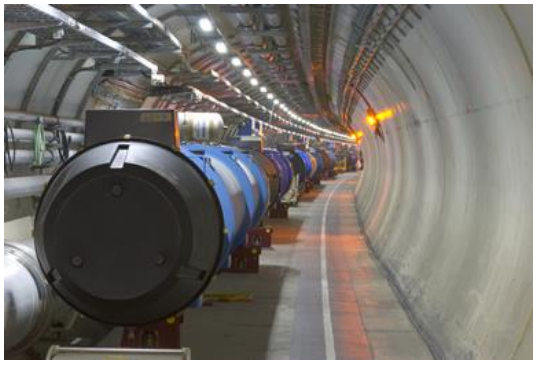
TECHNICAL BULLETIN

Vecom treats stainless steel with Swiss precision

Ultra clean and packing with special procedure

Some time ago, Vecom received a very specialised assignment for the ultra-clean pickling and cleaning, according to stringent requirements, of tubing destined for CERN (European Organisation for Nuclear Research) in Switzerland. A large particle accelerator was being built here. These stainless steel lines and tubes were intended to be used for cryogenic cooling using helium and some would be connected to the measuring equipment.

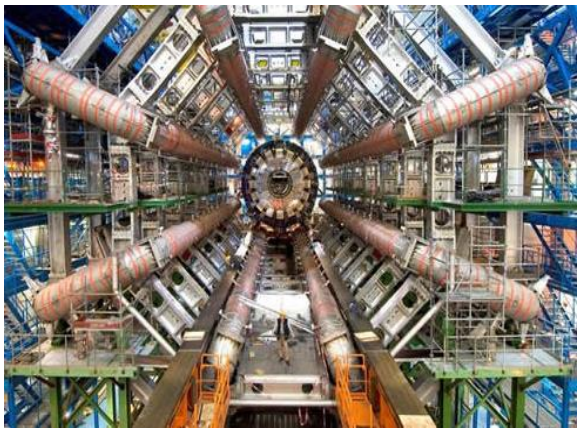


Vecom Metal Treatment B.V. has years of experience in the ultra-cleaning of various components and systems. An extremely clean surface is a prerequisite for components and systems used for production, storage and transport of gas. These can include various types of gas, in liquid form or in the gaseous state.

CERN, the project

On the border of Switzerland and France, 100 metres underground, a tunnel has been excavated measuring approximately 8 km in diameter and a total length of 27 km. A particle accelerator has been installed in this tunnel. The particle accelerator built by CERN in Geneva was designed to find the Higgs boson (or Higgs particle). The Higgs boson is described in the theory of physics as the most important particle. Investigators hope that, by building this particle accelerator, they will be able to visualise the Higgs boson. The particle accelerator, in which the electrons and protons collide, is the largest in the world. The electrons are accelerated to speeds approaching the speed of light, thereby dramatically increasing the mass of the electrons.

After coming online, the particle accelerator operated for 10 days. A short circuit severely damaged approximately 50 magnets. As a result, the project has suffered a delay of one year.

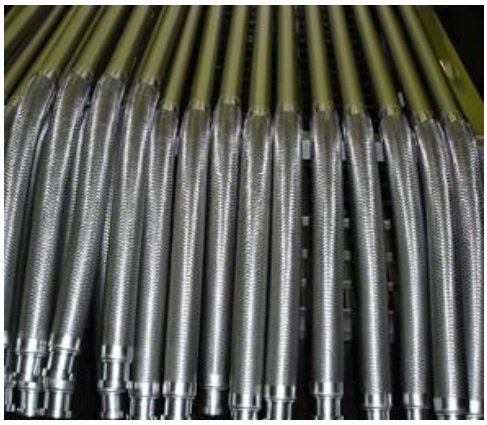


Manufacture of the lines

The lines were manufactured by the client in their specially designed clean room using approved orbital and hand-welding techniques. After manufacturing the lines, 4 essential tests and treatments were conducted (please refer to summary below). A certificate is awarded upon successful completion of each test or treatment. Such a certificate gives the customer a guarantee that his construction has been manufactured according to the specifications provided.

1) Pressure test, 30 minutes at 30 bar
2) X-Ray examination of the weld joints
3) Ultra-cleaning of the lines (Vecom)
4) Leak tightness testing, with a maximum leak detection of 1 cm^3 of helium over a period of 30 years!

Ultra-cleaning by Vecom



Vecom Metal Treatment B.V. was responsible for the ultra-cleaning and packaging of the lines. However, an initial test clean by Vecom demonstrated just how essential it was for the material to be clean. During the leak tests, conducted in a high vacuum, several molecules of degreasing liquid were found.

In order to prevent this problem it was decided, in consultation with the client, to implement a number of additional rinsing and neutralisation steps in the cleaning procedure. No further problems were encountered during the leak tests. The total cleaning treatment consisted of 14 separate steps!

1. Ultra-clean degreasing
2. Rinsing
3. Pickling
4. Rinsing
5. Chemical passivation
6. Rinsing
7. Neutralisation
8. Rinsing
9. Immersion in demineralised water
10. Rinsing with demineralised water
11. Passing nitrogen gas through
12. Drying
13. Oxygen inspection
14. Packaging

Vecom Metal Treatment B.V. is proud to have contributed to a challenging and prestigious high-tech project such as the CERN particle accelerator.

Interested and want to know more?

For further information and/or questions about this subject or in case you have other questions, please contact one of our specialists via +31 10 59 30 258 or go to our website.