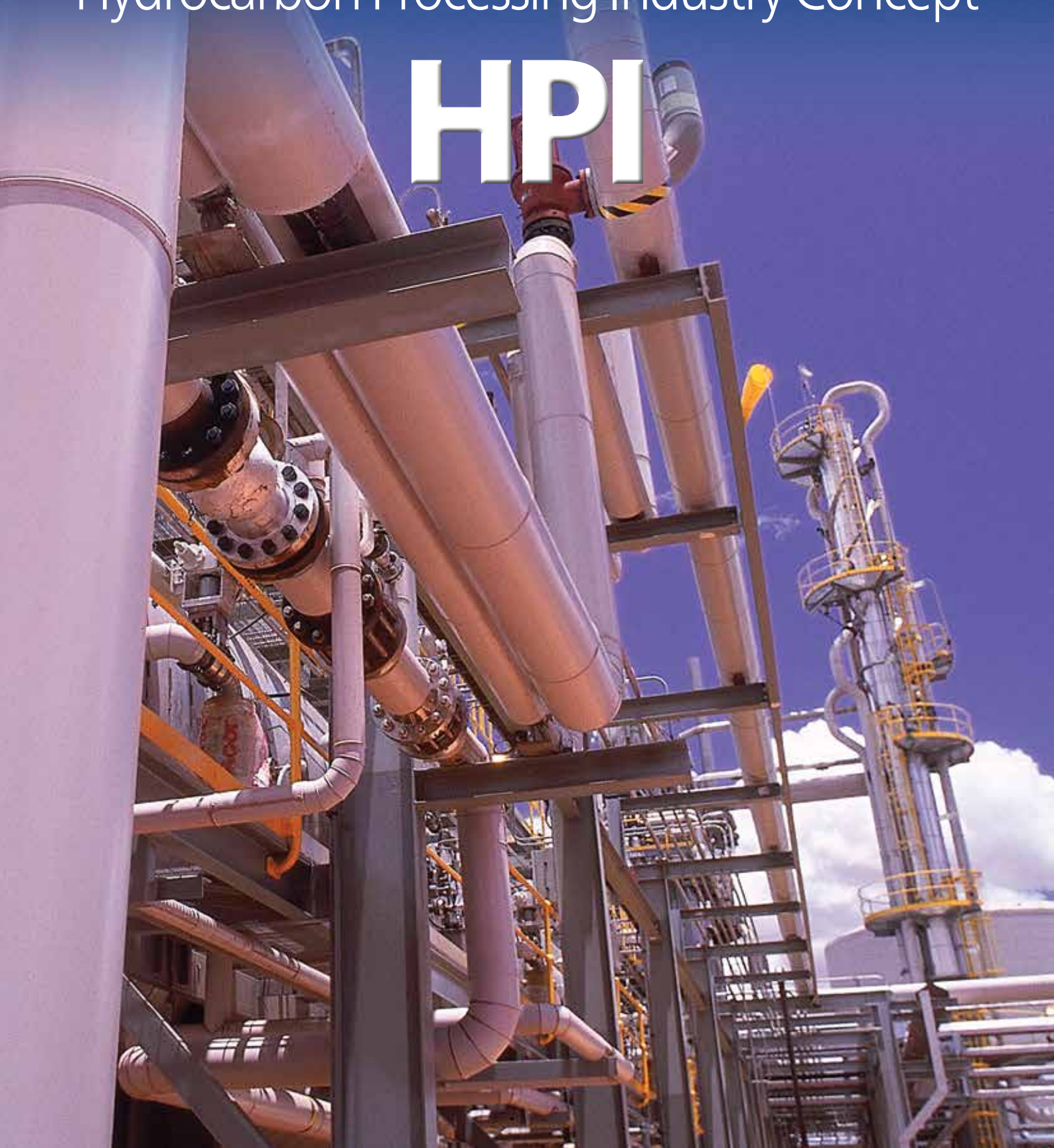




JOTUN

Hydrocarbon Processing Industry Concept

HPI



74 companies represented in more than 80 countries
39 production facilities. 8,600 employees



