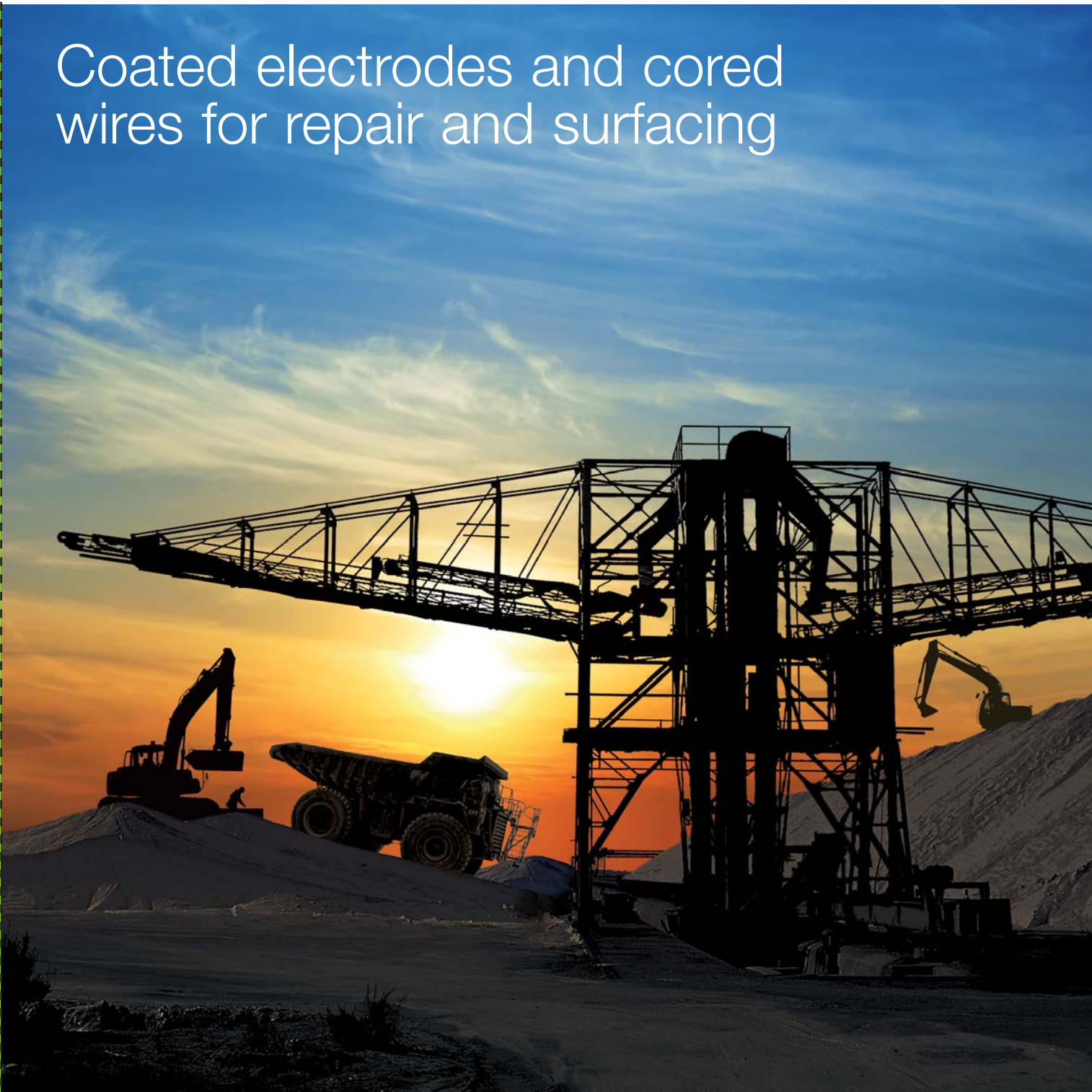


# Mines and Quarries

Coated electrodes and cored wires for repair and surfacing







## Introduction

In order to respond to the repair and maintenance requirements encountered in the mining and quarrying industries, the AIR LIQUIDE Welding group has developed a wide range of coated electrodes and cored wires.

These specific consumables associated with the correct equipment guarantee the optimization of repair and surfacing operations.

