



Aerotech® System

Air cooled dry cutting



Aerotech® System
winner in the category of:
Machining and Tools

JECeurope

Aerotech® System
winner in the category of:
Innovation Spreading

JECamericas



in Europe &
in the World

CRUING

The Aerotech® System is a revolutionary tooling solution that thoroughly evacuates hot dust particles produced during cutting operations.

By effectively air cooling the material and cutter, it significantly reduces machining temperatures.

This allows manufacturers of composite parts to consider dry cutting their components, providing a practical alternative to machining with coolants.



“People who say it cannot be done
should not interrupt those who are doing it.”

George Bernard Shaw



The principles of the jet engine; suck, squeeze, bang and blow

So how does the Aerotech System work?

Just like a jet engine, without the squeeze and bang!

The **Aerotech® System** has a solid fan turbine which, at operational rpms, sucks in air up to velocity of 80 meters a second at the point of cut, blowing it out into the CNC machines extraction hood through its Fan Outlets. This is what makes it so effective at removing hot dust particles while cutting, and at the same time reducing machining temperatures.

The **Aerotech® System** uses dedicated cutting tools with HSK cones. **HSK**, or hollow-taper-shank, is widely regarded as a superior tooling assembly, both within the Aerospace Industry as well as in the Metalworking sector. Since these cutters have an integral HSK cone, they are lighter, shorter and stiffer compared to conventional tools, providing exceptional axial and radial accuracy. The increase in rigidity that HSK cones provide also translates to a higher natural frequency for the cutting system. This gives you the possibility of running at higher speeds before resonance or chattering begins, minimising tool deflection and increasing your potential for productivity. The result, a better quality surface finish with lower Ra values and no delamination.



