HARDFACING WIRES

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TeroMatec OA 4601

Self-Shielded, Continuous Electrode For Semi-Automatic And Robotic

DESCRIPTION

Special, self-shielded, flux cored alloy wire specifically developed for outdoor maintenance and repair welding of thick, heavy components where faster weld deposition rates over traditional coated electrodes, are required. Worn or new critical parts may be cost effectively TeroCote protected either manually or fully automatically to extend their useful service life and increase productivity and profitability. High chromium, hypereutectic cast iron alloy for wear-preventive protective coatings on low or high alloy steels and 14% manganese steels.

- Excellent resistance to grinding abrasion with compression and medium impact
- Ready formation of stress relieving cracks
- Few slag residues to clean
- Deposits are grindable and rust resistant
- Cannot be cut using oxy -fuel processes
- Ideal choice for field work or on site applications
- No need for costly gas cylinders, regulators or flow meters
- Relatively thick, wide overlays possible in single pass
- No enforced stop -starts increase welding duty cycles
- Superior electrode efficiency due to low flux to metal ratio
- No stub end losses promotes material cost savings
- Variable electrode stick out capability improves control over heat input, dilution, deposition rate, visibility and access in tight spaces.

APPLICATIONS

For wear preventive protection of parts in the quarry, cement, sand and gravel, dredging, foundry industries : pump impellers, dredge cutters, rolls, crusher pinions and grinders, cement conveyor screws, hydro-pulpers, bucket shovel teeth and edges, dragline parts, chutes, mixer arms, scraper blades, screws, etc.

PROCEDURE FOR USE

Preparation:Remove old welding deposits and worn metal completely with ExoTrode

Preheating

Preheating depends on the steel's Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic recommends:

CE < 0.2 : preheat not essential

CE 0.4- 0.2 : preheat 200-100.C

CE 0.8- 0.4 : preheat 350-200.C.

Note that %14-12 Mn steels should never be preheated and the workpiece temperature during welding should be kept below 250.C.

Cooling after welding: After welding, the workpiece should be left to cool very slowly, away from draughts. It is recommended to cover the parts with vermiculite for protection.

Welding technique: After striking, maintain the wire stick-out around 40 mm with an arc length approx. 7 mm. Longer wire stick-out will further increase deposition rates. For optimum deposit quality, use drag stringer bead or moderate weaving techniques to minimise heat input & overheating risks

Machining

Weld deposits are machinable with standard cutting tools.Soluble oil lubrification improves machining efficiency.

TECHNICAL DATA

Typical hardness: 60 HRC

Current polarity: DC (+)

Electrode(mm)	Voltage (v)	Current(A)
2.8	26-36	170-350

TeroMatec OA 4666

Self-Shielded, Continuous Electrode For Semi-Automatic And Robotic

DESCRIPTION

Special, self-shielded, flux cored alloy wire specifically developed for outdoor maintenance and repair welding of thick, heavy components where faster weld deposition rates over traditional coated electrodes, are required. Worn or new critical parts may be cost effectively TeroCote protected either manually or fully automatically to extend their useful service life and increase productivity and profitability.High chromium, niobium Hypereutectic cast iron alloy depositing complex carbides for wear-protective coating of carbon steels, low or high alloy steels and 14% Mn steels.

- Excellent resistance to severeabrasion, erosionwith moderate impactup to 450°C
- Ready formation of stress relieving cracks
- Few slag residues to clean
- Deposits are grindable and rust resistant
- Cannot be cut using oxy -fuel processes
- Ideal choice for field work or on site applications
- No need for costly gascylinders, regulators or flow meters
- Relatively thick, wide overlays possible in single pass
- No enforced stop -starts increase welding duty cycles
- Superior electrode efficiency due to low flux to metal ratio
- No stub end losses promotes material cost savings
- Variable electrode stick out capability improves control over heat input, dilution, deposition rate, visibility and access in tight spaces.

APPLICATIONS

For wear-preventive protective coating of a wide range of steel components subject to abrasion by mineral particles, sand, rocks, gravel etc. processed in the Quarry, Cement, Earthmoving, Dredging and Drilling industries:
crusher jaws and hammers, mixer blades, pump impellers, mould screws, wear plates, coal screens, excavator bucket teeth, conveyor chutes, sand pumps etc.

PROCEDURE FOR USE

Preparation: Remove old welding deposits and worn metal completely with ChamferTrode 04. Preheating depends on the steel's Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic recommends.

CE < 0.2 : preheat not essential
CE 0.4- 0.2 : preheat 200-100.C
CE 0.4 -0.8 : preheat 200-350.C.
Note that 12-14% Mn steels should never be preheated and the workpiece temperature during welding should be kept below 250.C.

Cooling after welding: After welding similar base metals, the workpiece should be left to cool very slowly, away from draughts. It is recommended to cover the parts with vermiculite for protection.

Intermediate layer: On %14-12 Mn steels, deposit intermediate layers with TeroMatec 3205 or with the manual electrode EutecTrode 6450.
On hardenable and air-hardening steels, deposit intermediate layers with TeroMatec 3302 or XHD646.

Welding technique: After striking, maintain the wire stick-out around 40 mm with an arc length approx. 7 mm. Longer wire stick-out will further increase deposition rates. For optimum deposit quality, use drag stringer bead or moderate weaving techniques to minimise heat input & overheating risks

Machining: Weld deposits are machinable with standard cutting tools.
Soluble oil lubrification improves machining efficiency.

TECHNICAL DATA:

Typical hardness: 65 HRC

Current polarity: DC (+)

Electrode(mm)	Voltage (v)	Current(A)
2.8mm	30-36	200-440

TeroMatec OA 3205

Self-Shielded, Continuous Electrode For Semi-Automatic And Robotic

DESCRIPTION

Special, self-shielded, flux cored alloy wire specifically developed for outdoor maintenance and repair welding of thick, heavy components where faster weld deposition rates over traditional coated electrodes, are required. Worn or new critical parts may be cost effectively TeroCote protected either manually or fully automatically to extend their useful service life and increase productivity and profitability.High chromium manganese austenitic alloy for wear-preventive coating of carbon steels, low or high alloy steels and 14% manganese steels.

