Wear Protection

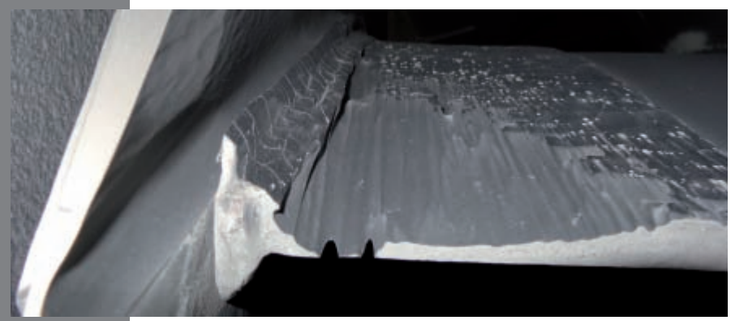
Durable . Efficient . Innovative

a company of POWERCHINA

TLT-Turbo

Wear protection.
for industrial fans.

Preventive wear protection pays off.



Wear in blade area at impeller outlet

In many industrial fields, centrifugal fans are exposed to strong particle flow wear. Especially in the steel-, cement-, wood- and mining industries or in power plants, the conveying gas contains strongly abrasive dusts such as quartz, clinker, corundum, sinter or wood dust. Wear changes the stream leading geometry (see figure) and causes a loss in efficiency and strength.

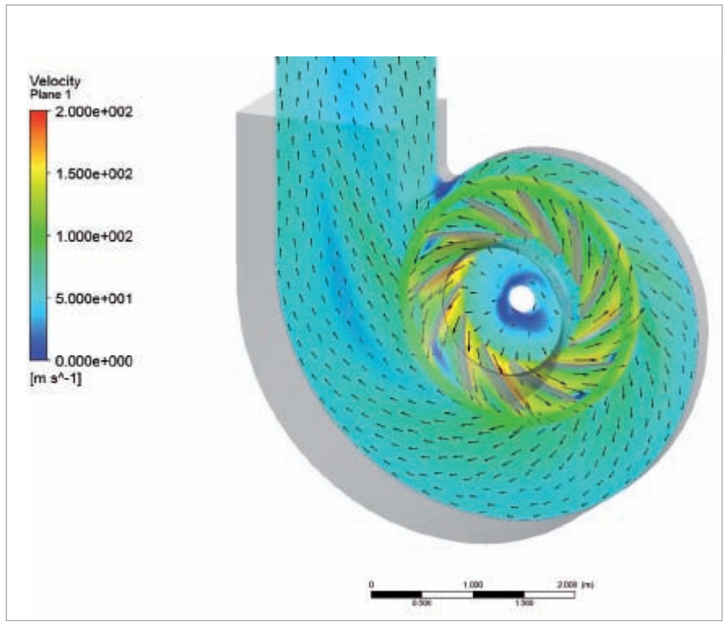
Uneven wear causes growing imbalances which results in inadmissible vibration and unsafe system operation, which can be very costly.

TLT-Turbo – Expertise for you.

For many years, we have developed solutions to protect your fans from extreme wear. Particle flow wear is the process that defines the material removal due to particle contact with the surface of parts and coatings.

During this process, there are many influencing factors, such as the impact angle, mass and velocity of the particles, the properties and geometries of the particles, machine parts and coatings, and the temperature, as well as the hardness ratio between particle and surfaces.

The velocity of the particle is the most important influencing factor. To design the customer-specific wear protection and the exact positions within the impeller or housing, TLT-Turbo also uses CFD (Computational Fluid Dynamics, see figure).



CFD evaluation of a centrifugal fan

TLT Turbo Wear Protection.

In order to protect the critical surfaces of the fan, either the part itself can be coated or coated plates can be attached to the part. Some of the methods TLT Turbo uses for the attachment of the coated plates include screwing (see figure), welding or gluing. The choice of method depends on the assembling situation, fan operating properties and whether the parts are rotating or fixed in the fan.

