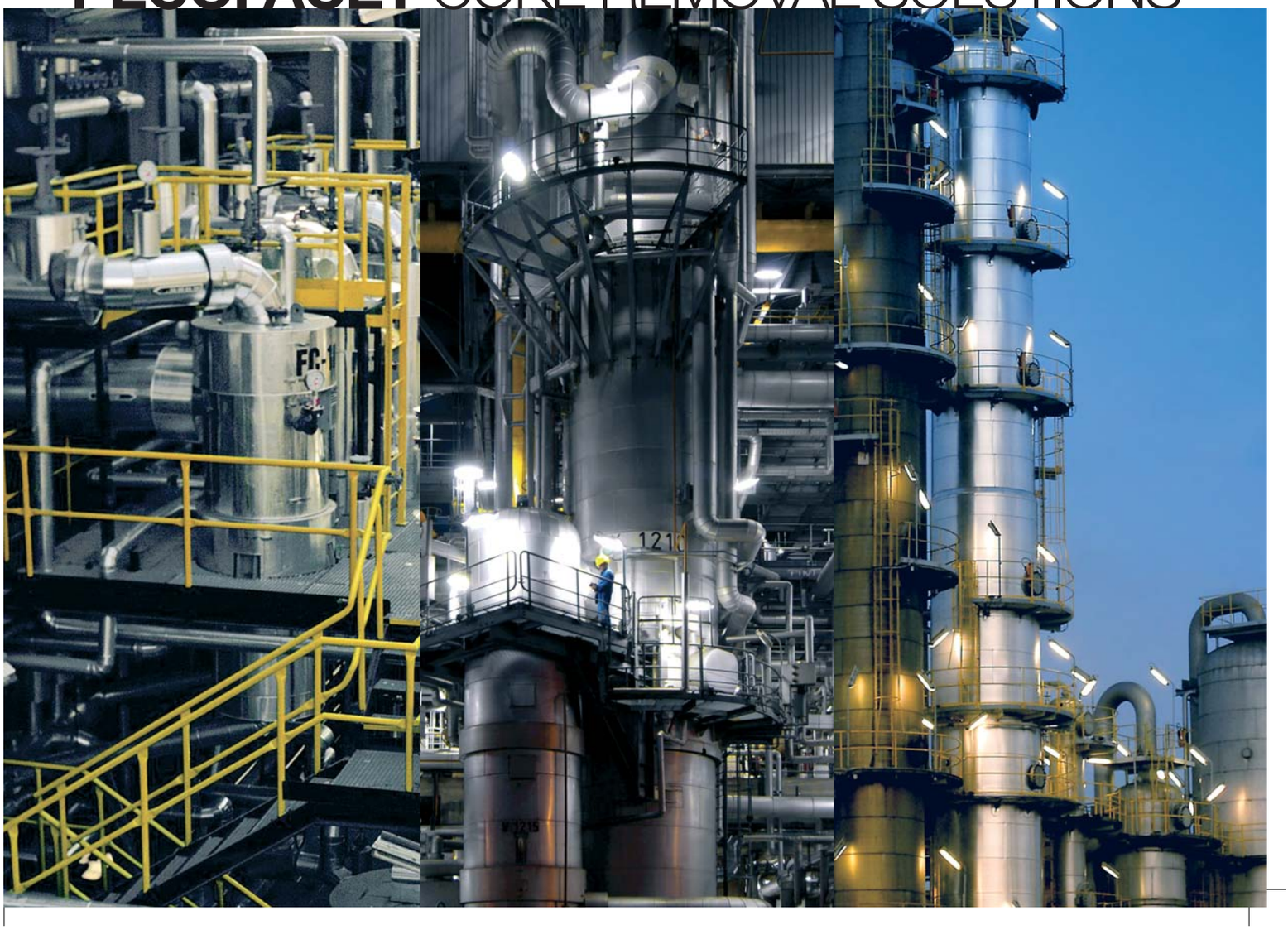
Peco Facet
a CLARCOR company

INTECHA

Ethylene

PECOFACET COKE REMOVAL SOLUTIONS



CLARCOR is a global provider of filtration products and services for the Petrochemical Industry. We offer the industry's broadest product range with more than 80,000 filter types, superb product quality, leading brands, extensive distribution network and technical expertise to serve customers worldwide.

