

# TECHNOGENIA GROUP

THE LEADER IN HARDFACING



HIGH PERFORMANCE |  
ANTI-WEAR SOLUTIONS | ANTI-CORROSION |

[www.technogeniagroup.com](http://www.technogeniagroup.com)

## A wide range of services and products

### Services:

- ▶ *Laser cladding and hardening*
  - **Lasercarb®**
- ▶ *Manual hardfacing*
  - **Technosphère®**
- ▶ *Infiltration*
  - **Technocasting®**



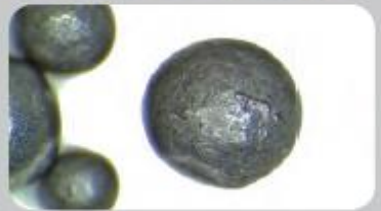
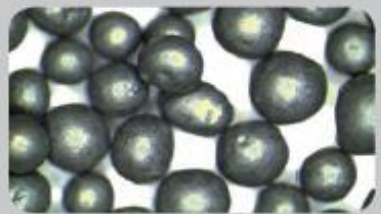
### Products:

- ▶ *Ropes*
  - **Technodur®**
  - **Technosphère®**
- ▶ *Powders*
  - **Technopoudres®**
- ▶ *Ropes wire*
  - **Technocore®**
  - **Ultitech®**
  - **Technology Plus®**



### Tungsten Carbide:

- ▶ *Manufacturer of spherical cast tungsten carbide high hardness*
- ▶ *Cemented tungsten carbide*



# Technogenia locations

## High performance anti-wear solutions

Technogenia was founded in 1979 by Guy Maybon.

Technogenia specializes in the production of spherical cast tungsten carbide coatings solutions for protection against abrasion, erosion, corrosion and impact to extend the wear life of critical components in numerous industries such as Oil & Gas, Mining, Tunneling, Industrial Mixing systems, Agriculture, Food processing, Construction equipment and many others.

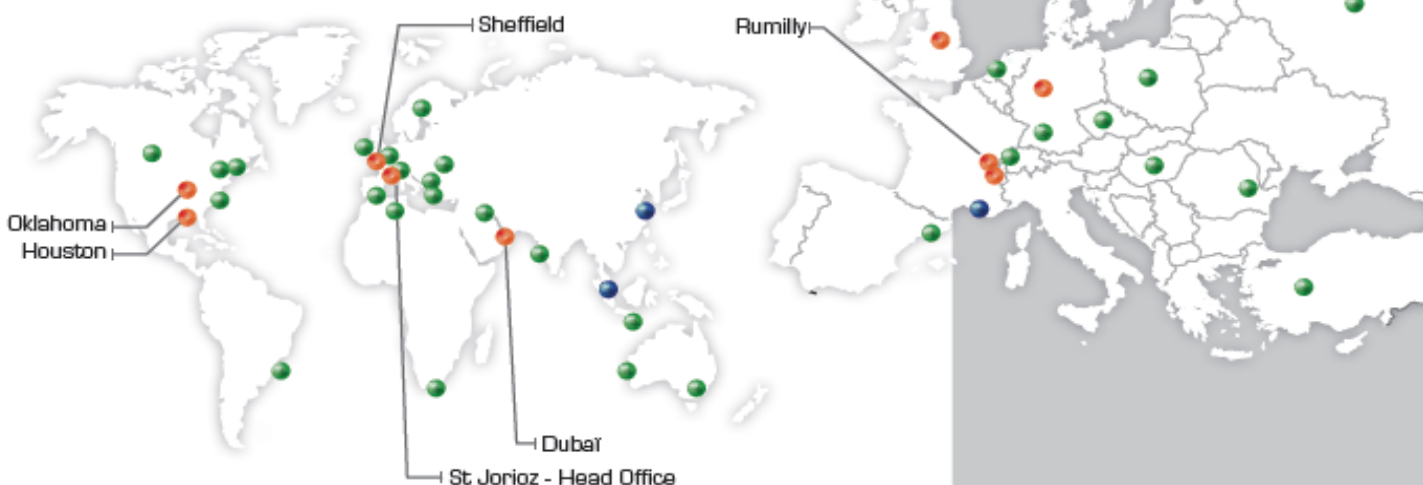
Due to the precise deposition capabilities of our **Lasercarb®** process, application-specific **Technolase®** powders can be applied to virtually any component profile.

