NITREX

Company Overview

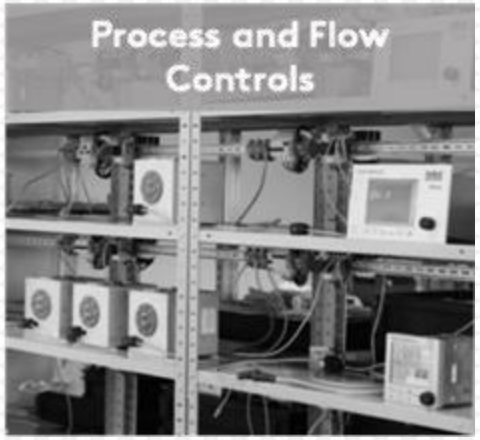
Over the last 35 years Nitrex has become a leading force in the heat treating industry, as an equipment manufacturer, a service provider of a wide variety of heat treatments, and most importantly a developer of gas nitriding & gas nitrocarburizing technologies and solutions.

Nitrex Worldwide

HTS Division

NTS Division

UPC Division



Nitrex is worldwide concentrated in core divisions:

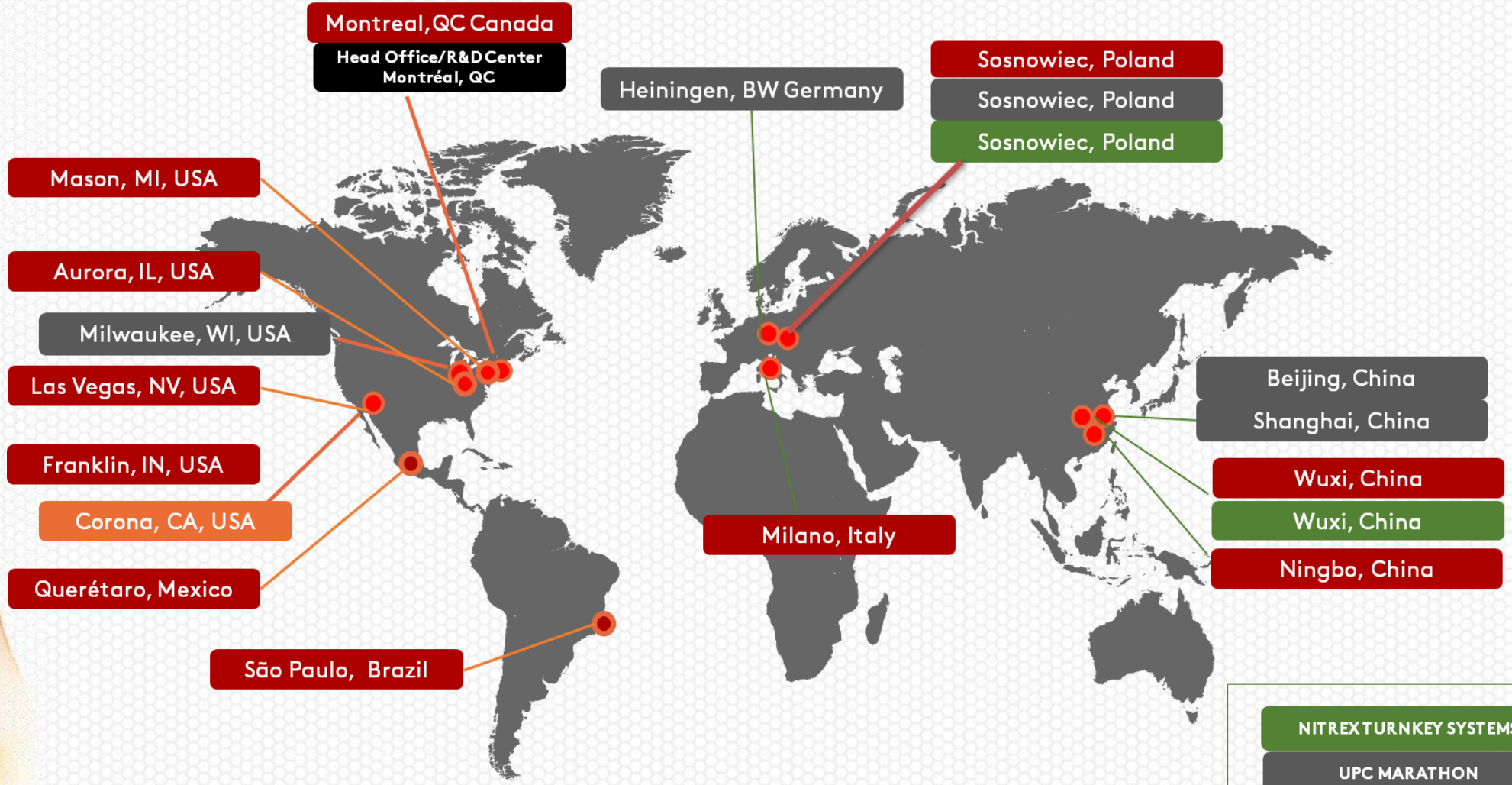
- HTS (Heat Treatment Services Provider),
- NTS (Seller of Turnkey Equipment and Solutions), and
- UPC (R&D, A.I. Monitoring, and 4.0 Control Systems developer).

