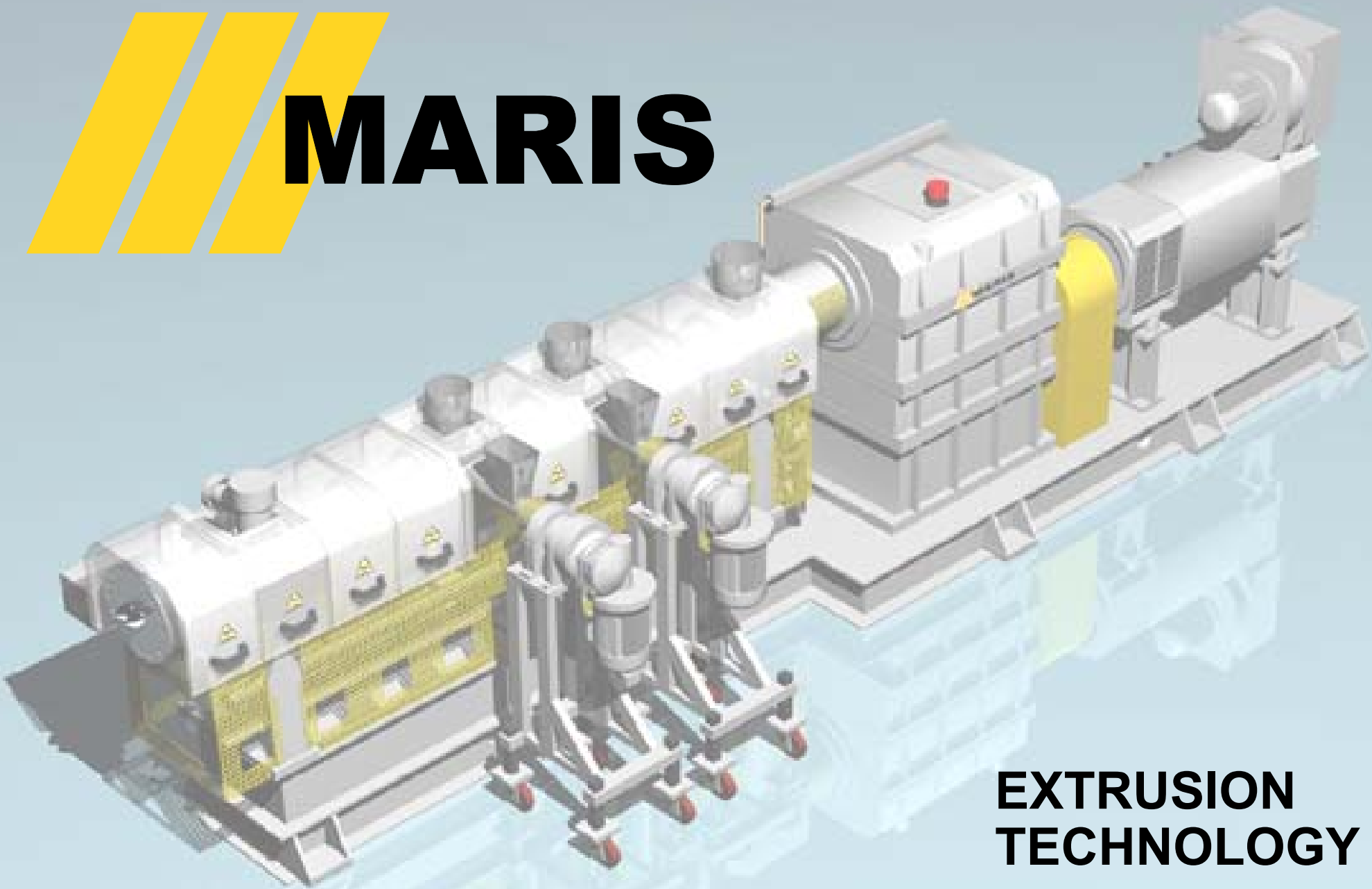
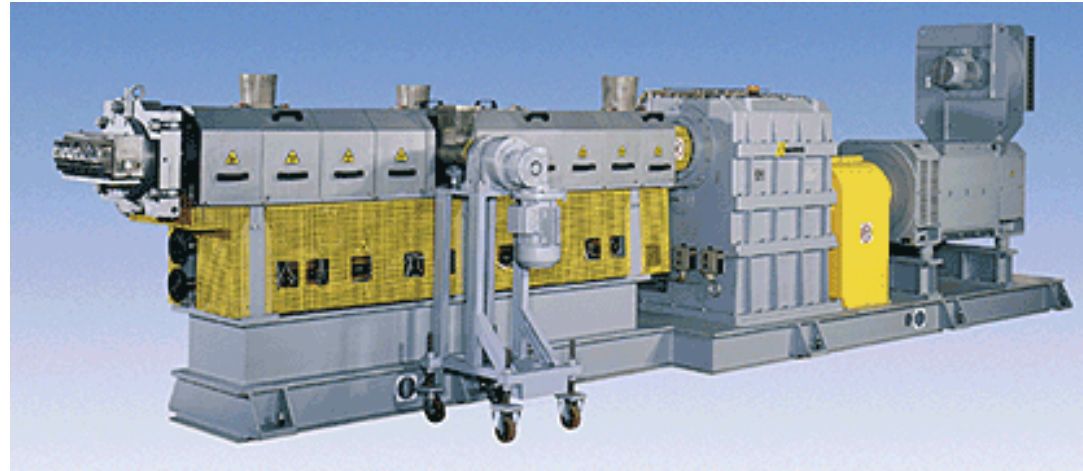




