Termomeccanica Industrial Process

Termomeccanica Group

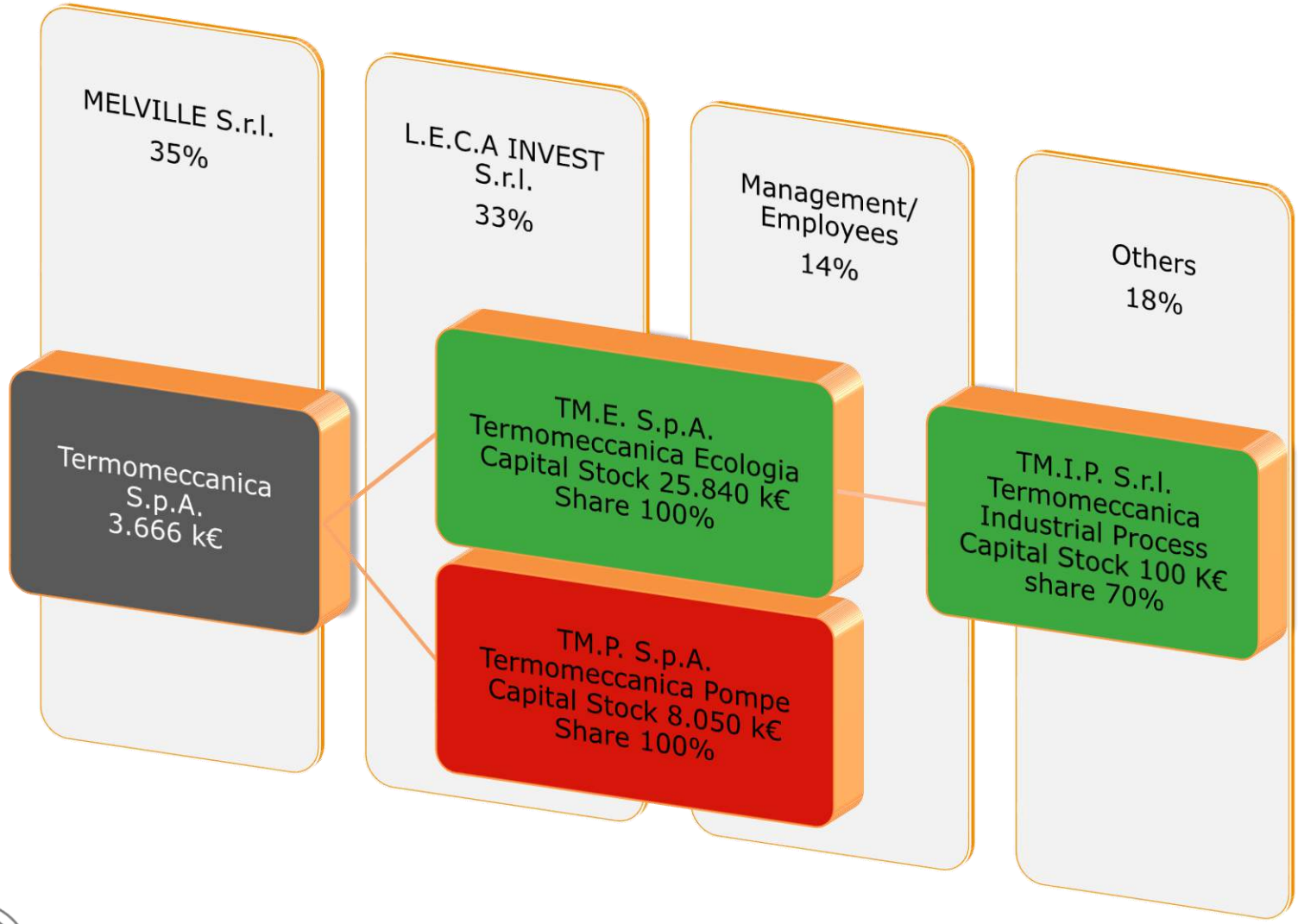
# *Company Profile*

May 2017

# Tradition, technology & innovation

| | | |
|---|---|---|
| • January 1995 | - | From "Termomeccanica Italiana" (EFIM Group) to "Termomeccanica S.p.A", a private company with the aim to carry on the Company tradition. |
| • 1950s | - | Widening the range of activities to environmental plant engineering, for civil and industrial waste water treatment, municipal and industrial waste treatment, renewable energy production |
| • 1930s | - | Development of projects for refrigeration units, with high-speed compressor (for marine and land applications) |
| • '14-'18 & after | - | Manufacturing of machines with different type of motorization (mechanical, electric and steam) for Industry, Military Navy & Merchant |
| • 1912 | - | Established in La Spezia as "Società Cerpelli & C.", afterwards turned into a stock company "Termomeccanica Italiana S.p.A."; Designing and manufacturing |