### A worldwide network

- Technogenia's Group
- Distributors
- **Lasercarb®** licensees

### Our most important fields of activities are:

- Oil & Gas
- Steel Industry
- Dredging
- Mining
- Ceramic Industry
- Aluminium plants
- Foundries
- Waste treatment and recycling
- Cement Industry
- Paper Industry
- Tunnelling...



# Technogenia locations



**Headquarter  
Technogenia  
FRANCE**

Expertise in manufacturing cast tungsten carbide powders and consumables hardfacing products.  
Lasercarb Service Center



**Technogenia Lasercarb  
Oklahoma  
USA**

Lasercarb Service Center



**Technogenia Inc  
USA**

Lasercarb Service Center



**Carbure du Chéran  
FRANCE**

Cemented carbide manufacturing Center



**Laser Cladding Technology  
UK**

Lasercarb Service Center



**Technogenia Middle East  
UAE**

Lasercarb Service Center



Special spherical cast Tungsten Carbide. Produced by Technogenia since 1986, using an unique, innovative and patented process, known as "the cold crucible". Sphérotène® are obtained by spraying a liquid phase of Tungsten Carbide.



**Sphérotène®** main feature is its very fine metallurgical structure known as "tangled needles".

**Sphérotène®** cast tungsten carbide is produced as spheres with an extreme hardness of 3000 HV  $\pm$  500 HV.

The absence of oxydation of **Sphérotène®** makes the derived products highly weldable. These particles give the deposits a much improved resistance to shock, as compared to deposits made of crushed particles.

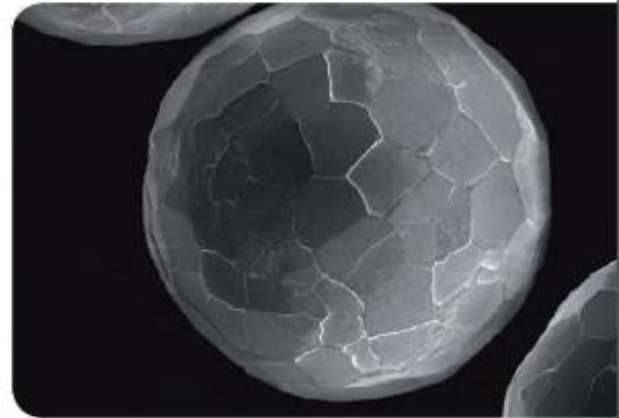
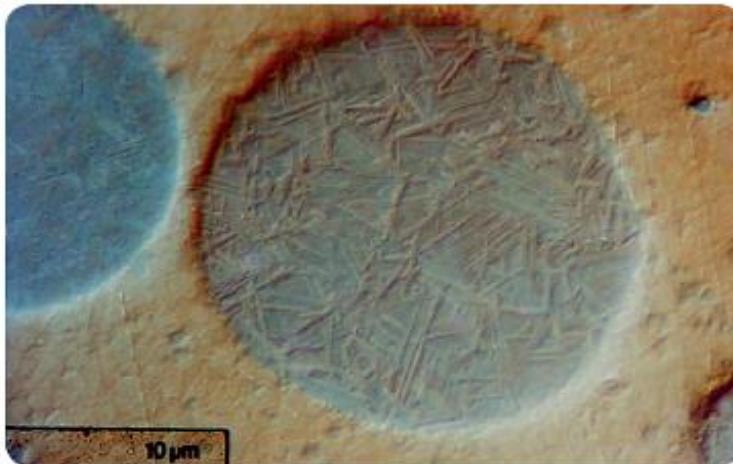
Hardness of **Sphérotène®**  
**3000 HV  $\pm$  500 HV**  
 (HV = Hardness Vickers).