## Summary

**Synopsis** ..... 2 and 3

### Consumables

Extraction ..... 4 and 5

Conveying ..... 6 and 7

Processing ..... 8 and 9

Profile rebuilding ..... 10 and 11

**Arc welding equipment** ..... 12

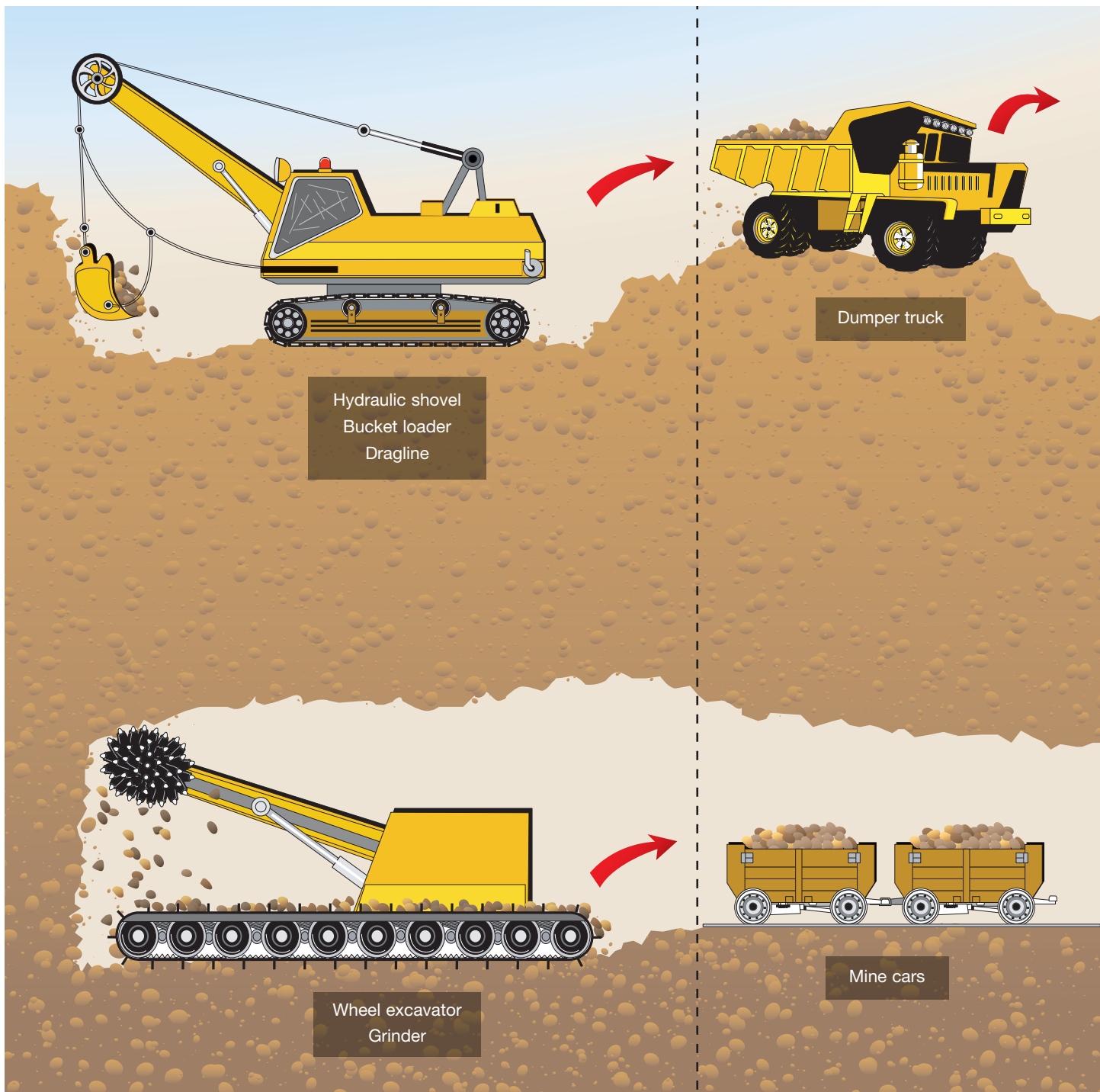
**Overview of the welding consumables** ..... 13

