TECHNOLOGY of MyP s.r.l

Advanced Technologies presentation
Dr. P. Bellotti
CEO MyP s.r.l

«Safe chemistry, respectful for the environment and accessible for everyone»

Made in Italy
MyP S.r.l

TECHNOLOGY of MyP

MyP MAGNETICA ITALIANA
The founder and cooperators have a large experience in a world leading manufacturing company of **formaldehyde, derivative glues & resins and chemicals** for the wood industry, agriculture, automotive and other chemical applications.
MyP HAVE SIGNED AGREEMENTS WITH THE FOLLOWING IMPORTANT IMPORTANT PLAYERS:

**TM.I.P Srl**
To supply a turn-key plant for production of Formaldehyde and UF-MF-MUF Glue & Resins, as well as other Formaldehyde chemical derivate.

TM.I.P 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 20 years (MyP) of activities all around the world.

**ANSHULA TECHNOLOGICAL ENGINEERING CONSULTANTS PVT. LTD.**
ATEC and MyP have jointly identified an synergistic prospect and have made an alliance to collaborate technically and commercially into projects for the industry.

**GALILEI ENGINEERING Srl.**
GALILEI and MyP have jointly made an agreement for collaboration into R&D activities.

**CONSTRUCTION COMPANIES**
MyP have selected and made agreements with important Italian construction companies.
MyP – REFERENCE LIST

MyP’s Founder and Cooperators have experience in top executive positions in the manufacturing industry with specialization in design, engineering, execution and management of large-scale industrial projects:

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Capacity Ton/y</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITALY</td>
<td>Formaldehyde</td>
<td>60.000</td>
<td>1998</td>
</tr>
<tr>
<td>ITALY</td>
<td>Revamping Powder resin UF MUF MF</td>
<td>25.000</td>
<td>1998</td>
</tr>
<tr>
<td>ITALY</td>
<td>Formaldehyde</td>
<td>110.000</td>
<td>2000</td>
</tr>
<tr>
<td>ITALY</td>
<td>UF MUF Glue &amp; Resin and N NP NK &amp; NPK slow release fertilizer</td>
<td>110.000</td>
<td>2000</td>
</tr>
<tr>
<td>ITALY</td>
<td>N NP NK &amp; NPK slow release granular fertilizer</td>
<td>35.000</td>
<td>2002</td>
</tr>
<tr>
<td>BELGIUM</td>
<td>Formaldehyde</td>
<td>120.000</td>
<td>2003</td>
</tr>
<tr>
<td>BELGIUM</td>
<td>UF MUF Glue &amp; Resin and N NP NK &amp; NPK slow release fertilizer</td>
<td>430.000</td>
<td>2003</td>
</tr>
<tr>
<td>BELGIUM</td>
<td>Formaldehyde</td>
<td>120.000</td>
<td>2003</td>
</tr>
<tr>
<td>BELGIUM</td>
<td>Elcoform (High Content Liquid Formaldehyde) and paraformaldehyde (continuous process)</td>
<td>5.000 + 5000</td>
<td>2007</td>
</tr>
<tr>
<td>BELGIUM</td>
<td>Formaldehyde-new technology with Electrical production</td>
<td>120.000</td>
<td>2008</td>
</tr>
<tr>
<td>BELGIUM</td>
<td>Revamping Elcoform (High Content Liquid Formaldehyde) and paraformaldehyde (continuous process)</td>
<td>5.000 + 12.000</td>
<td>2011</td>
</tr>
<tr>
<td>BELGIUM</td>
<td>Revamping post combustor-formaldehyde plant</td>
<td>n/a</td>
<td>2013</td>
</tr>
<tr>
<td>ITALY</td>
<td>Phenolic Resin</td>
<td>35.000</td>
<td>2015</td>
</tr>
</tbody>
</table>
**MyP TECHNOLOGY** is specialized in the design, engineering and management of large-scale industrial projects.

The founder and cooperators have a large experience in a world leading manufacturing company of **formaldehyde, derivative glues & resins and chemicals** for the wood industry, agriculture, automotive and other chemical applications.

**MyP TECHNOLOGY** can offer to the market the following activities:
- Design of new plants with high efficiency, productivity and low environmental impact and safety;
- Design of systems and technologies for the removal of toxic and harmful substances, both in a gaseous state both in liquid form;
- Sale of plants for the production of formaldehyde, glues / urea-formaldehyde resin, paraformaldehyde and fertilizers consisting of engineering and know-how;
- Revamping of existing plants: optimize and upgrade;
- Sale of equipment for the abatement of toxic and noxious substances both in the gaseous state both in the liquid state;
- Sale of used equipment and plants;
- Technical and project consultancy.
WHAT WE DO

MyP TECHNOLOGY covers the complete spectrum of project activities from conception to commissioning stage.

