



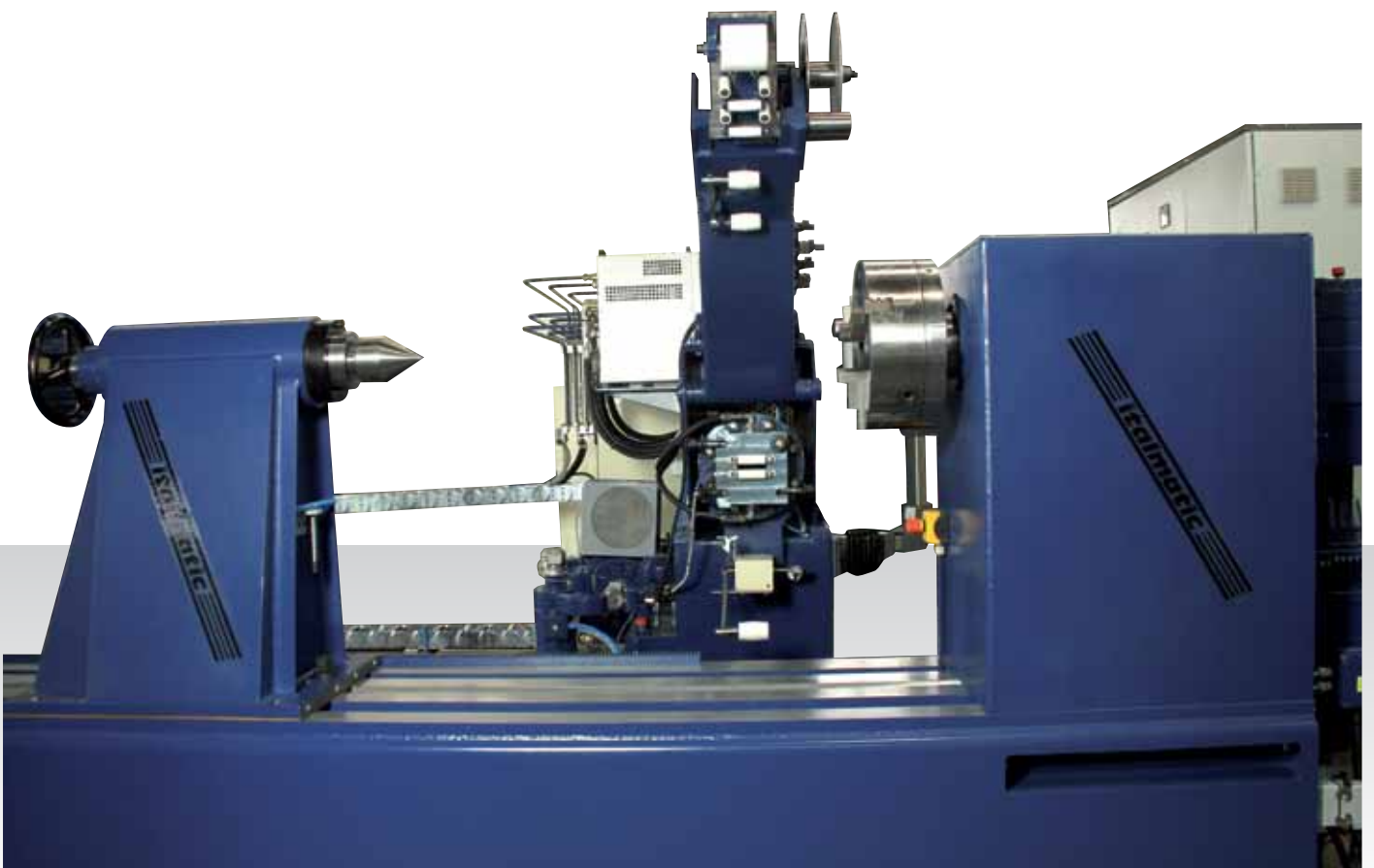
