... let’s introduce

General Presentation
Since 1962 Maris is specialized in the design and production of Co-rotating Twin-Screw Extruders
A dynamic family-based company that has become one of the world leaders in the production of Co-Rotating Twin-Screw Extruders

- **1962**: Start of the activity: extruders and dies for PVC pipes and plastic profiles
- **1970’s**: Extruders with two and three lobes screws
- **1980’s**: Extruders with self-cleaning screws and modular sectors
- **1990-2000**: High torque and high speed extruders, as well as new applications
- **2010’s**: Ultra-high torque and high volume machines
• Production capacity of over 60 extruders per year
• 8,000 sq. meters facility
• Staff of more than 100 employees
• Yearly turnover above EUR 25 Million
• Internationally renowned customers
• Worldwide commercial presence
Maris Extruders in Europe…
…and worldwide

U.S.A.  Canada
Costa Rica  Guatemala  Honduras  Mexico  Nicaragua
Argentina  Brasil  Chile  Colombia  Ecuador  Paraguay  Perù  Uruguay  Venezuela
Algeria  Angola  Egypt  Morocco  Nigeria  South Africa  Tunisia
India  Iran  Israel  Lebanon  Pakistan  Saudi Arabia  Syria  U.A.E.
Hong Kong  Indonesia  Malaysia  P.R. China  Singapore  South Korea  Taiwan  Thailand
Keyword: technology and experience

MARIS OWNS 100% OF ITS TECHNOLOGY AND HANDLES DIRECTLY EVERY PHASE OF THE PRODUCTION OF ITS EXTRUDERS
Keyword: technology and experience

The Project: “thoughts become things”
Keyword: technology and experience

Process Design
Keyword: technology and experience

Manufacturing Of All Main Components

GEAR BOXES

BARRELS

SCREWS

SCREW SHAFTS
Keyword: technology and experience

Full Line Assembling
Keyword: technology and experience

Important Stock of Spare parts
Keyword: technology and experience

The Added Value

Tailor-made solutions to match the Customer’s requirements
Fast response in adapting to potential modifications
Independence from third parties
Availability of spare parts even for older models

L/d = 100
MARIS EXTRUDERS: THE SYNTHESIS OF FLEXIBILITY

Available in 3 different screw D/d ratio:
1,55 - 1,65 - 1,78

Available with different specific torque:
8 - 11 - 13 - 15 Nm/cc and higher

Our aim: guarantee the appropriate extruder for each specific process, to ensure the production of superior quality products
MARIS EXTRUDER SERIES: THE WIDEST CHOICE AVAILABLE TO ACCOMMODATE THE BROADEST REQUIREMENTS

“M” Medium Torque

“HT” High Torque

“HS” High Torque High Volume

“VM” High Volume

“HF” High Force
A tailor-made product

### TM "M" MEDIUM TORQUE SERIE

<table>
<thead>
<tr>
<th>Extruder model</th>
<th>30</th>
<th>40</th>
<th>58</th>
<th>70</th>
<th>92</th>
<th>112</th>
<th>133</th>
<th>150</th>
<th>177</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max screw speed (rpm)</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>600</td>
<td>500</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Screw ax height from ground (mm)</td>
<td>1200</td>
<td>1050</td>
<td>1050</td>
<td>1100</td>
<td>1150</td>
<td>1250</td>
<td>1300</td>
<td>1350</td>
<td>1450</td>
</tr>
<tr>
<td>Total torque (Nm)</td>
<td>220</td>
<td>600</td>
<td>1720</td>
<td>3000</td>
<td>7640</td>
<td>10500</td>
<td>21020</td>
<td>31800</td>
<td>49600</td>
</tr>
<tr>
<td>Barrels (l/d)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Main motor power (kW)</td>
<td>14</td>
<td>38</td>
<td>108</td>
<td>200</td>
<td>480</td>
<td>660</td>
<td>1080</td>
<td>1000</td>
<td>1560</td>
</tr>
<tr>
<td>Lenght of the machine approx. (mm)</td>
<td>3000</td>
<td>3500</td>
<td>4800</td>
<td>5800</td>
<td>7500</td>
<td>8400</td>
<td>9700</td>
<td>10500</td>
<td>12500</td>
</tr>
<tr>
<td>Width of the machine approx. (mm)</td>
<td>750</td>
<td>1000</td>
<td>1000</td>
<td>1100</td>
<td>1250</td>
<td>1350</td>
<td>1500</td>
<td>1500</td>
<td>1800</td>
</tr>
<tr>
<td>Height of the extruder without hopper (mm)</td>
<td>1300</td>
<td>1400</td>
<td>1400</td>
<td>1500</td>
<td>1650</td>
<td>1750</td>
<td>1850</td>
<td>1900</td>
<td>2100</td>
</tr>
</tbody>
</table>

