

# Wheels all around...



A manufacturer of alloy wheels developed a new powder coating process. The quality has been significantly increased by means of rotary powder spray guns. This innovation is unique in the industry.



Already the place name of the new production site of AEZ Leichtmetallräder GmbH speaks for itself. In Neuenrade (which means new wheels in German), an ultra modern wheel-manufacturing plant was built on a green field site. On 11<sup>th</sup> March 2005, the new AEZ production site was opened. On the 14.000m<sup>2</sup> site, around 130 employees manufacture and supply 1.2 million top quality wheels to the retrofit market each year.

Since its foundation in the mid-90s, AEZ's history has been characterized by continuous growth. As well as all important wheel sizes from 13 to 22 inches, the product range today includes multi-piece wheels and designs for the off-road segment. The innovative designs are developed by the in-house design department.



All AEZ products undergo numerous tests and are all tested and certified by the German TÜV. The Siegburg-based logistics center stocks more than 100'000 wheels and guarantees availability and prompt delivery.

The construction project in Neuenrade was the biggest in the history of the ALCAR group, the holding company of AEZ Leichtmetallräder and five other brands. With a sales volume of 6.5 million wheels, ALCAR is Europe's biggest supplier of steel and light-metal wheels to the automotive retrofit market.

## Powder coating to a turn

In 2003, AEZ's project to build a new production site for the exclusive manufacturing of retrofit wheels was initiated. For reasons of profitability, the company adopted a vertical plant design.

In the wheel coating process, the pretreatment is typically carried out in a hanging position. Opting for horizontal coating by means of an internal conveyor system requires costly and space-intensive robots, which take off the wheels from the hangers and reposition them for the coating process. Another disadvantage is the limited flexibility. The market demands a steadily increasing variety of products, therefore batch sizes become smaller and smaller. In horizontal plants, change-overs are time-consuming and negatively affect plant availability. Furthermore, color changes in horizontal plants require expensive and complicated cleaning. A vertical arrangement of the wheel hangers also allows a shorter, more economic furnace design, as the same throughput consumes half of the space.



These aspects led AEZ Leichtmetallräder to design an installation for vertical coating.

The coating tests in the test lab of ITW Gema AG in St. Gallen (Switzerland) were run with a vertical arrangement. Five automatic guns including Super Corona applied three colors black, gray and silver.

The tests were satisfying, but showed, with certain wheel types, slightly weaker layer thicknesses at the transition from the spokes to the rim flanges. This is a problem that typically occurs with vertical coating.

Mr. Gustav Sponer, director of the wheel production at AEZ then discovered a rotary axis with a gun in another booth in the lab, giving him an idea that had never been realized before. "I imagined, that the gun

would follow the spoke deepening" said Gustav Sponer "guaranteeing uniform coating of the entire edge." While the tests were still running in the laboratory, he put forward his idea to the German sales director, Mr. Ulrich von der Mühlen. In collaboration with the engineering department, they developed a concept, which should be completely new and unique in the field of wheel coating: a double-gun rotary axis on a traveling gun rack.



And this is how the system works: two rotary axes each with two automatic guns OptiGun are mounted on an x-axis. While the x-axis travels with the wheels, the guns

exactly follow the diameter of the wheels. For each travel path, the wheels are coated twice.

After the “round coating”, four automatic guns on a standard reciprocator apply, with minimal output, an additional layer. Subsequently, the coated wheels are going into the furnace for treatment.



Mr. Gustav Sponer: “Due to the uniform layer thickness repartition, the coating quality is outstanding and virtually the same as with wheels produced on horizontal installations. The technology developed by us does an excellent job.”

Even though it is new technology, the entire application could be assembled and put into operation within a very short time frame.

The whole plant is fully automated and requires only one operator for the control of the wheel type changes. Also the fresh powder is added automatically. It is transported from the fresh powder containers into an eddy current screening machine and subsequently conveyed to the guns. The entire installation runs without powder pumps.

For automatic cleaning during color changes, the guns travel on a preset basic position, where they are blown off by means of air nozzles. As both installations are monochrome or “1+1” color systems, powder centers are not necessarily required and have not been integrated.

But as color changes do take place between gray and black in the second booth, it is equipped with two exhaust air filters and a manual diverter valve. The latter allows easy change over of the aspiration system to the appropriate filter unit to be used.

### **After all one robot in use...**

One robot, however, is in use. This process is also a special development of AEZ, confirming the company’s innovative force. The robot automatically takes off the coated wheels from the vertical hangers and positions them with pinpoint accuracy on an internal conveyor system. Subsequently, the wheels go through the horizontal final coating application executed by means of electrostatic high-rotation spray bells of the Aerobell type from ITW Ransburg.

### **Efficient and economic**

The efficiency of the whole installation is remarkable. Paul Goldbach, production manager in the Neuenrade site: “We work in 2 to 3 shifts and are able to produce 9’600 wheels in 24 hours. Although the design of the wheels continuously changes –

only 2 wheel models used in the coating tests are still in production – we can easily respond to new challenges and maintain a flexible production.“

The whole investment is set up economically and yet is extremely efficient. “It was worthwhile investigating new ways in wheel coating in collaboration with our partners. Of course, for our business partners, this also meant high flexibility and clear determination to try something new“ says Gustav Sponer. “All persons involved brilliantly coped with this challenge. This is how probably the most advanced wheel coating production in the world was realized. Quick, high quality, precise and economic in operation.“

These are exactly the characteristics of a light metal wheel. Is this really a coincidence?

Considering the company’s innovative force probably not. Because AEZ is worldwide also the first company using nanotechnology in wheel coating to cut down the degree of contamination and increase safety.

We can’t wait to see what AEZ will come up with in the future in the field of light-metal wheel production. One thing is for sure, it will be highly innovative.

More information on AEZ and ALCAR under:

[www.aez-wheels.com](http://www.aez-wheels.com) and [www.alcar.de](http://www.alcar.de)

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## Installation characteristics

### AEZ Leichtmetallräder GmbH Neuenrade b. Siegburg

Objects: Aluminum wheels for retrofit use  
Sizes: 22" (610mm, 1 per hanger)  
18" (510mm, 2 per hanger)  
max. depth 400mm

Capacities: 400 pcs./h for 18"  
V conveyor: 2 m/min.



Booth 1: Monocolor system, clear powder

OptiMatic AS02-13P  
1 x ZA02-18 with positioning unit  
1 x rack including rotary axes ZS01-18  
MagicPlus  
Simatic  
AZO sieve, FPS 14

Booth 2: Two color system, gray and black

1 x ZA02-18 with positioning unit  
1 x gun rack with rotary axis  
MagicPlus  
Simatic  
AZO sieve, FPS 14