



## **COURSE OVERVIEW PE1056** **Polyolefins Advanced Plastics Processing & Specialties Applications**

### **Course Title**

Polyolefins Advanced Plastics Processing & Specialties Applications

### **Course Date/Venue**

October 12-16, 2025/Meeting Plus 9, City Centre Rotana, Doha, Qatar

### **Course Reference**

PE1056

### **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.***

This course is designed to provide participants with a detailed and up-to-date overview of Polyolefins Advanced Plastics Processing & Specialties Applications. It covers the polyolefins covering its definition and classification, historical development and global, polyethylene (PE) versus polypropylene (PP) and thermoplastic characteristics; the polymerization techniques, physical and mechanical properties, polyolefin additives and stabilizers and polyolefin testing and characterization techniques; and the polyethylene grades and uses, film extrusion technology, pipe and profile extrusion, blow molding applications with PE and rotational molding of PE.



During this interactive course, participants will learn the PE welding and joining techniques and polypropylene grades and characteristics, injection molding of PP, thermoforming and sheet extrusion and fiber and filament production; the biaxially oriented polypropylene (BOPP), PP compounding and specialty blends, polyolefins in automotive applications and medical and healthcare applications; the polyolefins in consumer and industrial goods, recycling and sustainability of polyolefins, processing troubleshooting and defect analysis and quality control and process optimization; the innovations in polyolefin catalysis and design, polyolefins in packaging applications and advanced polyolefins in infrastructure; and the market strategy and product positioning.



### Course Objectives

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

- Apply and gain an in-depth knowledge on polyolefins advanced plastics processing and specialties applications
- Discuss polyolefins covering its definition and classification, historical development and global, polyethylene (PE) versus polypropylene (PP) and thermoplastic characteristics
- Explain polymerization techniques, physical and mechanical properties, polyolefin additives and stabilizers and polyolefin testing and characterization techniques
- Recognize polyethylene grades and uses, film extrusion technology, pipe and profile extrusion, blow molding applications with PE and rotational molding of PE
- Perform PE welding and joining techniques and identify polypropylene grades and characteristics, injection molding of PP, thermoforming and sheet extrusion and fiber and filament production
- Describe biaxially oriented polypropylene (BOPP), PP compounding and specialty blends, polyolefins in automotive applications and medical and healthcare applications
- Determine polyolefins in consumer and industrial goods, recycling and sustainability of polyolefins, processing troubleshooting and defect analysis and quality control and process optimization
- Carryout innovations in polyolefin catalysis and design, polyolefins in packaging applications, advanced polyolefins in infrastructure and market strategy and product positioning

### 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 polyolefins advanced plastics processing and specialties applications for process engineers and technologists, polymer chemists, material scientists, operations supervisors, product development scientists, application engineers, QA and QC specialists and other technical staff.

### Accommodation

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

### Course Fee

**US\$ 6,000** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

### **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**

Haward's 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**. Haward's certificates are internationally recognized and accredited by the British Accreditation Council (BAC). 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 **30 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**.

### 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 Program**

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

### **Day 1: Sunday, 12<sup>th</sup> of October 2025**

|             |                                                                                                                                                                                                                                    |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0730 – 0800 | Registration & Coffee                                                                                                                                                                                                              |
| 0800 – 0815 | Welcome & Introduction                                                                                                                                                                                                             |
| 0815 – 0830 | <b>PRE-TEST</b>                                                                                                                                                                                                                    |
| 0830 – 0930 | <b>Introduction to Polyolefins</b><br>Definition & Classification of Polyolefins • Historical Development & Global Importance • Polyethylene (PE) versus Polypropylene (PP) • Thermoplastic Characteristics                        |
| 0930 – 0945 | Break                                                                                                                                                                                                                              |
| 0945 – 1030 | <b>Polymerization Techniques</b><br>Ziegler-Natta Catalysts versus Metallocene Catalysts • Gas-Phase & Slurry-Phase Processes • Homopolymers, Copolymers & Terpolymers • Process-Structure-Property Relationships                  |
| 1030 – 1130 | <b>Physical &amp; Mechanical Properties</b><br>Crystallinity & Density Classification • Tensile, Impact & Elongation Behaviors • Thermal Properties (Melting Point, HDT, Softening) • Influence of Molecular Weight & Distribution |
| 1130 – 1215 | <b>Polyolefin Additives &amp; Stabilizers</b><br>Antioxidants & UV Stabilizers • Slip, Anti-Block & Antistatic Agents • Processing Aids & Flame Retardants • Colorants, Fillers & Reinforcements                                   |
| 1215 – 1230 | Break                                                                                                                                                                                                                              |
| 1230 – 1330 | <b>Global Market &amp; Industry Trends</b><br>Key Producers & Regional Capacities • Emerging Markets & Growth Sectors • Sustainability & Circular Economy • Recycled Polyolefins Demand & Regulation                               |
| 1330 – 1420 | <b>Polyolefin Testing &amp; Characterization Techniques</b><br>MFI/MFR (Melt Flow Index/Rate) • DSC (Differential Scanning Calorimetry) • FTIR, TGA & XRD Analysis • Density & Hardness Testing                                    |
| 1420 – 1430 | <b>Recap</b><br>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow                                            |
| 1430        | Lunch & End of Day One                                                                                                                                                                                                             |