**Note:** Depending on the process, the rpm of the screws can be adjusted.
**Note:** The indicated outputs can be subject to variations depending on formulations and materials features.
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### TM “HT” HIGH TORQUE SERIE

<table>
<thead>
<tr>
<th>Extruder model</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>58</th>
<th>70</th>
<th>80</th>
<th>92</th>
<th>112</th>
<th>133</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max screw speed (rpm)</td>
<td>750</td>
<td>650</td>
<td>650</td>
<td>650</td>
<td>650</td>
<td>650</td>
<td>650</td>
<td>650</td>
<td>600</td>
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<tr>
<td></td>
<td>1500</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1100</td>
<td>1100</td>
</tr>
<tr>
<td>Screw ax height from ground (mm)</td>
<td>1150</td>
<td>1200</td>
<td>1100</td>
<td>1100</td>
<td>1100</td>
<td>1150</td>
<td>1250</td>
<td>1350</td>
<td>1200</td>
<td>1300</td>
</tr>
<tr>
<td>Total torque (Nm)</td>
<td>96</td>
<td>330</td>
<td>757</td>
<td>1500</td>
<td>2278</td>
<td>4040</td>
<td>6120</td>
<td>9160</td>
<td>16700</td>
<td>28650</td>
</tr>
<tr>
<td>Barrels (l/d)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Main motor power (kW)</td>
<td>7.5</td>
<td>22.5</td>
<td>51.5</td>
<td>102</td>
<td>155</td>
<td>275</td>
<td>417</td>
<td>623</td>
<td>1050</td>
<td>1800</td>
</tr>
<tr>
<td>Lenght of the machine approx. (mm) (*)</td>
<td>15</td>
<td>45</td>
<td>103</td>
<td>204</td>
<td>310</td>
<td>550</td>
<td>834</td>
<td>1054</td>
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</tr>
<tr>
<td>Width of the machine approx. (mm)</td>
<td>2000</td>
<td>3200</td>
<td>3600</td>
<td>4900</td>
<td>5200</td>
<td>6500</td>
<td>7000</td>
<td>7500</td>
<td>9500</td>
<td>12000</td>
</tr>
<tr>
<td>Height of the extruder without hopper (mm)</td>
<td>900</td>
<td>750</td>
<td>1000</td>
<td>1150</td>
<td>1190</td>
<td>1470</td>
<td>1500</td>
<td>1550</td>
<td>1400</td>
<td>1650</td>
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<tr>
<td>(*): only for lenght 40 D</td>
<td></td>
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</table>

**F.LLI MARIS S.P.A.**

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<table>
<thead>
<tr>
<th>Extruder model</th>
<th>31</th>
<th>41</th>
<th>51</th>
<th>59</th>
<th>72</th>
<th>84</th>
<th>95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max screw speed (rpm)</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1100</td>
</tr>
<tr>
<td>Total torque (Nm) (*)</td>
<td>420</td>
<td>870</td>
<td>1790</td>
<td>2880</td>
<td>5100</td>
<td>8040</td>
<td>11470</td>
</tr>
<tr>
<td>Barrels (l/d)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Main motor power (kW)</td>
<td>57</td>
<td>132</td>
<td>244</td>
<td>392</td>
<td>692</td>
<td>1094</td>
<td>1320</td>
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<tr>
<td>Length of the machine approx. (mm)</td>
<td>3200</td>
<td>3600</td>
<td>4900</td>
<td>5200</td>
<td>6500</td>
<td>7000</td>
<td>7500</td>
</tr>
<tr>
<td>Width of the machine approx. (mm)</td>
<td>750</td>
<td>1000</td>
<td>1150</td>
<td>1190</td>
<td>1470</td>
<td>1500</td>
<td>1550</td>
</tr>
<tr>
<td>Height of the extruder without hopper (mm)</td>
<td>1500</td>
<td>1300</td>
<td>1600</td>
<td>1700</td>
<td>1750</td>
<td>1800</td>
<td>1850</td>
</tr>
<tr>
<td>Diameters ratio (D/d)</td>
<td>1.65</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* Depending on installation countries
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### TM series

