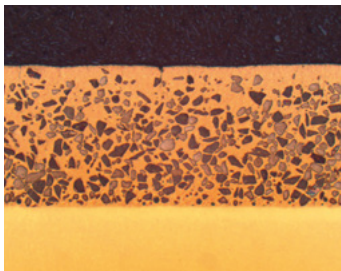


www.durmat.com

Advanced WEAR PROTECTION

with Fused Tungsten Carbide Products



DIN EN ISO 9001:2008
Cert. No.: 01 100 040463

WEAR SOLUTIONS

With Creative Ideas for Practical Solutions

DURUM VERSCHLEISS-SCHUTZ GMBH was established in 1984 as a manufacturer of advanced hard-facing products. Today DURUM has production and service centres in Brazil, France and the USA and exports to more than 80 countries all over the world!

DURUM provides high performance products for Welding and Thermal Spraying. DURUM is a global market leader in the supply of specialized overlaying consumables that can be applied by a range of processes including: Flux-Cored Wire Welding, Plasma Transferred Arc (PTA) Welding, Oxyacetylene Welding, Thermal Spraying.

Besides Willich (Germany) DURUM Group maintains production and workshop facilities in Brazil (São Paulo), France (Saint Victor) and the USA (Houston TX). We also support a network of independent agencies throughout the world. We meet demanding requirements of today's industry with a wide array of Welding and Thermal Spray technologies.

The company employs national and international PhD's; welding engineers and independent experts from well known and respected universities, which ensures that constant material and process development is achieved to the highest standards.

DURUM focuses on "continuous development" and sets a significant annual budget aside for research and development including new product development, product enhancement and the development of highly specialised solutions to the most challenging applications in the industry.



- Tungsten Carbide Rods for Oxy-acetylene Welding
- Stellite* - Flux-Cored Wires
- Nickel-, and Iron-based Flux-Cored Wires
- FCAW wires with Tungsten Carbide
- Tungsten Carbides, Complex Carbides and Chromium Carbides for manual Arc Welding
- PTA Welding Powders, Fe-Ni-Co based Powders PTA and special qualities

* Stellite is a registered trademark of Kennametal Stellite

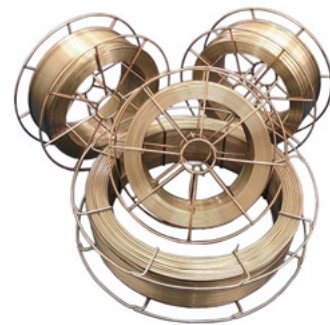
- PTA machines, torches and powder feeders
- Powders and Wires for Laser Cladding
- Powders for Oxy-acetylene Welding and Spraying
- Fused Crushed and Spherical Fused Tungsten Carbides
- Pre-manufactured replacement wear parts
- Tungsten Carbide Wear Plates
- Wear Plates with Chromium Carbides and Complex Carbides
- Thermal Spray Powders (conforming to DIN EN 1274)
- Thermal Spray Wires (conforming to DIN EN 14919)

Contents

DURUM as a welding consumable producer for high demanding applications and a long history in wear protection offers solutions suitable to any customer. We offer our Fused Tungsten Carbide products in different types and for different processes to address the needs of our customers. There are three different process types that are suitable to apply high quality coatings with the highest level of wear protection by using fused tungsten carbides: Gas Metal Arc Welding (GMAW), Oxyacetylene Welding and Shielded Metal Arc Welding (SMAW). All of these processes feature different process conditions and should be used according to their unique properties.

Gas Metal Arc Welding Wires:

Our welding wires for Gas Metal Arc Welding with Fused Tungsten Carbides (FTC), DURMAT® NIFD, DURMAT® NIFD PLUS and DURMAT® NI-2 define the industry standard and are patented by the Inventor DURUM VERSCHLEISS-SCHUTZ GMBH. They offer superior quality coatings with high productivity and process reliability.



Oxyacetylene Welding Rods:

Our Welding Rods for Oxyacetylene Welding with Fused Tungsten Carbides (FTC), DURMAT® B and DURMAT® BK have very good welding properties and feature a wide range of carbide sizes. Hard-facings feature very good carbide distribution and high carbide contents are readily used in a wide range of highly demanding applications like the Oil & Gas or heavy mining industries.

Shielded Metal Arc Welding Electrodes:

Our welding electrodes with Fused Tungsten Carbides (FTC), DURMAT® NISE are the perfect addition to our Gas Metal Arc Welding Wires and Oxyacetylene Welding Rods. High versatility and simplicity of its welding equipment offer a high range of repair applications. Our welding rods offer a high range of available carbide sizes and can be purchased in different diameters to fit the application.



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 2,000 HV₃₀. The micro-hardness of this material has been measured at 2,300 - 2,500 HV_{0,1}.

FTC has a carbon content of 3.8 - 4.1 %. This corresponds to a ratio of 78 - 80 % W₂C 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, an unproportionately 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.



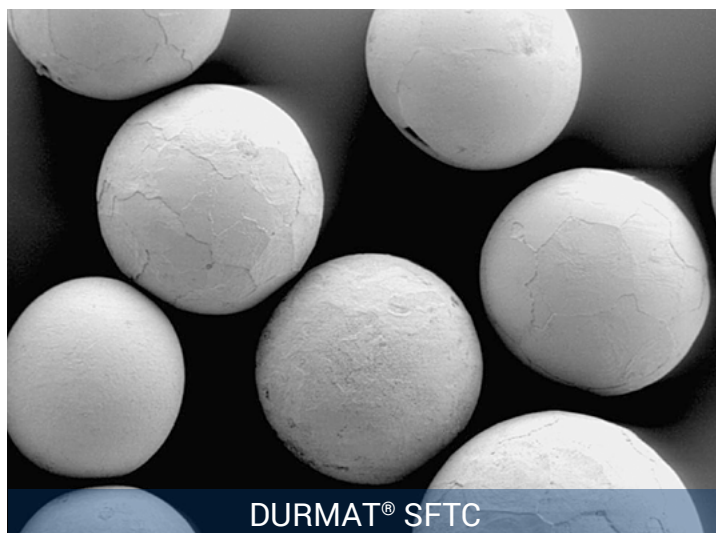
DURMAT® SFTC

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 HV_{0,1}). 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 & stone saws, hot-pressed tools, screens & conveyors, extrusion housings and hard additives to diamond bits and saws.

Product	-	DURMAT® FTC	DURMAT® SFTC
Alloy type	-	WC - W ₂ C	WC - W ₂ C
Parameter	Unit	Typical data	
C-total	%	3.8 - 4.1	3.8 - 4.1
C-free	%	0.1 max.	0.1 max.
O ₂ sieve range	%	0.05 max.	0.05 max.
O ₂ sub sieve range	%	0.2 max.	0.2 max.
Fe	%	0.3 max.	0.3 max.
Co	%	0.3 max.	0.3 max.
Hardness	HV _{0,1}	2,360	3,000
Structure	-	mainly feather	fine
Density	g/cm ³	16 - 17	16 - 17
Melting point	°C/°F	2,860/5,176	2,860/5,176



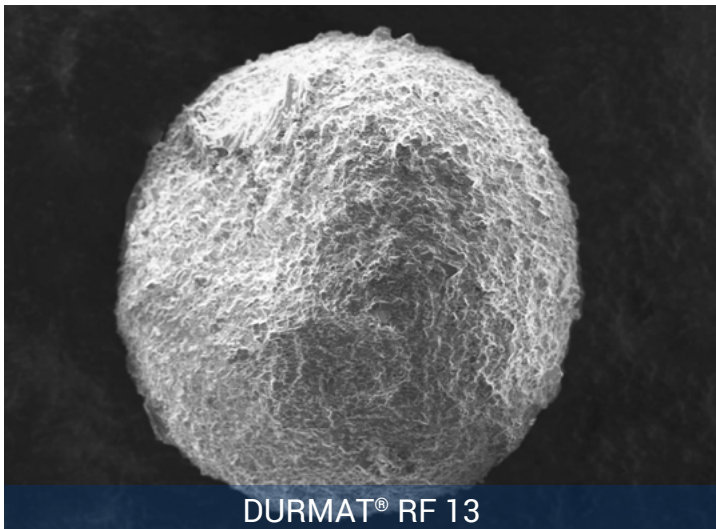
DURMAT® RF 13

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, which are 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 characteristic, 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® RF 13 development using fine-structured WC has resulted in hardness of approximately 1,750 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 hard-facing crystallites is exceptionally thin, making it harder to wash out. Due to this structural attribute, only very small hard-facing 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 to the presence of less defects.



