



HYDRAULIC
SYSTEMS

| more
support



HYDRAULIC SYSTEMS

Extensión de vida útil para componentes a través de nuevas tecnologías de metalización - HVOF

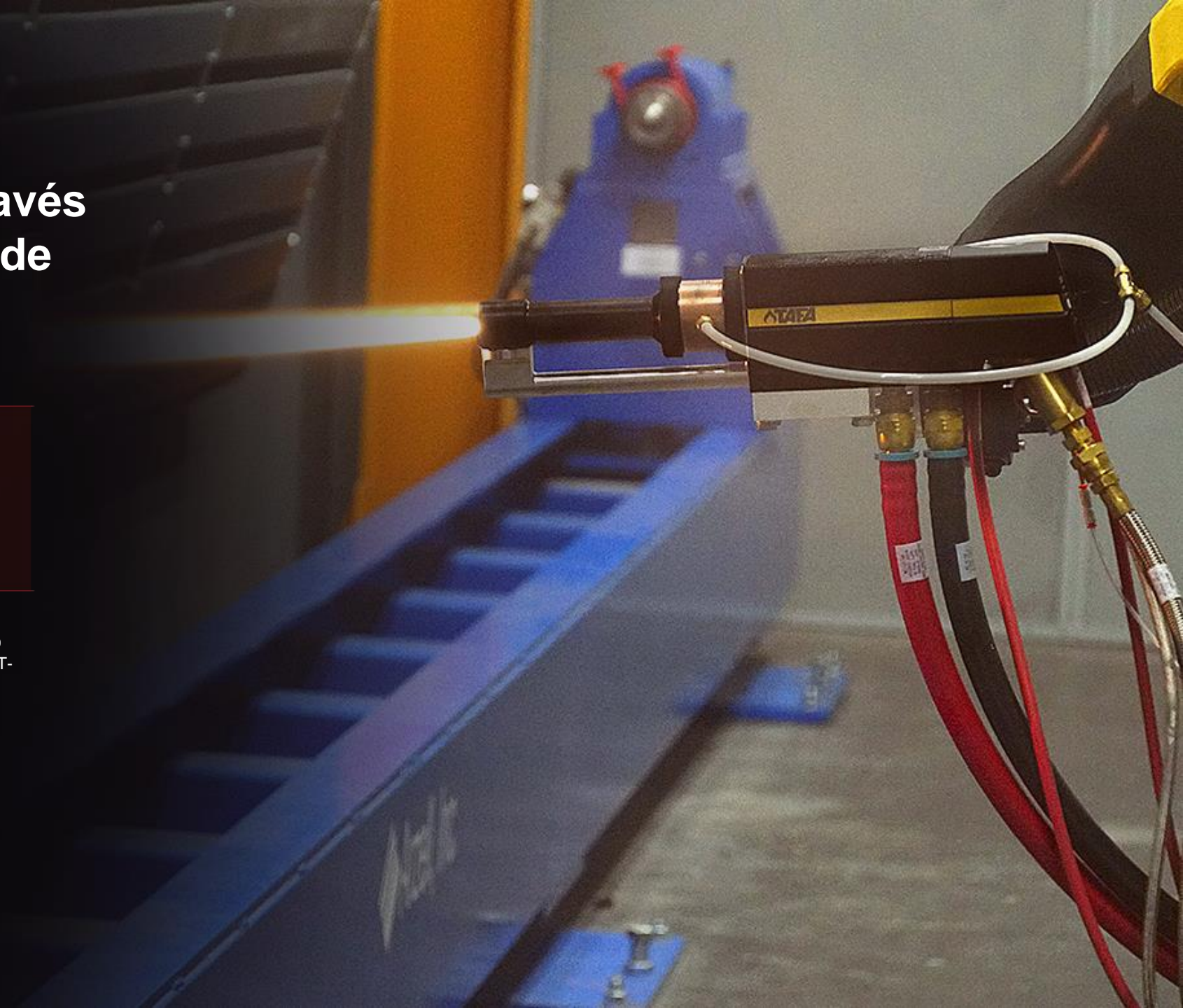


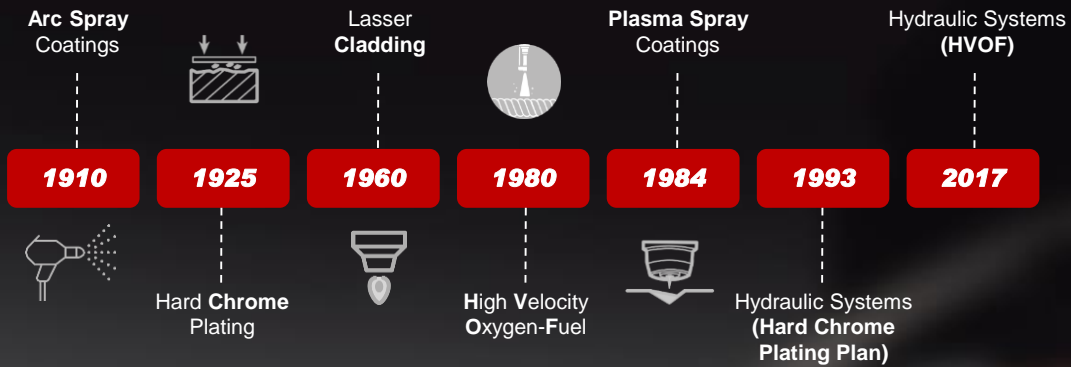
**RANDHAL
SILVERA H.**

Jefe
Operaciones de
Maquinado &
Recubrimientos
Especiales.