MARIS



**EXTRUSION
TECHNOLOGY**



MARIS started 1962 as a manufacturer of extruders and dies for profile production

In the 70's concentration on the manufacturing of twin screw extruders

About 100 employees at the headquarter and several agents world wide

Manufacturing all machine parts by themselves; electrical, mechanical parts, software, etc

Market-leader on the Italian market and expanding on international markets

EMPLOYEES: approx. 100

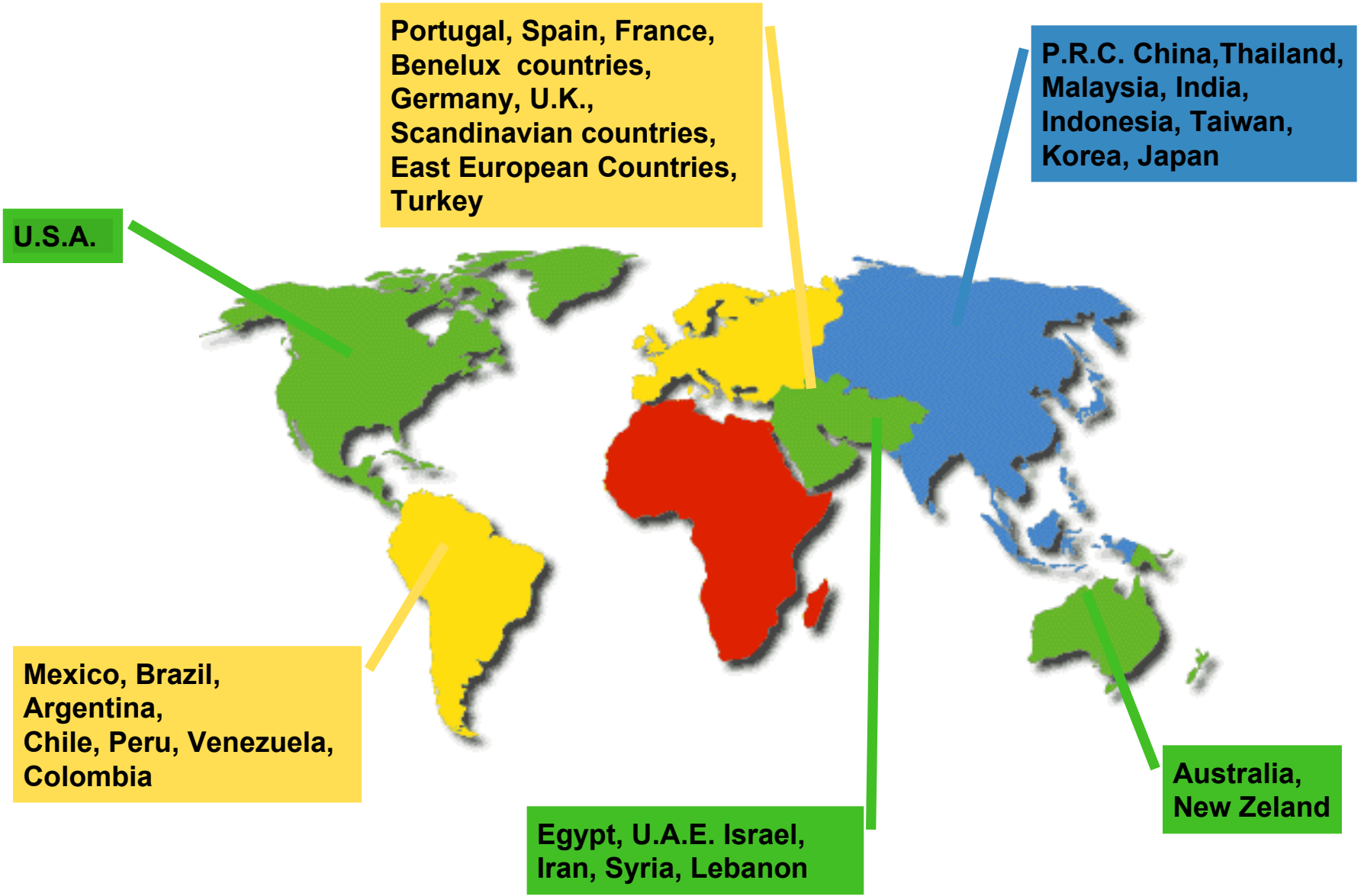
MAIN PLANT: 8.000 square meter / 86.000 square feet