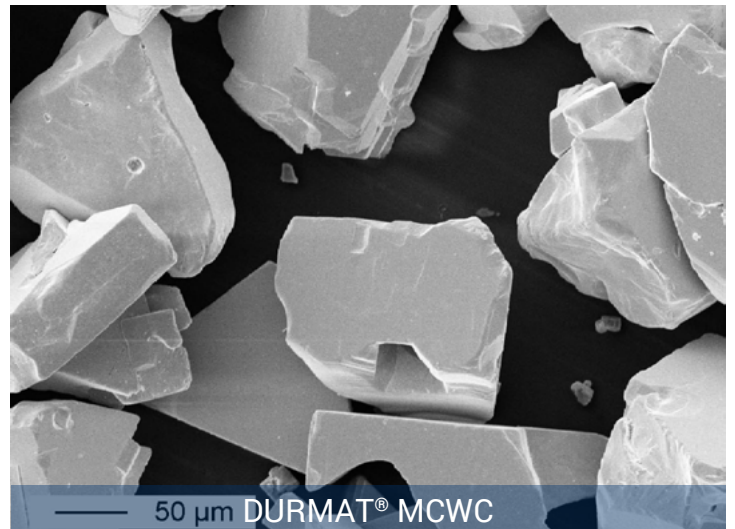
A characteristic, higher wear resistance also occurs with regard to corrosive wear. As a result of the nano-structure and in particular the significantly reduced intermediate binding metal layer, the corrosive media can only reach the cobalt with difficulty, leading to considerable delays in wear. In 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.

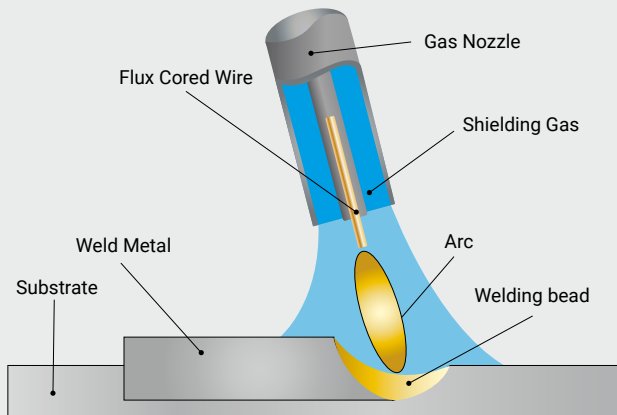
Based on its stable single-phase micro-structure, nearly no dissolution of the Macro-Crystalline Tungsten Carbides is observed after the welding process. MCWC has good weldability with nickel-based alloys during the PTA application process. The thermodynamically more stable MCWC has a blocky shape with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

The carbide hardness amounts 1,700 - 2,000 HV_{0,1}. The DURMAT® MCWC can stay in service up to 500 °C (930 °F).

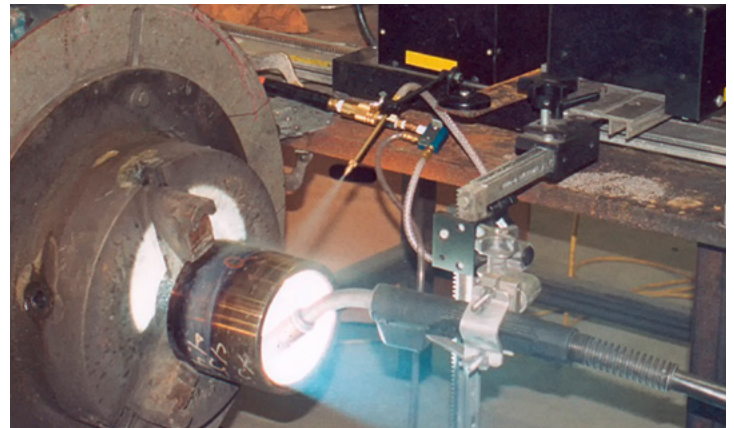


Gas-Metal Arc Welding Wires with Fused Tungsten Carbides

Gas Metal Arc Welding (GMAW) / Flux-Cored Arc Welding (FCAW) or MIG/MAG:



Gas Metal Arc Welding (GMAW), sometimes referred to by its subtypes Metal Inert Gas (MIG) welding or Metal Active Gas (MAG) welding, is a welding process in which an electric arc forms between a consumable wire electrode and the workpiece metal(s), which heats the workpiece metal(s), causing them to melt and join. By using Flux-Cored Wires the process is called Flux-Cored Arc Welding (FCAW). An externally supplied shielding gas is sometimes used, but often the flux itself is relied upon to generate the necessary protection from the atmosphere, producing both gaseous protection and liquid slag protecting the weld.





DURMAT® NIFD

Flux-Cored Wire DIN EN 14700: T Ni20
(DIN 8555: MF21-55-CGZ)

Industry
standard for
highest wear
protection

GENERAL CHARACTERISTICS:

DURMAT® NIFD is a Flux Cored Wire (NiCrBSi) filled with Fused Tungsten Carbide (FTC) for semi-automatic welding application. DURMAT® NIFD protects surfaces where extreme abrasive wear in combination with corrosion is encountered. The deposit alloy consists of approximately 50 - 65 % FTC and 35 - 50 % Ni-Cr-B-Si-matrix. The alloy has a low melting range of between 900 - 1,050 °C (1,652 – 1,922 °F) and flows extremely well and leaves a smooth and clean surface. The matrix is highly resistant to acids, bases, lye and other corrosive media.

APPLICATION:

Repairing and hard-facing ferritic and austenitic steel tools and machine parts (steel castings) in the chemical industry and food industry; stabilizers in the petroleum industry, mixer blades, conveyors and screws in the chemical, dye industry and in the food processing industry; mineral and brick industry.

TYPICAL HARDNESS:

FTC: ≈ 2,360 HV_{0.1}
Matrix: 450 - 480 HV_{0.1}

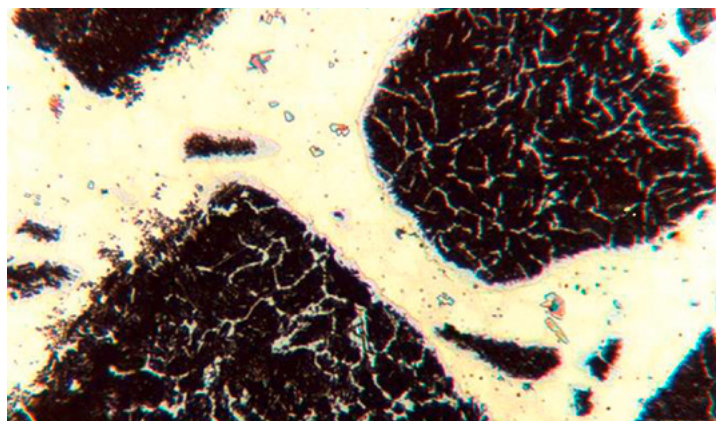
SALES UNITS:

Ø mm	Ø inch	Coil size DIN EN 759	Amps	Voltage
1.2	0.045	BS-300 spools ≈15 kg	100 - 160 A	16 - 20 V
1.6	1/16	BS-300 spools ≈ 15 kg	110 - 180 A	18 - 20 V
2.0	5/64	BS-300 spools ≈ 15 kg	120 - 200 A	17 - 21 V
2.4	3/32	B-450 spools ≈ 25 kg	140 - 230 A	21 - 23 V
2.8	7/64	B-450 spools ≈ 25 kg	160 - 260 A	21 - 23 V
3.2	1/8	B-450 spools ≈ 25 kg	200 - 280 A	23 - 25 V

vacuum packaging is available on request

Patents:

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



*) Please observe all appropriate safety regulations. The technical information provided in this data sheet reflects the present state of knowledge. They do not form part of any sales contract as guaranteed properties of the delivered materials. Our standard terms and conditions apply to all contracts included.

Gas-Metal Arc Welding Wires with Fused Tungsten Carbides

DURMAT® NIFD PLUS

Flux-Cored Wire 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:

SFTC: > 3,000 HV_{0,1}
Matrix: 450 - 480 HV_{0,1}

SALES UNITS:

DURMAT®	Ø mm	Ø inch	Coil size DIN EN 759	Amps	Voltage
NI-2	1.6	1/16	BS-300 spools ≈ 15 kg	110 - 180 A	18 - 20 V
NIFD PLUS / NI-2	2.4	3/32	B-450 spools ≈ 25 kg	140 - 230 A	21 - 23 V
NIFD PLUS / NI-2	2.8	7/64	B-450 spools ≈ 25 kg	160 - 260 A	21 - 23 V
NIFD PLUS / NI-2	3.2	1/8	B-450 spools ≈ 25 kg	200 - 280 A	23 - 25 V

vacuum packaging is available on request

DURMAT® NI-2

Flux-Cored Wire DIN EN 14700: T Ni20
(DIN 8555: MF21-55-CGZ)



GENERAL CHARACTERISTICS:

DURMAT® NI-2 is a cored metal wire filled with a combination of very hard special carbides together with Fused Tungsten Carbides (FTC) and Ni-Cr-B-Si-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.

