



CHROMALLOY

Chromalloy Holland Introduction

Company presentation



Long live your engine.

THE CARLYLE GROUP

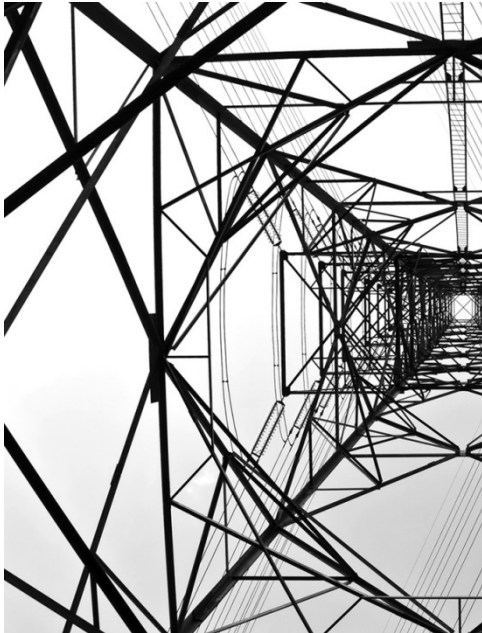
- The Carlyle Group is one of the world's largest private equity firms with over \$180 billion in assets under management.
- Carlyle has been a leading investor in the energy and aerospace and defense and sectors, having completed over 80 deals in each space.
- Carlyle's goal is to build the long-term value of Sequa and its holding companies through growth, process improvement and investment.



