

Industrial services: Comprehensive from a single source ...



Cooperation for the benefit of our customers

Cleaning, cooling, leak testing: Examples which require specialists

Industrial services are becoming increasingly important. Linde offers a wide range of services so that our customers are able to concentrate even more on their core business. This requires specialists.

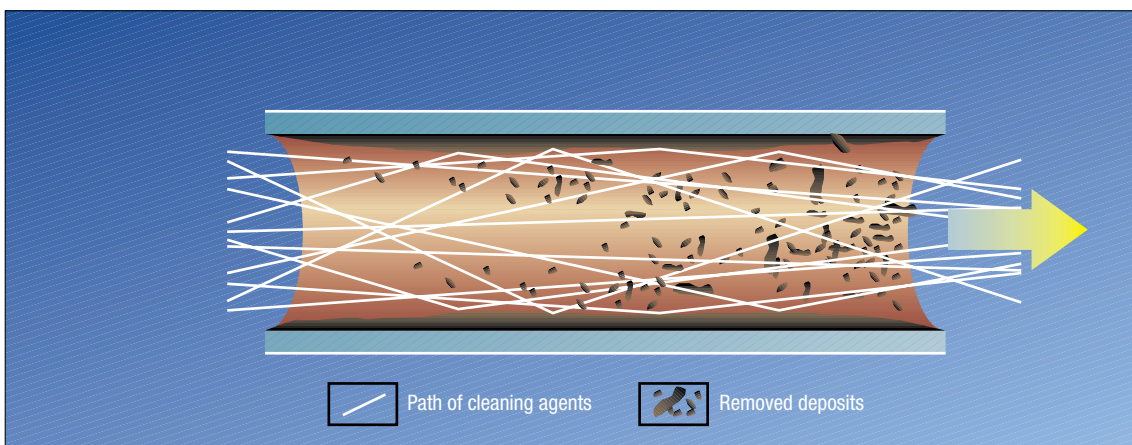
To offer the best solution in each case with regard to know-how, processes, equipment, personnel and gas supply, Linde works together with the experienced service provider A. Hak Industrial Services (in Germany: J.P.P.S. GmbH). A. Hak provides the specialists and the necessary equipment. Linde provides gases, required supply systems and gas know-how.

The potential which we and our partner are able to provide guarantees that the service work will be carried out reliably, flexibly and quickly.

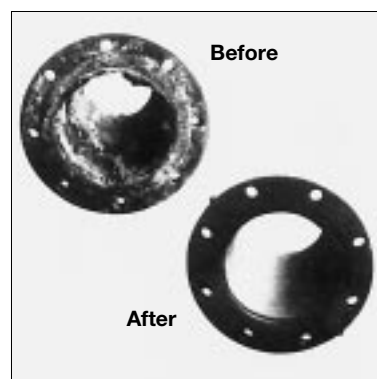
Piping and pipeline cleaning: Faster, better and more environmentally friendly with Sandjet®

The Sandjet® procedure enables pipelines and process furnaces to be cleaned while remaining installed. Cleaning is done with a cleaning agent (e. a. slag granulate) which gently knocks off all hard and brittle deposits. This eliminates the need to use chemical agents and greatly simplifies the disposal of the residual materials. For example, in a single day it is possible to clean pipelines 8 kilometres in length and with a nominal width of 600 mm, as well as various types of process furnaces. Normally, the pipes do not have to be removed or divided.

Furthermore, pipelines which are prepared in this way can then be given a new internal coating using the Innercure® process. The result: pipelines which are completely like new ones.



Functional principle of Sandjet®



Pipeline cross sections
before and after cleaning
with Sandjet®

◀ Title page: Applying Sandjet® to a vinyl chloride plant

Enhanced safety at acceptable costs: Leak testing with nitrogen and helium

Under operating conditions with pressures of up to 100 bar, very small leaks and their precise leakage rates can be determined with a special leakage test method. The leaks are repaired immediately if possible.

With a nitrogen / helium mixture, the inert and diffusible helium is used as a trace gas which can easily be detected. Compared with a standard helium leakage test, using a gas mixture makes this procedure much more interesting from an economical point of view.

Following the test the client receives a detailed report which enables him to take remedial action prior to commissioning. In addition to the protection of personnel and the plant this test procedure also contributes to environmental protection and, not least, economical operation.

Carrying out a leakage test on a hydrogen system





Control unit for cooling, heating or drying

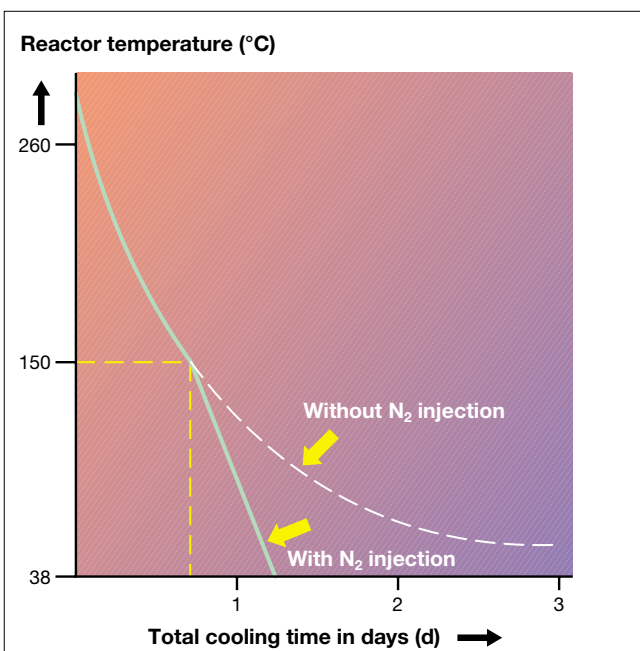
**When things need to be done more quickly:
Cooling, heating and drying with nitrogen**

Time required for cooling down or heating up systems with high operating temperatures which are due for a shutdown can be considerable. The production downtimes are correspondingly cost-intensive.