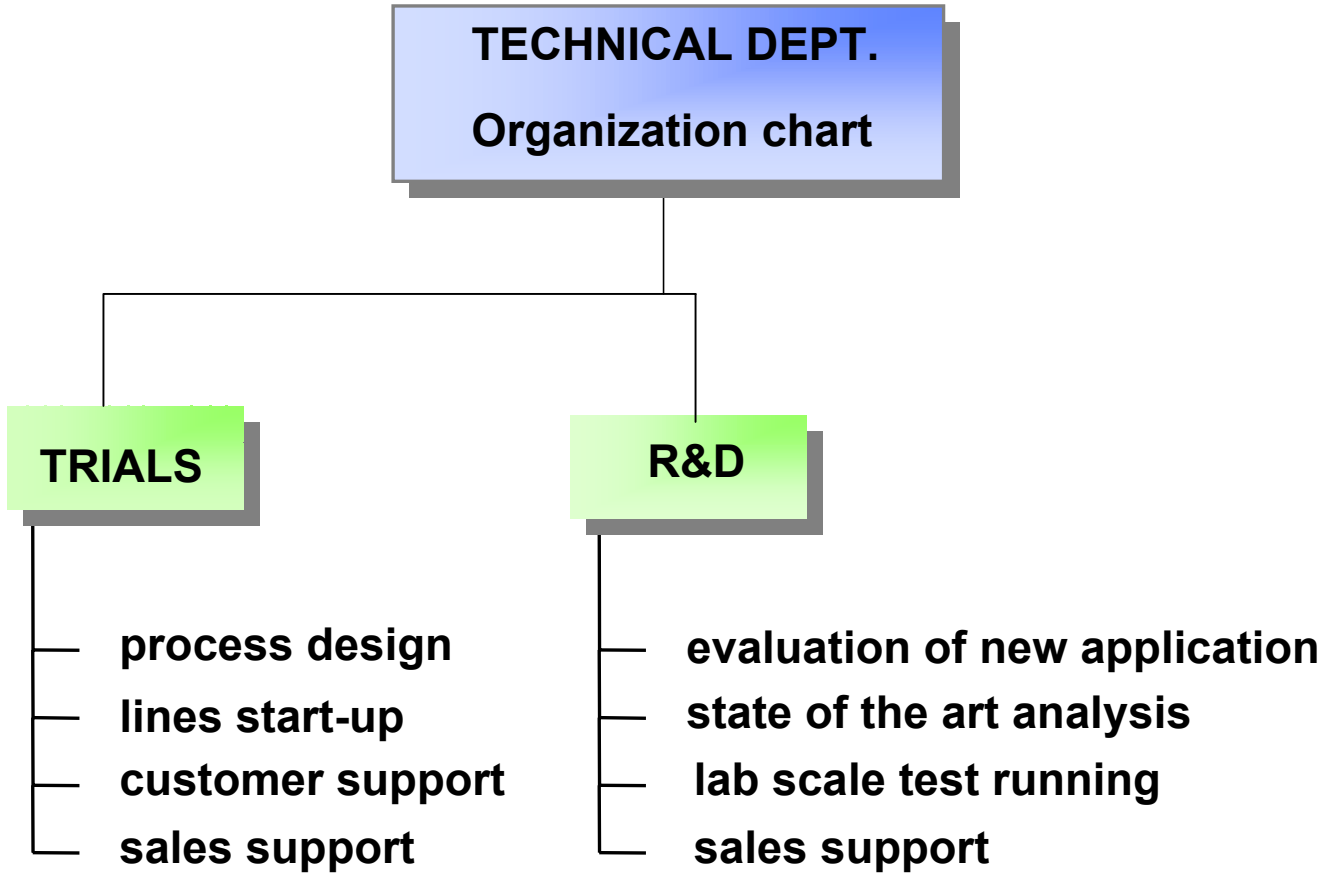
MANUFACTURING CAPACITY: 50 extruders/yrs