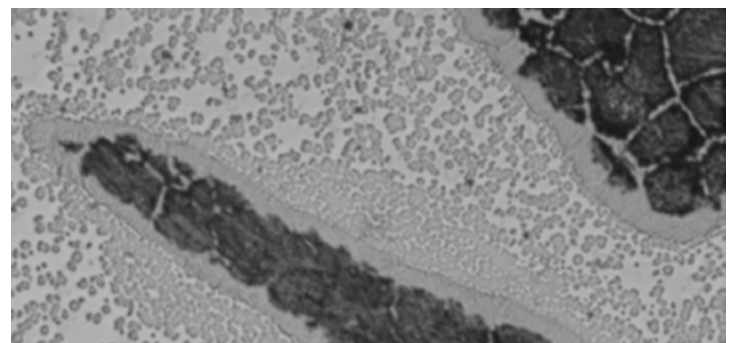
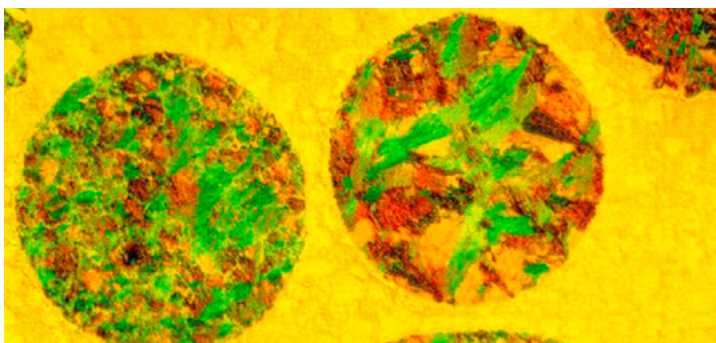
TYPICAL HARDNESS:

FTC: ≈ 2,360 HV_{0,1}
Other carbides: ≈ 2,900 HV_{0,1}
Matrix: 450 - 480 HV_{0,1}

Patents:

Germany: No. 40 08 091.9-41
United Kingdom: No. 2.232.108

USA: No. 5.004.886





DURMAT® NICRW

Flux-Cored Wire 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:

FTC: ≈ 2,360 HV_{0,1}
Matrix: 490 - 540 HV_{0,1}

SALES UNITS:

Ø mm	Ø inch	Coil size DIN EN 759	Amps	Voltage
1.6	3/32	BS-300 spools ≈ 15 kg	160 - 180 A	18 - 20 V
2.4	7/64	B-450 spools ≈ 25 kg	200 - 230 A	21 - 23 V
2.8	1/8	B-450 spools ≈ 25 kg	220 - 260 A	21 - 23 V

vacuum packaging is available on request

DURMAT® FD 773

Flux-Cored Wire DIN EN 14700: T Ni20
(DIN 8555: MF21-55-CGZ)



GENERAL CHARACTERISTICS:

DURMAT® FD 773 is a flux-cored wire with approx. 50 % DURMAT® RF 13 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:

RF 13: > 1,950 HV_{0,1}
Matrix: 490 - 540 HV_{0,1}

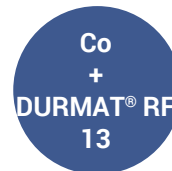
SALES UNITS:

Ø mm	Ø inch	Coil size DIN EN 759	Amps	Voltage
1.6	3/32	BS-300 spools ≈ 15 kg	160 - 180 A	18 - 20 V
2.0	7/64	B-450 spools ≈ 25 kg	190 - 200 A	19 - 21 V

vacuum packaging is available on request

DURMAT® FD 774

Flux-Cored Wire DIN EN 14700: T Ni20
(DIN 8555: MF21-55-CGZ)



GENERAL CHARACTERISTICS:

DURMAT® FD 774 is a flux-cored wire with approx. 50 % DURMAT® RF 13 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:

RF 13: > 1,950 HV_{0,1}
Matrix: 450 - 480 HV_{0,1}

SALES UNITS:

Ø mm	Ø inch	Coil size DIN EN 759	Amps	Voltage
1.6	3/32	BS-300 spools ≈ 15 kg	160 - 180 A	18 - 20 V
2.0	7/64	B-450 spools ≈ 25 kg	190 - 200 A	19 - 21 V

vacuum packaging is available on request

Gas-Metal Arc Welding Wires with Fused Tungsten Carbides

DURMAT® FD 778

Flux-Cored Wire DIN EN 14700: T Ni20
(DIN 8555: MF21-55-CGZ)



GENERAL CHARACTERISTICS:

DURMAT® FD 778 is a Flux-Cored Wire with approx. 50 - 65 % FTC. DURMAT® FD 778 was developed to protect surfaces against extreme abrasive wear in combination with corrosion attacks. The deposit alloy consists of approx. 50 - 65 % FTC and an austenitic NiFe-matrix. The alloy 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:

FTC: ≈ 2,360 HV_{0,1}
Matrix: 490 - 540 HV_{0,1}

DURMAT® FD 779

Flux-Cored Wire DIN EN 14700: T Ni20
(DIN 8555: MF21-55-CGZ)



GENERAL CHARACTERISTICS:

DURMAT® FD 779 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 Ni-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:

MCWC: > 1,700 HV_{0,1}
Matrix: 490 - 540 HV_{0,1}

SALES UNITS:

Ø mm	Ø inch	Coil size DIN EN 759	Amps	Voltage
1.6	3/32	BS-300 spools ≈ 15 kg	160 - 180 A	18 - 20 V
2.4	7/64	B-450 spools ≈ 25 kg	200 - 230 A	21 - 23 V
2.8	1/8	B-450 spools ≈ 25 kg	220 - 260 A	21 - 23 V

vacuum packaging is available on request

DURMAT® FD 780

Flux-Cored Wire DIN EN 14700: T Ni20
(DIN 8555: MF21-55-CGZ)



GENERAL CHARACTERISTICS:

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:

MCWC: > 1,700 HV_{0,1}
Matrix: 490 - 540 HV_{0,1}

DURMAT® FD 789

Flux-Cored Wire DIN EN 14700: T Ni20
(DIN 8555: MF21-55-CGZ)



GENERAL CHARACTERISTICS:

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:

RF 13: > 1,950 HV_{0,1}
Matrix: 450 - 480 HV_{0,1}

SALES UNITS:

Ø mm	Ø inch	Coil size DIN EN 759	Amps	Voltage
1.6	3/32	BS-300 spools ≈ 15 kg	160 - 180 A	18 - 20 V
2.4	7/64	B-450 spools ≈ 25 kg	200 - 230 A	21 - 23 V
2.8	1/8	B-450 spools ≈ 25 kg	220 - 260 A	21 - 23 V

vacuum packaging is available on request



Following is an example of the procedures that are used by DURUM VERSCHLEISS-SCHUTZ GMBH for overlay and repair of oil tools. DURMAT® NIFD is used for oil tools in western Canada, Colombia, Venezuela, North Sea, Australia, Thailand, USA (Texas, Louisiana, Wyoming, Oklahoma and Mississippi).

An oxyacetylene process to overlay a composite material of Tungsten Carbide enclosed in a nickel matrix is generally used to repair the stabilizer and centralizer sleeves used in directional drilling. DURMAT® NIFD wire offers an alternative process for new and repaired tools. Not only does it solve most of the technical problems linked with the conventional method, but is also a cost-effective solution.

Conventional method: Oxyacetylene

The best materials used for repair are most often made of Fused Tungsten Carbide in a Nickel Chromium matrix. The concentration of tungsten carbides for an optimum abrasion resistance is between 55 and 65 % by weight. DURMAT® B / BK or DURMAT® NIA is successfully used in the oil field on regular type stabilizers in very abrasive formations. Several problems can occur when the oxyacetylene process is used to repair the sleeve type stabilizers.

The oxyacetylene application requires a preheating of the entire part at 600 °F. Then the overlay process itself adds heat input. This high heat input on a thin sleeve can warp the part, which then affects the threaded connection and renders the sleeve useless.

The problem is aggravated by the low rate of deposit of those types of materials. A welder in a good working environment can apply 3 - 5 lbs. of material per hour.

The manual application leaves a wavy type deposit that needs to be OD grinded. Sometimes after grinding, the blades show a lack of material which needs to be replaced.

Alternative: MIG process using DURMAT® NIFD wire

The DURMAT® NIFD wire is made of a Nickel strip formed and closed into a hollow wire. That envelope is filled with Fused Tungsten Carbide (FTC) grains before being closed. The result is a Flux-Cored Wire for MIG application. Since it can be welded on itself crack-free, this product can be used for overlays or repairs. The deposit shows a homogeneous dispersion of Fused Tungsten Carbide metallurgically bonded to the Nickel matrix. The major advantages of DURMAT® NIFD and the MIG process are:

- The overlay can be done with just enough preheating to take the chill and humidity out of the metal base.
- The DURMAT® NIFD Nickel strip melts at approximately 1,750 °F. This enables you to control the heat input in the stabilizer blades and avoid distortion of the part or the connection threads.
- Because of the low heat input, no post-heat treatment is necessary after welding.
- The rate of deposit by hand increases to 10 - 15 lbs. per hour, depending on the size of the part.
- The repair can be fully automated at a low cost, as the setup for a straight-blades stabilizer is very easy and can be done with common equipment. Deposition rate can increase up to 25 lbs. per hour.
- The overlay thickness is more uniform than with an oxyacetylene application and the deposit thickness can be controlled (especially with an automatic setup). A more accurate estimate of the thickness can be made and less time is spent on the grinder.