Backed by one of the largest private equity banks in the world

Market Portfolio

Energy



Commercial Aero



Military

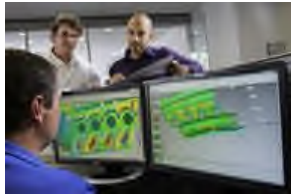


New Engine Manufacture Supply Chain Support

Aftermarket / Repair Supply Chain Support

One-stop Shop for Repair & Manufacture

Engineering



Welding



Casting



Thermal Processing



Inspection & Prep



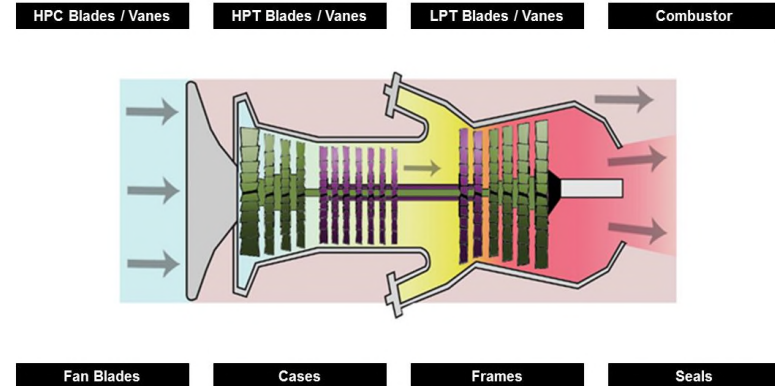
Coatings



Machining

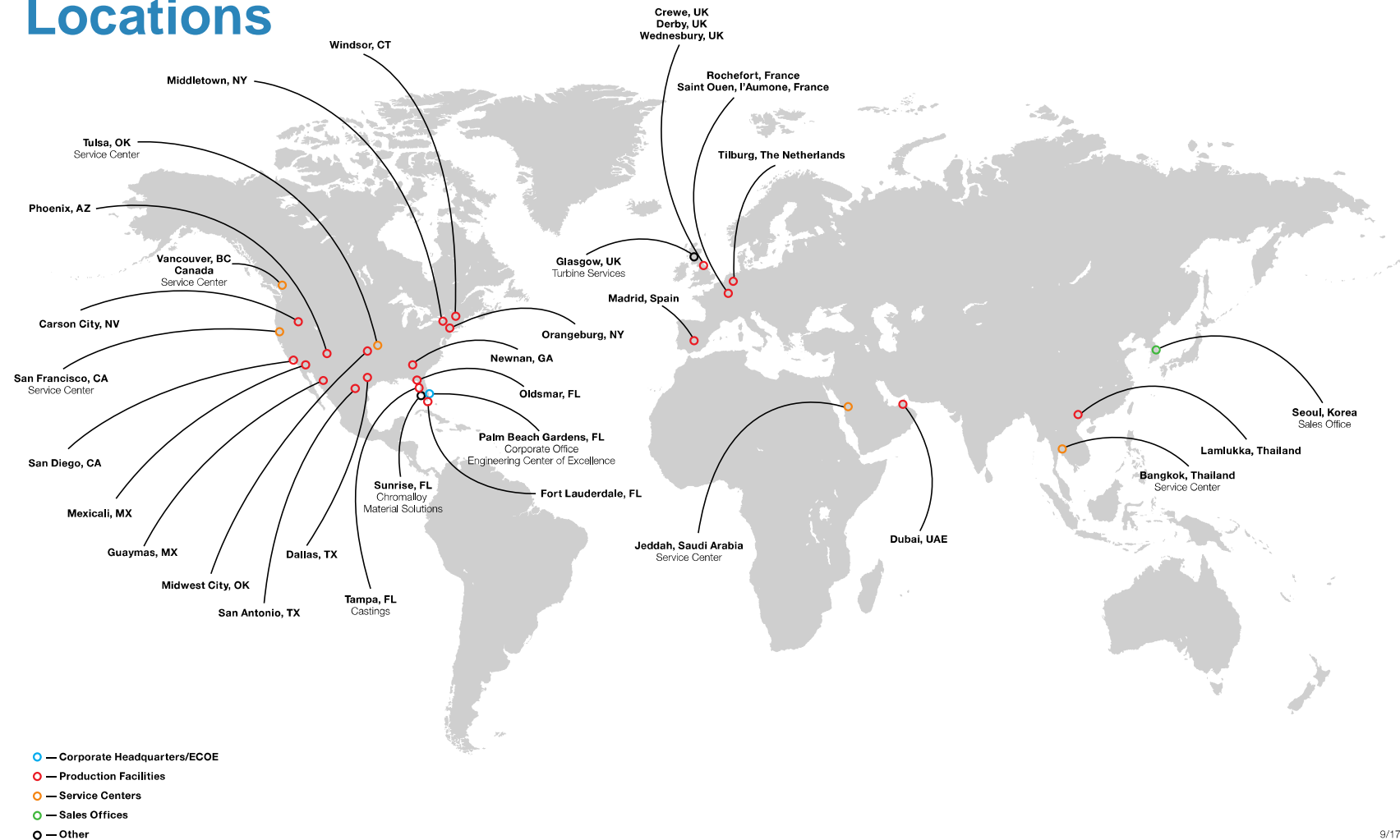


Surface Treatments



From individual part / component repair to “make-complete- parts” Chromalloy facilities are equipped to support full or partial solutions through a highly specialized and vertically integrated internal value chain

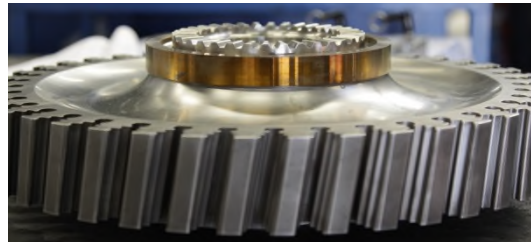
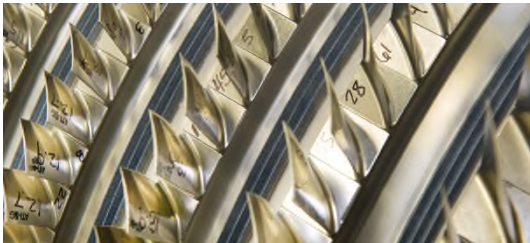
Locations



9/17/15

3,750 people in 17 countries around the world

Chromalloy Holland





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Site Leader

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Regional General Manager

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Primary Customer Contact

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Tilburg (Holland)