# Shareholders and parent company



# Turnover (TM Group)

KEY NUMBERS:

- Turnover 2016: 200 M€
- EBIT 2016: 12 M€
- STAFF 2016:
  - ✓ Head Office: 337 units
  - ✓ O&M: 441 units

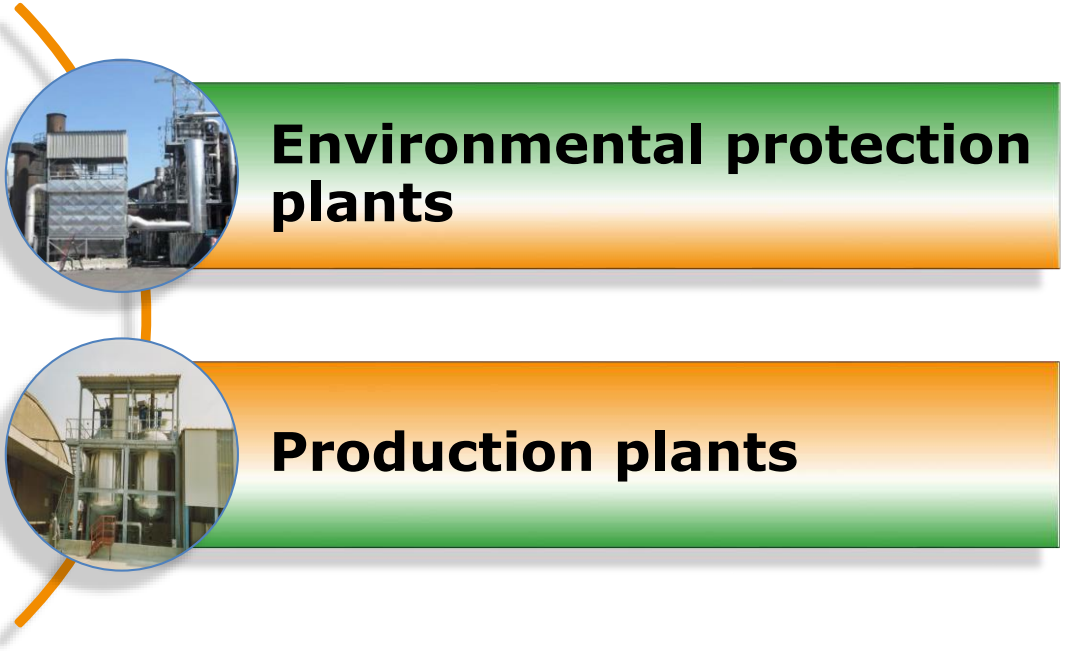
# Quality management system / Environmental management system

# TM.I.P.

"TM.I.P." was founded towards the end of 2011 to incorporate the know-how, the engineering and constructions technology and of the company "C.M.G." founded in 1977.

The company operates in the environmental protection and production sectors making use of C.M.G. credentials, patents and technical expertise in synergy with the know-how and industrial experience of "Termomeccanica Group".

**It is organized into two sections:**



# “Environmental protection plants”

Technologies plants:

## Thermal valorization

- Thermal valorisation of organic liquid wastes or Aqueous wastes polluted by organic compounds
- Thermal valorisation of solids and sludge

## Gaseous Waste Oxidation

- Thermal Oxidation Plants (recuperative)
- Catalytic Oxidation Plants
- RTO (Regenerative Thermal Oxidizers)

## Solvent Recovery

- Distillation Plants (Continuous, Batch, Multiple Effects, etc.)
- Adsorption Plants (Activated Carbon)
- Absorption Plants (Physical and Chemical Absorption)

## Gas Treatment

- Adsorption Plants (Activated Carbon, Iron Scavenger, Molecular Sieve)
- Absorption Plants (Physical and Chemical Absorption)
- Flue Gas Treatment (Dry and Wet Abatement)

## Liquid Treatment

- Stripping Plants
- Water Contaminated by Organic Compounds
- Evaporation and Concentration Plants

# “Environmental protection plants”

The **“Environmental protection plants”** section operates in the design and construction of plants (turn key) for the recovery of chemicals (solvents, light and heavy hydrocarbons, etc.) and for treatment of liquids, sludge and gaseous effluents from industries like:

- Chemical industry & auxiliary chemicals production
- Pharmaceutical industry
- Textile industry, synthetic leather production and other coated or impregnated products (fiberglass / carbon fiber)
- Adhesive tapes production and protective film
- Printing (rotogravure and flexo) - painting industry
- Resins production
- Oil&Gas and petrochemical

# “Environmental protection plants”

The compound chemicals are recovered by distillation, adsorption and absorption. The recovered product can be used directly in production therefore their installation is high profitable.

