MIXING EQUIPMENTS AND SERVICES FOR PVC
DRY-BLEND, POWDER COATINGS, MASTER BATCH AND WPC
WHO WE ARE

YOUR PARTNER IN MIXING since 1967

PVC mixing

Powder coatings

Master batch and pigments

Other applications

Laboratory mixers

Wood plastic composites
WHO WE ARE

- In house production of every single mechanical and electronic item
- Standard and custom engineering and design to meet the varied processing requirements

Customer’s needs

Engineering

Design

Manufacturing

Installation

Trials

Training

Technical service

Spare parts
WHO WE ARE

5.600 Machines working worldwide

2.159 TRM
1.104 HEC
420 TRR sold since 1995

49 years of experience
90% export worldwide
80 people employees
14 mio € turnover 2014

3 mio € value spare parts warehouse
Development of new methods of processing different kinds of materials

Research to ensure a competitive edge in plastics processing

Whole range of mixing machinery to test customers’ products
Listening

Analysis and study
  Engineering and design

Team of 15 people | 3D software

100% satisfaction
IN HOUSE MANUFACTURING IS A MATTER OF FACT

IN HOUSE MANUFACTURING MEANS

- Highest quality
- Maximum control
- Top flexibility
- Experienced team
A SKILLED TEAM OF 46 PEOPLE TAKES OF ALL MANUFACTURING PROCESS

Carpentry and turning dept

Welding dept with automatic welding machines

Polishing dept with fully robotized stations for mixing blades mirror polishing

Electrical dept for the construction of electric switchboards with Siemens and ABB components

Assembly dept

Carpentry
Welding dept
Polishing dept
Assembly dept
Electrical dept
WE VALUE OUR RELATIONSHIP

A dedicated team of 14 people is at your disposal for:

- **Technical training**
- **Maintenance programs**
- **On site and tele service**
- **Revamping**

’Spare Parts Special’ to be promptly updated about the order status — daily email notifications from approval to delivery | a dedicated warehouse to be timely
**PRODUCTION RANGE**

**MIXING PLANTS** WITH NO LIMITS TO YOUR IMAGINATION

**CUSTOMIZED MACHINES** AND **TARGETED ADVICE** FOR THE MOST VARIED INDUSTRIES AND APPLICATIONS
PRODUCTION RANGE | case study

NEED

SOLUTION
MAIN PRODUCTION LINES

PVC mixing systems

Powder coatings

Master batch and pigments

Other applications

Laboratory mixers

Wood plastic composites
MAIN PRODUCTION LINES - PVC MIXING SYSTEMS

PVC MIXING SYSTEMS

HC
HC COMBIMIX TRM + HEC

RV
RV COMBIMIX TRM + RFV

RO
RO COMBIMIX TRM + RFO
MAIN PRODUCTION LINES - PVC MIXING SYSTEMS

TRM HEATING MIXERS

TRM HEATING MIXERS are used for

RIGID and SOFT PVC MIXING powder coatings, master batch, WPC and special applications

- TRM heating mixers are the ideal solution in the transformation industry when good quality thermoplastic material must be combined with high hourly throughput

- The vessel lid can be supplied in different configurations; the internal surfaces are in stainless steel; the closure plug, is operated by a pneumatic cylinder and is adapted to fit the internal shape of the vessel

- Accessories and optional are available
MAIN PRODUCTION LINES - PVC MIXING SYSTEMS

HC - HIGH EFFICIENCY COOLING COMBINATION

HC COMBIMIX TRM + HEC

HORIZONTAL COOLER COMBINATION – HC COMBIMIX is the combination of the heating mixer TRM and the high performance horizontal cooler HEC

RV COMBIMIX TRM + RFV

PVC mixer COMBIMIX-RV is the combination of the heating mixer TRM and the vertical cooler RFV. The RFV range of coolers used for this combination is the ideal solution to combine the requirements of restricted spaces and easy cleaning

COMBIMIX-RO

RO COMBIMIX TRM + RFO

COMBIMIX-RO is the combination of the heating mixer TRM and the horizontal cooler RFO. It is used for those applications where the mixing process has a higher dry-blend final temperature.
MAIN PRODUCTION LINES - POWDER COATINGS

POWDER COATINGS

Pre Mixing
CONTAINER MIXERS TRR

Metallic Bonding
TRR/B CONTAINER MIXER
COMBIBOND HC/B

Metallic Blending
CONTAINER MIXERS TRR
MAIN PRODUCTION LINES - POWDER COATINGS

PRE MIXING

CONTAINER MIXERS
TRR

Cold mixing of polymers in powder or granular form with pigments fillers and additives
Concentrated master batches
Powder coatings
Pre-mixing of all kind of powders

