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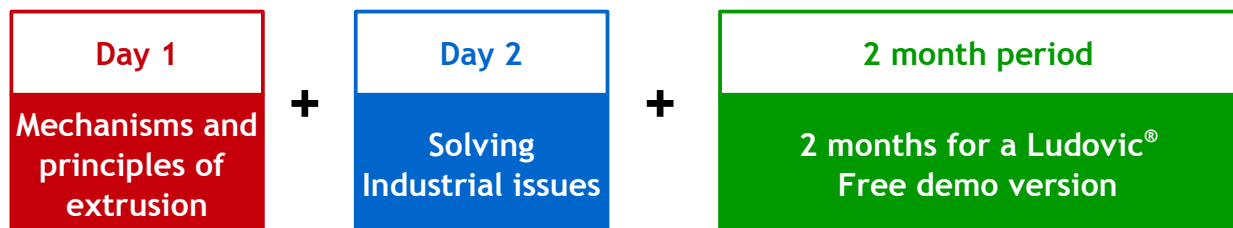
Ludovic®

March 21-22, 2018

Twin Screw Course Europe

Solving industrial issues with the Ludovic® software

The Seminar

The **twin screw course** consists in a 2 days 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 during two days. As a last step, the **Ludovic® simulation software is provided for a 2 months test period(3)**.

Day 1		Day 2		2 month period
Mechanisms and principles of extrusion	**+**	**Solving Industrial issues**	**+**	**2 months for a Ludovic® Free demo version**

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 proposes to establish a concrete link between mechanical principles in extrusion process and their translation into simulations languages. Industrial issues are also tackled.

Day 1 – Mechanics principles of extrusion

This first stage of the course is dedicated to the **mechanical process of extrusion**. It is aimed at describing the main mechanical phenomena occuring in the extruder and how to undertake them.

Program – Day 1

09:00 - 10:30	Reminders : about the continuum mechanics, rheology and thermal behaviour	Unit 1
10:30 – 11:00	*Break*	
11:00 – 12:30	Introduction to the twin screw extrusion process Material flow in the screw elements and the kneading blocks	Unit 2
12:30 – 14:00	*Lunch*	
14:00 – 15:00	Ludovic® software presentation – global functioning of a twin screw extruder	Unit 3
15:00 – 15:30	*Break*	
15:30 – 17:00	**Applications :** • Distributive mixing • Reactive extrusion • polymer blends and nano composites • Scale up & optimisation	Unit 4

Operationnal

Bruno VERGNES is in charge of 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 is currently senior scientist at Ecole des Mines de Paris and general manager of the "Polymer and composites" research unit at CEMEF. His main topics deal with extrusion processes and rheology of complex fluids.

Bruno VERGNES has developped the Ludovic® mathematical model.

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 practicals 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 will handle the Ludovic® software and will be teached about how to define, compute and interpret a simulation and its results.

Program – Day 2

08:30 – 09:00	**Global introduction to the software** • Ludovic® software principles • Resolution of Physics equations • The computation principles	Reminders of Unit 3
09:00 – 10:30	**How to define a complete simulation** • How to design the screw profile in Ludovic® • Importing a material • Definition the operating conditions	Using the case presented in Unit 4
10:30 – 11:00	*Break*	
11:00 – 12:30	How to perform a **scale up** process with the support of the Ludovic® software • Analyzing the lab scale (24 mm) • Performing a Design of Experiments	Using the case presented in Unit 4
12:30 – 14:00	*Lunch*	
14:00 – 15:30	How to perform a **scale up** process with the support of the Ludovic® software • Defining the industrial line design • checking the process	Using the case presented in Unit 4
15:00 – 15:30	*Break*	
15:30 – 17:00	How to optimize the screw design for getting a better mixing efficiency • Using the simulations comparison • Focusing on the mixing markers	
17:00 – 17:30	Conclusion	

Operationnal

Chantal DAVID is in charge of this course. Chantal DAVID is the general manager of the SCConsultants company, in charge of the development and commercialization of the Ludovic® software. Chantal DAVID also manages all the customers applications in the field of twin screw extrusion.

Two months 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 months temporary license of the Ludovic® software**.