**Technical features and part numbers  
for welding consumables** ..... 14

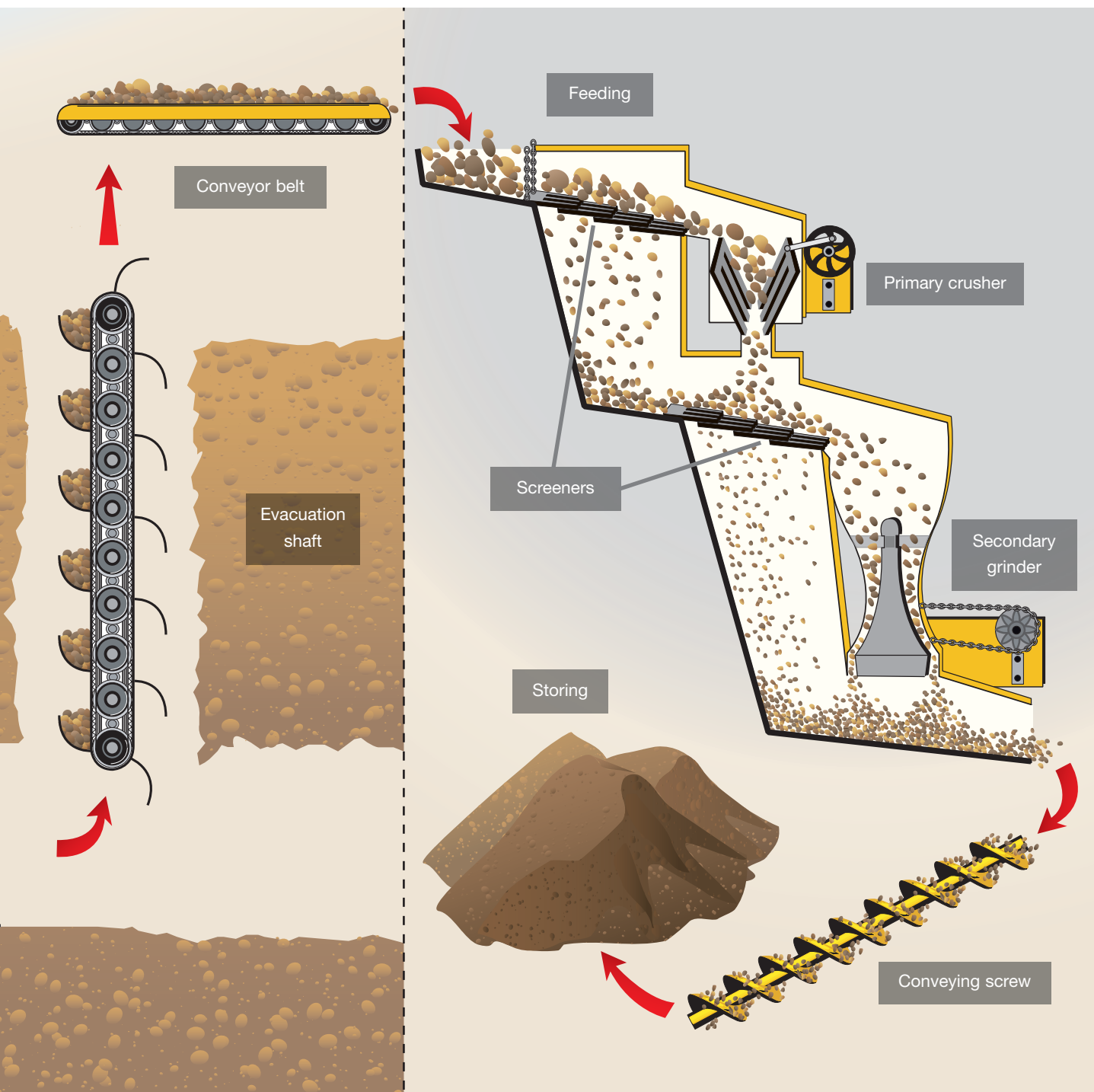
**Flame equipment** ..... 15 and 16

# EXTRACTION

# CONVEYING



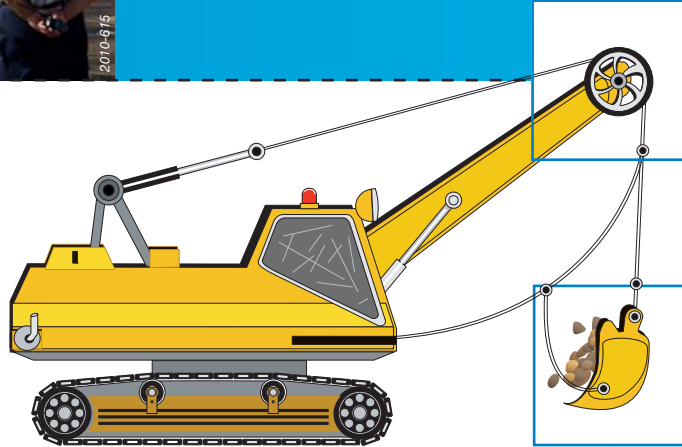
# PROCESSING



# Consumables



## EXTRACTION



Shovel teeth, blades and shanks



Severe abrasion - Moderate impact

Dragline bucket

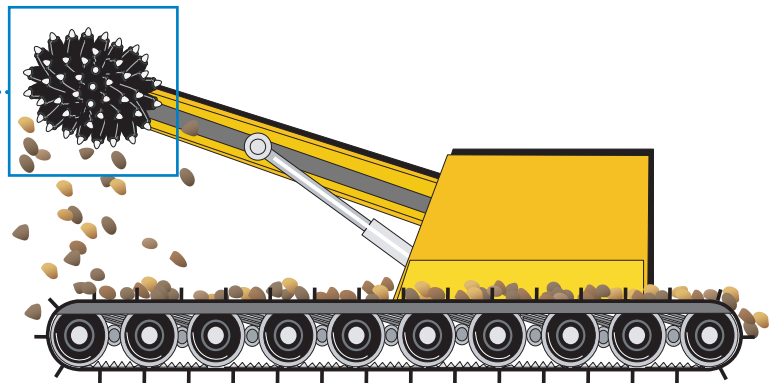


Severe abrasion - Moderate impact



Excavator wheel







Severe abrasion - Moderate impact



### Carbon steel

-  • Surfacing with **ABRACITO 62S**, number of layers: 2 to 3, or **SUPRADUR 600**, hard facing in position on large components.
-  • Surfacing with **FLUXODUR 58 TIC.O**, number of layers: 2 to 3.

### Manganese steel

-  • Buttering layer with **SUPERCHROMAX R 307-16**.
-  • Surfacing with **ABRACITO 62S**, number of layers: 2 to 3, or **SUPRADUR 600**, hard facing in position on large components, 2 to 3 layers.
-  • Teeth assembling or rebuilding with **FLUXODUR A.P.O**,
-  • Surfacing with **FLUXODUR 58 TIC.O**, number of layers: 2 to 3.





### Dragline cable pulley





Metal to metal abrasion - Compression

### Carbon steel

-  • Rebuilding and surfacing with **SUPRADUR 400**, machinable deposit, number of layers: 2 to 3.
-  • Rebuilding and surfacing with **CITOFLEX B13-0**, machinable deposit, number of layers: 2 to 3.

### Carbon steel

-  • Assembling wear plates with **SUPERCITO**, welding in position
- Anti-wear beads with **ABRACITO 62S**, maximum number of layers: 3 or **SUPRADUR 600**, hard facing in position on large components.
-  • Anti-wear beads with **FLUXODUR 58 TIC.O**, maximum number of layers: 3.

### Shovel-wheel



Severe abrasion - Moderate impact

### Bucket support wheel



Severe abrasion - Moderate impact

### Bucket

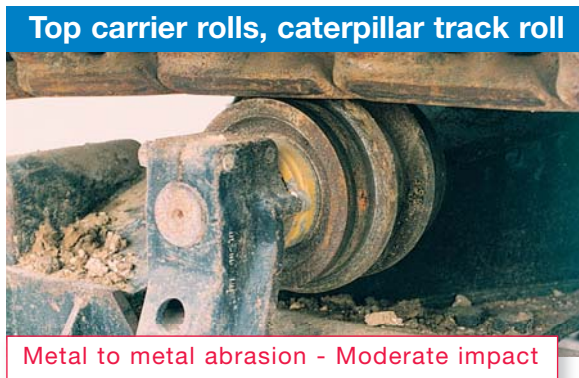
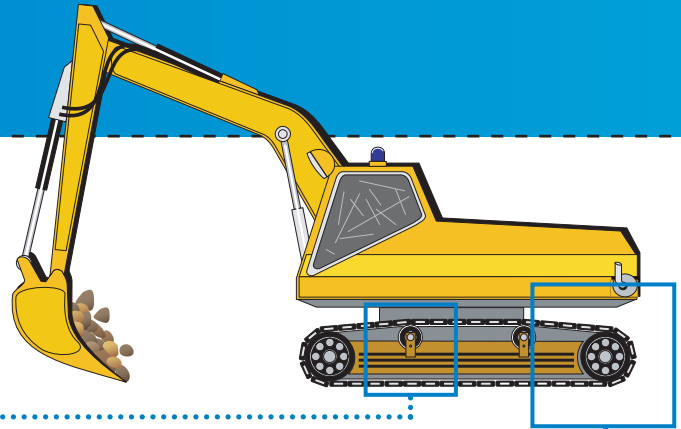


