



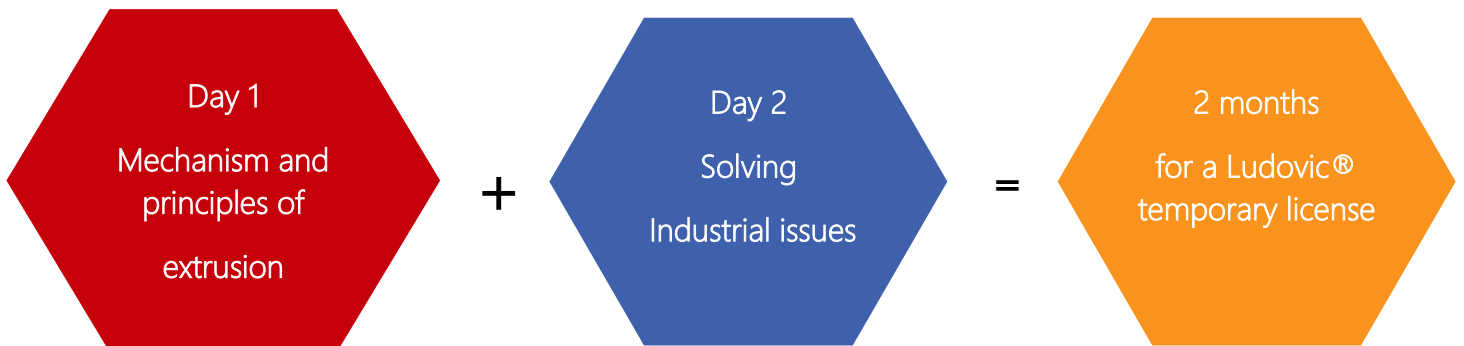
Brussels – May 10-11, 2023

Twin Screw Course Europe

Solving industrial issues with the Ludovic® software

The Seminar

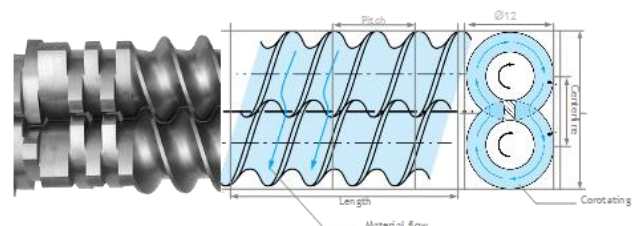
The **twin screw course** consists in a 2-day seminar aimed at a first approach of numerical simulation of twin screw extrusion. The real **mechanical principles of extrusion (1)** and their translation in **the numerical simulation model (2)** are explored for two days. As a last step, the **Ludovic® simulation software is provided for a 2-month period (3)**.



The audience

The **twin screw course** is aimed at process engineers, product development technically oriented engineers working in both research and manufacturing environment.

This extrusion course does establish a concrete link between mechanical principles of extrusion process and their translation into simulations languages. Industrial issues are also tackled with **process optimization, screw design and scale up**.



Day 1: Mechanics principles of extrusion

This first stage of the course is dedicated to the **mechanical process of extrusion**. It is indeed essential to know about the theoretical background used as basis of simulation. This day 1 is aimed at describing the main mechanical phenomena occurring in the extruder and how to undertake them.

Program – Day 1*

9h00-10h30	Reminders: about the continuum mechanics, rheology, and thermal behavior Let's go back to the basis and main mechanics rules	Unit 1
10h30-11h00	Coffee break	
11h00-12h30	Introduction to the twin screw extrusion process Material flow in the screw elements and the kneading blocks A useful reminder about the twin screw extrusion principles and flow calculations	Unit 2
12h30-14h00	Lunch break	
14h00-15h00	Ludovic [®] software presentation – global functioning of a twin screw extruder Why using the Ludovic software for twin screw?	Unit 3
15h00-15h30	Coffee Break	
15h30-17h00	Applications: <ul style="list-style-type: none">• Distributive mixing• Reactive extrusion• polymer blends and nano composites• Natural fibres/glass fibres extrusion• Scale up & optimization. Some highlights about specific applications in twin screw extrusion and comparison between experiments and simulation	Unit 4

Operational

Bruno VERGNES oversees this course.

Bruno VERGNES is an engineer, who got a PhD from Ecole des Mines de Paris. He has been working from 1981 in polymer processing at CEMEF. He was senior scientist at Ecole des Mines de Paris and general manager of the "Polymer and composites" research unit at CEMEF for many years. His main topics deal with extrusion processes and rheology of complex fluids. He is now scientific advisor of the SC-Consultants company for all the extrusion and mixing applications.

Bruno VERGNES has developed the Ludovic[®] mathematical model.

**Provisional agenda: to be confirmed*

Day 2 – solving industrial issues with Ludovic®

This second stage consists in a training based on real industrial issues. The goal of this practical is to solve industrial issues with the support of the Ludovic simulations results.

The proposed industrial issues for the practical are:

- ◆ a **scale up**: how to go from a lab scale (D24mm) to an industrial scale (D56mm)
- ◆ a **screw design optimization**: how to increase the mixing efficiency by the screw design

During the training, the attendees handle the Ludovic® software and are taught about how to define, compute and interpret a simulation and its results.