I. PRE-INVESTMENT STUDIES

MyP TECHNOLOGY is specialized in the identification of industrial projects suited to the specific requirements of Client. It has developed a databank of various projects to suit a variety of industrial applications which can be made available to interested entrepreneurs at competent prices.

II. TECHNO-ECONOMIC FEASIBILITY EVALUATION

MyP TECHNOLOGY is specialized into the feasibility techno-economic evaluations for industrial and engineering projects.

III. DESIGN – ENGINEERING – PROCUREMENT - CONSTRUCTION - COMMISSIONING

MyP TECHNOLOGY has a unique experience in first-hand and proven Know-How and engineering/design/construction practices in plant operation with a continuous development of innovative safe and environment friendly plant technologies and exclusive formulations. MyP TECHNOLOGY is able to design tailor-made solutions for any specific request.
OUR ACTIVITIES

MyP TECHNOLOGY can offer know-how, engineering practice, plant erection and operation support for the production of the following products:

I. FORMALDEHYDE

Formaldehyde (formic aldehyde) is a colorless gaseous organic compound, soluble in water, with a characteristic stinging and suffocating smell. It is widely used as raw material or as intermediate in many industrial processes.

The most important application concerns the production of thermosetting resins such as urea-formaldehyde, melamine-formaldehyde and phenol-formaldehyde, which, depending on the preparation process, have various properties.

Theses resins can be used as glues, adhesives, insulating materials and as coatings in the wood industry, in the preparation of plastic laminates and in the manufacturing of electrical or automotive components.

Furthermore the formaldehyde can be used as corrosion inhibitor, chelating agent for industrial or domestic detergents, fungicide and disinfectant or also in the textile industry and for the production of fertilizers.
II. GLUES \ RESINS (Formaldehyde derivate + Urea and/or Melamine + Phenol)

**Urea-Formaldehyde (UF) liquid glues/resins**
are the result of the condensation reaction of Urea and Formaldehyde and are mainly used as adhesive in the particle board production.

**Urea-Formaldehyde liquid glues/resins reinforced with Melamine**
are the result of the condensation reaction of Urea and Formaldehyde which then is reinforced by adding Melamine and are mainly used as adhesive in MDF and particle board (only external layers) production.

**Urea-Formaldehyde-Melamine (MUF) liquid glues/resins**
are the result of the condensation reaction of Urea, Melamine and Formaldehyde and are mainly used as adhesive in the production of water-resistant particle boards, MDF for indoor fittings (and furniture) and OSB.

**Phenolic liquid resins**
are the result of the condensation reaction of Phenol and Formaldehyde and are, depending on the recipe, mainly used for the impregnaation of Kraft paper for the production of plastic laminates and furniture, as adhesive in the Plywood production or as adhesive in the production of high density fiberboards.
III. PARAFORMALDEHYDE

Paraformaldehyde is a high concentrated (>88%) solid form of formaldehyde, obtained by a formaldehyde concentration process, without addition of catalyst. The paraformaldehyde can be produced in flakes or in micro-granules in a formaldehyde concentration range from 88 to 92%.

It is mainly used in the adhesive industry for the production of phenolic, urea and melamine based glues and resins, especially where is needed a high formaldehyde and low water content. Furthermore it finds its application in the general chemical and pharmaceutical industry for the synthesis of organic compounds and in the textile industry for the production of dyes and textile auxiliaries.

IV. SLOW N-RELEASE FERTILIZERS

In liquid or solid form, the fertilizer is the result of the polymerization of Urea, belonging to the class of slow nitrogen release fertilizers based on Urea-Formaldehyde (methylene urea).