CWI –
Especialista
en Ingeniería de
Soldadura.

Inspector END
SNT-TC-1A UT-
II, MT-II, PT-II,
VT-II





CROMADO	HVOF	LASER CLADDING	PLASMA
Cr hexavalente	Carburo de cromo Carburos de tungsteno Cobalto Níquel	Aceros inoxidables Stellite Inconeles	Oxido de Titanio Oxido de cromo
Electrolisis	Termorociado anclaje mecánico	Soldadura fusión	Termorociado anclaje mecánico
Baja adhesión Alta porosidad Bajo costo Baja temperatura	Media adhesión Baja porosidad Alto costo Baja temperatura	Alta adhesión Media porosidad Bajo costo Alta temperatura	Baja adhesión Alta porosidad Bajo costo Alta temperatura
Dr 800- 900 HV	Dr 500- 1400 HV	Dr 500- 800 HV	Dr 500- 1300 HV



C R O M O E



CAPA DE CROMO 15 MILÉSIMAS

Microhardneses hv 0,3	Wear Rate	Temperature (°C)
800 – 1000	1	430

C A R B U R O (H V O F)



CAPA DE 86WC/10CO/4CR 15 MILÉSIMAS

Microhardneses HV 0,3	Wear Rate	Temperature (°C)
1100 - 1400	0,2	540
900 - 1200	0,4	850

VS

EPI MATERIALS TESTING GROUP
 1273 Bayford Road
 Spring, TX 77386
 Phone (832) 363-9997
 Fax (832) 299-6577
 www.epimtg.com

Porosity Analysis Test Report

Per ASTM E709

Client:	Soluciones Empresariales 360	EPI MTG Job#:	M21-363
Contact:	190 Range	Lab Ref#:	M21-363-04
PO #:	TBA	Date:	Jan 30 2022

Sample I.D.: C881 (750C-25NiCr)

Sample #	Porosity (%)
Area 1	0.90
Area 2	1.10
Std dev	0.20
Average	1.0

1. C881 (750C-25NiCr) Coating

Hardness performance is dependent on the material's quality. Measurement error is possible. No specimen was retested for an average of 10.0% difference. Measurement is subject to the operator's skill, the sample's grain size and the amount of surface preparation. All test results are subject to the laboratory's standard deviation. Page 1 of 2
 EPI's compliance for various Test Reports Page 1 of 2
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Corrosion Testing Report

Tested in accordance with ASTM G31 Immersion Corrosion

Client:	Soluciones Empresariales 360	EPI MTG Job#:	M21-363
Contact:	190 Range	Lab Ref#:	M21-363-04
PO #:	TBA	Date:	Jan 30 2022

Sample I.D.: C881 (750C-25NiCr)

Sample was exposed to 3.5% saltwater solution with bubbling air for seven (7) days. The ends of the specimen were epoxy coated to prevent attack to the non-coated base material. At the completion of the test the bar was removed from solution, rinsed, dried in air, and examined. No indications of inter-connected porosity were observed.

Hardness performance is dependent on the material's quality. Measurement error is possible. No specimen was retested for an average of 10.0% difference. Measurement is subject to the operator's skill, the sample's grain size and the amount of surface preparation. All test results are subject to the laboratory's standard deviation. Page 1 of 2
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Adhesion / Cohesion Testing Report

Tested per ASTM G33

Client:	Hydraulic Systems	EPI Job #:	M21-363
Contact:	190 Range	EPI Ref #:	M21-363-03
PO / Batch:	TBA	Date:	5/15/2022

Coating Description: (750C-25NiCr)
 Coating Powder: 750C-25NiCr
 Coating Surface: As Sprayed, 0.010" Thick (or other)
 Specimens Tested: 2 Coated & 2 non-Coated
 Substrate Material: 4140 Steel, heat treated to 30-34 HRC (or other per client)
 Substrate Surface: grit blasted by Client or EPI MTS
 Bonding Agent: Masterbond EP15ND-2

Sample	OD	Area	Load	Strength	Fracture Location
	in	in ²	lbs	psi	
Blank	N/A	N/A	N/A	N/A	x
Set #1	1.001	0.786	7,927	10,080	Coat / Substrate
Set #2	1.002	0.788	7,149	9,080	Epoxy

Avg	9,580
Max	10,080
Min	9,080

Comments: Small black circle evident in pull of sample #2 epoxy was present on all specimens before application of epoxy.