Where selective recovery systems are not possible due to economically or feasibility reasons, thermal oxidation plants can be installed. In case of thermal oxidation (regenerative, recuperative, catalytic) can be convenient to equip the plant with a heat recovery system (steam, thermal oil or hot water).

The company has complete know-how in waste gas treatment system (wet and dry cleaning system, catalytic system for NOx reduction).

All the engineering has been developed on proprietary know-how. All the engineering activities basic and detailed engineering, commissioning and start-up can be performed.

# “Production plants”

Technologies plants:

- Formaldehyde derivatives (glue and urea formaldehyde)
- Adhesive (rubber and solvent based and acrylic)
- Auxiliary chemicals for textile and tannery
- Blending plants for lubricants production
- Resins
- Wood derivatives (tannin and furfural) and fruits extract (pectin)

# “Production plants”

The **“Production plants”** section operates in the design and construction of plants for the production of compound chemicals (adhesive, wood board glue , formaldehyde , resins, PU and PVC paste for coating process , tannery and textile auxiliary chemicals , wood derivatives as furfural and tannin, fruits extract as pectin, etc.) and in the mixing process for industries like:

- Chemical industry & auxiliary chemical
- Pharmaceutical industry
- Textile industry, synthetic leather production and other coated or impregnated products
- Lubricants blending
- Adhesive tapes production and protective film
- Resins production

# “Production plants”

TM.I.P. builds production reactors and mixers from a capacity from 2’000 to 60’000 litres.

TM.I.P. designs and builds:

- “Turnkey” plants for batch or continuous production of chemicals products with the latest automation systems
- Reactors – vacuum and pressure mixers with more settings for the pharmaceutical and cosmetics industries
- Complete plants for production of chemical products

TM.I.P. is able to provide in addition to the basic and detailed engineering for the construction of the entire production plants also formulations , training , start up assistance to ensure the customer the quality and characteristics of finished product.

# Turnkey plants with technology providers

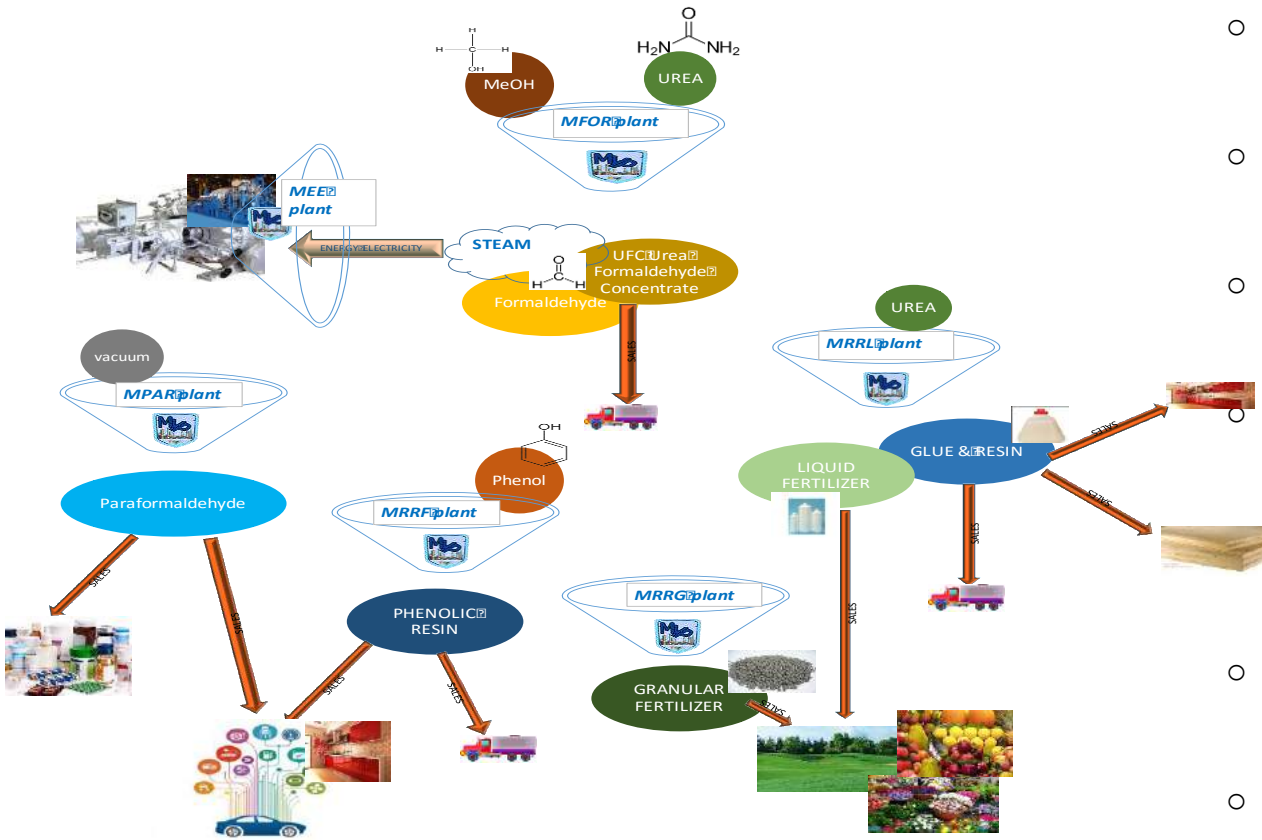
TM.I.P. can supply complete turnkey plants (including knowhow) using the state of the art technology based on specific agreements with the main Italian manufacturers.

