brief information

innovative and highly functional
surface designs

aalberts surface treatment

content

Aalberts surface treatment processes

(*pages in this brochure)

(All technical values published in this brochure are subject to the test conditions specified. We therefore emphasise that the applications and operating conditions, along with the end user's practical experience, will ultimately determine the level of performance achieved by the processes.)

CompCote®

aluminium oxide polymer composite layers

aalberts surface treatment

CompCote®

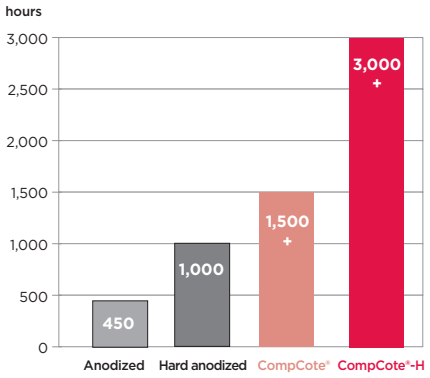
CompCote® refers to aluminium oxide polymer composite layers for aluminium alloys. The layers are formed by anodic oxidation of the base material and simultaneous molecular compounding of the aluminum oxide layer with polymers.

Excellent adhesion to the base material results from the fact that the layer partially merges into the base material. Due to the molecular polymer content, CompCote® offers chemical bond bridges with a coordinated choice of top-coats, providing very good adhesion results. In general, the cross-linked layer structure makes CompCote® a robust layer. CompCote® H, which is produced on the basis of a hard anodic oxidation (hard anodizing), is harder and more wear and corrosion resistant.

CompCote® is excellent for coloring. Accelerated weathering tests with 200 hours of UV exposure show only 1/3 of the reduction in color and brightness in CompCote® compared to that of conventionally anodized layers (both layers 10 µm, colored black and sealed). Standard colors: black, titanium grey, blue, red, gold, green. Other colors on request.

Corrosion resistance

CompCote® is corrosion resistant and outperforms normal anodic coatings due to the presence of molecular polymers.



Salt-spray Test (ASTM B117):
alloy 6061 T6, anodized (MIL Typ III) 10 µm / hard anodized (MIL Typ III) 37.5 µm / CompCote® 10 µm / CompCote®-H 37.5 µm

Component with blue colored CompCote® layer

	process details
Hardness	As layer hardness there is measured – as usual with anodic oxidation layers – the so called apparent hardness. Depending on the alloy and process, it is between 300 and 600 HV.
Wear resistance	In the Taber Abraser test (MIL A 8625F), CompCote® shows excellent wear resistance which can be even better than that of conventional anodizing layers.
Flexural strength	CompCote® does not affect the flexural strength of the base material. This attribute makes the layer interesting for applications in aviation.
Fracture properties	CompCote® produces a fibre-like fracture pattern in notch impact tests. In contrast, conventional oxide layers, break in a brittle manner, like glass.
Tribological properties	CompCote® roughens up the surface comparatively little and possesses an optimized microstructure. CompCote® displays very good anti-scuffing properties in various friction pairings and friction tests. In some cases, the coefficient of friction in repeated tests even decreases (self-smoothing effect). Stick-slip effects are reduced.
A selection of applications	Architecture, automotive industry, aviation, defense technology, domestic appliances, electrical engineering, food industry, hunting firearms, hydraulics, information technology, mechanical engineering, medical technology, packaging machines, photo and video technology, pneumatics, sporting goods.

HART-COAT®

hard anodizing of aluminium alloys

aalberts surface treatment

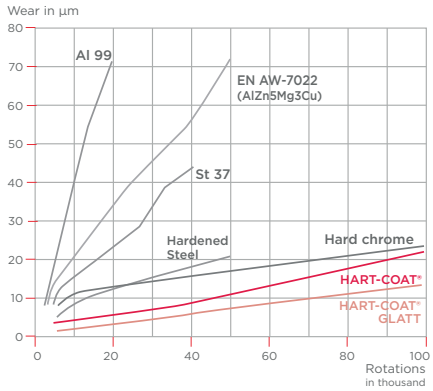
HART-COAT®

The HART-COAT® process, also known as HC, is an electrolytic treatment for aluminium substrates during which a hard and thick aluminium oxide layer is formed. The essential purpose of this surface treatment is to provide protection against wear and corrosion as well as further functional improvements to components from almost all industrial sectors.

The process corresponds to ISO 100 74. HART-COAT® layers are built up by anodic oxidizing in a specially formulated, cold, acidic electrolyte. By means of electric current, a protecting aluminium oxide layer is produced on the surface of the workpiece being treated.

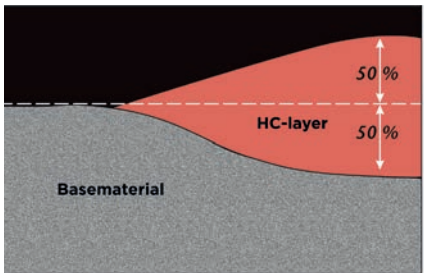
Compared to conventional anodized layers, HART-COAT® layers are thicker and provide better wear resistance.

HART-COAT® layers can be applied where properties like corrosion resistance, wear resistance, dimensional accuracy, anti-friction properties or insulation are required for aluminium substrates. HART-COAT® layers show a good adhesion to the base material. Nearly all wrought, cast and die-cast aluminium alloys destined for industrial use are suitable for treatment with HART-COAT®.



Wear behaviour of HART-COAT® layers compared to other materials (Taber Abrasion measurements, abrasive wheel CS 17, load 10N)

Winch coated with HART-COAT®.

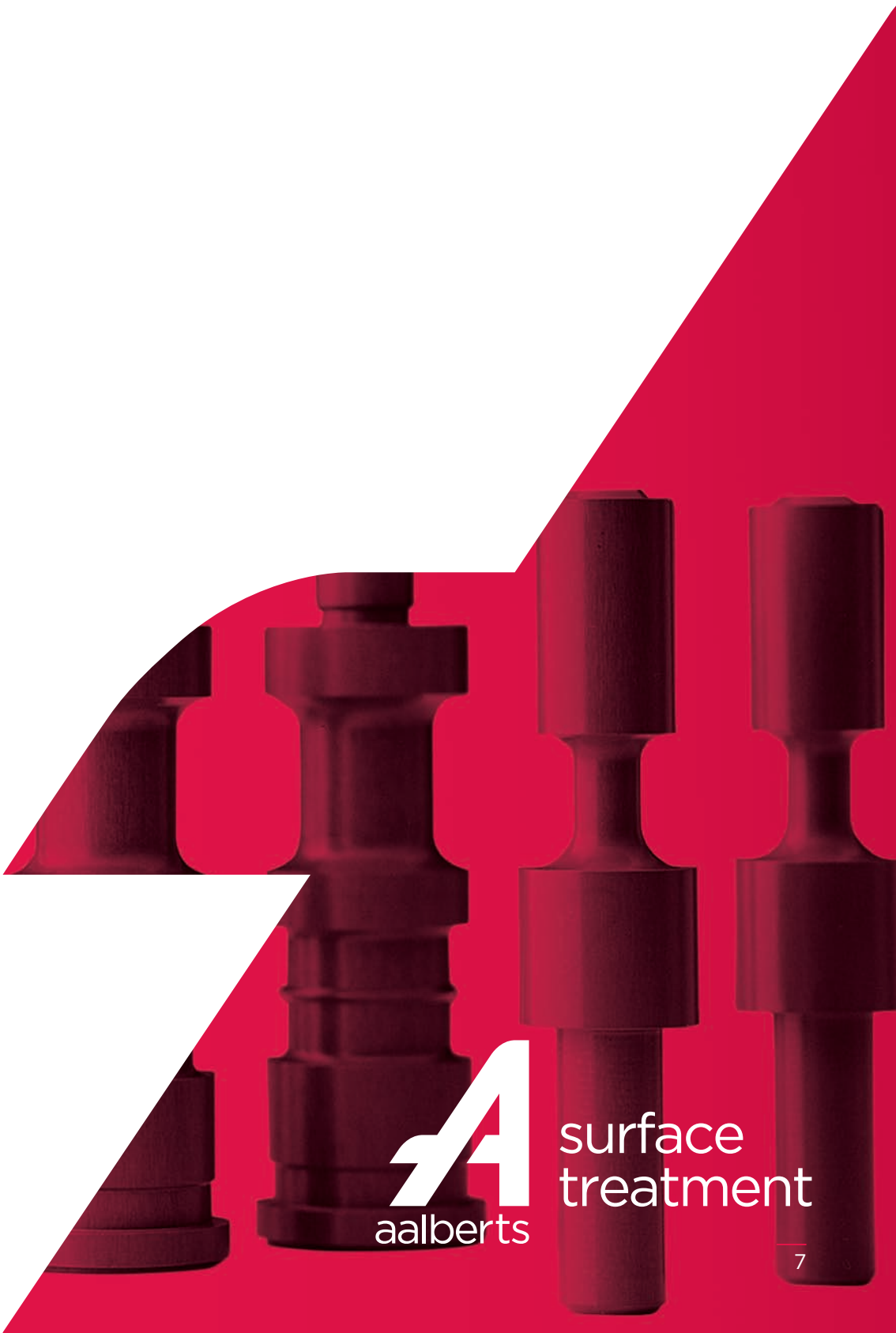


This schematic scene of a cross section of a 50 µm thick HART-COAT® layer (HC layer) shows that 50 % of this conversion layer grow into the substrate and 50 % outwards. In case of HART-COAT®-GLATT (HC-GL) there is a 2/3 penetration and 1/3 build-up.

	HC	HC-CU	HC-GD	HC-GL
Suitable materials	for wrought aluminium alloys as well as sand and permanent mold cast	for aluminium alloys with a high copper content (2 % to 6 %)	for die-cast aluminium alloys with high copper and/or silicon content	for wrought, cast and die-cast aluminium alloys with limited copper, silicon and lead content
Application	pneumatic and hydraulic cylinders, compressor wheels, lifting gear, insulator spacers, hot-plates, screw conveyors, spacers, clamping and retaining mechanisms, cylindrical tubes, rocker arms, surgical instruments	guide pulleys, pistons, nozzles, valves, roller bearings, centrifuges, camera components, bearing shells, cam plates, levers, pulleys, coils	housings, guide cylinders, guide plates, mounting plates, clothes iron plates, damping chambers, gears and rack drives, clutch components, cylinder heads	for components requiring an especially smooth and wear-resistant surface
Layer properties depending on alloy	high wear resistance, improved corrosion resistance, improved hardness, optimum anti-friction properties, optimum adhesion, high thermal insulation, high electrical insulation, good dimensional accuracy, resistant to temperature, suitable for consumer goods, food compatible			

HART-COAT® GLATT

hard anodizing of aluminium alloys
especially smooth and wear resistant



aalberts surface treatment

HART-COAT® GLATT

The process:

HART-COAT® or HC to be short is an hard anodic oxidation which protects aluminium materials against wear and corrosion with a hard ceramic-like layer. HC-GL is a process variant of HART-COAT® whose result is the forming of very smooth and very wear-resistant layers onto aluminium materials. HC-GL coatings are obtained through anodic oxidation in a specially formulated cooled, acid electrolyte. This type of coating has an extremely low pore volume and pore diameter compared to the protective coatings obtained with conventional anodizing processes.
The designer has to bear in mind, that the dimensions of a component only change by 1/3 of the total layer thickness.

