COURSE OVERVIEW PE0450
Plastic Additives Selection, Application & Troubleshooting

Course Title

Plastic Additives Selection, Application & Troubleshooting

Course Date/Venue

Session 1: May 18-22, 2025/Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

Session 2: October 05-09, 2025/Al Khobar Meeting Room, Hilton Garden Inn, Al Khobar, KSA

3.0 CEUs (30 PDHs) AWARD

Course Reference

PE0450

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.

Plastic additives are a diverse group of specialty chemicals that are either incorporated into the plastic product prior to or during processing, or applied to the surface of the product when processing has been completed. These additives aid in the actual processing of the plastic end product (e.g., antioxidants, nucleating agents, mold release agents, lubricants) or improve the characteristics of the final product (antimicrobials, colorants, antistatic agents, impact modifiers, and UV stabilizers).

Plastics additives account for 15 to 20% by weight of the total volume of plastics products marketed. The growth in use of these additives is relatively strong and continuous. However, environmental constraints have imposed rigorous performance requirements on many products, adding expenses to the development costs of these materials. A new trend is the development of biobased additives for bioplastics. It is expected that bioplastics will grow 50% by 2021.

This course provides the basic and specific information needed to employ the best additives in manufacturing situations. The course starts with a presentation of the structures of polymers for a better understanding of the ways to stabilize a plastic material against degradation due to thermal, mechanical or UV-degradation or other detrimental mechanisms. A presentation of the most common plastic materials and how they should be handled during processing is included. This is important to obtain the desired properties for a product. However, the quality and the short as well as the long-term properties can be improved by the correct choice of additives. This will be highlighted during the extensive presentation of available additives on the market and the mechanisms for their function. Further, the course will cover the analytical tools (DSC, TGA and Mass Spectrometry) and many of other instrumental techniques for identification and structure elucidation of plastics additives, e.g., antioxidants, stabilizers, plasticizers, pigments, UV-stabilizers.

This state-of-the-art course is designed to provide an overview of many additives used to produce the huge array of today's commercial polymeric materials. However, the participants will also learn which tools are available for trouble-shooting. Discoloration and poor UV-resistance are only two examples of common problems, which are often encountered. The aid of statistical methods will also be presented as well as alternatives to additives. Environmental issues are dealt with due to detrimental migration of additives, health risks with halogenated additives as well as consequences of plastic recycling and the restabilization of polymers with additives. Discussions will include additive functionality and how to select additives to meet the desired end-product properties and manufacturing process requirements.

Course Objectives

Upon the successful completion of this course, each participant will be able to: -

- Apply systematic techniques in the selection, application and troubleshooting of plastic additives
- Select the best plastic additives for different manufacturing situations
- Distinguish the details of the most common plastics additives (Antioxidants; Light Stabilizers like UV-absorbers and Hindered Amine Light Stabilizers; Fillers like Micas and Carbon Black, Pigments/ Colorants/ Dyes; Flame retardants/Smoke Suppressants; Slip/Anti-Blocking Agents; Antacids; Stearates; Metal Deactivators; Plasticizers; Blowing and Foaming Agents; Antibacterials/Fungicides; Anti-Fogging Agents; Anti-Static Agents)
- Enumerate proper trademarked additives and their trade names
- Select additives to meet the desired end-product properties and manufacturing process requirements
- Apply FTIR, DSC and Mass Spectrometry and many other instrumental techniques for identification and structure elucidation of plastics additives, e.g., antioxidants, stabilizers, plasticizers and pigments
- Identify the best and updated references in the Plastics Additives Technology (manufacturers, books, software, databases, etc.)