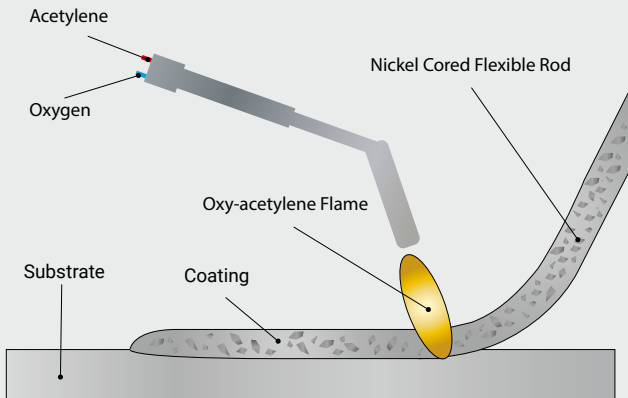
EXAMPLE:

New sleeve with 4 straight blades 16" x 2"; final deposit should be 1/16" per blade.

	OXYACETYLENE:	DURMAT® NIFD with MIG:
Density of material:	0.39 lbs./cu.in. (av. buildup per blade = 1/4")	0.39 lbs./cu.in. (av. buildup per blade = 1/8")
Quantity of material used:	12.5 lbs.	6.25 lbs.
Time for preparation, preheating and welding:	4.5 to 5.5 hours	1 to 1.5 hours
Estimated grinding time:	1 hour	1/2 hour

Oxyacetylene Welding Rods with Fused Tungsten Carbides

Oxyacetylene Welding

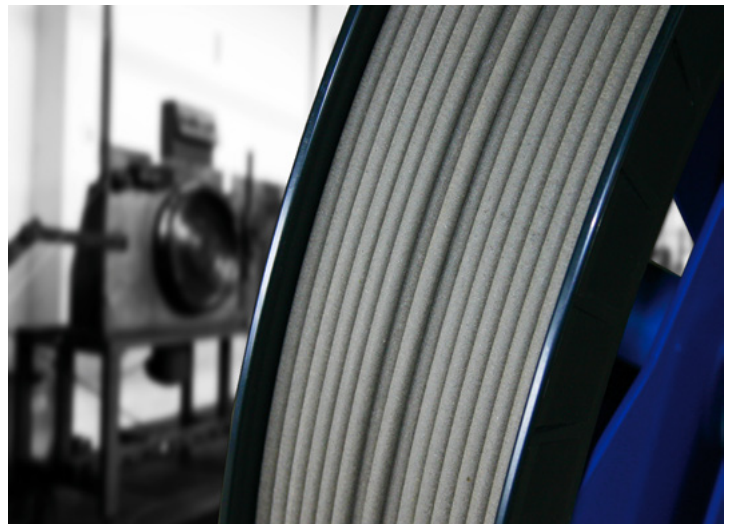
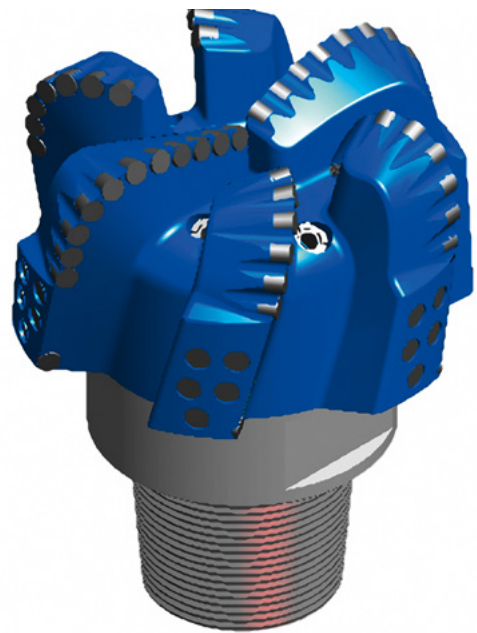


Oxyacetylene welding, also known as Oxy-fuel Welding (OFW), is a gas welding process in which coalescence is produced by a flame of oxygen and acetylene gases mixed together at the point of ignition. With this family of processes, the base metal and a filler rod are melted using a flame produced at the tip of a welding torch. Fuel gas and oxygen are combined in the proper proportions inside a mixing chamber in the torch. Molten metal from the plate edges and filler metal, if used, intermix in a common molten pool and join when cooling. Commonly-used fuel gases include acetylene, propylene, propane and natural gas.

The equipment used in oxyacetylene welding is low in cost, usually portable, and versatile enough to be used for a variety of related operations such as bending and straightening, preheating, post-heating, surfacing, brazing, and braze welding. Among commercially available fuel gases, acetylene most closely meets the requirements for all these applications. A minimal dilution with the base material makes OFW suitable for surfacing applications. Further an advantage is that the welder can exercise precise control over heat input and temperature, independent of the addition of filler metal.



Vacuum sealed. On plastic or wooden spools: 10/15/20 kg.





DURMAT® B

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

Industry
standard for
highest wear
protection

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:

FTC: $\approx 2,360 \text{ HV}_{0.1}$
NiCrBSi-Matrix: $\approx 420 - 450 \text{ HV}_{0.1}$

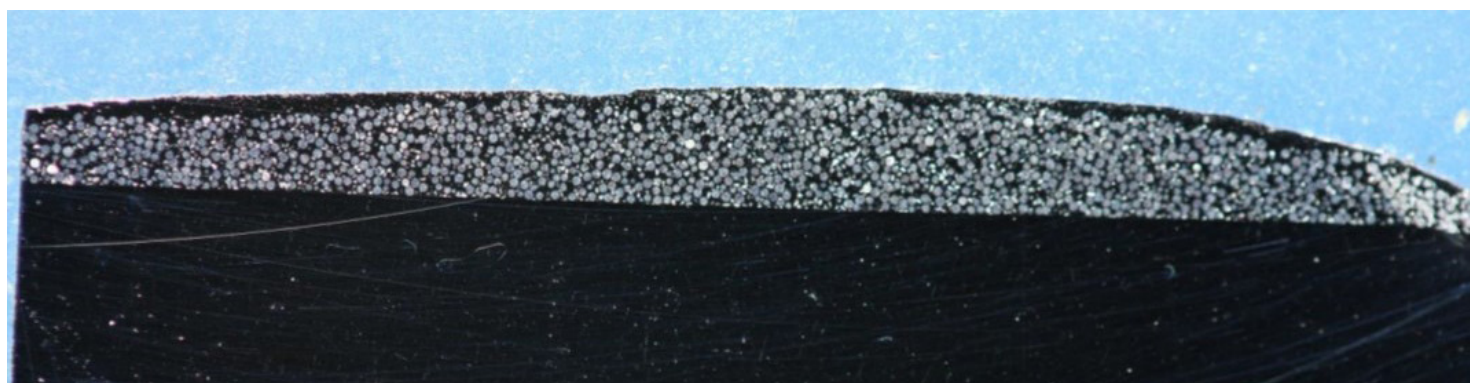
APPLICATION:

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 in 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

vacuum packaging is available on request



Oxyacetylene Welding Rods with Fused Tungsten Carbides

DURMAT® BK

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

Improved
Material with
SFTC.

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:

SFTC: $\approx 3,000 \text{ HV}_{0.1}$
NiCrBSi-Matrix: $\approx 420 - 450 \text{ HV}_{0.1}$

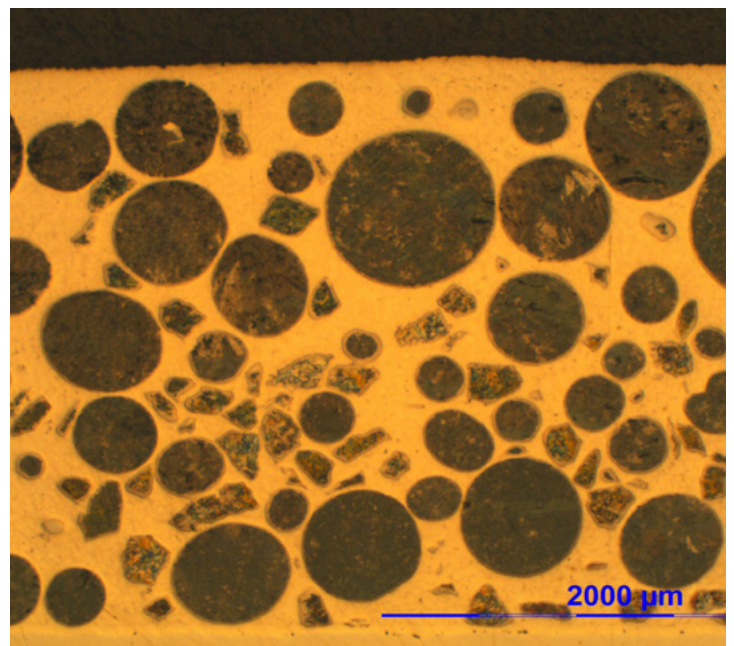
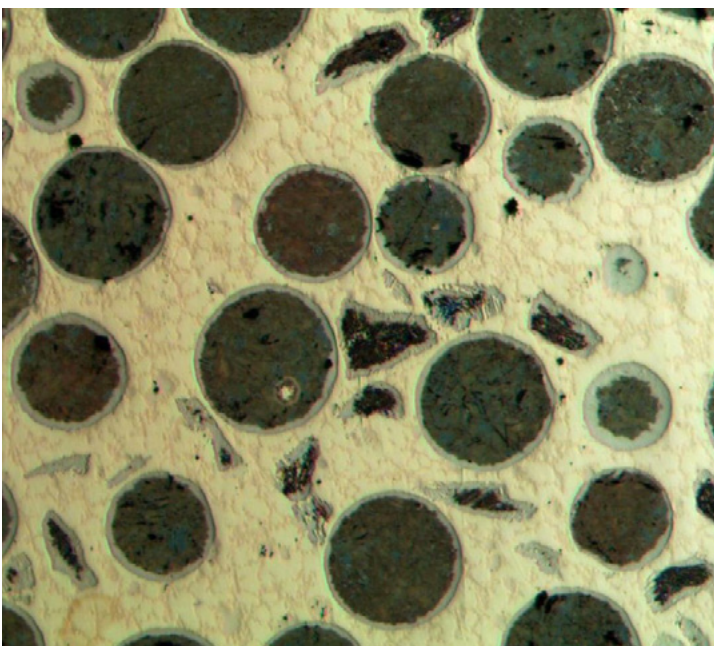
APPLICATION:

Hard-facing on ferritic and austenitic steels (steel castings), over-laying 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 in mm	US mesh size
4005	4.0	5/32	0.25 - 0.70 / 0.25 - 0.84	24 - 60 / 20 - 60
5005	5.0	3/16	0.25 - 0.70 / 0.25 - 0.84	24 - 60 / 20 - 60
6005	6.0	1/4	0.25 - 0.70 / 0.25 - 0.84	24 - 60 / 20 - 60
8005	8.0	5/16	0.25 - 0.70 / 0.25 - 0.84	24 - 60 / 20 - 60

vacuum packaging is available on request





APPLICATION:

Hardfacing of ferritic and austenitic steels (steel castings), overlaying mixer blades, screws & conveyors in Chemical and dye industry, Food industry. Specially recommended for stabilizer blades in the petroleum industry.

PREPARATION AND PREHEATING:

Every surface to be hardfaced with DURMAT® B must be clean and free of oxidation, dirt or other surface contamination. In some instances a slight grinding operation might be necessary. All edges must be cut by grinding.

To increase the wettability and to avoid any oxidation during the hard-facing with DURMAT® B apply an buffer layer of Ni-Cr-B-Si powder of about 0.05 mm thickness on the surface.

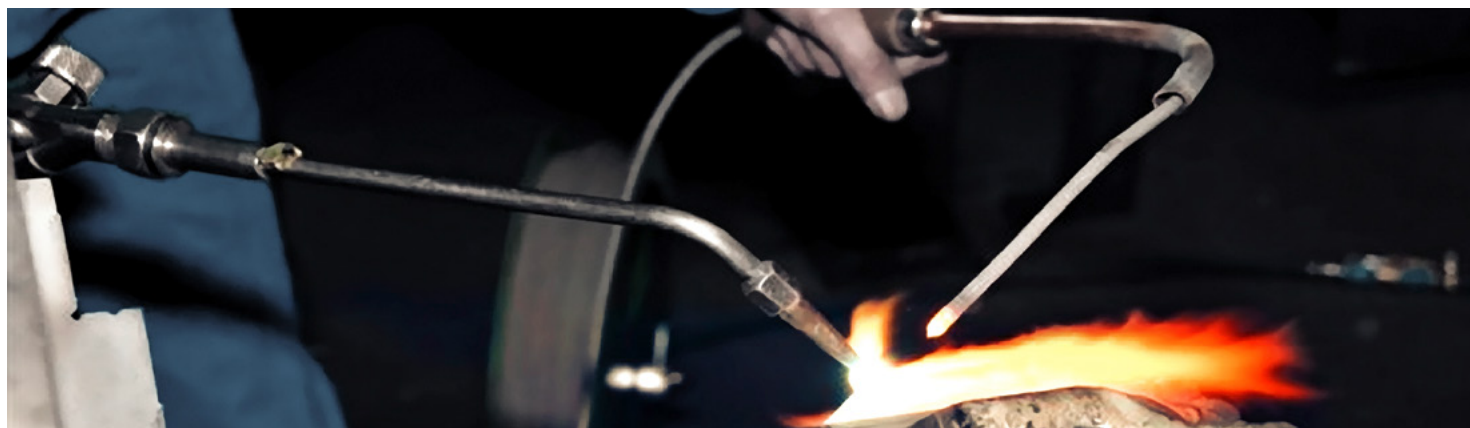
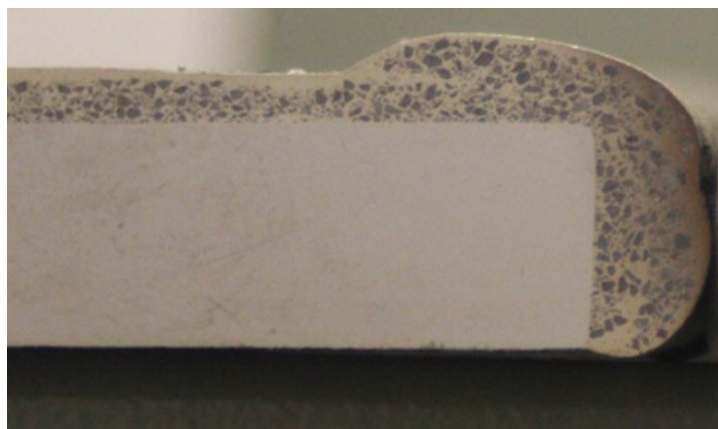
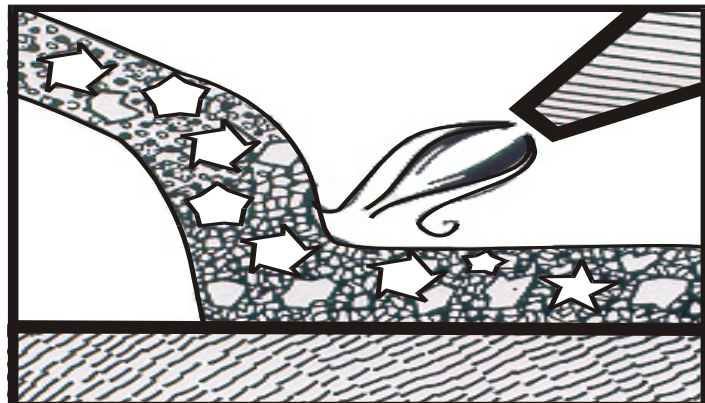
Preheat the part to about 300 °C - 350 °C.

DEPOSITING:

Heat a small area to allow the buffer layer to melt, and then apply DURMAT® B, and when it flows, it will carry with it the tungsten carbide particles. The torch flame must form an angle of about 45°.

All edges applications must be done first, then an additional center pass may be added.

Remember: The flame must be directed on to DURMAT® B. The wire must be completely melted by the torch. The melting of the wire will transfer the proper bonding temperature to adhere permanently to the base material.



Oxyacetylene Welding Rods with Fused Tungsten Carbides

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_{0.1} 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:

SFTC: > 2,360 HV_{0.1}

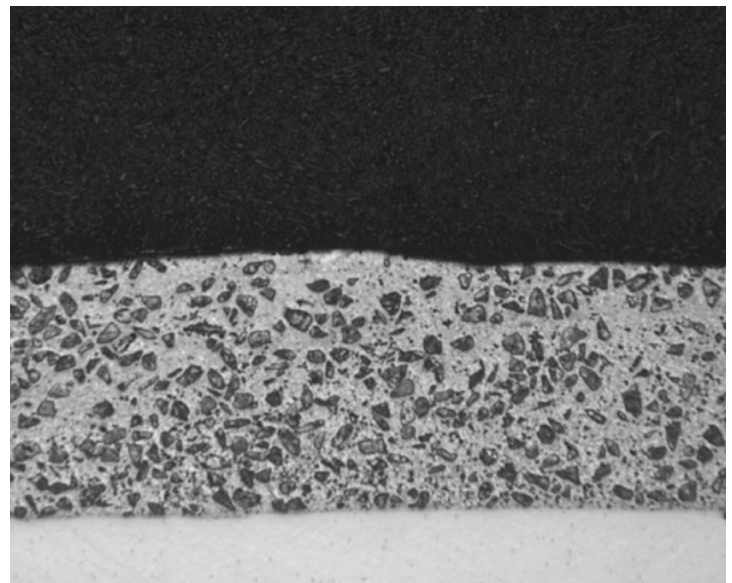
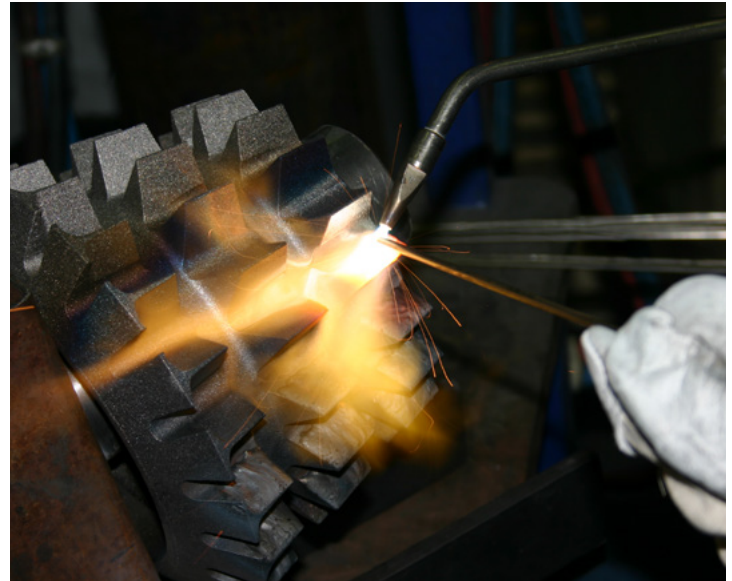
APPLICATION:

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").
vacuum packaging is available on request





Welding Tips

BASE METAL

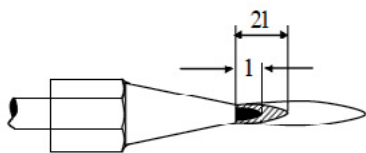
DURMAT® A is suitable for use with all non-alloyed and base alloyed steels or cast steel products with a carbon ratio of up to 0.5 %. If the carbon content is much above this level, bonding errors and a reduction in impact resistance can occur. The consistency of base metal must high enough so as to ensure that the weld deposit does not collapse during application.

PREPARATION OF MATERIAL

First ensure that all surfaces are free from rust, scale, grease and other impurities. The process works best, and thereby guarantees a satisfactory bonding of the alloy, on surfaces which have been polished through mechanical processing or grinding.

WORKING REGULATIONS

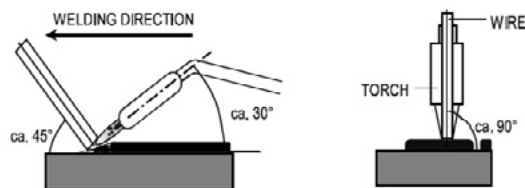
DURMAT® A is oxy-acetylene welded so preliminary heating of the separate components is unnecessary. Larger components, however, for which the required binding temperature of ca. 850 °C cannot be attained, must either be pre-heated in a furnace or else be brought to between 500 - 600 °C (dark red) with a larger welding or pre-heating torch. Choose a welding torch a size of two smaller than is used for ordinary joint welding. The flame should be adjusted to neutral.



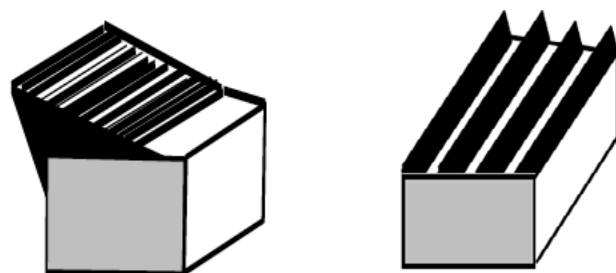
To prevent the component from slipping during welding, it should lie as level as possible with the plated surface. The thickness of the deposit can be altered by slightly inclining the surface plane.

The forehand welding technique is used for application. This method not only prevents the welding material from overheating, but simultaneously preheats the base metal.

The torch should be guided as horizontally as possible to the component being welded – thus ensuring that overheating does not occur. Ideally the “nucleus” of the flame should not come into contact with the welding material.

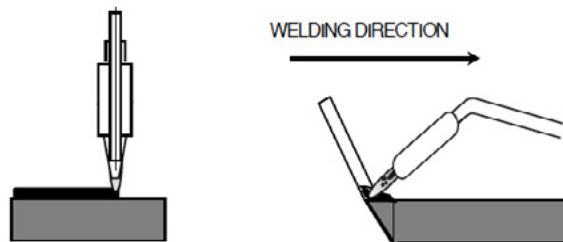


For the facing and mounting of edging work and line-beading a Welding alignment is required. In this way, the welding itself guides both the torch and the rod through the application.



Edge faced with DURMAT® A

Line beading with DURMAT® A



Position of torch and welding direction when facing edge with DURMAT® A

Particular care must be taken during facing not let the rod touch the welding puddle, otherwise the carbide grains will float upwards and be blown away by the welding flame. The welding material should be held as close as possible whilst still allowing tear-shaped droplets to form. Additionally, the rod should be held at an angle not exceeding 30° to the horizontal to ensure that the carbides do not drop of the rod and over-concentrate the initial part of the weld. Careful attention to this procedure will ensure the correct mixing of carbides and matrix throughout the welded length of the rod.

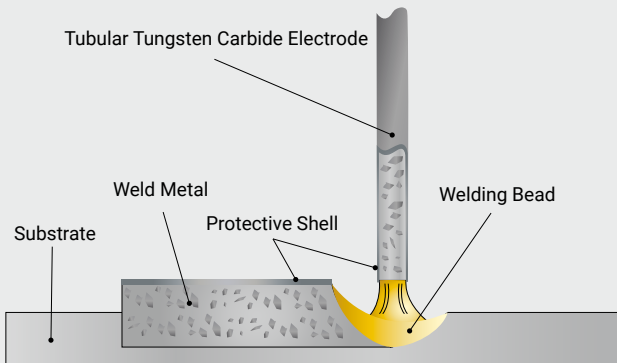
FINISHING

DURMAT® A hard-facing is indifferent to fast cooling, so special-weld treatment is not required. Tempering of the base metal can be done after the facing has been completed without fear of damaging the alloy. Quench hardening is, however, to be avoided. Processing through grinding with either silicon carbide (46 - 80 grain with a hardness of no more than 2) or diamond plate at 20 - 25 m/sec. shall be required later on.

* Please observe all appropriate safety regulations. The technical information provided in this data sheet reflects the present state of knowledge. They do not form part of any sales contract as guaranteed properties of the delivered materials. Our standard terms and conditions apply to all contracts included.

Shielded Metal Arc Welding / Manual Metal Arc Welding

SMAW (Shielded Metal Arc Welding) /
MMAW (Manual Metal Arc Welding):



Shielded Metal Arc Welding (SMAW), also known as Manual Metal Arc Welding (MMA or MMAW), Flux Shielded Arc Welding or informally as Stick Welding, is a manual arc welding process that uses a consumable electrode covered with a flux to lay the weld.

An electric current, in the form of either alternating current or direct current from a welding power supply, is used to form an electric arc between the electrode and the metals to be joined. The workpiece and the electrode melts forming a pool of molten metal (weld pool) that cools to form a joint. As the weld is laid, the flux coating of the electrode disintegrates, giving off vapors that serve as a shielding gas and providing a layer of slag, both of which protect the weld area from atmospheric contamination.

Because of the versatility of the process and the simplicity of its equipment and operation, shielded metal arc welding is one of the world's first and most popular welding processes. SMAW is the right process for high quality repairs on parts coated with fused tungsten carbide nickel-matrix alloys like DURMAT® NIFD.





DURMAT® NISE

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

Industry
standard for
highest wear
protection

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:

FTC: $\approx 2,360 \text{ HV}_{0,1}$
Ni-Matrix: 480 - 520 $\text{HV}_{0,1}$

APPLICATION:

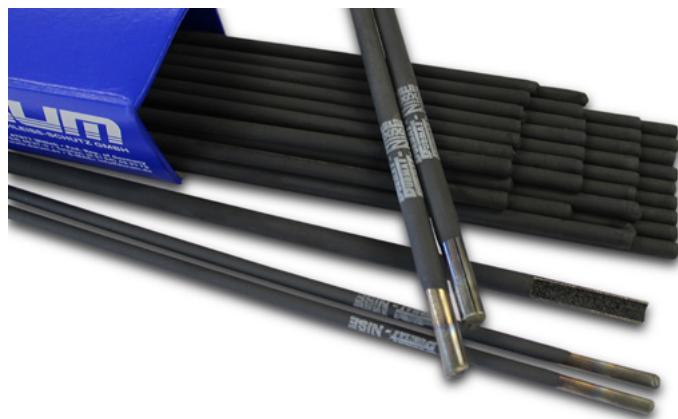
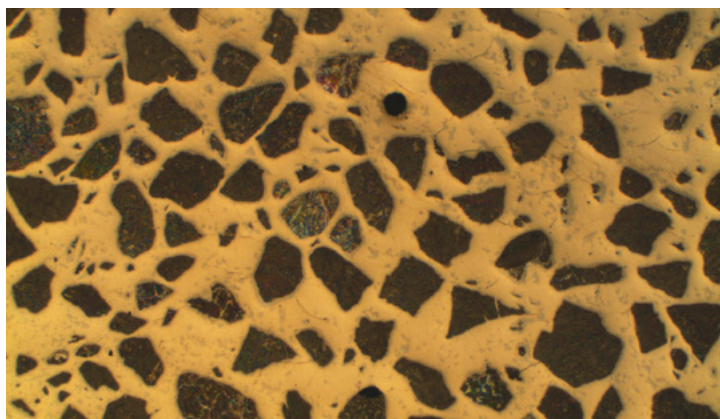
Repairing and hard-facing ferritic and austenitic steels (steel castings), stabilizer blades, conveyor screws, milling plates, deep drilling tools, and mixer blades. This type of stick electrodes require the least amount of equipment and provides maximum flexibility for welding in remote locations.