120k sq. ft. / 70% Utilized / Own / 40 Yrs

- Shrouds
- NPM
- Frames & cases
- Rotating parts
- Seals & Supports

- CFMI
- General Electric
- Rolls-Royce
- Solar
- Siemens

- CNC turning, milling, grinding
- EDM hole drilling, Wire EDM
- Laser cut & drill
- EB weld, TIG, Low heat input
- Full inspection, prep/Met-lab
- Thermal processing
- Coat, braze & heat treat
- Surface treatment

Overlay Coatings

High Velocity Oxy Fuel (HVOF)
Plasma and Wire Arc
MCrAlY, TBC, Hardfacing / Abradable

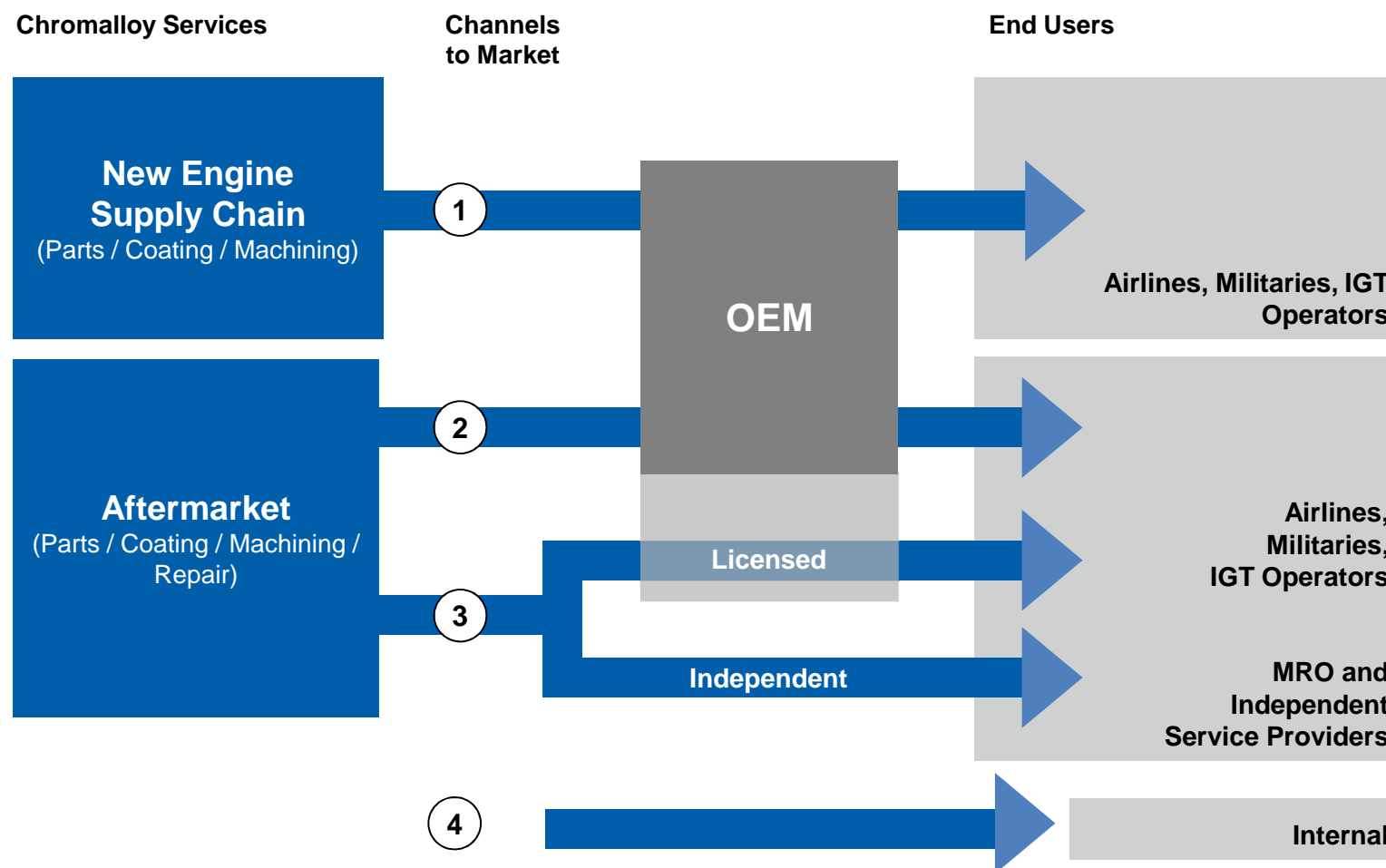
Diffusion Coatings

Aluminium Out-Of-Pack Cementation
Low Temperature Aluminizing (A-12)
(including conversion coating)