ACTIVITIES:

- Gear box equipments machining (gear cutters, grinders)
- Barrels manufacturing
- Screw elements production (automatic work centers),
- Software customizing
- Assembling
- In house testing workshop.

COMPOUNDING
TECHNOLOGY





LABORATORY EXTRUDERS AVAILABILITY

TM 58 HT
High torque, up to 800 rpm

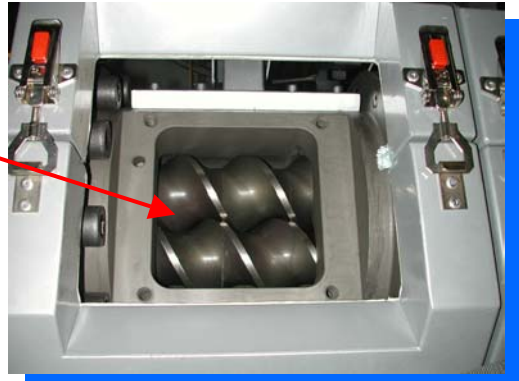
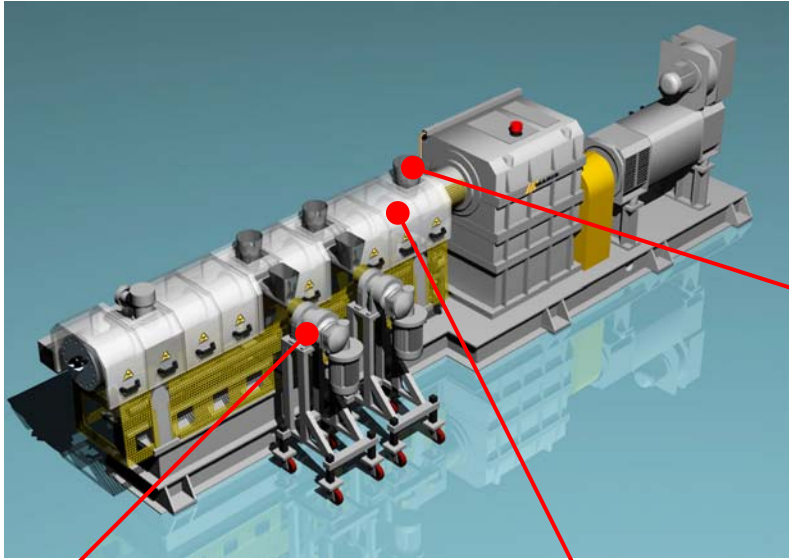
TM 41 HS
High torque, up to 1200 rpm