Maximum resistance to heavy impact and compression High resistance to cracking and plastic deformation
Rapid work hardening characteristics
Machinable, rust free deposits.
Easy slag removal
Low metal / metal friction coefficient.
Maximum service temperature 300°C.
Ideal choice for field work or on site applications
No need for costly gas cylinders, regulators or flow meters
Relatively thick, wide overlays possible in single pass
No enforced stop -starts increase welding duty cycles
Superior electrode efficiency due to low flux to metal ratio
No stub end losses promotes material cost savings
Variable electrode stick out capability improves control over heat input, dilution, deposition rate, visibility and access in tight spaces

APPLICATIONS

For buttering layers prior to harder overlays and wear-preventive coating of crane rollers, crusher cylinders, shovel buckets, mobile crane rails, rail points, coupling of rolling mill extensions, shovel teeth, etc.

PROCEDURE FOR USE

Preparation: Remove old welding deposits and worn metal completely with ExoTrode .For thick-section butt joints or horizontal fillets, use a single or double V preparation

Preheating: Preheating depends on the steel›s Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic recommends:

CE < 0.2 : preheat not essential
CE 0.4-0.2 : preheat 200-100.C
CE 0.8-0.4 : preheat 350-200.C.

Note that %14-12 Mn steels should never be preheated and the workpiece temperature during welding should be kept below

Welding parameters :Welding current: = (+)
Welding positions :PA, PB, PCaccording to ISO 6947
Welding technique: After striking, maintain the wire stick-out around 40 mm with an arc length approx. 7 mm. Longer wire stick-out will further increase deposition rates. For optimum deposit quality, use drag stringer bead or moderate weaving techniques to minimise heat input & overheating risks
Machining: Weld deposits are machinable with standard cutting tools.
Soluble oil lubrification improves machining efficiency.

TECHNICAL DATA

Typical hardness
As welded :250 BN
After work hardening :390 HB
ElongationA5 (%): 25

Current polarity: DC (+)

Electrode(mm)	Voltage (v)	Current(A)
1.6mm	26-30	100-220
2.8mm	26-30	250-375

TeroMatec OA 3302

Self-Shielded, Continuous Electrode For Semi-Automatic And Robotic

DESCRIPTION

Special, self-shielded, flux cored alloy wire specifically developed for outdoor maintenance and repair welding of thick, heavy components where faster weld deposition rates over traditional coated electrodes, are required. Worn or new critical parts may be cost effectively TeroCote protected either manually or fully automatically to extend their useful service life and increase productivity and profitability. Versatile austenitic Cr Ni Mn alloy for intermediate layers and rebuilding before hard surfacing on heat treatable alloy steels and 14% manganese steel,. Also recommended for joining thick section parts in dissimilar steels.

- Highresistance to impact, pressure and metal/ metal friction
- High resistance to cracking and plastic deformation
- Rapid work hardening characteristics
- Ideal for thick, multi-pass, protective coatings
- Thermal cycling and oxidation resistant up to 600ºC
- Non-magnetic, readily machinable deposits
- Machinable, rust free deposits.
- Very good corrosion resistance
- Easy slag removal
- Ideal choice for field work or on site applications
- No need for costly gas cylinders, regulators or flow meters
- Relatively thick, wide overlays possible in single pass
- No enforced stop -starts increase welding duty cycles
- Superior electrode efficiency due to low flux to metal ratio
- No stub end losses promotes material cost savings
- Variable electrode stick out capability improves control over heat input, dilution, deposition rate, visibility and access in tight spaces.

APPLICATIONS

For multi-pass intermediate layers, anti-wear coatings, and joining thick steel parts of dissimilar composition.
Railway points, curved tramlines, crusher bars and jaws, gyratory crusher cones, hydra-turbines, cylindrical crusher jaws, drive sprockets, rolling mill guides, etc.

PROCEDURE FORUSE

Preparation:Remove old welding deposits and worn metal completely with ExoTrode For thick-section butt joints or horizontal fillets, use a single or double V preparation.
Preheating: Preheating depends on the steel›s Carbon Equivalent, and the workpiece size , thickness and geometry. Castolin Eutectic recommends:
CE < 0.2 : preheat not essential
CE 0.4-0.2 :preheat 200-100.C
CE 0.8-0.4 : preheat 350-200.C.
Note that %14-12 Mn steels should never be preheated and the workpiece temperature during welding should be kept below 250.C.

Welding positions:PA, PBaccording to ISO 6947
Welding technique:After striking, maintain the wire stick-out around 40 mm with an arc length approx. 7 mm. Longer wire stick-out will further increase deposition rates. For optimum deposit quality, use drag stringer bead or moderate weaving techniques to minimizeheat input & overheating risks
Machining:Weld deposits are machinable with standard cutting tools.
Soluble oil lubrification improves machining efficiency.

TECHNICAL DATA

Tensile strength: 600 N\ mm2 (87,000 psi)
Yield strength : 400 N\ mm2 (58,000 psi)

Typical hardness
As welded :190 HB
After work hardening :430 BN
ElongationA5 (%): 40

Current polarity: DC (+)

Electrode(mm)	Voltage (v)	Current(A)
1.6mm	26-30	100-220
2.8mm	26-30	250-375

TeroMatec OA 3952

Self-Shielded Continuous Electrode For Semi-Automatic And Robotic Welding

DESCRIPTION

Special, self-shieldedflux cored alloy wire specifically developed for outdoor maintenance and repair welding of thick, heavy components where faster weld deposition rates over traditional coated electrodes, are required. Worn or new critical parts may be cost effectively TeroCote protected either manually or fully automatically to extend their useful service life and increase productivity and profitability. Complex carbidesalloy containing chromium, molybdenum and niobium giving deposits with very high concentration of ultra-hard, primary and eutectic phases to produce maximum resistance to fine, hot particle abrasion and erosion by coke, clinker, cement or sand at elevated temperatures.

- Exceptional resistance to hot abrasion up to 650.C.
- Smooth deposits without machining.
- Very hard deposits with one or two layers maximum
- Automatic formation of stress relief cracks
- Deposits can be grinded and resist rusting.
- Ideal choice for field work or on site applications
- No need for costly gas cylinders, regulators or flow meters
- Relatively thick, wide overlays possible in single pass
- No enforced stop -starts increase welding duty cycles
- Variable electrode stick out capability improves control over heat input, dilution, deposition rate, visibility and access in tight spaces.