<table>
<thead>
<tr>
<th></th>
<th>M/HT</th>
<th>HS</th>
<th>VM</th>
</tr>
</thead>
<tbody>
<tr>
<td>$D_o/D_i$</td>
<td>1.55</td>
<td>1.65</td>
<td>1.78</td>
</tr>
<tr>
<td>Channel depth (H)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free volume</td>
<td></td>
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<tr>
<td>Shear rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shear stress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence time</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Capacity</td>
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**TM “VM” - HIGH VOLUME SERIE**

<table>
<thead>
<tr>
<th>Extruder model</th>
<th>32</th>
<th>43</th>
<th>52</th>
<th>61</th>
<th>74</th>
<th>86</th>
<th>97</th>
<th>118</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max screw speed (rpm)</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1800</td>
<td>1500</td>
<td>1500</td>
<td>1200</td>
</tr>
<tr>
<td>Total torque (Nm)</td>
<td>270</td>
<td>620</td>
<td>1160</td>
<td>1860</td>
<td>3300</td>
<td>5200</td>
<td>7400</td>
<td>13000</td>
</tr>
<tr>
<td>Main motor power (kW)</td>
<td>51</td>
<td>118</td>
<td>218</td>
<td>350</td>
<td>617</td>
<td>810</td>
<td>1157</td>
<td>1650</td>
</tr>
<tr>
<td>Diameters ratio (D/d)</td>
<td>1.78</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A tailor-made product

<table>
<thead>
<tr>
<th>Extruder model</th>
<th>31</th>
<th>41</th>
<th>51</th>
<th>59</th>
<th>72</th>
<th>84</th>
<th>95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max screw speed (rpm)</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1100</td>
</tr>
<tr>
<td>Total torque (Nm) (*)</td>
<td>536</td>
<td>1230</td>
<td>2270</td>
<td>3675</td>
<td>6390</td>
<td>10200</td>
<td>14500</td>
</tr>
<tr>
<td>Barrels (I/d)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Main motor power (kW)</td>
<td>73</td>
<td>168</td>
<td>310</td>
<td>500</td>
<td>870</td>
<td>1390</td>
<td>1670</td>
</tr>
<tr>
<td>Length of the machine approx. (mm)</td>
<td>3200</td>
<td>3600</td>
<td>4900</td>
<td>5200</td>
<td>6500</td>
<td>7000</td>
<td>7500</td>
</tr>
<tr>
<td>Width of the machine approx. (mm)</td>
<td>750</td>
<td>1000</td>
<td>1150</td>
<td>1190</td>
<td>1470</td>
<td>1500</td>
<td>1550</td>
</tr>
<tr>
<td>Height of the extruder without hopper (mm)</td>
<td>1500</td>
<td>1300</td>
<td>1600</td>
<td>1700</td>
<td>1750</td>
<td>1800</td>
<td>1850</td>
</tr>
<tr>
<td>Diameters ratio (D/d)</td>
<td></td>
<td></td>
<td></td>
<td>1,65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) Depending on installation countries
### TM 20Hi-Tech Laboratory Extruder

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw diameter</td>
<td>mm 20</td>
</tr>
<tr>
<td>D/d ratio</td>
<td>1.55</td>
</tr>
<tr>
<td>Flight depth</td>
<td>Mm 3.5</td>
</tr>
<tr>
<td>Main motor power</td>
<td>7.5 / 15.0 kW</td>
</tr>
<tr>
<td>Screw speed</td>
<td>750 / 1500 rpm</td>
</tr>
<tr>
<td>Max. screw torque</td>
<td>47 Nm each screw</td>
</tr>
<tr>
<td>Dimension</td>
<td>mm 2000x850x2000</td>
</tr>
<tr>
<td>Weight</td>
<td>Kg 700</td>
</tr>
</tbody>
</table>
MARIS EXTRUDERS:
A WIDE RANGE OF CUSTOMIZATION OPTIONS