All Testing Sets

Hardness performance is dependent on the material's quality. Measurement error is possible. No specimen was retested for an average of 10.0% difference. Measurement is subject to the operator's skill, the sample's grain size and the amount of surface preparation. All test results are subject to the laboratory's standard deviation. Page 1 of 2
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Hardness Testing Report

Hardness measurement in accordance with ASTM E93 and Wilson charts

Client:	Hydraulic Systems	EPI Ref# Label:	M21-363
Contact:	190 Range	Lab Ref#:	M21-363-04
PO #:	TBA	Date:	Jan 07 2022

Sample I.D.: C881 (750C-25NiCr) Coating

Sample 01-A		
Indent #	0.5 kg Vickers	HRC Conv.
Indent #1	1095	69
Indent #2	1115	70
Indent #3	879.1	66

Sample 01-B		
Indent #	0.5 kg Vickers	HRC Conv.
Indent #1	1049	70
Indent #2	1055	70
Indent #3	957.8	68

Method		Reference	
Method	Indenter	Reference	Reference
Method	Indenter	Reference	Reference
Method	Indenter	Reference	Reference

Hardness performance is dependent on the material's quality. Measurement error is possible. No specimen was retested for an average of 10.0% difference. Measurement is subject to the operator's skill, the sample's grain size and the amount of surface preparation. All test results are subject to the laboratory's standard deviation. Page 1 of 2
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CASOS DE ÉXITO

Extensión de Vida de los Componentes (Siemens-Ecopetrol)



COMPONENTE

Turbina de Gas

Tipo de Operación

Refinería Ecopetrol -
Planta Orthoflow

UBICACIÓN

Barrancabermeja

**ESPESOR DE
SALVAMENTO**

560 Micrones

REVESTIMIENTO

75 CrC – 25 NiCr
0,7% porosidad
11.000 psi adhesión
1.100 VH



A N T E S

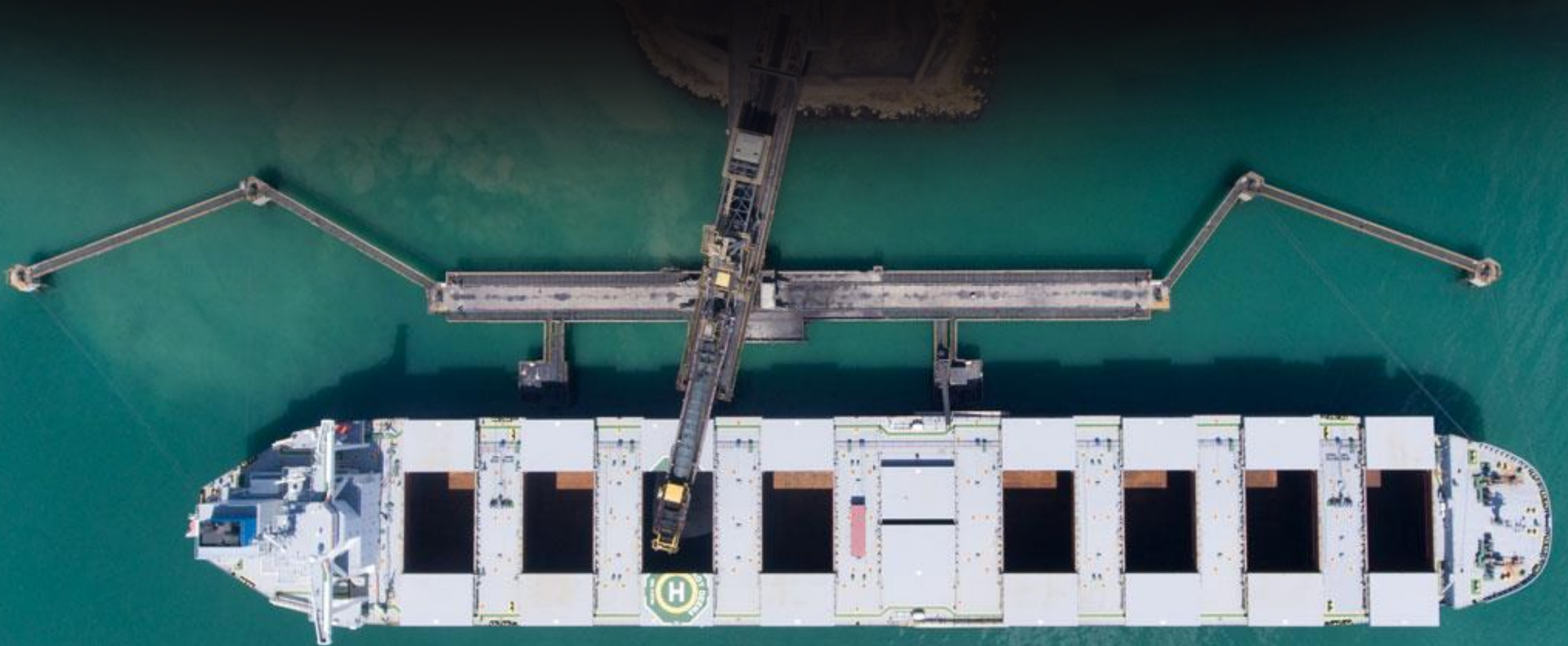
D E S P U E S





CASOS DE ÉXITO

Extensión de Vida de los Componentes (Cerrejón - Puerto Bolivar)