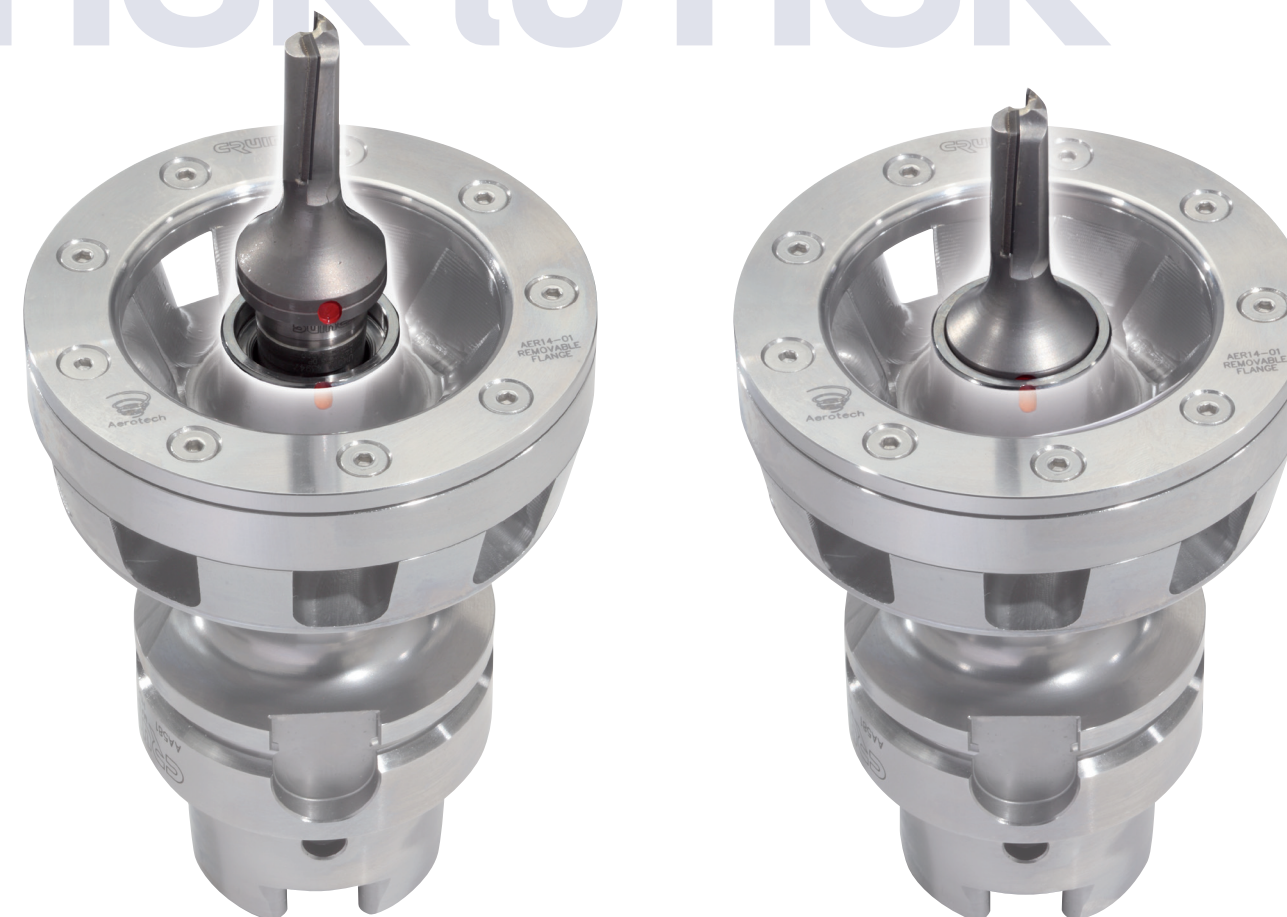
No Delamination

CRUING

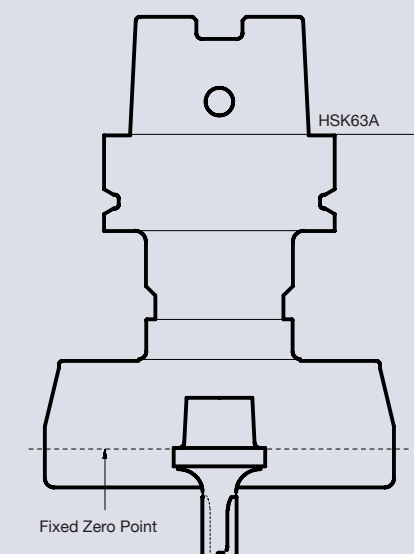
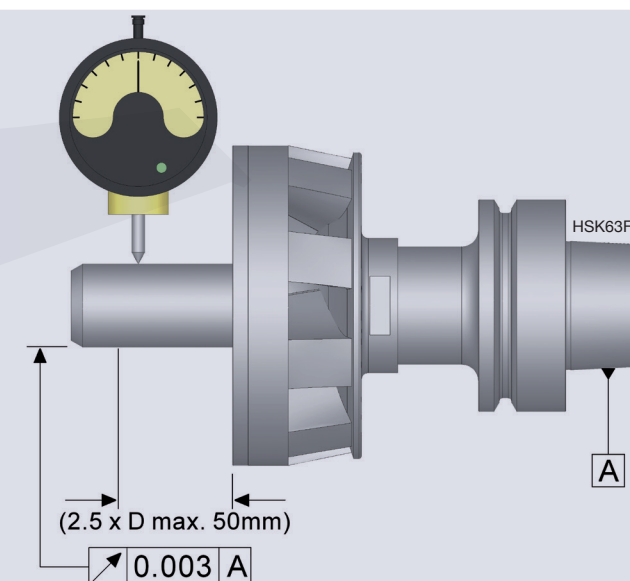


Aerotech® System

HSK to HSK



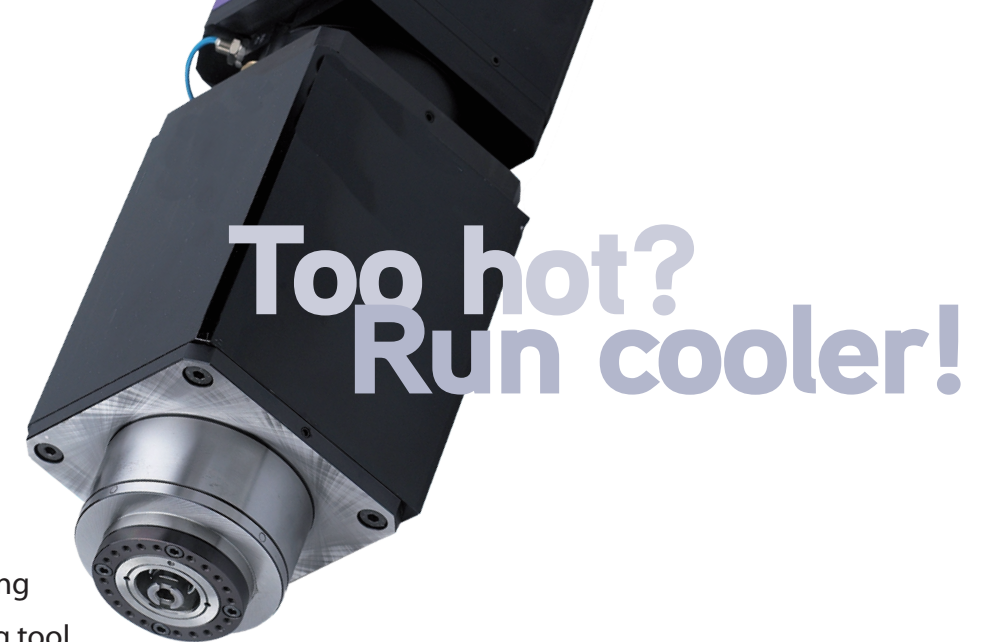
Cruing's HSK 20C cutters have a precision milled faceplate that interfaces with a similar faceplate on the Aerotech® System, for metal-to-metal contact both radially and axially. This guarantees permanent static accuracy and a fixed zero point, allowing the CNC machine operator to maintain a constant setting of the machines Z axis after changing between similar tools.