resource

- Jotun is a truly multinational giant in the global coatings market – comprising 70 companies represented in more than 80 countries.
- 39 production facilities on five continents meet ISO quality control requirements with many specialist products manufactured to exacting national and industrial standards.
- 600 coating advisors all around the world know that good routines and correct application are essential to achieve long-term protection. With a high level of education and experience, they ensure that you get what you need.
- A reputation is built on innovative products and superior customer service.
- At the forefront of developments in corrosion protection for hydro-carbon processing facilities, storage tanks and petrochemical installations.
- A continuously upgraded product range meets ever more demanding protection requirements, new and more stringent regulations and reduces environmental impact.
- It includes products combining corrosion protection and cosmetic appearance with a virtually unlimited range of topcoat colours.



Jotun factory Spain



Jotun factory Thailand



Jotun factory Norway (Vindal)



Jotun factory United Kingdom



Jotun factory India



Jotun factory China

hpi



values

Time, environment and safety = economy



1. HSE – Health, Safety, Environment

Health, safety and environment are increasingly important aspects of our business; even more so as environmental awareness and legislation are increasing.

Jotun coatings more than meet both current and proposed VOC legislation, and we continue to develop both water-borne and high volume solids products.

Good practice of HSE will have several benefits, such as easier project management on-site through safety of both the site and the personnel, careful coating selection contributing to improving safety and working conditions, and ensuring environmental legislation is being followed.



2. VALUE OF TIME

Jotun continuously works to develop quicker and better coating processes, and to find solutions that are optimal for any given project, aiming to reduce downtime. Reduced downtime means potential improvements of profitability, and the facility will be back in service faster.

Our uniform standard of service across the globe means we have the same high standard of trained personnel globally – making it easy to utilise global resources.



3. LIFE CYCLE

A correct choice of coating system can ensure time saving benefits as well as ensure a correct lifetime of the system. The longer the lifetime of a coating the greater potential for savings.

Reducing maintenance and shutdown time is vital over the lifecycle of a coating system, and a correct system will mean less chance of system failure.

Jotun's uniform standard of global service will increase chances of good performance of the coating system and a smooth production process.

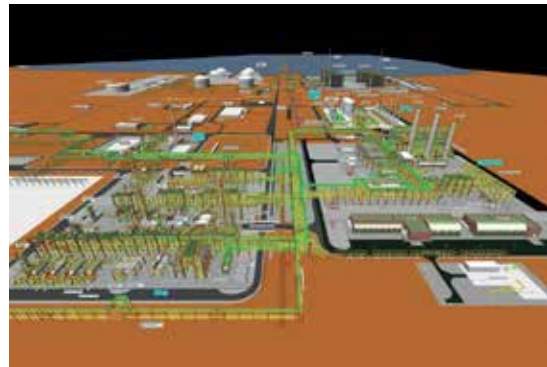


experience

- Almost 30 years experience in the HPI industry.
- Millions of square metres protected and hundreds of projects completed.
- A multitude of projects completed in every environment, from the sub zero temperatures of Northern Scandinavia to the desert heat of the Middle East to the humidity of the Amazon basin.
- A comprehensive database of proven solutions.
- Nearly three decades of constant development of advanced protective coating systems to meet every HPI challenge.
- Experienced in providing tailor made processes to protect, reduce downtime and have the facility back in service faster.