Type	Ø mm	Ø inch	Length of Rod	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	= + / ~

vacuum packaging is available on request

Patents:

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



Shielded Metal Arc Welding / Manual Metal Arc Welding

DURMAT® NISE PLUS

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

Improved
Material.

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:

SFTC: > 3,000 HV_{0,1}
Ni-Matrix: 480 - 520 HV_{0,1}

APPLICATION:

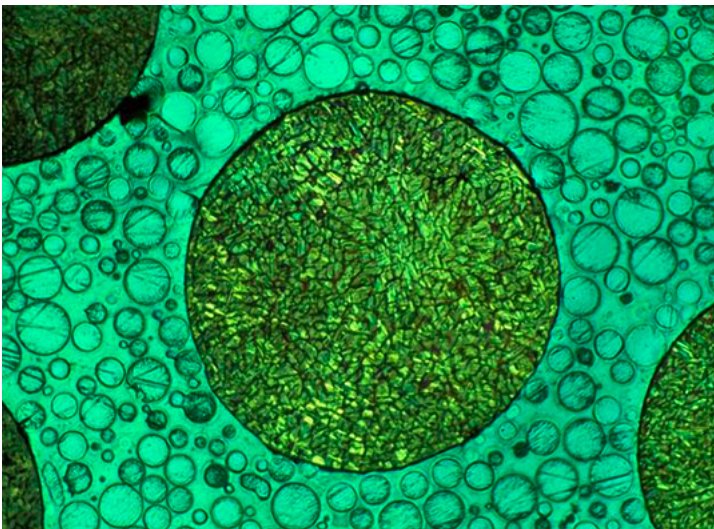
Repairing and hard-facing ferritic and austenitic steels (steel castings), stabilizer blades, conveyor screws, milling plates, deep drilling tools, and mixer blades, as well as machine parts in the chemical and food industry.

Type	Ø mm	Ø inch	Length of Rod	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	= + / ~

vacuum packaging is available on request

Patents:

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





DURMAT® NI-3

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

Improved
Material for
application
with very fine
abrasives.

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:

FTC: $\approx 2,360 \text{ HV}_{0,1}$
Other carbides: $\approx 2,900 \text{ HV}_{0,1}$
Ni-matrix: 480 - 520 $\text{HV}_{0,1}$

APPLICATION:

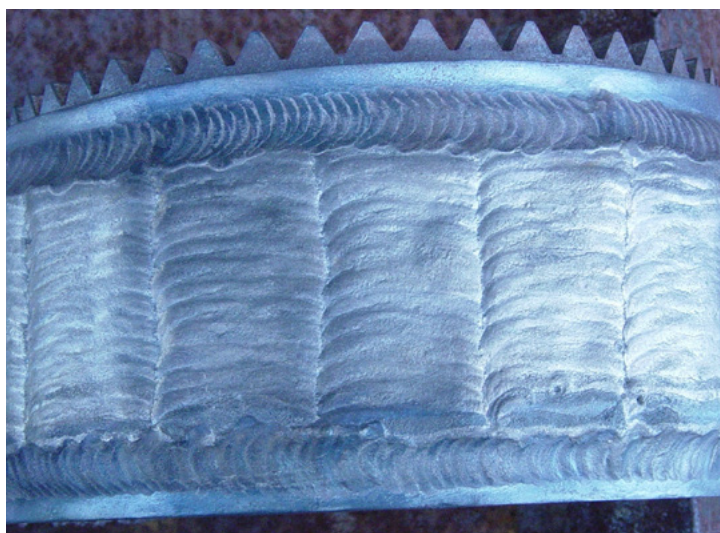
Repairing and hard-facing ferritic and austenitic steels (steel castings), stabilizer blades, conveyor screws, milling plates, deep drilling tools, and mixer blades, as well as machine parts in the chemical and food industry.

Type	Ø mm	Ø inch	Length of Rod	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	= + / ~

vacuum packaging is available on request

Patents:

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



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APPLICATION:

DURMAT® NISE electrodes are filled with Fused Tungsten Carbide particles and are used for facing steel or cast steel components that are subject to extreme abrasive wear in the production, preparation or handling of coal, coke, slag, sand, cement, limestone, clay and the like.

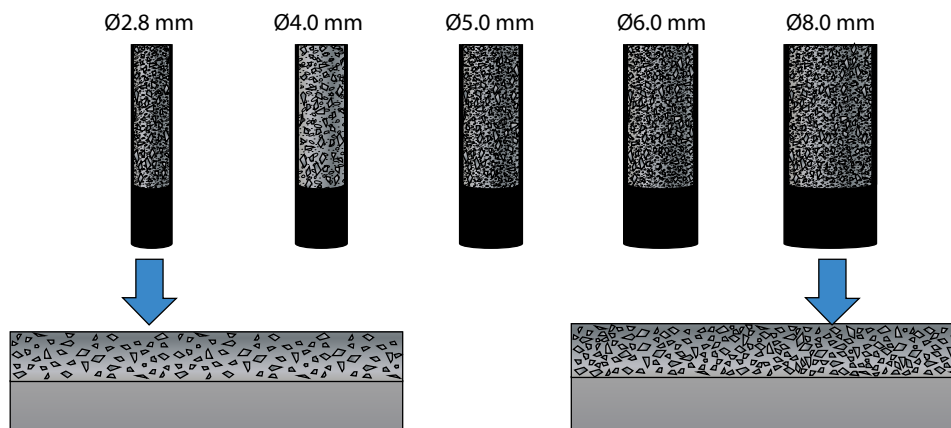
Typical applications are mixer blades, sand mixer ploughs, conveyor and plug mill screws and similar items. Keep in mind, however, that DURMAT® NISE electrodes cannot in all cases be substituted for DURMAT® NIA rods, because the electrically applied deposit does not possess the same high resistance to impact and crushing as the gas applied deposit. DURMAT® NISE is ideally suited for applications where a non-skid surface of deposit is required. They are economical in consumption and should always be deposited in two layers.

SUGGESTIONS FOR ELECTRIC ARC HARD-FACING:

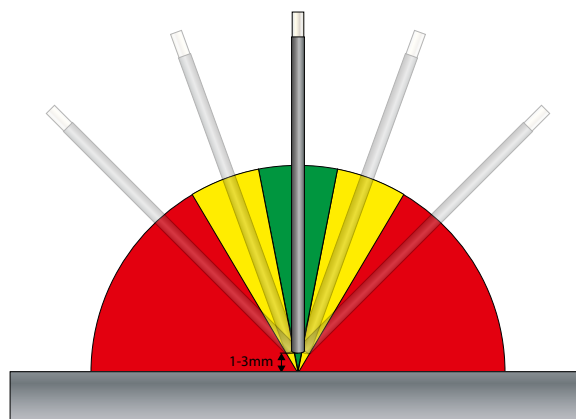
Although small sized components need not be preheated, it is much easier to produce a deposit on them that is free of cracks if they are preheated to about 300 °C and held at this temperature throughout the welding operation.

DURMAT® NISE electrodes can be deposited with alternating current. Best results, however, are achieved with direct current, electrode positive.

The percentage of Fused Tungsten Carbide (FTC) depends on the diameter of the electrode. The larger the diameter of the electrode, the higher the content of Fused Tungsten Carbide, which is evident in the hard-facing layer.



The right welding position of the electrodes during the welding process. The best results are achieved by a vertical position. The best results are achieved by a vertical position an a stickout of 1 - 3 mm.