Severe abrasion - Moderate impact

 Coated electrode       Gasless cored wire





## CONVEYING

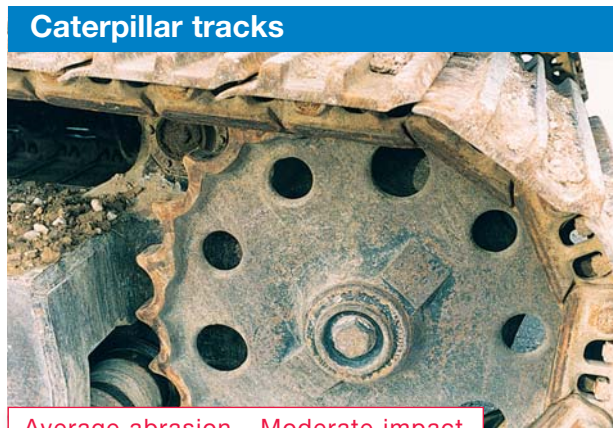


Top carrier rolls, caterpillar track roll

Metal to metal abrasion - Moderate impact

### Carbon steel





-  Rebuilding and surfacing with **SUPRADUR 400**, machinable deposit, number of layers: 2 to 3.
-  Rebuilding and surfacing with **CITOFLEX B13-0**, machinable deposit number of layers: 2 to 3.



Caterpillar tracks

Average abrasion - Moderate impact

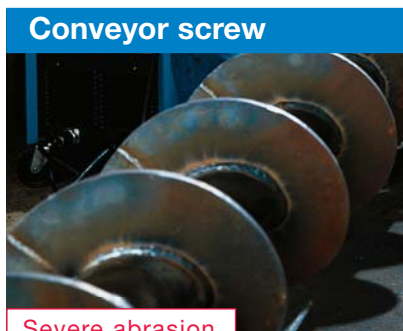
### Carbon steel

-  Rebuilding with **SUPRADUR 400**, machinable deposit, number of layers: 2 to 3.
-  Surfacing with **SUPRADUR 600**, hard facing in position on large workpieces.
-  Rebuilding with **CITOFLEX B13-0**, number of layers: 2 to 3.
-  Surfacing with **FLUXODUR 58 TIC.O**, number of layers: 2 to 3.



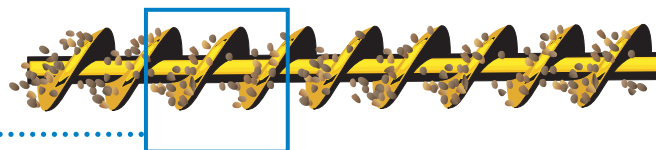
Overhead crane wheel

Metal to metal abrasion - Moderate impact





Conveyor screw

Severe abrasion



### Carbon steel

-  Restoring to original diameter and surfacing with **ABRACITO 62S**, maximum number of layers: 3, or **SUPRADUR 600**, hard facing in position on large components.
-  Restoring to original diameter and surfacing with **FLUXODUR 58 TIC.O**, maximum number of layers: 3.





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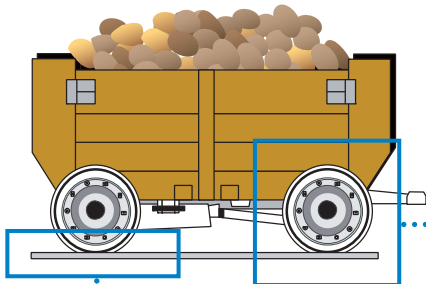


### Dumper truck skip

Severe abrasion - Moderate impact

### Carbon steel



-  • Assembling wear plates with **SUPERCITO**, all positional welding.
- Anti-wear beads with **ABRACITO 62S**, maximum number of layers: 3 or **SUPRADUR 600**, hard facing in position on large components, maximum number of layers: 3.
-  • Anti-wear beads with **FLUXODUR 58 TIC.O** maximum number of layers: 3.



### Railroad crossings

Metal to metal abrasion - Moderate impact - Compression

### Carbon steel



-  • Rebuilding and surfacing with **SUPRAMANGAN**, minimum 2 layers, maximum: unlimited.
-  • Surfacing with **FLUXODUR APO**, number of layers: 2 to 3.



