

Information service offered to plastics & rubber technological companies by Maris SpA



N.01

JOURNAL

MARIS

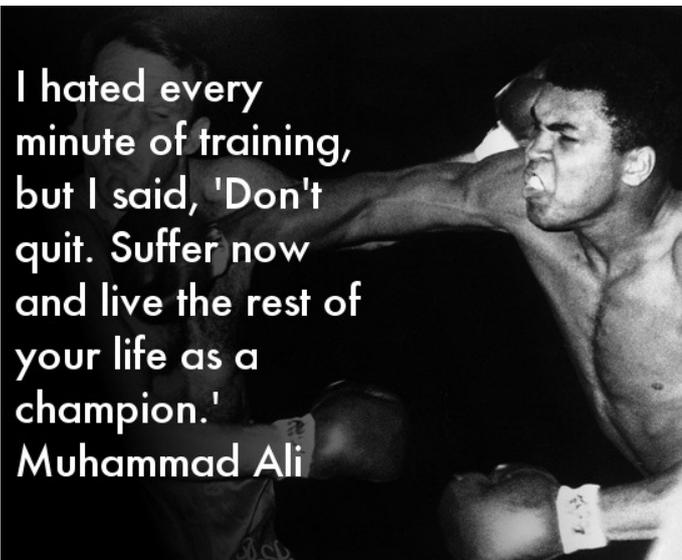
NEWS FROM THE COMPOUNDING WORLD

We all have our time machines
Some take us back, they're called memories.
Some take us forward, they're called dreams.

(Jeremy Irons)

BORN TO SHARE OUR DREAMS WITH YOU! ENJOY THE READING

In a global reality, where the granted goal does not exist and the certitudes are no more sure, leaps our service at your service: MARIS TECHNOLOGICAL CENTER. Here, there is a team of experts ready to materialize your dreams, thanks to tailor-made and advanced machineries. The above is completed by experience, tradition and passion that we put at your disposal for improving with you formulations and reaching the market requirements.



I hated every minute of training, but I said, 'Don't quit. Suffer now and live the rest of your life as a champion.'
Muhammad Ali

READY TO FIGHT AT YOUR SIDE

As the boxer constantly trains very hard to beat opponents, also the technologist needs to train constantly and be ready to knock down the limits set by the market laws. For example, in the sectors of synthetic materials and biomaterials, these limits are periodically overcome by new products, which are firstly tested in the laboratory, and then produced and spread to the market for granting better life conditions. It is curious to know that behind these incredible materials evolution there is a sole machine: the co-rotating twin-screw extruder, an efficient dynamic continuous mixer, flexible and adaptable to different types of process, which

foresees the continuous and constant materials feeding. Of course, with the aim to keep aligned with the market in constant evolution, it is necessary to have mental agility and be fast in creating new solutions for the problems arising day-by-day. As the boxer cannot imagine getting on the ring without training, in the same way an extruder's manufacturer cannot put on the market an equipment without testing its performances on the different applications. That is why we have created our own "gym", the place where we train to solve process problems together with our Customers, testing their own materials: MARIS Technological Center, an R&D department divided in two areas, the Testing Area and the Characterization Laboratory.

THE TESTING AREA, BESIDES BEING THE COMPANY SHOWROOM, IS THE HEART OF THE R&D PROCESS.

Here inside there are four complete extrusion lines, two laboratory-scale (models TM 20HT and TM30HF) and two production-scale (models TM41HS and TM 58HF), permanently installed and at disposal of our staff to allow the correct setting of the complete lines for each type of process. In addition to that, our extrusion lines include all the upstream and downstream auxiliary devices, which will permit to simulate exactly the most different extrusion processes.

The Characterization Laboratory allows checking in real time the properties of the materials produced in the Testing area. These features, compared with a reference sample brought by the Customer, allow discriminating the effects of the different process variables on the material quality and give the guidelines to the Testing Area to continue the compounding tests.



HOW DOES THE WORK OF THE TECHNOLOGICAL CENTER ORIGINATE AND DEVELOP?

It all starts from the need of a customer, who asks us to test their formulations in the Technological laboratory.

The technicians discuss the eventual problems linked to the material feeding or to process (thermal profile, screw profile, filling grade of the screw), then we start the tests on the pilot plant (TM 20HT and TM30HF) with small amounts of materials, in order to produce a sufficient number of samples.

The Characterization Laboratory analyses the products with internal methods, specially designed to be quick and similar to the production times, in order to obtain a very speed answer on the materials quality. At the end of the tests, we await the qualitative feedback from the customer, confirming the analysis carried out in the center, so that we can cross the analytic results. In this way, we can define the conditions to test on industrial productions by means of higher size extruders (TM41HS and TM 58HF). This passage is fundamental both to produce lots of material to be tested by the customer, and to get enough information to give guarantees during the scale-up phase, allowing in this way to design a machine around the customer and their requirements.