APPLICATIONS

For use on steel, alloy steel and 12-14% Mn steel parts.
Clinker, sinter crushers.
Cement exhaust fan blades.
Blast furnace bells and hoppers.
Hot screens, wear plates, mold extruders
Sinter crushers and fans, hot sieves, screens and bells.

PROCEDURE FORUSE

Preparation:Remove any previous weld deposits or cracked metal with ExoTrode.

Preheating: depends on the steel's Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic recommends:

CE < 0.2 : preheat not essential
CE 0.4-0.2 : preheat 200-100.C
CE 0.8-0.4 : preheat 350-200.C.

Note that %14-12 Mn steels should never be preheated and the workpiece temperature during welding should be kept below 250.C.

Intermediate layer: On %14-12 Mn steels, deposit intermediate layers with TeroMatec 3205 or with the manual electrode EutecTrode 6450.
On hardenable and air-hardening steels, deposit intermediate layers with TeroMatec 3302 or XHD646.
Welding parameters: Welding current: = (+)

TECHNICAL DATA

Typical hardness: 65 HRC

Current polarity: DC (+)

Electrode(mm)	Voltage (v)	Current(A)
1.6mm	26-33	100-240
2.8mm	26-36	250-440

TeroMatec OA 4395N

Self-Shielded, Continuous Electrode For Semi-Automatic And Robotic

DESCRIPTION

Special, self-shielded, flux cored alloy wire specifically developed for outdoor maintenance and repair welding of thick, heavy components where faster weld deposition rates over traditional coated electrodes, are required. Worn or new critical parts may be cost effectively TeroCote protected either manually or fully automatically to extend their useful service life and increase productivity and profitability. High chromium, hypereutectic cast iron alloy for wear-preventive protective coatings on low or high alloy steels and 14% manganese steels.

- Excellent resistance to grinding abrasion with compression and medium impact
- Ready formation of stress relieving cracks
- Few slag residues to clean
- Deposits are grindable and rust resistant
- Cannot be cut using oxy -fuel processes
- Ideal choice for field work or on site applications
- No need for costly gas cylinders, regulators or flow meters
- Relatively thick, wide overlays possible in single pass
- No enforced stop -starts increase welding duty cycles
- Superior electrode efficiency due to low flux to metal ratio
- No stub end losses promotes material cost savings
- Variable electrode stick out capability improves control over heat input, dilution, deposition rate, visibility and access in tight spaces.

APPLICATIONS

For wear preventive protection of parts in the quarry, cement, sand and gravel, dredging, foundry industries : pump impellers, dredge cutters, rolls, crusher pinions and grinders, cement conveyor screws, hydro-pulpers, bucket shovel teeth and edges, dragline parts, chutes, mixer arms, scraper blades, screws, etc.

PROCEDURE FOR USE

Preparation:Remove old welding deposits and worn metal completely with ExoTrode.

Preheating

Preheating depends on the steel's Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic recommends:

CE < 0.2 : preheat not essential

CE 0.4- 0.2 : preheat 200-100.C

CE 0.8- 0.4 : preheat 350-200.C.

Note that %14-12 Mn steels should never be preheated and the workpiece temperature during welding should be kept below 250.C.

Cooling after welding: After welding, the workpiece should be left to cool very slowly, away from draughts. It is recommended to cover the parts with vermiculite for protection.

Welding parameters Welding current: = (+)

Welding positions: PA according to ISO 6947

Welding technique: After striking, maintain the wire stick-out around 40 mm with an arc length approx. 7 mm. Longer wire stick-out will further increase deposition rates. For optimum deposit quality, use drag stringer bead or moderate weaving techniques to minimise heat input & overheating risks

Machining

Weld deposits are machinable with standard cutting tools.

Soluble oil lubrification improves machining efficiency

TECHNICAL DATA

Typical hardness:60 HRC

Current polarity: DC (+)

Electrode(mm)	Voltage (v)	Current(A)
1.6mm	26-33	120-240
2.8mm	26-36	170-350

EnDOtec. DO*351

Seamless, Gas Shielded Continuous Electrode For Semi-Automatic And Robotic Welding Applications

DESCRIPTION

Seamless, gas shielded, metal cored alloy wire, ideal for batch manufacturing or maintenance and repair applications where highest integrity welding, efficiency and productivity are re-quired.
High alloy Cr-Si-C steel for wear protective coatings. The air hardening deposit offers excellent resistance to wear caused by impact, adhesion (metal-metal friction) and abrasion. The forgeable deposit can be heat-treated or nitrided and with-stands thermal shock.

- Low heat input for low dilution.
- Maximizedweld metal recovery.
- Exceptional positional weldability.
- Regular bead profile, virtually spatter free.
- Versatile usage over wide parameter range.
- Faster deposition rate for reduced labour costs.

APPLICATIONS

Designed specifically to provide protective coating against wear caused by impact, adhesion (metal-metal friction) and abrasion in industries such as:

Mines and quarries
Drill heads, breaker plates, crusher drums, conveyor and drag-line buckets.

Civil engineering
Gravel pumps, rails, crusher hammers, bucket ripper teeth, vehicle tracks, soil compactors.

Urban and industrial waste disposal
Grilles and frames of rotary sleeves, crushers, hydraulic compactors.

PROCEDURE FOR USE

Welding Equipment: EnDOtec continuous electrodes are compatible with most conventional, constant voltage power sources. Models with programmable, pulsed arc, metal transfer modes offer optimal performance. Castolin Eutectic recommends using wire drive systems fitted with 4 knurled feed-rollers as well as polyamide liners.
Preparation:Remove old welding deposits and worn metal completely with ChamferTrode 04.
Preheating: Preheating depends on the steel's Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic **recommends:**
CE < 0.2 : preheat not essential
CE 0.2 -0.4 : preheat 100-200.C
CE 0.4 -0.8 : preheat 200-350.C
Note that 12-14% Mn steels should never be preheated and the workpiece temperature during welding should be kept below250.C.
Intermediate layer
.Deposit a buttering layer of EnDOtec DO*02 on austenitic manganese steels and EnDOtec DO*310 or DO*257 on mild and high strengthsteels.

