

Product Data Sheet

Work Hardening, Austenitic Matrix Hardfacing Alloy Strengthened with Fine Carbides

Wire Products: Metco 8233

Patent pending

1 Introduction

Metco™ 8233 is a revolutionary metal cored wire specifically designed as a cost-effective, high-impact hardfacing. It provides the best performance in aggressive environments where extreme impact and abrasive wear are critical sources of material failure. The combination of extremely fine carbides and a tough matrix result in the excellent impact performance of Metco 8233.

In addition, Metco 8233 is completely non-magnetic when welded on austenitic substrates and possesses low magnetism when welded on mild steel. The high volume fraction of carbides gives the hardfacing a great resistance to abrasion, but unlike typical hardfacing alloys, Metco 8233 will work harden in high impact environments, thus increasing wear performance in service.

1.1 Typical Uses and Applications

Metco 8233 overlays are suggested for use in any application where high impact resistance and/or a low- to non-magnetic hardfacing is required. The revolutionary improvement in impact resistance and toughness will typically result in an extended service life over chromium carbide overlays.

Specific applications include:

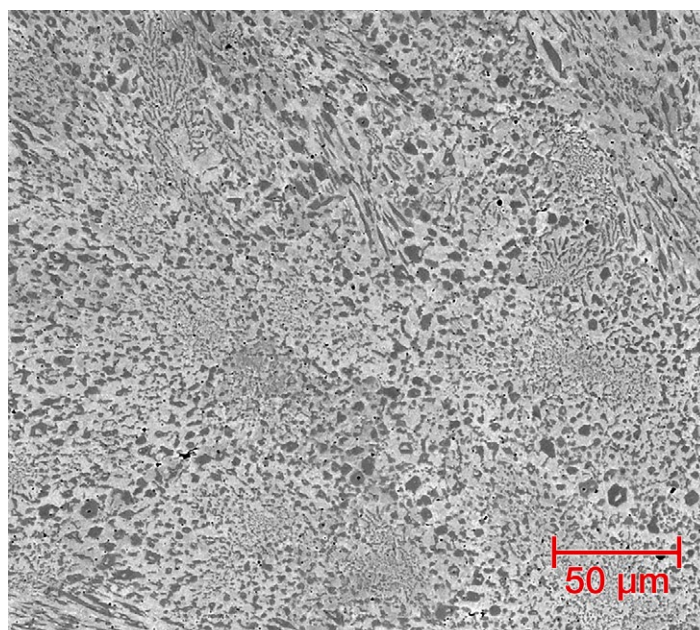
- Shaker screens
- Magnetic separators
- Chute blocks
- Wear plates
- Transfer chute rock boxes
- Mill liners
- Concrete processing equipment
- Comminution machinery
- Crusher rolls
- Other mining applications

Quick Facts

Classification	Alloy, iron-based
Chemistry	Proprietary austenitic alloy
Manufacture	Metal cored wire
Abrasion Resistance	0.13 to 0.3 g lost (ASTM G65A low stress abrasion)
Impact Resistance	> 10 000 impacts @ 20 J without failure
Overlay Hardness as welded ^a	1.6 mm wire: 50 to 56 HRC 2.8 mm wire: 53 to 58 HRC
work hardened	1.6 mm wire: 57 to 61 HRC 2.8 mm wire: 62 to 65 HRC
Magnetic Permeability	< 1.01 μ (on mild steel substrate using a low μ Severn gauge)
Hard Phase	33 % to 45 %
Purpose	Impact and abrasion resistance
Processes ^b	1.6 mm wire: MCAW, GMAW, OA 2.8 mm wire: MCAW, GMAW, SAW, OA

^a Measured on first weld pass

^b MCAW = Metal Cored Arc Welding; GMAW = Gas Metal Arc Welding; SAW = Submerged Arc Welding, OA = Open Arc Welding



Typical as-welded overlay microstructure of Metco 8233.

