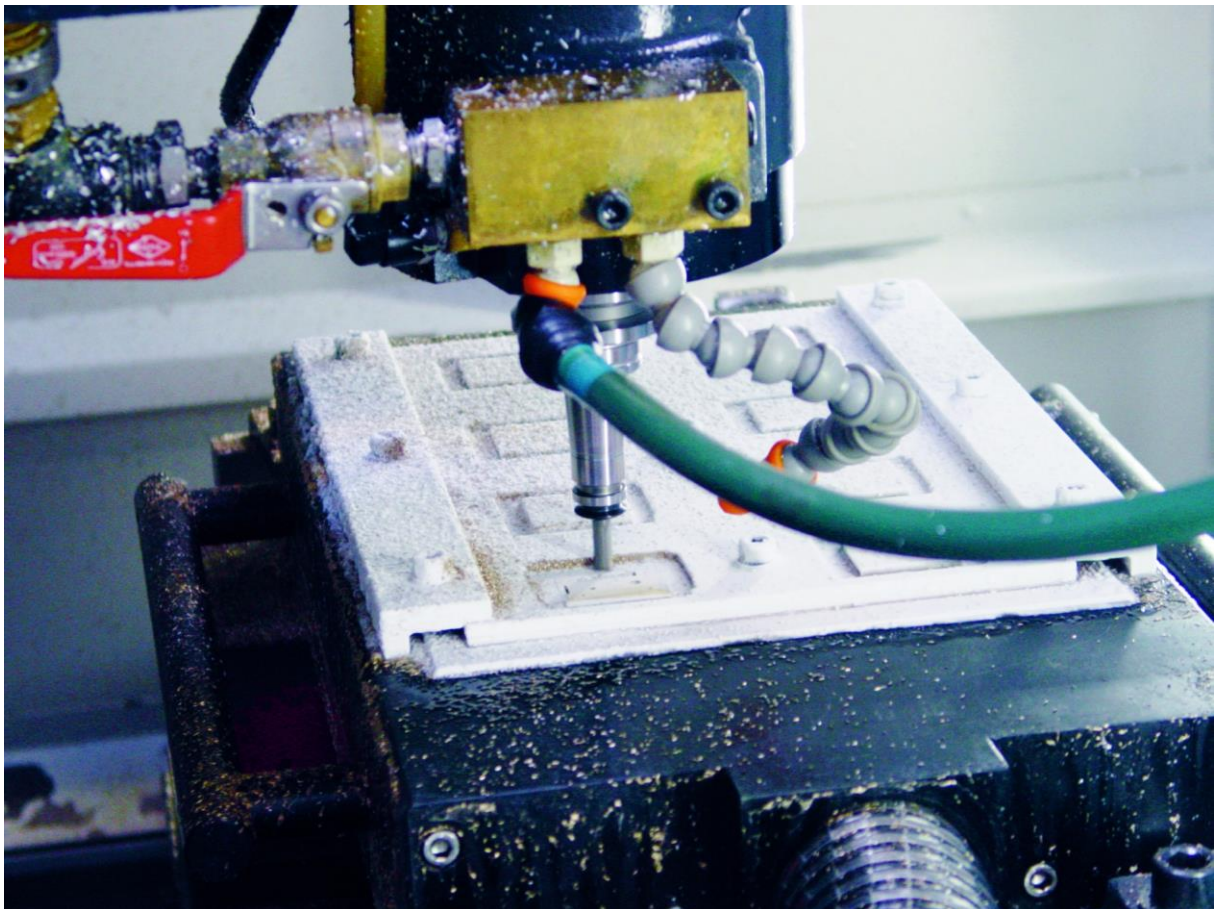


Triag triGEL freeze clamping shows how ice could be the fixturing solutions you need



Providing efficient workholding solutions for components that would be challenging, or even impossible, to fixture any other way is the Triag International triGEL range of freeze clamping plates. Now available from the UK and Eire from REM Systems.

Freeze clamping is a clamping technique that is primarily used for bulky parts made of metal, most mineral materials as well as engineering plastics. Ice offers excellent adhesion. When using the triGEL system, cold gas is run through the worktable's labyrinth of cables and cooled to the working temperature of -8°C.

The workpieces and the worktable are coated with a fine water film, which clamps the parts in place after freezing in approximately 60 seconds. The process is reversed to loosen the workpieces. The device functions as a heating pump. It allows the thawing point to be reached quickly, which releases the workpieces.