Welding technique
For single or multipass, downhand coating applications. Push the electrode at an angle of 70-80.to ensure optimal fusion. When required, additional passes should only be executed while the weld is still hot.

Machining
The deposit is machinable by grinding. Arc or plasma cutting equipment may also be used.

TECHNICALDATA

Typical hardness : 58 HRC

Current polarity: DC (+)

Shielding gases
Recommended gas:82% Ar-18% CO2 [EN ISO 14175M21]
Alternative gases:97,5% Ar, 2,5%CO2 [EN ISO 14175M12]
Flow rate(l/min):14-18

Electrode(mm)	Voltage (v)	Current(A)
1.2mm	12-35	50-320
1.6mm	16-38	60-420

EnDOtec. DO*48

Gas Shielded Continuous Electrode For Anti-Wear Coatings

DESCRIPTION

Exclusive, Chrome & Nickel free gas shielded, metal cored alloy wire, ideal for maintenance and repair applications or batch manufacturing where highest integrity welding, efficiency and productivity are required.

The slag-free deposit features a high density of hard, cast tungsten carbide particles evenly distributed in a ferrous alloy matrix which is further reinforced with very fine precipitates formed by recrystallisation. This gives exceptional resistance to abrasive-erosive particles combined with moderate impact at ambienttemperatures. Deposits may exhibit some stress relief cracks.

- Low heat input for low dilution.
- Maximised weld metal recovery.
- Exceptional positional weldability.
- Regular bead profile, virtually spatter free.
- Versatile usage over wide parameter range.
- Faster deposition rate for reduced labour costs

APPLICATIONS

Designed specifically for antiwear protective coatings on carbon steelsandalloy steels. Typical industries include mining, quarries, drilling, tunneling, public works.Extrusion press parts, transport screws, mixer blades, paddles, conveyors, scraper blades, cylinder crushers, pump rotors and bodies, etc.

PROCEDURE FOR USE

Welding Equipment: EnDOtec continuous electrodes are compatible with most conventional, constant voltage power sources. Models with programmable, pulsed arc, metal transfer modes offer optimal performance. Castolin Eutectic recommends using wire drive systems fitted with 4 knurled feed-rollers as well as polyamide liners.

Preparation: Remove old welding deposits and worn metal completely with ChamferTrode 04.

Preheating: Preheating depends on the steel's Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic recommends:
CE < 0.2 : preheat not essential
CE 0.2 -0.4 : preheat 100-200.C
CE 0.4 -0.8 : preheat 200-350.C.
Note that 12-14% Mn steels should never be preheated and the workpiece temperature during welding should be kept below 250.C.

Buttering layer
Deposit a buttering layer of EnDOtec DO*02 on austenitic manganese steels, and EnDOtec DO*28S on hardening steels.

Welding technique
For single pass, downhand coating applications, pull the torchat an angle of 70-80.to ensure optimal fusion. If required, a maximum second pass should only be executed while the weld is still hot.

Machining
The deposit is machinable by grinding. Arc or plasma cutting equipment may also be used.

TECHNICAL DATA

Typical hardness: 57 -60 HRC
Micro hardness of carbides(HV): 2300

Current polarity: DC (+)

Shielding gases
Recommended gases:97,5% Ar-2,5% CO2 [ISO 14175 -M12]
Flow rate (l/min):.18

Electrode(mm)	Voltage (v)	Current(A)
1.6mm	17-22	70-180

EnDOtec. DO*11

Gas Shielded Continuous Electrode For Semi -Automatic And Robotic Welding

DESCRIPTION

Exclusive,Chrome-freegas shielded, metal cored alloy wire, ideal for maintenance and repair applications or batch manufacturing where highest integrity welding, efficiency and productivity are required.

The slag-free deposit features a high density of hard, “as cast”Tungsten Carbide particles evenly distributed in a nickel alloy matrix which is further reinforced with very fine precipitates formed byrecrystallisation. This gives exceptional resistance to abrasive-erosive particles with moderate impact and is specifically for service in hot or corrosive environments.

Deposits are crack resistant which prevents ingress and contamination by organic matter or bacterial growth.

- Low heat input for low dilution
- Maximizedweld metal recovery
- Exceptional positional weldability
- Regular bead profile, virtually spatter free
- Versatile usage over wide parameter range
- Faster deposition rate for reduced labour costs

APPLICATIONS

Designed for antiwear protective coatings on carbon steels, alloy steels, stainless steels and nickel alloys. Typical industries include agricultural, food, beverage, organic oils, pulp and paper, chemical processing. Oil pressing parts, transport screws, cellulose mixing bladespaddles, conveyors, bone mill hammers etc.

PROCEDURE FOR USE

Welding Equipment: EnDOtec continuous electrodes are compatible with most conventional, constant voltage power sources. Models with programmable, pulsed arc, metal transfer modes offer optimal performance. Castolin Eutectic recommends using wire drive systems fitted with 4 knurled feed-rollers as well as polyamide liners.

Preparation

Remove old welding deposits and worn metal completely with ChamferTrode 04.

Preheating: Preheating depends on the steel’s Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic **recommends:**

CE < 0.2 : preheat not essential
CE 0.2 -0.4 : preheat 100-200.C
CE 0.4 -0.8 : preheat 200-350.C.

Note that 12-14% Mn steels should never be preheated and the workpiece temperature during welding should be kept below 250.C.

Buttering layer

Deposit a buttering layer of EnDOtec DO*02 on austenitic manganese steels, and EnDOtec DO*500S on hardening steels.

Welding technique

For single pass, downhand coating applications. Push or pull the electrode at an angle of 70-80.to ensure optimal fusion. If required, a second pass should only be executed while the weld is still hot.

Machining

The deposit is machinable by grinding. Arc or plasma cutting equipment may also be used.

