

Volgnummer: 2009/03

VECOM TREATS STAINLESS STEEL WITH SWISS PRECISION

CERN, European Organisation for Nuclear Research

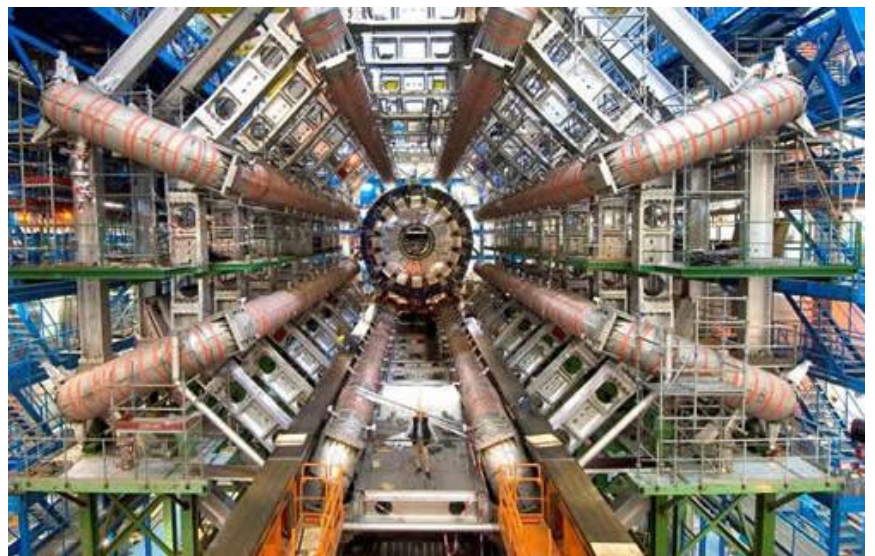
As you may already know, Vecom Metal Treatment B.V. has years of experience in the ultra-cleaning of various components and systems. An extremely clean surface is a prerequisite for components and systems used for production, storage and transport of gas. These can include various types of gas, in liquid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

At the end of 2005 Vecom received a very specialised assignment from the company Velmon Lastechniek (welding engineering) B.V. The assignment involved 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 is 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.

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.



The particle accelerator came online on 21 October 2008 and operated for 10 days. A short circuit severely damaged approximately 50 magnets. As a result, the project has suffered a delay of one year. The plan is to restart in September 2009 and to continue until the autumn of 2010.

Manufacture of the lines

The lines were manufactured by Velmon Lastechniek B.V. 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 cm³ 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 (1x10⁻¹⁰ Pa m³ s⁻¹), several molecules of degreasing liquid were found.

In order to prevent this problem it was decided, in consultation with Velmon Lastechniek B.V., 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., per order of Velmon Lastechniek B.V., is proud to have contributed to a challenging and prestigious high-tech project such as the CERN particle accelerator.



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