Base materials for the HC-GL coating:

HC-GL surface coatings can be used wherever corrosion protection, wear resistance, dimensional accuracy, anti-friction properties or insulation is required for aluminium materials. HC-GL layers distinguish themselves for a good adhesion on the base material. Nearly all wrought, cast and die-cast aluminium alloys destined for industrial use are suitable for treatment with HC-GL, but the content of copper, silicon and lead has to be limited.

Color of the HC-GL layer:

The color of the HC-GL layer depends of the alloy of the base material. With pure aluminium (Al 99.5) it is golden yellow. The more alloying elements are added the more changes the colour into grey yellow.

Layer thickness and tolerances:

Typical layer thickness: 10 µm up to maximum 25 µm. Layer thickness and layer thickness tolerance depend on the alloy, bath capacity and other parameters.

Roughening:

In comparison to conventional hard anodizing, the HC-GL process stands out with respect to its very low rate of roughness, which according to the substrate used varies between R_a = 0.1–0.2 µm. The increase is less if there is considerable surface roughness to begin with.

Hardness:

The hardness of the HC-GL layer depends on the alloy and amounts at least to 400 $HV_{0.025}$.

Anti-friction characteristics:

The coefficient of friction of HC-GL determined in an anti-friction test carried out with a pin-disc-tribometer had an average value of 0.73 (F_N = 5 N; v = 6 m/min; 9,000 revolutions).

Wear resistance:

Performance with regard to abrasive wear is especially good. Results of the Taber Abraser measurements can be seen in the diagram on page 6 (brief information HART-COAT®).

HART-COAT®-GL coated (25 µm) lever and knife carrier for asparagus peeling machine. The layer protects here against corrosion and provides improved cleaning and wear properties.

Electric strength:

The electric strength depends on the type of alloy and amounts to about 30 V/µm.

Surface impregnation:

Depending on the surface roughness to begin with and on the application cases an impregnation of the layer with PTFE can be useful in order to reduce friction (e.g. stick-slip effect) and wear additionally.

Corrosion resistanc:

Even without sealing, the corrosion resistance of an HC-GL-treated surface is excellent. It can withstand a test period of well over 2,000 hours in the DIN EN ISO 9227 salt spray chamber test (e.g. 0–2 spots of corrosion on 25 µm HC-GL applied to EN AW-6082 (AlSi1MgMn)).

Consultation with Aalberts surface treatment:

It is recommended to make decisions on construction and material selection in consultation with Aalberts surface treatment in an early stage of the planning phase.

anodizing

functional and decorative refinement of aluminium parts

aalberts surface treatment

anodizing

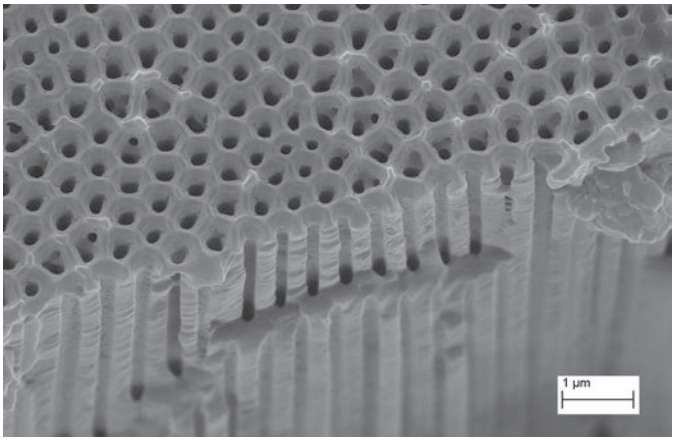
Sulphuric acid anodizing, better known as anodizing is a coating developed for the functional and decorative improvement of aluminium parts. The coating is performed in an acid electrolyte at temperatures slightly below room temperature. The parts are connected with the anode and, in the course of the treatment, the parts surface is converted into an aluminium oxide layer.
The achievable layer thickness depends on the application, the desired layer properties and other parameters. For most applications, layer thickness values range from 5 to 20 µm.

The oxide layer builds up for 1/3 on the aluminium and for 2/3 in the aluminium. This must be considered during the design phase.

Nearly all wrought, cast and die-cast aluminium alloys destined for industrial use can be anodized. However, the alloy has great influence on the color of the anodized part. An alloy out of the 3,000 series has grey color, a 7,000 alloy has more gold-like appearance.

For more information please consult your Aalberts surface treatment contact.

Anodized aluminium part



SEM-recording of an anodized layer

	maximum layer thickness	corrosion resistance	hardness
Properties	up to 20 µm depending on the alloy	max. 2,000 hours salt spray according to DIN EN ISO 9227 (acetic acid salt-spray test)	up to 250 HV 0.025, depending on the alloy
General specifications	MIL-8625 Type II		

	alloy	components	appearance
Influence of the alloy on the final color of the layer	1,000 series	unalloyed	clear / colorless
	2,000 series	alloyed with Cu	yellow / gold
	3,000 series	alloyed with Mn	grey
	5,000 series	alloyed with Mg	dark grey
	6,000 series	alloyed with Mg and Si	anthracite grey
	7,000 series	alloyed with Cu and Zn	gold
Available colors	clear, black, orange; others on request		

DURNI-COAT®

functional finishing of metals via electroless nickel

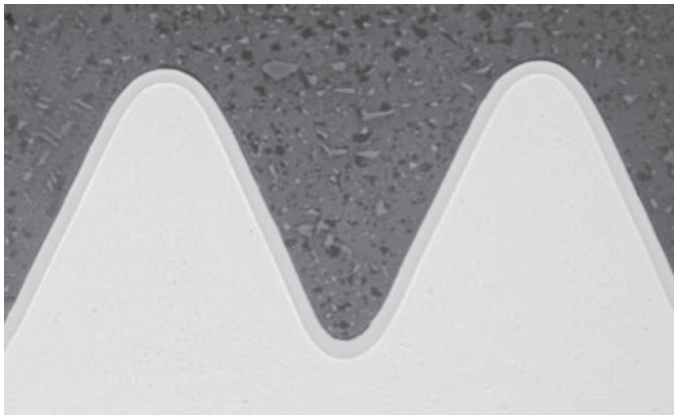
aalberts surface treatment

DURNI-COAT®

DURNI-COAT® nickel layers are deposited on active substrate surfaces from aqueous nickel salt solutions and hypoposphite as the reducing agent. The surfaces of complex shaped components are treated true to their original contours; sharp edges and impressions, accessible cavities and bores are uniformly coated. Through variation of electrolyte and process parameters, DURNI-COAT® layers can be tuned to suit special requirements. The composition of the electrolyte and the processing conditions are used to control the phosphorous content of the DURNI-COAT® layers. This content can be varied between 3 and 14 %. Phosphorous concentration is an important factor for many functional properties. DURNI-COAT® layers with higher phosphorous content are as-plated X-ray amorphous. Heat treatment brings about recrystallisation with the formation of nickel phosphides. Electrical and magnetic characteristics, and other mechanical and chemical properties, can be altered in this way.

The electroless nickel-plating (DURNI-COAT®) is carried out at our facilities according to DIN EN ISO 4527.

Electroless nickel plating by the DURNI-COAT® process gives wear and corrosion resistance to turbo charger compressor wheels made of aluminium



This cross-section illustrates the uniform DURNI-COAT®-deposit on an M4 thread

DURNI-COAT®	DNC 450	DNC 520	DNC 771	DNC-AL	PTFE-DURNI-DISP	SIC-DURNI-DISP
Characteristics of the variants	especially ductile and corrosion resistant, lead-free variant: DNC 471	especially corrosion and wear resistant, lead-free variant: DNC 571	especially wear resistant, lead-free	for aluminium and aluminium alloys	dispersion layer with embedded PTFE	dispersion layer with embedded SiC
Application	components with high corrosion and chemical loads	pump components for use with natural gas and crude oil, food handling and processing equipment, nozzles, compressors, screws, threads	mining equipment and components, metal fittings and hydraulic flaps, vehicle components	structural parts for textile machines, printing presses, packaging machines, control system technology, electronics, electrical engineering, vehicle components	structural pneumatic and hydraulic components, mould construction, control levers, door lock fittings, shafts, bearing seats, textile machine parts	brake discs, cylinder running surfaces, pistons, valve plates, structural pneumatic and hydraulic parts, feeding funnels, rollers, track rollers
Suitable materials	all types of low-alloy ferritic steel, cast iron-based materials, stainless steel, non-ferrous metals such as copper, brass and bronze, aluminium alloys, sintered metal materials, other metal and ceramic-based materials (depending on previously-supplied sample coatings)					
	For the most demanding specifications also double layers (DUPLEX-DNC) can be applied, e.g. the hard, wear-resistant DNC 771 layer in combination with a DNC layer with a higher phosphorous content.					

IVD aluminium vacuum coating

high-purity aluminium layers

aalberts surface treatment

IVD aluminium vacuum coating

Ion Vapour Deposition, known as IVD or Ivadising, is a physical vacuum deposition process which is used to apply a pure aluminium coating to various substrates, to improve the resistance to atmospheric and bi-metallic corrosion. The stages within the production process are as follows: After degreasing and grit-blasting the parts to be coated are loaded into a vacuum coating chamber and a vacuum is drawn. A noble gas is then back-filled into the chamber, and an electrical charge is applied. This results in a plasma / ionic glow discharge which is clearly visible as a purple haze in the chamber, and results in a super-clean surface. Once this is complete, the coating process can begin. Aluminium wire is fed into a series of superheated ceramic crucible. A high voltage is used to create very high temperatures. The aluminium is then vapourised as an electrically charged vapour, which has an affinity to deposit on to the components, which are electrically "earthed". Once coated in IVD aluminium, the components have a dull grey appearance. The next step is to close the pores in the outer surface of the coating by glass bead peening. The parts can be used as plated, or, more commonly, the pure aluminium surface is then converted to an aluminium chromate using a chemical conversion coating.

