Maris, for the purpose of a continuous research and development of technologically advanced solutions, have further strengthened their trials department, fitting out a new and autonomous Technological Center of more than thousand square meters.

**Maris Technological Center** carries out innovative and improving analysis of each production process which involves co-rotating twin-screw extruders. The Center makes use of a highly qualified technical staff, who are in a position to solve both the internal and on-site problems, such as start-up, ordinary and extraordinary assistance, Customers visits supporting the Commercial Department. Among the primary activities of the Technological Center are those for the processes optimisation in the study of new productive applications for our machines.

The Center collaborates with Public and Private Corporations, national and foreign, for the development of important research projects among which – in addition to those connected to the compounding of plastic materials - those for the use of co-rotating twin screw extruders for the production of vulcanising rubber, for the development of a rubber de-vulcanising process, for the continuous production of solvent base adhesive, and for polymerisation processes.

Thanks to the creativity, the know-how and the technicians working in the two parts of the Center, the **Technological Laboratory** and the **Materials Characterization Laboratory**, we are ready to take up any additional challenge to go beyond new technological barriers.

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Maris, in un’ottica di continua ricerca e sviluppo di soluzioni tecnologicamente all’avanguardia, ha ulteriormente potentizzato la sua unità di prova allentando un Centro Tecnologico nuovo e autonomo di oltre mille metri quadrati.

**Il Maris Technological Center** effettua analisi innovative e migliorative di ogni processo produttivo che impiega estrusori bivite corotanti. Il Centro si avvale di uno staff tecnico altamente qualificato capace di risolvere sia le problematiche interne sia quelle sul campo quali start-up, assistenza ordinaria e straordinaria, visite dei Clienti in supporto alla parte commerciale. Tra le attività primarie del Technological Center ci sono quelle per l’ottimizzazione dei processi nello studio di nuove applicazioni produttive per le nostre macchine.

Il Centro collabora con Enti pubblici e privati, nazionali ed esteri, nello sviluppo di importanti progetti di ricerca tra i quali – oltre a quelli legati alla compounding delle materie plastiche – quelli per l’impiego di estrusori bivite corotanti nella produzione di mescole di gomma vulcanizzabile, per lo sviluppo di un processo di devulcanizzazione della gomma, per la produzione in continuo di adesivo base solvente, come anche per processi di polimerizzazione.

Grazie alla creatività, al know-how e ai tecnici che lavorano nei due enti del Centro, il Laboratorio Tecnologico e il Laboratorio di Caratterizzazione dei Materiali, siamo pronti a raccogliere ogni altra sfida per superare nuove barriere tecnologiche.
The technological laboratory

In an always more competitive world having high technological standards, our Customers need to develop new materials and at the same time to rationalize the production equipment. In this market situation inside the Technological Laboratory it is possible to carry out trials – starting from a merely laboratory scale up to a typical production line – aimed to increase the production, to reduce the costs and optimise the formulations. All the above is realized thanks to four extrusion lines installed permanently inside the Technological Center. It is possible to join a lot of ancillary devices to such lines in order to simulate each production equipment type. Putting ourselves into the same productive conditions of the Customers, it is possible to understand which are the limits of their processes helping them to improve the same.

Trials on laboratory scale

The Technological Center has at it’s disposal two laboratory extrusion lines: a TM20 High-Tech and a flexible TM30 at high torque which can be configured both with D/d 1,55 and D/d 1,65. Besides the validation of existing processes, they allow to verify the possibility of new applications for the co-rotating twin screw extruders in processes for which, at the time being, they are not yet employed. Maris extruders, whose reactive zone can be totally personalized depending on different needs, are machines which can be adapted to different process types. For this reason the Technological Center mainly dedicates these machines to the applied research.

Il laboratorio tecnologico

In un mondo sempre più competitivo e con alti standard tecnologici, la nostra Clientela ha la necessità di sviluppare nuovi materiali e al tempo stesso di razionalizzare gli impianti produttivi. In quest’ottica di mercato all’interno del Laboratorio Tecnologico è possibile effettuare delle prove – da una scala puramente di laboratorio sino a una tipica da linea di produzione – rivolte ad aumentare la produzione, abbattere i costi e ottimizzare le formulazioni. Tutto ciò è realizzato grazie a quattro linee di estrusione installate permanentemente all’interno del Centro Tecnologico. A tali linee è possibile accoppiare molti tipi di attrezzature accessorie per simulare ogni tipo di impianto produttivo. Poniendosi nelle stesse condizioni productive dei Clienti è possibile capire quali siano i limiti dei loro processi e aiutarli a migliorarli.