TECHNICAL DATA

Typical hardness: 55 HRC
Micro hardness of carbides (HV) :2400

Current polarity: DC (+)

Shielding gases

Recommended gas:97,5% Ar, 2,5% CO2 [ISO 14175 -M12]
Flow rate (l/min):16

Electrode(mm)	Voltage (v)	Current(A)
1.6mm	18-22	120-140

EnDOtec. DO*390N

Gas Shielded Continuous Electrode For Semi-Automatic And Robotic Welding Applications

DESCRIPTION

Nanoalloy proprietary gas-shielded metal cored wire. It is ideal for both maintenance and repair and production applications where welds of utmost reliability, performance and productivity are required.The slag free deposit has a high concentration of complex borocarbides finely distributed in an iron alloy matrix. The exclusive nanoscale microstructure of this electrode guarantees exceptional performance against wear from severe abrasion and erosion. Bulk hardness properties are retained up to 750ºC.The slightly magnetic and machinable weld deposits exhibit stress relieving microfissures and smooth surface contours free from ripples.

- Low friction coefficient without lubrication
- Low heat input for minimum dilution, which guarantees best properties of weld layers
- Maximum weld metal recovery coefficient
- Exceptional positional weldability
- Virtually spatter free, regular bead profiles
- Versatile applications over a wide parameter range
- Faster deposition rate for reduced labour costs

APPLICATIONS

Designed for extremely abrasion and erosion resistant protective coatings of carbon steel, alloy steels and stainless steels.
Typical application industries include: steelworks, cement plants, waste management plants, power plants, foundries, chemical processing plants, mining, petrochemical plants, etc.
Specific parts: Screw conveyors, furnace chutes, extractor fans, cyclones, conveyors, mixing blades, vanes, scrapers, press screws, sieves, etc.

PROCEDURE FORUSE

Welding Equipment: EnDOtec continuous electrodes are compatible with most conventional constant voltage power sources. Models with programmable pulsed arc metal transfer functions offer optimum performance. E+C recommends the use of wire drive systems fitted with 4 knurled rollersas well as polyamide liners.
Preparation: Completely remove all previous weld deposits and worn metal with ChamferTrode 04.

Preheating: Preheating depends on the steel's Carbon Equivalent (CE), workpiece size, thickness and geometry.
Castolin Eutectic recommends:
CE < 0.2: no preheating required
CE 0.2 -0.4 : preheating between 100-200°C
CE: 0.4 –0.8 : preheating between 200-350ºC
300ºC preheat promotes relatively crack-free welds.

Intermediate coat: Microfissures are minimized by depositing a base layer of EnDOtec DO*02 for manganese austenitic steels and work hardening steels.

Welding technique

For single or multipass, downhand coating applications. Push the electrode at an angle of 70-80.to ensure optimal fusion. When required, additional passes should only be executed while the weld is still hot.

Machining

The deposit is machinable by grinding. Arc or plasma cutting equipment may also be used.

TECHNICAL DATA

Typical hardness
Hardness (1 layer): ...66-68 HRC
Hardness (2 layers)..67-71 HRC

Current polarity: DC (+)

Shielding gases

Recommended gas: 97.5% Ar, 2.5% CO_2 [ISO 14175 M12]
Alternative gases:82% Ar, 18% CO_2 [ISO 14175 M21]
Flow (l/min): 18

Electrode(mm)	Voltage (v)	Current(A)
1.6mm	20-34	150-350

EnDOtec. DO*33

Gas Shielded Continuous Electrode For Semi-Automatic And Robotic Welding Applications

DESCRIPTIONExclusive, gas shielded, metal cored alloy wire, ideal for maintenance and repair applications or batch manufacturing where highest integrity welding,efficiency and productivity are required.The slag-free deposit features a high density of very hard, complex particles, in a matrix which is reinforced with very fine precipitates formed from additional elements. This gives exceptional resistance to fine-particle abrasion and moderate-impact erosion at operating temperatures up to 650.C. Hardness and full quality of deposit obtained with one pass.

A high-performance antidote to abrasion problems which will significantly reduce maintenance costs and extendthe life of worn parts. 70% saving in welding time and in filler metal used because 68 HRC hardness is obtained with one pass. Against severe abrasion, EnDOtec DO*33 has a better cost/ wear resistance ratio than conventional chromium castings. Good resistance to severe abrasion at high temperatures, as well as erosion in a gaseous environment.

- Smooth bead improves resistance to erosion.
- Low heat input for low dilution.
- Maximizedweld metal recovery.
- Exceptional positional weldability.
- Regular bead profile, virtually spatter free.
- Versatile usage over wide parameter range.
- Faster deposition rate for reduced labour costs.

APPLICATIONS

Designed specifically for antiwear protective coatings in: Public works. Iron and steel mills. Brickworks. Quarries. Ceramics works. Dredgers. Mines and cement works: Extruder/press screw segments and pug mill augers Dust extractors -Hot screens and furnace retorts -Clod crusher hammers -Pump frames -Conveyor chains.

ROCEDURE FOR USE

Welding Equipment: EnDOtec continuous electrodes are compatible with most conventional, constant voltage power sources. Models with programmable, pulsed arc, metal transfer modes offer optimal performance. Castolin Eutectic recommends using wire drive systems fitted with 4 knurled feed-rollers as well as polyamide liners.

Preparation:Remove old welding deposits and worn metal completely with ExoTrode.

Preheating

Preheating depends on the steel's Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic recommends:

CE < 0.2 : preheat not essential
CE 0.2 -0.4 : preheat 100-200.C
CE 0.4 -0.8 : preheat 200-350.C.

Note that 12-14% Mn steels should never be preheated and the workpiece temperature during welding should be kept below 250.C.

Buttering layer

Deposit a buttering layer of EnDOtec DO*02 on austenitic manganese steels, and EnDOtec DO*28S on hardening steels.

The use of pulsed arc technology significantly improves semi-automatic welding productivity. A synergic program with continuously variable parameters is incorporated in certain Castolin Eutectic equipments which optimizeswelding performance over a wide range of deposition rates with minimum heat input and also facilitates positional work. To obtain additional information, contact your Castolin Eutectic application specialist.

Welding technique :For single pass, downhand coating applications, pull the torchan angle of 70-80.to ensure optimal fusion. If required, a maximum second pass should only be executed while the weld is still hot.

Machining:The deposit is machinable by grinding. Arc or plasma cutting equipment may also be used.

