

Green cutting of metals

Ensuring the flow of the liquid phase of the cryogenic medium into the cutting zone

Fields of use

Manufacturing processes,
cutting, processes,
cryogenic cutting

Current state of technology

Prototype developed and
tested

Patent status

Patent pending,
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Inventors

University of Ljubljana,
Faculty of Mechanical
Engineering

Internal number

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Contact

[Knowledge Transfer Office,
University of Ljubljana](#)

Phone: +386 1 2418 533

E-mail:
gospodarstvo@uni-lj.si



Background

Cutting processes result in high thermal and mechanical loads of cutting tools. As a sustainable alternative to conventional oil emulsions, nitrogen can be used as a refrigerant; but nitrogen in gaseous form has poor lubricating properties.

Description of invention

The invention is a continuous liquid phase supply system for the cryogenic medium with phase separator that supplies the liquid phase to the cutting zone while the separated gaseous phase is used to isolate the flow of the liquid phase and create an inert atmosphere in the rigid cutting zone.

Main advantages

The advantage of this invention is, in particular, the possibility of a local supply of a fully liquid phase (and consequently a higher lubricating effect) of nitrogen, with smaller volume flows.

Other advantages of the invention are:

- better cooling and lubricating effect,
- more localized supply of liquid nitrogen,
- economical usage of liquid nitrogen (lower consumption),
- improving the performance of the cutting process (longer tool life);
- improving product performance (improved integrity of the treated surface)