Spherical Cast Tungsten Carbide  
 size **40 to 2400  $\mu$ m**  
 (microns)



Spherical Cast Tungsten Carbide 160  $\mu$ m: picture with **Knoop indentation** under 1 kg (2.2lb.load.)

**Knoop indentation** shows the resistance of Sphérotène to the propagation of cracks.



**Sphérotène®** are incorporated into the following hardfacing products offered by Technogenia:

The wire:

- **Technosphère®**
- **Technocore®**

The powders:

- **Technopowders**  
For oxyacetylene welding
- **Technopowders PTA**  
For PTA technology
- **Technolase®** powders  
For **Lasercarb®** process

The rods:

- **Ultitech®**

Special protections with:

- **Technocasting®**



Hardfacing solutions.  
High levels of antiwear and resistant performances.

### Principle:

The **Lasercarb®** process consists in focusing the energy of a Laser beam to melt a wide range of application specific powders, to the OD or ID surface of the part. This results leads to a precise metallurgical bond between the deposit and the base metal.

### Benefits for hardfacing:

Powders consisting of **Sphérotène®**, spherical cast Tungsten Carbide, providing very high hardness of 3000 HV ± 500 HV.

**Sphérotène®** are not affected by the **Lasercarb®** process. Additional benefits include:

- Absence of porosity
- Extremely limited cracking and deformation
- Large deposit thickness: 0.5 to 3 mm
- Perfect adherence through welding
- Precision
- Automation
- Reproducibility

### Lasercarb® Coatings:

The **Lasercarb®** process implements **Technolase®** powders based on **Sphérotène®**

### Other types of coatings:

- Cobalt based powders: **Stellite®**
- Nickel based powders: **Inconel®**
- Steel based powders: **Stainless Steel**

### Base Materials:

- All weldable steels
- Most stainless steels
- Non magnetic steels particularly those used for drilling equipments
- Titanium
- Some types of (weldable) cast irons,
- Tool steels.



### Main applications:

- Oil and gas drilling tools
- Cylinders and rollers in the steel industry
- Pump rings and shafts
- Foundries
- Tunnel boring
- Ceramic industry
- Wear parts in the agri-food industry
- Paper industry

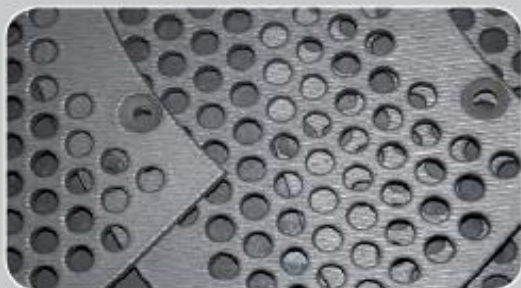
### Types of Coatings (add) for Laser cladding applications:

**Technolase®** powders are specially formulated for high performance, anti-wear resistance applications to protect against abrasion, corrosion, erosion and impact

#### Can be adapted to specific requirements:

- Stainless alloys coatings
- Stellite alloys coatings
- Inconel
- Hastelloy
- Alloyed steel
- Titanium
- Nickel/chromium with diamond

For different coatings, please do not hesitate to reach us.





**TECHNODUR®****TECHNOSPHERE®**

*Technodur® and Technosphère® torch-applied welding ropes consist of a nickel wire core, coated with a thick layer of Tungsten Carbide and Ni Cr B Si alloy.*

### Application and packaging:

These products are applied with an oxyacetylene torch assembly, Technokit T2000. Welding is easy, economical and produces no fumes. There is no dilution of the hardness of the Tungsten Carbide particles and multiple layers can be applied.

**Technodur®** and **Technosphère®** rope products are packaged in 20kg reels, (44 lbs.) Packaging in 10kg and 15kg reels are available by special request.

### Use:

**Technodur®** and **Technosphère®** can be applied to all non-martensitic steels and weldable stainless steels.

The deposits are free from cracks and any deformation caused by welding is very limited.

