

Rittal – Nanotechnology leaves dirt no chance



Innovative protective coatings for
Rittal TopTherm cooling units

Rittal TopTherm & RiNano – In top form under tough conditions

RiNano in gear-box manufacturing



RiNano coatings were tested at the Volkswagen gear-box manufacturing centre in Kassel.



The grille of the condenser remains clean for much longer.



Without RiNano: The oily ambient air leaves noticeable contamination.

Foundries and the manufacturing centres for vehicle gear-boxes can be counted among the toughest applications for cooling units. Dry dust and heavily oil-laden air block up the integrated heat exchangers, calling for costly and time-consuming cleaning and maintenance. With the combination of Rittal TopTherm and RiNano technology, Rittal is now able to offer an ingenious climate control package for such applications. The water, dirt and oil-repellent properties of the innovative RiNano coating applied to the heat exchangers ensures a constant cooling performance over a much longer period and brings significant savings in both time and money.

Decisive factor in future competition

The industrial conquest of the nanometre dimension has already begun. Basic research, development and the launching of the first products go hand in hand. While nanotechnology is already well established in electronic engineering, the future competitiveness of other important sectors of industry, such as chemical, pharmaceutical, vehicle engineering, IT or optics, is decisively dependent on continued advances in the field.



RiNano saves time and money

- Reduced contamination of the heat exchanger
- High resilience of the RiNano coating
- Significantly simpler cleaning
- Extended service and maintenance intervals cut costs
- No time-consuming removal and remounting of the cooling unit
- Filter mats no longer necessary for many applications, e. g. dry dust
- Longer service life of metal filter mats (oily air)

RiNano in foundries



A foundry means extremely harsh operating conditions.



Thanks to the RiNano coating, there is less contamination of the condenser grilles.



The dust loads in a foundry are especially high.

Nanotechnology – What is it?



Nanotechnology is attractive as additional surface protection for Rittal products in various applications.

Nanotechnology (from “nano”, Greek for “dwarf”) is held to be one of the most important future technologies. With its motto of “smaller and smaller, faster and faster”, it is our door to the world of the smallest imaginable objects. A nanometre represents one-millionth of a millimetre. That is fifty thousands times smaller than the diameter of a human hair. The potential of this technology is immense, and it is already to be found in numerous applications in power generation, environmental engineering, information technology and the health sector.

Nanotechnology is an umbrella term covering a broad variety of material analysis and processing techniques with one thing in common: They all work in dimensions below the threshold of 100 nanometres. Nanotechnology exploits the special properties characteristic for many nanostructures. These mechanical, optical, magnetic, electrical and chemical properties, however, are not necessarily dependent on the type of material used, but arise in ingenious fashion from the size and arrangement of the structures. One prerequisite for nanotechnology has been the development of methods to handle the individual structural elements of a material, and our increasing understanding of the self-organisation of these elements.

On this basis, nanotechnology is elaborating the foundations for even smaller data storage structures with ever greater storage capacities, for highly efficient filters for use in wastewater treatment, for photovoltaic windows, for the materials to manufacture ultralight engines or for artificial joints whose organic nanosurfaces improve their acceptance by the human body.

Nature shows us how: The “lotus effect”



The “lotus effect”. Even a greasy dye of the kind used by the police to mark banknotes can be flushed from the leaf surface with a few drops of water thanks to the lotus effect.

Source: www.dbu.de

In Asia, the lotus plant is a sacred symbol of purity – liquids simply form pearls and run off, and no dust is able to cling to its surface. The “secret” behind this phenomenon: Natural nanoparticles, tiny papillae which repel the water. They stand so densely packed that a water droplet simply sits on the brush-like tips and (on account of its surface tension) is not actually in contact with the leaf itself. Translated into modern technical applications, this principle can be exploited to produce self-cleaning ceramic surfaces, scratchproof spectacle lenses or special paints for particularly hard, resilient and dirt-repellent surface finishes.

How do nanosealings function?

The innovative RiNano coatings used by Rittal comprise different classes of nanoparticles, which form a solid bond with the condenser surface of the TopTherm cooling units and there produce the desired protective effect. The nanoparticles arrange themselves intelligently during application: The bonding components gather at the surface to be coated, while the anti-adhesive components migrate to the air. This produces an ultrathin, glass-like layer which bonds homogenously to the original surface and guarantees extreme durability.