Project: Kashagan development
Country: Kazakhstan
Client: Agip KCO UK/Kazakhstan
Engineering: Agip/Parsons FD



Project: Dushanzi Polypropylene, Ethylene Plant & Expansion
Country: China
Client: PetroChina
Engineering: AMEC China



Project: Pampa Melchorita
Country: Peru
Client: PERU LNG – a consortium led by Hunt Oil (USA) with partners Repsol YPF (Spain), SK Energy (South Korea) and Marubeni (Japan)
Engineering: CDB Melchorita – a consortium of Saipem (France), Jan de Nul (Belgium) and Norberto Odebrecht (Brasil)



Project: OGD III 3rd NGL Project
Country: Abu Dhabi
Client: Adnoc UAE
Engineering: Bechtel USA/UK
Project: AGD II - ASAB Gas Development Phase 2
Country: Abu Dhabi
Client: Gasco
Engineering: Bechtel USA/UK



understanding

Jotun's extensive experience and knowledge equips it with an unrivalled understanding of the particular challenges of the industry. Four key factors strengthen Jotun's ability to provide economical, lasting solutions to plant protection.

JAMP (Jotun Asset Management Programme)

- Avoids, where possible, unplanned costly shutdowns resulting from coating problems.
- Helps maximise life cycle of coated or pre-coated assets thus enhancing maintenance cycles.
- Establishes the condition of the site.
- Allows client and Jotun to function as a team.
- Supports preparation of a maintenance programme providing long term cost effective corrosion protection coating systems.
- Considers issues related to planned maintenance of a plant in operation or at shutdown.
- Recommends coating systems taking into consideration all relevant facts.

Worldwide R&D

- A team of scientists at the central laboratory in Norway and at regional laboratories in China, Korea, Malaysia, USA and UAE, work together combining state-of-the-art technology, innovative thinking and practical knowledge and experience to ensure Jotun coating systems work in all climates and locations.

Team No.1

- An unrivalled comprehensive technical support function at every Jotun location worldwide.
- A team of highly trained, experienced coatings specialists, certified to FROSIO or NACE certification standards working as a team both together and with their customers.

- Providing coating design advice, site surveys, written specifications, planning actual coating work, ensuring surface preparation and application are to the standards which secure lasting corrosion protection with minimum maintenance.



Involvement & understanding from concept leads to...



...analysis, assessment and understanding the challenges... ...shared knowledge increases understanding.....



...between Jotun people on five continents... ...working together – delivering solutions

Education and Training

- The TSS Academy – available to all employees – is an established system for education and training for management, technical support staff and corrosion engineers for construction facilities, contractors, engineering consultants and industrial companies.
- Proven to be very successful, increasing product knowledge, improving communication and understanding of common problems and their solutions.

Understanding in practice –
monitoring, inspecting, guiding,
delivering on our promises wherever
you are in the world

hpi



*Solutions to the challenges of
engineering & design of new
construction projects*

solutions



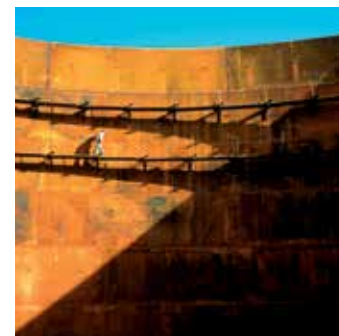
Solutions to the challenges of climate from the frozen north to desert heat



Solutions to the challenges of combining corrosion prevention & visual effect



Solutions to the challenges of improving life cycle cost and site maintenance



Solutions to the challenges of internal erosion, corrosion & contamination

With coatings for the Hydrocarbon Processing Industry there are four major areas of concern:

1. Temperature
2. Pressure
3. Chemical exposure
4. Ambient exposure (structural steel)

1. Temperature

An intrinsic part of any process is the temperature required for reaction or to allow pumping the material through the system. For external areas there are two considerations in addition to temperature; exposed to atmosphere and insulated areas.

Insulated steel

Insulated steel will often be referred to in conjunction with CUI (corrosion under insulation). This term has become a key word in the industry due to the severity of the problem.