Exclusive Smart Training Kit - H-STK®

*Participants of this course will receive the exclusive "Haward Smart Training Kit" (**H-STK®**). The **H-STK®** consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC**.*

Who Should Attend

This course provides an overview of all significant aspects and considerations of plastic additives for process engineers, scientists, chemists and laboratory team who are involved in the selection, application and troubleshooting; practitioners in plastics production, plastics processing, plastics additives and researchers in the area of polymer degradation and spectroscopists. Further, the course is important for procurers, purchasers, sales & marketing engineers in the field of plastics and polymers. Management team in the manufacturing plants of plastics and polymers are encouraged to attend this comprehensive course which will give them invaluable technical information on plastics additives and polymers.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Fee

US$ 5,500 per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Dr. Lennart Johansson is currently the **Principal Consultant** of **Polymer Support Incorporation,** a company that provides **Analytical Services** to the **Plastics/Rubber Industry.** He is also the **Chairman** of the **European Colors & Additives Conference of Germany since 1995** and the **Board member** of the **Society of Plastics Engineers** (**SPE**)**.** Dr. Johansson is an **International Expert** in **Polymers and Plastics/Rubber additives** with over **25 years** of industrial experience in this area. Further, he is an **Authority** in the **processes leading to degradation and aging of polymers for different industrial applications like tubes, pipes, cables, capacitors, films generators, motors and transformers**.

During his career life, Dr. Johansson worked as the **Manager of Process/ Polymer, & Development Engineer** for **Dyno Nobel**; as the **Senior Scientist and Project Leader** within the area of **Degradation and Stabilization of plastics**, for **ABB Corporate** where he was in charge of researches of **Aging of polymers**, **Aging of insulation liquids, Aging of cables, Improved performance for capacitors, Electrical treeing, Water treeing, Corona resistance** and **New filler materials.** Further, he worked as a **Chemical Engineer** for different **Plastics and Rubber** companies in **Sweden**, **Germany**, **Italy** and the **UK**.

Dr. Johansson has **five patents in Plastic industry**, and he published **tremendous number of Papers and proceedings**. His qualifications include **Bachelor, Master and PhD Degrees in Chemical Engineering** from **Lund University, Sweden**. Further, he is a **Certified Instructor/Trainer**.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 1000	***Introduction to Plastics*** *Structure of Polymers ● Processing of Plastics ● Some Physical Properties ● Choice of Plastic Materials*
1000 – 1015	*Break*
1015 – 1115	***Plastic Materials & Additives*** *What do Additives Add to Plastics? ● Polyolefins*
1115 – 1230	***Material Handling*** *Material Conveying ● Effect of Water on Plastics ● Drying of Material ● Material Granulation & Grinding*
1230– 1245	*Break*

1245 – 1345	***Thermoplastics Processing*** *Injection Molding & Blow Molding ● Film & Profile Extrusion ● Rotational Molding*
1345 – 1420	***Quality Control (QC)*** *What can be Obtained by QC? ● QC of Polyolefins*
1420 – 1430	***Recap***
1430	*Lunch & End of Day One*

Day 2

0730 – 0900	***Degradation of Plastics Materials*** *Micro Degradation ● Macro Degradation ● Effect of Radicals*
0900– 0915	*Break*
0915– 1000	***Stabilization of Polyolefins*** *Different Types of Additives*
1000 – 1130	***Plastic Additives: Antioxidants (AO) for Polyolefins*** *Different Types of AO ● Process Stabilization ● Long Term Stabilization*
1130 – 1145	*Break*
1145 – 1315	***Plastic Additives: Light Stabilizers for Polyolefins*** *UV-Absorbers ● Hindered Amine Light Stabilizers ● Other Types*
1315 – 1420	***Plastic Additives: Fillers for Polyolefins*** *Impact Modifiers ● Smart Fillers ● Micas ● Carbon Black*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Two*

Day 3

0730 – 0900	***Plastic Additives: Pigments, Colorants & Dyes*** *Pigments ● Colorants ● Dyes*
0900 – 0915	*Break*
0915 – 1100	***Plastic Additives: Flame Retardants*** *The Mechanism of Fire ● Non-Halogen Flame Retardants ● Smoke Suppressants*
1100 – 1200	***Plastic Additives: Lubricants & other Additives*** *Slip & Anti-Blocking Agents ● Antacids & Stearates*
1200 – 1215	*Break*
1215 – 1420	***Plastic Additives: Some other Important Additives*** *Metal Deactivators for Polyolefins ● Plasticizers ● Blowing & Foaming Agents for Polyolefins ● Antibacterials/Fungicides ● Anti-Fogging Agents & Anti-Static Agents*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Three*