Slurry (Paint Type) Coatings

Sermaloy J and Equivalent

Chromalloy Channels to Market



Chromalloy Holland B.V. Approvals

CHROMALLOY

CAA-NL / Part 145: NL.145.1148

FAA / Part 145: DM5Y810M

CAAC (China) / Part 145: F03100201

DCA (Thailand): 89/2533

DGCA (Indonesia): 145/49900

TCCA (Canada): 899-02

JCAB (Japan): 230

ISO 9001 / AS 9100C: 16884

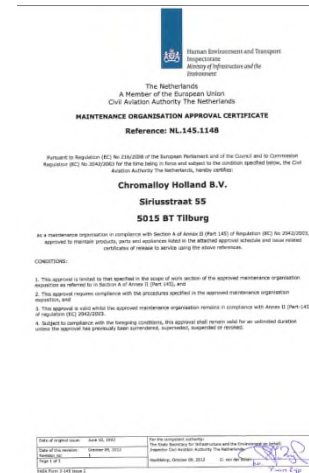
ISO 14001: EN14401

Nadcap Heat Treating ref AC7102: 4697168222

Aerospace quality systems ref AC7004 : 4697161434

Rolls Royce: 11120

Rolls Royce Deutschland: 98950



ISO 9001 / AS9100C: 16884

Nadcap Chemical Processing ref AC7108: 4016163732

Nadcap Non Destructive Testing ref AC7114: 4016175189

Nadcap Welding ref AC7110: 4016168628

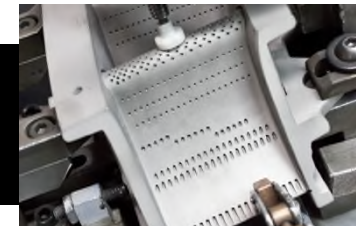
Rolls Royce: 84610

Rolls Royce Deutschland: 98850

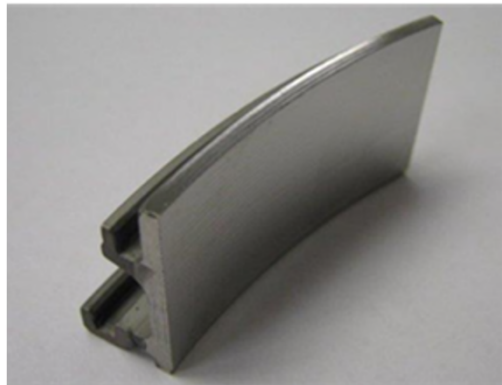


Page 1 of 1

This approval is subject to the company maintaining its system to the required standard, which will be monitored by NQA, USA, an accredited organization under the European Register Management Program.



