COURSE OVERVIEW FE0216
Piping Design in Accordance with ASME B31.3 (Level 2)

Course Title
Piping Design in Accordance with ASME B31.3 (Level 2)

Course Date/Venue
Session 1: July 26-30, 2026/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE or Online Virtual Training
Session 2: December 06-10, 2026/Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE or Online Virtual Training

Course Reference
FE0216

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of Piping Design in Accordance with ASME B31.3. It covers the ASME B31.3 overview and scope, piping system design criteria and P&ID interpretation and enhancement; the isometric drawing fundamentals, line list and piping specifications and plot plans and equipment layout; the pressure design of straight pipe (B31.3), corrosion and mill tolerance allowances including fittings and branch reinforcement calculations; the flange rating and pressure-temperature relationship, valve selection and pressure class matching and line sizing and velocity calculations; and the carbon steel and alloy steels (B31.3), stainless steels and specialty alloys, non-metallic and lined piping.

During this interactive course, participants will learn the piping components standards, gaskets, bolts and sealing technology and special piping components; the purpose of piping stress analysis, types of loads in piping systems, types of pipe supports and support location and spacing rules; the CAESAR II/stress tools, expansion loop and flexibility concepts, B31.3 compliance and documentation; the isometrics and MTO generation and stress review; and the practical interpretation including constructability and site considerations.

Course Objectives

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

- Apply and gain an in-depth knowledge on piping design in accordance with ASME B31.3
- Discuss ASME B31.3 overview and scope, piping system design criteria and P&ID interpretation and enhancement
- Recognize isometric drawing fundamentals, line list and piping specifications and plot plans and equipment layout
- Illustrate pressure design of straight pipe (B31.3), corrosion and mill tolerance allowances including fittings and branch reinforcement calculations
- Recognize flange rating and pressure-temperature relationship and apply valve selection and pressure class matching and line sizing and velocity calculations
- Identify carbon steel and alloy steels (B31.3), stainless steels and specialty alloys as well as non-metallic and lined piping
- Discuss piping components standards, gaskets, bolts and sealing technology and special piping components
- Recognize the purpose of piping stress analysis, types of loads in piping systems, types of pipe supports and support location and spacing rules
- Identify CAESAR II/stress tools and discuss expansion loop and flexibility concepts, B31.3 compliance and documentation
- Review isometrics and MTO generation and apply stress review and practical interpretation including constructability and site considerations

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 piping design in accordance with ASME B31.3 for piping design engineers, mechanical engineers, piping supervisors and senior draftsmen, plant engineers in, EPC contractors and engineering consultants, quality, inspection, and reliability engineers and those who involved in stress analysis, material selection, code compliance, and complex piping design challenges under ASME B31.3.

Virtual Training (If Applicable)

If this course is delivered online as a Virtual Training, the following limitations will be applicable:-

Certificates	Only soft copy certificates will be issued to participants through Haward's Portal. This includes Wallet Card Certificates if applicable
Training Materials	Only soft copy Training Materials (PDF format) will be issued to participant through the Virtual Training Platform
Training Methodology	80% of the program will be theory and 20% will be practical sessions, exercises, case studies, simulators or videos
Training Program	The training will be for 4 hours per day starting at 0930 and ending at 1330
H-STK Smart Training Kit	Not Applicable
Hands-on Practical Workshops	Not Applicable
Site Visit	Not Applicable
Simulators	Only software simulators will be used in the virtual courses. Hardware simulators are not applicable and will not be used in Virtual Training

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

F2F Classroom: US$ 5,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Online Virtual: US$ 2,750 per Delegate + **VAT**.

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.

Accommodation

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

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:

Mr. Geoff Kaschula is a **Senior Corrosion & Inspection Engineer** with over **30 years** of extensive experience within the **Oil & Gas**, **Petrochemical**, **Process** and **Power Industries**. His fields of specialization widely cover in the areas of **Metallurgy**, **Corrosion & Prevention** of **Failures**, **Material Selection & Properties**, **Corrosion Management & Material Selection** in Process Operations, **Pipeline & Compression**, Oil & Gas **Pipeline Infrastructure**, **Pipeline** Inspection, **Testing & Integrity** Assessment, **Pipeline** Defect Assessment, **Pipeline** Integrity Management, **Pipeline Pigging**-Technical & Operational Aspects, **Pigging** Operations, **Pigging** Technology, **Pipeline & Piping** Design, **ASME B31.3 Process Piping** Design, **Piping** Systems, **Forensic** Assessment, **Corrosion** Technology & Inspection, **Corrosion** Control & Corrosion Monitoring, **Corrosion & Fouling**, **Corrosion Management** in Production/Processing Operations, **Pipeline Corrosion** Inspection, Advanced **Integrity Management** for **Corrosion & Inspection**, **Design**, **Fabrication**, **Construction**, **Installation**, **Commissioning**, **Inspection** & **Maintenance** of **Process Equipment**, Factory Acceptance Test (**FAT**), **Boilers**, **Pressure Vessels**, **Structures** & **Storage Tanks**; **Condition Assessment** of Rotating & Auxiliary Equipment like **Compressors**, **Steam Turbines**, **Pumps**, **Heat Exchangers** & **Valves**; Risk Based Inspection (**RBI**), Fitness-For-Service (**FFS**), **In-Service Inspection & Condition** Assessment, **Steam Drums & Pressure Vessels**, **Tanks**, **Piping** Inspection, **Welding & Fabrication** Engineering, **Welding** Technology, Fabrication, **Welding** Inspection, **Failure Analysis**, Flaw Evaluation, Remnant Life Determination, Capacity Reviews for Process and Power Equipment, Asset Management and Project Management. He has also worked extensively with international industry standards such as **ASME B31**, **ASME VIII div 1 & 2**, TEMA, BS/EN 13445, BS/EN 12952, **API 650**, **API 653**, ANSI B31.1, ANSI B31.3, PD5500, AWS D1.1, SANS 10162, just to name a few. Mr. Kaschula is currently the **Director** of **RBI-Asset Management** wherein he provides technical support and consultancy services in the field of physical infrastructure asset management.