- The TRR serie of mixers is the ideal alternative to traditional turbinmixers when production conditions require high levels of flexibility and involve a wide range of different products to be mixed with the same machine.
- Mixing head and container hopper are divided in two distinct and separate parts, so cleaning times are reduced to a minimum.
- Different configuration with same or independent speed of the blades or high power version.
- Storage and transport of the mixtures is also facilitated by direct use of the same container.
- Accessories and optional are available.
MAIN PRODUCTION LINES - POWDER COATINGS

METALLIC BONDING

TRR/B CONTAINER MIXER

TRR/B model is the most robust, reliable and simple system for the Powder Coating Pre-mixing process.

COMBIBOND HC/B

This mixing plant is the combination of the TURBOMIXER TRM and a cooling mixer to achieve the bonding process.

This technology offers an excellent metallic bonding effect by a simple and safe process, taking account of the risk of any blast of aluminum pigment by inerting bonding chamber using a controlled nitrogen atmosphere.

METALLIC BLENDING

CONTAINER MIXERS TRR

The TRR serie of mixers is the ideal alternative to traditional turbomixers when production conditions require high levels of flexibility and involve a wide range of different products to be mixed with the same machine.
MAIN PRODUCTION LINES – MASTER BATCH AND PIGMENTS MIXING

Master Batch and Pigments Mixing

- TRR-Container Mixers
- TRM-High speed Mixer
- TRA-Vertical Mixer
MAIN PRODUCTION LINES — MASTER BATCH AND PIGMENTS MIXING

CONTAINER MIXERS

Cold mixing of polymers in powder or granular form with pigments fillers and additives
Concentrated master batches
Powder coatings
Pre-mixing of all kind of powders

TRM HEATING MIXERS

RIGID AND SOFT PVC MIXING

Mixing Rigid or Plasticized PVC dry-blend obtained from polymers in suspension, emulsions or mass

TRA VERTICAL MIXER

Cool batch preparation of master batch materials with excellent pigment and additive dispersion characteristics.
Preparation of suspension or emulsion batch mixes, usually PVC based.
Pigmentation and intensive mixing of other thermoplastics, e.g. PE, PP, ABS, etc.
MAIN PRODUCTION LINES - WOOD PLASTIC COMPOSITES (WPC)

WOOD PLASTIC COMPOSITES (WPC)

COMBIWOOD HC

COMBIWOOD RV

HEATING MIXER TRM + COOLING MIXER HEC
HEATING MIXER TRM + COOLING MIXER RFV

Possibility of utilizing natural fiber with moisture content up to 15%
Agglomerate with a residual moisture less than 0.2%
Product Dust Free
Easily processable in extruder
MAIN PRODUCTION LINES - OTHER APPLICATIONS

- **THERMOPLASTIC**
  - TURBOMIXER TRG

- **RIBBON BLENDER**
  - HORIZONTAL BLENDER HEB

- **UNIVERSAL MIXER**
  - HORIZONTAL UNIVERSAL MIXER HUM
  - HORIZONTAL MIXER MO
  - VERTICAL UNIVERSAL MIXER TRA

- **PLASTISOL**
  - MIXER TRP
Each industrial mixer of the range can be manufactured in small size for laboratory tests.

PLAS MEC laboratory mixers are supplied on its own or combined with the cooler.

The laboratory mixer TRL is suitable for PVC dry blend, powder coatings, master batch and pigments, thermoplastic rubbers, wood plastic composites and offers high reproducibility of the process environment on the production plants in order to provide essential data to improve productivity and quality.

TRL lab mixer is available from a minimum capacity of 5 lt. to a maximum capacity of 100 lt.

Adding the cooler mixer to the TRL, you obtain the laboratory heating cooling combination RV.
WHERE WE ACT

With a wide range of agents and international commercial team we cover the worldwide market
COME AND VISIT US

Lonate Pozzolo headquarter covers 20,000 m² floor space
THANK YOU FOR YOUR ATTENTION!
Latest developments in PVC dry blend preparation
- Mixing tool technologies
- Cooling technology
- Humidity removal on PVC dry blend
MIXING :
From non-homogeneous mixture to an ordered and distributed blend

INITIAL STATE

THEORETICAL IDEAL STATE
PVC 2017 - Mixing tool technologies

- VORTEX = Distributive Mixing

- VORTEX Cut = Dispersive Mixing
MIXING = Distributive mixing + Dispersive mixing

