







Oil & Gas Refinery - Petrochemical Process Solutions

Introduction

TM.I.P. – Termomeccanica Industrial Process is a private company, established in 1977 and now part of Termomeccanica Group. Since then we have been supporting our international clients operating in the Oil & Gas, Refinery and Petrochemical market with high technology Equipment for the Environmental Protection and Pollution Control.

TM.I.P. has designed and supplied more than 1,000 treatment packages for Air, Gas and Liquid treatment.

TM.I.P. team is properly organized to manage Packages (Engineering – Procurement – Fabrication – Site Supervision) projects for different Products and Technologies. Skilled Engineers and Project Team will take care of all inhouse basic and detailed engineering activities as well as project management.

TM.I.P. is equipped with the latest and updated software for:

- process simulation
- heat exchanger design
- pressure vessels calculation
- piping 3D modeling

The Engineering Department develop the design of all unit fully according to Client specifications and required standard.

The Project Manager has overall responsibility for the execution of the project with respect to:

- · communication with clients
- planning, production and delivery schedule for documentation and equipment

Procurement activities are performed according to the project schedule. Expediting activities are regularly performed to assure that sub suppliers provide to delivery equipment on time.

For each project QA dept. team take care of the respect of the ITP (Inspection and Test Plan) agreed with our clients.



Process Solutions

Incineration Thermal Oxidation	Thermal Oxidizers for Acid Gas, Tail Gas, Off Gas, Process Gas, Vent Laden Air etc. (TO, AGO, DFTO);
	Incinerators of Waste Liquid and Spent Solutions, Chlorinated Streams, Residues, Polluted Water etc.;
	Regenerative Thermal Oxidizers (RTO);
	Catalytic Oxidizers (CATOX);
	Units can be equipped with Waste Heat Recovery and Flue Gas Treatment;
Hydrocarbon recovery and Waste Gas Treatment	Wet Scrubbers, Dust Scrubbers, DeSOx and DeNOx Packages, Quenchers, Odour Control Units
	Vapour Recovery Units (VRU), Activated Carbon Filters, H2S Scavengers;
	Special Distillation Units
Liquid treatment	Stripping Units (BTEX , H ₂ S, NH ₃ removal);
	Sour Water Oxidation;
	Evaporation and concentration plants.



Thermal Oxidizers / Incinerators

Typical processed stream:

- Contaminated air by hydrocarbons VOCs
- Tail gas, Acid gas
- Vents containing chlorinated compounds
- Vents containing H2S and sulphur compounds
- Waste liquids, sludges, heavy boiling compounds
- Polluted water

Process solution:

- Thermal Oxidizer (TO)
- Acid Gas Oxidizer (AGO)
- Direct Fired Thermal Oxidizer (DFTO)
- Regenerative Thermal Oxidizer (RTO)
- Catalytic Thermal Oxidizer (CATOX)
- Recuperative Thermal Oxidizer
- Incinerator (static or rotary kiln)

Units can be equipped by:

- Flue Gas Treatment (DeSOx, DeNOx, caustic scrubbers, quenchers, baghouse filters, dioxins removal etc.)
- Waste Heat Recovery Boiler (WHRB)
- Special Burners Gas / Liquid
- Air Preheater, Process Gas Preheater;
- ID fans, stack, emergency case stack etc.









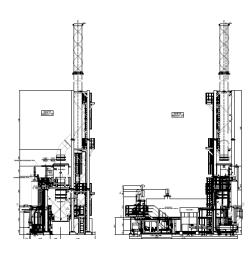


Thermal Oxidizers



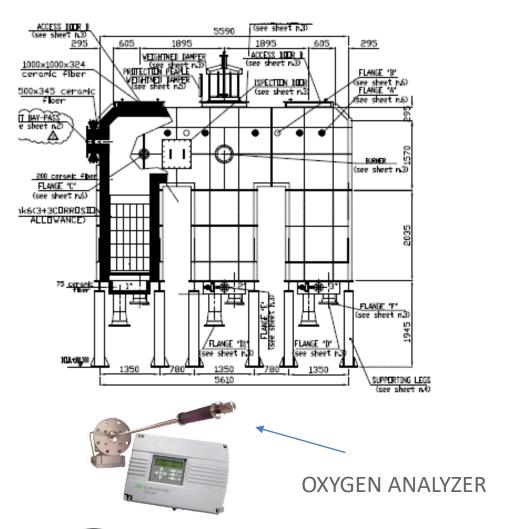


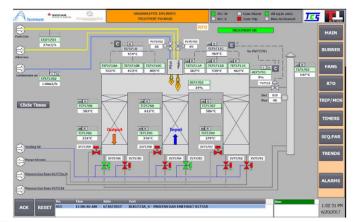


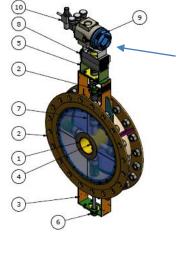


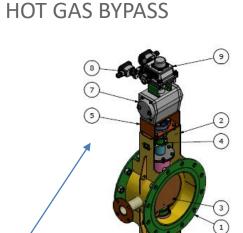


Regenerative Thermal Oxidizer (RTO)











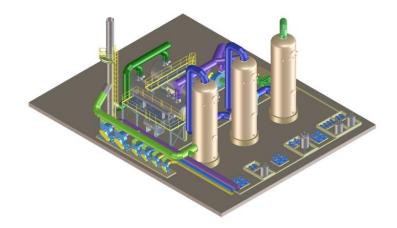


Odour abatement units

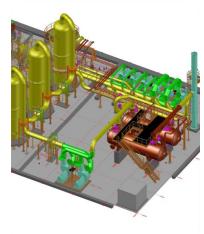
Typical processed stream:

- Waste air containing H₂S, NH₃ and VOCs coming from refinery WWTP (DAF, API, Oily sludge tank, etc..)
- Oily water sump, pits emission
- Spent caustic, slops tank out breathing emissions

- Waste air collection system from WWTP roofs/covers
- Scrubbing of NH₃ by sulphuric acid solution
- Scrubbing of H₂S by caustic soda and oxidation by NaClO
- VOCs adsorption by activated carbon filters (with steam regeneration for recovery)
- Skid mounted activated carbon filters for emissions from tank, pits and sumps









Odour abatement units

For mitigating odours from Refineries, the primary area for odour source has been the refinery Waste Water Treatment Plant. However Hydrocarbon emissions in other parts of Refinery could also contribute to odour.

TM.I.P. controls and minimize odour emissions from these identified sources by providing Activated Carbon Filter facilities at these locations.







Those units remove H_2S , VOCs and ammonia from waste air coming from tanks, pits and sumps by a special type of activated carbon.



Gas treatment

Typical processed stream:

- Air or gaseous stream containing solvents
- Air or gaseous stream containing dust
- Stream containing HCl, SO₂, HF, Ammonia, NO_x, H2S, etc..
- CO₂ removal
- Odours abatement by acidic/alkaline scrubbers

- Chemical and physical absorption (alkaline or acid scrubber)
- Dry abatement with chemical injection
- Adsorption on activated carbon, molecular sieve, iron scavenger
- NO_x thermal and catalytic reduction







Adsorption plants

Typical processed compounds:

- Toluene
- Hexane
- Ethyl-acetate
- Gasoline, Naphtha, etc...
- Odours from refinery tanks/pits

- Activated Carbon regeneration by steam
- Activated Carbon regeneration by hot nitrogen
- Molecular Sieve for Dehydration
- Activated carbon filters for odours mitigation
- Iron scavenger for H2S removal







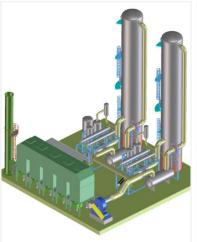


Liquid treatment

Typical processed stream:

- Water containing
 - Solvents
 - Hydrocarbons
 - Ammonia
 - H2S
 - BTEX
 - CO₂

- Stripping by Air or Nitrogen
- Stripping by Fuel Gas
- Wet oxidation by chemical injection
- Concentration and Crystallization









Special Distillation plants

Typical recovered compounds:

- Ethanol
- Methanol
- Acetone
- Dymethylformamide (DMF)
- N-methyl-2 pyrrolidone (NMP)
- Acetic acid
- Isopropyl alcohol (IPA)
- Ethyl acetate (EtAc)
- Methylene chloride (MC)
- Hexane
- TEA
- DEA
- MDEA
- Ammonia
- DMAc
- DNP
- Acetonitrile
- Toluene

And more...

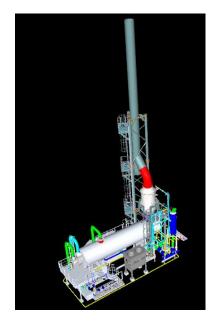
- Continuous Distillation
- Batch Distillation
- Azeotropic Distillation
- Extractive Distillation
- Vacuum Distillation
- High pressure Distillation
- With Mechanical Compression
- With Thermocompression
- Multiple effects

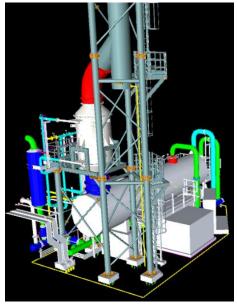






3D Modeling



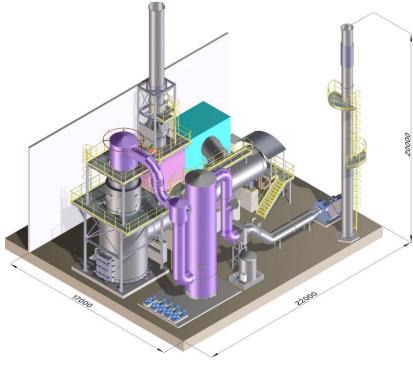






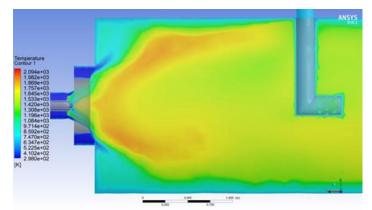


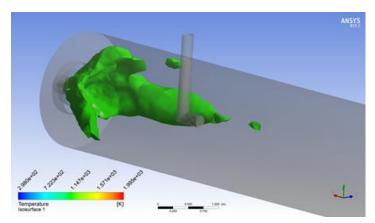




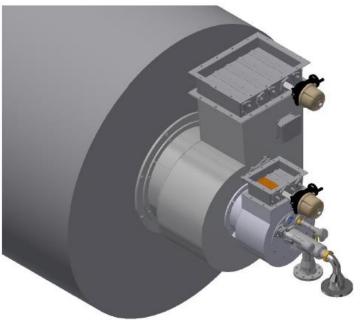


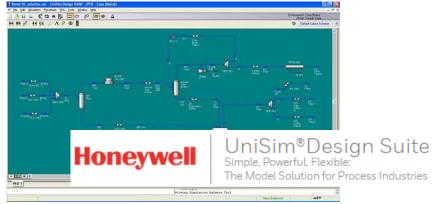
Process Design













thank you



Termomeccanica Industrial Process

Termomeccanica Group



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