Nitrex Querétaro is part of HTS.

35 YEARS

Heat Treat Excellence

Nitrex Worldwide



NITREX TURNKEY SYSTEMS

UPC MARATHON

NITREX HEAT TREATING SERVICES

Industries we serve

Aerospace & Defense

Automotive & Machinery

Commercial Heat Treating

Gears

Tooling

Nitrex Querétaro, México.

We serve mainly the automotive industry, along with some portion of Manufacturing and Oil and Gas, and in 2021, we were appointed AS9100D certified company and with it, our entrance into the aerospace industry was completed, and strengthened by obtaining NADCAP AC 7102/4.

Certifications in México

FEMIA

ING. CARLOS LLERENA
GENERAL MANAGER
SOLUCIONES TECNOLÓGICAS TÉRMICAS NITREX QUERÉTARO
NITREX QUERÉTARO

Estimado Ing. Llerena.

Por medio de la presente y con gran satisfacción, tengo el agrado de informarle que la Comisión de Honor y Justicia y el Consejo Directivo, durante su última sesión del día **12 de febrero del 2020**, han resuelto **ACEPTAR** la solicitud realizada por parte de **SOLUCIONES TECNOLÓGICAS TÉRMICAS NITREX QUERÉTARO** para convertirse en miembro de la Federación Mexicana de la Industria

TÜV NORD

CERTIFICATE

Management system as per
IATF 16949:2016
(1st edition, 2016-10-01)

Evidence of conformity with the above standard has been furnished and is certified for

Soluciones Tecnológicas Térmicas NITREX Querétaro, S de RL de CV
Calle Lluvia No. 8
76246, Fraccionamiento Industrial La Noria
México

Scope

Thermal and thermochemical heat treatment process

without product design responsibility (according to section 8.3)

TÜV USA

CERTIFICATE

TUV USA, Inc.
Accredited under the Aerospace Registration Management Program and under the ICOP scheme

hereby certifies that

Soluciones Tecnológicas Térmicas NITREX Querétaro
S. de R.L. de C.V.
Calle LLuvia No. 8, Fraccionamiento Industrial La Noria
Querétaro, Qro. 76246 Mex

has established and applies
a quality system for the

Thermal and thermochemical heat treatment

(Certification Structure: Single)

Proof has been furnished that the requirements according to

ISO 9001:2015/AS9100D

are fulfilled.

"The assessment was performed in accordance with AS9104/1:2012"

Certificate Registration No.

56 900 21610018

Initial Certification Date: March 27, 2021
Issue Date: March 27, 2021
Expiry Date: March 26, 2024

ANAB IAF

QUERÉTARO

El Poder Ejecutivo del Estado de Querétaro
otorga la
MENCIÓN HONORÍFICA
Premio al Mérito Empresarial Querétaro 2019
en la Categoría de Competitividad
a: SOLUCIONES TECNOLÓGICAS TÉRMICAS NITREX QUERÉTARO, S. DE R.L. DE C.V.
por su compromiso con la calidad y la mejora continua.

PREMIO AL MÉRITO EMPRESARIAL
QRO 2019
Cero Scrap
Cero Retrasos

Francisco Domínguez Servién
Gobernador del Estado de Querétaro

QRO ORGULLO DE MX

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PREMIO AL MÉRITO EMPRESARIAL
QRO 2020

Francisco Domínguez Servién
Gobernador del Estado de Querétaro

QRO ORGULLO DE MX

Querétaro, Qro., 8 de julio de 2021

Certificates of Automotive and Aerospace Quality Management Systems, as well as Querétaro Business Merit Award 2020 (1st Place), and 2019 (2nd Place) edition. This Award is the most renown Quality and Compliance competence among all companies registered in the State.

