical hardness:**

DURMAT® RF 13: >1,950 HV  
 Matrix: 450 - 480 HV

### DURMAT® FD 778

DIN EN 14700: T Ni20 / DIN 8555: MF21-55-CGZ

DURMAT® FD 778 was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The deposit alloy consists of 50 - 65% FTC and an austenitic NiFe-matrix and has a much lower melting point than commonly used iron based Flux-Cored Wires with tungsten carbide filling and feature self fluxing characteristic producing a smooth and clean surface. The matrix shows a good resistance to corrosive media.

**Typical hardness:**

DURMAT® FTC: ≈2,360 HV  
 Matrix: 490 - 540 HV

### DURMAT® FD 779

DIN EN 14700: T Ni20 / DIN 8555: MF21-55-CGZ

DURMAT® FD 779 consists of approx. 50 - 65% MCWC and an austenitic Ni-matrix. The deposit alloy with a low melting point protects surfaces against extreme abrasive wear in combination with corrosion attacks. The matrix shows a good resistance to corrosive media.

**Typical hardness:**

DURMAT® MCWC: >1,700 HV  
 Matrix: 490 - 540 HV

### DURMAT® FD 780

DIN EN 14700: T Ni20 / DIN 8555: MF21-55-CGZ

DURMAT® FD 780 was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The deposit alloy consists of approx. 50 - 65% MCWC and an austenitic NiFe-matrix. The alloy has a much lower melting point than commonly used iron based Flux-Cored Wires with MC tungsten carbide filling and feature self fluxing characteristic producing a smooth and clean surface. The matrix shows a good resistance to corrosive media.

**Typical hardness:**

DURMAT® MCWC: >1,700 HV  
 Matrix: 490 - 540 HV

### DURMAT® FD 789

DIN EN 14700: T Ni20 / DIN 8555: MF21-55-CGZ

Good corrosion protection against chloride media. DURMAT® FD 789 was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The deposit alloy consists of approx. 50% DURMAT® RF 13 and 40% NiBSi-matrix.

**Typical hardness:**

DURMAT® RF 13: >1,950 HV  
 Matrix: 450 - 480 HV

# Tungsten Carbide Products: Oxy-Acetylene Welding



## DURMAT® B

Welding Rod DIN EN 14700: T Ni20-CGTZ / DIN 8555: G21-UM-55-CG

### General characteristics:

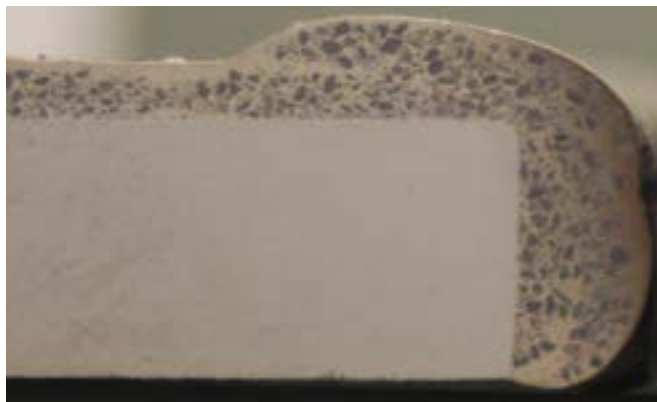
DURMAT® B is a nickel core flexible rod coated with both Fused Tungsten Carbide (FTC) and Ni-Cr-B-Si developed for oxyacetylene welding. The deposited alloy consists of approximately 65% FTC and 35% Ni-Cr-B-Si-matrix with a matrix hardness of 45 HRC. The overlay is highly resistant to acids, bases, lye and other corrosive media and excessive wear conditions. The rod has a low melting range of between 950 - 1,050 °C (1,742 - 1,922 °F) and features a self fluxing characteristic producing a smooth, clean welded surface.