Program – Day 2

08h30 – 09h00	<p>Global introduction to the software</p> <ul style="list-style-type: none"> • Ludovic® software principles • Resolution of Physics equations • The computation principles 	Reminders of Unit 3
09h00 – 10h30	<p>How to define a complete simulation</p> <ul style="list-style-type: none"> • How to design the screw profile in Ludovic® • Importing a material • Definition the operating conditions 	Using the case presented in Unit 4
10h30 – 11h00	Coffee break	
11h00 – 12h30	<p>How to perform a scale up process with the support of the Ludovic® software</p> <ul style="list-style-type: none"> • Analyzing the lab scale (24 mm) • Performing a Design of Experiments 	Using the case presented in Unit 4
12h30 – 14h00	Lunch Break	
14h00 – 15h30	<p>How to perform a scale up process with the support of the Ludovic® software</p> <ul style="list-style-type: none"> • Defining the industrial line design • checking the process 	Using the case presented in Unit 4
15h00 – 15h30	Coffee break	
15h30 – 17h00	<p>How to optimize the screw design for getting a better mixing efficiency</p> <ul style="list-style-type: none"> • Using the simulations comparison • Focusing on the mixing markers 	
17h00 – 17h30	Conclusion	

Two month-Ludovic® license

After this course, the attendee is self-reliant in the use of the Ludovic® software for analysing and optimizing his own cases/applications. He is thus provided with a 2 month-temporary license of the Ludovic® software (gold package registration).

During the two months, the attendees benefit from:

- ◆ Ludovic® v7.1 version
- ◆ access to the eSupport site
- ◆ access to the Technical Support (via hot line)



Presentation

Ludovic® is a virtual extrusion lab designed for optimizing the **corotating twin screw extrusion** process. Within a mathematical model, resolving the physics equations (as presented in **Day 1**), Ludovic® performs a thermo mechanical analysis of the process and **predicts the material behaviour**.

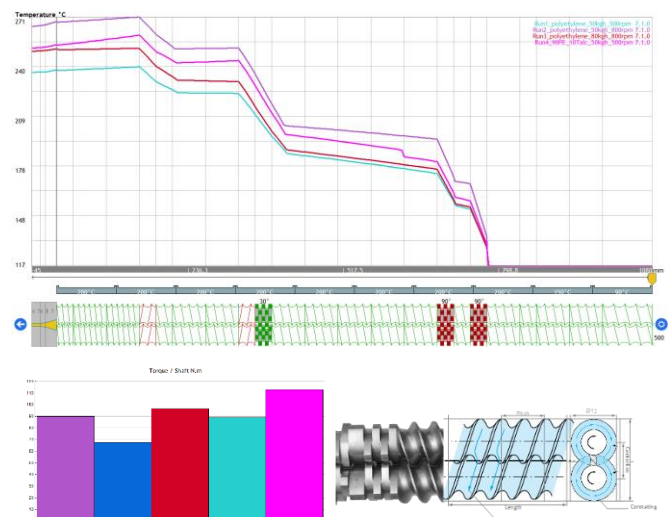
The **V7.1 new release** proposes new evolutions and improvements.

Evolutions:

- ◆ Tandem extruders
- ◆ Devolatilization
- ◆ 2D Kneading Blocks analysis.
- ◆ Blister ring integration
- ◆ Mixing efficiency new map
- ◆

Improvements:

- ◆ New results (density evolution)
- ◆ Import/export/Backup features more robust
- ◆ New material analytical law



Ludovic® is used for product formulation, process set up and scale up issues. Proposing a **fast-learning curve**, Ludovic® is easily integrated as complementary tool for saving time to market (**50% of trials saved**).

Pre required equipment.

To attend the Twin Screw Course, some pre-required equipment is necessary. Indeed, attendees are provided with a 2-month license of the Ludovic® software during this training.

Laptop

In this way, the attendee will come to the training with:

- ◆ a **laptop** (Windows environment)
- ◆ the administrative **rights to install** a new program (Ludovic® v7.1)



The Ludovic® software will be installed on the attendee's laptop for performing the training (Day 2). After the training, the attendee keeps on his own laptop the performed work and the Ludovic® temporary license.

Twin screw course: registrations & information

Registrations:

The registrations are opened from February 22nd, 2023, until April 30th, 2023 at:

- <http://www.siconsultants.com/scc-eboutiquegenerale.html>

Early registration discount:

For all registration before March 31, **get 200 euros discount** on the hereafter packages.

SCC keeps the right to cancel this course if a minimum registration has not been reached.

Packages:

Silver package – 1200€ Fitted for a refresh on extrusion topics. Are included: <ul style="list-style-type: none">• Two-day seminar• Lunches and breaks• Networking and dinner on May 10 in Brussels downtown	Gold package - 2300€ Designed for industrial applications . Are included: <ul style="list-style-type: none">• Silver package• + Ludovic® 2-month license	
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1000€ will be deducted on the Ludovic® permanent license price in case of purchase within the next 6 months (after the end of the temporary license)

Place:

As a central and easy access-place, our TSC takes place in Brussels airport area, in :

Hotel NH Brussels Airport
De Kleetlaan 14B
B-1831 Machelen (Belgium)
Tel: +32 2 203 92 52



Contact

For any questions or requests, please contact our SC-Consultants team.



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