TECHNICAL DATA

Typical hardnessafter welding: 68 HRC

Current polarity: DC (+)

Shielding gases
Recommended gases:82% Ar, 18% CO2
[EN ISO 14175-M21]
. Alternative gases: 97,5% Ar, 2,5% CO2
[EN ISO 14175-M12]
Flow rate (l/min):14-18

Electrode(mm)	Voltage (v)	Current(A)
2mm	17-39	70-300
1.6mm	18-40	80-400

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EnDOtec DO*04

Gas Shielded, Peripheric Continuous Electrode For Semi-Automatic

DESCRIPTION

Exclusive, gas shielded, metal cored alloy wire ideal for maintenance and repair applications or batch manufacturing where the highest integrity welding, effi ciency and productivity are required. The slag-free deposit is of the martenistic stainless steel type with hardness increased through precipitation (structural hardening). On stainless steels and alloys with high nickel content, structure and hardness depend on dilution. Highly alloyed with controlled additive amounts, this alloy composition offers the following advantages...

- Hardness obtained with fi rst pass and maintained to max working temperature 1020°F (550°C)
- Excellent corrosion and oxidization resistance at temperatures up to 1200°F (650°C)
- Excellent metal-to-metal friction resistance
- Ideal for use as cladding with no risk of cracking
- Exceptional positional weldabilty
- Low heat input for low dilution
- Good corrosion resistance in high temperature gaseous media: Combustion chambers, diesel engines, valves.
- Good corrosion resistance in saline environment, with cavitation resistance
- No buttering layer necessary when coating heat-resistant steels of CrMo/CrMoV type
- Unique peripheral arc characteristics
- Maximized weld metal recovery
- Regular bead profi le, virtually spatter free
- Wide parameter range
- Faster deposition rates for reduced labor costs

APPLICATIONS

- Rods for hot extrusion profi les
- Feed rolls
- Sizing mandrels
- Hot working dies
- Clipping beds
- Furnace components
- Valve seats and heads
- Curving tram lines
- Blow out preventers (BOP)

PROCEDURE FOR USE:

Equipment EnDOtec continuous electrodes are compatible with most conventional, constant voltage power sources. Models with programmable, pulsed arc, metal transfer modes offer optimal performance. Eutectic Corporation recommends using wire drive systems using 4 feed rollers - smooth rollers for 0.045" (1.2mm) diameter and knurled rollers for 1/16" (1.6mm) diameter - as well as polyamide liners.

Preparation: Remove old welding deposits and worn metal completely with ExoTrode.

.**Preheating**: depends on the steel's carbon equivalent and the workpiece size, thickness and geometry. Eutectic recommends...

CE<0.2: Preheat not necessary

CE 0.2-0.4: Preheat 210° - 390°F (100-200°C)

CE 0.4-0.8: Preheat 390° - 660°F (200-350°C)

NOTE that 12-14% Mn steels should never be preheated and the workpiece temperature during welding should be kept below 480°F (250°C).

WELDING TECHNIQUE

For multi-pass, downhand coating push the electrode down the workpiece at an angle of 70/80° to ensure optimum fusion.

TECHNICAL DATA:

Typical hardness: 48 HRC

Heat Treatment

Quenching temperature: 1900°F (1040°C)

Stress relief annealing 2x2 hours at 1380°F (750°C)

Current polarity: DC (+)

Shielding Gas

Recommended: 100% Argon

Alternative: 95% Ar + 5% CO2

Flow (l/min): 16

	Diameter	Voltage	Amperage
Short Arc	1.2mm	15-20	80-200
Transfer Mode	1.6mm	19-27	150-300
Spray Arc	1.2mm	26-28	230-300
Transfer Mode	1.6mm	27.5-33	250-400

EnDOtec. DO*23

Gas Shielded Continuous Electrode For Semi-Automatic And Robotic Welding Applications

DESCRIPTION

Exclusive, gas shielded, metal cored alloy wire, ideal for maintenance and repair applications or batch manufacturing where highest integrity welding,efficiency and productivity are required. Specifically developed for low heat input semi-automatic joining, rebuilding and anti-wear protective coating of cast iron. It can also be used to join cast iron to steels. The innovative composition, with carbon and manganese added to a ferronickel base, gives a slag-free deposit with exceptionally good mechanical properties. Its nickel-rich matrix, with spheroidal graphite precipitates, offers exceptional crack resistance under high restraint. Thanks to its combination of strength and good elongation properties, cast iron can be joined without use of fixtures, rebuilt or coated.

- Low heat input for low dilution
- Maximizedweld metal recovery
- Exceptional positional weldability
- Regular bead profile virtually spatter free
- Versatile usage over wide parameter range
- Faster deposition rate for reduced labor cost s

APPLICATIONS

For joining and coating highly restrained spheroidal graphite cast iron, grey cast iron and malleable cast iron workpieces, as well as for joining cast iron to steels.

- Frames
- Casings for pumps and valves
- Crushers
- Machine tool beds
- Turbine scaling rings
- Textile industry machines
- Machining errors on castings

Complementary products: XHD 2230: manual electrode

PROCEDURE FOR USE

Welding Equipment: EnDOtec continuous electrodes are compatible with most conventional, constant voltage power sources. Models with programmable, pulsed arc, metal transfer modes offer optimal performance. Castolin Eutectic recommends using wire drive systems fitted with 4 knurled feed-rollers as well as polyamide liners.

Preparation: Remove old welding deposits and fatigued metal with ExoTrode.

For joining and assembly, bevel edges to a V (45.) or X, especially for parts with a large cross-section. Areas to be coated and the groove faces of joints should be cleaned or ground to remove any contamination or oxidation (scale).

Preheating: This is not usually necessary. With difficult-to-weld base metals and with complex -shaped workpieces, slight preheating to about 200.C will minimizeany risk of cracking in the transition zone.

The use of pulsed arc technology significantly improves semi-automatic welding productivity. A synergic program with continuously variable parameters is incorporated in certain Castolin Eutectic equipments which optimises welding performance over a wide range of deposition rates with minimum heat input and also facilitates positional work. To obtain additional information, contact your Castolin Eutectic application specialist.

Welding technique:For multipass flat/down handjoining, best penetration is obtained by pulling the torch at an angle of 80-70.to the axis of the joint.

For fillet and or corner welding, the best bead pattern is obtained by pushing the torch at an angle of 70-60.to the axis of the joint.

Machining:Machine using normal cutting tools. Arc or plasma cutting equipment may also be used.