CLARCOR provides Total Filtration from a single source by bringing together the products, experience and expertise of our companies to meet all your filtration needs. This collaboration insures that customers receive the best filtration and on-time delivery directly to each business location to protect people, equipment and the environment.

CLARCOR offers the broadest array of filtration products, technologies and services to meet current and future Petrochemical Industry requirements. Our customers, worldwide, depend on CLARCOR filtration products to fuel their future.

CLARCOR provides unparalleled customer value with filtration solutions for water, fuel, oil, air and gas in every stage and aspect related to its particulate field. We optimize equipment reliability and power output to reduce equipment downtime and unplanned power outages.

PECOFACET COKE REMOVAL SOLUTIONS

CLARCOR is positioned to meet your Total Filtration and service needs.

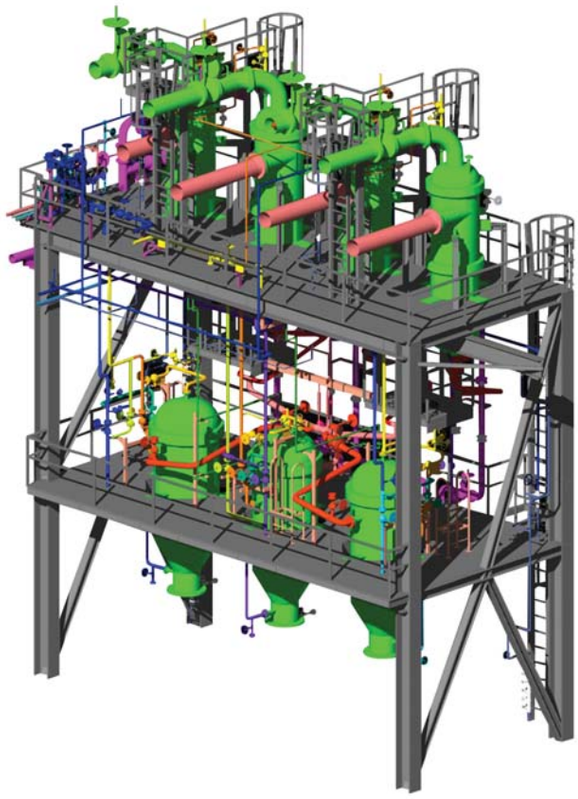
PECOFACET is the leading filtration and separation company serving the world's petrochemical, refining, marine, offshore and aviation industries. PecoFacet has earned worldwide recognition with more than 50 years of experience in the separation of solid-liquid, liquid-liquid, liquid-gas and solid-gas.