Relevant Partnerships

MURATA

SCHAEFFLER

Valeo

ISRI ISRINGHAUSEN

CROWN

PETERSON SPRING
MANUFACTURERS OF ENGINEERED METAL PRODUCTS

Associated Spring

EATON

Danfoss

MACIMEX
THE POWER INSIDE YOUR ENGINE®

BorgWarner

Current Layout

5 Pit Nitriding Systems, fully compliant to SAE2759-12b/10b
Gas neutralizers, Gas panels, Inconel baskets, et al.

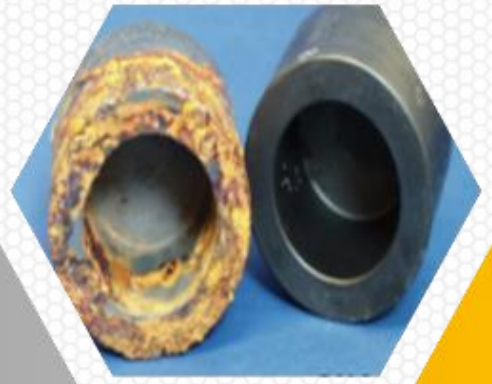
Metallurgic and Materials Engineers will be your laboratory support.

Nitrex Queretaro. Process Scope

PROCESS CAPABILITITES
Querétaro facilities

Improves wear and resists the effects of high temperatures

NITREG®-S Potential-Controlled Nitriding of Stainless Steel



Hardened superficial layer. Enhances wear and corrosion resistance.

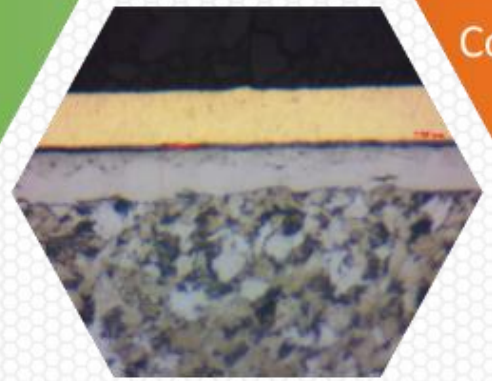
NITREG®-C Potential-Controlled Nitrocarburizing

NITREG®-Ti Potential-Controlled Nitriding of Titanium Alloys

Increased wear resistance. Attractive gold finish.

ONC® + Nitreg® or Nitreg-C® with Post-nitriding oxidation

Further enhances corrosion and wear resistance properties. Aesthetic, dark finish.



NITREG® Potential-Controlled Nitriding

Superior case properties. Enhances wear and fatigue resistance.

Applications

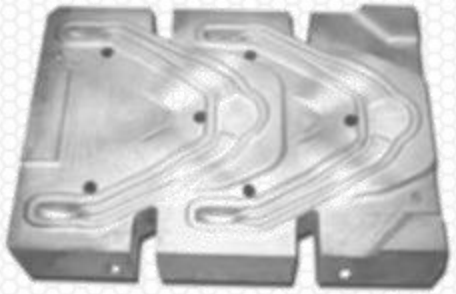
Our potential-controlled gas nitriding and potential-controlled gas nitrocarburizing (ferritic nitrocarburizing-FNC) heat treatment technologies are applied in the precision parts for aerospace, automotive, aluminum extrusion, defense, gears, tool & die, plastics, machinery and many other industries.

Nitriding comparison table

PROPERTIES / FEATURES	NITREG® Controlled Nitriding	Conventional Gas	Salt Bath	Plasma (Ion)
Cleaning (Before)	Clean	Clean	Relatively Clean	Very Clean
Cleaning (After)	Not required	Not required	Strongly Required	Not Required
Heating Time	Short	Short	Very Short	Long
Positioning of Parts	Simple	Simple	Simple	Very Complex / Requires Skill & Experience
Nitriding of Stainless Steel	Possible	Not Possible	Possible	Possible
Operation of Equipment	Very Simple / Fully Automated	Relatively Simple	Simple	Very Complex / Requires Advanced Skills
Temperature Control & Uniformity	Excellent	Good	Good	Difficult / Insufficient / Overheat Possible
Control of Nitriding Potential	Yes	No	No	No
Control of % of ε and γ'	Possible	No	No	Possible
Nitriding with No White Layer	Possible	No	No	Possible
Porosity Control	Possible	No	No	Possible
Repeatability of Results	Excellent (regardless of load)	Possible (repetitive loads only)	Possible (repetitive loads only)	Possible (repetitive loads only)
Equipment Maintenance	Simple	Relatively Complex	Complex	Very Complex
Degree of Pollution	Very Low	High	Extremely High	Very low