**Technodur®** and **Technosphère®** can be welded easily onto themselves. This is a real advantage for some repairs.



#### Technodur®:

Crushed Tungsten Carbide grains  
Hardness 2000 HV ± 200 HV

Since the beginning **Technodur®** has represented a very significant advance in the field of anti-wear protections.

They give new possibilities and advantages: no smokes, no loss during welding, exceptional resistance to abrasion, ease of repairs, no cracks.



#### Technosphère®:

Spherical cast Tungsten Carbide grains  
Hardness 3000 HV ± 500 HV

The difference lies in the use of spherical Tungsten Carbide grains called **'Sphérotène®'**.

The spherical shape and the extreme hardness of the **Sphérotène®** give **Technosphere®**, amongst other properties, two advantages:

- Better shocks resistance
- Unequaled wear resistance.



Technodur®		THICKNESS OF THE DEPOSIT	MAIN GRAIN SIZE	ROPE DIAMETER
	GF	2 to 5 mm	0,2 to 0,4 mm	4 - 6 and 8 mm
GN	3 to 6 mm	0,4 to 0,7 mm	4 - 6 and 8 mm	
GG	3 to 8 mm	0,7 to 1,2 mm	6 and 8 mm	
TGG	4 to 10 mm	1,2 to 2,2 mm	6 and 8 mm	

Technosphère®		THICKNESS OF THE DEPOSIT	MAIN GRAIN SIZE	ROPE DIAMETER
	GF	2 to 5 mm	0,2 to 0,4 mm	4 - 6 and 8 mm
GN	3 to 6 mm	0,4 to 0,7 mm	4 - 6 and 8 mm	
GG	3 to 8 mm	0,7 to 1,2 mm	6 and 8 mm	
TGG	4 to 10 mm	1,2 to 2,2 mm	6 and 8 mm	

The size of tungsten carbide particules must be adapted to the thickness of the coating



Techno kit 2000  
Easy to handle and convenient for the welder

### Main applications:

#### Oil & Gas

- Stabilizer blades
- Drilling heads

#### Foundries and steel industry

- Blades and scrapers for sand mixers
- Press guides

#### Ceramic Industry

- Press screws
- Blades and screws for mixers
- Scrapers for cylinder
- Sheaths and casings for press

#### Aluminium Plants

- Screw elements

#### Dredging

- Cutter teeth

#### Waste treatment and recycling

- Conveyor screws

#### Food Industry

- Decanter centrifuge screw for oil extraction





## TECHNOPOWDERS

The solution to a wide range of hardfacing problems. The Technopowders products range in hardness from 40Rc to 60Rc and even greater with Tungsten Carbide based powders.

*Other types can be supplied upon request. Sphérotène® is a very high hardness spherical cast Tungsten Carbide.*

The Technopowders have the FDA agreement and can be used in the food industry.

Application: oxyacetylene torch, Type TECHNOKIT T 2000.

### Nickel-based hardfacing powders

- **Technopowder MB 40 / TP 40 RC Underlayer Powder**

Hardness: 40 Rc

Main application: oxidation inhibiting underlayer for Technodur® and Technosphère®

Supplied in 1 and 5kg bottle

- **Technopowder 60 RC / TP 60 RC**

Hardness: 60 Rc

Base composition: Ni Cr B Si: (12 to 16% Chromium)

Main application: finishing or sliding coat for barrel extruder and screw conveyor faces

### Premixed carbide powders

- **Technopowder 2030**

Nickel base + crushed cast Tungsten Carbide  
2 000 HV ± 200 HV

Applications: thin hardfacing

Machining: not possible

Grinding: possible

Supplied in 1kg bottle

- **Technopowder 4000**

Nickel base + Sphérotène® 3 000 HV ± 500 HV

Very high hardness spherical cast Tungsten Carbide Applications: very high performance hardfacing, low thicknesses

Machining: not possible

Grinding: possible / depending on the shape

- **Technopowder 40/40**

Nickel base + crushed cast Tungsten Carbide  
2 000 HV ± 200 HV

Applications: hardfacing, medium thicknesses, causes very few deformations.

