

## Material Product Data Sheet

### Sintered Tungsten Carbide Electrodes with Nickel and Iron Additives

#### Welding Products: WokaDur S80-Ni-TIG

##### 1 Introduction

WokaDur™ S80-Ni-TIG is a sintered electrode comprised of a tungsten carbide with nickel and iron additives.

WokaDur S80-Ni-TIG is designed for application using the TIG welding process.

WokaDur S80-Ni-TIG can be applied to mild steels, low-alloy steels and high-alloy steels. It is appropriate for use on thin-walled components and can be used on thin edges.

WokaDur S80-Ni-TIG is designed for use where hard and wear resistant overlays are needed. It produces smooth, extremely hard and wear-resistant overlay deposits and is an excellent choice for surfaces exposed to sliding and abrasive mineral wear that are exposed to minimal impact stress.

##### 1.1 Typical Uses and Applications:

Typical applications for WokaDur S80-Ni-TIG include:

- Draw knives
- Roll mandrels
- Extrusion dies
- Debarring knives
- Pressure rolls
- Baffle plates
- Wire guides and capstans

#### Quick Facts

|                      |                                  |
|----------------------|----------------------------------|
| Classification       | Electrode, tungsten carbide      |
| Chemistry            | 7.7Fe 75W 10Ni 7.3C              |
| Manufacture          | Sintered and dip-coated          |
| Deposit Hardness     | 65 – 68 HRC                      |
| Weld Deposit Density | 13.4 g/cm <sup>3</sup>           |
| Service Temperature  | ≤ 500 °C (930 °F)                |
| Purpose              | Wear resistance                  |
| Process              | Tungsten Inert Gas Welding (TIG) |



WokaDur S80-Ni-TIG 5.0 mm sintered electrode.

## 2 Material Information

### 2.1 Chemical Composition

| Product            | Nominal Chemical Composition (wt.%) |    |     |    | Deposit Hardness (HRC) |
|--------------------|-------------------------------------|----|-----|----|------------------------|
|                    | C <sub>TOTAL</sub>                  | W  | Fe  | Ni |                        |
| WokaDur S80-Ni-TIG | 7.3                                 | 75 | 7.7 | 10 | 56 – 60                |

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

| Product            | Available Length | Available Diameters                                      |
|--------------------|------------------|--|
| WokaDur S80-Ni-TIG | 300 mm (11.8 in) | 3.0 mm (0.12 in)<br>4.0 mm (0.16 in)<br>5.0 mm (0.20 in) |

### 2.3 Key Selection Criteria

Choose WokaDur S80-Ni-TIG for applications where:

- An extremely hard surface is required to resist abrasive minerals and/or sliding wear.
- Surfaces are exposed to minimal impact stress.
- Parts having thin walls and/or edges to be welded.
- Parts comprised of almost any type of steel.

### 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.
- Multilayer deposits are not recommended.
- Use straight polarity (electrode-negative; DC-), pulse arc mode is preferred.
- Use shield gas DIN EN ISO 17175:2008-I1 (100% Argon).

- TIG weld without preheating to avoid porosity in weld deposits.
- High heat input is required during welding, depending on the electrode diameter, to create a functional melt.
- 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                  |
|--------------|-------------------|-------------------------------------|
| 3.0 mm       | 110 – 130 A       | 15 l/min (31.78 ft <sup>3</sup> /h) |
| 4.0 mm       | 150 – 170 A       | 15 l/min (31.78 ft <sup>3</sup> /h) |
| 5.0 mm       | 190 – 210 A       | 15 l/min (31.78 ft <sup>3</sup> /h) |

Parameter reference: Mild steel with carbon content of 0.1%; thickness 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 | Rod Length       | Rod Diameter     |
|--------------------|-----------|--------------|------------------|------------------|
| WokaDur S80-Ni-TIG | 1065242   | 5 kg (11 lb) | 300 mm (11.8 in) | 3.0 mm (0.12 in) |
| WokaDur S80-Ni-TIG | 1067602   | 5 kg (11 lb) | 300 mm (11.8 in) | 4.0 mm (0.16 in) |
| WokaDur S80-Ni-TIG | 1065244   | 5 kg (11 lb) | 300 mm (11.8 in) | 5.0 mm (0.20 in) |

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 50-1090 (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](http://www.oerlikon.com/metco) (Resources – Safety Data Sheets).