THE EXTRUSION TIME



The natural tendency to the technological development brought us to decide to offer the "Extrusion Time", an assisted rental of the laboratory extruder, a MARIS TM20HT, open to everybody, but intended in particular to research centers and universities to which convenient rates will be granted. Thanks to this machine, it will be not only possible to produce little quantities of common materials as compounds or masterbatches, but also to obtain production of adhesives, reactive extrusion, recycling of vulcanized elastomers, polymerization and try to produce in a continuous way all the processes which are normally produced in batch. For Customers who will apply the "Extrusion Time", it will also be possible to use, always assisted by our staff, the characterization laboratory, which is able to make mechanical investigation (in the center there is a little injection press which allows to print samples), rheological, morphologic and optical microscope. In case of interest in process and research studies, do not hesitate in taking contact with us, by sending a message to the address: info@mariscorp.com



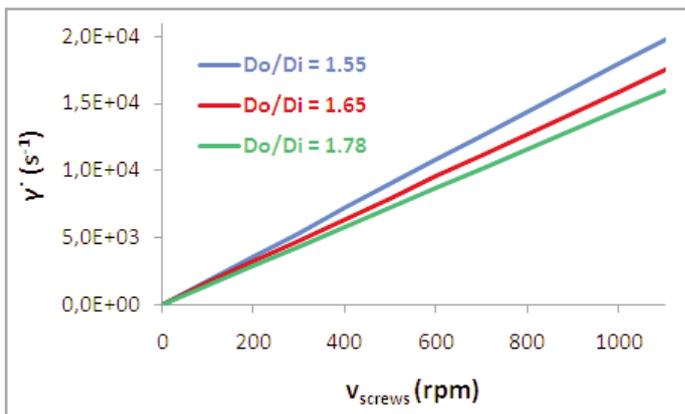
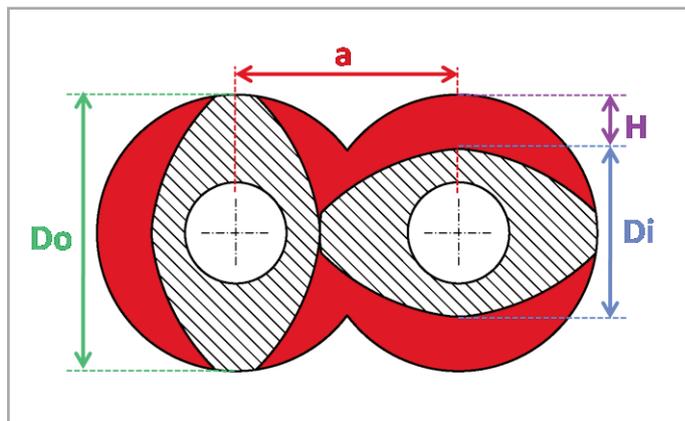
THE INTERVIEW

TECHNOLOGICAL CORNER: THE SHEAR-RATE EFFECTS ON MASTERBATCHES PRODUCTION

The co-rotating twin screw extruders are dynamic and continuous mixers, and their origin is placed between the two World Wars for the production of masterbatches, i.e. concentrates in a polymeric matrix mainly of pigments and additives, in form of powder or liquid, which are successively diluted in the polymer with which it is made the finished product in the next processing phase. We ask Dr. Gallo of our Technological Center, who participated as speaker during the congress AMI Masterbatch 2014 in Berlin, why MARIS decided to deepen the case of masterbatches.

