Arc Metal Spraying

Applications

NON-SLIP
PROTECTION
RECLAMATION

TOWERINPUT GROUP LTD

ARCTEC Durable non-slip Arc-Metal Coatings

Thermal spraying is a process of applying pure or alloyed metals as coatings onto a wide range of base materials. The metals applied are not paints with metal particles, but solid metals that are melted, atomised and sprayed to make a coating.

Many large steel structures, including oil platforms, refineries and bridges, have been routinely protected against corrosion by thermal spray Aluminium (TSA), zinc or alloys of the two.

Ideally, steel structures needing a durable coating that protects against both slip and corrosion, would be treated with a specialist coating that:

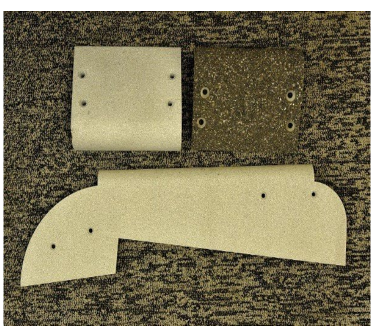
• Provides a suitable level of grip to avoid personal slips or industrial skidding.

• Provides comparable corrosion protection to Aluminium as used in extremely aggressive environments.

• Provides easy application by a long-standing process covered by international standards

The molten metal particles cure instantly as they land on the base material that is grit blasted first. The blasted surface provides the perfect key to produce a well-adhered coating. Spraying parameters can be changed to create texture coatings that give a variety of grip levels suitable for public walkways through to forklift loading ramps. In some applications, coatings are sealed after metal spraying.

Whilst Painting, (or applying Grit with adhesive), may be seen as normal for floor plates, and is sometimes applied with grit inclusions to provide a non-slip covering, these coatings can degrade quickly in heavy use, resulting in corrosion and an ***increased slip hazard***.



Aluminum Arc Sprayed Train steps for longevity.

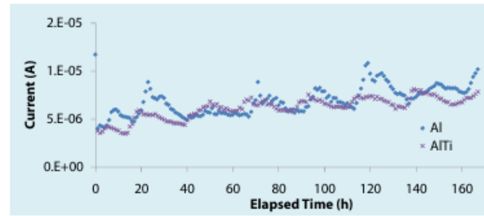
The HSE guidelines suggest that a floor coating with a Pendulum Test Value (PTV) greater than 36 will have a low slip potential in pedestrian areas. To prove the durability of the coating, steel plates were coated and tested. The coated plates were then walked on by a standard shoe on a robotic walking Un-sealed sample

The plate was rotated after each step to simulate walking in a straight line and around corners. The PTV was checked before walking and at 250,000, 500,000, 750,000 and 1 million steps.

Sealed and unsealed plates were tested in wet and dry conditions.

Cycles Completed Pendulum Test Value
Dry machine

Corrosion Testing

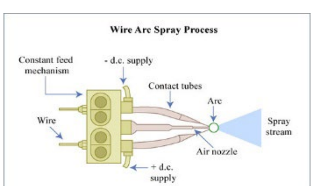


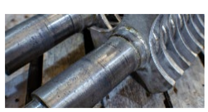
The product has undergone a range of accelerated corrosion testing.
This offers a comparison of the performance between the coating
and 99.5% Aluminium that has offered corrosion protection for several
decades in harsh, corrosive environments around the world.

Two tests were undertaken by an independent research laboratory:
• Galvanic corrosion tests for 1 week.
• Neutral salt spray corrosion tests for 1000 hours.

The latter was performed in accordance with ASTM B117.
It was concluded that in both tests, the corrosion protection performance of the product was comparable to 99.5% Aluminium, thus enabling confidence that the coating will provide excellent corrosion protection in harsh environments.

Thermal Spraying Protection / Reclamation





Dimensional Restoration
The most basic use of arc thermal spray is dimensional restoration. Rotating parts often experience surface erosion over time from rotating inside sleeves or collars. This creates problems when the parts wear out of round and become unbalanced. Not only is this noisy, but it can also decrease operating efficiencies, and the vibration can cause damage to other machine components. Arc spray can be used to remanufacture the surface of the part, up to a quarter of an inch, and restore it to OEM specifications. This is great for many parts including pump shaft repair, print roll repair, or hydraulic cylinder repair; to name but a few.