The challenge lies in the fact that it is impossible to keep moisture out of a system. With an electrolyte introduced, should the steel go through cycles where the temperature is dropping below 100°C there will be condensation, and hence corrosion. At elevated temperatures corrosion will be rapid. In cases with longer periods under 100°C or frequently occurring cycles, significant corrosion may occur in just a few months. Even short periods of temperature change can result in significant corrosion issues.

The lifetime of HPI plants should be several decades, and because of that, problems with corrosion under insulation becomes prevalent during operation times with potentially catastrophic results. Inert modern coating systems can tolerate high temperatures and exposure to moisture providing long life cycles.

Jotun has extensive experience in meeting these challenges, and our solutions can be selected specifically for the environment in which they will be exposed.

Product ranges such as Jotatemp and Epoxy HR will provide excellent corrosion protection designed according to the temperature range needed.

Exposed steel

Exposed steel has another set of challenges. Exposed steel is open to air movement giving less risk of an electrolyte remaining on the surface, and corrosion is not as extensive as with insulated areas. However, temperatures are often in the lower range where moisture will not be driven off so rapidly, thus corrosion will occur over time.

In addition to corrosion protection it is usually desired to have a cosmetic finish on exposed steel, again requiring attention to the temperature exposure. The binder system (resin) of the coating may change colour at certain temperatures – in some cases permanently and in others only during the high temperature cycle.

The choice of pigments is also critical as these will also change colour according to temperature. For Jotun this challenge is well known and we have developed an extensive program to understand which pigments can be used for which temperature, resulting in a wide range of finishes in the Solvalitt range. Utilising different technologies we can tailor make systems to fit your exacting needs.

hpi



solutions

2. Chemical resistance

When working with oil derivatives and chemicals, chemical resistance is clearly an area to which attention should be paid.

In some ways chemical resistance is easier than other areas of protection, because we know the exposure and the temperatures tank linings need to resist. However, proper work must be done in both the choice of the coating, the surface preparation and the application process.

Choosing the correct technology

First and foremost it is important to choose the correct product technology.

Utilising our advanced resistance list to identify the chemicals in question a list of appropriate linings will be

produced, such as a vinyl-ester from the Chemflake range, an epoxy or a zinc silicate from the Tankguard range.

These products all have their different advantages beyond chemical resistance. For example:

- if a speedy production process is important to bring tanks quickly back into service, a vinyl-ester is a great choice.
- If a more robust, easy to apply coating is required, an epoxy from the Tankguard range may be the best solution.

Consultation with our technical staff to find your best option is advised, to ensure the chemical resistance, your need for the production process and the temperature of the chemical are being addressed.

TANK CONTENT Which paint to choose when?

Available on the
App Store

Jotun Chemical Resistance
App available



ZINC SILICATES

- Alcohols
- Ketones
- Other solvents

VINYL ESTERS

- Biofuels
- Acids
- Aggressive chemicals

EPOXIES

- Alkaline solutions
- Some biofuels
- Water in various forms
- Phenolic epoxies used for higher temperatures
- Oils (veg & mineral: note acid factors)



solutions

3. Pressure

Pressure vessels are probably the most complicated HPI area to protect.