One-stop Shop for Repair & Manufacture



HPT Shrouds

Center of Excellence

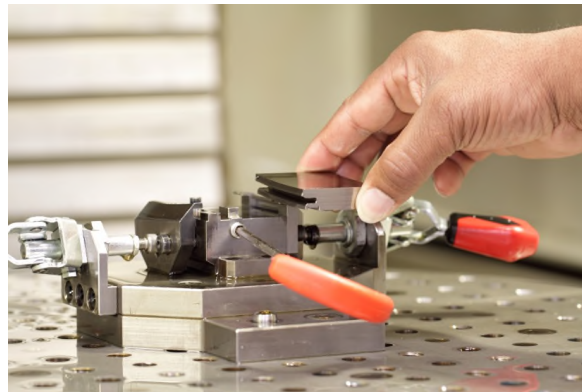
Repair

New Manufacture

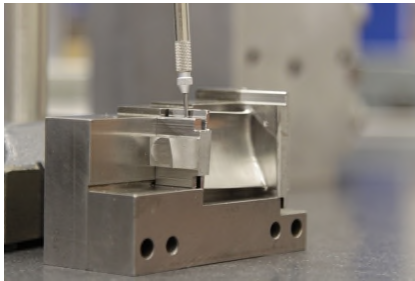
CNC-Turning

CNC-Milling

CNC-Grinding



One-stop Shop for Repair & Manufacture



New Part Manufacture

HPC Vanes
HPC Stator Assemblies
Aluminum Cases
Titanium Cases
CNC-Turning
CNC-Milling
CNC-Grinding



One-stop Shop for Repair & Manufacture



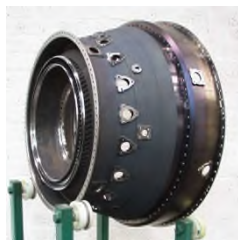
Component Repair



Frames
Cases HPT, LPT, HPC
Modules and Rotating
Parts
Seals and Supports
Composites
Advanced coatings



OEM Repair Capability – Rotating Parts / Frames and Cases



72-21-03	Fan Rotor Disk
72-21-04	Booster Spool
72-31-00	HPC Rotor Assy
72-31-04	HPC Spool Stg 1-2
72-31-05	HPC Disk Stg 3
72-31-06	HPC Spool 4-9
72-31-07	HPC Front Shaft
72-31-08	HPC Rear CDP Seal

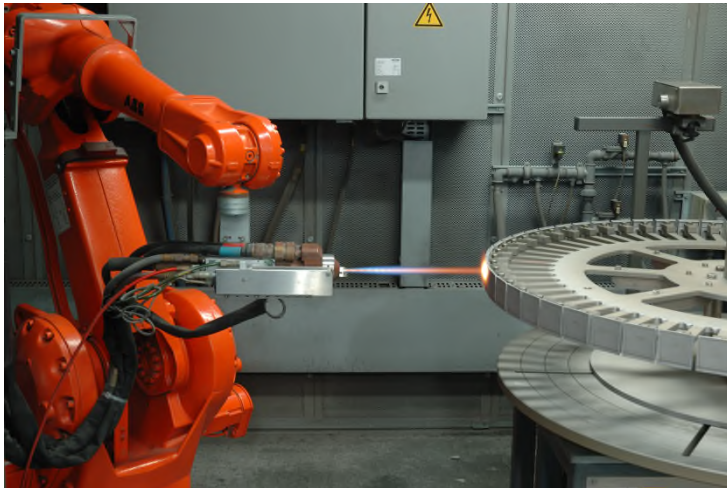
72-31-11	HPC Rotor Air Duct
72-52-00	HPT Rotor Assy
72-52-02	HPT Rotor Disk
72-52-03	HPT Front Air Seal
72-52-04	HPT Front Shaft
72-52-05	HPT Rear Shaft
72-52-10	HPT Rear Rot Seal

72-32-01	HPC Front Stator Case
72-33-01	HPC Rear Stator Case
72-41-01	Combustion Case
72-53-02	HPT Shroud LPT Nozzle Support
72-54-07	LPT Stator Case
72-56-01	LPT Frame



CF6 and CFM56

Coatings



- Chromalloy Holland has a depth of coating processing capability, including:

Thermal Spray Coatings

- HVOF
- APS
- WIRE ARC

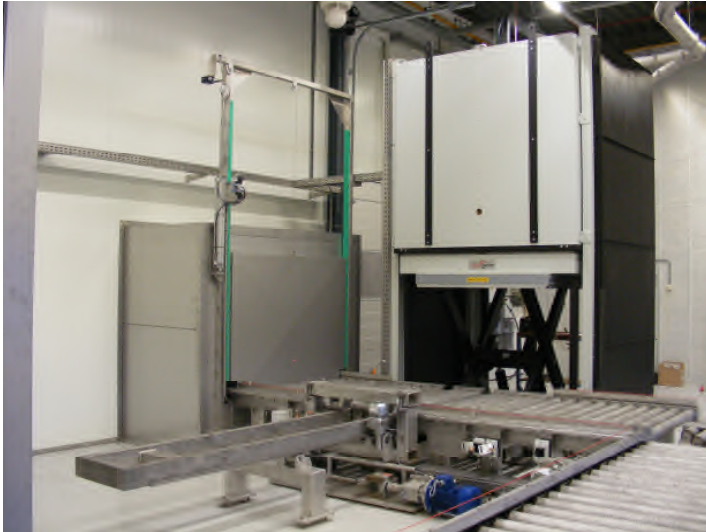
Diffusion Coatings

- A12 Coating
- Aluminize Coatings

Spray Coatings



New A12 Coating installation



- 2016 Operational
- A12 Coating upgrade equipment
- semi-Automatic coating cycle
- anti-corrosion and degradation protection



Welding



- Chromalloy Holland is equipped with state-of-the-art advanced welding capabilities including:
 - EB-Welding
 - TIG
 - Lorch Welding
 - Low heat input TIG (Jetline)



Thermal Processing



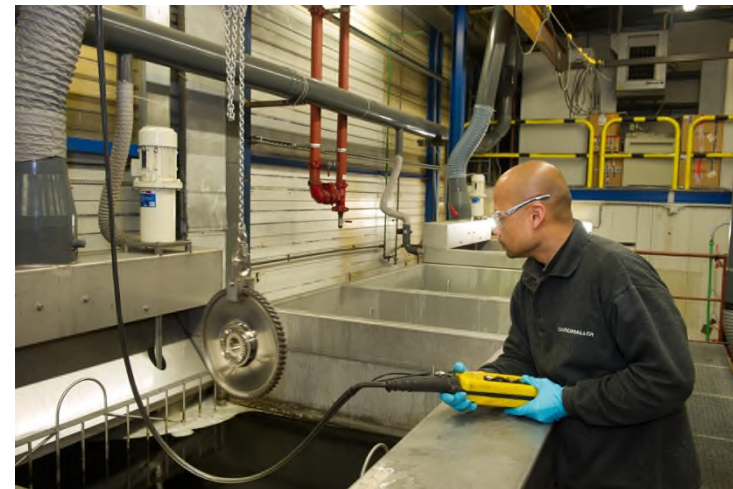
- Chromalloy Holland have a depth of thermal processing capability, including:
 - Coating furnaces
 - Braze furnaces
 - Vacuum furnaces



Cleaning and Stripping



- Chromalloy Holland is equipped with a wide range of cleaning and stripping capabilities, including:
 - Ultra High Pressure Wash
 - Chemical Cleaning
 - Grit blasting



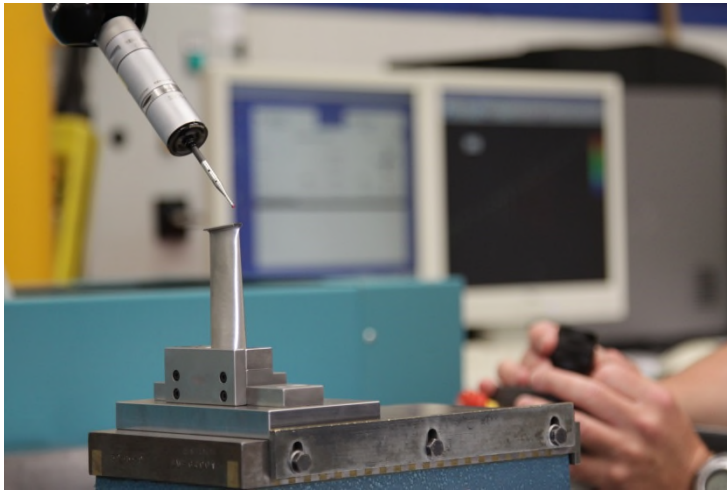
Surface Treatment



- Chromalloy Holland is equipped with a wide range of surface finishing capabilities, including:
 - Shot and glass peening
 - Vibro super polishing