### Typical hardness:

DURMAT® FTC: ≈ 2,360 HV  
NiCrBSi-Matrix: ≈ 420 - 450 HV

### Sales units:

Type	Ø mm	Ø inch	Grain size (mm)	US mesh size
4005	4.0	5/32	0.25 - 0.70	24 - 60
4010	4.0	5/32	0.70 - 1.20	14 - 24
5005	5.0	3/16	0.25 - 0.70	24 - 60
5010	5.0	3/16	0.70 - 1.20	14 - 24
5020	5.0	3/16	1.00 - 2.00	9 - 16
6005	6.0	1/4	0.25 - 0.70	24 - 60
6010	6.0	1/4	0.70 - 1.20	14 - 24
6020	6.0	1/4	1.00 - 2.00	9 - 16
8005	8.0	5/16	0.25 - 0.70	24 - 60
8010	8.0	5/16	0.70 - 1.20	14 - 24
8020	8.0	5/16	1.00 - 2.00	9 - 16



## DURMAT® BK

Welding Rod DIN EN 14700: T Ni20-CGTZ / DIN 8555: G21-UM-55-CG

### General characteristics:

DURMAT® BK is a nickel cored flexible rod coated with mainly Spherical Fused Tungsten Carbide (SFTC) and Ni-Cr-B-Si-matrix with a matrix hardness of 45 HRC. The hard-facing is highly resistant to acids, bases, lye, and other corrosive media and excessive wear conditions. The rod has a low melting range of between 950 - 1,050 °C (1,742 - 1,922 °F) and features a self fluxing characteristic producing a smooth, clean welded surface.

### Typical hardness:

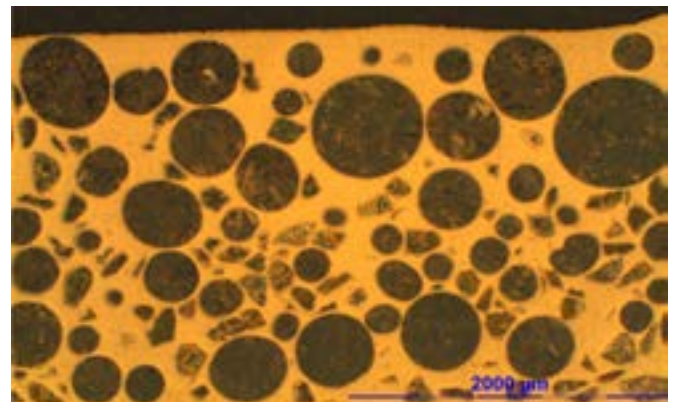
DURMAT® SFTC: ≈ 3,000 HV  
NiCrBSi-Matrix: ≈ 420 - 450 HV

### Application:

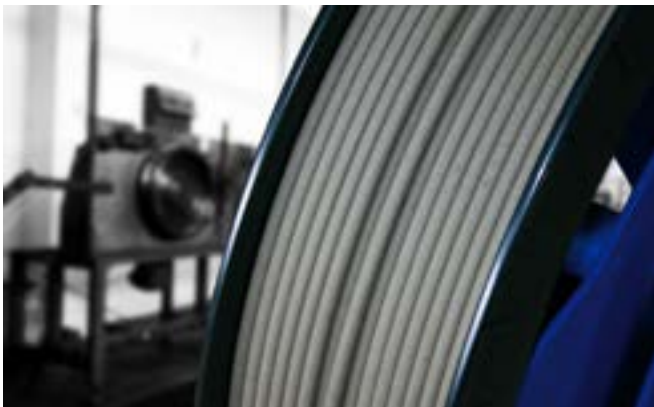
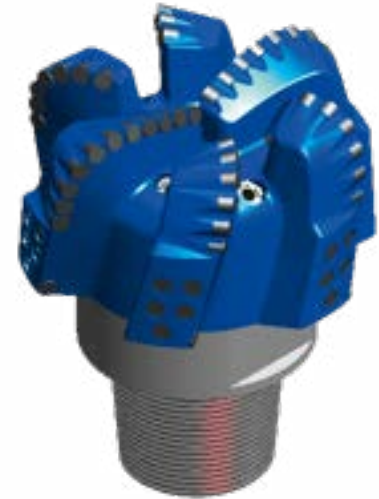
Hard-facing of ferritic and austenitic steels (steel castings), applied for overlaying mixer blades, screws and conveyors in chemical and dye industries and the food industry. Especially recommended for stabilizer blades in the petroleum industry.

