

COVID-19: Plant engineering in critical times

Line pipe engineering for vaccine production plant



Zauner Anlagentechnik & INRA Group - Peregrine Project in Lonza
Never underestimate the power of good teamwork.

The race for available COVID-19 vaccines presents vaccine manufacturers with the challenge of producing approved vaccines as promptly as possible in order to guarantee the provision of large sales volumes. At the Lonza IBEX complex MC1 in Visp (Switzerland), production modules for the Moderna COVID vaccine mRNA-1273 were built in the last third of 2020 under the project name „Peregrine“. The joint venture (AZI) comprising the two companies Zauner Anlagentechnik GmbH and Inra Group AG participated in this project with line pipe engineering. This article describes the framework conditions and necessary measures required to implement this „Lightning Fast-Track Project“.

Since 6 January 2021, the COVID-19 vaccine of the US biotechnology company Moderna has been granted conditional marketing authorisation in the European Union for the prevention of COVID-19 disease. This vaccine, termed mRNA-1273, is an mRNA-based vaccine that achieves an efficacy of 94.1% according to study results. Under a contract signed between the European Commission and Moderna, a total of 160 million vaccine doses are to be delivered to European Union member countries between the first and fourth quarters of 2021. On 17 February 2021, the European Commission approved a second contract which provides for an additional purchase of 300 million doses, of which 150 million in 2021 and a purchase option for a further 150 million in 2022, on behalf of all EU Member States.

In order to be able to produce the COVID-19 vaccine mRNA-1273 in sufficient quantities, Moderna entered into a strategic cooperation with the Swiss pharmaceutical company Lonza back in May 2020. The production of a total of 1 billion vaccine doses per year to meet global demand will be carried out at two sites, in the USA and in Switzerland. The production capacity at the Swiss site in Visp is expected to be 400 million doses per year.

Peregrine project

The construction of the production facilities for the COVID-19 vaccine mRNA-1273 was undertaken as part of the Peregrine project in Visp. The production facility for the vaccine, which is subsequently to be distributed worldwide, was built in the MC1 building at Lonza's Ibex biopark. The contract awarded to AZI included the delivery and assembly of the pipes and supports for black and high-purity utilities required for the vaccine plant, as well as support with the commissioning of the production facilities.

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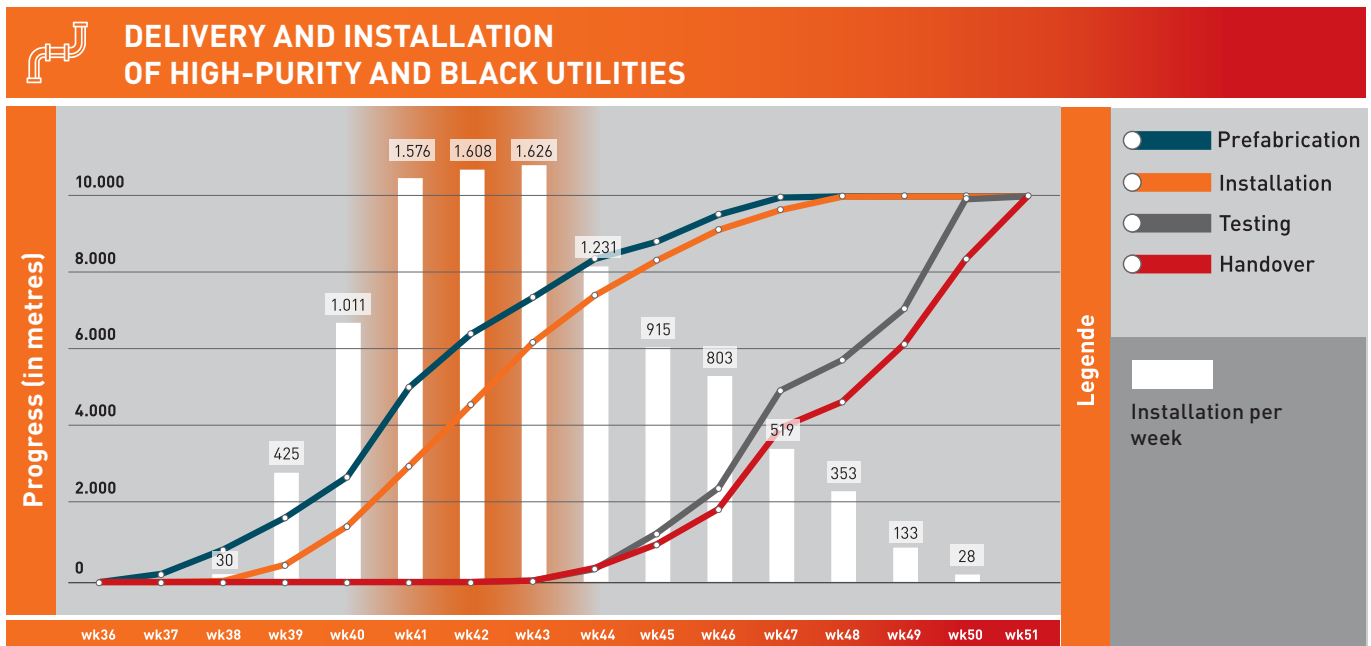
Line pipe engineering under extreme time pressure

The specifications were very ambitious. While an average of nine months are scheduled for the prefabrication and installation of projects of comparable scope, three months had been planned for the Peregrine project. The construction of the requisite 10.1 kilometres of pipes was to be completed by the joint venture in 13 weeks, from September 2020 to December 2020. This tight schedule affected all construction works and required a high degree of coordination and organisation as well as cooperative handling of the various subsections.

In September 2020, the procurement and provision of the required materials and personnel was initiated, which was immediately followed by the start of prefabrication. In order to realise the required installation peaks in excess of 1,500 metres of pipes per week, more than 200 employees were mobilised, working in a three-shift operation from Monday to Sunday and covering work fronts around the clock.

Following the commissioning of the first systems, measures for the start of production were implemented in several production areas, with the respective zones gaining cleanroom status. The difficulty was compounded by the fact that finalisation work had to be carried out under cleanroom conditions.

The following diagram illustrates the progress made over the course of the project. The close juxtaposition of the curves shows how the individual work steps, from prefabrication to the final documentation handover, were realised in parallel and within consistently short time intervals. The installation performance deserves special mention in this regard. Although values in the order of 1,000 metres are considered to be absolutely outstanding in the industry, progress peaks of more than 1,500 metres were achieved in this project over a period of three weeks.



Decisive facts

- The race for the availability of COVID-19 vaccines places great pressure on vaccine manufacturers to produce and deliver contractually guaranteed quantities within specified periods of time.
- Lonza's Peregrine project succeeded in getting production facilities for COVID-19 vaccines up and running in the shortest possible time.
- With the installation of the pipes under extreme time pressure, the joint venture between Zauner Anlagentechnik and the INRA Group (AZI) made a significant contribution to the timely construction of the production facilities.