NDT INSPECTION

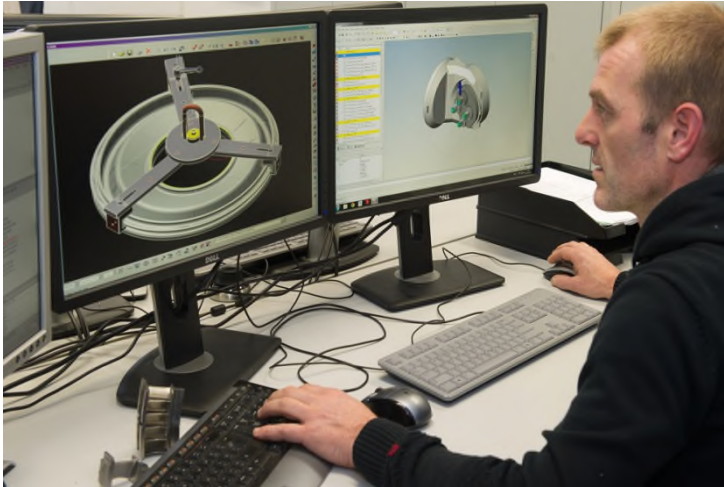


- Chromalloy Holland is equipped with state-of-the-art Non Destructive Testing capabilities and equipment including:

- Ultrasonic Inspection
- Eddy current Inspection
- FPI Lines
- X-ray
- Magnetic Particle Inspection
- 3D and visual



Engineering

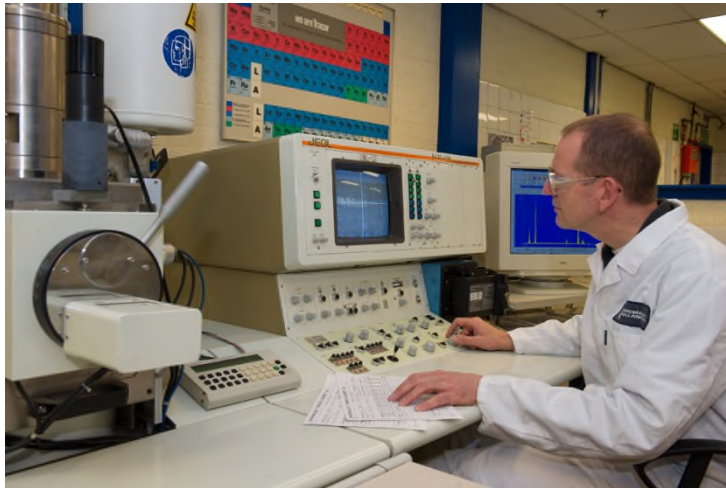


- The Chromalloy Holland Engineering provides Prognostic & Diagnostic Processes include:

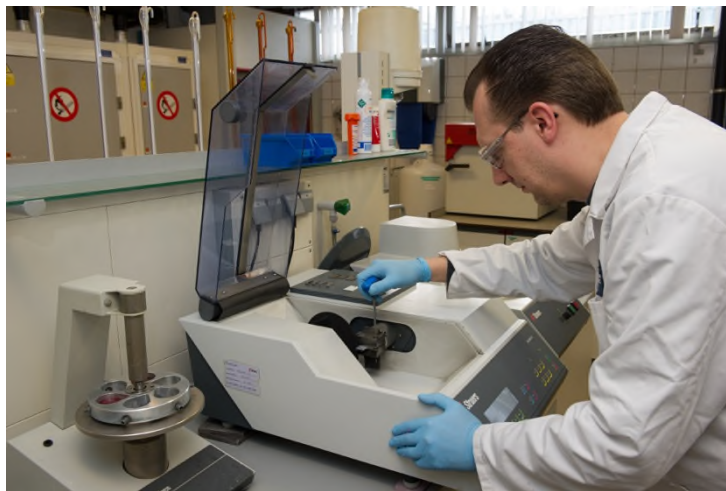
- CAD/CAM
- Root cause analyses
- (Co-)design