### Sales units:

Type	Ø mm	Ø inch	Grain size (mm)	US mesh size
4005	4.0	5/32	0.25 - 0.70	24 - 60
5005	5.0	3/16	0.25 - 0.70	24 - 60
6005	6.0	1/4	0.25 - 0.70	24 - 60
8005	8.0	5/16	0.25 - 0.70	24 - 60



## Tungsten Carbide Products: Oxy-Acetylene Welding





# Tungsten Carbide Products: Oxy-Acetylene Welding



## DURMAT® NIA

Welding Rod DIN EN 14700: T Ni20 / DIN 8555: G21-GF-55-CG

### General characteristics:

DURMAT® NIA is a cold rolled, formed, and closed seam nickel tube filled with Fused Tungsten Carbide (FTC) and Cr, B and Si for oxy-acetylene application. The deposited hard-facing consists of approximately 65% FTC and 35% Ni-Cr-B-Si-matrix. DURMAT® NIA feature self-fluxing characteristic producing a smooth, clean surface. DURMAT® NIA has a low melting point of approx. 950-1,050 °C (1,742-1,922 °F). The overlay is extremely wear resistance and anti corrosive to acids, bases, lye and other corrosive media.

### Application:

Hard-facing on ferritic and austenitic steels (steel casings), overlaying mixer blades and conveyor and screws in chemical, dye and food industry. Recommended for hard facing rock bits and stabilizers in the petroleum industry.

### Typical hardness:

Hardness FTC: ≈2,360 HV  
NiCrBSi-Matrix: 450 - 520 HV

### Sales units:

Type	Ø mm	Ø inch	Grain size (mm)	US mesh size
2805	2.8	7/64	0.25 - 0.70	24 - 60
4005	4.0	5/32	0.25 - 0.70	24 - 60
4010	4.0	5/32	0.70 - 1.20	14 - 24
5005	5.0	3/16	0.25 - 0.70	24 - 60
5010	5.0	3/16	0.70 - 1.20	14 - 24
5020	5.0	3/16	1.00 - 2.00	9 - 16
6005	6.0	1/4	0.25 - 0.70	24 - 60
6010	6.0	1/4	0.70 - 1.20	14 - 24
6020	6.0	1/4	1.00 - 2.00	9 - 16

### Welding recommendation:

The surface to be hard faced should be clean and free of rust, scale or grease and other contamination, preferably by grinding or grit blasting. Deposits should be made using a gas flame with a neutral to slight acetylene balance.

## DURMAT® NIA-PLUS

Welding Rod DIN EN 14700: T Ni20 / DIN 8555: G21-GF-55-CG

### General characteristics:

DURMAT® NIA-PLUS is a cold rolled, formed, and closed seam nickel tube filled with Spherical Fused Tungsten Carbide (SFTC) and Cr, B and Si for oxyacetylene application. The deposited alloy consists of approximately 65% SFTC and 35% Ni-Cr-B-Si-matrix. DURMAT® NIA-PLUS wets easily and has excellent flow producing a smooth, clean surface. DURMAT® NIA-PLUS feature self-fluxing characteristic producing a smooth, clean surface. The overlay is extremely wear resistance and anti corrosive to acids, bases, lye and other corrosive media.

### Application:

Hard facing on ferritic and austenitic steels (steel casings), overlaying mixer blades, conveyors and screws in chemical, dye and food industry. Recommended for hard facing rock bits and stabilizers in the petroleum industry.

### Typical hardness:

SFTC: >3000 HV  
NiCrBSi-Matrix: 450 - 520 HV

### Sales units:

Type	Ø mm	Ø inch	Grain size (mm)	US mesh size
2805	2.8	7/64	0.25 - 0.70	24 - 60
4005	4.0	5/32	0.25 - 0.70	24 - 60
5005	5.0	3/16	0.25 - 0.70	24 - 60
6005	6.0	1/4	0.25 - 0.70	24 - 60

# Tungsten Carbide Products: Stick Electrodes



## DURMAT® NISE

Stick Electrode DIN EN 14700: E Ni20 / DIN 8555: E21-GF-UM-60-CGZ

### General characteristics:

DURMAT® NISE is a tubular electrode filled with Fused Tungsten Carbide (FTC) and a special nickel alloy for manual welding. This alloy is specially designed for application where extreme abrasion in combination with corrosion is expected. DURMAT® NISE can be applied on steel castings, nickel based and stainless steel alloys. The alloy combination of DURMAT® NISE is specially designed for surfaces that are exposed to corrosive media and excessive wear conditions. The matrix is highly resistant to acids, lye and other corrosive media.