During the two months, the attendees benefit from :

- a Ludovic® v5.6 version
- an access to the eSupport site
- an access to the Technical Support (via hot line)

Presentation

Ludovic® is a 1D software aimed at analysing the **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**.

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

In order to attend the *Twin Screw Course*, some pre-required equipments are necessary. Indeed, attendees will be provided with a 2 months license of the Ludovic® software during this training.

Laptop

	The Ludovic® software will be installed on the attendees 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.
	In this way, the attendee will come to the training with : • a **laptop** (Windows XP, Vista, 7) • the administrative **rights to install** a new program (Ludovic® v5.6)

Twin screw course : registrations & information

Registrations

The registrations are opened <u>until February 20, 2018</u>

Fees :

1 900 € per participant (900 € for the second participant of the same company)

The registration fees include :	
The registration fees include : • The two days seminar • the lunches • the dinner • the Ludovic® temporary license • Guarantee of the license key : 50€	** 1000€ will deduced on the Ludovic® permanent license price in case of purchase within the next 6 months (after the end of the temporary license).* *N.B. : French attendees can benefit from a « Convention de formation professionnelle »*

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

Registration form ::

Name : e-mail : Invoice Address . Company : Function : Tel : Complementary Information :	Main attendee . ☐ 1 x 1 900,00 € Second attendee ☐ 1 x 900,00 €

Place :

CEMEF
(Room R016 – Building I)
Rue Claude Daunesse
F-06904 Sophia Antipolis (FRANCE)
Tel : +33 4 93 95 75 75
http://www.cemef.mines-paristech.fr

Contact

For any information, do not hesitate to contact SCC :

SCIENCES COMPUTERS CONSULTANTS
10 rue du plateau des glières
F-42000 Saint Etienne
Tel +33(0)4 77 49 75 80
http://www.scconsultants.com
scc@scconsultants.com

Hotels & accomodations

For your stay in Sophia, different hotels are located in the neighbourhood of the CEMEF place. Please find some suggestions for your stay.

The hotels

Hotel	Contacts	Notes
OMEGA	Hotel OMEGA*** Les Lucioles Accès 3 49 rue L. Van Beethoven F-06560 VALBONNE Tel : +33 4 92 96 07 07 Internet Link	**Special Price** for the TSC attendees : 99€/night 2 minutes walking from the CEMEF
IBIS	Hotel Ibis Sophia Antipolis 502 rue Albert Caquot F-06560 VALBONNE Tel : +33 4 93 65 30 60 Internet link	From 77,00€/night
MERCURE	Mercure Antibes Sophia Antipolis Rue Albert Caquot F-06560 VALBONNE Tel : +33 4 92 96 04 04 Internet Link	From 115,00€/night
NOVOTEL	Hotel NOVOTEL Sophia Antipolis 290 rue Fedor Dostoievski F-06560 VALBONNE Tel : +33 4 92 38 72 38 Internet Link	From 125,00€/night
LE RELAIS BLEU	Relais de Sophia** 3725 route des Dolines F-06410 BIOT Tel : +33 4 93 95 84 82 Internet Link	From 66,00€/night

Pre-booked rooms

Some rooms have been pre-booked for the TSC attendees in the OMEGA hotel :

- Attendees can book their rooms at the OMEGA, mentionning their participation to the *TSC Europe*
- they will benefit from a special price, including the breakfast
- **Book your room as soon as possible**, as it is the deadline of the rooms guarantee.

Place and Access

CEMEF – Sophia Antipolis

The Twin Screw course takes place on the CEMEF site :

CEMEF
Room R016 – Building I
Rue Claude Daunesse
F-06904 Sophia Antipolis (FRANCE)
Tel : +33 4 93 95 75 75
http://www.cemef.mines-paristech.fr

Access

From the *Nice Côte d'Azur Airport* :

- **by bus** : line n°**230** – 40 minutes for 1€. The stop is « *Sophie Laffitte* » *(20m from the CEMEF)*
- By taxi : the course is between 50 and 65,00€

For more information : download the access plan from the CEMEF site

Information

For any information about the Twin Screw Course, do not hesitate to contact SCC :

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