TM.I.P. made an agreement with **MyP:**

- to supply a turn-key plant for production of Formaldehyde and UF-MF-MUF Glue & Resins, as well as other Formaldehyde chemical derivate.

TM.IP and MyP, following a successful collaboration on various projects, have formalized their partnership in a structured cooperation joining the know-how and long experience of MyP in the project management of several plants in world leading companies and the economical and financial strength , engineering expertise and experience, developed in a 100 years (TM.I.P) and over 20years (MyP) of activities all around the world.

# MyP advanced technology: MPLANTs




- Formaldehyde Plant: **MFOR**
- Glue & Resin Plant: **MRRL**
- Liquid Phenolic Plant: **MRRF**
- Paraformaldehyde Plant: **MPAR**
- Liquid Fertilizer Plant: **MRRL**
- Granular Fertilizer Plant: **MRRG**
- Energy Recovery Plant: **MEE**
- Consultancy: **MC**

# Resins production plants

For Polyester and Alkyd

Agreement with Italian supplier: POLYNT & NOVARESINE

For Epoxy resins

Internal KNOWHOW

For Acrylic

Agreement with technologist ICAP-SIRA Chemicals & Polymers S.p.A.

For Phenolic

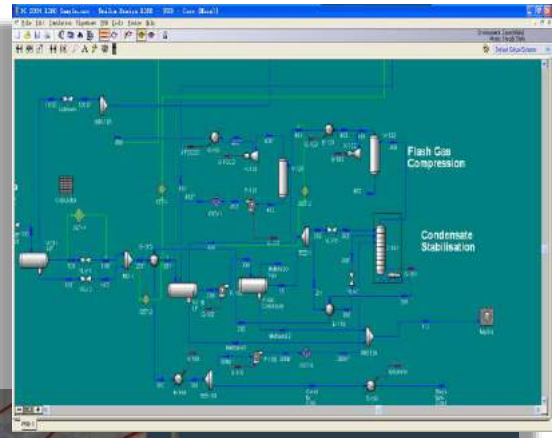
MyP made plants in Italy about 35.000 t/y

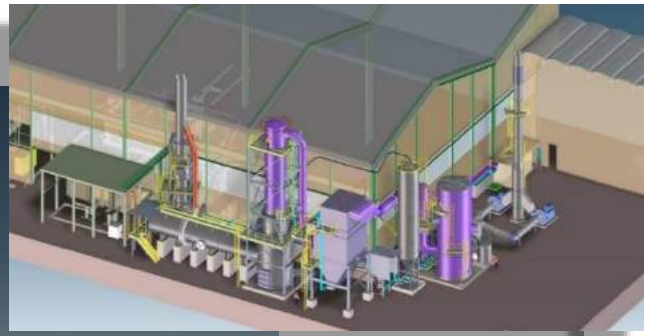
# New Technologies development and process

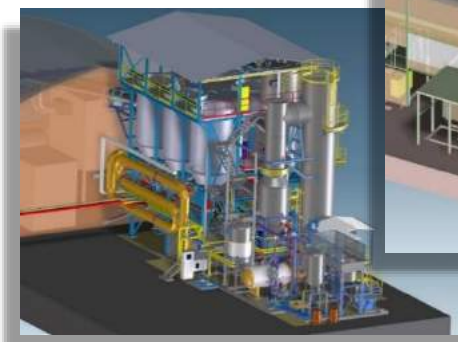
TM.I.P. uses **UniSim Design** software as a process simulator to optimize distillation, absorption, stripping and energy recovery plants, in order to:

- Elaborates material and thermal balances
- Verifies the correct sizing of equipment
- Defines the best technology for energetic recovery
- Optimizes the functioning cycle efficiency

and **3D Creo** modelling software:





# Last project

**«Distillation + Concentrator + Evaporator»** project in ***Italy***
Status: ***In operation***

«**Adhesive production**»
project in ***Serbia***
Status: ***In operation***

# Last project

**«RTO project»** in ***Iran***
Status: ***Ready for construction***

**«Thermal Oxidizer + flue gas treatment»** project in ***Italy***
Status: ***In operation***

# Last project

**«Solvent recovery»** project in ***China***
Status: ***In operation – 500.000 m3/h of air treated***

**«Odour mitigation and Odour abatement»** project in ***Oman***
Status: ***In operation***

# Technologies list

Plants for Production:

**RPP**

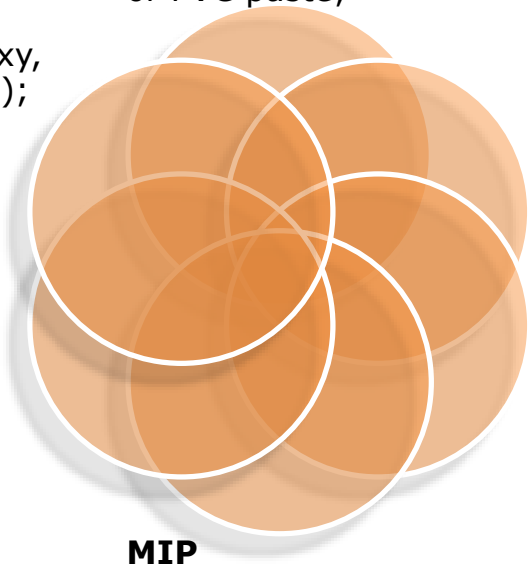
- Complete plants for Resin Production: (Polyester, Alkyd, Amino, Acrylic, Epoxy, Polyurethane resins);
- Wood board glue and formaldehyde production plant

**BAP**

- Batch plants for production of chemicals;

**PPP**

- Plants for preparation of Polyurethane paste or PVC paste;



**MIP**

- Mixing units and complete automated mixing plants;

**ADP**

- Plants for preparation of Adhesive paste;

**APP**

- Production plants for Tannery or textile auxiliary chemical products;

# Technologies list

Plants for Enviromental Protection

- **Gaseous Effluents Treatment**
  - **SC** - Washing towers and scrubbers;
  - **TO** - Regenerative and recuperative thermal combustion plants;
  - **CO** - Catalytic oxidation plants (VOC abatement, Ammonia oxidation);
  - **CC** - Cryogenic condensation (Benzene recovery);
  - **AC** - Absorption plants by activated carbon (Hexane / toluene / gasoline recovery);
  - **RP** - Recovery plants of organic and non-organic compounds (Solvents – plasticizers recovery);
  - **FG** - Flare Gas Recovery System and Vapour Recovery Unit;
  - **ST** - Stripping Tower (BTEX removal, Ammonia Stripping).

- **Industrial Hazardous Wastes Treatment:**
  - **WI** – Combustion plant for liquid waste, sludge, solid complete with steam/thermal oil and/or electricity production, and flue gas treatment (wet and dry pollutants abatement);
  - **DI** - Solvents recovery from solvents mixture or solvent solutions by distillation

# Example of …

| | Chemical industry & auxiliary chemicals | Pharmaceutical industry | Textile industry, synthetic leather production and other coated or impregnated products | Lubricants blending | Adhesive tapes production and protective film | Printing (rotogravure and flexo) - painting industry | Resins production | Oil&Gas and petrochemical |
|---|---|---|---|---|---|---|---|---|
| SC | X | X | X | | | | X | X |
| TO | X | X | X | | | X | X | X |
| CO | X | X | | | | X | X | |
| CC | X | X | | | | | | X |
| AC | X | X | | | X | X | X | X |
| RP | | | X | | | | X | |
| FG | | | | | | | | X |
| ST | X | | | | | | | X |
| WI | X | X | | | | | X | X |
| DI | X | X | X | | X | X | X | |
| PPP | | | X | | | | | |
| ADP | | | | | X | | | |
| APP | | | X | | | | | |
| RPP | | | | | | | X | |
| MIP | X | | | X | | | | |
| BAP | X | | | | | | | |

*thank you*

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