COKE CAN CAUSE BIG PROBLEMS

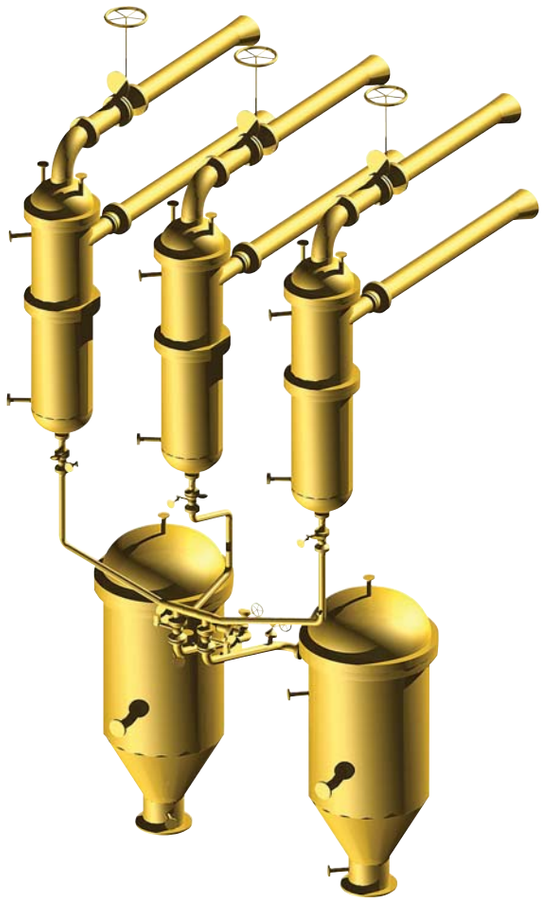
- Premature or unexpected plant shut-down.
- Large-scale and expensive maintenance of pumps and valves.
- Large-scale and expensive maintenance and cleaning (during plant operation) of heat exchangers.
- Heavy pollution of environment.
- Heavy environmental pollution and health danger due to the use of conventional standard filters (basket filters, settlers, etc.) periodical cleaning.
- High and fluctuating pressure losses in the QO loop which require increased energy consumption of QO circulation pumps.
- Low efficiency of steam generation.
- Primary column fouling and high differential pressure.

· Big improvement in the handling of the coke during and after the discharge.
· No more toxic emissions and a big contribution to health, safety and enviroment issues.

- Gaseous wastes: Only nitrogen during filters purging before coke discharge is vented to ambient, all other hydrocarbons vapours are handled in the system and are fed back to the oil primary/quench tower.
- Liquid wastes: No liquid wastes occur out of the system; all liquids are brought back in to the production process line (primary / quench column).
- Solid wastes: ONLY dry bulk coke without toxic hydrocarbons. No odours or fumes.
- Health safety: No exposure of personnel to toxic fumes.