Crack-free hardfacing Recommended for stainless steels.

Machining: not possible

Grinding: possible / depending on the shape

- **Technopowder 4040 S**

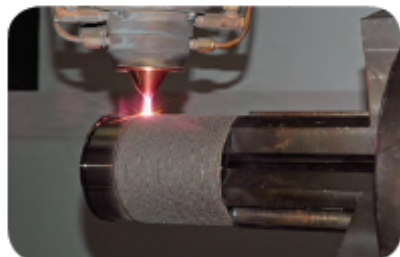
Nickel base + Sphérotène® 3 000 HV ± 500 HV

Very high hardness spherical cast Tungsten Carbide Applications: very high performance hardfacing, medium thicknesses on base materials susceptible to deformation, e.g. stainless steels.

Crack-free hardfacing. Machining: not possible

Grinding: possible / depending on the shape

Application: oxyacetylene torch, Type TECHNOKIT T 2000.





## Technopowders

### Oxyacetylene torch

Cat.	Item	Crushed Carbide Hardness	Sphérotène* Carbide Hardness	Carbide size	Carbide Concentration	Base Alloy	Alloy Hardness	Melting point	Deposit density	Recom. Deposit Thickness
Powder NiCr	<b>MB40</b>	no	no			NiCr	40 HRc	1087 °C	8,2	0,5 mm
Powder NiCr	<b>TP 40 RC</b>	no	no			NiCr	40 HRc	1087 °C	8,2	0,5 to 3 mm
Powder NiCr	<b>TP 60 RC</b>	no	no			NiCr	60 HRc	1038 °C	7,8	1 to 2 mm

### Premixed powder with tungsten carbide

Powder WC	<b>TP 2030</b>	2000 ± 200 HV	no	40-100 µ	40 % by weight	NiCr	60 HRc	1038 °C	10,5	1 to 2 mm
Powder WC	<b>TP 40/40</b>	2000 ± 200 HV	no	40-100 µ	40 % by weight	NiCr	40 HRc	1087 °C	11,2	1 to 2 mm
Powder WC Sphérotène*	<b>TP 4000</b>		3000 ± 500 HV	40-100 µ	40 % by weight	NiCr	60 HRc	1038 °C	10,5	1 to 2 mm
Powder WC Sphérotène*	<b>TP 4040S</b>		3000 ± 500 HV	40-100 µ	40 % by weight	NiCr	40 HRc	1087 °C	11,2	1 to 2 mm

Powder for Laser and PTA			3000 ± 500 HV	40-210 µ	> 60 % by weight	NiCr	30 HRc	1070 °C	13	0,5 to 3 mm
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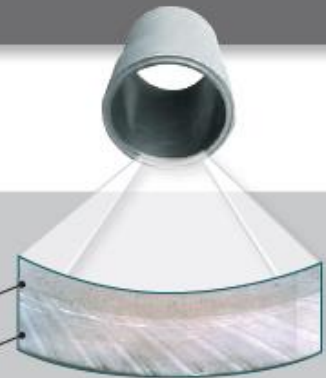


*Technocasting®* enables to run over the limitations of traditional welding. By using the *Technocasting®* process it's possible to make grooves and internal tubes claddings.



**Technocasting®** Coating

Steel part



## TECHNOCASTING® PROCESS:

Using this foundry-like technology, an infiltration of a brazing alloy with a compact assembly of **Sphérotène®** is performed in a mould.

### Principle:

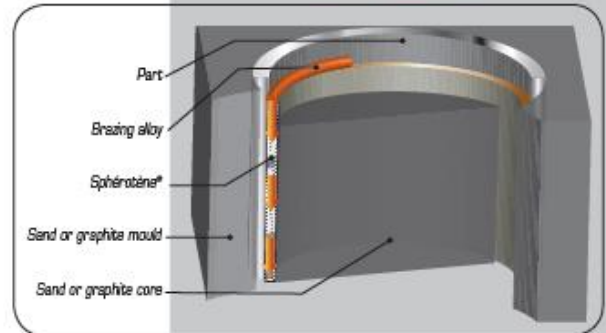
The coating is composed of a very dense combination of **Sphérotène®** and a brazing alloy. During the process, the brazing alloy melts and infiltrates the **Sphérotène®** by capillary action.