### Mine car wheel

Metal to metal abrasion - Moderate impact - Compression

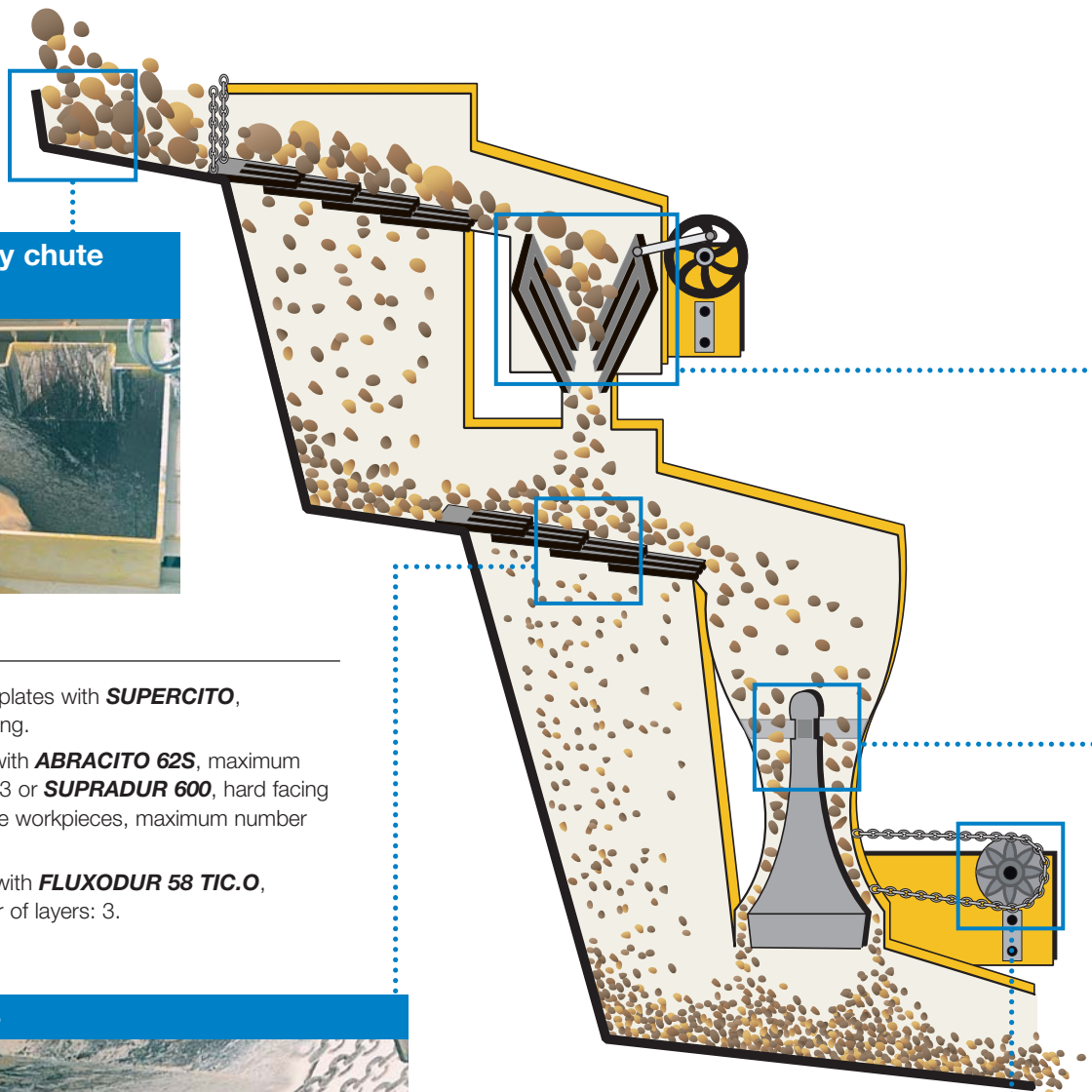
### Carbon steel

-  • Rebuilding with **SUPERCITO**.
- Surfacing with **SUPRADUR 400**, machinable deposit, number of layers: 2 to 3.
-  • Rebuilding with **CITOFLEX B13-0**.
- Surfacing with **FLUXODUR APO**.





## PROCESSING





Entry and supply chute of crusher



Abrasion

### Carbon steel



-  • Assembling wear plates with **SUPERCITO**, all positional welding.
- Anti-wear beads with **ABRACITO 62S**, maximum number of layers: 3 or **SUPRADUR 600**, hard facing in position for large workpieces, maximum number of layers: 3.
-  • Anti-wear beads with **FLUXODUR 58 TIC.O**, maximum number of layers: 3.

Grille bar plates



Severe abrasion

### Carbon steel

-  • Surfacing with **ABRACITO 62S**, number of layers: 2 to 3.
-  • Surfacing with **FLUXODUR 58 TIC.O**, number of layers: 2 to 3.







2010-620

### Crusher jaws



Severe abrasion - Severe impact

#### Carbon steel



-  • Underlayer with **SUPERCHROMAX R 307-16**.
- Surfacing with **ABRACITO 62S**, number of layers: 2 to 3.
-  • Surfacing with **FLUXODUR 58 TIC.O**, number of layers: 2 to 3.

### Hammers, crushing cylinders



Severe abrasion - Severe impact

#### Carbon steel



-  • Buttering layer with **SUPERCHROMAX R**.
- Surfacing with **ABRACITO 62S**, number of layers: 2 to 3.
-  • Surfacing with **FLUXODUR 58 TIC.O**, number of layers: 2 to 3.

### Chain sprocket



Metal to metal abrasion - Compression

#### Carbon steel



-  • Rebuilding and surfacing with **SUPRAMANGAN**, minimum: 2 layers, maximum: unlimited.
-  • Rebuilding and Surfacing with **FLUXODUR A.P.O**, number of layers: 2 to 3.

### Crusher cone



Severe abrasion - Severe impact

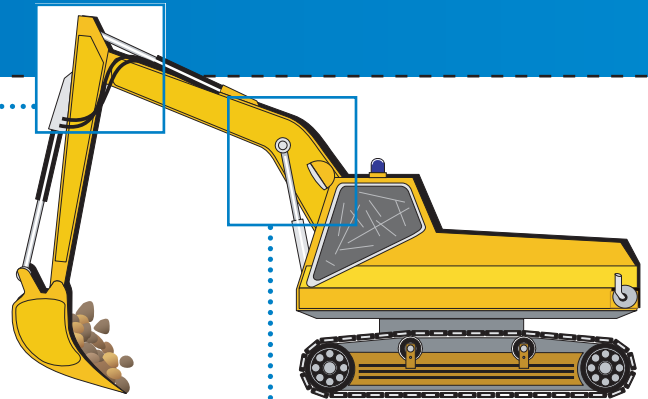
#### Carbon steel

-  • Surfacing with **ABRACITO 62S**, number of layers: 2 to 3.
-  • Surfacing with **FLUXODUR 58 TIC.O**, number of layers: 2 to 3.