Corrosion resistance of IVD aluminium vacuum coating

The process has been developed as three different coating classes, with a class 1 coating at 25 µm minimum, offering the best corrosion resistance. The class 2 coating is often used on machined parts where tight tolerances apply, and the thickness applied is generally 13-25 µm. Finally the class 3 coatings are generally applied to fasteners and other tight tolerance and detailed components. This process has typically 8-13 µm thickness and offers the lowest corrosion resistance. Corrosion resistance can be increased by converting the surface with a chromate treatment such as Surtec or Alodine.

The benefits of this process are numerous when compared to cadmium plating. The process is run in vacuum, and uses high purity aluminium. So there is minimal impact on the environment and the operators. The coating outperforms cadmium in salt spray corrosion tests.

IVD coated components, with a masked internal diameter. The components have been treated with a trivalent chromate after application of IVD.

		Test period	
Coating class	Coating thickness µm	Type I (as coated) h	Type II (chromate converted) h
1	25 +	504	672
2	13-25	336	504
3	8-13	168	336

Minimum performance of the IVD Aluminium Vacuum Coating in salt spray testing according to ASTM B117.

Further properties	• IVD aluminium vacuum coating is smooth and uniform and consists of pure aluminium. • provides sacrificial corrosion protection to steel without the risk of hydrogen embrittlement. • provides improved corrosion protection to high strength aluminium alloys. • can be used in contact with aero engine fuels. • prevents contact corrosion e.g. titanium, stainless steel parts in aluminium assemblies. • Neither the process nor the coating create toxic materials. • Corrosion resistance is at least equal to that of cadmium. • The coating can be applied within closely controlled limits. • The coating is highly conducting. • The coating can perform in service at temperatures in excess of 400 °C.
Applications	The coating is currently used in aerospace and defence applications where critical corrosion resistance with electrical conductivity is paramount or where dissimilar metal contact can cause galvanic attack. Typical components currently processed with IVD Aluminium Vacuum Coating include engine and airframe fasteners (steel and titanium), high tensile steel airframe parts, titanium bearing shells, landing gear components and assemblies, sintered magnets and electrical connectors.

high tech galvanics

tin, silver, gold plating and nickel sulfamate treatment of a wide range of materials

aalberts surface treatment

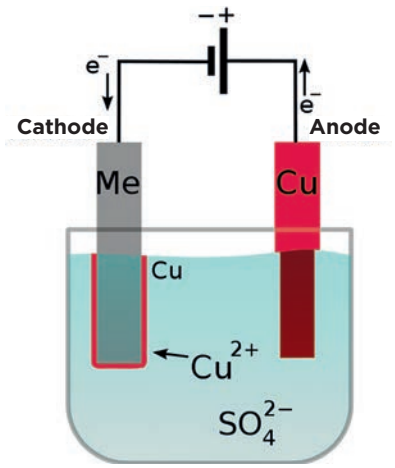
high tech galvanics

Electroplating is a process that uses an electrical current to deposit a thin metal layer on the surface of a conductive metal part. This thin metal layer is deposited from an electrolyte which contains the ions of the specific metal. Electroplating is primary used for changing the properties, such as wear resistance, corrosion resistance, friction etc., of metal parts. Also electroplating is used for repair of worn out parts and for the fabrication of parts.

The principles of electroplating are as follows:
In a water based electrolyte, which contains conductive salts and ions of the to be plated metal, a metal or conductive part is connected with the negative pole (cathode) of a rectifier. At the same time the positive pole of the rectifier (anode) is connected with sheets of metal which are of the same sort as the metal ions in the solution.

When the rectifier is turned on, a current will start to flow and will cause oxidation of the metal sheet at the anode. This oxidized metal will dissolve in the electrolyte, creating new metal ions.
Simultaneously metal ions discharge at the cathode which results in a metal deposition on the submerged part.

Swivel nuts with silver plating on the inside (above)
Thread guide for textile machines with nickel sulfamate surface (below)



Scheme of the process

main process	max. dimension in mm	max. weight in kg
Gold	600 x 100 x 400	25
Gold/Cobalt	400 x 300 x 450	10
other processes	1,900 x 500 x 850	1,000

DURALLOY®

optimisation of friction processes
through specially structured metal surfaces

aalberts surface treatment

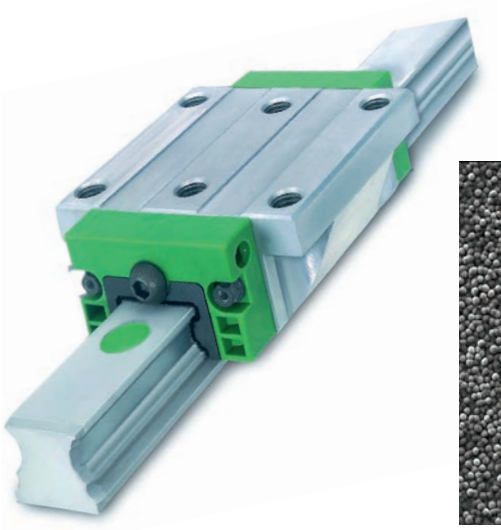
DURALLOY®

DURALLOY® is a special thin dense chrome coating with a maximum of 20 µm layer thickness. The specific structured surface of the DURALLOY® layer provides outstanding chemical resistance and material hardness for applications where conventional coating systems with comparable layer thicknesses are ineffective.

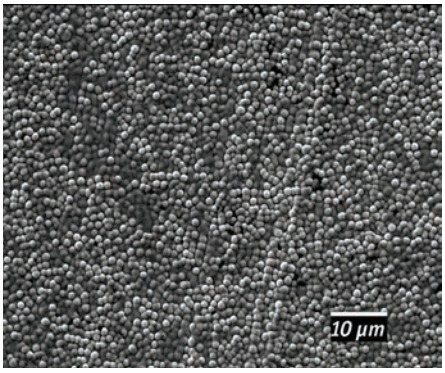
Due to its specific properties, in high friction applications the structured surface of the DURALLOY® layer significantly increases the wear and corrosion resistance of the coated material.

Properties

DURALLOY® is an extremely hard, crack-free, precise, very thin and ultrapure metallic chrome layer. By means of a high-energy process a nodular structured surface can be deposited on all types of metals, except for magnesium and titanium. Applications for aluminium components are limited (please contact us for details). Due to the low process temperature of under 60 °C no changes to the structure of the base material occur during plating.
This essential advantage of the process ensures shape and hardness stability for any manufactured components. DURALLOY® provides effective protection against friction and vibration corrosion and thus considerably increases the wear resistance of the material when used, for example, in gears or with shaft-hub-joints.



Linear guide with DURALLOY® layer



Micrograph of the DURALLOY® surface.

DURALLOY® facility in Villingen-Schwenningen, Germany

	TDC	TDC-LC	TDC-Ag
Layer material	Chrome	Chrome + LC	Chrome + Silver
Application	in cases of load by friction and vibration corrosion and by wear	in cases of pressure load (linear guides, ball bearings) or exposure to aggressive gases (roller mills, metallurgy, defense technology)	in cases of load by starved lubrication, dry lubrication (e.g. vacuum technology)
Suitable materials	The range of the materials that can be coated with DURALLOY® includes most of the widely used engineering metals: steels up to 62 HRc and with a chrome content of 15 %, stainless steels, grey cast iron, sintered metals and bronze. For surface treatment of each of the particular base materials specific DURALLOY® processes are available.		
Layer properties depending on process	wear protection, corrosion protection, hardness, effective lubricant reservoir, dry-running characteristics, damping features, protection against vibration corrosion, non-magnetic, not magnetisable, outstanding adhesion		

galvanic zinc

functional and decorative

aalberts surface treatment

galvanic zinc

Zinc is the most frequently deposited metal in surface technology. It serves as corrosion protection and provides cathodic protection for the base material. This means that the steel becomes the cathode and the zinc forms a sacrificial anode and dissolves at the imperfections of the layer. Below 100°C it is brittle, in the range of 100 - 200°C it becomes soft and elastic, above 200°C it becomes brittle again.
Metal parts are effectively protected against corrosion with galvanic zinc plating. With modern, fully automatic rack and barrel systems, we meet the highest functional and optical requirements in a reproducible manner and work in accordance with all current standards and specifications. With DIN 14001, we also meet the requirements for the conservation of natural resources and the environment.

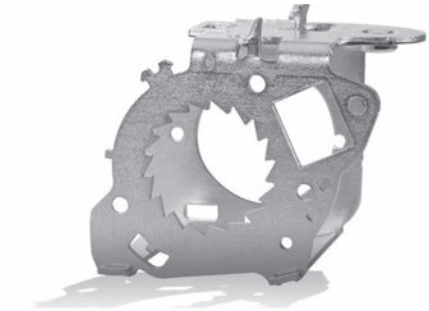
Post-treatment processes (Cr VI-free): blue/transparent passivation, thick-film passivation, black passivation, sealings, topcoats, lubricants for wear protection and adjustment of friction coefficients.

Process description

The basis for high-quality galvanizing is electrolytic-chemical pre-cleaning through degreasing and pickling. Afterwards, the coating takes place in an acidic or alkaline electrolyte before the post-treatment(s) including the drying process complete the process. In order to produce and increase corrosion protection (zinc corrosion – white rust and base metal corrosion – red rust), a precisely adapted passivation and/or sealing can be selected – depending on the requirements or area of application.


Galvanized screws


Galvanized threaded shafts


Galvanized housings

	galvanic zinc
Main features	Alkaline and acid zinc processes are used. The alkaline process is characterised by good throwing power and high hanging densities. Processing of die-cast zinc as well as high-strength components is possible. The acid process is characterised by a high deposition rate and flangability (ductility). In addition, cast and forged parts can be coated. Zinc coatings provide a good base for subsequent cathodic dip painting or powder coating. The coating properties are considerably improved by zinc alloys such as zinc-iron and zinc-nickel. Corrosion protection and usage are produced and influenced by passivations, sealings and topcoats.
Applications	Automotive industry, mechanical and apparatus engineering, sanitary engineering, construction and fittings industry, electrical industry; fastening elements
Facilities	rackware: goods window 3.00 x 1.50 x 0.40m Bulk goods: modern double barrel machine up to 280kg filling weight and 180 litres volume

Galvanic zinc coatings, minimum requirements for corrosion resistance according to DIN EN ISO 19598:2017-04

Galvanizing	Process	DIN 9227 without coating corrosion (white rust)	DIN 9227 without base metal corrosion (red rust)		
			5 µm	8 µm	12 µm
Galvanic zinc transparent passivated	barrel	8	48	72	96
	rack	16	72	96	120
Galvanic zinc iridescent passivated	barrel	72	144	216	288
	rack	120	192	264	336
Galvanic zinc iridescent passivated sealed	barrel	120	192	264	360
	rack	168	264	360	480

Service	We find the optimal coating process for your components on the basis of an individual consultation. From the first sampling to the introduction into series production, we define the relevant work steps together with you. On request, we can also supplement our technical services with a tailor-made service for you, e.g. 100% inspections, packaging, logistics with pick-up and delivery service. We also offer composite production (e.g. duplex layers, screw locking / sealing).

galvanic zinc-nickel

functional and high corrosion protection

aalberts surface treatment

galvanic zinc-nickel

Galvanically deposited zinc-nickel coatings offer excellent cathodic corrosion protection for the base material. In addition, they are suitable for use at higher temperatures. The zinc-nickel alloy layer has a significantly higher hardness than pure zinc. With a nickel incorporation rate of approx. 12 to 16 % and over 400 HV the zinc-nickel alloy layer has a significantly higher hardness than pure zinc.