COMPONENTE

Vástago Grúa
LUFFING

TIPO DE OPERACIÓN

Puerto Cerrejón

UBICACIÓN

Puerto Bolívar

ESPESOR DE SALVAMENTO

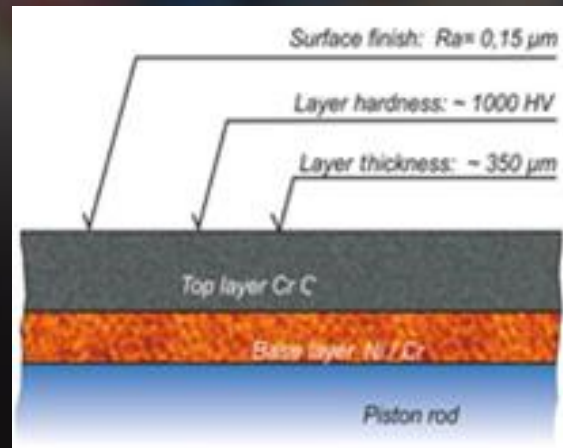
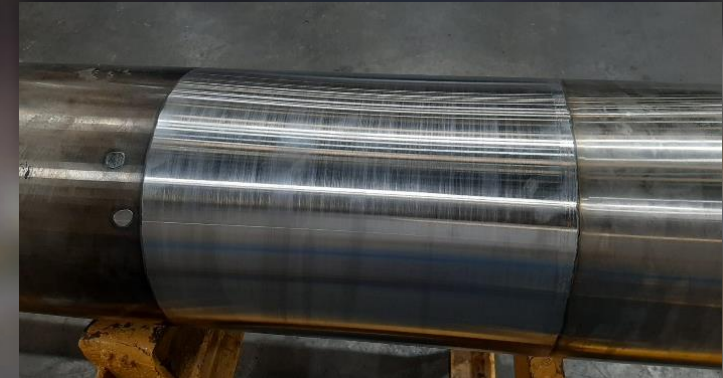
650 Micrones

REVESTIMIENTO FINAL

75 CrC – 25 NiCr
0,7% porosidad
11.000 psi adhesión
1.100 VH

CAPA BASE

80 Ni– 20 Cr





Extensión de Vida de los Componentes (Weatherford)



COMPONENTE

Rotor de Perforación
675

Tipo de Operación

Taladro de
Perforación

UBICACIÓN

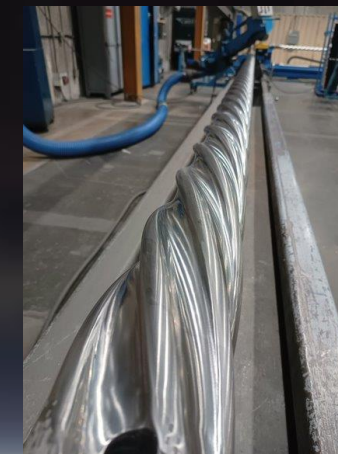
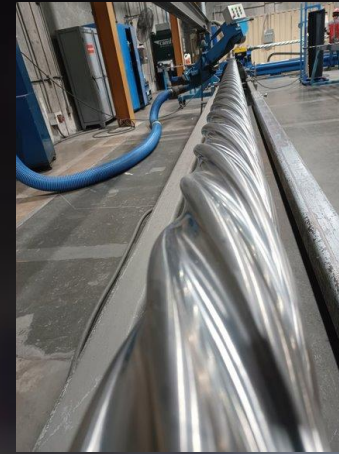
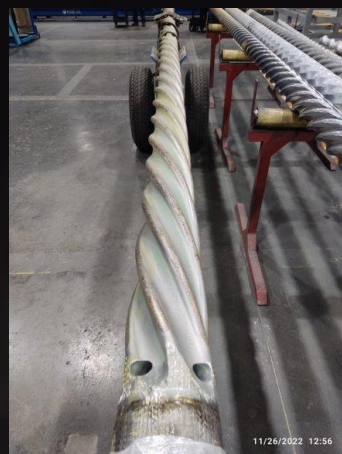
Llanos Orientales

