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joining & cladding

Material Product Data Sheet
Coarse-Grained Tungsten Carbide with Self-Fluxing Nickel Alloy Sintered Welding Rod

Welding Products:
WokaDur SA 100-Ni

1 Introduction
WokaDur™ SA 100-Ni is sintered welding rod that consists of coarse grained, sintered tungsten carbide and a self-fluxing, nickel alloy binder matrix.

WokaDur SA 100-Ni is designed for application of hardface deposits using oxy-acetylene welding. No additional flux is necessary as the flux is formed by the matrix metal during fusing.

1.1 Typical Uses and Applications:
WokaDur SA 100-Ni is used to protect surfaces against extreme sliding wear and abrasion in deep drilling and tunnel drilling applications such as:

- Down hole drill and core bits
- Horizontal drilling equipment
- Stabilizers
- Other mining and foundry tooling

Quick Facts	
Classification	Rod, tungsten carbide
Chemistry	48W 38Ni 5Cr 3Co 3C 1.5Fe 1.5Si
Manufacture	Sintered Rod
Carbide Hardness	1300 – 1600 HV0.1
Weld Deposit Density	11.7 g/cm^3
Service Temperature	≤ 500 °C (930 °F)
Purpose	Cutting / wear resistance
Process	Oxy-acetylene welding

WokaDur SA 100-Ni.

2 Material Information

2.1 Chemical Composition

Product	Nominal Chemical Composition (wt.%)							Carbide Hardness HV0.1	Hard Phase wt. %
	C_{TOTAL}	W	Ni	Co	Cr	Fe	Si		
WokaDur SA 100-Ni	3	48	38	3	5	1.5	1.5	1300 – 1600	50 – 55

2.2 Primary Carbide Grain Size and Type, Available Lengths and Weights

Product	Primary Carbide Type	Primary Carbide Grain Size (mm)	Available Rod Length	Available Rod Weight (per rod)
WokaDur SA 100-Ni	Sintered	4.8 – 6.4	450 mm (17.75 in)	500 g (17.6 oz)

Other primary carbide grain sizes, lengths and weights are available on request and can be tailored for on-site conditions and special applications.

2.3 Key Selection Criteria

The main selection criteria for choice of product are:

- WokaDur SA 100-Ni has coarse carbides that are uniformly distributed within a self-fluxing, nickel-alloy matrix. Overlay deposits of WokaDur SA 100-Ni exhibit a homogeneous distribution of carbides resulting in deposits that have excellent abrasion resistance and cutting properties. The primary carbide grain size chosen depends on the application; therefore, a wide range of grain sizes are available.
- WokaDur SA 100-Ni meets DIN EN 14700: C Ni20.
- WokaDur SA 100-Ni can be used to produce hardface deposits on nearly all types of steel and cast iron substrates.

2.4 Related Products

Metco Joining & Cladding offers a wide variety of carbide-containing hardfacing welding products in a number of forms designed for convenient application. Products are available for oxy-acetylene welding, MIG / open arc welding and powders for PTA welding. These products are available with different carbide types and hardness, matrix materials and matrix materials so customers can choose a product that is suitable for both their budget and surface application. Please contact your Metco Joining & Cladding Account Representative for additional information.

3 Coating Information

3.1 Key Welding Recommendations

- The surface to be welded should be free from grease, oil, fats, lipids, rust and other foreign matter
- Use welding positions PA or PB (DIN EN ISO 6947)
- Multilayer welding is not possible
- It is essential to slowly and uniformly preheat the substrate to a temperature of approximately 400 to 600 °C (750 to 1110 °F), depending on the type of base material
- Use a neutral flame but with plenty of heat, so that the carbide chips can be placed properly before the nickel alloy freezes
- Extreme care must be taken not to overheat the carbide particles to the point that the nickel-silver evaporates as this would prevent bonding of the carbide particles to the substrate
- Deposits are not machinable or forgeable, but can be ground to dimension or finish with diamond tools

3.2 Recommended Welding Parameters

Parameter	Recommended Setting	
Carrier Gas	Oxygen	
Carrier Gas Pressure	5 – 7 bar	70 – 100 psi.
Fuel Gas	Acetylene	
Fuel Gas Pressure	0.7 – 1.0 bar	10 – 14
Nozzle Size	6 – 9 mm	

Above parameters are for welding on a mild steel substrate with a carbon content of 0.1 % and a thickness of 15 mm (0.59 in).

3.3 Welding Parameter Development

For specific application needs, Metco Joining & Cladding can offer parameter advice and parameter development services may be available.

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Package Size	Weight per Rod	Rod Length	Carbide Grain Size (mm)	Color Code
WokaDur SA 100-Ni	1065217	10 kg (22 lb)	500 g (17.6 oz)	450 mm (17.75 in)	4.8 – 6.4	Yellow

Please note: All materials are globally available on a Special Order basis. Please allow adequate lead time.

4.2 Handling Recommendations

Store in the original, closed container in a dry location. Open containers should be stored in a drying oven to prevent moisture pickup.

4.3 Safety Recommendations

See SDS 50-1092 (Safety Data Sheet) in the version localized for the country where the material will be used. SDS are available from the Metco Joining & Cladding web site at www.metcojoiningcladding.com (Resources – Safety Data Sheets).

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