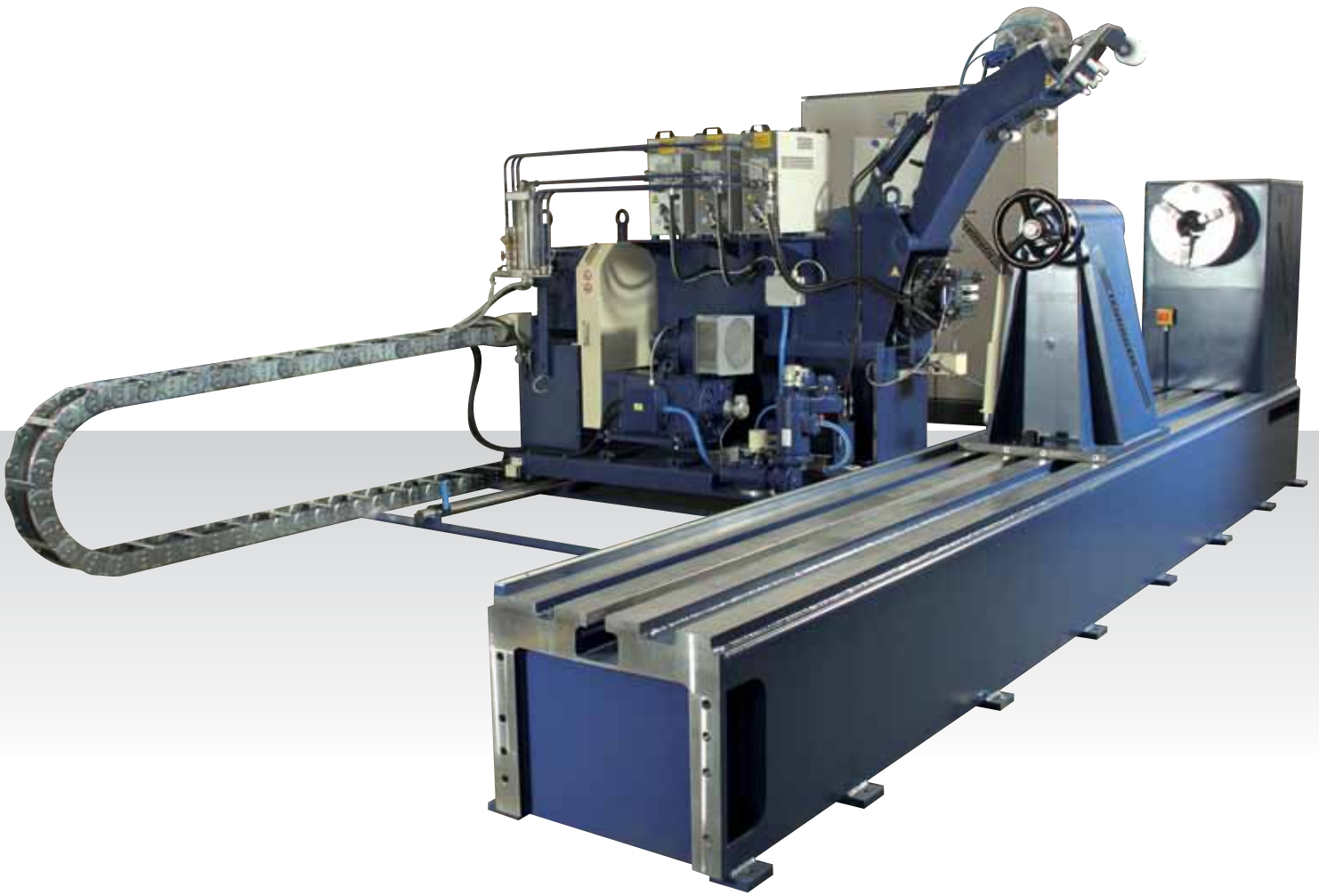
**italmatic**<sup>®</sup>