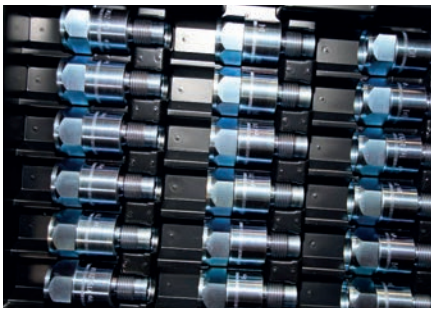
By applying a conversion layer, resistances of over 1,000 hours are achieved in the salt spray test according to DIN EN ISO 9227. Galvanic coating with zinc-nickel is impressive due to its good chemical and mechanical properties. With modern, fully automatic rack and barrel facilities, we meet the highest functional and optical requirements in a reproducible manner and work according to all current standards and specifications.

We also fulfil the requirements of DIN 14001 for the conservation of natural resources and the environment.

Post-treatment processes (Cr VI-free):
Transparent passivation, thick film passivation, black passivation, sealings, topcoats, lubricants for wear protection and adjustment of friction coefficients.

Process description:
The basis for a high-quality zinc-nickel coating is electrolytic-chemical pre-cleaning through degreasing and pickling. Afterwards, the coating takes place in an electrolyte before the post-treatment(s), including the drying process, complete the process. In order to further increase the corrosion protection, a precisely adapted sealing can be selected – depending on the requirements or area of application.


Zinc-nickel bars


Zinc-nickel casings


Zinc-nickel screws

	galvanic zinc-nickel
Main features	The zinc-nickel process features very high corrosion protection. The processing of steel as well as zinc die-castings is possible. With an internal anode, an extremely good layer distribution can also be achieved. Zinc-nickel coatings are also suitable for processing high-strength parts. We also offer a utility model-protected flangeable zinc-nickel (ductile). Zinc-nickel coatings offer a good adhesion base for subsequent cathodic dip painting or powder coating.
Applications	Automotive industry, mechanical and apparatus engineering
Facilities	rackware: goods window 2.30 x 1.20 x 0.40m Bulk goods: modern double barrel machine with 280 kg filling weight and 180 litres volume

galvanic zinc-nickel coatings, minimum requirements for corrosion resistance according to DIN EN ISO 19598:2017-04

Alloy coating	Process	Minimum test duration (h)			
		without coating corrosion	without base material corrosion depending on the Zn or Zn alloy layer thickness		
			5 µm	8 µm	12 µm
galvanic zinc/nickel transparent passivated	barrel	120	480	720	720[a]
	rack	192	600	720	720[a]
galvanic zinc/nickel transparent passivated, sealed	barrel	168	600	720	720[a]
	rack	360	720	720[a]	720[a]
galvanic zinc/nickel iridescent passivated	barrel	120	480	720	720
	rack	192	600	720	720[a]
galvanic zinc/nickel iridescent passivated, sealed	barrel	168	600	720	720[a]
	rack	360	720	720	720
galvanic zinc/nickel black passivated, sealed	barrel	168	480	720	720[a]
	rack	240	600	720	720[a]
galvanic zinc/nickel black passivated	barrel	48	480	720	720[a]
	rack	72	600	720	720[a]

a) The requirement was reduced to 720 h in order to limit the costs for the tests.

Service	We find the optimal coating process for your components on the basis of an individual consultation. From the first sampling to the introduction into series production, we define the relevant work steps together with you. On request, we can also supplement our technical services with a tailor-made service for you, e.g. 100% inspections, packaging, logistics with pick-up and delivery service. We also offer composite production (e.g. duplex layers, screw locking / sealing).

GLISS-COAT®

environmentally friendly dry lubricant
coating systems for all kinds of friction partners

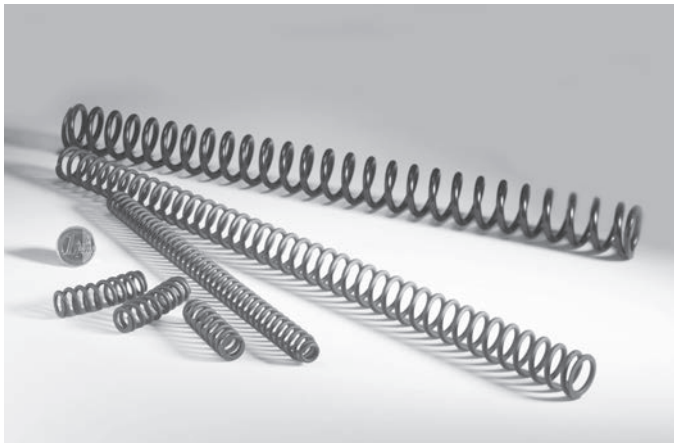
aalberts surface treatment

GLISS-COAT®

The GLISS-COAT® brand denotes the range of dry lubricant coatings developed by Aalberts suface treatment and designed to reduce friction and surface wear of the final coating. The coating materials are water-soluble. Various methods of application are possible. The type of application method depends upon the geometry and quantity of parts to be coated, the type of liquid coating material used, e.g. single or multiple component system, and the final coating requirements.

The properties of GLISS-COAT® can be adjusted according to customer and application-specific requirements.
Most GLISS-COAT® layers must be dried after application onto the surface to achieve the required properties with regard to adhesion, hardness, corrosion protection and lubrication. During the drying process temperatures below 100 °C are generally employed. The coated parts are spread out during drying in order to ensure uniform curing.

Small parts, treated with GLISS-COAT®



Pressure springs for automotive shock absorbers, treated with GLISS-COAT® 200-W-60P

GLISS-COAT®	200-W	200-W-60P 200-W-100P 200-W-60P	200-W-KP	200-W-SO3	CO3	400-W	2000
Characteristics of the variant	water-based, solvent-free coating system (basic system)	various compositions which contain lubricating additions	with corrosion protecting additions	black-dyed surface with anti-friction properties	formation of a shiny lubricant film, if subject to pressure	high temperature coating for anti-adhesive applications (shielding gas nozzles for welding technology), applicable up to 600 °C	multi-functional combination coatings: a first layer + a functional paint coat without silane compounds
Applications (rack and barrel plated parts)	• all parts that are subjected to an abrasive load • movable vehicle interior components, e.g. hinge pins, bearing bolts, seat adjustment components, guide plates • rotationally symmetric components, anchors • leaf springs • bolts, screws, nuts • vehicle door locks • guide mechanisms, rollers • slide bearings, bushes • insert/outsert injection moulding technology				• balls • bearings fitted to drive systems, turbines and rotors • coil compression springs for damping systems • seat bolting devices • spindles, shafts • valves, stopcocks • roller bearings • toothed wheels • gear racks		
Suitable materials	Depending on the process variant all metals, light metals as well as plastics destined for industrial use can be treated. Among others, the following substrates have been successfully treated for special applications: paper, non-woven fabrics, plastic foils, metal foils, ceramics						
General layer properties	anti-friction properties, pressure resistant, helps prevent squeaking and grinding noises free of heavy metals according to the EU End-of-Life Vehicle Directive						

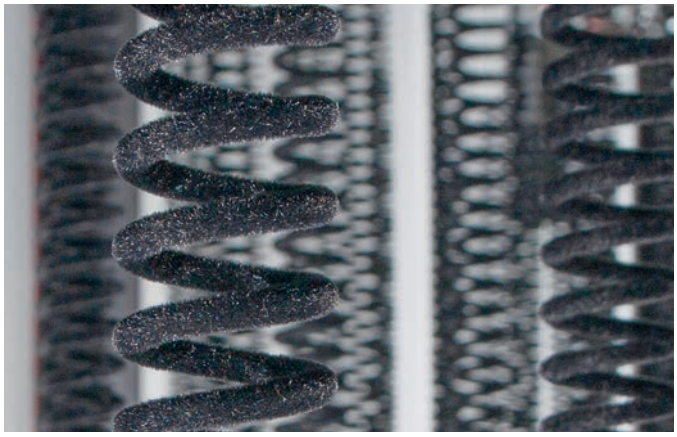
functional painting

anti-friction flock coatings, cathodic dip paintings and phosphatings

aalberts surface treatment

functional painting

Aalberts surface treatment offers a broad range of functional painting that includes cathodic dip paintings and anti-friction flock coatings. Pre-treatments and additional finishes, such as degreasing or phosphating without a downstream painting process are also offered. Assembling of components, customized final inspections or the realisation of the packaging instructions of our customers complete the range of services.



Coil springs with GLISS-COAT® FLOCK

Guide rail with GLISS-COAT® FLOCK

	anti-friction flock coating GLISS-COAT® FLOCK
Description	GLISS-COAT® FLOCK is a coating to improve the absorption of impacts and noise. For this a low-friction GLISS-COAT® adhesive is combined with polymer-fibers. GLISS-COAT® FLOCK can be applied to phosphated, anodised and blasted metal surfaces as well as to plastic.
Applications	all kinds of springs, profiles, anti-friction mechanisms, guides, guide rails, blocking pins Partial coatings are also possible, e.g. only the outside area or only the inside area of a spring.
Layer properties	compliant surface helps with variable tolerances, prevents squeaking and grinding noises, improves impact absorption, anti-friction properties, improved corrosion resistance, elevated wear resistance

	cathodic dip painting	zinc-phosphating
Description	Cathodic dip painting is a process during which the workpiece to be coated is negatively charged and then immersed into a paint bath with positively charged paint particles. These paint particles are attracted to the workpiece on which they deposit and form a uniform film across the whole surface. Every gap and corner is coated until the film reaches the specified layer thickness. At this layer thickness the film acts as an insulation of the part so that the electrical attraction is suppressed and the coating process is finished. Subsequent to the application of the paint layer a heat treatment (baking) is carried out at 180 to 220 °C.	Aalbert surface treatment offers rack and barrel phosphating with and without oiling according to DIN EN 12476:2001. To confirm corrosion resistance performance it is necessary to test sample coatings.
Applications	• the automotive sector (corrosion resistance) • general mechanical engineering (corrosion protection, also for stamped parts) • well suited for complex shaped parts	Lot of applications for the automotive sector, mechanical engineering as well as for many other branches.
Layer properties	• good corrosion resistance • high impact resistance	• primer for subsequent paintwork • moderate corrosion resistance