The use is not limited to simply fertilizing the land, but covers a broader spectrum, also being used in the fertirrigation and leaf manuring of crops, as a dust removal agent in physical mixes of granular fertilizers (bulk blended) or as a source of slow nitrogen releaser in complex compounds.
MyP ADVANCED TECHNOLOGIES: 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
KEY PRINCIPLES OF MyP ADVANCED TECHNOLOGIES: MPLANTs

- High plants performance
- High flexibility: high concentration for more products.
- High technologies for Health and Safety
- Efficient application/distribution of energy containing streams in all departments
- Ability to produce with the lowest possible total energy consumes (thermal-electrical)
- Low environmental impact: Lowest possible emissions in the atmosphere
- Ability of full automatic production plants
- Low business interruption risk

MyP plants and upgrade are in according to the legislative requirements and standards in the European Union, the United States and elsewhere. MyP plants are designed to meet worldwide standards such as ASME, ANSI, DIN, ATEX, EN, NEC, IEC, and CENELEC

MyP TECHNOLOGY offers a range of activities and services that cover the complete lifecycle of a plant’s operation, maintenance and improvement
**MyP FORMALDEHYDE PRODUCTION PLANTS “MFOR” – Global overview**

- **FA** Formaldehyde concentration **till 55%**
- **UFC** Urea-Formaldehyde concentrate **till 85%**
- **FA** and **UFC** production in one plant line

<table>
<thead>
<tr>
<th>PERFORMANCE PARAMETER</th>
<th>COMMON STANDARDS</th>
<th>MYP TECHNOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average catalyst life time:</td>
<td>8000 hr</td>
<td>up to 12000 hr</td>
</tr>
<tr>
<td>Specific production:</td>
<td>17-19 ton Fd37%/kg cat</td>
<td>up to 29 ton Fd37%/kg cat</td>
</tr>
<tr>
<td>Methanol inlet</td>
<td>Relatively low</td>
<td>Highest possible</td>
</tr>
<tr>
<td>Pressure drop</td>
<td>Relatively fast pressure increase</td>
<td>Slower increase</td>
</tr>
<tr>
<td>Plant operative pressure:</td>
<td>+/- 2 barg</td>
<td>&lt; 0.5 barg</td>
</tr>
<tr>
<td>Reactor cooling medium:</td>
<td>diathermic oil</td>
<td>Molten salts</td>
</tr>
<tr>
<td>Formaldehyde concentration</td>
<td>max. 52%</td>
<td>Up to 55%</td>
</tr>
</tbody>
</table>
MyP "MFOR" Standard Capacity

<table>
<thead>
<tr>
<th>MODEL TAG</th>
<th>MTPD as Formaldehyde 37% ww</th>
<th>FA Reactor FR</th>
<th>Column FC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Nominal</td>
<td>High</td>
</tr>
<tr>
<td>MSFOR</td>
<td>7</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>MCFOR</td>
<td>31</td>
<td>39</td>
<td>51</td>
</tr>
<tr>
<td>MFOR35</td>
<td>76</td>
<td>100</td>
<td>118</td>
</tr>
<tr>
<td>MFOR50</td>
<td>113</td>
<td>143</td>
<td>174</td>
</tr>
<tr>
<td>MFOR55</td>
<td>129</td>
<td>158</td>
<td>197</td>
</tr>
<tr>
<td>MFOR60</td>
<td>141</td>
<td>172</td>
<td>214</td>
</tr>
<tr>
<td>MFOR100</td>
<td>225</td>
<td>285</td>
<td>348</td>
</tr>
<tr>
<td>MFOR110</td>
<td>258</td>
<td>316</td>
<td>394</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MTPA at days</th>
<th>350</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Nominal</td>
</tr>
<tr>
<td>8%ww</td>
<td>9.5%ww</td>
</tr>
<tr>
<td>MSFOR</td>
<td>2.000</td>
</tr>
<tr>
<td>MCFOR</td>
<td>11.000</td>
</tr>
<tr>
<td>MFOR35</td>
<td>27.000</td>
</tr>
<tr>
<td>MFOR50</td>
<td>39.000</td>
</tr>
<tr>
<td>MFOR55</td>
<td>45.000</td>
</tr>
<tr>
<td>MFOR60</td>
<td>49.000</td>
</tr>
<tr>
<td>MFOR100</td>
<td>79.000</td>
</tr>
<tr>
<td>MFOR110</td>
<td>90.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OPERATING POINT</th>
<th>per 1 Ton</th>
<th>Operating Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde 37% ww</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Nominal</td>
<td>High</td>
</tr>
<tr>
<td>8%ww</td>
<td>9.5%ww</td>
<td>11%ww</td>
</tr>
<tr>
<td>Methanol Consumption Ton</td>
<td>0,425</td>
<td>0,426</td>
</tr>
<tr>
<td>Yield %</td>
<td>93,0</td>
<td>92,6</td>
</tr>
<tr>
<td>Formaldehyde Catalyst Consumption kg</td>
<td>0,045</td>
<td>0,050</td>
</tr>
<tr>
<td>IBL Power kwh without Contopressure turbine</td>
<td>&lt;663</td>
<td>&lt;660</td>
</tr>
<tr>
<td>IBL Power kwh with Contopressure turbine</td>
<td>&lt;48</td>
<td>&lt;45</td>
</tr>
<tr>
<td>Steam produced Kg</td>
<td>0,92</td>
<td>0,92</td>
</tr>
<tr>
<td>Steam exported Kg</td>
<td>0,68</td>
<td>0,68</td>
</tr>
</tbody>
</table>