Sacrificial Corrosion Coatings

Another application of arc spray is sacrificial corrosion coatings. Using Aluminium and Zinc-Aluminium, arc spray can provide an anodic layer over steel. This layer can attract corrosion and keep the underlying surface protected. Arc spray coatings are also porous so they can accept sealants more readily than a regular carbon or tool steel surface, so parts stay sealed longer.

Custom Alloy Coatings

One advantage of arc spray that is unique to this thermal spray process is how the spray material is fed during application. Since it uses two wires, you can create custom alloys by feeding two different material wires. One example is carbon steel and bronze to create a more wear resistant bearing surface coating than plain bronze. You can also combine 316 stainless steel with a Molybdenum wire to create an economically friendly anti-galling coating. There are many combinations that can be explored and engineered to fit the operating environment of the part.

Bearing Surfaces

The application of thermal spray to bearing surfaces using arc spray allows the use of many materials for softer bearing surfaces. Soft bearing surfaces are used to allow deformation so that the bearing area can accommodate small amounts misalignment. Arc spray can apply bronze, babbitt, brass, and Aluminium Bronze. Using thermal spray to apply these as coatings, as opposed to making the entire part from these materials, is not only more economical but has the added benefit of porosity. Like sealants, the porous surface more readily accepts lubricants and holds onto them longer. Arc spray bearing surfaces can also be removed and reapplied again and again when they get worn and no longer operate at peak performance.

Cost Effective Wear / Corrosion Surface Solution

The purpose of any thermal spray coating is to keep your parts operating at peak performance for longer, whether that's through preventative coatings or remanufacture. Arc spray offers many unique solutions and is one of the most affordable forms of thermal spray coating. So, whether you are struggling with corrosion or bearing area issues, arc thermal spray could be the solution you've been looking for.

Fretting

Fretting occurs when material is gradually worn away from rubbing or gnawing. Typically found at the rough edges of contact surfaces, fretting is sometimes caused by friction or vibration. Fretting leaves behind pitted surfaces and corrosion. Anti-fret coatings increase the surface hardness of the component and extend the life of the part.

Fretting Solutions

- Ball bearing raceway coating
- Cylinder head coating
- Tungsten carbide coating

Galling

Galling is caused by adhesion between sliding surfaces. There is typically a visible transfer of material. Common metals susceptible to adhesive wear include Aluminium, stainless steel and titanium. Galling often occurs in bearings and bushing, as well as hydraulic cylinders and bolt-hole threads. Anti-gall coatings increase the hardness of the surface and prevent the softer materials from being affected.

Galling solutions:

- Brass alloy coatings
- Bronze alloy coatings
- Tungsten carbide coatings

Erosion

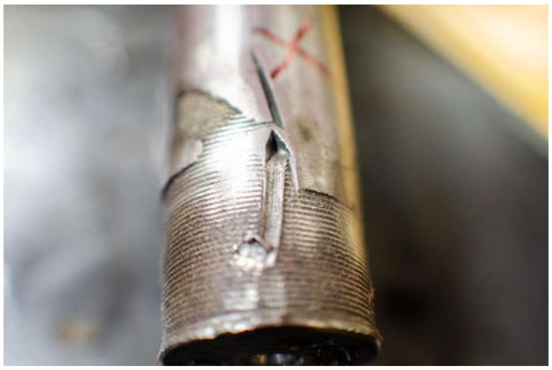
Erosive wear is caused by the impact of solid or liquid particles against the machine component surface. This occurs in a variety of industries; namely print and mining. Wear coating increases machine elements tolerance towards erosion by increasing the surface hardness. This extends the life of components and decreases production downtime. Components that encounter harsh materials or liquids benefit greatly from wear resistant coatings.

Abrasion

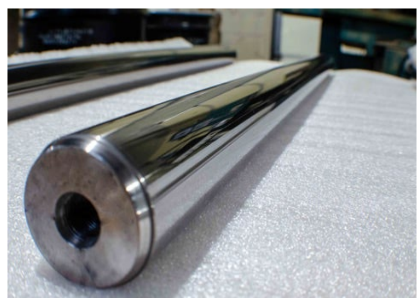
Abrasive wear is caused by rough or sharp objects rubbing against soft surfaces. Abrasion resistant coatings put a layer of specifically selected material between these surfaces to protect the softer surfaces. This eliminates the need to constantly replace machine elements made of softer materials such as Aluminium, Copper and Nickel.