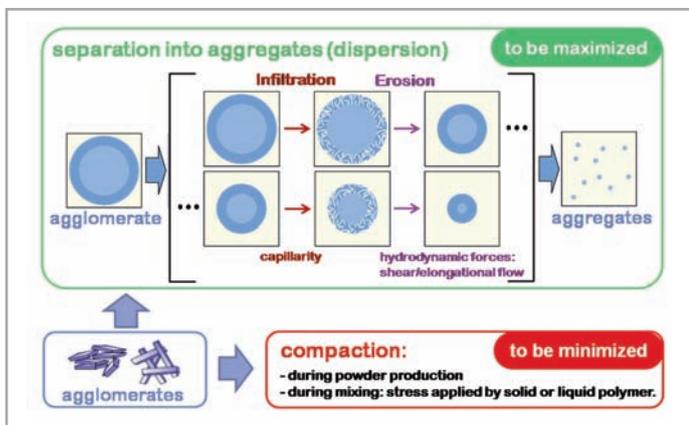
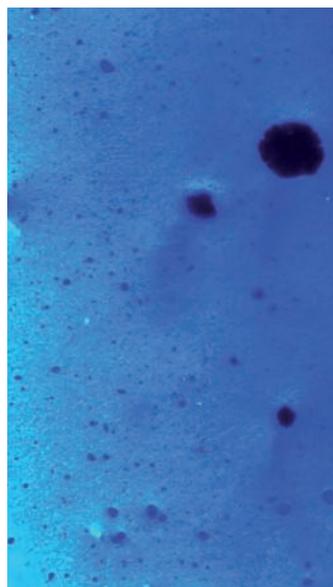
A. - MARIS Technological Center changing, among others, the most influential geometric parameter, the D/d ratio of the extruders, i.e. the ratio between the outer diameter and those on the screw core, evaluated the effects of the shear-rate in the dispersion of a common organic pigment, the phthalocyanine. This study arises because, generally, the market focuses on one or maximum two D/d and not on all the existing three, as we do (editor's note: in fact, MARIS manufacture 4 series of machines, two of which having D/d 1.55, one having D/d 1.65 and one having D/d 1.78.) Thanks to our experience this work started, followed by two other very intere-

sting cases (editor's note: they will be edited in the next issues of MARIS Journal), in which we explain how the change of the D/d may affect the material quality.



Q. - What do you mean for dispersion?

A. - The dispersion is one of the two components of the mixing, which is the reason why the twin-screw extruder was born. The mixing is divided into dispersion and distribution (i.e. the material homogenization). For dispersion, we mean the dimension reduction of a solid particle, the agglomerate, which is great a hundred of micron, to an aggregate, which could reach the dimensions of less than a micron. This phase must absolutely avoid the agglomerate compaction, which would negatively affect the material quality.



Q. - Which instruments did Maris Technological Center use to evaluate the obtained results?

A. - We have conducted measures of MARIS Pressure Index (MPI), probe created by us, a speed analysis which uses few grams of pure material and which permits a quick answer in terms of dispersion, evaluating numerically and/or graphically the clogging curve of a filter. The snapper will be the slope of the curve, or the higher will be the numeric value of the measure, the worst will be

the masterbatches quality, in terms of dispersion.

Q. - Which have been the results of the study?

A. - It was interesting to note as the phthalocyanine appreciates being processed with an extruder which can produce a high shear-rate (always within certain limits to avoid the agglomerates compaction), therefore a machine having D/d 1.55.

	1.55	1.65	1.78
Monopigment inorganic	+	++	++
Color masterbatch	++	+	--
Monopigment organic	++	+	--
Fluorescent	+	++	+++
Perlescent	+	++	+++
Filled	+	++	+++
White TiO ₂	+	++	+
Carbon Black	++	++	++
Additives	++	+	--
Flame Retardant	+	++	+

Q. - Does this mean that the phthalocyanine cannot be made with D/d different from 1.55?

A. - No, it does not. Of course, we are speaking about optimization and choice of machines for new installations (as shown in the above table). Many times we have carried out modifications of existing lines, for customers who wished to diversify the production (for example producing pearlescent masterbatches by using D/d 1.55 machines), but those solutions always present

limitations, typically in productivity vs quality. The limits to be overcome, making a process study, are the quality and the output required by the customer, providing the best technological solution at the right cost. It is on these requirements that we have to build the bases for the extruder design. This capability makes the difference from being a simple mechanical workshop to be a technological company providing solutions, as we are.



MARIS
Technological Company

Enhance the power of your creativity!

Maris Co-Rotating Twin-Screw Extruders, to take compounding formulations to new standards in:

- Organic pigment Masterbatch
- Inorganic pigment Masterbatch and mineral fillers
- Additives Masterbatch
- White Masterbatch
- Black Masterbatch
- Polymeric Alloys
- Technopolymers reinforced with glass fiber and natural fiber
- Polyphasic compounds of thermoplastic elastomer with SEBS base
- Polyphasic compounds with polyolefinic base
- Reactive Extrusion
- Elastomeric compounds complete with vulcanized agents
- Monomers and/or solvent content reduction
- Technopolymers qualified recycling
- Compounds for cables alogen free
- Compounds of Rubber, EPDM, NBR, NR, SBR
- Rubber recycling by devulcanizing process
- Hot-Melt adhesives
- Solvent base adhesives

Visit us at **PLAST 2015**
Hall 13
Stand C21 D22

Since 1962, more than 50 years of experience

MARIS
Technological Company

C.so Moncenio, 22 | Tel. +39 011 9567925 | info@mariscorp.com
10090 Rosta (TO) Italy | Fax +39 011 9567987 | www.mariscorp.com

YOUR NEEDS, OUR SOLUTIONS

Case: special adhesive.