Engines: AC (air or water cooled) or DC

Barrel Heating Elements: ceramic, cast or cartridge

Control Boards: traditional or PLC based

Vacuum Pumps: open or closed circuit

Extruder mounted on wheels or platform

...plus countless adaptations and customizations according to the Customer’s requests
MARIS EXTRUDERS CAN INTERFACE UPSTREAM AND DOWNSTREAM EQUIPMENT

Cutting systems (air, water ring, underwater, strands die…)

Screen changers

Dosing systems (loss-in-weight, volumetric…)

Gear Pump
Accessories and complements

COOPERATION WITH RENOWNED BRANDS

Gala
ELIN Motoren
ITISYSTEMS
maag group
automatik
Brabender
Dynisco
Pelletizing systems
TRIA
Gefran
ABB
FILTEC
Guzzetti s.p.a.
ROTOMECE
ALFATECH
BD PLAST FILTERING SYSTEMS
BKG
GAMMA MECCANICA
G&G
Previero
NP
Sacchi
Comerio Ercole s.p.a.
Siemens
MARIS EXTRUDERS: EXCELLENCY APPLIED TO A VARIETY OF PRODUCTION SECTORS
Sectors and Applications

THERMOPLASTIC COMPOUNDS
- Polyphasic Compounds of thermoplastic elastomer with SEBS base
- Polyphasic Compounds with polyolefinic base
- HFFR Compounds
- Polymeric Alloys
- Technopolymers reinforced with glass fiber and natural fibers
Sectors and Applications

MASTERBATCHES
- Organic pigment Masterbatch
- Inorganic pigment Masterbatch and mineral fillers
- Additives Masterbatches
- White Masterbatch
- Black Masterbatch
- Pearlescent Masterbatch
ADHESIVES
- Solvent based
- Hot-melt
- Duct tape
- Labels adhesives
Sectors and Applications

RUBBER
- Vulcanizable Rubber Compounds
- Rubber recycling by means of Devulcanization
Sectors and Applications

REACTIVE EXTRUSION
- Chemical modifications to polymers

POLYMERIZATION
- Reacting monomer molecules to form polymeric chains (PU, POM)

RECYCLING PROCESSES
- Technopolymers qualified recycling (PET, PP, PE...)

Images of plastic waste and recycled material.
MARIS TECHNOLOGICAL CENTER

WHERE THE HIGHEST EXPECTATIONS TURN INTO PRACTICE
Over 1100 sq. meters completely dedicated to our Customers’ trials

4 extruders: 20 mm, 30 mm, 41 mm and 58 mm, to accommodate tests at both laboratory and industrial scale

Lines fully equipped with upstream and downstream accessories and complementary systems

Experimentation and assessment on new materials, technologies and productive applications

Cooperation with Public and Private Corporations, in Italy and abroad, for the development of research projects
THE CHARACTERIZATION LABORATORY

THE AIM OF TOTAL QUALITY
Real-time evaluation of the results of the trials

- Morphological analyses by optical reflection and transmission microscope
- Evaluation of Masterbatches pigment dispersion by MPI analysis (MARIS patented quality control)
- Evaluation of mechanical properties: Izod, Vicat-HDT, Durometer ShA and ShD, Tensile and Flexural
- Rheological properties of the materials by rotational viscometer, capillary rheometer and MFI
Our focus, our advantages

- Dedicated analyses and tailor-made solutions
- Project development in cooperation with the Customer
- Constant dialogue for the optimization of the productive processes
- Support and training
- Technical assistance all over the world. MARIS takes care of supplying a widespread after-sales service having at disposal an experienced staff of technicians, ready to intervene everywhere in the world, in order to assist the Customers.
Our focus, our advantages

- More than 50 years of experience in the production of co-rotating twin-screw extruders
- Fully owned know-how
- Assistance and spare parts, for current and older versions
- Total commitment to ensure superior quality products
- Tailor-made solutions
- Constant cooperation, support through time

At the center, the customer!
You formulate, our extruders create
Thank you very much for your attention!

F.Lli Maris S.p.A.
Rosta (TO) Italy

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