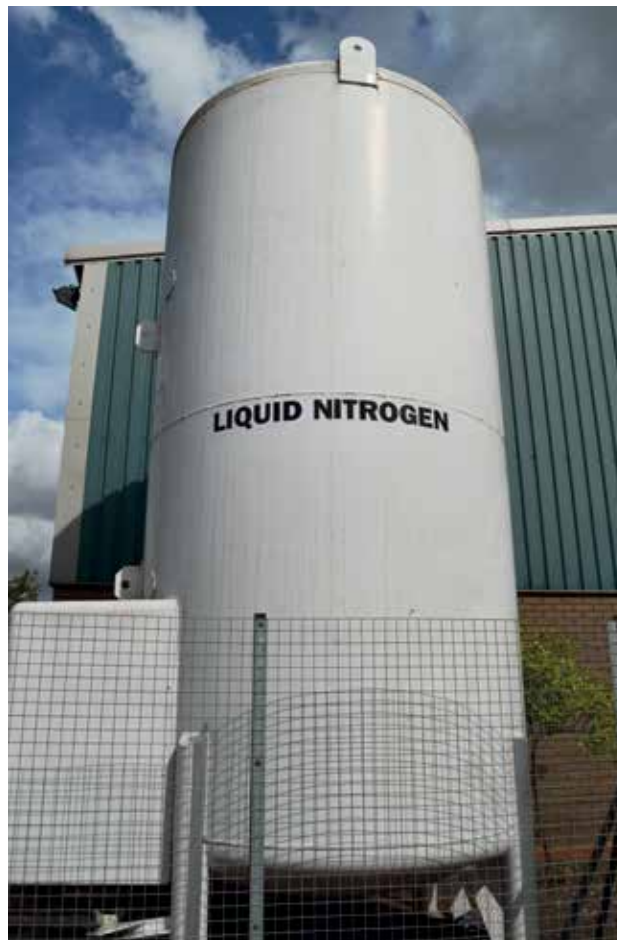
Besides the pressure itself, there are challenges in the chemical processes in the vessel and the temperatures that often accompany them, and it is important to be clear on the exact needs.

Choice of lining must be based on the specific specification and will sometimes go beyond a coating type of lining to rubber or ceramics, and in

other cases it may be acceptable with an epoxy or vinyl ester.

Questions about decompression are often asked as rapid decompression in some cases will destroy a coating. However, controlled decompression will allow the coating to relax and recover without delamination. Knowledge

of the operational process is helpful to find an optimised solution. To ensure the best solution is chosen always consult Jotun's technical sales staff.



hpi

solutions

4. Structural steel

Structural steel has the widest range of systems available. It is very much dependent upon whether it is new construction or maintenance (how long the life to the first maintenance) and cosmetic finish.

For new construction a zinc silicate, such as a product from the Resist range is the usual choice. The amount of zinc metal in the coating predicts life expectancy – but more zinc is not necessarily the best. We recommend following international standards such as ISO and NACE to guide this choice.

For maintenance and repair during construction a zinc epoxy like Barrier is the most robust choice. Again the choice is varied according to life expectancy.

After a zinc primer a midcoat is needed to build the system and to protect the primer from weathering and erosion. The choice of midcoat is according to the steel exposure needs.

For areas such as jetties, where abrasion is expected, a glass flake

can be correct. If time is of the essence during application a fast track coating should be used to get the structure into service quickly.

For highly corrosive environments inert pigmentation such as MIO (Micaceous Iron Oxide) is advisable.

Many choices are available for midcoats, including surface tolerant primer midcoats from the Jotamastic range. These can replace the need for other primers making construction easier and maintenance easier in an operational plant.

For a topcoat or finish, Jotun recommends careful

consideration of expectations. If no maintenance is needed and life expectancy is long a polysiloxane such as Hardtop Optima may be the correct choice. If maintenance is inevitable, a polyurethane such as Hardtop XP is ideal. Jotun also has products for other needs, such as isocyanate free or even waterborne products.



hpi



service

UNIFORM STANDARD ACROSS THE GLOBE

GLOBAL SERVICE

- Highest number of technical personnel in the industry
- Same high standard of trained personnel globally
- Easy to exchange trained technical personnel across national borders and multi-national projects

STANDARDISED

- Same tools, reports, procedures and behaviour world-wide.
- Same competence in maintaining company standard procedures
- Recognised globally by our yellow and red boiler suits

TSS ACADEMY

- Compulsory training for all technical personnel worldwide
- Theoretical and practical training, testing and examination
- FROSIO and NACE certification
- First aid and fire-fighting



TRAINED TO DELIVER THE BEST RESULT

Jotun worldwide

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Jotun Protects Property