# MRC

## 50-90-120



IMPIANTO ESTRUSORE PER RIVESTIMENTO CILINDRI  
EXTRUDER PLANT FOR ROLLERS RUBBERIZING  
INSTALLATION EXTRUDEUSE POUR HABILLAGES EN CAOUTCHOUC DES CYLINDRES





## Technical details and construction features

### 1 The machine consists of the following parts:

- 1.1 **LATHE BED** rigged and fixed to the floor; the self-centering group and the tailstock group are positioned on it; the tailstock group is mobile by means of handle with gear and rack and automatically by means of motorized tailstock (optional). Between these 2 groups the cylinder to be rubberized is centered and blocked.
- 1.2 Sliding **CHASSIS** on two steel rails, on which 4 wheels having strong bearings are moving. A reducer with parallel axles, the hydraulic power station, the motor controlling the extrusion group (consisting of cylinder, screw, head), the group controlling the translation and the potentiometer group (which according to the high or low position of the balancing axle accelerates or reduces the extrusion speed) are mounted on it.
- 1.3 **FRAME** fixed on the chassis; the following groups are mounted on it:
  - Thermoregulators
  - Building group
  - Rubber feeding group with corresponding roller
  - Bending group

All of the above listed parts are built in iron section bar, with flat and bent plate, everything electro-welded and pre-arranged for the following mechanical finishing workings, which are executed on numerical control machines, suitable to the overall dimensions of the machine as regards the area of work.

### 2 The standard plant to which we make reference has the following general features:

- Cylinder minimum diameter 30 mm
  - Cylinder maximum diameter:
    - MRC 50: 500 mm
    - MRC 90: 1000 mm (on request up to 1500/2000 mm, previous modification)
    - MRC 120: 1000 mm (on request up to 1500/2000 mm, previous modification)
  - Cylinder minimum length 100 mm
  - Cylinder maximum length:
    - MRC 50: 3000 mm
    - MRC 90: 6000 mm
    - MRC 120: 6000 mm
    - (on request any other length, previous modification)
- 2.1 The thermoregulation group consists of:
    - MRC 50: n° 3 water thermoregulators and n° 1 digital thermoregulator:
      - n° 2 thermoregulators feed the liners forming an interspace between them and the extruder roller and n° 1 thermoregulator feeding an interspace obtained in the extrusion head;
      - n° 1 electric heating elements and a thermocouple located in the door of the extrusion head, controlled by a suitable digital thermoregulator positioned on the control board.

MRC 90: n° 3 water thermoregulators and n° 1 digital thermoregulator:

- n° 2 thermoregulators feed the liners forming an interspace between them and the extruder roller and n° 1 thermoregulator feeding an interspace obtained in the extrusion head;
- n° 2 electric heating elements and a thermocouple located in the door of the extrusion head, controlled by a suitable digital thermoregulator positioned on the control board.

MRC 120: n° 4 water thermoregulators and n° 1 digital thermoregulator:

- n° 3 thermoregulators feed the liners forming an interspace between them and the extruder roller and n° 1 thermoregulator feeding an interspace obtained in the extrusion head;
- n° 2 electric heating elements and a thermocouple located in the door of the extrusion head, controlled by a suitable digital thermoregulator positioned on the control board.

### 2.2 Range of the compounds that can be used:

- Rubber compound for cold feeding: 25 – 70 Shore A
- Rubber compound for pre-heated feeding: 70-90 Shore A

These data depend on the type and on the viscosity of the compound used.

### 3 Connections to be pre-arranged:

#### 3.1 Pneumatic: Connection ¼" Gas

Air consumption:

MRC 50: 30 lt/h

MRC 90: 50 lt/h

MRC 120: 50 lt/h

Working pressure: 6 Bar

#### 3.2 Hydric: Water feeding ½"

Screened rubber pipe inside diameter 15 mm

Water release 1"

Emergency release: screened rubber pipe inside diameter 15 mm

Screw release: rubber pipe inside diameter 15 mm

#### 3.3 Electric: Feeding tension: 400 V / 50 Hz / 3 phases

Total absorption:

MRC 50: 160 A

MRC 90: 210 A

MRC 120: 330 A

Section of the feeding cable:

MRC 50: 50 mm<sup>2</sup>

MRC 90: 90 mm<sup>2</sup>

MRC 120: 120 mm<sup>2</sup>

#### 3.4 Installed power for single users:

3.4.1 D.c. motor of the extruder group mounted on the carrier:

MRC 50: 29.9 Kw

MRC 90: 59.7 Kw

MRC 120: 102 Kw

# Extruder plant for rollers rubberizing MRC 50/90/120

## Technical details and construction features



3.4.2 D.c. motor of the chuck mounted on the lathe bed:

- MRC 50: 6.45 Kw
- MRC 90: 10.14 Kw
- MRC 120: 10.14 Kw

3.4.3 D.c. motor for carrier translation:

- MRC 50: 0.736 Kw
- MRC 90: 1.32 Kw
- MRC 120: 1.32 Kw

3.4.4 A.c. motor for hydraulic power station 0.75 Kw

3.4.5 MRC 50: N° 3 thermoregulators 19.5 Kw  
MRC 90: N° 3 thermoregulators 19.5 Kw  
MRC 120: N° 4 thermoregulators 26 Kw

3.4.6 Thermo-resistances

- MRC 50: 0.25 Kw
- MRC 90: 0.50 Kw
- MRC 120: 0.50 Kw

Total absorbed power:

- MRC 50: 60 Kw
- MRC 90: 90 Kw
- MRC 120: 150 Kw

3.5 Three d.c. motors have the following features:

- Regulation with constant torque
- S1 continuous service and over-temperatures (C.E.I. rules)
- Insulation in class F
- Ambient temperature not higher than 40°C
- Altitude not higher than 1000 m. on the sea level
- 3 phases bridge, completely controlled
- Forced ventilation through motorfan
- Speedometer dynamo

3.6. Electric equipment:

- N° 3 digital, static converters, suitable to run d.c. motors; equipment enclosed in a cabinet on the floor, separated from the machine.
- Control panel located in a position being comfortable for the operator with pushbuttons of start/stop, emergency, potentiometers, screw speed regulators, chuck and carrier.

3.7 Weights:

- Extruder:
  - MRC 50: 2500 Kg
  - MRC 90: 4500 Kg
  - MRC 120: 5000 Kg
- Electric board: 500 Kg
- Complete lathe bed:
  - MRC 50: 1000 Kg
  - MRC 90: 3000 Kg
  - MRC 120: 4500 Kg
- Total weight:
  - MRC 50: 4000 Kg
  - MRC 90: 8000 Kg
  - MRC 120: 10.000 Kg

3.8 Noise:

The value of air noise emitted is lower than 70 dB

## 4 Integration of other technical data with the description of the most significant groups of which MRC 50/90/120 extruders consist.

4.1 Use: rubberizing of cylinders, tangs and sidewalls (only MRC 90/120).

4.2 Material to be handled: rubber compound or silicone (by suitable screw).

4.3 Feeding: by cold or pre-heated strip.

4.4 Production:

- MRC 50: 100-220 kg/h.
- MRC 90: 150-300 Kg/h.
- MRC 120: 150-350 Kg/h.

Details of production capacities variable according to viscosity and sensitivity to the temperature of the material to be extruded and to the section of the product extruded. Dimensions of band extruded from the head:

- Min. thickness 2 mm
- Max. thickness 7 mm
- Min. width 30 mm



Max. width :  
MRC 50: 70 mm  
MRC 90: 70 mm  
MRC 120: 80 mm

## 5 Extruder group:

Consisting of an extrusion screw of:

MRC 50: diameter 50 mm  
MRC 90: diameter 90 mm  
MRC 120: diameter 120 mm

having its seat in a support and guide cylinder. It assures the progress of the rubber up to inside the extrusion head, from which it will come out with a band corresponding to the sizes of a suitable template.

The screw is made in special steel, drilled and equipped with rotary joint for cooling, it suffers the treatment of nitriding, grinding and polishing.

