

Material Product Data Sheet

Nickel-Core, Flexible Welding Rod / Wire Coated with Tungsten Carbide and Nickel-Based Matrix

Welding Products:

WokaDur NiA, WokaDur NiA-Plus

1 Introduction

WokaDur™ NiA consists of nickel wire coated with blocky cast tungsten carbide (CTC) and a nickel-based alloy matrix.

WokaDur NiA-Plus is a newly designed hardfacing product that consists of nickel wire coated with spherical cast tungsten carbide (CTC-S) in combination with blocky cast tungsten carbide and a nickel-based alloy matrix. The shape and hardness of the spherical cast tungsten carbide produces deposits with much higher wear resistance compared to standard cast and crushed carbide.

The nickel-based alloy used in these products produces hardface deposits with excellent corrosion resistance.

WokaDur NiA and WokaDur NiA-Plus are designed for application using oxy-acetylene welding and have excellent flow and wetting characteristics at a low welding temperature of approximately 1050 °C (1925 °F). These products are available as flexible welding rod or wire.

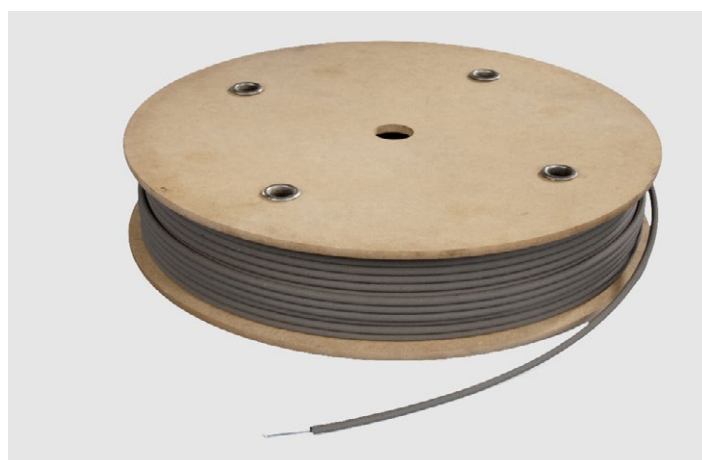
1.1 Typical Uses and Applications:

WokaDur NiA and WokaDur NiA-Plus can be used for hardfacing and surface build-up on all types of steel substrates except manganese steels, nor are they recommended for use on cast iron. They excel in applications where maximum surface protection is required. Typical applications where these products are used:

- Stabilizers and other oil-field equipment
- Augers
- Impellers
- Mixer plates used for brick and clay manufacturing
- Food and chemical processing decanter screws

Quick Facts

Classification	Flexible rod/wire, tungsten carbide coated
Chemistry	WNiCrC
Manufacture	Extruded rod/wire
Deposit Hardness	52 – 65 HRC
Carbide Hardness	2000 – 3100 HV0.1
Weld Deposit Density	12.9 g/cm ³
Service Temperature	≤ 500 °C (930 °F)
Purpose	Wear resistance
Process	Oxy-acetylene welding



Top: WokaDur NiA rod (5 mm diameter). Bottom: WokaDur NiA wire (6 mm diameter).

2 Material Information

2.1 Chemical Composition and Hardness

Product	Nominal Chemical Composition (wt.%)				Carbide Hardness HV0.1	Deposit Hardness HRC	Hard Phase wt. %
	C _{TOTAL}	Ni	W	Cr			
WokaDur NiA	2.7	30	balance	2.5	2000 – 2300 (CTC)	52 - 58	62 – 67
WokaDur NiA-Plus	2.7	30	balance	2.5	2700 – 3100 (CTC-S) 2000 – 2300 (CTC)	58 - 65	62 – 67

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

Product	Primary Carbide Type	Primary Carbide Grain Size mm	Available Product Forms	Available Diameters
WokaDur NiA	Cast	0.2 – 0.5 0.3 – 0.7 0.7 – 1.4	Rod: 500 mm (19.5 in) Spools: 15 kg (33 lb)	4.0 mm (0.16 in) 5.0 mm (0.20 in) 6.0 mm (0.24 in)
WokaDur NiA-Plus	Cast / Spherical Cast	0.3 – 0.7 0.5 – 1.0	Rod: 500 mm (19.5 in) Spools: 15 kg (33 lb)	4.0 mm (0.16 in) 5.0 mm (0.20 in) 6.0 mm (0.24 in) 8.0 mm (0.31 in)

Other primary carbide grain sizes, lengths and diameters 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 NiA and WokaDur are excellent choices for hardface surfaces where maximum wear protection, combined with corrosion resistance, is required.
- Excellent flow and wetting characteristics can be achieved with a deposition rate that is 20% to 30% better than with comparable oxy-acetylene welding tubular rods.
- Products are easy to use and inexpert welders will have no difficulty making smooth deposits without cracks
- Choose WokaDur NiA-Plus for applications where the additional hardness and wear resistance of the spherical cast tungsten carbide material is required.
- Worn surfaces can be hardfaced with minimal surface clean-up and can be restored without the need to completely remove previously hardfaced surfaces when using the same hardfacing material.
- Compatible with nearly all steel substrates with a carbon content of less than 0.5%, as well as cast iron substrates.

2.4 Related Products

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 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 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 (DIN EN ISO 6947).
- Multilayer welding is possible (1 to 3 passes).
- 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.
- A lower welding temperature can be used while still maintaining excellent flow, thereby reducing the heat input to the substrate material.
- Use a slightly excessive acetylene feather.
- Apply the material uniformly using a dabbing technique within the torch flame to produce an even droplet pattern.
- Avoid excessive puddling during processing.
- Sweat the deposit to the base metal with minimum penetration.
- Deposits are not machinable or forgeable, but can be ground to dimension or finished 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, 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	Product Form	Rod Diameter	Carbide Grain Size (mm)
WokaDur NiA	1065188	5 kg (11 lb)	500 mm (19.5 in) rod	4.0 mm (0.16 in)	0.3 – 0.7
WokaDur NiA	1065190	5 kg (11 lb)	500 mm (19.5 in) rod	5.0 mm (0.20 in)	0.3 – 0.7
WokaDur NiA	1065487	5 kg (11 lb)	500 mm (19.5 in) rod	5.0 mm (0.20 in)	0.2 – 0.5
WokaDur NiA	1067592	5 kg (11 lb)	500 mm (19.5 in) rod	5.0 mm (0.20 in)	0.7 – 1.4
WokaDur NiA	1068585	5 kg (11 lb)	500 mm (19.5 in) rod	6.0 mm (0.24 in)	0.7 – 1.4
WokaDur NiA ^a	1065192	15 kg (33 lb)	spool	5.0 mm (0.20 in)	0.3 – 0.7
WokaDur NiA	1065195	15 kg (33 lb)	spool	6.0 mm (0.24 in)	0.3 – 0.7
WokaDur NiA-Plus	1069077	5 kg (11 lb)	450 mm (17.7 in) rod	8.0 mm (0.31 in)	0.5 – 1.0
WokaDur NiA-Plus	1067258	15 kg (33 lb)	spool	4.0 mm (0.16 in)	0.3 – 0.7
WokaDur NiA-Plus	1065196	15 kg (33 lb)	spool	5.0 mm (0.20 in)	0.3 – 0.7
WokaDur NiA-Plus	1065488	15 kg (33 lb)	spool	6.0 mm (0.24 in)	0.3 – 0.7

Please note: All materials are globally available on a Special Order basis, except as noted otherwise. Please allow adequate lead time.

^a Order No. 1065192 is a stocked product.

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 50-1082 (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).