### **Day 2: Monday, 13<sup>th</sup> of October 2025**

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|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0730 – 0830 | <b>Polyethylene Grades &amp; Uses</b><br>HDPE, LDPE, LLDPE – Differences & Applications • High-Performance PE (UHMWPE, MDPE) • Film, Pipe, Blow Molding & Wire & Cable Grades • Environmental Stress Cracking Resistance (ESCR) |
| 0830 – 0930 | <b>Film Extrusion Technology</b><br>Cast versus Blown Film Process • Bubble Stability & Cooling Systems • Film Gauge Control & Winding • Typical Applications (Packaging, Agriculture Films)                                    |
| 0930 – 0945 | Break                                                                                                                                                                                                                           |

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|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0945 – 1100 | <b>Pipe &amp; Profile Extrusion</b><br>Extruder Design & Die Types • Cooling & Haul-Off Systems • Sizing & Calibration of PE Pipes • Standards & Performance Testing (e.g., ISO, ASTM)                                    |
| 1100 – 1215 | <b>Blow Molding Applications with PE</b><br>Extrusion & Injection Blow Molding Differences • Parison Programming & Mold Design • PE Bottle Manufacturing & Barrier Performance • Typical Applications (Containers, Tanks) |
| 1215 – 1230 | Break                                                                                                                                                                                                                     |
| 1230 – 1330 | <b>Rotational Molding of PE</b><br>Materials Used & Powder Characteristics • Mold Heating & Cooling Cycles • Wall Thickness Control & Aesthetics • Applications in Tanks, Toys, Containers                                |
| 1330 – 1420 | <b>PE Welding &amp; Joining Techniques</b><br>Butt Fusion & Electrofusion • Hot Gas & Extrusion Welding • Welding Parameters & Failure Modes • Quality Assurance & Inspection                                             |
| 1420 – 1430 | <b>Recap</b><br>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow                                   |
| 1430        | Lunch & End of Day Two                                                                                                                                                                                                    |

**Day 3: Tuesday, 14<sup>th</sup> of October 2025**

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|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0730 – 0830 | <b>Polypropylene Grades &amp; Characteristics</b><br>Homopolymer, Random Copolymer, Impact Copolymer • Isotactic versus Syndiotactic Configurations • Rheological Behavior & Crystallinity • Property Tuning for Specific Applications |
| 0830 – 0930 | <b>Injection Molding of PP</b><br>Cycle Optimization (Cooling, Filling, Ejection) • Shrinkage & Warpage Control • Gate Design & Flow Balancing • Thin-Wall & Complex Part Molding                                                      |
| 0930 – 0945 | Break                                                                                                                                                                                                                                  |
| 0945 – 1100 | <b>Thermoforming &amp; Sheet Extrusion</b><br>Sheet Extrusion Lines & Roll Stack Systems • Sheet Quality: Haze, Gloss, Flatness • Vacuum & Pressure Forming Techniques • Applications: Trays, Clamshells, Automotive Panels            |
| 1100 – 1215 | <b>Fiber &amp; Filament Production</b><br>Melt Spinning & Spunbond Techniques • Nonwoven Fabric Production • Stretching & Orientation • PP in Hygiene, Filtration & Industrial Textiles                                                |
| 1215 – 1230 | Break                                                                                                                                                                                                                                  |
| 1230 – 1330 | <b>Biaxially Oriented Polypropylene (BOPP)</b><br>Sequential versus Simultaneous Orientation • Line Configuration & Processing Zones • Film Properties: Clarity, Strength, Barrier • Applications: Packaging, Labels, Tapes            |
| 1330 – 1420 | <b>PP Compounding &amp; Specialty Blends</b><br>Talc & Glass-Fiber Filled PP • Impact Modifiers & Elastomer Blends • Long-Fiber Thermoplastic (LFT) Technology • Compatibilizers for Alloy Formation                                   |
| 1420 – 1430 | <b>Recap</b><br>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow                                                |
| 1430        | Lunch & End of Day Three                                                                                                                                                                                                               |