TM 43 VM
High volume, up to 1800 rpm

TM 30 HS
High torque, up to 1200 rpm

Extruder features

COMPOUNDING
TECHNOLOGY



Closely intermeshing screws



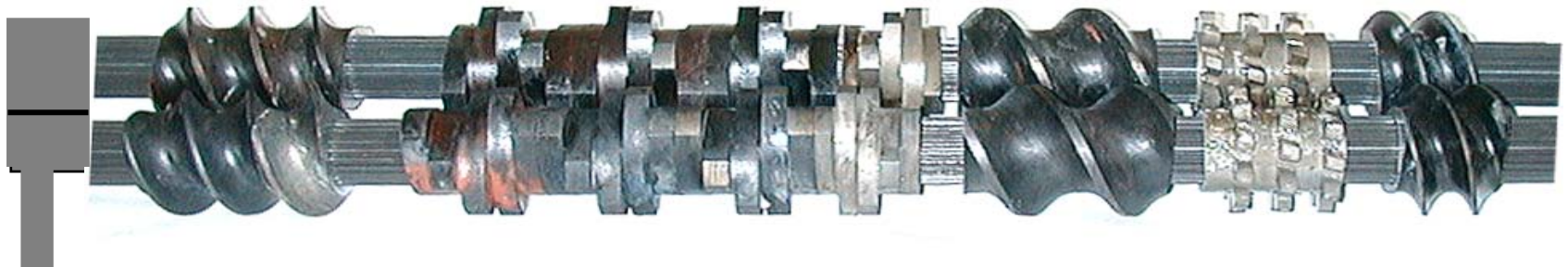
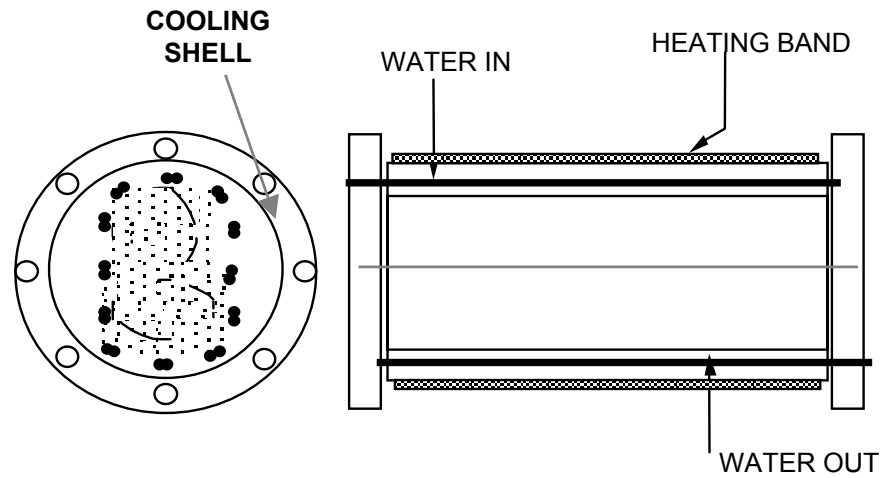
Adjustable feeders