**ESPESOR DE
SALVAMENTO**

810 Micrones

REVESTIMIENTO

WC86 - 10 Co - 4Cr
0,5% porosidad
12.000 psi adhesión
1.300 VH



A N T E S

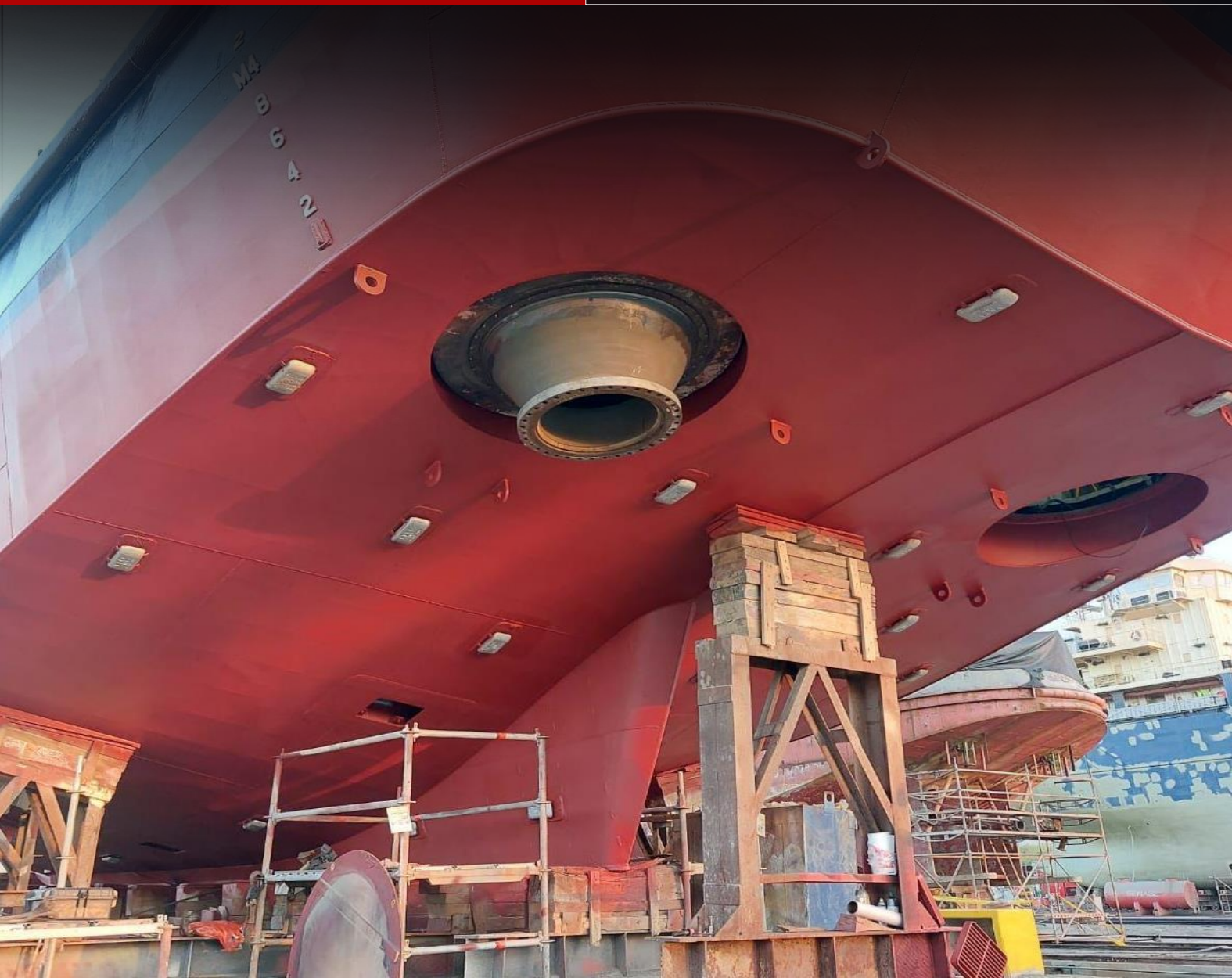
D E S P U E S





CASOS DE ÉXITO

Recuperación de puesto sellado de CONOS AZIMUTALES (SVITZER)



COMPONENTE

Cono Azimutal
Remolcador
Modelo MS1781

**TIPO DE
OPERACIÓN**

Marítimo

UBICACIÓN

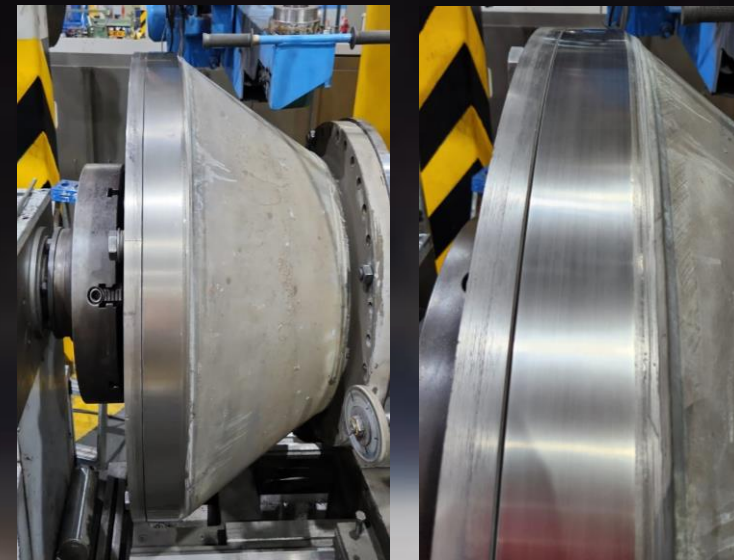
Cartagena -
Colombia

**ESPESOR DE
SALVAMENTO**

700 Micrones

REVESTIMIENTO

75 CrC – 25 NiCr
0,7% porosidad
11.000 psi adhesión
1.100 VH



A N T E S



D E S P U E S





CASOS DE ÉXITO

Extensión de Vida de los Componentes (First Quantum – Liebherr Panamá)