TECHNICAL DATA

Tensile strength: 475 N\ mm2 (68,000 psi)
Yield strength : 375 N\ mm2 (54,000 psi)
Typical hardness: 190 BN

Current polarity: DC (+)

Shielding gases
Recommended gas: 82% Ar, 18% CO2 [ISO 14175 -M21]
Flow rate (l/min): 16

Electrode(mm)	Voltage (v)	Current(A)
1.2mm	19-24	110-280

EnDOtec DO*622 S

Gas Shielded Continuous Electrode For Semi -Automatic And Robotic Welding

DESCRIPTION

Exclusive, gas shielded flux cored nickel base wire, ideal for maintenance and repair applications or batch manufacturing where highest integrity welding, efficiency and productivity are required. Specifically developed for joining large pieces, subjected to high stresses and made of low alloy steels, high alloy steels, dissimilar steels, non-identified steels and nickel alloys.
Also suitable for protective coatings, offering excellent resistance to attack by most kinds of acids and alkalis, even in strong concentrations. Conceived to avoid brittle phases in the dilution zone, even when the base metal is an alloy steel, stainless steel, nickel or copper-based alloy.

*Exceptional resistance to cracking because deposit has a coefficient of thermal expansion very similar to steel.
*No risk of sigma phase formation or embrittlement.
*Deposit is unaffected by heat thermal cycles and stresses induced by high temperatures over long periods of time.
*Basic slag deposit, very easy removal.
*Good resistance to corrosion, oxidation.
*Excellent resistance to thermal shocks.
*Very high impact strength.
*Low heat input for low dilution.
*Maximized weld metal recovery
*Regular bead profile, virtually spatter free.
*Faster deposition rate for reduced labour costs.

APPLICATIONS

Cement: Kiln bearing rings. Ball mill couplings and clips. Railways: Rail brakes. Civil engineering: Mechanical arms -Chassis -Ripper teeth -Bucket arms

PROCEDURE FORUS

Welding Equipment

EnDOtec continuous electrodes are compatible with most conventional, constant voltage power sources. Models with programmable, pulsed arc, metal transfer modes offer optimal performance. Castolin Eutectic recommends using wire drive systems fitted with 4 knurled feed-rollers as well as polyamide liners.

Preparation Remove old welding depositsand worn metal with ExoTrode.
For joining and assembly, bevel edges to a V (45.) or X, especially for parts with a large cross-section.

Preheating This is not usually necessary. For high tensile carbon steels preheating to 200-100.C can be employed.
Welding parameters Welding current: = (+)

The use of pulsed arc technology significantly improves semi-automatic welding productivity. A synergic program with continuously variable parameters is incorporated in certain Castolin Eutectic equipments which optimises welding performance over a wide range of deposition rates with minimum heat input and also facilitates positional work. To obtain additional information, contact your Castolin Eutectic application specialist.

Welding technique

Once the workpieces are securely clamped, apply a buttering layer on the two groove faces to limit dilution with the base metal.Where there is a severe risk of hardening the base metal, make the first pass at a low amperage, pushing the torch without weaving.Ensure that there are no cracks by carrying out a dye-penetrant test.Finish filling the groove.

Machining

Machine using normal cutting tools. Arc or plasma cutting equipment may also be used.

TECHNICAL DATA

Tensile strength: 610 N\ mm2 (88,000 psi)
Yield strength : 380 N\ mm2 (55,000 psi)
Elongation : 40%
Impact strength AV(J/-196°C): 90

Current polarity: DC (+)

Shielding gases
Recommended gas :Ar%15-25%CO2 [ISO 14175 –M21]
Flow rate (l/min):14-18

Electrode(mm)	Voltage (v)	Current(A)
1.2mm	21-31	130-250
1.6mm	22-32	150-300

NanoAlloy 395N

Nanoalloy Flux-Cored Wire For Hardfacing Applications

DESCRIPTION

NanoAlloy 395N leads the newest generation of hardfacing products based on the science and engineering of ultra- fine, submicron grain structures. Weld deposits have a high volume fraction of ultra-hard, complex borocarbides distributed in a matrix uniquely balanced between liquid and crystalline phases Finely dispersed Nano-particles minimize wear of the underlying matrix by maximizing the complex borocarbides exposed at the wearing surface. 395N outperforms chromium and complex carbides by up to 40%! 395N's wear resistance is equal to that of a 35% tungsten carbide alloy at a lower cost.

- Unique NanoAlloy structure for unmatched abrasion and erosion resistance
- Produces tough uniform 68 HRC weld deposits
- Wears like tungsten carbide at a fraction of the cost
- Outlasts chrome carbide and complex carbide alloys
- Ensures enhanced productivity and cost savings

APPLICATIONS

Designed for extremely abrasion and erosion resistant protective coatings of carbon steel, alloy steels and stainless steels.
Typical application industries include: steelworks, cement plants, waste management plants, power plants, foundries, chemical processing plants, mining, petrochemical plants, etc.
Specific parts: Screw conveyors, furnace chutes, extractor fans, cyclones, conveyors, mixing blades, vanes, scrapers, press screws, sieves, etc.

PROCEDURE FOR USE:

PREPARATION: Remove all "old" cracked or spalled material down to a sound base. Clean any residual oxides, coatings, spatter or residue. NanoAlloy 395N may be applied up to ½" thick, at least four passes. Nanoalloy 395n Should Not Be Used On Manganese/ Hadfield Steels As It Will Not Bond!

Welding Technique: After checking that the welding conditions are optimal by testing on scrap metal, position the gun head at a 70-80° angle from the workpeice and use a "pull" technique. For fully automated welding such as hardfacing cylindrical parts, the wire should exit at about a 10° leading angle from top dead center. Using this technique will assure a smooth and regular weld deposit profile with the optimum level of fusion. 395N can be used with or without shielding gas protection.
Note: For best results apply NanoAlloy 395N with as little heat as possible, allowing parts to cool between layers.

Finishing: For most applications, other than a superficial grind, finishing is not required. If some level of profiling is needed, grinding is recommended.