### Typical hardness:

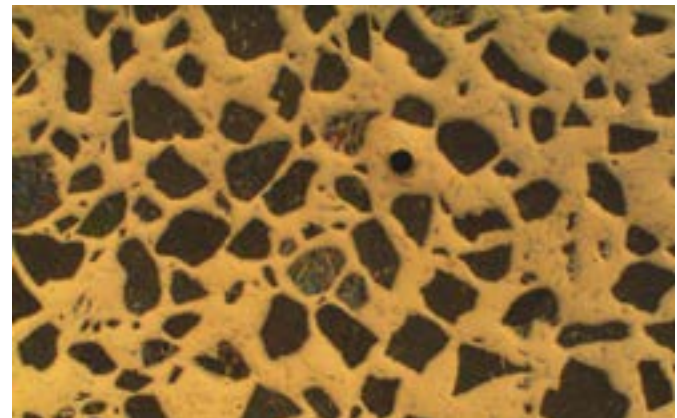
DURMAT® FTC:                     ≈2,360 HV  
 Ni-Matrix:                         480 - 520 HV

### Application:

Repairing and hard-facing ferritic and austenitic steels (steel castings), stabilizer blades, conveyor screws, milling plates, deep drilling tools and mixer blades. This type of stick electrodes require the least amount of equipment and provides maximum flexibility for welding in remote locations.

### Sales units:

Type	Ø mm	Ø inch	Length	Amps	Voltage
4005	4.0	5/32	350 mm	100 A	= + / ~
5005	5.0	3/16	350 mm	120 A	= + / ~
6005	6.0	1/4	350 mm	160 A	= + / ~
8005	8.0	5/16	450 mm	160 A	= + / ~



Patents - Germany: No. 40 08 091.9-41, United Kingdom: No. 2.232.108, USA: No. 5.004.886

# Tungsten Carbide Products: Stick Electrodes



## DURMAT® NISE PLUS

Stick Electrode DIN EN 14700: E Ni20 / DIN 8555: E21-GF-UM-60-CGZ

### General characteristics:

DURMAT® NISE-PLUS is a tubular electrode filled with Spherical Fused Tungsten Carbide (SFTC) and a special nickel matrix for manual welding. This alloy is specially designed for application against extreme abrasion in combination with corrosion attacks. DURMAT® NISE PLUS can be applied on steel castings, nickel based and stainless steel alloys. The alloy combination of DURMAT® NISE PLUS is specially designed for surfaces that are exposed to corrosive media and excessive wear conditions. The matrix is highly resistant to acids, lye and other corrosive media.

### Typical hardness:

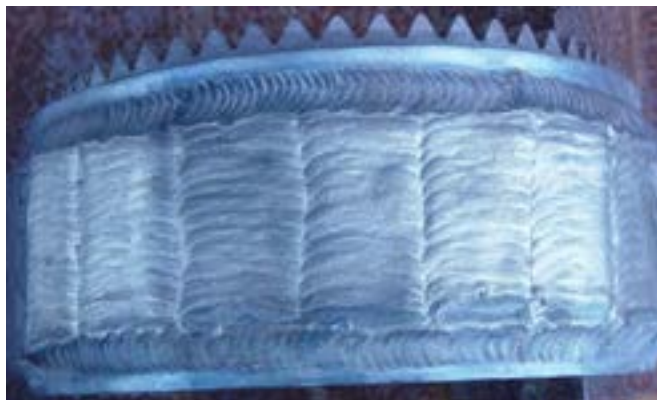
DURMAT® SFTC: >3,000 HV  
Ni-Matrix: 480 - 520 HV

### Application:

Repairing and hard-facing ferritic and austenitic steels (steel castings), stabilizer blades, conveyor screws, milling plates, deep drilling tools, and mixer blades, as well as machine parts in the chemical and food industry.