Screwed insert plate on blade

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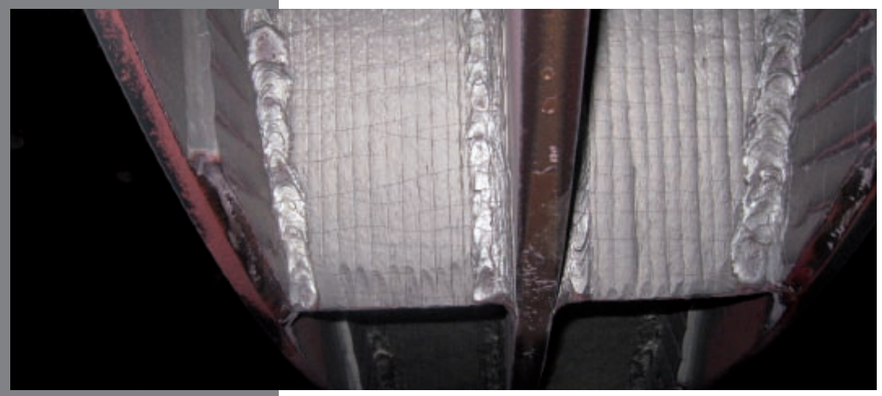
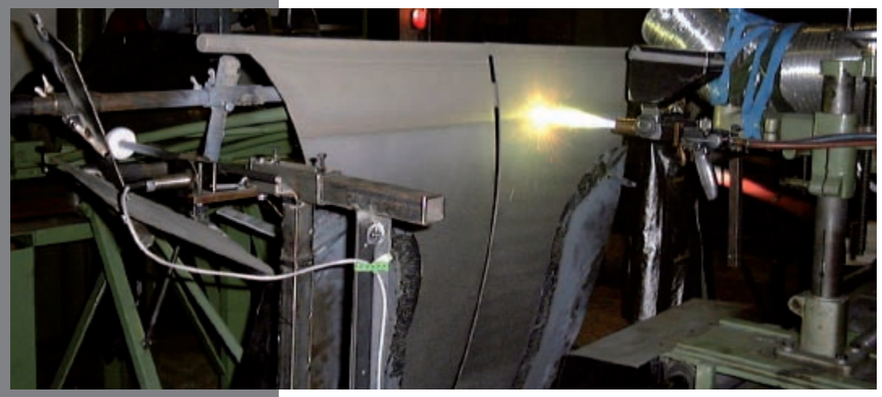
We also use different advanced coating methods. Most economic and consequently most widespread are common layered welded and composite armored plates (see figure).



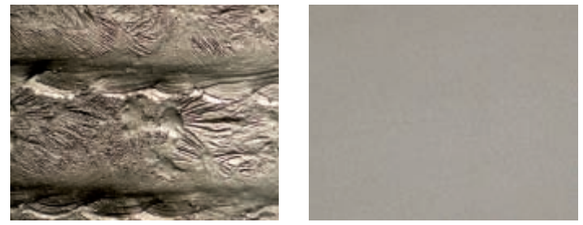
Welded insert plates

In the meantime however, thermal spraying methods (see figure) such as the next generation High Velocity Oxygen Fuel (HVOF) processes gain further importance.



Thermal spraying of a fan blade

These new advanced and innovative coatings have much better wear properties, better bonding along with a hydraulically smooth surface (see figure).



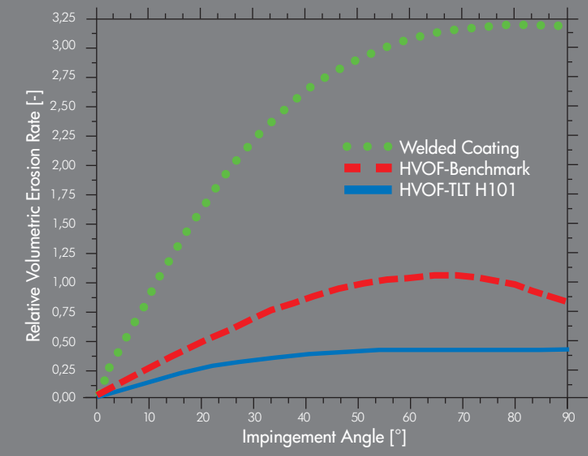
Comparison of the surface of an armored plate (left) and a HVOF-coating (right)

TLT-Turbo – Wear Protection Materials. A small selection of the most operated TLT-Turbo coatings is shown in table.