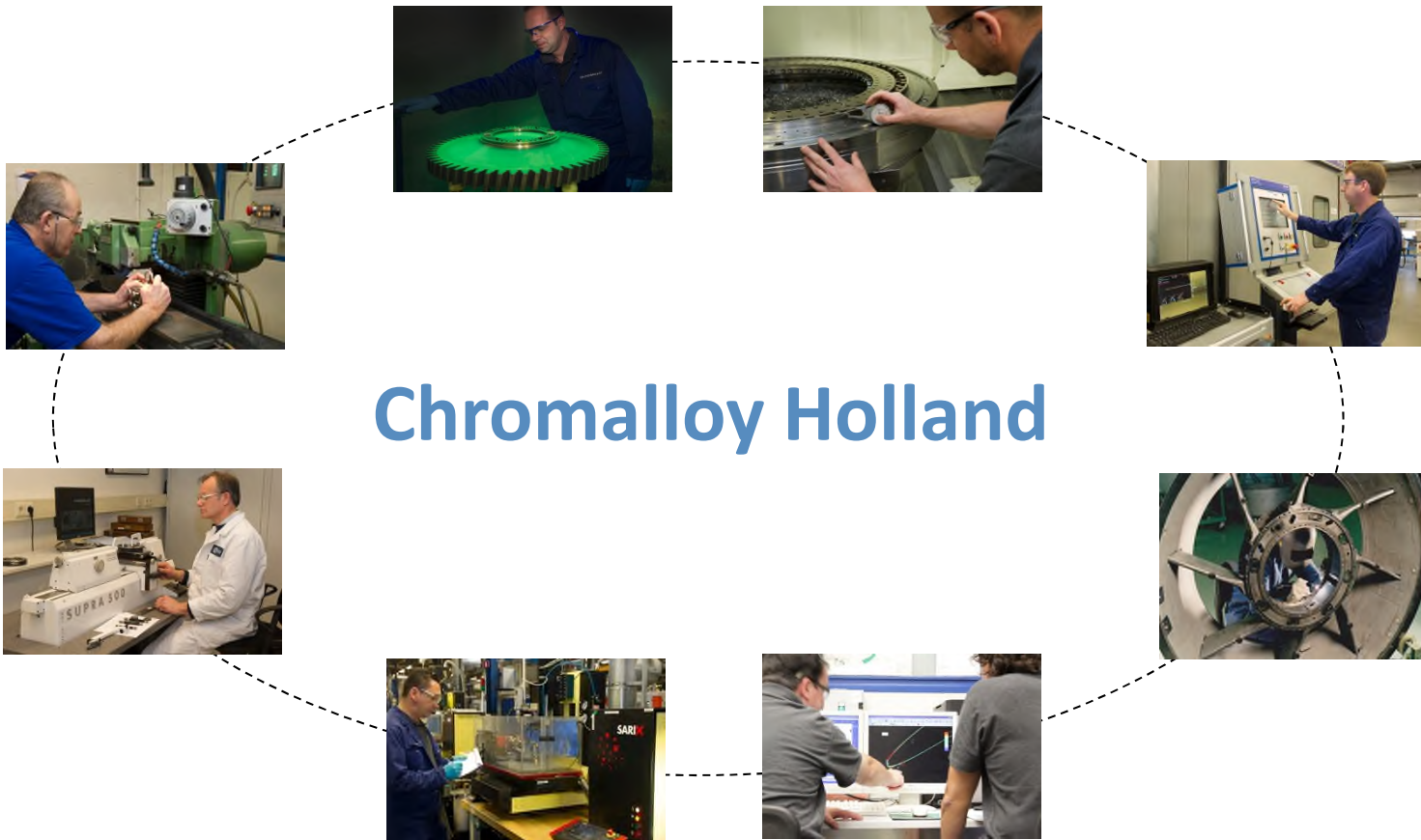
Laboratory



- Chromalloy Holland has full Laboratory capabilities and equipment including:
 - Metallurgic preparation
 - Scanning electron microscope/ XRF analyzer
 - Optical microscopes
 - Tensile testing and Shear testing
 - Hardness testing
 - Chemical analyses



How we will help





CHROMALLOY

Long live your engine.