2010-619



## PROFILE REBUILDING AND REPAIR





### Articulation shaft



Abrasion

#### Carbon steel

-  • Surfacing with **SUPRADUR 400**, machinable deposit, number of layers: 2 to 3.
-  • Rebuilding and surfacing with **CITOFLEX B13-0**, machinable deposit, number of layers: 2 to 3.

### Articulation



Abrasion

### Cracked arm



Repair of cracks


#### Preparation

- Grinding or arc air gouging with **K 4000** gouging torch and **CARBONAIR**.
- Chamfering with **SUPERCUT**.

#### Carbon steel

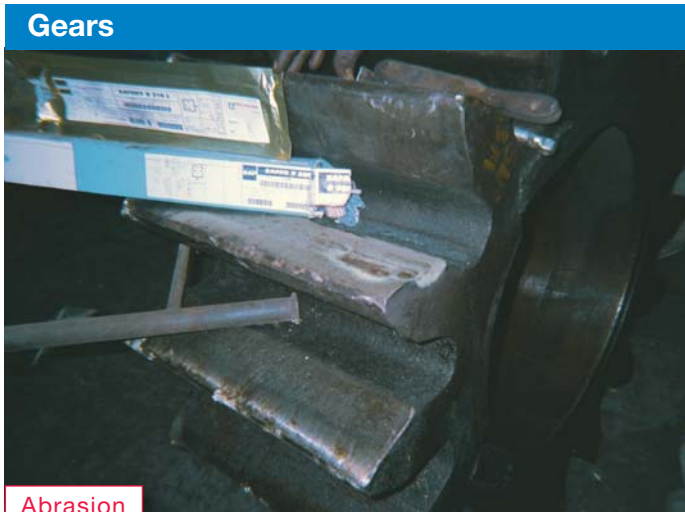
-  • Repair with **SUPERCITO**, stick electrode all positional welding.

#### All steels

-  • Repair with **DW 312**: Ideal for welding dissimilar metals or **SUPRANEL SR**: Allows the reduction or elimination of pre-heating.

#### Cast iron


-  • Repair with stick electrode **SUPERFONTE**.



**Cast iron**

- 
 • Rebuilding and surfacing with **SUPERFONTE**, positional welding.

**All steels**

- 
 • Rebuilding and surfacing with **CITOBRONZE SN**, machinable deposit, very low coefficient of friction

 Coated electrode	 Gasless cored wire
--	--

# Arc welding equipment



## CITOROD 6500XT

**Thyristor rectifier** for direct current (DC) welding. Reliability and resistance to cope with the most critical working conditions for gouging and for welding with MMA, TIG or MIG with optional kit.



2 YEARS WARRANTY

### ■ The product bonus:

- Digital display
- Hot Start Arc Force
- As standard : selection of output characteristic CV or CC / gouging / MMA TIG or MIG/MAG (with additional features)
- With MIG (CV), better results with DV YARD P additional wire-feeder
- Oversized power source (650A at 35%)
- Efficient for any kind of applications, even with long cable lengths
- Suitable for covered electrode from 1,6 to 6,3 mm diameter.

### ■ Power source with wheels and handles:

**W000272667**

### ■ Optional VRD (Off-load voltage reduction for increased safety):

**W000275160**

### ■ DV YARD P autonomous wire feeder:

**W000275839**

### ■ Autonomous wire feeder

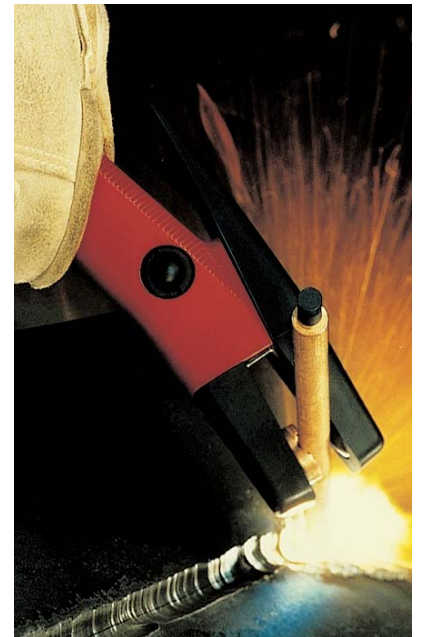


## GOUGING

■ Torches	K 2000	K 4000
Current	400 A	1 000 A
Electrode Ø	4 to 6,3 mm	4 to 13 mm
Cat. nr	<b>W000010136</b>	<b>W000010118</b>

### ■ Graphite (carbon) electrodes:

- **CARBONAIR** (Ø 4 to 10 mm),
- **CARBONAIR+** (jointed) (Ø 8 to 19 mm).



# Overview of the welding consumables



- **Rebuilding:** to restore the worn parts to size if necessary.
- **Buttering layer:** necessary for metallurgical reasons when it is recommended.
- **Underlayer:** Necessary for the mechanical strength of the deposited metal when it is recommended.
- **Surfacing:** anti-wear deposit applied in a minimum of 2 layers, maximum 3 layers.