Description	Operation temperature [°C]	Coating thickness [mm]	Surface Hardness [HRC/HV]	Hardening component	Comments
H-101	up to 600	0-0.5*)	up to 1200 HV0.3	Tungsten carbide	Good protection against corrosion
H-102	up to 500	0-0.5*)	up to 1100 HV0.3	Tungsten carbide	Protection against corrosion
W-101	up to 400	0-10	60-62	Chromium carbide	
W-102		0-10	62 / 750	Chromium carbide	
W-103		0-10	51 / 530		

*) Thickness can be increased

A series of measurements on our new test stand for systematic determination of abrasion rates under defined marginal conditions is available for each coating method and composition. The test series also cover the effect of different impact angles. In general, impingement angles between approx. 0° and 30° between approx. 60° and 90° cause erosion whereas glide angles between 0° and 30° result in abrasion. The coating H-101 was developed by TLT-Turbo and turned out to be especially effective against wear. It has clearly proven itself in test series (see figure) as well as at customer plants in rough conditions all over the world.

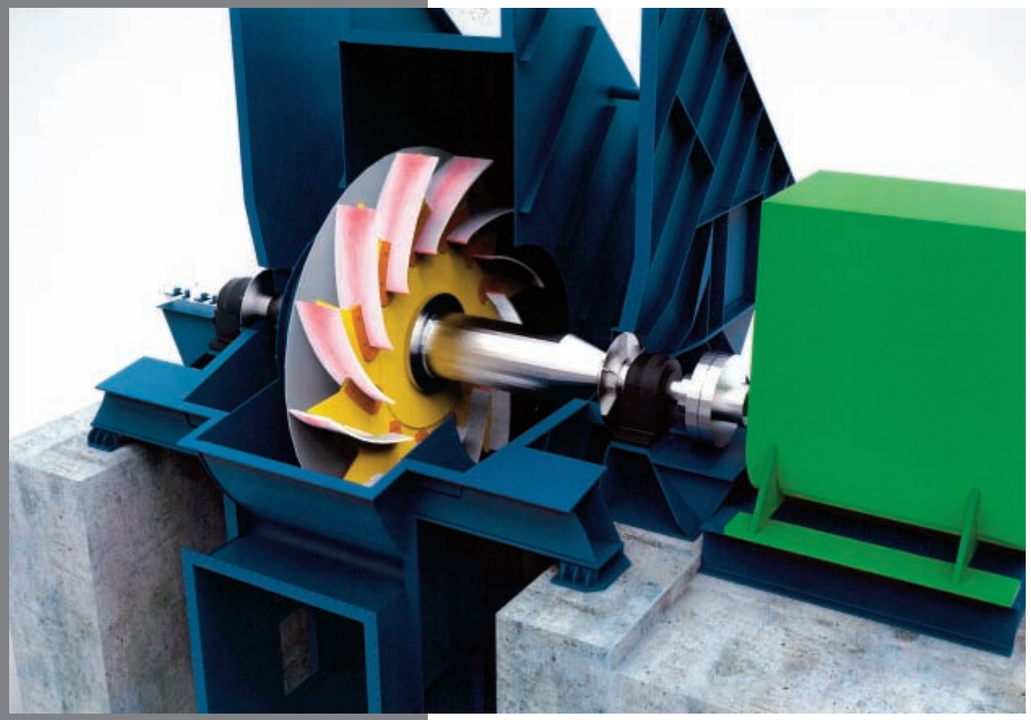


Relative wear rate due to particle impact angle

Wear protection.

How about a doubling of your operation time?

Typical Locations of Wear.



Display of typical Locations of wear on blades

In very tough abrasive conditions, TLT-Turbo is also able to increase the thickness of the highly wear-resistant coating on the impeller up to several millimeters. This process can result in a substantial extension of operating time for your plant.

Based on decades of experiences in wear as well as CFD-analyses, figure shows, with red markings, typical locations of wear on blades of a centrifugal fan. It is also possible to develop a wear protection concept based on customer information or pictures of wear on existing fans.

It is never too late!

TLT-Turbo uses wear protection on new impellers, but also optimizes wear protection on fans in operation. Thereby, it is also possible to develop a customized wear protection concept based on customer information or photos.

> “ Our know-how and expertise are also at your disposal for refurbishment and increasing of fan operation time of other supplier´s fans , or even for protection of other wear-suffering parts in your plant!

Depending on the fan condition and the situational requirements, a repair can take place at your plant or in the workshop of TLT-Turbo in Bad Hersfeld, Germany, USA, China and South Africa.