Prove su scala laboratorio

Il Centro Tecnologico dispone di due linee di estrusione da laboratorio: una TM20 High-Tech e una versatile TM30 ad alta coppia che può essere configurata sia con un D/d 1,55 che un D/d 1,65. Oltre alla validazione di processi esistenti, esse permettono di verificare la possibilità di nuove applicazioni degli estrusori bivite costanti in processi per i quali, allo stato attuale, non sono ancora impiegati. Gli estrusori Maris, avendo la zona reattiva completamente personalizzabile in base ad ogni necessità, sono macchine adattabili a diversi tipi di processi. Per questa ragione il Centro Tecnologico dedica principalmente questi macchinari alla ricerca applicata.
Trials on industrial scale

In case it would be necessary to carry out trials on production scale, the Technological Laboratory puts at disposal a TM 58 HT (D/d 1,55), a TM 41 HS (D/d 1,65) and a TM 43 VM (D/d 1,78).

It is possible to adapt our machines to each type of process, integrating the necessary devices. In fact Maris is always careful in implementing new equipment useful for the realization of new applications.

The equipment at our disposal include:

> Wide choice of gravimetric feeders both for solids and liquids
> Underwater cutting system
> Water-ring cutting system
> Air/water head cutting system
> Remote cutting system
> Vacuum pumps
> High vacuum pump (minimum residual 2m bar)
> Gear-pump
> Screen-changer
> Flat die
> Turbo-mixer
> Slow mixer
> Mill
> Single-screw extruder
> Calender with transport belt

The characterization laboratory

Besides the Technological Laboratory Maris put at disposal the Characterization Laboratory, for evaluating, in real time, the results of the trials as they are carried out on the extrusion lines.

The laboratory is able to make the morphological characterisation (using a reflection microscope and a transmission microscope (assisted by digital images analysis software), and a rheological analysis (the Center has got a Melt Index, a capillary rheometer and a rotational viscosimeter).

Moreover, it is able to evaluate the mechanical properties (using a dynamometer to measure elongation, compression and flexure, two durometers - one Shore A and one Shore D - an Izod Pendulum and a Vicat-HDT), to measure residual ash content (through persistence in muffle), volatiles content (by using a thermal balance) or water content (through a Karl-Fisher), but also cross-linking degree (through selected solvent extraction).

It has got also a little injection moulding press with standard ASTM specimens mould. A particular analysis carried out by the Characterisation Laboratory is Maris Filter Test: Pressure Index measuring through a filter blockage carried out on a small quantity of undiluted masterbatch. Maris has patented this type of fast analysis by means of the capillary rheometer, on the outlet of which there is positioned a small metallic filter. The lower the filter blockage speed, the better will be the product quality in terms of dispersion and fillers and/or pigments distribution.

Inside the Characterisation Laboratory there is a section for the Quality Check, in particular the check of the metals with which the fundamental elements of our extruders are produced. It is set up with an englobing, a lapping machine, a hardness-meter for metals and the reflection microscope.
Other activities of the technological Center

The technological Center is run by a technologist staff, who, besides taking care of the laboratory is constantly engaged in different activities of technical-commercial type.

- **Lines start-up.**
  An essential duty of the technical staff is the start-up and commissioning of lines at Customer’s site. Our most qualified technicians are engaged in this activity to ensure the best service to our Customers.

- **Process assistance.**
  The technological Center also takes care of the process assistance. In case of doubt, formulation change or production problems, our technical staff are available to assist at the Customers site, with the full back-up support of the Center at its disposal.

- **Commercial support and new equipments designing.**
  Our technicians are the vital connection between the Sales Managers and the Customers, because they are able to recommend the best solution according to the technical requirements of the Customers Projects. Therefore, both the offers and the designing of new lines are carried out in conjunction with this Center, the Technical and Commercial Department to ensure the correct solution for the Customer.

- **Customers visits.**
  At the outset of a Customer’s visit, prior to any trials, a meeting is convened with the Technical and Commercial departments to best assess the Customer’s needs, and to arrive at the most appropriate solution both technically and commercially. The solution can then be tested and optimised in the Center.

- **Customers offers.**
  The Project Department proposes to the Technical Department the line layout, only after suggestion and opinion of the Center, which takes the technical responsibility about the choices. These decisions arise from the careful evaluation of the results obtained from the work carried out in the Technological Laboratory during the trials with the Customers.

- **Instruction courses for Customers.**
  In case of specific Customer demands, some special courses under the guidance of the technical staff at the Technological Center can be organized. Such courses can be on specific matters or more generally on compounding Technology.
Experience at your service

The Technological Center technical staff is in a position to put at disposal of our Customers their many years of experience in processes development such as:

> Glass fibers reinforced materials up to 50%
> Filled Materials up to 85% of CaCO₃ and talc
> Flame Retardant
> Polymers alloys
> Cable compounds (Halogen free, PP, PE, Engage, EVA, PVC)
> TPE, SBS, SEBS
> TPV
> Organic and inorganic pigments masterbatches
> White and black masterbatches
> Additives masterbatches
> Pearlescents and Fluorescents masterbatches
> Hot melts adhesives for tapes and labels, PSA
> Solvent based adhesives
> Adhesives for wood applications and others
> Recycling of PET, LDPE, HDPE, PP and others
> Soft and rigid PVC
> Grafted materials
> Heat resistant polymers (PEEK, PPS)
> Vulcanized rubbers, synthetic and natural
> Reactive extrusion
> Food applications
> Special applications