Fixturing with ice is a physical phenomenon that many of us have experienced. Taking hold of a metal handrail in the winter, when the temperature is below zero, you can suddenly find your hand stuck to the rail provides that perfect example. Windscreen wipers, door locks and handbrakes frozen into place on our cars demonstrate the same effect.

This same phenomenon is used by ice clamping devices and there are two different methods of achieving the necessary cooling of the machine table or working surface. First is the Peltier Effect for thermoelectric refrigeration, and the second is the use of a cooling medium such as those commonly applied within a deep freezer. In this second method, the latent heat of evaporation of the cooling medium (for example R4040 that has no greenhouse effect) contained in a closed coolant circuit is used. The cold gas passes through a labyrinth of channels in the machine table, bringing its temperature to about -8°C.

Managing Director, Ian Holbeche, explains: "The second method is significantly more powerful, and that is why Triag applies this technique within its triGEL system. At 2 N/mm² the adhesive strength is up to 20 times greater than that achieved by vacuum clamping. And, since there are no clamping forces applied to the workpiece there is no stress transferred, so even semi-flexible parts can be machined to very tight tolerances."

Both the machine table and the workpieces are covered with a fine film of water using a water atomizer. This causes the workpiece to stick to the machine table within approximately 15 to 60

seconds. The process is reversed to release the workpieces, with the triGEL operating much like a heat pump, so that the dew point is reached again very quickly, and the workpieces are released.

For parts with a flat surface the thickness of the film of water or ice is negligibly small. Components with irregular geometry can be frozen solid in a water bath prior to being fixed to the worktable. All metallic and most mineral materials, as well as many engineering plastics, can be clamped in this way.

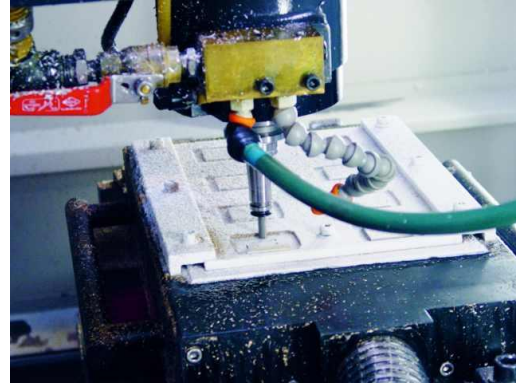
“Ice clamping was once confined to use in the watch making and jewellery industries,” says Ian Holbeche. “Now, with standard table sizes ranging 100 by 100 up to 500 by 550 mm, the Triag triGEL range can extend its application into medical device and implant technology manufacturers through to general precision mechanical engineering production.”

Triag’s triGEL system consists of two interconnected elements, the workholding table and the control cabinet. The workholding table is made from thermo-conductive materials such as aluminium and copper. The refrigerating gas R4040 is circulating inside the standard sized or custom-made tables.

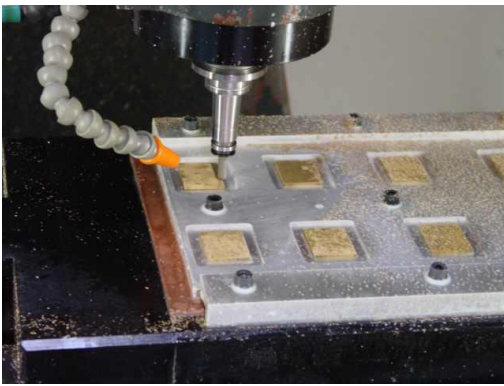
Contained in the control cabinet is the compressor and heat exchanger, thermostatic control for the freezing and the reheating process, including the system to maintain a pre-set temperature for holding the components during the machining cycle. The electrical safety circuitry with control lights to ensure the workholding process is fully functioning, as well as the interface to the machine control system for process monitoring and control.

Ends

Images:



(GEL1.jpg and GEL2.jpg) Workpieces frozen securely on Triag triGEL worktable



(GEL3.jpg) Raw material loaded ready to freeze into place (GEL4.jpg) Triag triGEL worktable

Note to Editors

REM Systems was established in the early eighties to service Swiss EDM machines. This activity brought the company into contact with the Swiss tooling and automation company Erowa and it has been its distributor in the UK and Ireland since 1987.

At about the same time, it also became the distributor for another Swiss company, TRIAG that produces multi-vice systems. Recently it became the distributor for a third Swiss company, FTool that manufactures EDM tooling systems. REM Systems association with these companies, coupled with many years' experience of machine tools and production engineering, means it is well placed to help customers in their pursuit of lean manufacturing processes.

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