oerlikon
metco

Material Product Data Sheet
Tungsten Carbide Filled Tubular Nickel Welding Rod

Welding Products: WokaDur NiA-Tube

1 Introduction

The WokaDur™ NiA-Tube series of products are pure nickel tubular welding rod filled with cast tungsten carbide (W_2C-WC) and additives. WokaDur NiA-Tube incorporates blocky, cast and crushed tungsten carbide (CTC).

The chemical composition and the select carbide grain size distribution of these products creates hardface deposits that are extremely resistant to abrasive media. The high nickel content offers good corrosion reistance. They exhibit excellent flow and wetting characteristics at a low working temperature of 1050 °C (1920 °F). Deposits are pore-free and produce smooth, clean surfaces. Multilayer deposits are possible without cracking.

WokaDur NiA-Tube series products are designed for tungsten inert gas (TIG) welding. They can be applied to ferritic and austenitic steel substrates as well as cast steels with a maximum carbon content of 0.5 %.

1.1 Typical Uses and Applications:

WokaDur NiA-Tube provides excellent wear resistance as a result of its high carbide content of 60 to 67 wt.%. They are typically recommended for hardfacing of oil field components, agricultural equipment, chemical processing equipment and food processing equipment.

- Diamond drilling bits
- Oil and gas drill string stabilizers
- Plowshares
- Decanter screws
- Restoration of pump components

Quick Facts	
Classification	Nickel rod, cast tungsten carbide filled
Chemistry	52.2W 37Ni 5.2Cr 2.9C 1.5Si 1.2B
Manufacture	Filled tubular rod
Carbide Hardness	1900 – 2300 HV0.1
Deposit Hardness	55 – 65 HRC (1st pass)
Weld Deposit Density	12.5 g/cm^3
Service Temperature	≤ 500 °C (930 °F)
Purpose	Wear resistance
Process	TIG welding

WokaDur NiA-Tube 2.8 mm tungsten carbide-filled welding rod.

2 Material Information

2.1 Chemical Composition

Product	Nominal Chemical Composition (wt.%)						Carbide Hardness HV0.1	Hard Phase wt. %
	C_{TOTAL}	Ni	W	Cr	B	Si		
WokaDur NiA-Tube	2.9	37	52.2	5.2	1.2	1.5	1900 – 2300	63 – 67

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

Product	Primary Carbide Grain Size mm	Primary Carbide Type	Available Lengths	Available Diameters
WokaD ur NiA-Tube	0.3 – 0.7	Cast (CTC)	700 mm (27.5 in)	2.8 mm (0.11 in) 4.0 mm (0.16 in) 5.0 mm (0.20 in)

Other primary carbide grain sizes, lengths and diameters are available on request.

2.3 Key Selection Criteria

- WokaDur NiA-Tube is an excellent choice for hardface surfaces where maximum wear protection combined with corrosion resistance is required.
- WokaDur NiA-Tube series products can be applied to nearly all steel substrates that have a maximum carbon content of 0.5 %.
- WokaDur NiA-Tube series meet DIN EN 14700: T Ni20.

2.4 Related Products

For oxy-acetylene welding, Oerlikon Metco offers the WokaDur NiA family of products Please see datasheet DSMW-0006.

Oerlikon Metco 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 matrix compositions so customers can choose a product that is suitable for both their budget and surface application. Please contact your Oerlikon Metco 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.
- Multilayer deposits are possible (standard 1 pass).
- Shield gas: DIN EN ISO 14175:2008 -I1 (100 % Argon).
- Use straight polarity (electrode-negative; DC-), pulse arc mode is preferred.
- TIG weld without preheating to avoid porosity in welded deposits.
- Apply the material uniformly using a dabbing technique within the gas shield. Testing of the welding technique for coverage and uniformity using the same welding parameters and wire on scrap metal is recommended.
- Avoid excessive puddling during processing.
- Post-weld processing requires a slow cool down phase under moisture-free conditions.
- Deposits are not machinable or forgeable, but can be ground to dimension or finished with diamond tools.

3.2 Recommended Welding Parameters

Rod Diameter	Current Intensity	Shielding Gas Rate
2.8 mm	110 – 130 A	15 l/min (31.78 ft^3/h)
4.0 mm	150 – 170 A	15 l/min (31.78 ft^3/h)
5.0 mm	190 – 210 A	15 l/min (31.78 ft^3/h)

Parameter reference: Edge width 6 mm (0.24 in), stainless steel

3.3 Welding Parameter Development

For specific application needs, Oerlikon Metco can provide parameter advice and parameter development services may be available.

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Package Size	Diameter	Product Form	Carbide Grain Size (mm)	Availability
WokaDur NiA-Tube	1065197	5 kg (11 lb)	2.8 mm (0.11 in)	700 mm (27.5 in) Rods	0.3 – 0.7	Stock
WokaDur NiA-Tube	1065198	5 kg (11 lb)	4.0 mm (0.16 in)			Special Order
WokaDur NiA-Tube	1064506	5 kg (11 lb)	5.0 mm (0.20 in)			Special Order

All materials are globally available. Please allow adequate lead time. for special order products.

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 50-1081 (Safety Data Sheet) in the version localized for the country where the material will be used. SDS are available from the Oerlikon web site at www.oerlikon.com/metco (Resources – Safety Data Sheets).

www.oerlikon.com/metco
info.metco@oerlikon.com