MESSER
Gases for Life

INCAL Die cooling with liquid nitrogen

Customised, cost-effective and precise with liquid nitrogen

INCAL Die Cooling

In die cooling, the liquid nitrogen is introduced into the backer, where it provides cooling while vaporising. The resulting nitrogen vapour enters the press throat at the down stream side of the die and protects the extrusion from oxidising. With this process the bearing surface is cooled, thus compensating for frictional heat build-up. Given optimum heat conduction, it is possible to achieve an increase in output in the order of 20 to 50% and more, depending on the shape of the extrusion, the design of the tool and the aluminium alloy employed.

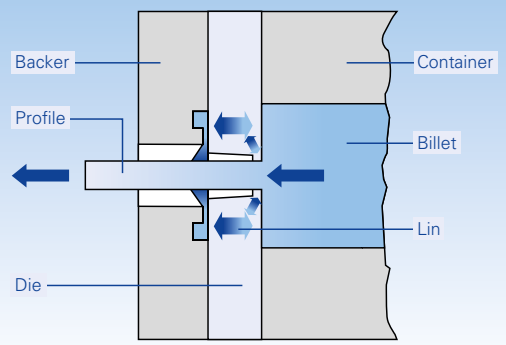
Advantages

- Higher press speed
- Fewer surface defects
- Less wear of die

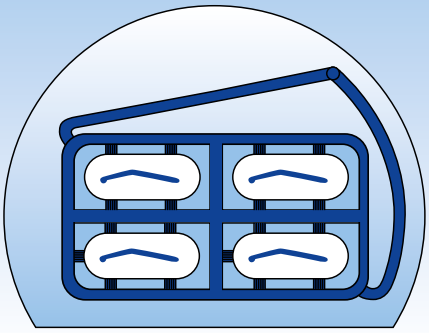
Cooling channels

Die cooling calls for some special features of the die. To ensure optimum cooling efficiency, it is essential that the ducts run close to the die bearing surface so that the surplus heat is effectively removed. Accurately controlled feeding of the coolant is of extreme importance in terms of both process safety and efficiency.

How liquid nitrogen works in the die:



Specific design of cooling channels is necessary:



Cryogenic nitrogen requires expertise

The cryogenic temperature of -196 °C demands special expertise in storage, transport and application. The nitrogen is stored in special tank systems whose insulation ensures minimum longterm losses of the cryogenic nitrogen due to the effect of ambient heat. Different-sized tank systems are available for different applications and nitrogen requirements.

If liquid nitrogen is required at atmospheric conditions, a device known as a subcooler is used. It feeds some of the nitrogen into a depressurised container, where evaporation takes place due to expansion. The subcooler, thus filled with -196 °C, contains a heat exchanger, which then cools the still "warm gas" (-180 °C) to almost -196 °C as well. In this way, the evaporation takes place in the subcooler rather than the application.

If you have any questions or would like a personal consultation with our application experts, please do not hesitate to get in touch with us.

Cold-insulated nitrogen storage tank

The subcooler improves the nitrogen's refrigerating qualities.

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