Nickel based FTC/SFTC Hard-facing Alloys:

Nickel based FTC/SFTC Hard-facing Alloys:			
Product		DIN 8555	DIN EN 14700
DURMAT® B	Welding Rod	G21-UM-55-CG	T Ni20-CGTZ
DURMAT® BK-SPHERICAL	Welding Rod	G21-UM-55-CG	T Ni20-CGTZ
DURMAT® NISE	Stick Electrode	E21-GF-UM-60-CGZ	E Ni20-CGTZ
DURMAT® NISE PLUS	Stick Electrode	E21-GF-UM-60-CGZ	E Ni20-CGTZ
DURMAT® NI-3	Stick Electrode	E21-G F-UM-60-CGZ	E Ni20-CGTZ
DURMAT® NIFD	Flux-Cored Wire	MF21-55-CGZ	T Ni20-CGTZ
DURMAT® NIFD PLUS	Flux-Cored Wire	MF21-55-CGZ	T Ni20-CGTZ
DURMAT® NICRW	Flux-Cored Wire	MF21-55-CGZ	T Ni20-CGTZ
DURMAT® NI-2	Flux-Cored Wire	MF21-60-CGZ	T Ni20-CGTZ
DURMAT® NI-2 PLUS	Flux-Cored Wire	MF21-60-CGZ	T Ni20-CGTZ
DURMAT® 61 PTA	PTA metal powder: abrasion and corrosion resistant		
DURMAT® 62 PTA	PTA metal powder: abrasion and corrosion resistant		

Iron based FTC/SFTC Hard-facing Alloys:			
Product		DIN 8555	DIN EN 14700
DURMAT® OA	Flux-Cored Wire	MF21-65-CG	T Fe20
DURMAT® E	Stick Electrode	MF21-65-CG	E Fe20
DURMAT® A	Welding Rod	MF21-65-CG	T Fe20

Iron-based Fused Tungsten Carbide Products

DURMAT® OA

Flux-Cored Wire DIN EN 14700: T Fe20
(DIN 8555: MF21-65-CG)

GENERAL CHARACTERISTICS:

DURMAT® OA is an open arc iron-based tubular wire filled with fused tungsten carbide for semi-automatic application, where extreme abrasive wear is anticipated.

APPLICATION:

For hard-facing low alloyed steels that have a maximum of 0.45 % carbon. Higher carbon content could lead to cracking. Also for hard facing and repairing tools and machine parts that are exposed to wear in mining, excavation, earth moving, tunneling shields, road construction, well drilling and deep drilling applications.

TYPICAL HARDNESS:

Weld metal: 1st layer approx. 64 - 66 HRC
2nd layer approx. 66 - 68 HRC
FTC: > 2,360 HV_{0.1}

SALES UNITS:

Ø mm	Ø inch	coil size DIN EN 759	Amps	Voltage
1.2	0.045	B 300 (approx. 15 kgs)	130 - 600A	24 - 26 V
1.6	1/16	B 300 (approx. 15 kgs)	180 - 220 A	24 - 26 V
2.4	3/32	B 435 (approx. 25kgs)	240 - 280 A	26 - 28 V
2.8	7/64	B 435 (approx. 25 kgs)	240 - 280 A	26 - 28 V
3.2	1/8	B 435 (approx. 25 kgs)	250 - 300 A	26 - 28 V

vacuum packaging is available on request

WELDING RECOMMENDATION:

The area to be hard-faced should be free of rust, scale, grease or other dirt. Depending on the base metal's alloy and the size of the area to be hard-faced the advisable preheating temperature should be between 350 - 500 °C (662 - 932 °F). If the amps are kept on the lowest setting possible the tungsten carbide granular will be prevented from melting. During welding, position the arc that the weld metal is deposited in coarse droplets.

NOTE: The base material that is to be hard faced should have enough tensile strength so that the hard facing overlay cannot be pressed into it.

DURMAT® E

Stick Electrode DIN EN 14700: E Fe20
(DIN 8555: E21-GF-UM-60-CG)

GENERAL CHARACTERISTICS:

DURMAT® E is a tube metal filled with medium size fused tungsten carbide developed for manual welding application. This electrode can be applied by alternating or direct current trouble free once the proper machine setting is obtained.

APPLICATION:

For hard-facing unalloyed and low alloyed steels (cast steels) with a maximum carbon content of 0.5%. Higher carbon content could lead to cracking. For welding on high alloyed steels after a buffer layer is recommended. Also for hard facing tools and machine parts that are exposed to wear in mining, excavation, digging, road construction and deep drilling applications.

TYPICAL HARDNESS:

55 - 58 HRC

SALES UNITS:

Type	Ø mm	Ø inch	length of rod	Amps	Voltage
3505	3.5	1/8	350 mm	90 A	= + / ~
4005	4.0	5/32	350 mm	110 A	= + / ~
5005	5.0	3/16	350 mm	140 A	= + / ~
6005	6.0	1/4	350 mm	160 A	= + / ~
8005	8.0	5/16 (18")	350 /450 mm	200 A	= + / ~

vacuum packaging is available on request

WELDING RECOMMENDATION:

Depending on the base metal's alloy and the area to be hard faced, a preheating temperature between 350-500 °C (662 - 932°F) is advised.

NOTE: DURMAT® E is a hollow tube metal filled with fused tungsten carbide powder, the lowest amp setting possible should be used when depositing it in order to avoid any decomposition to the carbides.

Oxyacetylene Welding Rods for Special Application

DURMAT® CS

GENERAL CHARACTERISTICS:

DURMAT® CS consists of sintered tungsten carbide fragments in a ductile Cu-Ni-Zn matrix. The alloy exhibits a tensile strength of 100,000 psi. DURMAT® CS production methods ensure an homogeneous distribution of the sintered tungsten carbide particles. DURMAT® CS composite rods are available in two grades: Wear resistant and cutting.

APPLICATION:

Downhole reamers, openers, fishing tools (spears), coring tools, reamers, milling tools and stabilizers.

CARBIDE CONTENT:

Standard percentage: 60 %.

Other percentages available are: 40 %, 50 % or 70 %.

SALES UNITS:

Standard composite rod length:	Carbide grain sizes:
450mm (18")	1/16 x 1/8
450mm (18")	1/8 x 3/16
450mm (18")	3/16 x 1/4
450mm (18")	1/4 x 5/16
450mm (18")	5/16 x 1/2

Other grain sizes are available on request.
vacuum packaging is available on request



Welding Tips

1. Select a mesh size suitable for the job. Stabilizers require a mesh size approximately 1/16" below finish thickness of deposit or distance between inserts .
2. Thoroughly clean the areas to be coated. Rust, scale, mud and oil prevent the matrix from wetting.
3. Pre-heating is probably necessary on larger components such as stabilizers and big mills. The maximum pre-heat temperature is 500 °C., minimum 300 - 350 °C .
4. Pre-tin using a slightly oxidising flame, matrix rod and adequate DURUM flux .
5. Deposit the DURMAT® CS composite Rod using a neutral flame, heating the work and the DURMAT® CS. As the DURMAT® CS drops onto the work, push the carbides together, arranging the points for cutting as required .
6. Infill with matrix as the work proceeds. Avoid overheating the carbides.



DURMAT® TINNING-RODS

<i>AWS</i>	<i>ASME</i>	<i>BS</i>
<i>A5.27 (1978)</i>	<i>SFA-5.27 (1978)</i>	<i>1453 C5</i>
<i>A5.8 (1981)</i>	<i>SFA-5.8 (1981)</i>	
<i>RBCuZn-A</i>	<i>RBCuZn-D</i>	

GENERAL CHARACTERISTICS:

DURMAT® TINNING-RODS are fume reduced nickel bronze rods containing 10% nickel developed for oxyacetylene welding. Coatings have high mechanical properties and are used in preference to other welding alloys; especially the nickel color (silver) should be matched. One of DURMAT® TINNING-RODS unique applications is a binder for the sintered tungsten carbide particles with DURMAT® TINNING-RODS.

APPLICATION:

Deposits on drilling tools & equipment used in oil & gas well drilling, for tinning & filling in combination with DURMAT® CS.

TYPICAL PHYSICAL CHARACTERISTICS:

Hardness:	74 HRB; 120 HB
Melting point:	915 °C (1,680 °F)
Solidification point:	905 °C (1,661 °F)
Average tensile strength:	505 test: 70,000 psi
Average elongation:	25 %

DURMAT® BRAZING FLUX

GENERAL CHARACTERISTICS:

DURMAT® BRAZING FLUX is a welding flux for copper base alloys.

TYPICAL CHEMICAL COMPOSITION:

Boric Acid and Tetraborate of sodium decahydratado.

APPLICATIONS:

Used for cleaning and oxide elimination on surface before welding DURMAT® TINNING-ROD and DURMAT® CS. It reduces the superficial tension of the melted tinning. Prepare the surface by grinding to reduce all contamination.

PROCEDURE:

Spread a layer of moistened DURMAT® BRAZING FLUX pre heat the piece with a neutral oxyacetylene flame without concentration of the heat of the flux. As soon as the flux becomes liquid, apply the DURMAT® TINNING-ROD or DURMAT® CS. Weld the product drop to drop keeping the heat of the area to be welded.

We understand Wear Protection



- Tungsten Carbide Rods for Oxy-acetylene Welding
- Stellite* - Flux-Cored Wires
- Nickel-, and Iron-based Flux-Cored Wires
- FCAW wires with Tungsten Carbide
- Tungsten Carbides, Complex Carbides and Chromium Carbides for manual Arc Welding
- PTA Welding Powders, Fe-Ni-Co based Powders and special qualities

* Stellite is a registered trademark of Kennametal Stellite

- PTA machines, torches and powder feeders
- Powders and Wires for Laser Cladding
- Powders for Oxy-acetylene Welding and Spraying
- Fused Crushed and Spherical Fused Tungsten Carbides
- Pre-manufactured replacement wear parts
- Tungsten Carbide Wear Plates
- Wear Plates with Chromium Carbides and Complex Carbides
- Thermal Spray Powders (conforming to DIN EN 1274)
- Thermal Spray Wires (conforming to DIN EN 14919)



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