PECOFACET CAN SOLVE THESE PROBLEMS

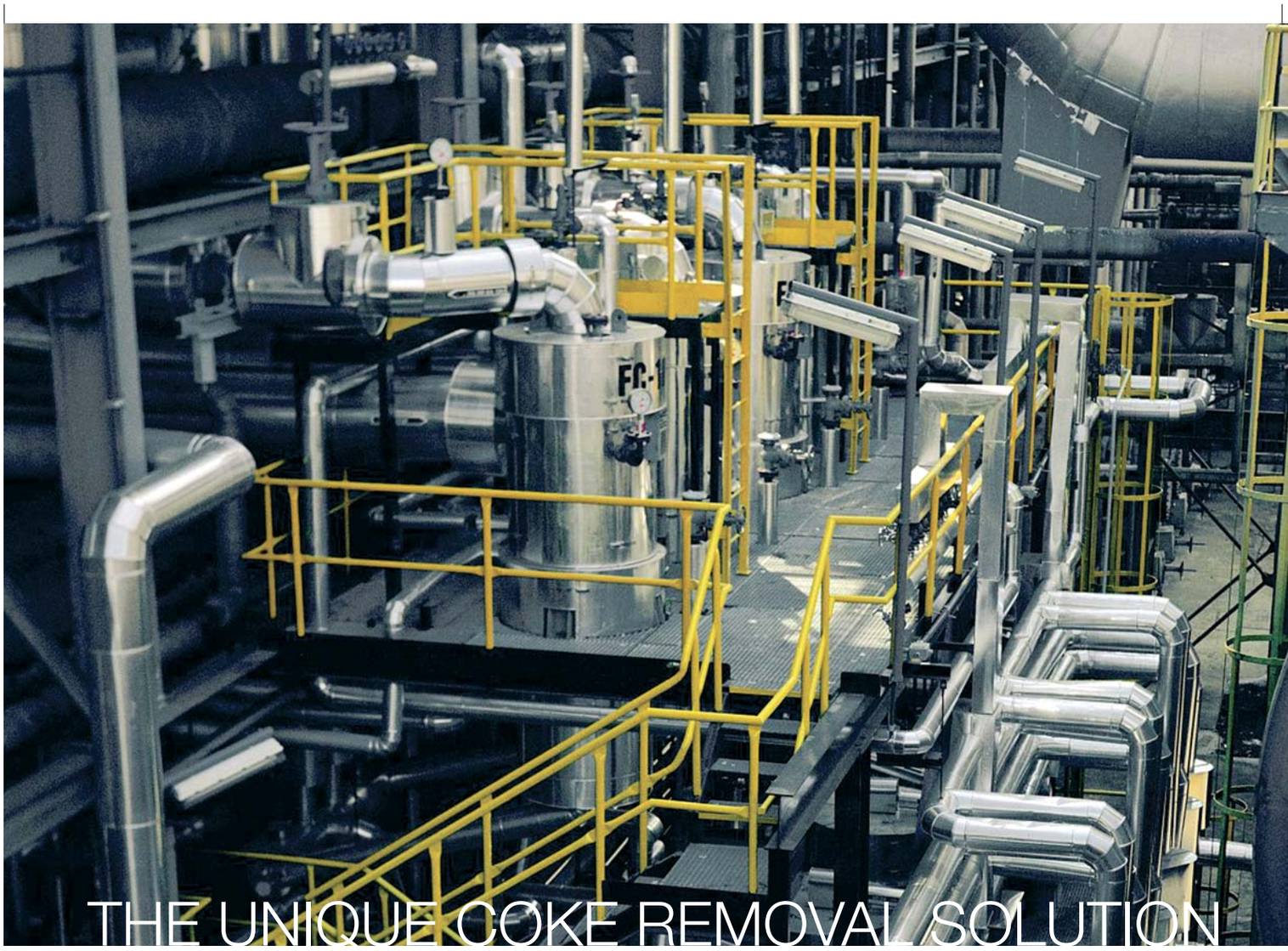


· High separation efficiency.
· The separation efficiency of the first stage for coke particle sizes above 500µ is enough to eliminate any fouling and plugging in the QO loop.
· Low pressure drop. The pressure drop of the QO flow through the first stage "hydro-cyclone(s)" is about 1 bar and stabile in time for the design case of quench oil circulation loop —ENERGY SAVING.
· Improved primary tower efficiency.
· Higher and stabile steam production efficiency.
· Lower maintenance costs:

- No needs to clean equipment from coke settlements.
- Less man-hours of plant operators. Big time savings.

· The CRU can run automatically.
· No cost for waste disposal:

- No cost for deposit of quench oil coke sludge or wet coke or for dangerous hydrocarbons transportation.
- Full stream filtration, no by-pass.
- Minimal energy consumption for the quench oil pumps —constant differential pressure during operation.
- Continue cleaning of quench oil loop.
- Minimal required plot area.



THE UNIQUE COKE REMOVAL SOLUTION

Reference CRU

Our first reference unit is in operation since 1997 at Chemopetrol Litvinov, CZ.
The quench oil capacity of this CRU is from 3,000 m^3/h up to 5,000 m^3/h. This considered the much higher capacity achieved after the revamp.
The CRU package unit saves money, eliminates environmental pollution and have reduced the maintenance sequence of pumps, heat exchanger etc. dramatically.
The unit operates without any problem since being on stream.

CRU Worldwide

Several CRUs with a design capacity from 1000 up to 8000 m^3/h are in operation or nearing start up. This technology, meanwhile known worldwide, is valued and accepted by the most of our clients.