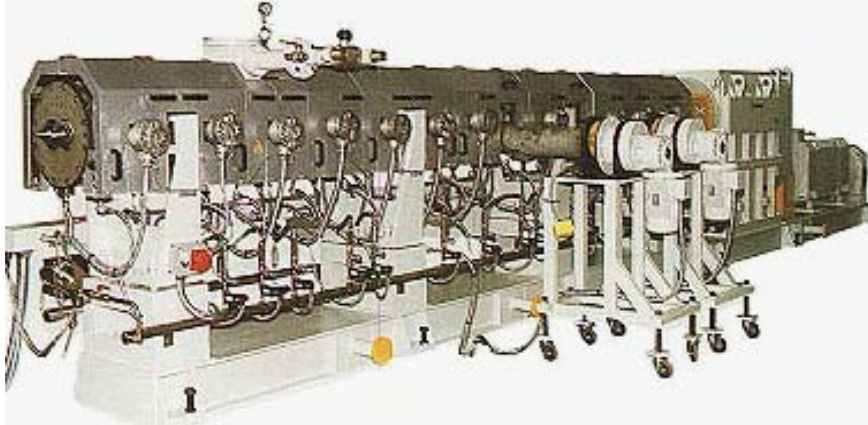


Modular construction

Barrel & screws

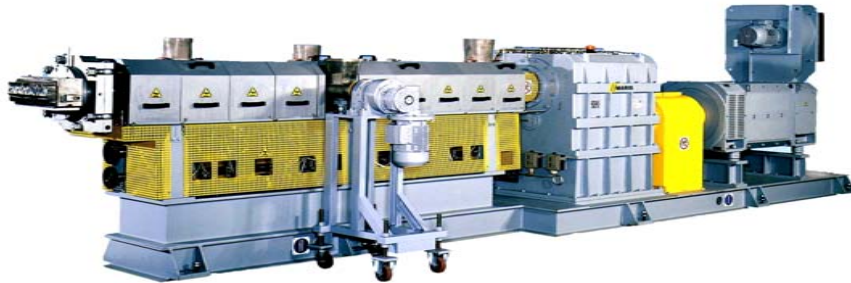
BARREL



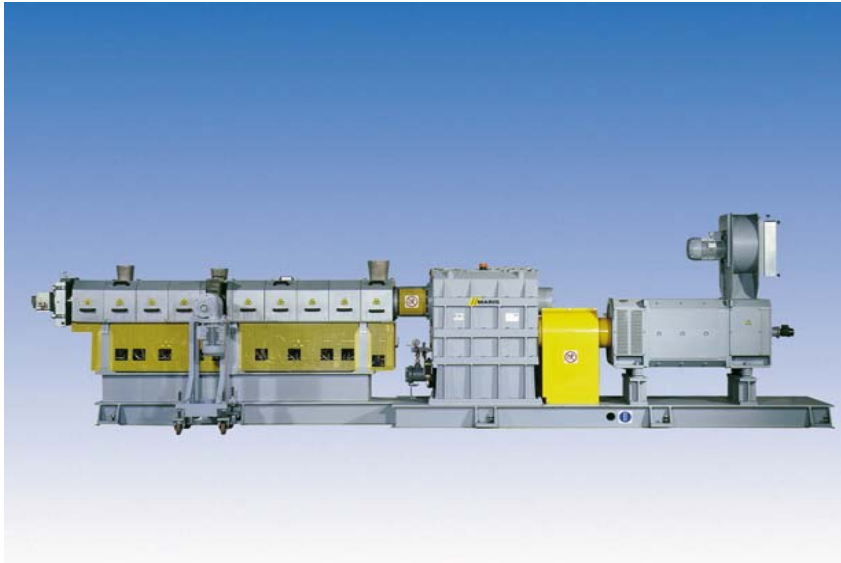


TM "M" MEDIUM TORQUE SERIES										
Extruder		30 MW	40 MW	58 MW	70 MW	92 MW	112 MW	133 MW	150 MW	177 MW
Max screw speed	rpm	600	600	600	600	600	600	500	300	300
Total torque	Nm	200	600	1900	3200	600	10600	20600	31800	49600
Main motor power	kW	14	38	108	200	480	660	1080	1000	1560
D/d Ratio	1,55									

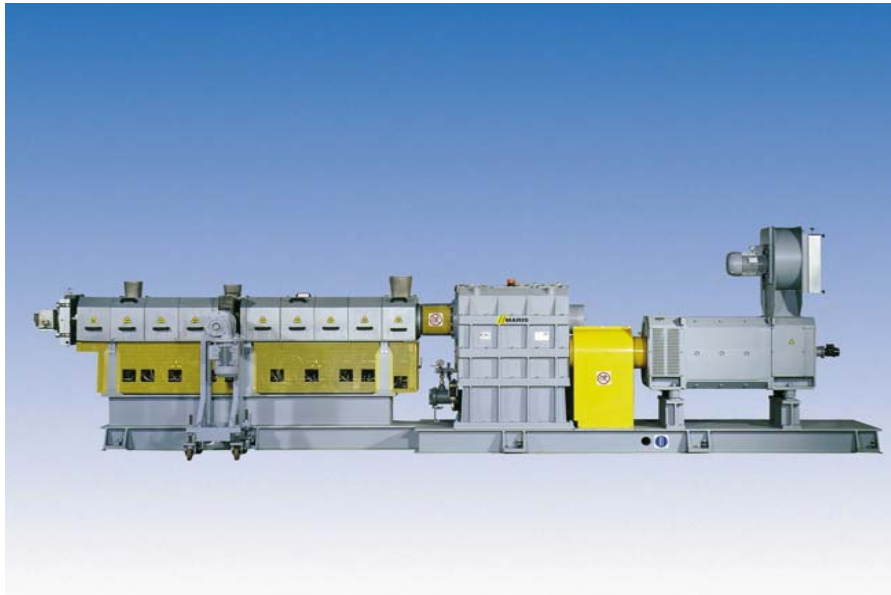
NOTE: Some of the above models can also be supplied with 1200 rpm