			ELECTRODES										SELF SHIELDING CORED WIRES				
			SUPRADUR 400 (Ø 3,2-4 mm)	SUPRADUR 600 (Ø 3,2-4 mm)	SUPRAMANGAN (Ø 3,2-4 mm)	ABRACITO 62S (Ø 3,2-4 mm)	SUPERCHROMAX 307-16 (Ø 2,5-3,2-4 mm)	DW 312 (Ø 2,5-3,2-4 mm)	SUPRANEL SR (Ø 2,5-3,2-4 mm)	SUPERCITO (Ø 2,5-3,2-4 mm)	SUPERFONTE BM (Ø 2,5-3,2-4 mm)	CITOBRONZE SN (Ø 3,2 mm)	SUPERCUT (Ø 4 mm)	CARBONAIR	Ø 1.6 mm in 15 kg spool Ø 2.4 mm in 25 kg reel		
														CITOFUX B13-0	FLUXODUR AP-O	FLUXODUR 58 TIC-O	
Shovel, bucket teeth, excavator drum	Carbon steel	Surfacing		•		•										•	
	Manganese steel	Rebuilding Buttering Surfacing		•		•	•								•	•	
Bucket, skip, bucket support wheel, crusher entry plates	Carbon steel	Assembling Surfacing		•		•			•						•	•	
Dragline cable pulley	Carbon steel	Rebuilding Surfacing	• •											• •			
Caterpillar tracks	Carbon steel	Rebuilding Surfacing	•	•										•		•	
	Manganese steel	Under layer Surfacing															
Top carrier rolls, caterpillar track rolls, overhead crane wheel	Carbon steel	Rebuilding Surfacing	• •											• •			
Mine car wheel	Carbon steel	Rebuilding Surfacing	•											•	•		
Rail track, railroad crossing	Carbon steel	Rebuilding Surfacing			• •										•		
Screw conveyor	Carbon steel	Surfacing		•		•										•	
Grille bars	Carbon steel	Surfacing				•										•	
Crusher jaws, hammer cones and crusher cylinder	Carbon steel	Under layer Surfacing				•	•									•	
	Manganese steel	Rebuilding Surfacing				•	•									•	
Sprocket wheel	Carbon steel	Rebuilding Surfacing	• •											• •			
Gears, articulation shafts	Carbon steel	Rebuilding Surfacing	• •											• •			
Bearings	Carbon steel	Rebuilding Surfacing									•	•	•				
Pump body, engine support	Cast iron	Rebuilding Surfacing								• •							
Repair	Carbon steel								•								
	All steels	Anti-cracking If preheating is not possible					•	•									
	Cast iron									•							
Chamfering											•						
Gouging												•					

# Technical features and part numbers for welding consumables



## AVERAGE OPERATING PARAMETERS

### ■ MMA electrodes

	Direct current Electrode polarity	Alternating current Open circuit voltage	Average welding current		
			Ø 2.5 mm	Ø 3.2 mm	Ø 4.0 mm
<i>SUPRADUR 400</i>	-	$U_o \geq 60$ V	-	95 A	125 A
<i>SUPRADUR 600</i>	-	$U_o \geq 60$ V	-	95 A	125 A
<i>SUPRAMANGAN</i>	+	$U_o \geq 70$ V	-	110 A	160 A
<i>ABRACITO 62S</i>	-	$U_o \geq 60$ V	-	125 A	160 A
<i>SUPERCHROMAX R</i>	+	$U_o \geq 55$ V	70 A	100 A	125 A
<i>DW 312</i>	+	$U_o \geq 50$ V	75 A	100 A	130 A
<i>SUPRANEL SR</i>	+	Non applicable	60 A	90 A	120 A
<i>SUPERCITO 7018S</i>	+	$U_o \geq 75$ V	85 A	120 A	160 A
<i>SUPERFONTE BM</i>	+	$U_o \geq 45$ V	60 A	85 A	110 A
<i>CITOBRONZE SN</i>	+	Non applicable	-	100 A	120 A
<i>SUPERCUT</i>	-	$U_o \geq 60$ V	-	170 A	260 A

## TO ORDER

### ■ MMA electrodes

	Ø 2.5 mm		Ø 3.2 mm		Ø 4.0 mm	
	Qty/box	Part N°	Qty/box	Part N°	Qty/box	Part N°
<i>SUPRADUR 400</i>	-	-	115	W000288143	80	W000288144
<i>SUPRADUR 600</i>	-	-	90	W000288146	60	W000288147
<i>SUPRAMANGAN</i>	-	-	135	W000258522	95	W000258523
<i>ABRACITO 62S</i>	-	-	85	W000288169	55	W000288170
<i>SUPERCHROMAX R</i>	205	W000258459	115	W000258460	80	W000258461
<i>DW 312</i>	195	W000258451	115	W000258452	80	W000258453
<i>SUPRANEL SR</i>	220	W000258481	140	W000258482	-	-
<i>SUPERCITO 7018S</i>	185	W000258277	115	W000258278	80	W000258280
<i>SUPERFONTE BM</i>	135	W000258519	85	W000258520	55	W000258521
<i>CITOBRONZE SN</i>	130	W000288102	80	W000288103	-	-
<i>SUPERCUT</i>	-	-	70	W000258293	55	W000258294

### ■ Gouging electrodes

	Ø (mm)	Length (mm)	Qty/box	Part N°
<i>CARBONAIR</i>	4	305	100	W000010645
	5		100	W000010443
	6,4		60	W000010444
	8		50	W000010445
	10		50	W000010446
	13		50	W000010447
<i>CARBONAIR PLUS*</i>	8	355	50	W000010448
	10	430	50	W000010449
	13	430	50	W000010450
	16	430	25	W000010451
	19	430	25	W000010452

\* CARBONAIR : Possible stubbing - No electrode ends loss

### ■ Self shielding cored wires

For all self shielding cored wires type

#### **FLUXODUR:**

- Direct current (D.C)  
Polarity **+** to the wire.
- Voltage: between 26 V and 30 V.
- Stick out: 35 mm.
- Welding current:
  - 180 to 200 A for Ø 1.6 mm,
  - 250 to 300 A for Ø 2.4 mm.