TECHNICAL DATA

Typical hardness:
Hardness (1 layer): ...66-68 HRC
Hardness (2 layers)..67-71 HRC

Current polarity: DC (+)

Shielding gases
Recommended gas: 97.5% Ar, 2.5% CO_2 [ISO 14175 M12]
Alternative gases:82% Ar, 18% CO_2 [ISO 14175 M21]
Flow (l/min): 18

Diameter	Volts	Amps
1.2 mm	24	135
1.6mm	24	220

SafeHard 600

Seamless, Gas Shielded, Continuous Electrode For Semi-Automatic And Robotic Welding

DESCRIPTION

Seamless, gas shielded, metal cored alloy wire, ideal for batch manufacturing or maintenance and repair applications where highest integrity welding, efficiency and productivity are re-quired. Medium alloy steel with high C content, chrome and nickel free, with very fine carbides in small grain size matrix for wear protective coatings. The deposit offers excellent resistance to wear caused by a right balance of impact and abrasion. It keeps the mechanical properties up to 600ºC.

Product Details

- Martensitic–austenitic micro structure
- Low heat input for low dilution.
- Maximized weld metal recovery.
- Exceptional weldability.
- Regular bead profile.
- Versatile usage over wide parameter range.
- Faster deposition rate for reduced labour costs.
- Weldability in all positions

APPLICATIONS

Designed specifically to provide protective coating against wear caused by impact, adhesion (metal-metal friction) and abrasion in industries such as:

Mines and quarries

Drill heads, breaker plates, crusher drums, conveyor and drag-line buckets.

Civil engineering

Gravel pumps, rails, crusher hammers, bucket ripper teeth, vehicle tracks, soil compactors.

Urban and industrial waste disposal

Grilles and frames of rotary sleeves, crushers, hydraulic compactors.

PROCEDURE FOR USE

Welding Equipment : EnDOtec continuous electrodes are compatible with most conventional, constant voltage power sources. Models with programmable, pulsed arc,
metal transfer modes offer optimal performance. Castolin Eutectic recommends using wire drive systems fitted with 4 knurled feed-rollers as well as polyamide liners.

Preparation: Remove old welding deposits and worn metal completely with ChamferTrode 04

Preheating depends on the steel›s Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic recommends:

CE < 0.2 : preheat not essential
CE 0.4- 0.2 : preheat 200-100.C
CE 0.8- 0.4 : preheat 350-200.C.

Note that %14-12 Mn steels should never be preheated and the workpiece temperature during welding should be kept below 250.C.
Intermediate layer
On %14-12 Mn steels, deposit an intermediate layer with EnDOtec DO*02 or with the manual electrode EutecTrode 646XHD.
Welding parameters: Welding current: = (+)

Welding technique: For single or multipass, downhand coating applications. Push the electrode at an angle of 80-70.to ensure optimal fusion. When required, additional passes should only be executed while the weld is still hot.

Machining

The deposit is machinable by grinding. Arc or plasma cutting equipment may also be used.

TECHNICAL DATA

Typical hardness: 600HB

Shielding gases

General recommended: 82% Ar, 15-25% CO2
[EN ISO 14175 -M21]
Flow rate L/min: 14-18
CrVIcontent : 0 mg/m3

Current polarity: /DC (+)

Electrode(mm)	Voltage (v)	Current(A)
1.2mm	11-34	40-300
1.6mm	15-38	60-420

Note: For optimum result use the lowest amperage practical

SafeHard 700

Gas Shielded Continuous Electrode For Semi-Automatic And Robotic Welding

DESCRIPTION

Gas shielded, metal cored alloy wire, ideal for batch manufacturing or maintenance and repair applications where highest integrity welding, efficiency and productivity are required.
This exclusive alloy is chrome and nickel free and contains complex carbides of tungsten, molybdenum, vanadium and niobium evenly distributed in a boron hardened matrix. This alloy has exceptional resistance to impact and abrasion and itkeeps its mechanical properties until high temperature (57 HRC at 600ºC; 41 HRC at 700ºC).

* Product Details

Martensitic–austenitic micro structure
*Low heat input for low dilution.
*Maximized weld metal recovery.
*Exceptional weldability.
*Regular bead profile.
*Versatile usage over wide parameter range.
*Faster deposition rate for reduced labour costs.
*Weldability in all positions

APPLICATIONS

Designed specifically to provide protective coating against wear caused by impact, adhesion (metal-metal friction) and abrasion in industries such as:
Mines and quarries :Drill heads, breaker plates, crusher drums, conveyor and drag-line buckets.
Civil engineering :Gravel pumps, rails, crusher hammers, bucket ripper teeth, vehicle tracks, soil compactors.
Urban and industrial waste disposal
Grilles and frames of rotary sleeves, crushers, hydraulic compactors.

PROCEDURE FOR USE

Welding Equipment : EnDOtec continuous electrodes are compatible with most conventional, constant voltage power sources. Models with programmable, pulsed arc, metal transfer modes offer optimal performance. Castolin Eutectic recommends using wire drive systems fitted with 4 knurled feed-rollers as well as polyamide liners.
Preparation: Remove old welding deposits and worn metal completely with ChamferTrode 04. Remove old welding deposits and worn metal completely with ChamferTrode 04.
Preheating: depends on the steel›s Carbon Equivalent, and the workpiece size, thickness and geometry. Castolin Eutectic recommends:
CE < 0.2 : preheat not essential
CE 0.4- 0.2 : preheat 200-100.C
CE 0.8- 0.4 : preheat 350-200.C.
Note that %14-12 Mn steels should never be preheated and the workpiece temperature during welding should be kept below 250.C.
Intermediate layer
On %14-12 Mn steels, deposit an intermediate layer with EnDOtec DO*02 or with the manual electrode EutecTrode 646XHD.
Welding parameters: Welding current: = (+)
Welding technique: For single or multipass, downhand coating applications. Push the electrode at an angle of 80-70.to ensure optimal fusion. When required, additional passes should only be executed while the weld is still hot.
Machining:The deposit is machinable by grinding. Arc or plasma cutting equipment may also be used.

TECHNICAL DATA

Typical hardness: 600HB

Shielding gases
General recommended: 82% Ar, 15-25% CO2
[EN ISO 14175 -M21]
Flow rate(L/min) : 14-18

CrVIcontent : 0 mg/m3

Current polarity: /DC (+)

Electrode(mm)	Voltage (v)	Current(A)
1.2mm	11-34	40-300
1.6mm	15-38	60-420

Note: For optimum result use the lowest amperage practical