MAGOXID-COAT® / KEPLA-COAT®

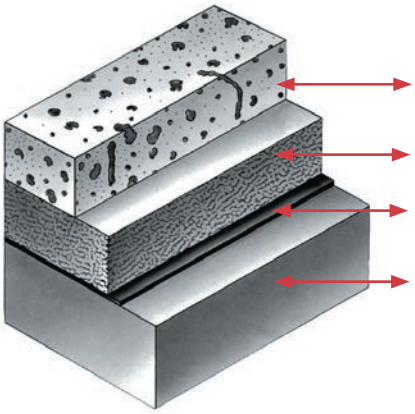
plasma chemical coatings for light metals

aalberts surface treatment

MAGOXID-COAT® / KEPLA-COAT®

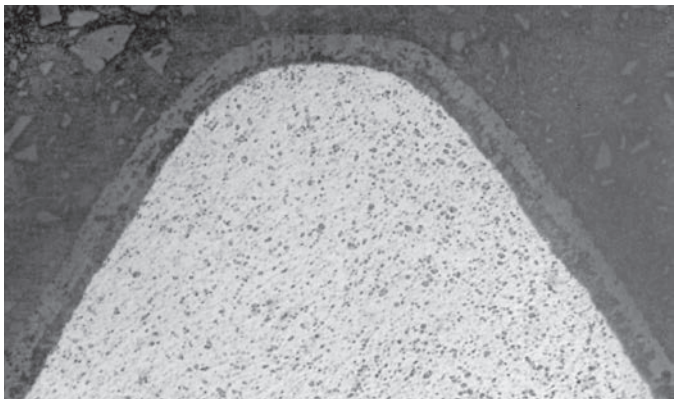
MAGOXID-COAT® and KEPLA-COAT® are anodic plasma chemical surface treatments with functional characteristics, which – added up – cannot be achieved with conventional electroplating.
MAGOXID-COAT® can be used to apply finishes to magnesium alloys, while KEPLA-COAT® is designed for use on aluminium and titan alloys. The plasma chemical process is used to produce oxide-ceramic layers which, in addition to providing a high level of protection against wear and corrosion, also fulfill requirements regarding hardness, uniform layer formation, fatigue strength, dimensional accuracy or temperature load capacity.

Magnesium component with MAGOXID-COAT® layer (right) and without (left)



1 = high pore-count oxide ceramic layer
2 = low pore-count oxide ceramic layer
3 = Barrier layer ~ 100 nm
4 = Aluminium, titan or magnesium substrate

The schematic diagram provides a graphic representation of the oxide ceramic/metal bonding created by the MAGOXID-COAT® or KEPLA-COAT® process



The photograph shows a metallographic microsection of a KEPLA-COAT® layer on a thread ridge.

	MAGOXID-COAT® (MC)	MC black	KEPLA-COAT® (KC)	KC black
Suitable materials	For use with all common magnesium alloys	Virtually any magnesium-based material suitable for industrial use	Suitable for almost all wrought, cast and die-cast aluminium alloys	For use with all common aluminium- or titan-based materials
Application	Bobbins, clutch components, conveyor guide rails, cylinder tubes, driving gears, housings, levers, packaging moulds, piston valves, pulleys, rollers, sealing units	Aviation and space sector, fine precision screw threads, heating radiators, optical components, vacuum technology	Bracket devices, cylinders and drums, cylindrical tubes, fixing discs, housings, rotors, running wheels, sealing gaskets	Aviation and space sector, fine precision screw threads, heating radiators, optical components, vacuum technology
Properties	MAGOXID-COAT® and KEPLA-COAT® are electrolytic processes which make use of an external power source. The workpiece being processed takes on the function of the anode. The surface of the material is transformed into the corresponding oxides. The electrolytes used are saline solutions. Anodizing takes place, as the plasma is discharged in the electrolyte, on the surface of the workpiece, being processed. The effect of the oxygen plasma produced in the electrolyte on the metal surface causes partial short-term surface melting and a bonded oxide ceramic-metal compound forms on the workpiece. Due to an increase in volume, 50 % of the produced oxide layer grows outwards. Edges, cavities and relief designs are coated uniformly. In other words, there is no edge build-up that occurs in conventional electroplating processes.			
Layer properties depending on alloy	high wear resistance, excellent corrosion resistance, outstanding hardness, high thermal insulation, excellent fatigue strength, good dimensional accuracy, high absorption, low reflection, good chemical resistance			

MagnaCoat®

thick-film systems with high chemical resistance

aalberts surface treatment

MagnaCoat®

Components in contact with products in the chemical industry such as filter funnels, reactor vessels and pipelines can be coated with MagnaCoat®, a thick-film system based on fluorinated polymers, as an alternative to the costly use of alloys such as Hastelloy or enamelling. Other machine parts or baths, e.g. in the electroplating or semiconductor industry, are also suitable for Magna-Coat® coating. Magna-Coat® is a high-quality fluorinated thermoplastic with good thermal, chemical and dielectric properties. Magna-Coat® can be applied electrostatically and is thermally melted. The layer thickness is 0.3 to 0.5 mm, depending on the heat capacity of the parts to be coated. The mechanical strength of the coating permits subsequent processing, e.g. by grinding. In this way, exact dimensional tolerances can also be achieved.

With MagnaCoat® coatings, Aalberts surface treatment offers thick-film polymer coatings and fluoropolymer coatings with an almost pore-free surface. This makes the surfaces resistant to diffusion. The combination of good non-stick properties, abrasion resistance and excellent corrosion protection make Magna-Coat® thick-film systems ideal solutions for applications under chemically aggressive conditions.

Corrosion protection – basket with ball (MagnaCoat® layer)

Insulation coating Rilsan for medical instruments

Motor housing with MagnaCoat® coating

	MagnaCoat®
Applications	MagnaCoat® is suitable for heavy corrosion protection. Typical parts in the chemical industry are storage vessels, reaction vessels, fittings, agitators or measuring probes. Can also be used for dryer or calender rolls.
Coatable base materials	various metals, stainless steel, grey cast iron
Pre-treatment	degassing, sandblasting, degreasing, primer if necessary, powder coating or spraying
Characteristics	excellent chemical resistance, diffusion resistant, high temperature resistance and wear resistance, non-stick properties, easy cleaning, high layer build-up
Performance characteristics	**Layer thickness:** 100 µm - 1.5 mm **Temperature resistance:** -40 °C bis 290 °C **Roughness R_a:** up to 1.5 µm **Foodstuffs approval:** partial **Diffusion resistance:** very good **Bending strength:** very good, up to 4 mm radius without spalling **Chemical resistance:** very good
Service	We find the optimal coating process for your components based on an individual consultation. From the first sampling to the introduction into series production, we define the relevant production steps together with you. On request, we can also supplement our technical services with a logistics concept tailored to your needs, including pick-up and delivery services.

TempCoat®

fluoropolymer coatings

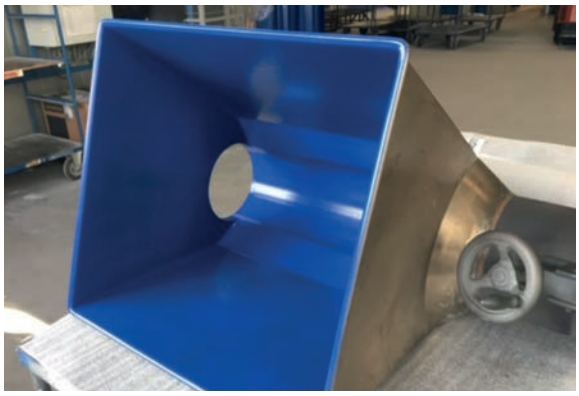
aalberts surface treatment

TempCoat®

Many manufacturing processes involving metal surfaces in contact with the product would be very difficult to resolve in a satisfactory way, even with highly refined metal surfaces. Only the use of special fluoropolymers produces hydrophobic surfaces with very low surface tension, which effectively prevents the adhesion of various substances such as adhesives, rubber and plastic materials or foodstuffs. The non-stick effect is further increased by reducing the surface contact area through targeted modification of the surface structure with defined roughness profiles. The surfaces modified in this way are indispensable in a wide variety of industries and applications such as printing, baking, the chemical industry and even high-class frying pans. The Aalberts surface treatment solution is called TempCoat®.
The efficient and trouble-free processing and handling of metals, plastics, paper and foodstuffs in various production processes is no longer conceivable without the excellent anti-friction properties of product-contacting surfaces. Fluorinated polymers are indispensable as coating materials for such applications due to their low friction coefficients for static and sliding friction. The typical minimal difference between the two values offers the great advantage of reducing the stick-slip effect in reciprocating motion.

The TempCoat® fluoropolymer coatings offer outstanding non-stick properties, anti-friction properties or high chemical resistance. Combinations of different properties are also possible. Both the use of special additives, such as graphite or molybdenum disulphide, and the multilayer structure including reinforcing layers, make it possible to adapt the layers specifically to the desired application. For example, multilayer, wear-resistant, anti-adhesion systems improve demoulding processes or the excellent dry lubrication properties of anti-friction systems protect sliding components from failure.

Volume flaps with TempCoat® as corrosion protection



TempCoat® gives excellent nonstick properties and good chemical resistence to a funnel. Through such funnels flow sticky liquid substances, which are processed e.g. in the food-industry or in the plastic and rubber industry.

	TempCoat®
Applications	folding shoes, casting tools, laminating tools, glue tanks, ball valves, gear wheels
Coatable base materials	Aluminium, steel, stainless steel, ceramics, copper (limited), plastics, cast iron, glass
Pre-treatment	degassing, sandblasting, degreasing
Characteristics	excellent non-stick properties, easy cleaning, high chemical corrosion protection, good non-stick and anti-friction properties, suitable for foodstuffs
Performance-characteristics	**Layer thickness:** 7 µm - 1.5 mm **Friction coefficient** (stat.) up to 0.09 (against mild steel) **Roughness:** R_a up to 1.0 µm **Foodstuffs approval:** partial
Service	We find the optimal coating process for your components based on an individual consultation. From the first sampling to the introduction into series production, we define the relevant production steps together with you. On request, we can also supplement our technical services with a logistics concept tailored to your needs, including pick-up and delivery services.