Hard. 58 HRC to be precise. Each Aerotech® System is heat treated to help withstand the erosion of evacuating dust. In some cases this dust can be particularly abrasive, without the Aerotech dust may deposit on machine components and over a short period of time will damage and wear out mechanical parts.

Hardness 58HRC G2.5

The main Aerotech® System body is manufactured from a single, solid piece of steel, making it extremely rigid. With a balance class of $G < 2.5$ at 25.000 rpm, it is absent of even the slightest vibration. This puts you in a position to make an even better quality product.



Heat produced during cutting operations assists in deteriorating tool life, thereby having a negative effect on the quality of your finished components. Some of the materials used in today's industries are particularly sensitive to heat and can delaminate due to over heating.

If heat is allowed to persist, the conduction of this heat up through the CNC machine's electro spindle can alter the characteristics of the grease used to lubricate the electro spindle bearings. This can already begin to occur at temperatures of $\sim 73^{\circ}\text{C}$ thereby causing inefficiency of the bearings and giving rise to potential electro spindle damage.

The Aerotech System effectively air-cools the cutter and material, removing dust particles that become super-heated while cutting, thereby ensuring that the electro spindle runs cooler.

During a series of heat tests conducted at an Aerospace company located in Europe, thermal camera images confirmed that the Aerotech can reduce machining temperatures by over 100°C .

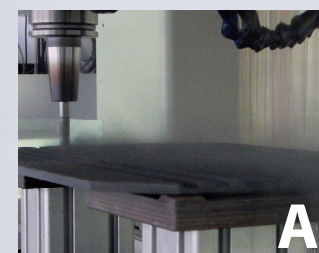


Photo A shows a conventional tool dry cutting a carbon fibre component. Without the use of air or flood coolants the cutter becomes extremely hot. The jet of dust particles created by the cutter is super-heated and can damage the surface of the carbon fibre component.

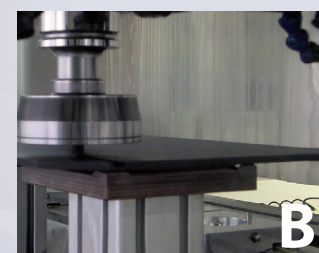


Photo B shows an Aerotech System dry cutting the same carbon fibre component. At operational rpms the Aerotech sucks in air up to velocity of 80 meters a second at the point of cut, blowing the air and hot dust particles out through its Fan Outlets. By effectively air cooling the material and cutter, it significantly reduces machining temperatures. This allows manufacturers of composite parts to consider dry cutting their component, providing a practical alternative to machining with coolants.



WHY CONSIDER DRY CUTTING?



