
Construction yoke pins


Washing machine axles


Aluminium casting dies


Rocker arms

hef durferrit

TECHNIQUES SURFACES INDIA

hef groupe

ARCOR®

(H.E.F. patent)

ARCOR® (HEF Patents and Trade Mark)

ARCOR® processes are thermochemical salt bath nitrocarburizing and oxinitrocarburizing treatments which enrich the surface of ferrous materials primarily with nitrogen and a small amount of carbon.

Avantages of ARCOR®

- Wear resistance
- Corrosion resistance
- Fatigue resistance
- Friction properties
- Aesthetic Aspect
- Cheap
- Flexible
- Quick
- Environment friendly
- Multi-purpose

Examples of industrial applications

ARCOR® is an excellent alternative to hard chromium, electro-less nickel, zinc and cadmium platings.

ARCOR® may be used in the following industries :

- **Automotive**
- **Construction**
- **Renewable energy (windmills, ...)**
- **Electrics**
- **Marine**
- **Electromechanics**
- **...**

Others (Oxi)-nitrocarburizing treatments from HEF groupe are available: Tuffride®; Tenifer®; QPQ®; Melonite®


Clutch forks


Wiper shafts


Windmill guiding bushes


Forging dies


Ball studs


Piston rods & hydraulic cylinders


Engine valves


Latch plates

Properties of the ARCOR® treated components

Corrosion resistance
Corrosion resistance may exceed 600 hours in salt spray test on simple parts and reaches easily 400 hours on components having welded or crimped assemblies.*(fig.1)*

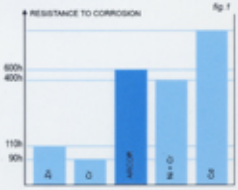


fig.1

Resistance to fatigue
Significant and important increase in fatigue strength is obtained thanks to the compressive stresses created in the nitrogen diffusion zone.

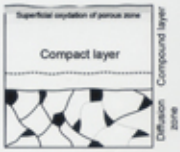
ARCOR® also eliminates any risk of failure due to hydrogen embrittlement, a major problem encountered with many applied coatings.

Resistance to wear and seizure
The hardness of the compound layer from 600 to 1200 HV, depending on raw materials, allows to effectively overcome the problem of wear.

Friction properties
Crystalline structure of ε nitrides forming majority of compound layer and top porosity of the same compound layer retaining lubricant provides excellent friction properties on surface.

Characteristics of the treatment

Compound layer
- The treatment produces a duplex layer made of a compact zone and a top porous zone.
- The composition of the compound layer is mainly ε nitrides and special nitrides.
- During the oxidizing step of the process, top porous portion will be filled with iron oxides (Fe_3O_4).
- The compound layer thickness depends on raw material alloy content.



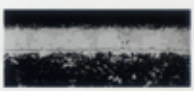
Diffusion layer
Under the compound mayer is a deep zone of nitrogen diffusion, the hardness and depth of which will depend on :
- The alloy content of the substrate
- Time and temperature of the diffusion

Note : the ductility of the surface layers enables excellent compatibility with mating surfaces.

Component improvement	Main influence		
	Compound layer	Diffusion zone	Superficial oxidation
Wear resistance	✓		
Scuffing resistance	✓		
Running behavior	✓		
Hot temperature resistance	✓	✓	
Rotating fatigue strength		✓	
Pressure loadability		✓	
Rolling fatigue strength		✓	
Corrosion resistance	✓		✓

Functional benefits

Three types of ARCOR® treatments

	ARCOR® C		ARCOR® V		ARCOR® N	
Compound & diffusion layers						
		Corrosion resistance		**Corrosion resistance**		**Corrosion resistance**
Standard process	ARCOR® C2	400h BS	ARCOR® V2	400h BS	ARCOR® N7	400h BS
Other processes	ARCOR® C2.5 ARCOR® C3 ARCOR® C4	300h BS 150h BS 100h BS	ARCOR® V2.5 ARCOR® V3 ARCOR® V4	300h BS 150h BS 100h BS	ARCOR® N2	600h BS
Treatment temperature (°C)	570		590		630	
Compound layer morphology	<50% porosity		<30% porosity		<20% porosity	
Compound layer thickness (µm)	10 to 20		10 to 20		20 to 40	
Diffusion depth (mm)	0,2 to 0,5		0,2 to 0,5		0,2 to 0,6	