During his career life, Mr. Kaschula has gained his practical and field experience through his various significant positions and dedication as the **Director/Owner**, **Project Manager**, **QE Division Manager**, **Resident Inspection Engineer**, **Refurbishment Inspection Engineer**, **Inspection Engineer**, **Corrosion Engineer**, **Welding Engineer**, **QA/QC Engineer**, **Appointed Statutory Management Representative**, **Technical Assessor** and **Senior Instructor/Trainer** for numerous international companies like the Parsons Brinckerhoff Africa, Weltech CC., Projects Expedited (Pty) Ltd., Airtec Davidson (Pty) Ltd. and Hubert Davies, Arnot & Hendrina Power Station, Projects Expedited, Airtech Davidson & the Department of Transport.

Mr. Kaschula has a **Bachelor's** degree in **Mechanical Engineering**, a **National Diploma** (**Welding Engineer**) and a **Registered Professional Technologist** and **International Welding Technologist**. Further, he is a **Certified Instructor/Trainer**, a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership & Management** (**ILM**), a **Certified API 510 Pressure Vessel Inspector**, a **Certified API 570 Piping Inspector**, a **Certified API 580 Risk Based Inspector**, a **Registered Inspector** & **Competent Person** for Boilers, Pressure Vessels & Pressure Equipment, an ISO 9001 Lead Auditor and a member of South African Institute of Welding. He has further delivered numerous trainings, courses, seminars, conferences and workshops internationally.

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

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***ASME B31.3 Overview & Scope*** *Scope and Application Areas (Process Piping) • Differences Between B31.1, B31.4, B31.8 and B31.3 • Fluid Service Categories (Normal, Category D, Category M, High-Pressure) • Code Responsibilities – Owner, Designer, Inspector*
0930 – 0945	*Break*
0945 – 1030	***Piping System Design Criteria*** *Design Pressure and Design Temperature • Operating Conditions versus Upset Conditions • Corrosion Allowance & Design Margin • Design Life & Safety Factor Concept*
1030 – 1130	***P&ID Interpretation & Enhancement*** *Standard P&ID Symbols and Conventions • Equipment, Valve, Instrument Identification • Flow Direction, Line Numbers and Specifications • Process Conditions and Control Philosophy Reading*
1130 – 1215	***Isometric Drawing Fundamentals*** *Difference Between Orthographic and Isometric • Line Routing Principles • Dimensioning and Elevation Control • Spool Identification (Field versus Shop)*
1215 – 1230	*Break*
1230 – 1330	***Line List & Piping Specifications*** *Line Number Breakdown (Service, Size, Material, Class) • Specification Sheets Interpretation • Line Class Responsibilities • Tie-in and Battery Limit Identification*
1330 – 1420	***Plot Plans & Equipment Layout*** *Equipment Spacing Requirements • Pipe Rack Corridors • Access, Maintenance and Safety Clearance • Expansion and Layout Flexibility Concept*
1420 – 1430	***Recap*** *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

0730 – 0830	***Pressure Design of Straight Pipe (B31.3)*** *Hoop Stress Calculation • Allowable Stress & Efficiency Factor • Seam Type Factor (E) • Thickness Calculation per Code*
0830 – 0930	***Corrosion & Mill Tolerance Allowances*** *Typical Corrosion Allowance Values • Mill Tolerance (12.5% Rule) • Erosion versus Corrosion Effects • Design-for-Life Considerations*
0930 – 0945	*Break*
0945 – 1100	***Fittings & Branch Reinforcement Calculations*** *Branch Connection Types • Area Replacement Method • Reinforcement Pad Requirements • Integrally Reinforced Fittings*