2 Material Information

2.1 Properties and Characteristics

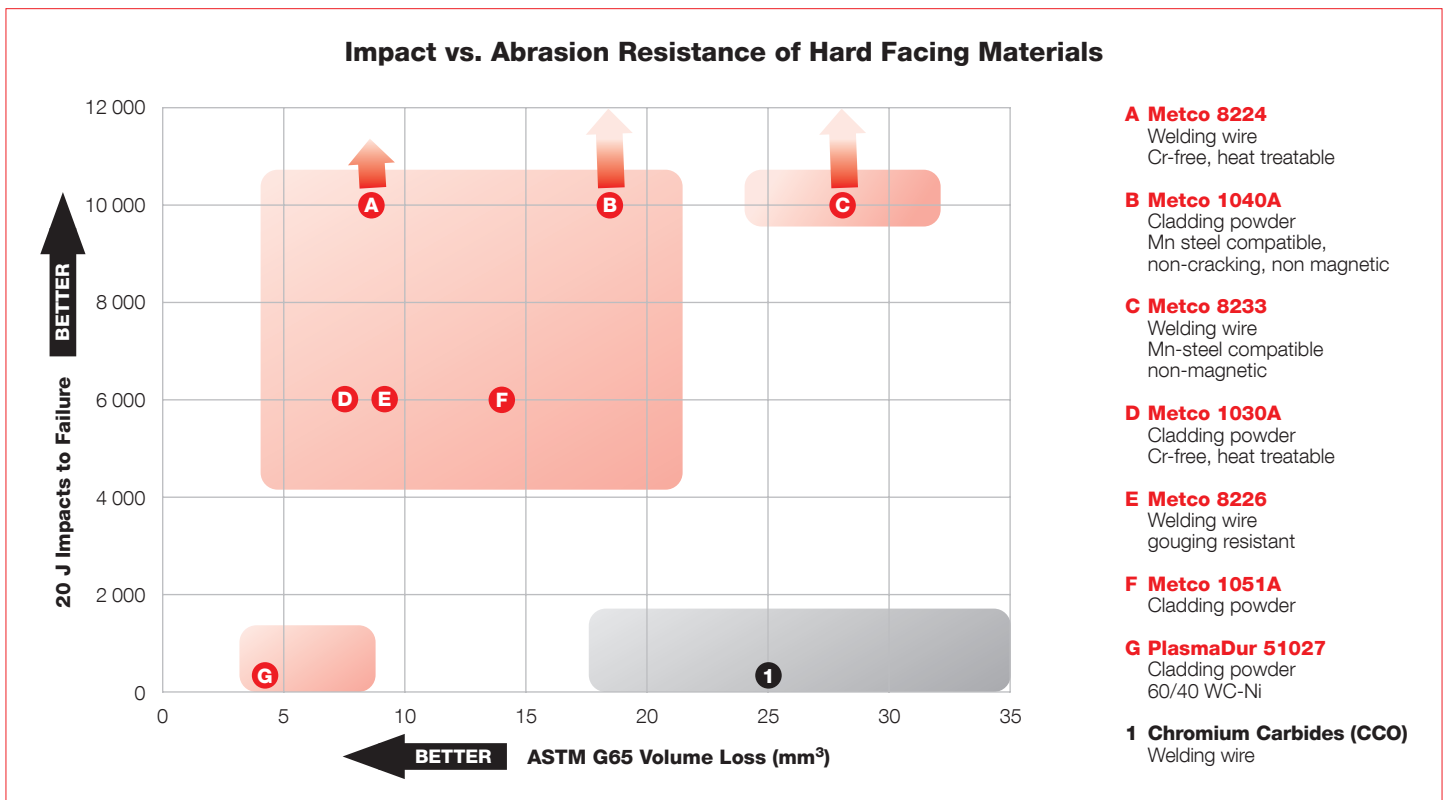
Product	Nominal Chemistry	Product Form	Size	Recommended Process
Metco 8233	Proprietary	Metal Cored Wire	1.6 mm (0.63 in)	MCAW; GMAW, OA
			2.8 mm (0.109 in)	MCAW; GMAW; SAW; OA