It has its seat by one side in the hollow shaft of a reducer, by the other one in the extrusion head.

The screw reaches a max. speed of:

MRC 50: 85 r.p.m.  
MRC 90: 49 r.p.m.  
MRC 120: 46 r.p.m.

It has a ratio L/D corresponding to 17/1.

Under the extruding cylinder there is an adjustable brass scraper, in the aim to keep the screw diameter clean in that point (only on MRC 90/120).

The extruder rotation occurs by means of:

MRC 50: 4 V belts  
MRC 90: 5 V belts  
MRC 120: 5 V belts

stretched between the d.c. motor and the inlet shaft of the reducer with parallel axles.

### 5.1 Chuck rotation:

MRC 50:

It occurs by means of a d.c. motor connected to a reducer by V belts.

Max. speed of the chuck 100 r.p.m.

MRC 90:

it occurs by means of an elastic joint connecting the reducer to the self-centering unit. The reducer axle is at 90° compared to the self-centering unit.

Max. speed of the chuck 100 r.p.m.

MRC 120:

it occurs by means of an elastic joint connecting the reducer to the self-centering unit. The reducer axle is at 90° compared to the self-centering unit.

Max. speed of the chuck 100 r.p.m.

### 5.2 Carrier translation:

It is carried out by a d.c. motor with reducer, through a pinion keyed on a rack screwed on rails supports; when the pinion rotates it moves the carrier at the max. speed of:

MRC 50: 40 mm/sec.  
MRC 90: 53 mm/sec.  
MRC 120: 53 mm/sec.

### 5.3 Extrusion head:

screwed by means of stud bolts and high resistance nuts, equipped with a door in which:

MRC 50: 1 thermoresistance  
MRC 90: 2 thermoresistances  
MRC 120: 2 thermoresistances

have their seat, controlled by a thermocouple and a slot where to position the template You wish to use. Inside the head, a filter, an extrusion mouth and a net supporting ring are mounted.

The door is connected to the head by means of four tie rods with eyelet and corresponding high resistance nuts. By means of an inside circuit, consisting of a liner and the central body, the head is heated or cooled by the water passage run by thermoregulators.

## 6 Thermoregulation plant:

It consists of:

MRC 50: 3 thermoregulators  
MRC 90: 3 thermoregulators  
MRC 120: 4 thermoregulators  
developing a max. temperature of 90°C.

The fluid employed is water, each pump is of 0,5 Kw, the heating capacity is 6 Kw, the cooling capacity is 32 Kw at 80°C by water at 29°C. Pump capacity 3.3 m<sup>3</sup>/h.

## 7 Speed reducer with parallel axles:

7.1 Shafts and gears with helical teeth built in special steel, they are grinded on the involute profile after cementation, hardening and final temper.

7.2 The bearings are all of type with conical rollers or swinging rolls. The thrust bearing with rollers, oversized, is mounted on the reducer chuck which is in special grinded steel. It releases the thrust it receives from the extrusion effort on the frame of the reducer, which is in cast iron and was modified in this aim personalizing it to our requirements.

7.3 Lubrication in oil bath. The thrust bearing is lubricated independently by means of a pump.

## 8 Feeding group:

8.1 Fixed to the extrusion cylinder by high resistance screws it is built in steel, it is a support to the roller on which a cast iron scraper with adjustable position is working, in the aim, working tangentially, to keep the outside diameter of the roller clean in correspondence of the feeding opening.

8.2 The feeding roller is supported by two roller bearings inserted in the shoulders of the feeding body.

The roller is manufactured in treated and grinded steel.

The diameter, where a keyway is obtained, is a centering for a gear, which couples with the teeth obtained on the extrusion screw; it transmits the rotation movement to the roller.

8.3 The feeding protections consist of a frame prepared with iron profiled and of the assembling of seven idle rollers acting as safety in forbidding the operator to put His hands in dangerous areas. These rollers help in the insertion of the material to be extruded.

