Process Plants and Stainless Steel

Process Plants and Stainless Steel (Photo: Sandvik)

Process plants

Stainless steel process plants represent the core installations in chemical, pharmaceutical and food industries. Often, they account for million investments where questions from material selection and specification to service and maintenance are crucial to ensure a high degree of reliability and feasibility.

FORCE Technology possesses extensive know-ledge and experience within this field, and may in many cases be a natural partner for the building owner, adviser or contractor.

Let us participate in projects

There are several advantages by engaging a FORCE specialist in projects. Certain competences can be brought into the project group and fill gaps within e.g. specification, materials technology, welding, inspection and validation.

Moreover, an assigned specialist can provide rapid access to a wide range of other competences that FORCE Technology provides, as the need arises during the project.

We have a strong culture for projects, which has been established through our yearlong experience with clients' projects.

Qualification and validation

The pharmaceutical industry is subjected to demands from authorities for qualification during the design phase and subsequent installation and run-in of equipment.

We have a team of specialists experienced in validation and qualification that can provide assistance to the industry within the following areas:

- General advising within system design, preparing VMP's etc.
- Preparing specific protocols and test plans, defining acceptance criteria etc.
- Completing tests and reports (such as IQ/OQ or FAT/SAT).

We can undertake qualification tasks as self-contained tasks or participate in the company's validation team, as resource persons, project managers or specialists.

Material with opportunities

Stainless steel is an attractive material that offers many possibilities when applied correctly. The high corrosion resistance ensures almost unlimited lifetime and makes the material easy to clean.

Stainless steel is supplied in numerous variants and qualities that have been adjusted to suit specific process purposes. Optimum use of stainless steel requires insight in all steps from steel types, standards and manufacturing to mechanical and corrosion properties – areas in which we are well experienced.

Plan and inspect welds

A well-performed weld is often the optimum joining method when corrosion and hygiene is crucial. On the other hand, an improper weld may be the weakest point in a stainless steel system.

It is of utmost importance that requirements for welding method, geometry and material combinations be thoroughly specified. Welding inspection must be planned, specified and carried out to assure compliance with the quality requirement. We provide advice and inspection in all phases.

The development of the Reference Atlas, routines for video inspection and the Tint-Tester for verifying shield gas quality, are all results of our yearlong experience within welding technology.

Tint-Tester and test dish for validating shield gas quality for welding

Level A (oxygen conc. 21 ppm)

Level C (oxygen conc. 100 ppm)

Level E (oxygen conc. 1000 ppm)

Examples from REFERENCE ATLAS for validating shield gas quality for welding

Choose the right surface finish

In systems with strict demands for cleaning and hygiene it is important to specify and validate the surface quality. Stainless steel covers a wide range of price groups and qualities from ground, pickled to electropolished finish.

Mechanical or chemical posttreatment is vital for the properties of the completed system but at the same time these are costly processes. Qualified advising by FORCE Technology can ensure the optimum result and minimise costs.

Stainless steel with ground, pickled (2B) and electropolished finish

Prevent contamination and discoloration

Deposits or discolorations in process plants may be a result of hardly soluble products, inadequate cleaning or corrosion. In all cases the problem and source should be identified in order to establish suitable precautions or cleaning procedures without compromising system integrity. This may require special techniques for sampling and chemical analysis, which we provide in combination with our extensive experience within corrosion.

Discoloration (rouging) of pump housing

Pitting in tank wall

When failure occurs

In the event of failure, the cause should be identified immediately in order to prevent repeated failures. We have experience from thousands of cases of corrosion and failure analysis.

The cause is identified with great certainty by applying a systematic approach that for instance may include chemical analysis, metallographic examination, NDE assisted damage assessment and corrosion tests.

Apart from clarifying legal matters such investigations contribute with an objective evaluation of the problem as well as constructive solutions.

Pump wheel damaged by acid corrosion

Will the system withstand process changes?

Alteration of the conditions in an existing process plant should always involve preceding assessment of the corrosion resistance of equipment under the new conditions.

Deviation from this principle has led to unexpected corrosion failures in numerous cases.

An experience-based evaluation, possibly supported by corrosion tests, can prevent such failures in time without costly losses related to interruption or shutdown.

Coupon for corrosion monitoring

Corrosion test in the laboratory

Monitor the system's condition

The principles for corrosion testing in the laboratory may in many cases be applied for corrosion monitoring in a process, no matter whether it is based on simple weight-loss coupons or more advanced techniques for on-line monitoring.

By applying a suitable monitoring technique, the system lifetime may be extended considerably. We provide advice in all questions from specification and design to interpretation of results.

Education

FORCE Technology provides an update of knowledge within materials science and technology for contracting, operators and maintenance staff.

Scheduled courses with a wide sight are offered regularly while targeted courses may be composed to fulfil a company's individual needs.

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