### ■ Self shielding cored wires

Packaging	Ø 1.6 mm	Ø 2.4 mm
	15 kg spool	
<i>CITOFUX B13-O</i>	W000281395	-
<i>FLUXODUR AP-O</i>	W000281433	W000281434
<i>FLUXODUR 58 TIC-O</i>	W000281406	W000281407

# Flame equipment



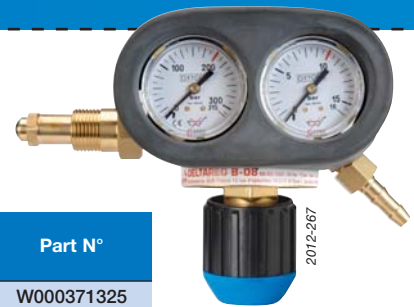
## GAS PRESSURE REGULATOR

■ Armoured pressure regulator **DELTAREG B-08** suitable for on site works:

- › Metallic armour and rubber protection
- › Safety valve
- › Technology with membrane/valve
- › Captive screw
- › Weight = 1.950 kg

**Standards**  
EN ISO 2503  
EN 13918

Gas	Pressure (in bar)		Flowrate Nm <sup>3</sup> /h	Part N°
	Inlet	Outlet		
Oxygen	200	10	30	W000371325
Acetylene	25	1,5	5	W000371314



## CUTTING BLOWPIPE

■ **SOVAG SM:**

The reference cutting blowpipe for on site works.



**Part N°**  
Ox/Ad : W000290149  
Ox/GPL : W000290151



## HEATING BLOWPIPE

■ **FLAMOXAL M100** (without nozzle):

- › Fuel gas: Acetylene or Ethylene, Propylene / Propane
- › Flow rate: 1000 to 10000 l/h
- › Length: 1130 mm
- › Applications: shrinkage heat, heat treatment, descaling, pre-heating and forming

**Part N°**  
W000278660



## Cutting Nozzle G1



Size in mm	Cutting thickness in mm	Part N°	
		Acetylene	Propane
7/10	3-10	W000262059	W000262066
10/10	10-25	W000262060	W000262067
12/10	25-50	W000262061	W000262068
16/10	50-80	W000262062	W000262069
20/10	80-120	W000262063	W000262070
25/10	120-200	W000262064	W000262071
30/10	200-300	W000262065	W000262072



## Nozzles for FLAMOXAL M100

Different nozzles for FLAMOXAL M100 are available. According flowrate, type of gas, simple flame or multiframe.

[Consult us](#)

## CUTTING CARRIAGE

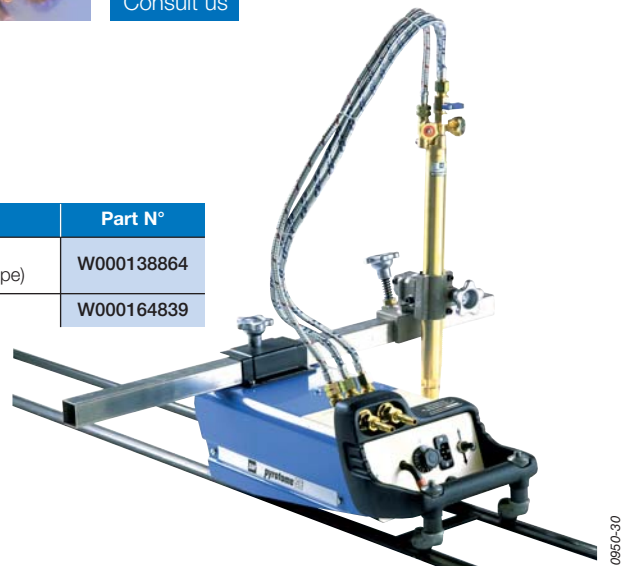
■ **PYROTOME SE :**

Portable multi-process self propelled carriage to carry out straight cutting or V-chamfered cutting.

### Features:

- › Balance weight compass
- › Swivel turret
- › Second set
- › Cutting manual valve
- › Lateral guiding
- › 2 meter long rail

Designation	Part N°
Basic equipment (fit out for oxycutting without blowpipe)	W000138864
Blowpipe G1 multigas	W000164839



# Flame equipment and accessories



## QUICK-CONNECT COUPLING

- **QUICKMATIC self-sealing:**  
Allowing quick connections between gas hoses.

**Standards**  
EN 561  
EN ISO 7289



Quick connect coupling (rings included).  
Kit fuel gas + oxygen.

**Part N°**  
W000011017

## FLASH BACK ARRESTORS

- **SECURTOP 662:**

**Standards**  
EN 730-1



Assembly between hoses (rings included).  
Hoses Ø 6,3 and 10 mm.

Gas	Part N°
Oxygen + Acetylene kit	W000290926

## GAS HOSES

- **Standard rubber hoses :**

**Standards**  
EN ISO 3821

Gas	Color	Ø	Maximum Service pressure	Ring	Part N°
Acetylene	Red	10 x 16 mm	20 bar	40 m	W000010068
Oxygen	Blue				W000010069



## PROTECTION

- **Googles PILOT - Shade N° 6**  
Black and flexible PVC Frame in one part, round eyepiece, Ø 50 mm, anti-scratch processing.

**Standards**  
EN 166  
EN 175



**Part N°**  
Shade N° 6  
W000011048



- **Welding helmet FG flip-up**

Suitable for all arc welding process.  
Glass 105x50 mm.

**Part N°**  
W000372271

**Standards**  
EN CE 175  
EN CE 169

- **Gloves UNIVERSEL**

**Leather palm for better protection and flexibility.**

- palm, forfinger, and thumb in premium quality leather
- bridle in premium quality leather on the top of the thumb and at finger base
- back and cuff made of butt leather with 1.3 mm thickness
- cuff artery protected by premium quality leather
- total glove length : 350 mm
- suitable for handling metallic parts until 50 °C

**Standards**  
EN 420

**Part N° - size 10**  
W000010417

2032

EN 388

41XX4X

EN 407





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