MyP TECHNOLOGY offers: Other plants of different capacities, according to customer's request, through study and customization dedicated.
MFOR - AUTOMATION

Advanced Technologies

MyP “MFOR” FORMALDEHYDE PRODUCTION PLANTS - Automation

- Complete **PLC/DCS** controlled plant

- **Full and semi-automatic** control of process parameters

- **Fully integrated safety** control and automatic safety shutdown

- **Operator only as supervision** from centralized control room

- High guarantee for **Safety and Environment**
MyP MFOR – LOWEST POSSIBLE EMISSION IN ATMOSPHERE

Thanks to MyP’s applied plant off gas incineration technology Formaldehyde and COT emissions in the atmosphere are reduced to absolute minima:

- Formaldehyde emission in the atmosphere: < 3mg/Nm³
- COT emission in the atmosphere (continuous online monitoring): < 15mg/Nm³

The process state-of-the-art equipment are very critically chosen and/or developed to reduce operative emissions and the risks for incidental emission to an absolute minimum.
**MyP GLUE & RESIN PRODUCTION PLANTS “MRRL- MRRF” – Global overview**

- MRRL & MRRF are designed to produce the following glues & resins:
  
  **UF, Ufdopè, MUF, PF, MF-UFpaper**

<table>
<thead>
<tr>
<th>MTPD Standard Capacity</th>
<th>MTPD at days</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MODEL TAG</strong></td>
<td><strong>Batch</strong></td>
</tr>
<tr>
<td>MRRL20</td>
<td>20</td>
</tr>
<tr>
<td>MRRL28</td>
<td>28</td>
</tr>
<tr>
<td>MRRL30</td>
<td>31</td>
</tr>
<tr>
<td>MRRL50</td>
<td>51</td>
</tr>
<tr>
<td>MRRL60</td>
<td>61</td>
</tr>
</tbody>
</table>

**Production**

<table>
<thead>
<tr>
<th><strong>MODEL TAG</strong></th>
<th><strong>Batch</strong></th>
<th><strong>Day 8 hour</strong></th>
<th><strong>Day 16 hour</strong></th>
<th><strong>Day 24 hour</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>MRRL20</td>
<td>6.600</td>
<td>13.200</td>
<td>19.800</td>
<td></td>
</tr>
<tr>
<td>MRRL28</td>
<td>9.200</td>
<td>18.500</td>
<td>27.700</td>
<td></td>
</tr>
<tr>
<td>MRRL30</td>
<td>10.200</td>
<td>20.500</td>
<td>30.700</td>
<td></td>
</tr>
<tr>
<td>MRRL50</td>
<td>16.800</td>
<td>33.700</td>
<td>50.500</td>
<td></td>
</tr>
<tr>
<td>MRRL60</td>
<td>20.100</td>
<td>40.300</td>
<td>60.400</td>
<td></td>
</tr>
</tbody>
</table>

- **MyP TECHNOLOGY** owns a wide range of recipes and formulations for standard and specific application in Wood industry (PanelBoard, Plywood, MDF, HDF, OSB, CALANDER, Paper Impregnation), Automotive industry and others.