FlexiColor®

decorative powder coatings
for highest requirements

aalberts surface treatment

FlexiColor®

The metallic surfaces of a large number of components, housings and covers must be protected from corrosion and weather influences and they must also be impact and scratch resistant. There are also requirements for the optical appearance and the tactile feel. This spectrum of characteristics is provided to electrically conductive surfaces through powder coating. In powder coating, an electrically conductive material is coated with powder paint. Electrically charged particles of the coating powder and the workpiece to be coated attract each other. The powder is electrically charged via an electrode in the spray gun. The workpiece is earthed so that an electric field is formed between the material and the gun, transporting the powder particles to the surface of the material. The subsequent thermal treatment of the coated materials at 160 - 200°C causes the powder particles to form a smooth, uniform surface. The powder coatings used are based on polyamide, epoxy or polyester resins and offer good protection against scratches, impacts, corrosion and weathering. Powder coatings are available in almost all RAL colours as well as in different variations of gloss and structure and can also be used for decorative purposes. Aalberts surface treatment offers the environmentally friendly FlexiColor® process as a solution.

In order to ensure optimum adhesion of the powder coating to metallic substrates as well as very good corrosion protection, even for damaged paint surfaces, Aalberts surface treatment uses modern zirconium-based conversion coatings.

Powder coating: Application of powder paint in the spray booth

Covers for gas distribution with powder coating

	FlexiColor®
Applications	car bicycle carrier, devapor housing, vehicle trim
Coatable base materials	most metals and almost all electrically conductive materials
Pre-treatment	degreasing, pickling, passivating
Characteristics	high corrosion protection, excellent optics, antibacterial structural coating for medical use, excellent chemical resistance, impact resistance
Performance characteristics	**Layer thickness:** 35-600 µm, **Temperature resistance:** -40 °C to 160 °C, depending on coating type **Foodstuffs approval**
Service	We find the optimal coating process for your components based on an individual consultation. From the first sampling to the introduction into series production, we define the relevant production steps together with you. On request, we can also supplement our technical services with a logistics concept tailored to your needs, including pick-up and delivery services.

screw locking and thread sealing

aalberts surface treatment

screw locking and thread sealing

We are specialists for high-quality functional metal finishing and high-quality pre- and post-processing of thread pre-coating. Thanks to our many years of expertise in the fields of screw locking, thread sealing, loss protection and lubricant coating, we are able to implement your requirements even for difficult materials and properties.

Screw locking

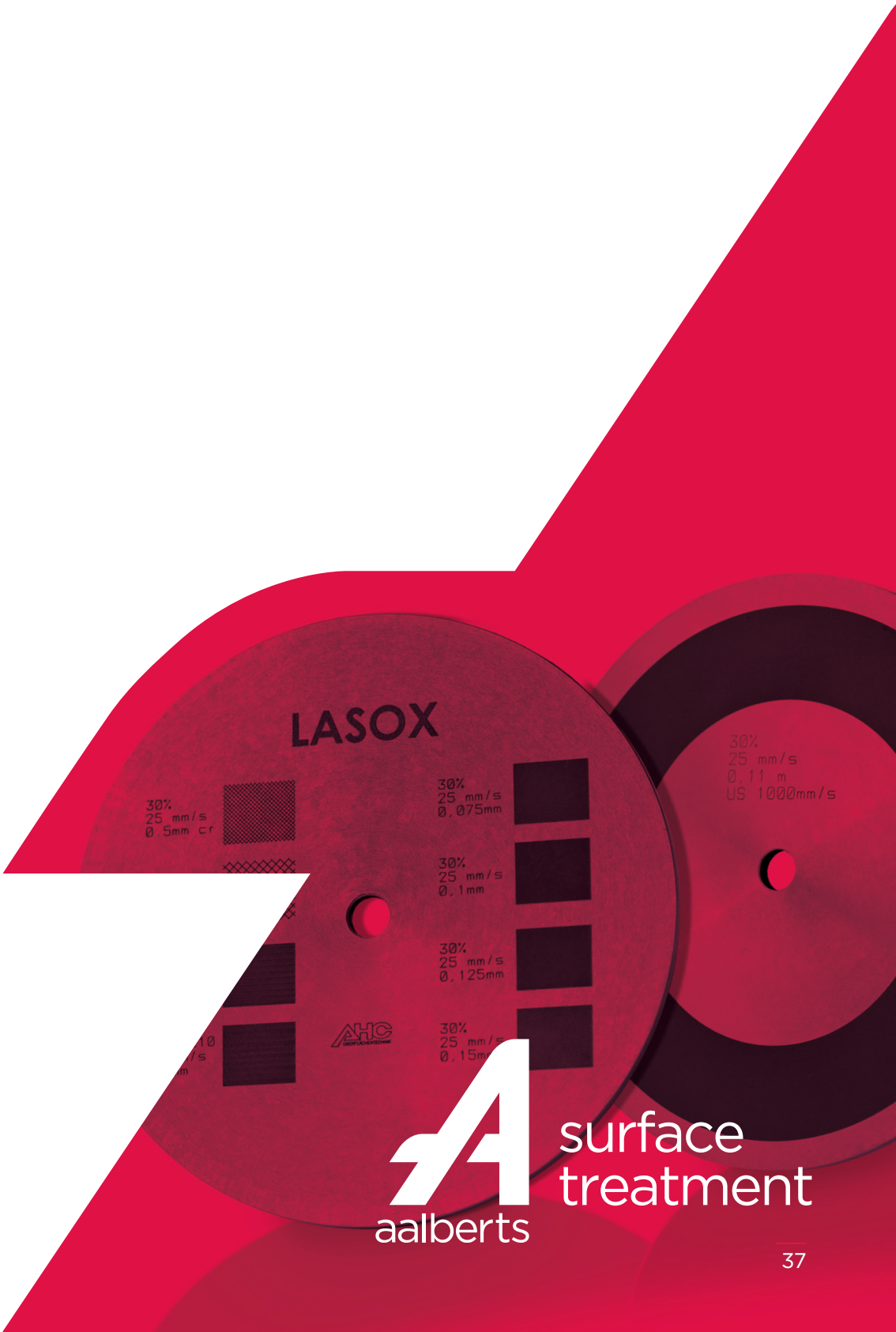
Thread sealing

Loss protection

process	microencapsulated adhesive	permanently elastic sealing coating	polyamide spot coating
Applications	The micro-encapsulated pre-coating is a permanent screw lock to maintain the pre-tension force during frequent load changes. In addition, the permanent safe-guard also acts as a seal and complies with DIN 267 Part 27.	A permanently elastic thread seal with a dry surface and high sealing effect against almost all media. Coating is carried out ac-cording to customer specification or according to DIN 267 part 27.	Spot-coating is a plastic spot with many properties: loss protection, reduction of loosening torque, adjustment protection with sub-sequent adjustability. The coating complies with DIN 267 Part 28.
Adhesives	360° coating, Loctite Dri-Loc®, Precote®, 3M ScotchGrip	360° coating, Loctite Dri-Seal®, Vibra-Seal®, Precote®	90°-120° angle coating, Loctite Dri-Loc-Plastic®, PPA 571, polyolefin
Coatable base materials	threaded parts of almost any kind, screws from MS to M20, customer-specific special parts		
Pre- and post-treatment	degreasing and cleaning, corrosion protection, lubricant coating (Torque'N'Tension, OKS, Gleitmo etc.)		
Characteristics	Excellent chemical resistance, diffusion resistant, high temperature resistance and wear resistance, non-stick properties, easy cleaning, high layer build-up		
Performance characteristics	**Standard:** DIN 267 part 27 + 28 or according to customer specification **Shelf life:** up to 4 years		
Service	We find the optimal coating process for your components based on an individual consultation. From the first sampling to the introduction into series production, we define the relevant production steps together with you. On request, we can also supplement our technical services with a logistics concept tailored to your needs, including pick-up and delivery services.		

LASOX-COAT®

selective oxidation of aluminium surfaces via laser technology



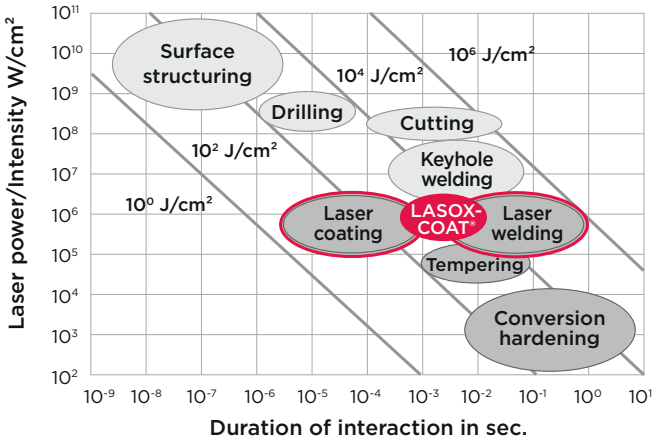
aalberts surface treatment

LASOX-COAT®

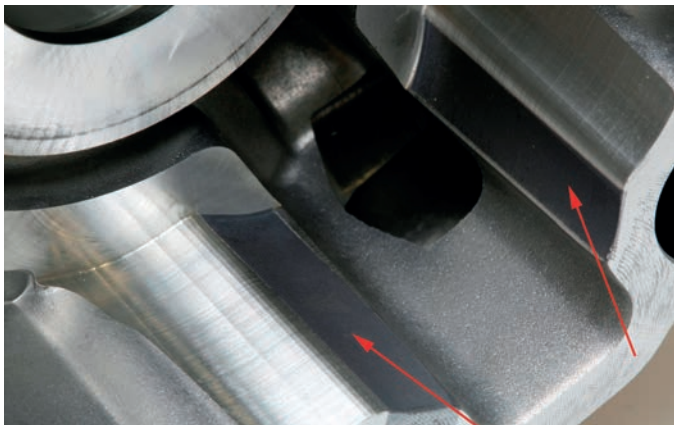
LASOX-COAT® is a novel coating process for the oxidation of aluminium surfaces without the use of chemicals. With this process components can be protected selectively against wear and corrosion. What is special about this process is the use of a laser in an oxygen atmosphere, targeted along the surface of the workpiece to be coated. The surface is treated line by line. The laser starts to melt the alloy and some particles will vaporize.
On the remelt area an aluminium oxide layer is formed (corundum). The distance of laser lines affects the degree of cover and the roughness of the surface.

The duration of treatment is proportional to the treatment area of the workpiece. It can be accelerated by the use of several laser beams simultaneously.

The possibilities of the selective coating are plenty, like writings, single lines, complex forms or patterns.
The major advantage of this process in contrast to galvanic processes lies in the complete abandonment of chemicals. Thus the authorisation of a LASOX-COAT® installation does not cause problems. This is of particular interest with regard to the integration of LASOX-COAT® into existing production lines.



The LASOX-COAT® process in comparison to other laser processes for material treatment.