The project was born with the customer's necessity to transfer in a continuous way the traditional batch system, which is used for the production of special adhesives. After some process definition tests, our technicians designed the whole plant at industrial level. In

the specific case, we acted as main contractor, applying all necessary equipment for the realization of two lines, a lab line for formulation development, and a production line. The supplied plants entirely satisfy both the R&D and production requirements, requested by the customer.



Case: rubber devulcanization

In order to give our contribution to the environmental safety, we have developed a vulcanized rubber recycling process, which produces a plastic material that could re-enter in the productive process of new products. After many laboratory and industrial tests, a machinery has been fine-tuned in a way that, by just modifying the process variables, it permits to obtain plastic material for different type of elastomers, such as NR, IR, EPDM, SBR, FKM, NBR, Buthilic, Silicone, and Acrylic, which come from technical items, tires, production and post-production scraps. Several plants are already operating worldwide.



LET'S COME CLOSER!

OUR COMPANY IS ALWAYS OPEN TO VISITORS, BUT WE ARE ALSO IN A POSITION TO PUT AT YOUR DISPOSAL A TEAM OF AGENTS / TECHNICIANS, READY TO ORGANIZE A SEMINAR, DIRECTLY AT YOUR SITE.



The evolution of the world in which we are growing, induces us to acquire instruments and skills to understand the reality around ourselves, in which the jungle law never wanes. We are in front of a double difficulty: keeping updated trying to understand the events and finding means, languages, suitable ways to learn and teach how to interface with a world, which is sometime unfriendly, but rich in opportunities.

This is the challenge we want to catch here in Maris and share with you our knowledge, in theory and in practice: how can we do that? MARIS, in partnership with manufacturers of upstream and downstream equipment, organizes technical seminars. The aim of the seminars is to share experiences with customers who want to deepen the aspects related to a specific application. Besides, the benefit is to show a complete production process. The focus of the seminars can be even adapted to customer needs and requirements; we are ready to talk about the main processes in thermoplastic and rubber compounds industry. Similar events were done during the past in Brazil, Turkey, Italy and the most recent meeting has been organized in Istanbul. This last one, in the presence of a good number of interested participants, with the needful co-operation of our representative agent company ENPA Ltd., and in this case, the partner companies ITISYSTEMS S.r.l. (Italian manufacturer of feeders), and GALA Kunststoff- und Kautschukmaschinen GmbH (worldwide well known manufacturer of downstream equipments) we introduced the "Latest developments in extrusion technology – Overview on technological application of co-rotating twin screw extruders" on the production of pigment masterbatches, filled and

reinforced compounds. People who attended the event took part actively, asking questions, developing concepts and bringing the discussion to a very good level of knowledge sharing.

The content of the technical seminar is the result of more than 50 years of Maris experience and the consequence of hundreds of installation around the world and thousands of trials run in the Technological Center.

Thanks to the success of such initiatives and willing to get closer and closer to our customers, we are planning to organize new events specifically in UK, Poland, France, Turkey, Benelux and Scandinavian areas.

Let us know eventual suggestions and ideas about possible topics to be discussed and to the possibility of holding seminars in specific required geographic areas.

...get closer!

EXHIBITION, CONGRESSES AND CONFERENCES

- **K 2016** - Düsseldorf / Germany on October 19th to 26th, 2016
- **Chinaplas 2015** - Guangzhou / China on May 20th to 23rd, 2015
- **Plast 2015** - Milan / Italy on May 5th to 9th, 2015
- **SGF conference** at Elmia Polymer Jönköping / Sweden on April 23rd and 24th, 2015
- **VIII Plastics and Rubber Congress** Warszawa / Poland on March 26th, 2015
- **Workshop on extrusion** Rivalta Scrivia (AL) / Italy on November 6th, 2014
- **Equiplast 2014** - Barcelona / Spain on September 30th to October 3rd, 2014
- **Feica Conference 2014** Berlin / Germany on September 17th to 19th, 2014
- **Masterbatch 2014** - Berlin / Germany on June 24th to 26th, 2014
- **FIP 2014** - Lyon / France on June 17th to 20th, 2014
- **RubberCon 2014** - Manchester / U.K. on May 14th and 15th, 2014
- **Chinaplas 2014** - Shanghai / China on April 23rd to 26th, 2014
- **Conference during the Rubber Technology Expo 2014** - Bangkok / Thailand on March 12th to 14th, 2014

... to the next!



C.so Moncenisio, 22 / 10090 Rosta (TO) Italy
Tel. +39 011 9567925 / Fax +39 011 9567987
info@mariscorp.com / www.mariscorp.com
Editorial coordination: Maris spa