Day 4

0730 – 0900	***Plastic Additives: Nucleating Agents & Clarifying Agents*** *Difference between Nucleating & Clarifying Agents ● Antagonism & Synergism with other Additives ● Choice of Additives-Based on What?*
0900 – 0915	*Break*
0900 – 1115	***Plastic Additives: Analysis & Spectrometric Methods*** *Troubleshooting by Analysis ● FTIR & DSC*
1115 – 1230	***Plastic Additives: Surface Analysis & Spectrometric Methods (cont'd)*** *OIT & TGA & Owen Aging*
1230 – 1245	*Break*

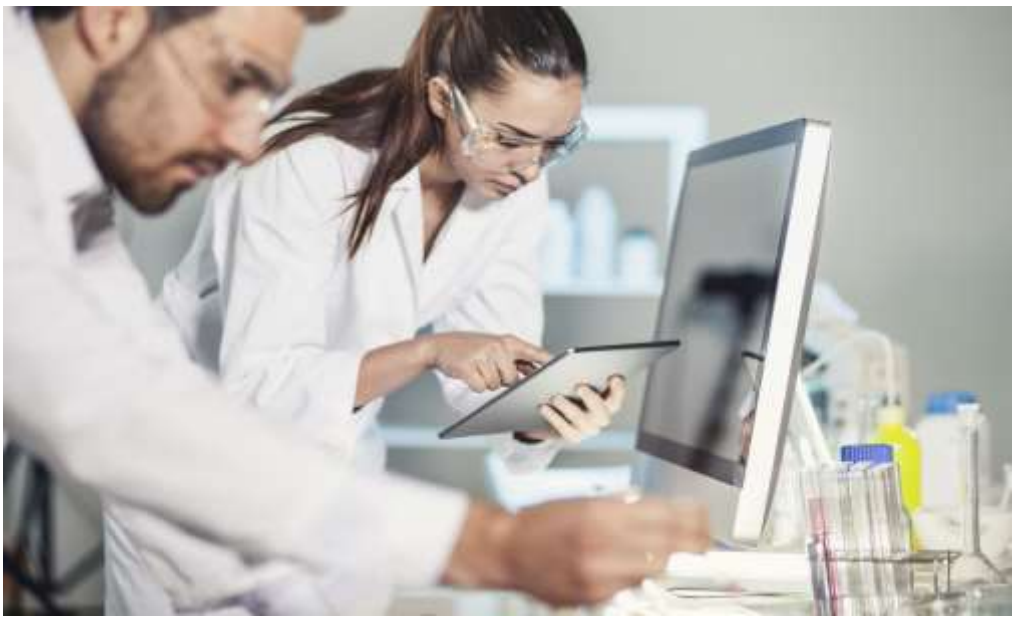
1245 – 1420	***Plastic Additives: Surface Analysis & Spectrometric Methods (cont'd)*** *Rheology ● Chemiluminescence ●XPS or ESCA ● SIMS & Scanning Electron Microscopy (SEM) ● Mass Spectrometry (Advanced Method) ● Simple Analyses of AO & Hydrogen Peroxides in Resins*
1420 – 1430	***Recap***
1430	*Lunch & End of Day Four*

Day 5

0730 – 0900	***Plastic Additives: Alternatives & Statistical Methods*** *Alternatives to Additives ● QC & Statistical Evaluation*
0900 – 0915	*Break*
0915 – 1100	***Plastic Additives: Environmental Concerns*** *Re-Stabilization ● Biodegradation of Plastics ● The Environmental Impact of Plastic Wastes ● Migration of Additives*
1100 – 1230	***Plastic Additives: New Trends*** *Anti-Counterfeiting Additives ● Bioplastics vs Conventional Plastics ● Biobased Additives ● Antioxidant Polymers*
1230 – 1245	*Break*
1245 – 1345	***Summary & Open Forum*** *Data of Additives in the Literature & Summary & Open Forum*
1345 – 1400	***Course Conclusion***
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

This practical and highly-interactive course includes real-life case studies and exercises:-



Course Coordinator

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