Aluminium workpiece with surfaces coated with the LASOX-COAT®-process

Suitable materials	In principle, all aluminium alloys can be coated. For alloys containing silicon (Si >8 %) the hardness can be increased by about 50 % compared to the hardness of the original alloy. Also, aluminium alloys with silicon contents above 20 % can be coated with LASOX-COAT®. Furthermore, die cast alloys become harder due to the surface treatment. Silicon particles in the base material actually support the development of a thicker although slightly rougher layer.
Duration of coating	proportional to the coating area, pilot plant 40 seconds for 1 cm^2, standard coatings 3 seconds for 1 cm^2
Roughness	in laser tracking direction R_a of 1 µm, perpendicular to laser tracking direction more than double (depending on the alloy)
Duration of interaction (laser beam with surface)	ca. 0.005 seconds
Layer thickness	Corundum layer approximately 6 to 10 µm, remelt area about 100 µm. On die-casting alloys corundum layers of >20 µm are possible but the roughness increases to R_a >10 µm.
Hardness of the aluminium oxide	ca. 2,000 HV
Application	Housing edges, pump impellers, laser labeling and laser lettering, pneumatic valves, proportional valves, brake pistons, hydraulic and pneumatic sliders
Benefits	Partial wear protection, corrosion protection, production of labels, patterns, shapes and lines; no use of process chemicals

SELGA-COAT®

selective galvanic coatings of
aluminium alloys in self-contained tools

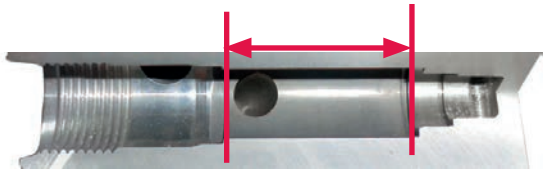
aalberts surface treatment

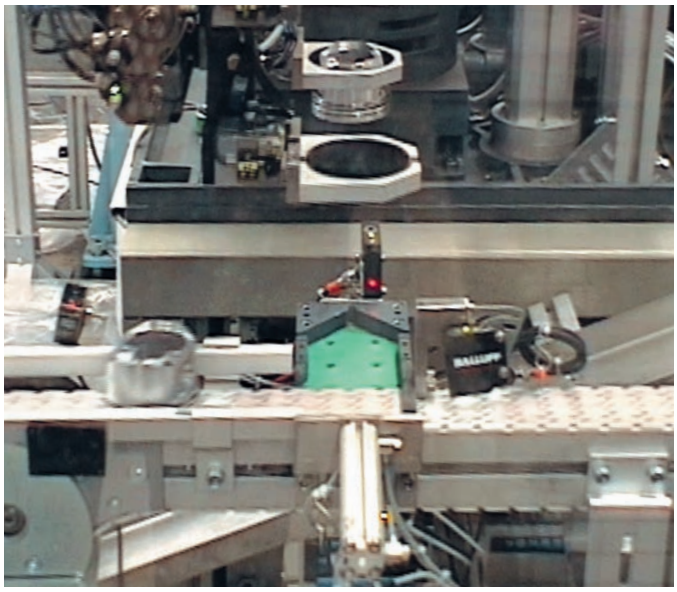
SELGA-COAT®

SELGA-COAT® is a further developed Aalberts surface treatment technology for the selective coating of parts made of aluminium-based wrought, cast and die-cast alloys. Precisely defined surface areas are coated with masking taking place in self-contained tools.

With the partial hard anodizing of aluminium-based alloys, the part being coated acts as an anode. The electrolyte circulates in high speed cycles with high current density between anode and cathode.
The use of high-speed electrolytes in conjunction with reactors tailored to components produces coatings with markedly improved characteristics in comparison to conventionally produced coatings. These improvements include better covering capacity, increased hardness, a more regular microstructure, vastly improved levelling properties and far cleaner surface quality. In general no further machining of the coated surface areas is required.

1/





2/

1/ Pump housing (detail): the area coated with SELGA-COAT® is marked in red

2/ Automatic plant system for the selective hard anodizing of the first ring groove of engine pistons; the process consists of anodizing, rinsing and drying, with a machine cycle time of 12.5 seconds per piston.

Application	SELGA-COAT® surface treatments have proved themselves many times over for the partial coating of vehicle parts, among others • hydraulic power steering pumps • engine pistons (diesel, otto) • plates for stop & start systems • pump housings (power steering) • valve body assembly • valve housings for electronic stability control (ESC) • heat exchangers for exhaust gas recirculation systems • aluminium plates for automatic transmissions We plan and realise manual and automatic plant systems to individual requirements.	Our plant systems are solid, component-specific and self-contained. They can be integrated into existing mechanical production lines without difficulty. The advantages of this complete integration of surface treatment into the manufacturing process are short processing, simple logistics, low emissions and a high level of operational and process reliability. All SELGA-COAT® plant systems work on the closed circuit principle. As coatings are applied selectively, only minimal amounts of electrolyte are lost thus maintaining the consumption of electrolyte at highly cost-effective levels.
Characteristics of the SELGA-COAT® process	Hard anodizing of aluminium alloys: • increased corrosion and wear resistance • layer hardness between 300 and 500 HV • electrical insulation • rapid layer build-up, e.g. 12 µm in less than 1 min • thickness tolerances ±2 µm • lower roughness compared to conventional processes	Services: • development and design • job shop • production process-integrated plant systems for SELGA-COAT®

FuseCoat®

diffusion galvanizing (sheradizing)
for highest corrosion protection requirements

aalberts surface treatment

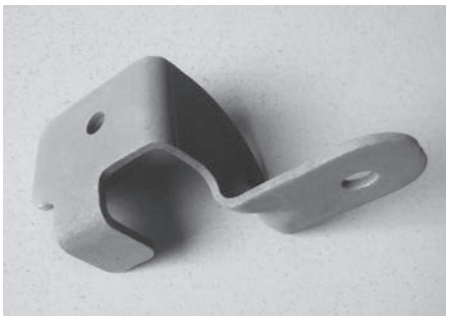
FuseCoat®

Zinc diffusion coating (sherardizing) is a modern corrosion protection process of the highest quality. In the coating process, the workpiece is exposed to a "zinc atmosphere" in a slowly rotating, closed chamber at temperatures between 350°C and 450°C and, in a diffusion process, is coated with a close-contour zinc layer, whereby the zinc penetrates into the steel surface. The diffusion bond between zinc and the ferrous carrier material in combination with a suitable conversion layer (Cr(III)-passivation) ensures excellent long-term corrosion protection.

With the zinc diffusion coating, uniform zinc layers between 15 µm and 100 µm can be produced. The zinc coating has a hardness of 350 HV to 450 HV and is highly resistant to wear and corrosion. In a duplex composite with cathodic dip painting, wet painting or powder coating, corrosion resistance can be increased and the coefficient of friction and colour appearance can be adjusted. Aalberts surface treatment meets all international car manufacturer specifications.

Anchor rods

Covers



Assembly support

	FuseCoat®
Applications	corrosion protection in the automotive industry and construction industry, railway vehicle elements, fastening elements, offshore products, sheet metal parts, stamped parts, clamps, caps
Coatable base materials	unalloyed carbon steels, low-alloy steels, heat-treated steels, high-strength steels, sintered materials, grey cast iron, cast iron
Pre-treatment	degreasing, degassing, blasting
Characteristics	high corrosion resistance, very high mechanical strength, salt water resistance, impact strength
Performance characteristics	**Process:** Diffusion galvanizing (sherardizing) + Cr(III) passivation + TopCoat, sealing, cathodic dip painting or powder coating **Layer thickness:** 15-100 µm, uniform even with complex geometries **min. size:** 30x30x30 mm **Unit weight:** 10-20 g to 40 kg **Cathodic corrosion protection:** 1000 h (with Topcoat 2000 h) according to DIN EN ISO 9227 No hydrogen embrittlement - high hardness, impact-resistant, temperature-resistant, ductile
Service	We find the optimal coating process for your components based on an individual consultation. From the first sampling to the introduction into series production, we define the relevant production steps together with you. On request, we can also supplement our technical services with a logistics concept tailored to your needs, including pick-up and delivery services.

PlasmaCoat®

metallic coatings and combination coatings
for the highest requirements

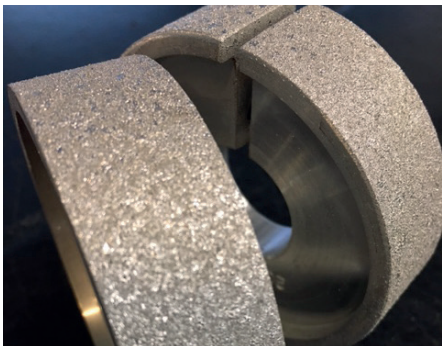
aalberts surface treatment

PlasmaCoat®

The safe and trouble-free handling of materials or sheet products made of plastics, textiles or paper requires transport rollers and other components with wear-resistant traction surfaces, which must also have non-stick and conductivity properties, depending on the application. Aalberts surface treatment offers a variety of perfect coatings with the PlasmaCoat® process. These are applied by thermal spraying. PlasmaCoat® combines the extreme surface hardness and excellent wear protection of thermally sprayed metal or ceramic coatings with the non-stick and anti-friction properties of fluorinated polymers as a matrix. The adjustment of different roughnesses and profiles leads to the desired traction properties.

With PlasmaCoat®, high-quality metal coatings and ceramic coatings are produced by thermal spraying. The highest surface hardness improves wear protection and extends the life cycle of mechanically highly stressed components. In addition, excellent non-stick properties or extremely wear-resistant sliding properties can be achieved with a topcoat. PlasmaCoat® coatings can be applied to almost all metallic materials and also to CFRP materials. PlasmaCoat® can also replace hard chrome coatings when mechanically reworked.

Friction enhancing anti-adhesive coating PlasmaCoat® for transport rolls in the paper and textile industry



Metal sprayed coating PlasmaCoat® on transport wheels

Release coating PlasmaCoat® on welding sheets

	PlasmaCoat®
Applications	sealing and sliding seats of motor rotors, gear shafts and pinion shafts, bearing bores, running surfaces of piston rods, sealing strips, seats of axles and shafts, valve spindles, roller surfaces, shaft protection sleeves, gears, pins, cylinders and cylinder liners, etc.
Coatable base materials	Aluminium, steel, stainless steel, cast iron, brass, copper, aluminized steel
Pre-treatment	degassing, sandblasting, degreasing
Characteristics	excellent non-stick properties with high wear resistance and traction (round or sharp-edged structure)
Performance characteristics	**Layer thickness:** 80-300 µm **Abrasion resistance:** very good **Hardness (scratch resistance):** 28-70 HRc **Bending strength:** good, radius 6 mm without cracking
Service	We find the optimal coating process for your components based on an individual consultation. From the first sampling to the introduction into series production, we define the relevant production steps together with you. On request, we can also supplement our technical services with a logistics concept tailored to your needs, including pick-up and delivery services.

thermal spraying

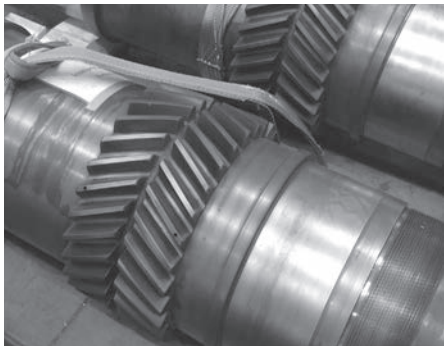
aalberts surface treatment

thermal spraying

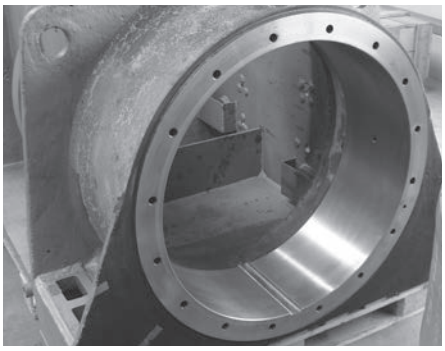
In thermal spraying, a coating material in the form of wire or powder is melted or fused and accelerated onto the component to be coated. Before coating takes place, the surface is cleaned and roughened by blasting with corundum. The roughness of the surface enables mechanical bonding of the spray particles and ensures the adhesion of the coating.