The surface formed is a landscape of peaks and valleys of nanoscale dimensions.

The properties of this surface are comparable to a lotus structure.

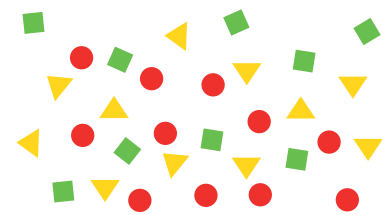
Rittal enclosure cooling units with RiNano coatings are thus also reliably protected against particularly aggressive environmental influences such as oily ambient air.

Nanotechnology in enclosure cooling units

Constant cooling performance under the harshest conditions

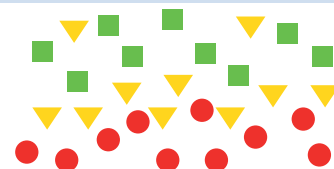
It is not unusual to find cooling units of the Rittal TopTherm series in extremely tough operating environments. The dry dust in a foundry and the heavily oil-laden air in vehicle gear-box manufacturing are just two examples among many. It is the surface dirt collecting on the condenser grilles which leads to considerable outlay for cleaning and maintenance.

The advantages of nanotechnology have now been incorporated into selected Rittal TopTherm cooling units. The condensers of the cooling units are coated with a nanopaint comprising countless ceramic nanoparticles. The permanent sealing of the surface pores leaves no hold for contamination and the surface properties are maintained. The same kind of nanocoating is used in the motor industry to produce especially hard and resilient paint finishes.



Condenser surface

Nanosealings comprise nanoparticles with complementary properties.



Condenser surface

The nanoparticles arrange themselves intelligently during application.



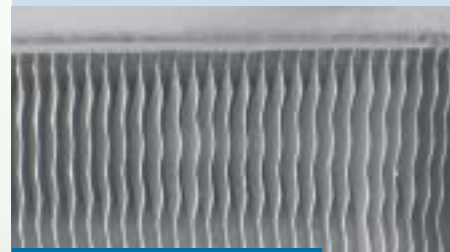
Condenser surface

This process of "self-organisation" produces an extremely durable and ultrathin glass-like coating.



Dust test:

Coated condenser (photo after cleaning)



Dust test:

Uncoated condenser (photo after cleaning)

“A Fresh Breeze and Less Work”

TopTherm and RiNano – innovative coatings for reliable cooling

With heat exchangers, in particular, increasing contamination of the cooling elements can lower the cooling capacity by 30 to 50 %. But Rittal is now bringing the positive properties of innovative nanotechnology into system climate control. Under the process name RiNano, selected Rittal TopTherm cooling units of the SK series can be supplied in optional versions with a nanocoated condenser. The benefit: Long-term constant cooling performance paired with savings in time and costs.

- Condenser with revolutionary nanocoating
- Water, dirt and oil-repellent properties
- Constant cooling performance over a longer period
- Time and cost savings through simpler cleaning and significantly extended maintenance intervals



Request by fax:

- I would like a visit from a Rittal adviser.
 Please call me.

Fax hotline: 02772 505-70101
Enquiries to: rinano@rittal.de

Rittal TopTherm with RiNano coating

		Voltage	Controller	Model No. SK	
				Basic	RiNano
Wall mounted units	500 W	230 V	Comfort	3303.500	3303.400
	1000 W	230 V	Comfort	3304.500	3304.400
	1000 W	400 – 460 V, 3~	Comfort	3304.540	3304.440
	1500 W	230 V	Comfort	3305.500	3305.400
	1500 W	400 – 460 V, 3~	Comfort	3305.540	3305.440
Roof mounted units	1500 W	230 V	Comfort	3384.500	3384.400
	1500 W	400 V, 2~	Comfort	3384.540	3384.440

Other cooling units with RiNano available on request.

First name _____

Name _____

Company _____

Address _____

Telephone _____

e-mail _____

Date/signature _____

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Rittal GmbH & Co. KG · Postfach 1662 · D-35726 Herborn
 Telephone: +49(0)2772 505-0 · Telefax: +49(0)2772 505-2319 · eMail: info@rittal.de · www.rittal.com



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