Typical Applications

- Actuator housings
- Bearings and needles
- Brake pistons
- Bushing and sleeves
- Camshafts
- Crankshafts
- Clutch hubs/plates
- Engine valves
- Forging dies
- Forming dies
- Fuel injectors



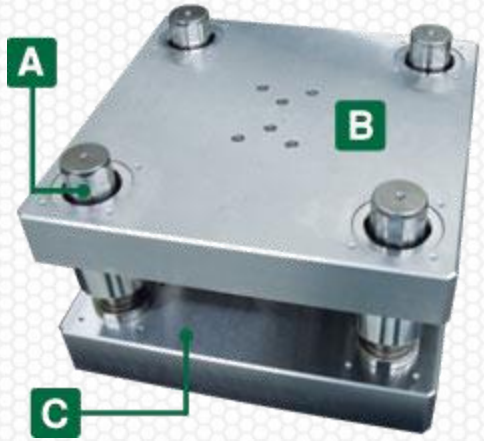
- Gears
- Housings
- Journals
- Piston rings
- Rocker arms
- Seat tracks & screws
- Shafts
- Springs
- Torsion bars
- Window sectors
- Wiper shafts

Nitriding Applications

TYPE OF APPLICATION

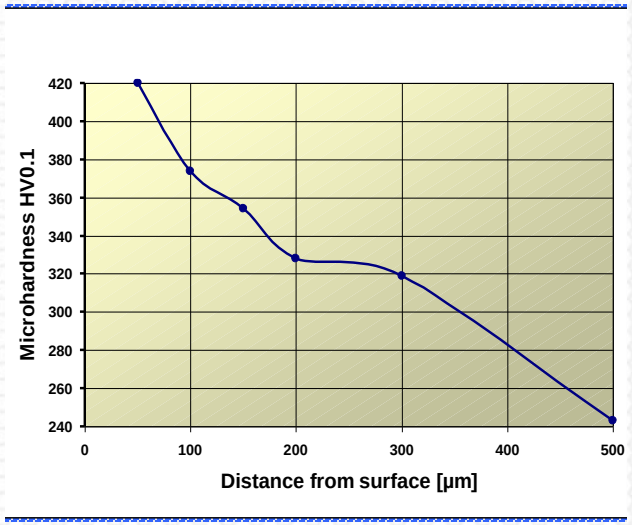
PERFORMANCE EXAMPLE: Extrusion dies

Today probably 1/5th of all installations are supplied. Why: the high value of dies, retooling cost, cost of scrapped aluminum profiles, low quality



Nitriding Applications

Brake Pistons



Nitriding Specifications		
Characteristics	*Requirements*	*Results*
White Layer [µm/inch]	* 20 (.0008)	24 (.009)
Porous Zone [µm/inch]	< 50% WL	10 (.0004)
Effec. Case [µm @ C+100]	N/A	360 (.014)
Surface Hardness [HV1]	N/A	499
Corrosion resistance [hrs.]	*	> 400

*** Exceed Alternate Technology**

Nitriding Applications

Hydraulic Cylinders

Nitriding Specifications		
Characteristics	*Req'ments*	*Results*
White Layer [µm]	10 - 15	13 - 15
Effec. Case [µm @ C+50]	N/A	-
Surface Hardness [HV1]	N/A	427
Corrosion resistance [hrs.]	*	> 450

*** Best Resistance Possible**

Nitriding Applications

Transmission Hubs (1010)

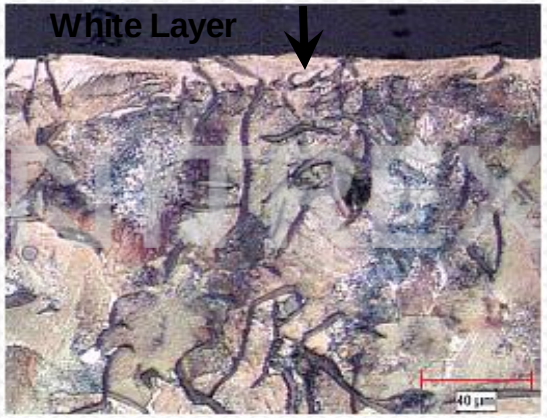
Nitriding Specifications		
Characteristics	*Req'ments*	*Results*
White Layer [µm / inch]	>10 (.0004")	15 (.00055")
Total Case Depth [µm / inch]	≤ 500 (.020)	360 (.014)
Surface Hardness [HV1]	N/A	N/A