**Day 4: Wednesday, 15<sup>th</sup> of October 2025**

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|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0730 – 0830 | <b>Polyolefins in Automotive Applications</b><br>Lightweighting with PP & TPO • Interior Trim & Under-The-Hood Components • Scratch Resistance & Heat Performance • OEM Standards & Specifications                                                                          |
| 0830 – 0930 | <b>Medical &amp; Healthcare Applications</b><br>Sterilizable Grades & Biocompatibility • Packaging for IV Fluids & Medical Devices • Cleanroom Molding Considerations • FDA/USP Class VI Compliance                                                                         |
| 0930 – 0945 | Break                                                                                                                                                                                                                                                                       |
| 0945 – 1100 | <b>Polyolefins in Consumer &amp; Industrial Goods</b><br>Housewares, Appliances, Toys & Sports Equipment • Large Part Molding & Aesthetics • Impact Resistance & Fatigue Durability • Market-Driven Customization                                                           |
| 1100 – 1215 | <b>Recycling &amp; Sustainability of Polyolefins</b><br>Mechanical & Chemical Recycling Routes • Challenges in Mixed Waste Streams • Degradation Mechanisms & Stabilization • Designing for Recyclability                                                                   |
| 1215 – 1230 | Break                                                                                                                                                                                                                                                                       |
| 1230 – 1330 | <b>Processing Troubleshooting &amp; Defect Analysis</b><br>Surface Defects (Sharkskin, Melt Fracture) • Flow Lines, Voids, Sink Marks in Molded Parts • Contamination & Gels in Film & Pipe • Systematic Problem-Solving Approach                                           |
| 1330 – 1420 | <b>Quality Control &amp; Process Optimization</b><br>Statistical Process Control (SPC) in Extrusion & Molding • Inline Monitoring Systems (Thickness, Color, Temperature) • Optimization of Screw Design & Processing Conditions • Production Downtime Reduction Techniques |
| 1420 – 1430 | <b>Recap</b><br>Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow                                                                                     |
| 1430        | Lunch & End of Day Four                                                                                                                                                                                                                                                     |

**Day 5: Thursday, 16<sup>th</sup> of October 2025**

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|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0730 – 0830 | <b>Innovations in Polyolefin Catalysis &amp; Design</b><br>Metallocene Catalyst Advantages • Multimodal Polymers & Tailored Architectures • Controlled Branching & Polymer Blending • High-Performance PE & PP Grades                             |
| 0830 – 0930 | <b>Polyolefins in Packaging Applications</b><br>Flexible versus Rigid Packaging • Barrier Layer Integration (Co-Extrusion) • Sealability, Printability & Shelf-Life Impact • Food Contact & Regulatory Standards                                  |
| 0930 – 0945 | Break                                                                                                                                                                                                                                             |
| 0945 – 1100 | <b>Advanced Polyolefins in Infrastructure</b><br>Geomembranes & Geotextiles • Cable Insulation & Jacketing • Composite Pipes & Fittings • Aging, Creep & Weatherability Concerns                                                                  |
| 1100 – 1230 | <b>Market Strategy &amp; Product Positioning</b><br>Value Chain & Application Mapping • Custom Compounding versus Off-The-Shelf Grades • Customer Technical Support & Product Trials • Responding to End-User Trends (Sustainability, Durability) |

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|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1230 – 1245 | Break                                                                                                                                                                                                                     |
| 1245 – 1345 | <b>Case Studies &amp; Technical Analysis</b><br>Processing & Application Success Stories • Failure Investigation & Performance Review • New Product Development Lifecycle • Collaborations with Converters & Brand Owners |
| 1345 – 1400 | <b>Course Conclusion</b><br>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course                                                             |
| 1400 – 1415 | <b>POST-TEST</b>                                                                                                                                                                                                          |
| 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**

Reem Dergham, Tel: +974 4423 1327, Email: [reem@haward.org](mailto:reem@haward.org)