COMPONENTE

Vástago Suspensión
frontal camión T284

**TIPO DE
OPERACIÓN**

Minería de Cobre

UBICACIÓN

Coclé - Panamá

**ESPESOR DE
SALVAMENTO**

550 Micrones

REVESTIMIENTO

75 CrC – 25 NiCr

0,7% porosidad

11.000 psi adhesión

1.100 VH





CASOS DE ÉXITO

Reparación de componentes de Sistema de transmisión de potencia



COMPONENTE
GEAR OUTPUT

TIPO DE OPERACIÓN

Tren de transmisión
de potencia

UBICACIÓN
Colombia

ESPESOR DE SALVAMENTO
500 – 550 Micras

REVESTIMIENTO
WC86 - 10 Co - 4Cr
0,5% porosidad
12.000 psi adhesión
1.300 VH



A N T E S



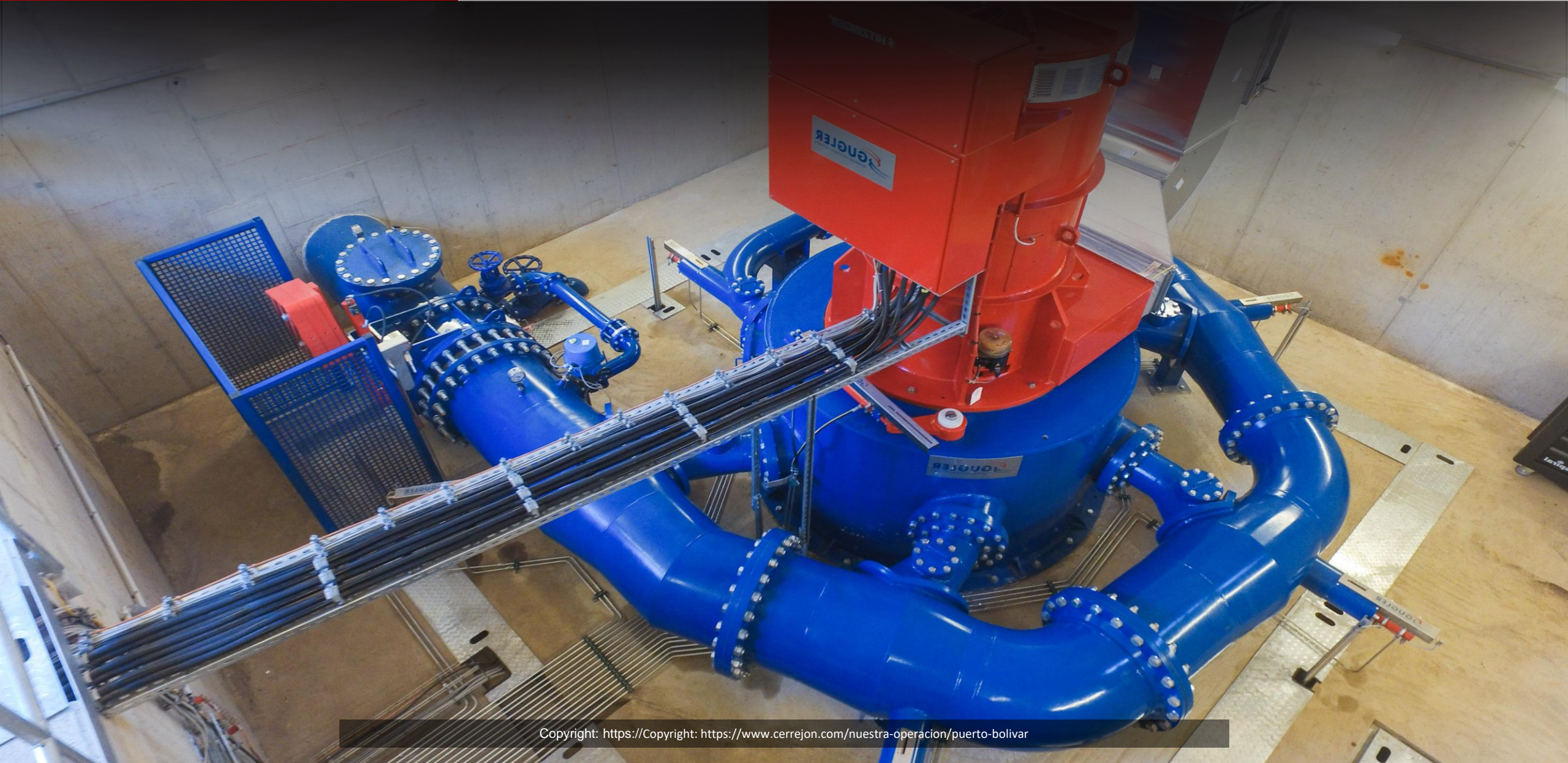
D E S P U E S





CASOS DE ÉXITO

Reparación de Agujas y Boquereles de turbinas Pelton



COMPONENTE

Aguja y Boquereles
Sistema inyección
Turbina Pelton

TIPO DE OPERACIÓN

Hidroeléctrico

UBICACIÓN

Colombia

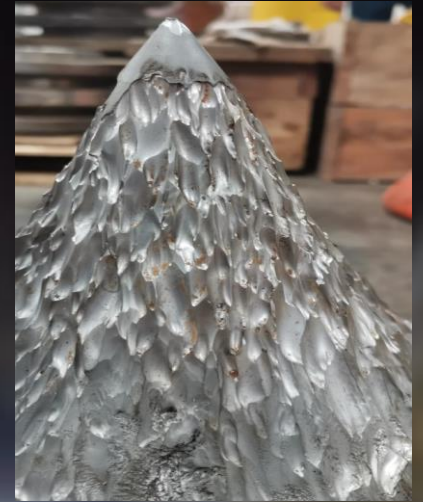
ESPESOR DE SALVAMENTO

500 - 800 Micras

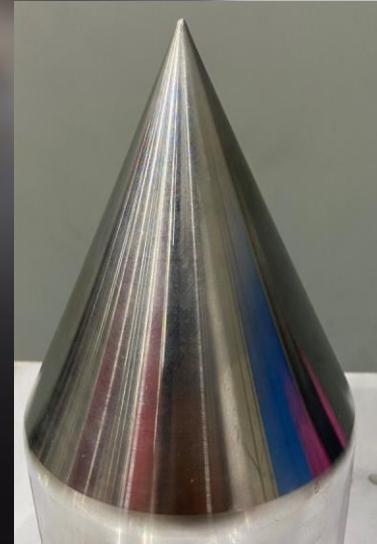
REVESTIMIENTO

WC86 - 10 Co - 4Cr
0,5% porosidad
12.000 psi adhesión
1.300 VH

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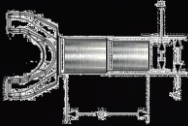