With our high-performance hardware, we offer the possibility to minimize the shutdown time of your systems by several days through the direct injection of controlled quantities of cold or hot nitrogen. This enables production downtime costs to be significantly reduced.

We can also offer valuable assistance in the case of drying. New and renovated systems often contain moisture which delays commissioning or which can at least obstruct maximum product yield for several days.

By purging the equipment with heated gaseous nitrogen the equipment is dried in a controlled way. The shutdown time can thereby be shortened by several days and maximum capacity can be restored fast.



Shortening the cooldown time of a reactor by cooling with nitrogen

Advantages you can count on

● Your partner for comprehensive industrial services

We also offer many standard applications using nitrogen, such as pressure testing, inerting and pigging. Our high-performance evaporators, which operate autonomously and provide up to 25.000 m³ / h of nitrogen at 700 bar pressure and can heat up to over 250 °C, provide a wide range of applications. Mini-Sandjet® allows tubular heat exchangers and pipelines with small cross sections to be cleaned.

● Time and cost savings

Our processes can reduce the duration of an inspection or maintenance work significantly. In most cases, there is absolutely no need for any disassembly or removal of system components. The drying effect of the inert gases used is also favourable.

Costs arising from production downtimes can thereby be reduced to a minimum.

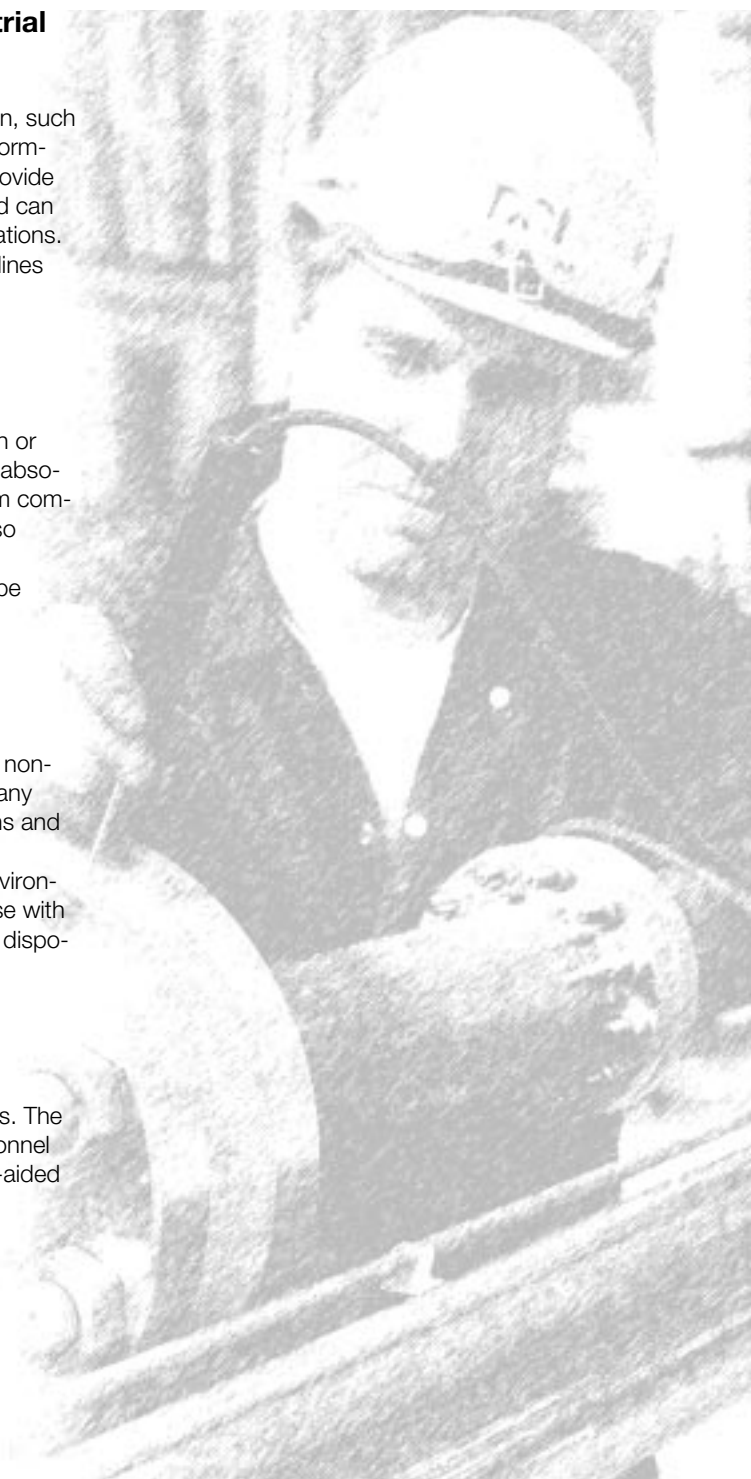
● Safety and environmental protection

Nitrogen and helium are non-flammable, non-toxic and non-corrosive gases. They do not harm the environment in any way. Using them reduces the risk of fires and explosions and allows systems to be started up safely.

In all cleaning and renovation work, significantly less environmentally harmful materials are produced than is the case with most chemical and physical processes. This minimizes disposal problems.

● Everything from a single source

The client does not incur any significant personnel costs. The service work is carried out by qualified and skilled personnel with many years of experience together with computer-aided calculation systems.





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