- **MyP TECHNOLOGY** offers a range of activities and services that cover the complete lifecycle of a plant’s operation, maintenance and improvement.
MyP “MRRL & MRRF” GLUE & RESIN PRODUCTION PLANTS - Automation

- Complete **PLC controlled** plant
- **Automatic loading** of raw materials
- **Online** measurement of **viscosity** and **pH**
- **Full and semi-automatic** control of **recipe**
- **Operator only as supervision** from centralized control room
- High guarantee for **Safety and Environment**
- **Process and quality stability** guaranteed
Thanks to the large experience into the management of the plants operation, MyP TECHNOLOGY is able to design processes with the highest energy efficiency where the generated steam by the exothermal reaction (example: synthesis Formaldehyde) of a production process can be applied:

- Auto-consume and Heating of Glue & Resin reactors
  → Low necessity of heating by Electrical Power or by Natural Gas

- Steam driven process air fans
  → Important reduction of Electrical Power consume

- ALTERNATIVE: Generation of Electrical Power
  → No useless condensation or venting of excess steam

MyP PRODUCTION PLANTS – Historical key efficiency steps
MyP MEE– ENERGY EFFICIENCY IMPROVING

An excellent plant off-set that makes it possible to efficiently apply the generated steam, to run high-performance catalysts and a continuous improvement and installation of low-energy-consumption machinery results in a very low overall energy consumption. Some numbers:

**FORMALDEHYDE PLANT “MFOR”**
- Specific energy consume Formaldehyde production (IBL with VSD): < 45 kWh / ton Fd37%
- Specific process fan consume (IBL with VSD): < 28 kWh / ton Fd37%
- ALTERNATIVE - Internal Energy production: from 100 to 150 kWh/ton Fd37%

**GLUE & RESIN PLANT “MRRL”**
- Specific energy consume Glue & Resin production: < 30 kWh / ton

**INTEGRATED FACTORY: FORMALDEHYDE “MFOR” +GLUE & RESIN PLANT “MRRL”**
- Specific energy consume Total Factory (Formaldehyde + Glue & Resin ): < 50 kWh / ton
- Natural gas consume: < 10,000 Nm3/year
MyP PARAFORMALDEHYDE PRODUCTION PLANT “MPAR” – Global overview

Contrary to the traditional production processes on the market, MPAR enables the CONTINUOUS production of:

- a HIGH PURITY Paraformaldehyde in microflake form (88-92%) that has the correct polymerisation degree without using the support of catalysts, and having a high stability and reactivity.
- a high concentrated aqueous Formaldehyde solution stabilised with Methanol, named HCSF.

KEY PRINCIPLES OF MPAR:

- High guarantee for Safety and Environment
- Cooling belt technology, no circulation air => explosion safe process
- Operator only as supervision from centralized control room
- Complete PLC controlled plant
- Process and quality stability guaranteed
MyP FERTILIZER PRODUCTION PLANTS “MRRL & MRRG” – Global overview

MyP TECHNOLOGY can offer production plants for a wide range of Methylene-Urea complexes in liquid or granular form with the following properties:

- Lower content of unreacted urea
- Slow N-release recipes possible from 10 weeks to 10 months
- High uniformity for easy and superior blending; uniformity index: 50-70
- Salt index <1,5 is the lowest available in fertilizer industry
- Physionutritional action to root growth

MyP TECHNOLOGY offers plants to produce MU-UF in order to produce:

- Liquid N-slow release Nitrogen fertilizer Liquid N-P-K: MRRL Plant
- Solid Granular N-slow release Nitrogen Fertilizer Solid Granular N-P-K: MRRG Plant

MyP TECHNOLOGY offers recipes/formulation:

- Liquid N-slow release Nitrogen fertilizer: ML F28.0.00
  Liquid N-P-K & microelement (Zn, B, Mn): MFL20.0.08; MFL15.0.15; MFL 12.6.12; MFL10.0.20.......  
- Solid Granular N slow release Nitrogen Fertilizer: MFS40.0.00 MFS38.0.00

![Diagram depicting the conversion of Methylene Urea to Nitrate and Ammonium via Urease Enzyme and Nitrobacteria.](image)
MyP – PRE-INVESTMENT TECHNO/ECONOMIC STUDIES & FEASIBILITY STUDIES

- Marketing;
- Business Case;
- Business Plan:

MyP – MOST EFFICIENT FACTORY DESIGN

- Engineering of a whole CHEMICAL PRODUCTION UNIT;
- TOTAL CUSTOMIZED Engineering and Design for FACTORY LAY-OUT
- Optimize and upgrade of existing Plant;
  - Optimize plant Energy
  - Improve Quality product
  - Maximize production
  - Improve plant safety
  - Increase Capacity
- Best Available Technologies for:
  - ALL PROCESSES
  - STORAGE of ALL FEEDSTOCKS, INTERMEDIATES, CHEMICALS and FINAL PRODUCTS
  - EMISSIONS in ATMOSPHERE, SOIL and WATER
  - MINIMISATION OF DISCHARGE PRODUCTS (water, byproducts)