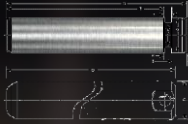
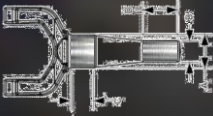
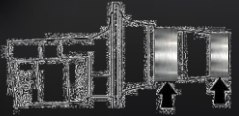
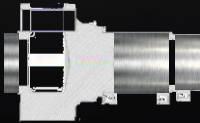



CASOS DE ÉXITO

Aplicaciones sugeridas para HVOF



APLICACIONES SUGERIDAS PARA HVOF

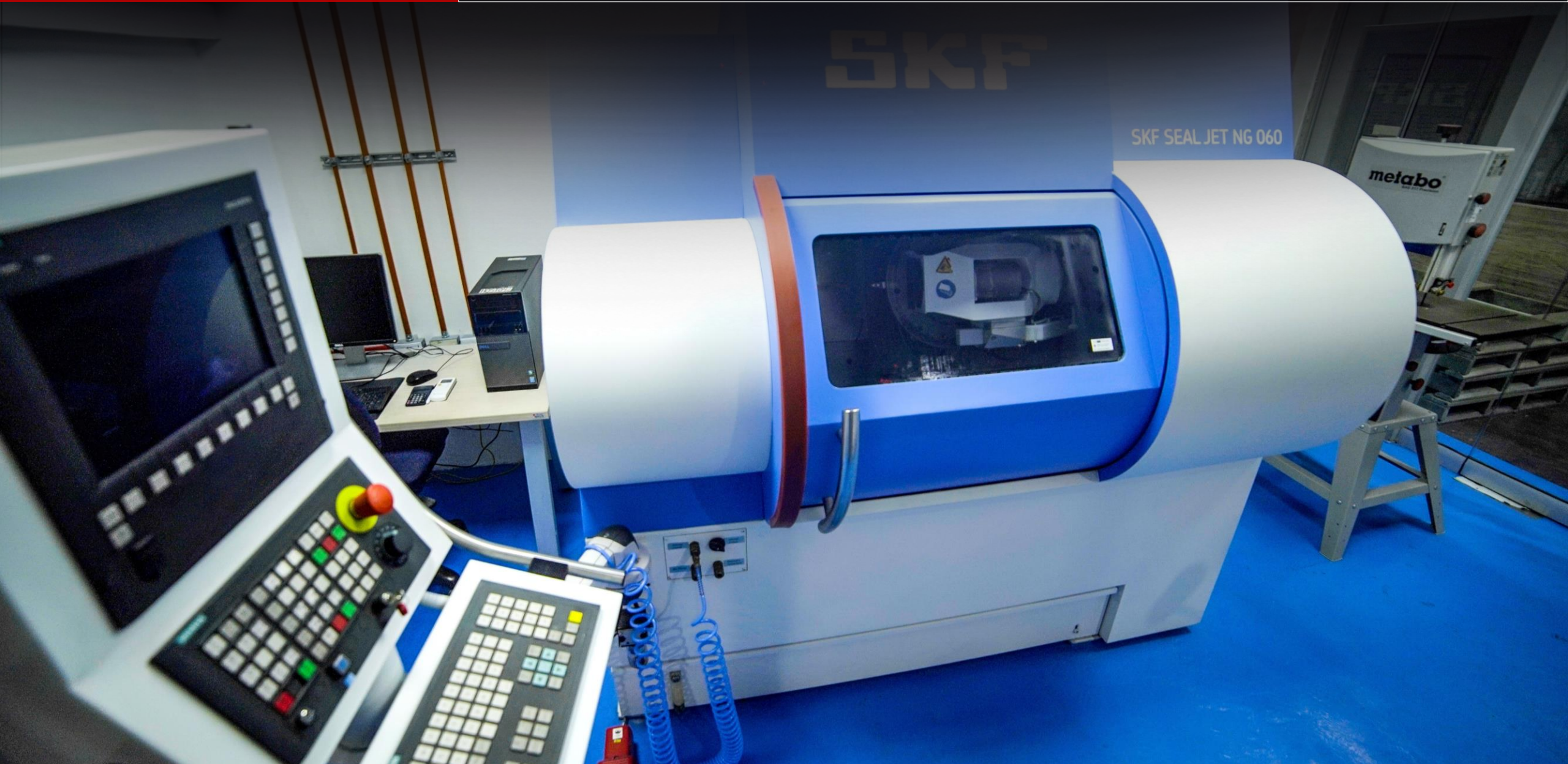
COMPONENT	TYPE	FIGURE	MAXIMUM THICKNESS	COATING CHEMISTRY
Blade Lift Yokes	Backhoe Loader, Excavator, Track Feller Buncher, Integrated Toolcarrier, Load Haul Dump, Mobile Hydraulic Power Unit, Tillage, Track-Type Loader, Compact Wheel Loader, Wheeled Excavator		As Required	Cr3C2 -25NiCr
TTT Bearing Sleeves	Motor Grader		As Required	Cr3C2 -25NiCr
TTT Dozer and Ripper Pins	Track-Type Tractor		As Required	Cr3C2 -25NiCr
WTS Pan Lift Yokes	Track-Type Tractor:		As Required	Cr3C2 -25NiCr
Front Wheel Spindles	Wheel Tractor-Scraper		As Required	Cr3C2 -25NiCr
Swing Drive Spindle	Off-Highway Truck/Tractor Unit Rig Mining Truck		As Required	FE - 18Cr - 12Mo - 4Ni
Front Spindle for MT	Off-Highway Truck/Tractor		As Required	FE - 18Cr - 12Mo - 4Ni