Nitriding Applications

Timing Gear Nitreg®-C Nitrocarburized

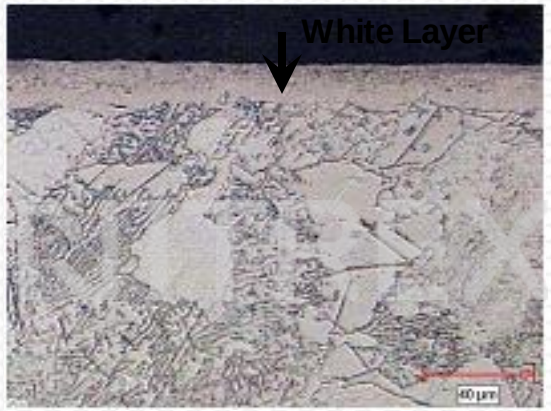
Grey Cast Iron

Characteristics	*Req'ments*	*Results*
White Layer [µm / inch]	5 - 10 .0002-.0004"	7 .00028"
Surface Hardness (HV0.5)	> 500	586



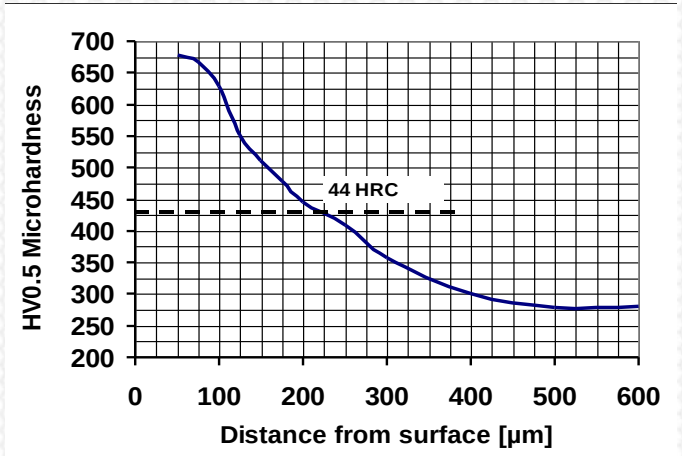
AISI 1045

Characteristics	*Req'ments*	*Results*
White Layer [µm / inch]	10 - 25 .0004-.0010"	18 .0007"
Surface Hardness (HV0.5)	> 450	483



Nitriding Applications

Big Rocker Arms



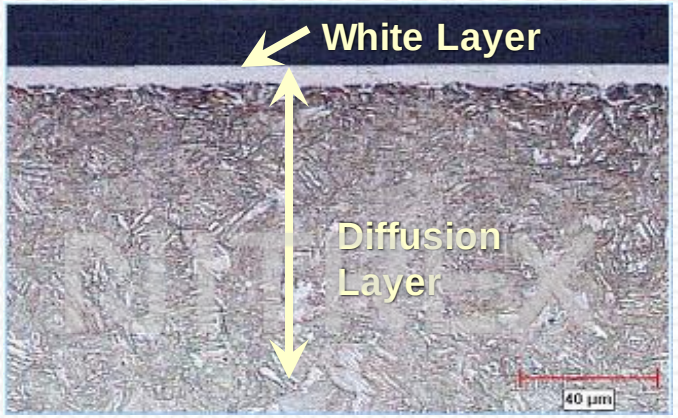
Material: 4140 alloy steel

Results:

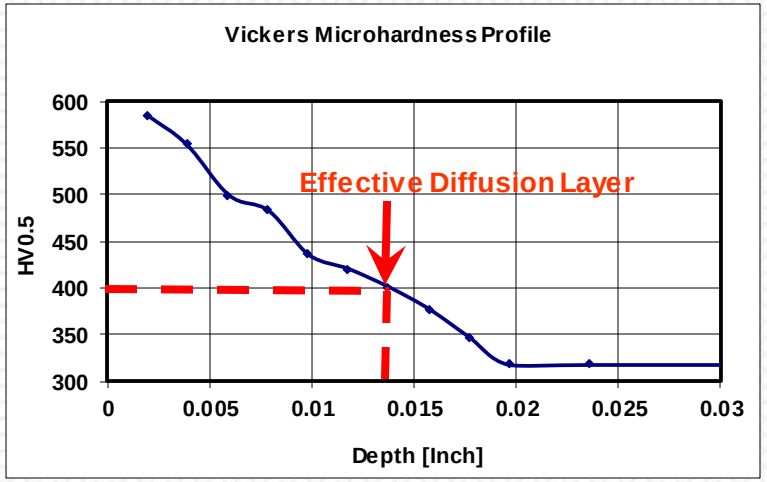
- Compound Layer = 12 µm (~0.0005 Inch)
- Surface Hardness = 580 HV1 (~54 HRC)
- Total Case Depth = 350 µm (~0.0014 Inch)

Nitriding Applications

Ringe Gear – 4140 Low Alloy Steel



Characteristics	*Req'ments*	*Results*
White Layer [µm/Inch]	< 15 (0.0006)	10 (0.0004)
Eff Case @ 40HRC [µm/Inch]	> 305 (0.0012)	355 (0.0014)
Surface Hardness (HV/HRC)	> 500 (49)	560 (53)

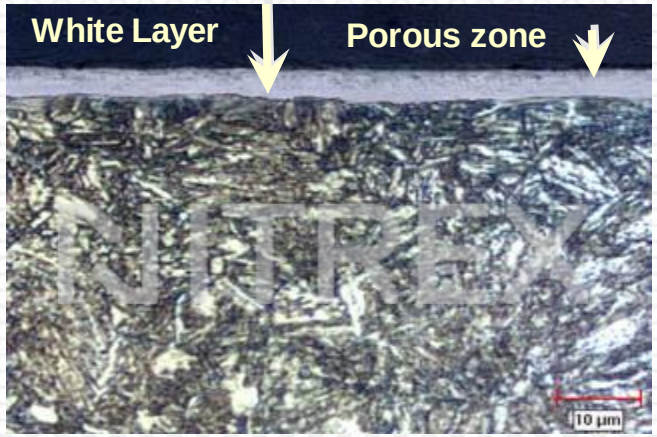


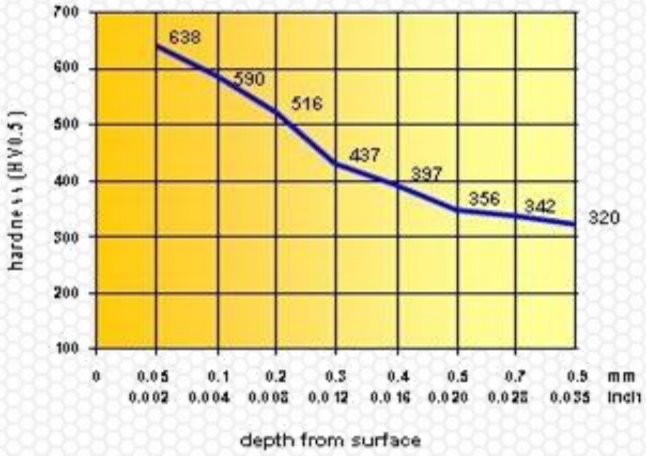
Nitriding Applications

Transmission Gears, Nitreg® Nitrided

Nitriding Applications

Engine Gears, Nitreg® Nitrided





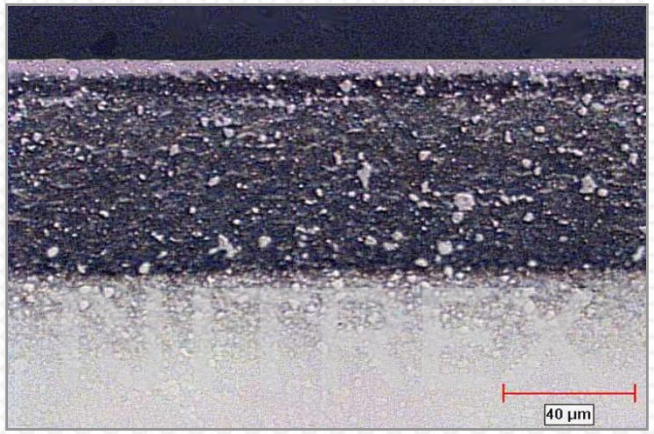
AISI 4140 (42CrMo4)

Characteristics	*Req'ments*	*Results*
White Layer [µm/inch]	< 6 (.0002)	3 (.0001)
Surface Hardness (HV20)	> 513	577