TM "HT" HIGH TORQUE SERIES									
Extruder		30 HT	40 HT	50 HT	58 HT	70 HT	80 HT	92 HT	112 HT
Max screw speed	rpm	1300	1300	1300	1300	1300	1300	1100	900
Total torque	Nm	220	810	1500	2070	4180	6390	9400	16700
Main motor power	kW	45	110	204	320	570	870	1080	1570
D/d ratio	1,55								

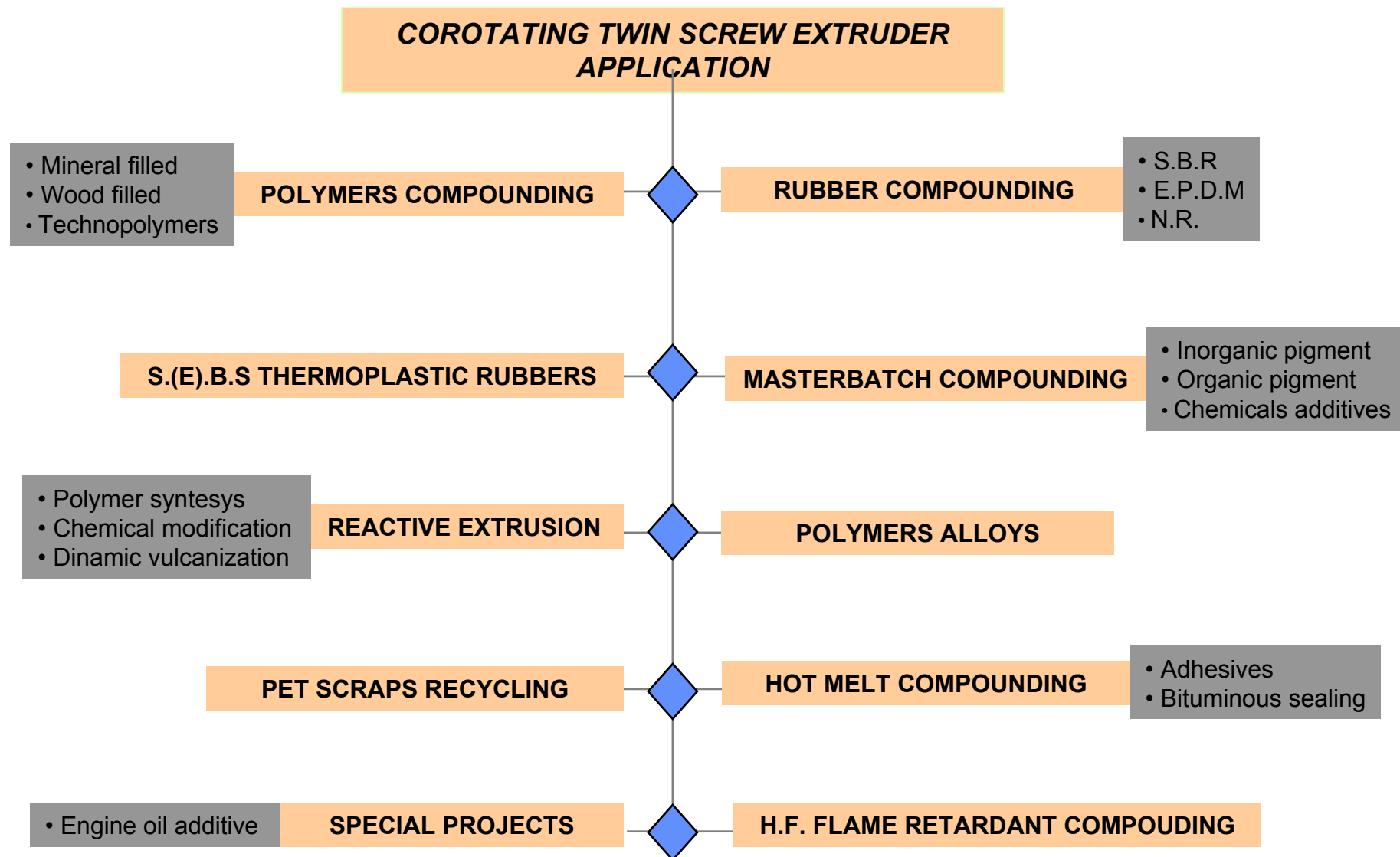


TM "HS" HIGH TORQUE SERIES								
Extruder		30 HS	41 HS	51 HS	59 HS	72 HS	84 HS	95 HS
Max screw speed	rpm	1200	1200	1200	1200	1200	1200	1100
Total torque	Nm	420	870	1790	2880	5100	8040	11470
Main motor power	kW	53	122	225	362	640	1010	1320
D/d ratio	1,65							