Depending on the type of coating and the application, the usual coating thicknesses for thermal spraying are between one tenth and several mm.

The coatings are suitable both for the protection and functionality of new parts as well as the repair of worn components.



With molybdenum coated bearing seats of a drive shaft to prevent adhesive and abrasive wear



Repairing the bearing bore of a pillow block bearing by flame spraying with chrome-nickel steel

Wear protection of screw conveyors by flame spraying and smelting of a nickel hard alloy

Coating materials	Coating materials in thermal spraying are metals, alloys, hard metals or ceramics. Thermal spraying is superior to many other coating processes due to the large selection of materials for the targeted adjustment of functional properties. Common coating materials are: • metals and alloys: Aluminium, copper and nickel alloys, molybdenum, bronze, white metal, chromium and chromium-nickel steels; nickel and cobalt-based hard alloys • hard metals: Tungsten and chromium carbide in metal matrix of nickel, cobalt or chromium • oxide ceramics: Oxides of aluminium, chrome, titanium and zirconium
Process	Thermal spraying processes differ in the form of the spray material and in the type of thermal and kinetic energy used to melt and accelerate the spray particles. The coating properties, such as wear and corrosion resistance, hardness or adhesion, are determined not only by the coating material but also by the spraying process. The procedures we employ are: • powder and wire flame spraying • flame spraying and melting • high velocity flame spraying • plasma spraying • arc spraying
Applications	Thermal spray applications include wear and corrosion protection, electrical and thermal insulation or conductivity, and the generation of certain friction and sliding properties. Examples are: • plain bearing and sealing seats of turbine and compressor rotors • bearing and coupling seats of drive shafts • piston rods and cylinder running surfaces of compressors • bearing bores of pedestal bearings, gear housings or gear wheels • erosion and corrosion protection of turbomachinery components • fan blades and conveyor elements
Service	Our services in connection with coating: • pre-machining and finishing of coated components • complete preparation of components • restoration of geometry and function of damaged components • quality assurance coating and component testing • technical advice on coating selection and design • application-oriented coating development

SILA-COAT® 5000

powerful sealings of aluminium alloys surfaces

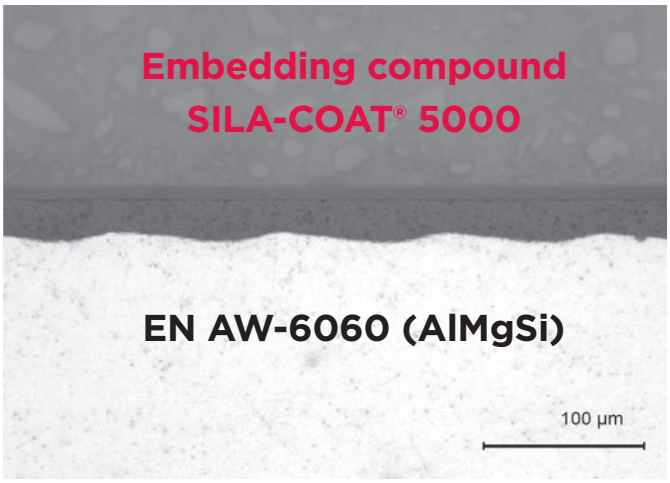
aalberts surface treatment

SILA-COAT® 5000

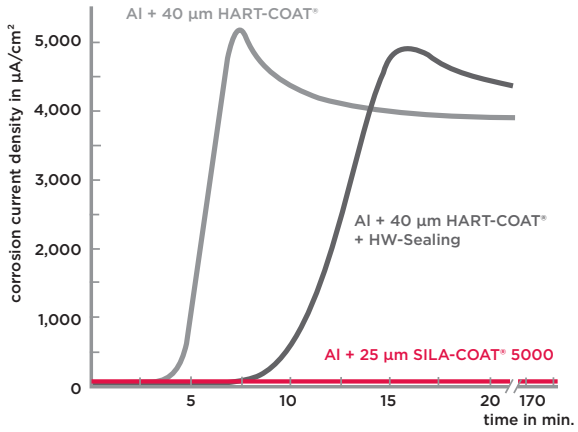
SILA-COAT® 5000 is carried out in a three-step process:

1. Pre-treatment, suited to the aluminium material;
2. Conversion treatment;
3. Sealing using an electrophoretically applied liquid paint.

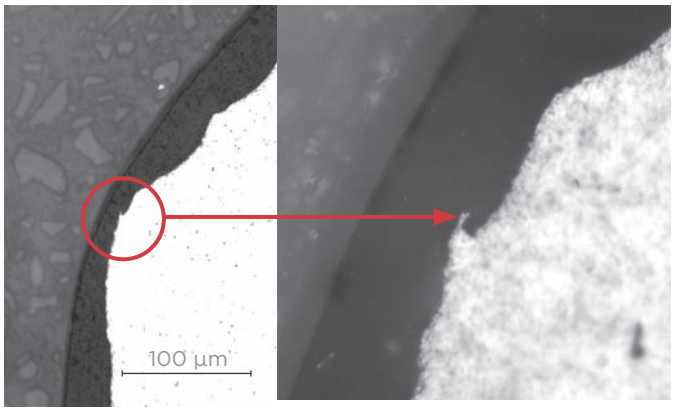
The corrosion resistance will be improved and particularly the alkali resistance increases considerably. The regularly formed network structure of the paint system provides for a sealing and a levelling of the surface.



Improvement of corrosion protection and levelling of the surface with electrophoretically applied liquid paint



Improvement of alkali resistance compared to HART-COAT® layers. Via the chronoamperometric method (measurement at rest potential) it can be determined after which time the corrosion attack starts. In this case the measurement was performed in a 3 % aqueous sodium hydroxide solution.



Cross section of EN AW-6060 (AlMgSi) with SILA-COAT® 5000

Benefits	• excellent alkali resistance (following ASTM D 1647) • high corrosion protection • levelling of surface (e.g. from R_a=1.28 µm to R_a=0.27 µm) • high dielectric strength	• food compatibility according to FDA regulations • no cytotoxicity according to ISO 10 993-5 (biocompatibility) • uniform layer formation • thickness of the paint layer 25 ±5 µm
Applications	SILA-COAT® 5000 is especially well-suited for applications in the following industrial sectors: • Food processing industry • Medical engineering • Mechanical engineering • Plant and systems engineering • Packaging industry • Automotive industry	

zinc flake coating

corrosion protection for fasteners,
structural and chassis parts

aalberts surface treatment

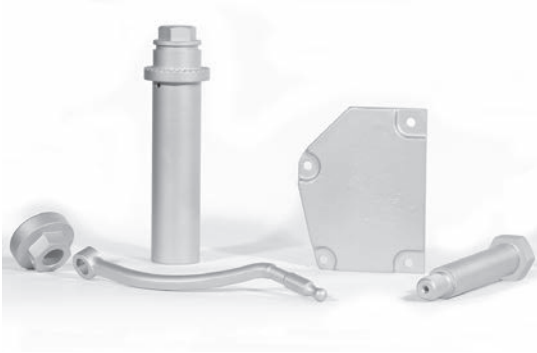
zinc flake coating

Originally conceived as an environmentally friendly chromium VI-free electroplating alternative, zinc flake corrosion protection has established itself not only in the automotive sector due to its wide range of applications. Zinc flake coatings enable safe corrosion protection, e.g. for high-strength steels, without hydrogen-induced stress cracks occurring.

Constant friction coefficients, dimensional accuracy and colour choice are, along with the highest corrosion protection requirements, additional outstanding properties of zinc flake coatings.

Chassis components

Large fastening element for wind energy / offshore technology



Several fastening elements

Applications	automotive industry, construction and agricultural machinery, fastening elements, brake parts, chassis components, springs, threaded parts, aviation, punched parts, offshore wind plants
Coatable base materials	hardened steel, spring steel, high-strength steel, zinc die-casting
Pre-treatment	optional: degreasing, blasting, phosphating
Characteristics	long-term corrosion protection, very thin layer thicknesses, integrated lubricant additives, stable friction coefficients even with multiple screw connections, no hydrogen-induced stress corrosion cracking, very high corrosion protection depending on requirements >1500 h, silver or black surfaces, no distortion from high heat treatment temperatures, topcoats for high-strength aluminium compounds, protection against contact corrosion.
Performance characteristics	**Outstanding corrosion protection** under cyclic loading; **No red rust** >1,000 h salt spray test (DIN EN ISO 9227) **Barrier protection:** delayed red and white rust and contact corrosion **Resistance to chemicals:** resistant to acids, alkalis, cleaning agents, oils, petrol and organic solvents **Layer thickness:** 6-25 µm (depending on requirements) **Topcoats for duplex coatings and non-ferrous metals** **Temperature resistance:** 180-300°C depending on the product **Process temperatures** from air drying to thermal curing **Friction coefficients:** according to requirement **Color:** silver, black, (others on request)
Service	We find the optimal coating process for your components based on an individual consultation. From the first sampling to the introduction into series production, we define the relevant production steps together with you. On request, we can also supplement our technical services with a logistics concept tailored to your needs, including pick-up and delivery services.
Zinc flake application method	bulk material (dip-spin), rack dip-spinner (rack-spin) and spray application (full automatized)

overview: processes / locations

aalberts surface treatment

www.aalberts.com/st

info@aalberts-st.com

Aalberts Surface Treatment GmbH

Boelckestr. 25-57
50171 Kerpen
Germany
+49 2237 502 0

Hohenhorststr. 1
21337 Lüneburg
Germany
+49 4131 882 10