Nitriding Applications

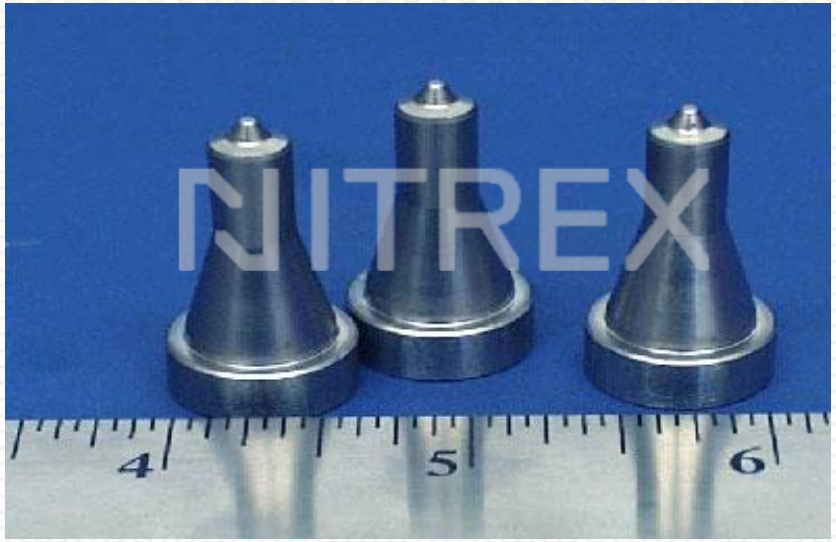
Stainless Steel Piston Rings, Nitreg®-S

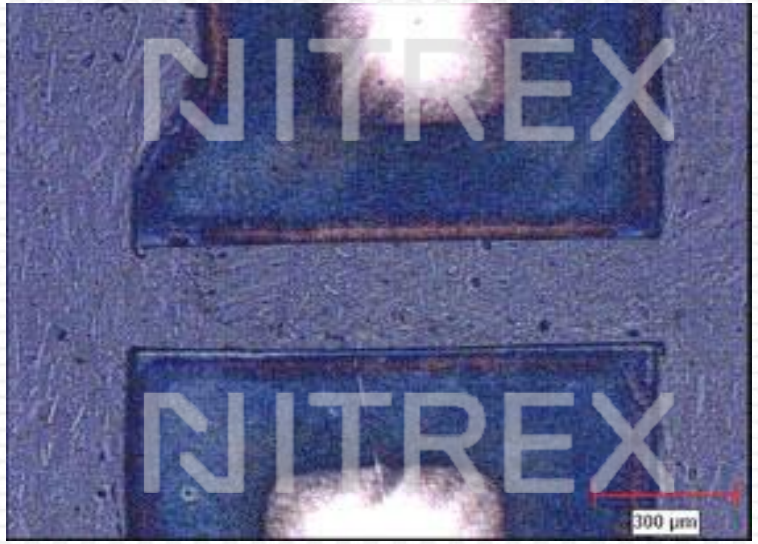
<u>Customer Achieved</u>
Excellent properties
Dimensional stability
Cost savings



Nitriding Applications

Fuel Injectors, Nitreg® Nitrided





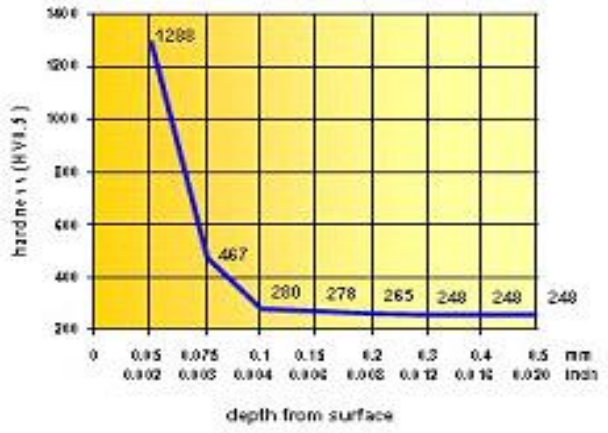
Part: Fuel Injector
Material: H13 (X40CrMoV5-1)
Treatment: Nitreg®

<u>Metallurgical Advantage</u>
Surf. Hardness = 1000 HV1 (~68HRC)
Compound Layer = 0 µm (0”)
Total Case Depth = 200 µm (~.008”)
Core Hardness = 360HV (~36HRC)