### Characteristics:

- Thickness of the deposit: from 2 to 10 mm (5 mm is the optimum)
- Composition: mini 70 % of **Sphérotène®** + brazing alloy.
- Carbide hardness: 3000 HV ± 500 HV
- Maximum Height: 550 mm  
(please enquire if more is required e.g. sub-assemblies can be made).
- Bore from 10 to 550 mm

### Conclusions:

- Allows complex shapes and internal coatings
- Well adapted for small series
- Guarantees maximum homogeneity and density thanks to **Sphérotène®**
- Gives a very regular surface
- Provides excellent impact resistance
- Can be grinded



### Main applications:

#### Ceramic industry:

- Cores and rakes for dies (brick making)
- Dies for tiles

#### Cement Works:

- Conveyors and feeder screws

#### Miscellaneous:

- Casings
- Presses

#### Oil and gas drilling:

- Radial bearings
- Pump sleeves
- Wear sleeves



A Complete range of high performance anti-wear protections

### Ultitech:

High performances composite Rods for precise Hardfacing  
Specially adapted for Drilling Tools / Drill Bits  
Easy welding / No fume / Friendly process



#### Spherical Cast Tungsten Carbide

	Sphérotène	Nickel Alloy 40HRC	PSO1600 : ø7 490mm 250g/rod 5kg/pack
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### Technoloy Plus:

#### Crushed Sintered Tungsten Carbide 2-3mm

	2-3mm	Nickel Alloy 40HRC	PSO1500 : ø9 490mm 250g/rod 5kg/pack
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**PUSH THE LIMIT  
OF YOUR TOOLS!**



### Technocore:

#### Technocore® Ni Flux Cored Wire

Metal-cored wire with spherical cast tungsten carbide (**Sphérotène**®, hardness 3000 Hv) in a Nickel-based matrix for optimum abrasion resistance in severe environment conditions. The deposit offers a very good resistance to wear. Re-application of worn tool can also easily be done. The low heat input helps reducing tungsten carbide particles dissolution.



#### Standard sizes & packaging

Diameter: 1.6 mm / Packaging: Spools 5 kg to 15 kg



## LASER HARDENING

### Hardness increase

	Slot design
Material	AISI 4140
Hardness Before	320HV / 33.4HRc
Hardness After (0.015" below surface)	590HV / 54.1HRc



	Thread
Material	AISI 4130
Hardness Before	485 HV / 48.6HRc
Hardness After (0.015" below surface)	630 HV / 55.7HRc



	Wear band
Material	AISI 4140
Hardness Before	320HV / 33.4HRc
Hardness After (0.015" below surface)	600HV / 54.5HRc



### Advantage:

- Common heat treated materials include carbon steel, alloy steel, tool steel, and cast iron.
- Achievable core hardness and depth are dependent on the base material's carbon content.
- All Materials which contain minimum 0.22% C



### Main applications:

#### Shaft



#### Coupling thread



#### ID cylinder



#### Piston slot





# CEMENTED TUNGSTEN CARBIDE

## Maximum rough sizes:

- Cylindrical parts:  $\varnothing$  200 mm x 300 mm.
- Rectangular parts: 115 mm x 115 mm x 300 mm.

## Process control:

- Every batch from our HIP sintering furnace is meticulously checked: density, hardness and microstructure by our modern laboratory, geometry and dimensions controls according to customer's requirements.

## Main applications:

- Aeronautics
- Automotive
- Oil & Gas industry
- Drawing industry
- Watchmaking industry
- Nuclear industry
- Textile industry
- Agriculture industry
- Material industry (wood, glass, building)



# TECHNOGENIA GROUP



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