2.2 Key Selection Criteria

- Overlays of Metco 8233 should be chosen for environments where both aggressive abrasion and impact are a concern. Its iron-based composition makes it a very economical choice.
- Metco 8233 is unique in that it forms a tough, austenitic matrix that work hardens in service, further improving the impact performance of the alloy. It achieves the apparently discordant properties of high abrasion resistance and toughness by forming a high fraction of fine, wear-resistant carbides.
- When welded on a non-magnetic surface, overlays of Metco 8233 will also be non-magnetic. This property makes it especially useful in directional drilling operations as well as magnetic separators.
- For multilayer applications, use Metco 8233 1.6 mm wire. The hardness in multilayer overlays will increase approximately 2 to 4 HRC compared to a single layer overlay.

2.3 Related Products

- For higher abrasion resistance, consider Metco 8224 or Metco 8226, however, the non-magnetic properties of Metco 8233 will be compromised. If better gouging resistance is needed, combined with resistance to high-stress abrasion, consider Metco 8226, however impact resistance is lower than that achieved using Metco 8233.
- In addition, Oerlikon Metco produces a wide range of other products designed for mining applications. Products are available in wire and powder form appropriate for application using thermal spray, PTA, laser cladding and other welding processes. Please contact your Oerlikon Metco Account Manager for more information..



3 Key Overlay Information

3.1 Using Metco 8233 Wire

Metco 8233 is a cored wire for weld overlays. The 2.8 mm and 1.6 mm products can be processed using metal cored arc welding (MCAW), gas metal arc welding (GMAW) and open arc welding (OA). The 2.8 mm wire can also be processed using submerged arc welding (SAW). Please contact your Oerlikon Metco Account Manager for starting point welding parameters and expected results.

3.2 Overlay Development

For specific overlay application requirements, the services of Oerlikon Metco's Coating Solution Centers are available. Please contact your Oerlikon Metco Account Manager for more information.

4 Commercial Information

4.1 Ordering Information and Availability

Product	Order No.	Form	Size	Package Size	Availability	Distribution
Metco 8233	2267845	Wire	1.6 mm (0.063 in)	12.5 kg (27 lb) wire basket	Special Order	Global
	1306114		2.78 mm (0.109 in)	25 kg (55 lb) wire basket		
	1306115		2.78 mm (0.109 in)	250 kg (551 lb) drum		

4.2 Handling Recommendations

- Powder-filled composite wires may be prone to moisture pickup and must be stored in a dry environment.
 - Avoid temperature fluctuations of greater than 5 °C (9 °F).
 - Maintain storage at a humidity level of ≤ 60 % at 15 to 25 °C (59 to 77 °F) or ≤ 50 % at 25 to 35 °C (77 to 95 °F).
 - Do not store for more than 5 years. Older wire should be redried.
 - If slightly affected by moisture, the wire may be redried at a temperature of 150 °C (300 °F) for 6 h. Longer drying times of up to 12 h at temperatures up to 200 °C (390 °F) can be employed if necessary. Redry no more than 6 times.
 - Wires exposed to severe water contamination, exposed to the atmosphere for long periods and/or exhibit oxidation or corrosion cannot be redried and should be scrapped.

4.3 Safety Recommendations

See SDS 50-2329 (Safety Data Sheet) in the localized version applicable to 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).

The Oerlikon Metco Difference:

Metco 8233 was developed using our patented and proprietary **Scoperta™** high throughput computational metallurgical process to evaluate millions of candidate alloy compositions. Potential candidates are then experimentally evaluated using an advanced screening process where both properties and alloy microstructure are measured.

The combined **Scoperta** computational and experimental approach allows Oerlikon Metco to rapidly design the final material with a much better accuracy than conventional empirically-based methodologies.