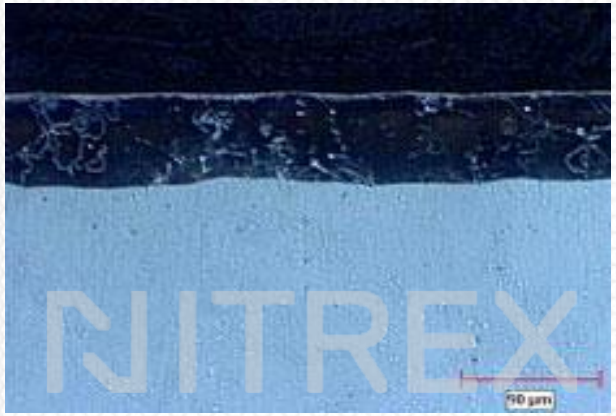
Nitriding Applications

Turbocharger Insert

Cast Ferritic Stainless Steel

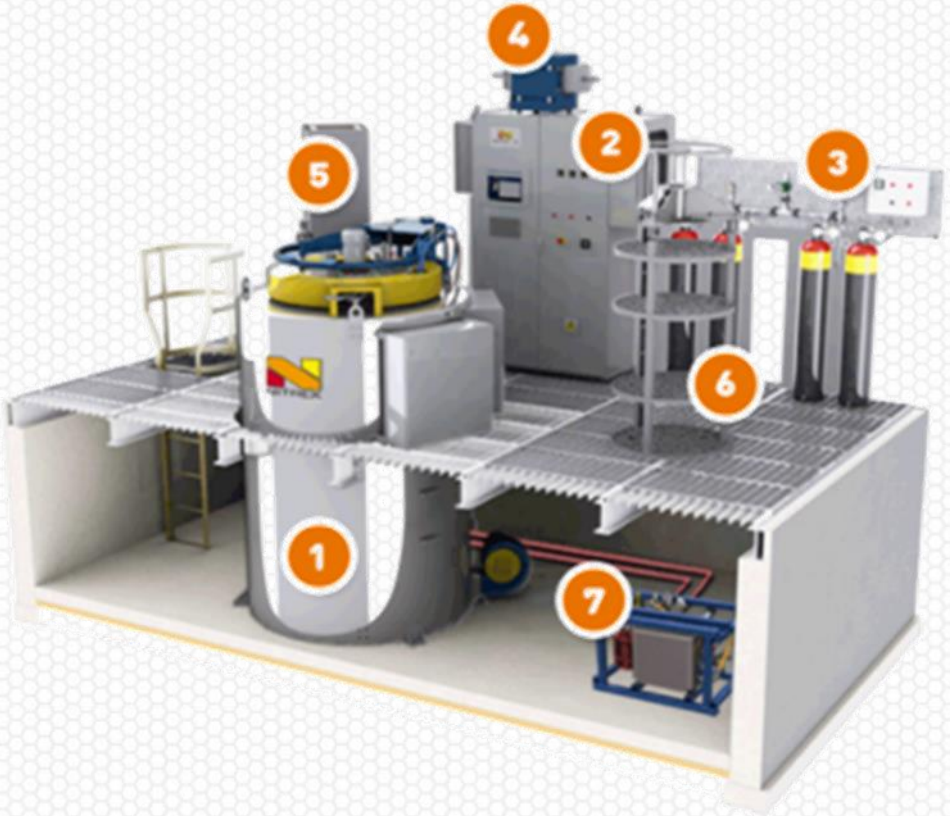


Characteristics	*Requirements*	*Results*
White Layer [µm]	5-15	6
Effec. Case Depth [µm]	60-100 @ core+100	68
Surface Hardness [HV0.1]	1000 min.	1300



Nitriding Systems

- Our revolutionary, and proprietary gas nitriding technology brought greater wear, fatigue and corrosion resistance to ferrous or non-ferrous materials, qualities much sought after by anyone whose product manufacturing activities involve any heat treatment process. You can have more information, even about acquiring equipment at www.nitrex.com



1. NITRIDING / NITROCARBURIZING FURNACE
2. FURNACE PROCESS CONTROL SYSTEM
3. PROCESS GAS DISTRIBUTION STATION
4. AMMONIA GAS DISSOCIATOR
5. EXHAUST GAS NEUTRALIZER - BURNER
6. RACKING
7. CLOSED-LOOP WATER COOLING SYSTEM

For More Information Please Contact in Mexico:

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