The environmental impact

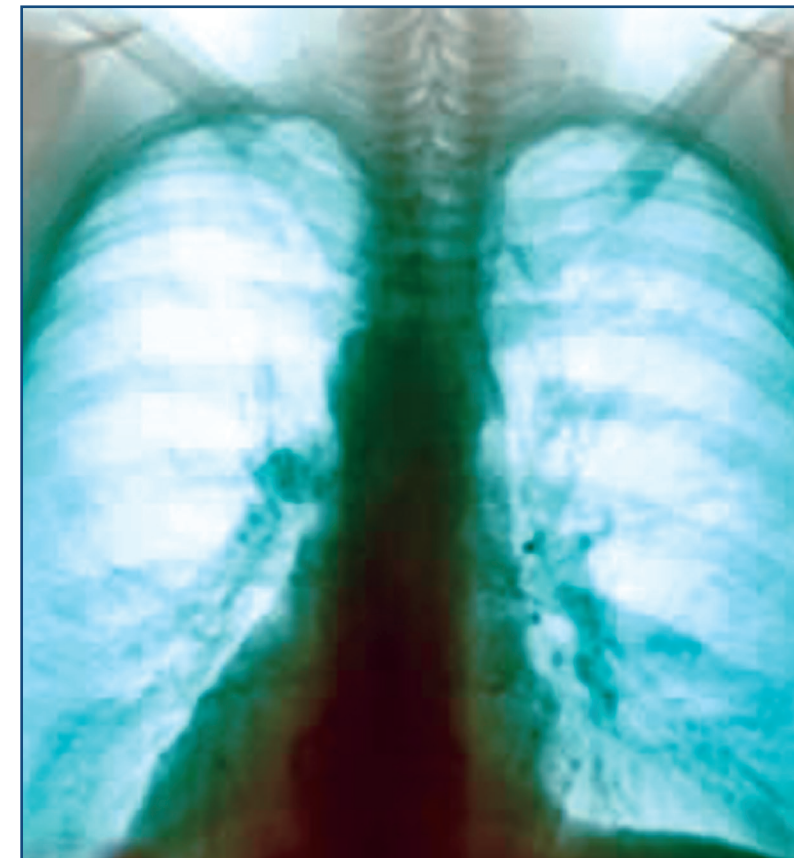
The use of coolants fluids, or 'wet cutting', is particularly common in the Aerospace and Automotive industries. These fluids can have an impact on health and to water resources. Many chemicals used in cutting fluid composition, such as biocides, anticorrosive, antifoam and others, can have a negative effect on the environment.

Because biocides are intended to kill living organisms, many biocidal products pose significant risk to human health and welfare. The use of biocides can also have significant adverse effects on the natural environment. Disposal of used or unwanted biocides must be undertaken carefully to avoid serious and potentially long-lasting damage to the environment.

The biocides are extremely harmful to operator health and have high costs.

Health

Cutting fluids and coolants have been associated with skin rashes, dermatitis, esophagitis, lung disease, and cancer. These problems result from either toxicity or bacterial or fungal contamination. Metalworking fluids often contain substances such as biocides, corrosion inhibitors, metal fines, tramp oils, and biological contaminants. Inhalation of cutting fluid aerosols may cause irritation of the throat, nose, and lungs and has been associated with chronic bronchitis, asthma, hypersensitivity pneumonitis (HP), and worsening of preexisting respiratory problems. Skin exposure may result from touching contaminated surfaces, handling parts and equipment, splashing fluids, and aerosol mist settling on the skin. Skin contact with cutting fluids may cause allergic contact dermatitis, irritant contact dermatitis, and occupational ("oil") acne.



Your safety



BG TEST CERTIFICATE n° HO 082007:
Aerotech bodies pass over-speed safety tests at
60.000 rpm.

BG TEST CERTIFICATE n° HO 082004:
HSK 20C inserts pass over-speed safety tests at
60.000 rpm.

Enviroment

Tests conducted by



Universität Stuttgart
Germany



Institut für
Werkzeugmaschinen

Testing of dust and chip extraction with
Aerotech® System

Machine: MAKA 5-axis-milling center type PE170

Summary of the results: "With the Aerotech a
degree of extraction of 97,4% can be achieved, the
Aerotech removes 5,3-times more material than
a standard tool. A standard tool leaves a 5,3-times
more polluted work piece than the Aerotech".

Saving Energy



The Aerotech® System runs on passive energy,
that created by the rpm of your machines electro
spindle. It therefore provides you with low cost air
cooling, allowing you to consider the elimination
of compressed air to reduce machining temperatures.

Efficiency

Tests conducted by  **Fraunhofer**
IPA

Temperature and wear tests conducted with
Aerospace grade CFRP. Results and videos available
on www.aircooleddrycutting.com



Tool designed
and manufactured
under EN 847-2 regulations

Utensile progettato
e realizzato secondo
la normativa europea EN 847-2

COMPANY WITH QUALITY MANAGEMENT
SYSTEM CERTIFIED BY DNV
= ISO 9001:2008 =

COMPANY WITH ENVIRONMENTAL
MANAGEMENT SYSTEM CERTIFIED BY DNV
= ISO 14001:2004 =

European Patent EP 1 940 585

THINKING BEYOND



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