# Extruder plant for rollers rubberizing MRC 50/90/120

## 8.4 Building group:

consisting of a primary arm having its fulcrum on a hydraulic cylinder and of a secondary arm having its fulcrum on a pneumatic cylinder; the combination of these two movements has the roller, which has to press the rubber on the cylinder to be rubberized, reaching an optimal position. On the secondary arm, adjustable guiding rollers are applied, suitable for the transport of the strip from the extruder to the cylinder.

The control equipment was studied to assure the continuous coating of the cylinder in automatic cycle, equipping the plant of a precision regulator allowing to keep the pressure constant on the increase of the cylinder diameter.

## 8.5 Bending group:

It is positioned on the right side of the primary arm; it is equipped with a driving pin with two alu discs guiding the coil wrapping the strip by which bending the cylinder to be cured. In the inside part of the primary arm (centred with the pin being the rotation fulcrum), there is a metal disc on which a pneumatic brake operates, inhibiting or increasing the possibility for the coil to rotate. A rollers system assures a good passage of the strip between coil and cylinder to be bended.

The machine is equipped finely painted and complete with accessories of use. Unless there is a different written request, the machine is painted in standard Italmatic colour.

## 9 Eventual optional requests:

9.1 Sizes of the rollers to be rubberized: On request possibility to rubberize cylinders of diameter up to 1500/2000 mm or to rubberize cylinders having a max. length of 12000 mm (only for MRC90/120).

9.2 Motorized tailstock: It is possible, in particular when the tailstock becomes heavy therefore difficult to be moved, to order a motorized tailstock having a spring disconnection in case of hit against an eventual obstacle (Only for MRC 90/120).

9.3 Articulated arm to rubberize cylinders sidewalls: Modifying the primary and secondary arm, it is possible to rubberize the sidewalls of the cylinders, applying arms of new conception, for cylinders up to a max. diameter of 600 mm (Only for MRC 90/120).

9.4 Steady rest to support the cylinder: It supports the cylinder to be rubberized when it has a considerable weight and length (Only for MRC 90/120).

9.5 Conditioning plant for the electric board: Possibility of installation of a conditioner in the electric board due to problems of environmental temperature (All models).

9.6 Tropicalized d.c. motors: for tropical climates (All models).

9.7 Special voltages: Supply of motors with feeding tensions different from 400/3/50 using autotransformers (All models).

## 9.8 Computer: (Only for MRC90/120)

Possibility to enjoy the advantages of a SIMATIC PLC S7 SIEMENS brand. Connected to it and mounted on the control board there is the OP77-B display SIEMENS brand. This equipment is used to display all present working parameters, to select the recipe in use, to modify the working data and, eventually, to memorize new recipes. On page 2 the operator can insert manually the production parameters listed hereby :

- Number of still turns: possibility to overlap compound turns to the cylinders' ends.

- Number of head turns: it optimizes the application of compounds from the end to the remaining part of the cylinder.

- Number of coats: number of passes on the cylinder.

- Strip overlapping at the first coat (mm): cycle executed on purpose by the Plc to optimize the first pass of coating on the cylinder.

- Strip overlapping after the first coat (mm)

- Length of the cylinder (mm)

- Width of the rubber strip (mm)

The operator carries out all tests until finding the best condition of the strip, then he establishes the extrusion speed. This parameter will adjust, by means of PLC system, all of the speeds being in connection with the cylinder rubberizing going on (carrier, chuck). The operator can realize the correctness of the speed selected looking at the potentiometer rod which has to be in the middle of its angular movement.

The more the types of cylinders to be rubberized are the same, the more the advantages of having a machine run by a PLC are evident.

N.B. Having the PLC, the use in manual mode of the machine is not precluded.

9.9 Extrusion of silicone compounds: In case silicone has to be extruded, it is necessary equipping the machine with a different screw conceived on purpose in this aim.

(Only for MRC90/120)

## 10 What follows is excluded from the supply:

- Electric connections and cables from the net of the Customer to the terminal boards and control boards on the machine board.

- Lubricants.

- Connections and releases of water/compressed air from the net of the Customer to the uses on the machine.