Hard face Repair

Towerinput specialises in a variety of processes; some of which pertain to hard facing. Hard face welding is a type of welding process used to create metallurgically bonded metal coatings. Hard facing requires in depth experience and knowledge to select the materials and processes that provide the quality repair or protection solution. Hard face welding protects against corrosion, abrasion and thermal shock. Each type of hard face welding has benefits and applications depending upon the component's production environment. Welding is also used during the thermal spray repair process to mend components or fill in eroded sections of a surface before thermal spray application as seen in the print roll repair below:-



Hydraulic Cylinder Repair



Repair of Damaged Hydraulic Cylinders

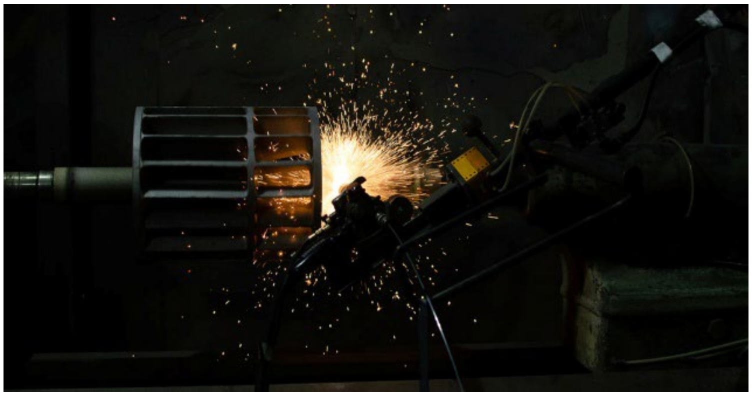
No need to scrap an expensive hydraulic cylinder, it can be repaired...

- Bent hydraulic cylinders
- Undersized hydraulic cylinders
- Pitting on hydraulic cylinders
- Impact damage to hydraulic cylinders

Thermal spray can repair damaged surfaces and bring new life to most hydraulic rods. Engineered materials and surface roughness help hydraulic rods operated at peak performance for years to come.

Our team provides the best solution to get your part back in action. Thermal spray is durable and increases the wear life so you don't have to spend money on a new part or worry about future breakdowns.

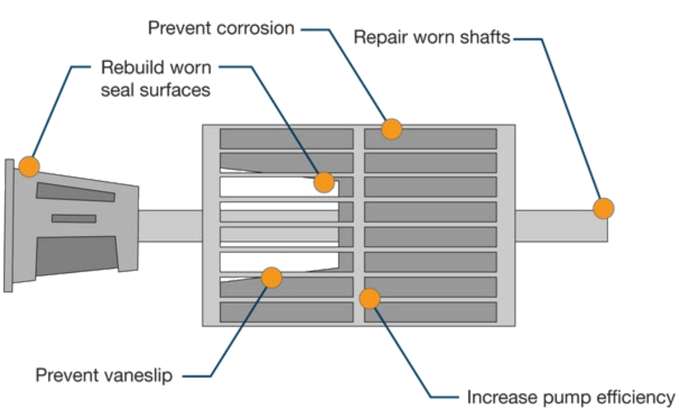
Vacuum Pump Part Repair



All pumps face three problems: wear, corrosion and cavitation. Vacuum pumps are especially affected by wear and corrosion. Liquid ring pumps rely heavily upon the seal created by the cone and the rotor. If either of these are damaged or corroded the pump will begin to lose pressure and become inefficient. Other vacuum pumps, such as rotary vane pumps and screw vacuum pumps, also depend upon their components to create seals and maintain pressure. If pump component surfaces are worn down or corroded, they will no longer meet OEM specifications, and the pump will become inefficient.

When pump components begin to wear or corrode, this does not mean they have to be doomed to the scrap pile. Instead of purchasing new components, most can be repaired via specialized machining and thermal spray processes. Wear and corrosion resistant coatings can be applied to repair pump components as well as extend the future life of the pump. These coatings can be built up and machined to meet the required operating dimensions.

Coating Benefits



Thermal spray remanufacture can

- Restore pump cone and rotor to OEM specifications
- Rebuild worn or corroded cone and rotor surfaces
- Repair damaged, worn rotor shafts
- Repair and prevent cavitation damage
- Prevent corrosion and damage on cast iron pump housings
- Increase efficiency by restoring pressure to worn parts

For further information Please contact;

Towerinput Group Limited

Interlux Business Park
Oldbury Road
West Bromich
B70 9DE

United Kingdom

Telephone + 44 (0) 121 568 7003
Email WBSales@towerinput.com
Web www.towerinput.com