CRU has got positive results in adjacent processes

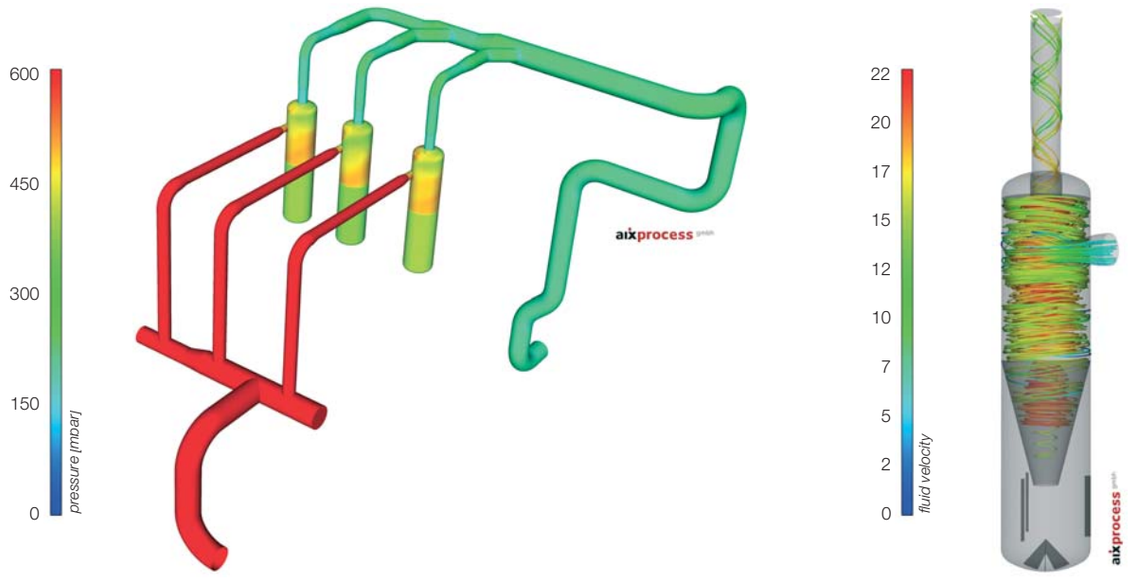
Beside the above described advantages some PHE (plate heat exchanger) were installed instead of Shell/Tube type used for a dilution steam production at another plant. Unfortunately the test finished after several months due to improper design of the Water/Steam side. But, it was noticed much to the joy of everyone involved, that the QO side was not affected by any kind of coke fouling.

CRU the only unit which can handle high coke loads

One unit coped with a very high coke inlet load during the start up occurred after an unexpected shut down. The CRU made sure that the QO loop capacity was not affected. Any “old fashioned” coke separation solution would be blocked immediately that results a decreasing of the QO pumping capacity and finally a decreasing in the production.

CRU scope of supply

PecoFacet provides the basic engineering, procurement of critical equipment, construction, supervision and start up assistance in cooperation with Intecha.



CFD Studies support the design.
CFD simulations have been used for different kind of improvements e.g. piping design and hydro-cyclone itself for pressure drop, velocity characteristics, etc.