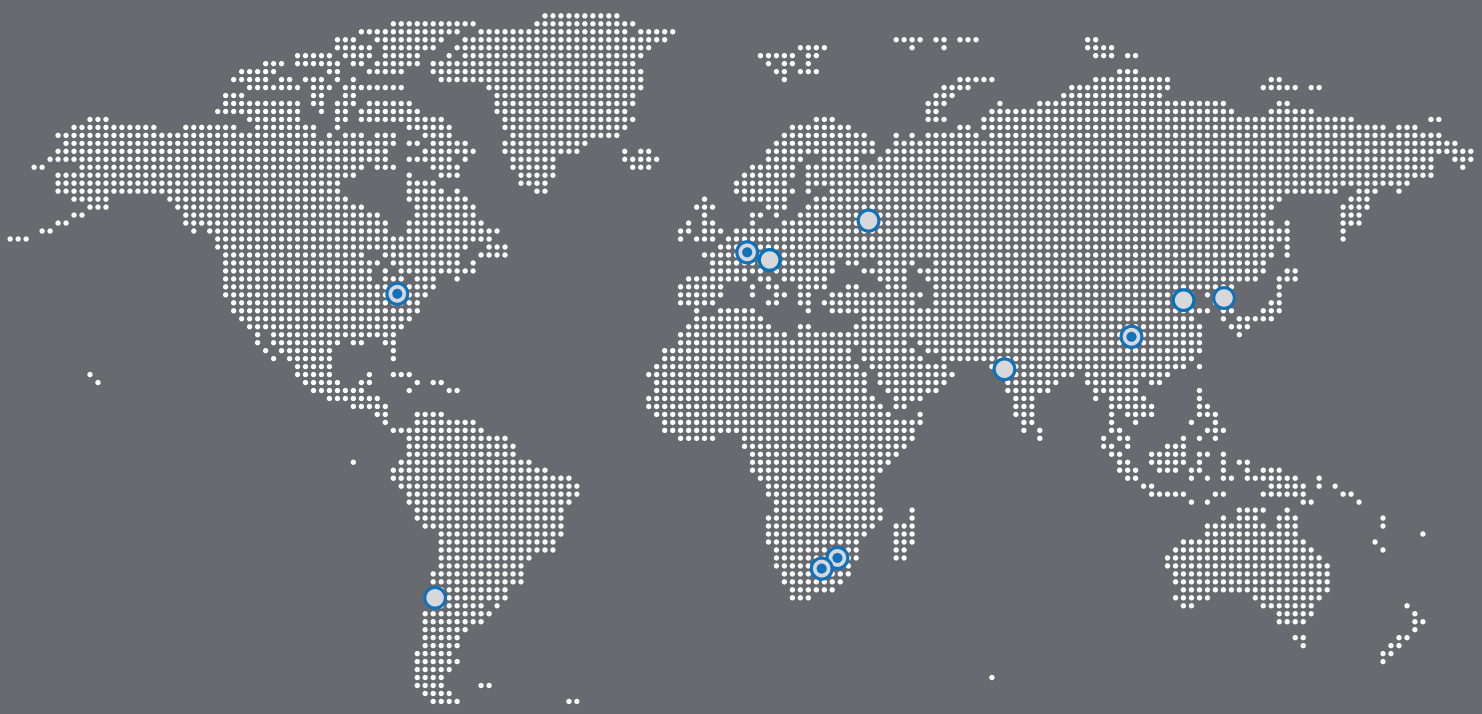
TLT–Aftermarket Service.

Our experts are disposable and available for monitoring the critical areas of your fans by visual control, measuring of coating thickness, vibration or bearing temperature measurements and for initiating repair.

> “ TLT-aftermarket service stands for professional and on time service. Contact us.
> Your contact person at TLT-Turbo will, in close contact with you, develop the best solution to protect your plant

A Passion for Solutions.

Germany . China . South Africa . USA
Austria . Chile . Hungary . India . Russia . South Korea



Business Location w/ Manufacturing and Service Workshop

TLT-Turbo GmbH . Germany
TLT-Turbo (Sichuan) Co., Ltd. . China
TLT-Turbo Africa . South Africa
TLT-Turbo Inc. . USA

Business Location

TLT-Turbo Rep. Office . Austria
TLT-Turbo South America SpA . Chile
TLT-Turbo Rep. Office . China
TLT-Turbo Rep. Office . Hungary
TLT-Turbo India (Pvt.) Ltd. . India
TLT-Turbo Rep. Office . Russia
TLT-Turbo Korea . South Korea

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