Distributive mixing

Dispersive mixing

Temperature
<table>
<thead>
<tr>
<th>First design</th>
<th>Improved design</th>
<th>Current design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double spoon</td>
<td>Spoon &amp; Ring</td>
<td>Spoon &amp; Blades</td>
</tr>
</tbody>
</table>

PVC 2017 - Mixing tool technologies
PVC 2017 - Mixing tool technologies

Small radius vessel VS large radius vessel

Energy dispersed due to the abrupt change of direction
- Premature wearing of the vessel
- Generation of crusts and hot spots

Energy transfer optimized due to the larger vessel radius.
- Longer life of vessel
- Less generation of crusts and hot spots
- Electrical consumption savings from 5 to 10% average
Double Spoon

ADVANTAGES
• Short cleaning time
• Lower cost of repairs or as spare part

DISADVANTAGES
• Longer heating time
• Possible contamination between products due to deflector
• High mixing speed required with consequent possibility of formation of hot spots
• Lower dispersion efficiency of fine components
• Small radius vessel design
**Ring**

**ADVANTAGES**
- Shorter heating time
- Mixing speed reduced
- Very gentle heating of transparent and high plasticized products
- Improved dispersion efficiency of fine components

**DISADVANTAGES**
- Longer cleaning time due to tool design complexity and presence of deflector
- Small radius vessel design
- Higher cost of repairs or as spare part
- Tendency of light materials to float on the ring
PVC 2017 - Mixing tool technologies

Spoon & Blades

ADVANTAGES

• Fast heating time
• Energy transfer optimization due to vessel bottom radius increasing
• Modular design permits to adjust tool configuration
• Very good dispersion efficiency of fine components
• Very gentle heating of transparent products and high plasticized ones
• Short cleaning time due to modular design and deflector removal
• Low price of repairs or as spare part because the tool has a modular design

DISADVANTAGES = NONE
## PVC 2017 - Mixing tool technologies

**Mixing tools profiles and materials**

<table>
<thead>
<tr>
<th>Material</th>
<th>PVC Rigid</th>
<th>PVC Soft</th>
<th>PVC Medical</th>
<th>Compound</th>
<th>Additives</th>
<th>Masterbatch</th>
<th>Pigments</th>
<th>Pharma</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>AISI 304 Mirror polished</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AISI 304 + Tungsten carbides</td>
<td>XX</td>
<td>XX</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>AISI 2205 Duplex Mirror polished</td>
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<tr>
<td>AISI 316 Mirror polished</td>
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<td>X</td>
<td>XX</td>
<td></td>
<td></td>
<td>XX</td>
</tr>
</tbody>
</table>

X: usable  
XX: recommended
PVC 2017 – Cooling Technology

Cooling mixers

| Vertical cooler | U shaped horizontal cooler | High Efficiency Cooler |

Cooling efficiency = Higher productivity

HEC cooler is the higher performance cooler
H E C 1st model

Performance
- More efficient thermal exchange compared to RFO and RFV
- Productivity 120-40°C = 7 batch/h

Limits
- Feeding water @ 0,5 Bar
- Thermal exchange unbalanced
- Market demand = 8 batch/h

Consequence
Revision of the jacket design

Dario SONCIN / Area Sales Manager
New “turbulence” jacket

- Very efficient thermal exchange
- Feeding water @ 2.5 Bar
- Productivity 120-40°C = 9 batch/h

- Lower installation costs
- Fewer deposits due to higher speed of water
- External insulation for lower cooling dispersions

Previous jacket

New “turbulence” jacket
Previous jacket vs High «turbulence» jacket

Temperature - °C

0 40 80 120

HEC new design
HEC old design

9 batch/h

Time - min
Moisture in PVC dry blend

Fish eyes

Structural problems caused by bubbling
PVC 2017 – Humidity removal on PVC dry blend

Drying system

Vacuum pipe

Vacuum dome with filter

Curved lid

Vacuum group
PVC 2017 – Humidity removal on PVC dry blend

Drying system

- Inlet
- Separator
- Vacuum break
- Outlet
- Vacuum pump
- Liquid inlet

Vacuum group
PVC 2017 – Humidity removal on PVC dry blend

Water

Humidity from turbomixer

Water inlet for the ring

WATER was not collected and not recovered = extra costs for water consumption
PVC 2017 – Humidity removal on PVC dry blend

Water is now re-circulated inside a tank with cooler exchanger

= COST SAVING

Cooling water
PVC 2017 – Humidity removal on PVC dry blend

WPC Version

- Vacuum dome for wpc
- Double Separator
- Vacuum pump
- Collecting tank for liquid ring recovery and cooling

Cooling water
PVC 2017 – Humidity removal on PVC dry blend

THANK YOU FOR YOUR ATTENTION