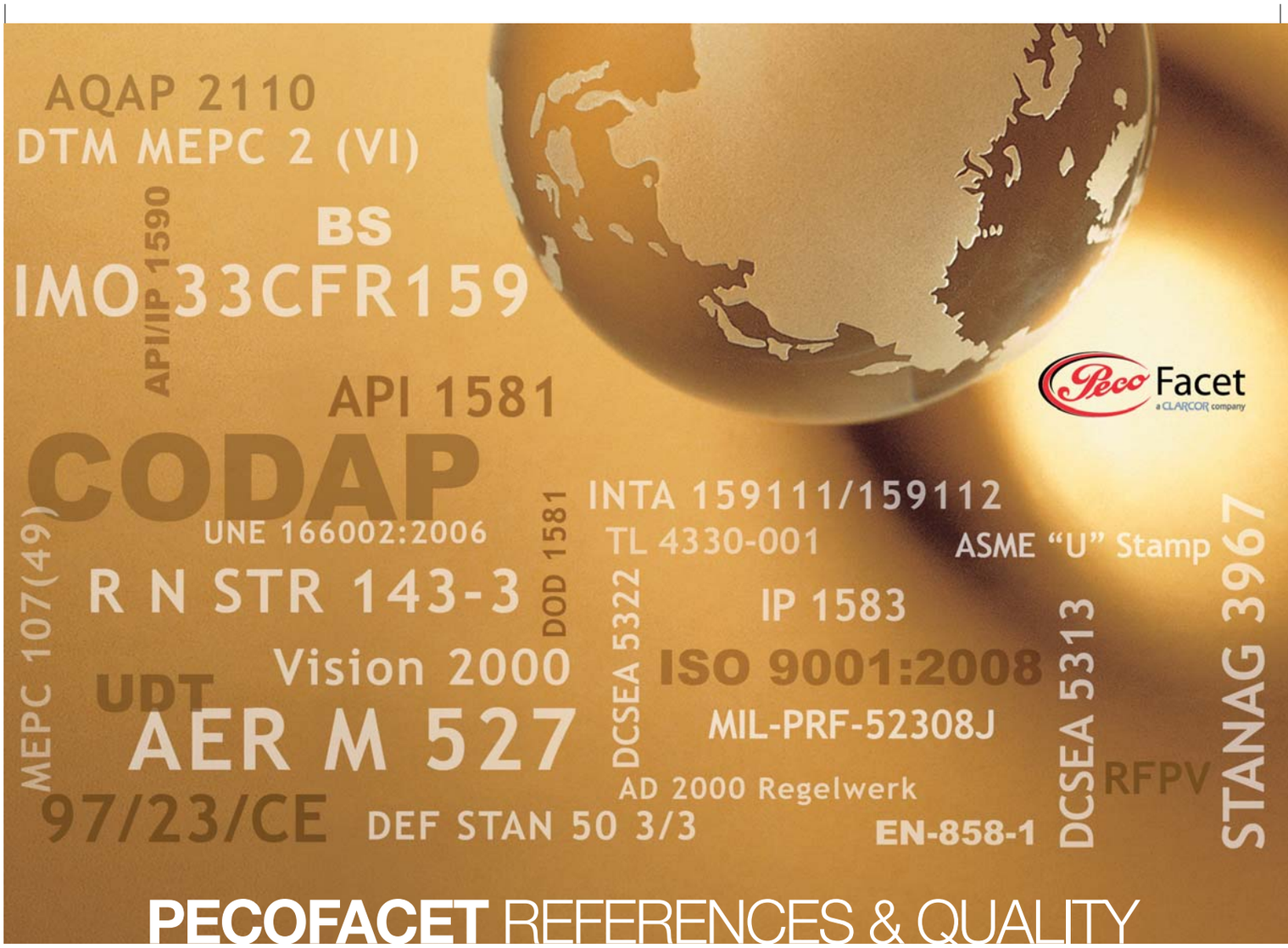
PECOFACET RESEARCH & DEVELOPMENT

Coke discharge via vacuum truck.

Since 2009 the vacuum discharge have been developed in cooperation with one of our client and reached finally very good results. More than 3 m³ could be sucked off via a common vacuum truck while only a few litres left in the filter. Such a residual amount in the filter does not have any influence on the further process when put back in operation.

The advantages of this improvement are obviously:

- Dust does not occur
- Impact to the operator/environmental is minimized
- Gasket replacement can be economized (there is no need to open the big blind flange –used for conventional coke discharge- during each discharge)
- Time period used for discharging the coke from the filter is reduced



PECOFACET REFERENCES & QUALITY

PecoFacet's business depends on its products and services being of the finest QUALITY. This commitment is reflected in the fact that PecoFacet was the first filter manufacturer to receive the ISO 9001:2000 and AQAP 2110 quality approvals. Today, PecoFacet holds more technical approvals for its commercial and military products than any other company in the world.

ABB Lummus	OMV
Atofina	Petromont
Basell	PKN
BASF	Samsung
BIPC	Shell
BSL	Technip
Chemopetrol	Total
Coflexip	TPL/ Beijing
Dow	TVK
Enichem	Veba
Fina	INEOS
IPC	Foster Wheeler
Linde	Fluor
MOL/Slovnaft	Lukoil
Naphtachimie	JGC
Neste Oy	Saudi Polymers Company

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