CASOS DE ÉXITO

SOLUCIONES DE SELLADO





Las soluciones para la fabricación de sellos a la medida a través de la tecnología SEALJET de SKF, NOS PREMITE OFRECER + Soporte a nuestros clientes de todos los sectores, con los siguientes valores agregados:

1. Reducción en tiempo de fabricación y entrega.
2. Gran eficiencia de sellado con un mínimo de fricción y desgaste.
3. Extensión de la vida útil de los componentes.
4. Se puede fabricar sellos de casi cualquier perfil y tamaño.
5. Fabricación de sellos de geometría compleja.

The SKF logo, consisting of the letters 'SKF' in white on a blue rectangular background.

The logo for HERCULES SEALING PRODUCTS, featuring the word 'HERCULES' in a bold, blue, sans-serif font above the words 'SEALING PRODUCTS' in a smaller, black, sans-serif font.

The logo for CHESTERTON, featuring a red circular icon with a white globe inside, followed by the word 'CHESTERTON' in a bold, red, sans-serif font. Below it, the tagline 'Global Solutions, Local Service.' is written in a smaller, black, sans-serif font.

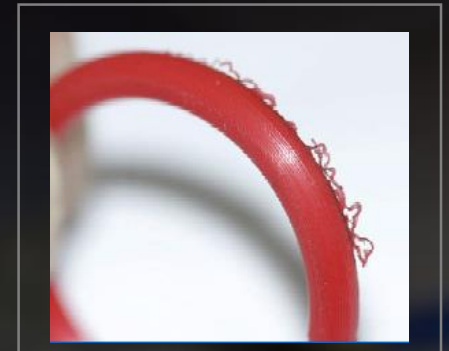


CARACTERÍSTICAS BÁSICAS

POLÍMEROS TERMOESTABLES	POLÍMEROS TERMOPLÁSTICOS
No se funden. Pueden soportar altas temperaturas.	Al aplicar calor se vuelven blandos, recobrando su dureza al enfriarse
Elevada dureza y alta resistencia a la abrasión.	Limitadas características mecánicas



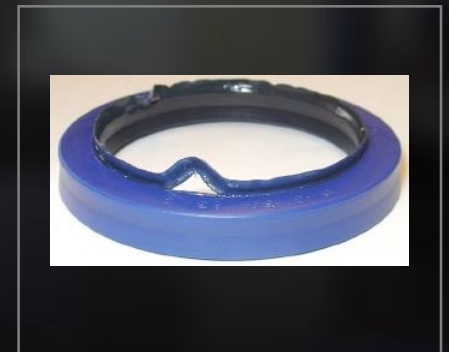
EROSIÓN



EXTRUSIÓN



PLASTIFICACIÓN



EXTRUSIÓN Y QUEMADURAS



CASOS DE ÉXITO

Soluciones de Sellado Plataforma Chuchupa B – La Guajira



COMPONENTE

Cilindro Levante Boom

TIPO DE OPERACIÓN

Grúa Nautilus –
Plataforma Off-Shore

UBICACIÓN

Chuchupa B

Reparación Global y
Suministro de Solución
de Sellado a la Medida



A N T E S



D E S P U E S






HYDRAULIC
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