### Sales units:

Type	Ø mm	Ø inch	Length	Amps	Voltage
4005	4.0	5/32	350 mm	100 A	= + / ~
5005	5.0	3/16	350 mm	120 A	= + / ~
6005	6.0	1/4	350 mm	160 A	= + / ~
8005	8.0	5/16	450 mm	160 A	= + / ~



## DURMAT® NI-3

Stick Electrode DIN EN 14700: E Ni20 / DIN 8555: E21-GF-UM-60-CGZ

### General characteristics:

DURMAT® NI-3 is a tubular electrode filled with a mixture of FTC and special carbides in a combination with a specially developed nickel alloy for manual welding. This alloy is designed for applications where extreme abrasion in combination with corrosion is expected. The alloy combination of DURMAT® NI-3 is specially designed for items that are exposed to corrosive media and excessive wear conditions. The matrix is highly resistant to acids, lye and other corrosive media.

### Typical hardness:

DURMAT® FTC: ≈2,360 HV  
Other carbides: ≈2,900 HV  
Ni-matrix: 480 - 520 HV

### Application:

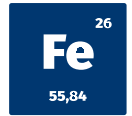
Repairing and hard-facing ferritic and austenitic steels (steel castings), stabilizer blades, conveyor screws, milling plates, deep drilling tools, and mixer blades, as well as machine parts in the chemical and food industry.

### Sales units:

Type	Ø mm	Ø inch	Length	Amps	Voltage
4005	4.0	5/32	350 mm	100 A	= + / ~
5005	5.0	3/16	350 mm	120 A	= + / ~
6005	6.0	1/4	350 mm	160 A	= + / ~
8005	8.0	5/16	450 mm	160 A	= + / ~



# Tungsten Carbide Products: Oxy-Acetylene Welding



## DURMAT® A

Welding Rod DIN EN 14700: T Fe20 / DIN 8555: G21-GF-55-CG

### General characteristics:

DURMAT® A consists of a special pre-alloyed tube filled with coarsely grained Fused Tungsten Carbide (FTC) for oxyacetylene welding. The FTC has an exceptionally high hardness of over 2,360 HV giving outstanding wear protection to hard-faced areas. For special hard-facing on machine parts of unalloyed, low alloyed or cast steel with carbon content up to 0.45%. Higher carbon content could lead to cracking. Depending on the size and composition of the area to be hard-faced, the proper rod diameter and grain size should be chosen. If the area will encounter heavy abrasion a small grain size is recommended. If a cutting action is desired a larger grain size is preferable.

### Typical hardness:

DURMAT® FTC: >2,360 HV

### Application:

Hard-facing and repairing tools and machine parts exposed to wear in mining, road construction, ceramic, petroleum, excavation and dredging applications.

### Sales units:

Type	Ø mm	Ø inch	Grain size (mm)	US Mesh size
3505	3.5	1/8	0.25 - 0.70	24 - 60
3510	3.5	1/8	0.70 - 1.20	14 - 24
4005	4.0	5/32	0.25 - 0.70	24 - 60
4010	4.0	5/32	0.70 - 1.20	14 - 24
4020	4.0	5/32	1.00 - 1.60	10 - 16
5005	5.0	3/16	0.25 - 0.70	24 - 60
5010	5.0	3/16	0.70 - 1.20	14 - 24
5020	5.0	3/16	1.00 - 2.00	9 - 16
6005	6.0	1/4	0.25 - 0.70	24 - 60
6010	6.0	1/4	0.70 - 1.20	14 - 24
6020	6.0	1/4	1.00 - 2.00	9 - 16
8010	8.0	5/16	0.70 - 1.20	14-24
8020	8.0	5/16	1.00 - 2.00	9 - 16
8030	8.0	5/16	1.50 - 3.00	7 - 12

Standard rod lengths: 350mm (14") and 700mm (28")