TM "VM" HIGH VOLUME SERIES								
Extruder		32 VM	43 VM	52 VM	61 VM	74 VM	86 VM	97 VM
Max screw speed	rpm	1800	1800	1800	1800	1800	1500	1500
Total torque	Nm	270	620	1160	1860	3300	5200	7400
Main motor power	kW	51	118	218	350	617	810	1157
D/d ratio	1,78							

COMPOUNDING
TECHNOLOGY



CONSOLIDATED TECHNOLOGY

COMPOUNDING

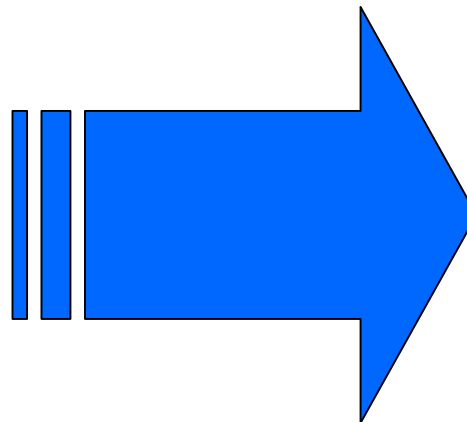
- mineral powder
- techno-polymers
- flame retardant
- polymer alloys
- pigments & additives masterbatch
- thermoplastics rubber
- hot melt & solvent adhesives
- wood powder
- pet recycling
- thermoplastics starches & blends

REACTIVE EXTRUSION

- trioxane continuous polymerization
grafted polyolefines
- polyaddition polyol and isocyanate
- PET chemical re-grading

CONTINUOUS RUBBER MIXING

- compound for technical articles (EPDM base)
- Tires compound (SBR base)



NEW DEVELOPMENTS

EXTRUDERS

- High volume series
- Reactors 10,000 / 15,000 tons/year
- New screw/barrel design

PROCESSES

- Improvement in continuous rubber mixing
- Low energy screw element geometry
- nano-compounds

CONSIDERATIONS FOR PROCESS CHOICE

- **End user requirement** define properties of final compound:
 - aspect
 - physical feature
 - stresses under working condition
 - working life

- **Formulation setting** fine tuning for modification of the raw polymer to meet specific properties:
 - polymer or polymers features
 - polymer modifiers
 - etherophasics addition
 - cost considerations

- **Machineries choice** definition of the manufacturing method, able to grant best performances:
 - discontinuous process
 - Bambury
 - two roll mill
 - z-blade mixer

 - continuous process
 - single screw extruder
 - counter-rotating twin screw extruder
 - co-rotating twin screw extruder

TWIN SCREW EXTRUDER CAPABILITY

Compared to other transformation machines, the co-rotating twin screw extruder (CTSE) can be considered as the last developed.

CTSE has been subjected to a fast development and growing for what concern mechanical features and process development: in less than 20 years, both power load and screws speed have been enhanced respectively more than 3 and 10 times.

The main features, almost unique to find in the same machine, are the following.

- very high conveying ability, both for powders and granules
- self wiping ability also in case of sticky materials as glues or resins
- very high screw speed for high production rates
- very high shear flow and elongation flow for effective dispersive mixing
- unique flexibility in machine configuration
- process reliability
- very wide and growing application range

LATEST GENERATION OF COMPOUNDING MACHINES PROVIDE:

- **HIGH SPEED**
- **HIGH TORQUE AVAILABILITY**
- **INCREASED CHANNEL DEPTH**

THESE GEOMETRICAL, MECHANICAL, AND ENERGETIC IMPROVEMENTS ALLOWS US TO SUCCESSFULLY FACE NEW APPLICATIONS WHICH REQUIRE AN EXCELLENT ABILITY IN :

DISPERSION PERFORMANCES,

TEMPERATURE CONTROL

PROCESS FLEXIBILITY.