1100 – 1215	***Flange Rating & Pressure-Temperature Relationship*** *ASME B16.5 and B16.47 Classes (150–2500) • Pressure-Temperature Derating • Gasket Selection Basics • Bolting Stress Control*
1215 – 1230	*Break*
1230 – 1330	***Valve Selection & Pressure Class Matching*** *Gate, Globe, Ball, Butterfly, Check Valves • Fire-Safe and Fugitive Emission Valves • Cryogenic and High-Temperature Valves • Pressure Class Matching to Line Spec*
1330 – 1420	***Line Sizing & Velocity Calculations*** *Gas and Liquid Velocity Limits • Pressure Drop Calculation • Erosion Velocity Concept • Economic Pipe Diameter Principles*
1420 – 1430	***Recap*** *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

0730 – 0830	***Carbon Steel & Alloy Steels (B31.3)*** *ASTM A106, A53, A333, A335 • Temperature Limitations • Low-Temperature Service Requirements • Impact Testing Requirements*
0830 – 0930	***Stainless Steels & Specialty Alloys*** *Austenitic versus Duplex Stainless Steel • Corrosion Resistance & Pitting • High-Temperature Alloy Selection • NACE & Sour Service Material Requirements*
0930 – 0945	*Break*
0945 – 1100	***Non-Metallic & Lined Piping*** *FRP, HDPE, PVC, PTFE Lined Piping • Temperature & Pressure Limits • Chemical Compatibility • Support and Expansion Behavior*
1100 – 1215	***Piping Components Standards*** *ASME B16.9 (Butt-Weld Fittings) • ASME B16.11 (Forged Fittings) • ASME B16.10, B16.34 (Valve Standards) • MSS SP Standards*
1215 – 1230	*Break*
1230 – 1330	***Gaskets, Bolts & Sealing Technology*** *Spiral Wound, RTJ, Flat, Ring Gaskets • ASTM Bolting Grades (A193 / A194) • Bolt Torque Principles • Leak Prevention Methods*
1330 – 1420	***Special Piping Components*** *Expansion Joints & Bellows • Steam Traps & Strainers • Pressure Relief Valves (PRV) • Inline Mixers / Orifice Plates*
1420 – 1430	***Recap*** *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

0730 – 0830	***Purpose of Piping Stress Analysis*** *Thermal Expansion Problems • External Loads and Vibration • Failure Mechanisms • Code Compliance Verification*
0830 – 0930	***Types of Loads in Piping Systems*** *Sustained Loads (Pressure + Weight) • Occasional Loads (Wind/Seismic) • Thermal Loads (Expansion/Contraction) • Dynamic Loads (Surge, Vibration)*

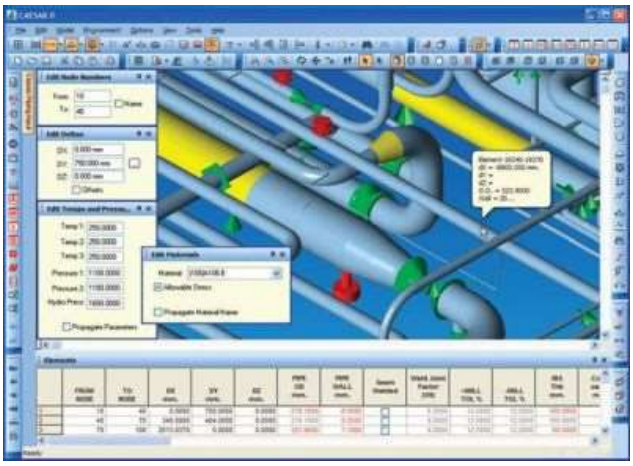
0930 – 0945	*Break*
0945 – 1100	***Types of Pipe Supports*** *Rigid Supports • Spring Supports • Guides and Anchors • Variable versus Constant Effort Supports*
1100 – 1215	***Support Location & Spacing Rules*** *Span Charts and Deflection Control • Based on Pipe Size & Material • Lateral versus Longitudinal Spacing • Heavy Valve & Equipment Supports*
1215 – 1230	*Break*
1230 – 1330	***CAESAR II / Stress Tools*** *Model Input Data Requirement • Boundary Conditions & Restraints • Load Cases Generation • Understanding Output Reports*
1330 – 1420	***Expansion Loop & Flexibility Concepts*** *Natural versus Engineered Flexibility • Anchor and Guide Placement • Offset and Loop Design • Cold Spring and Stress Reduction*
1420 – 1430	***Recap*** *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

0730 – 0830	***B31.3 Compliance & Documentation*** *Design Calculations Documentation • Required Code Statements • Material Traceability • Design Verification Reports*
0830 – 0930	***Review of Isometrics & MTO Generation*** *Checking Elevations & Slopes • Clash Detection Basics • Material Take-Off Process • Fabrication Drawing Coordination*
0930 – 0945	*Break*
0945 – 1100	***Stress Review & Practical Interpretation*** *Allowable Stress versus Calculated Stress • Overstress Indicators • Support Re-Adjustment Methods • Design Modification Options*
1100 – 1215	***Constructability & Site Considerations*** *Welding Access and NDT Requirements • Lifting and Erection Planning • Field Fit & Tolerance Allowance • Cold Alignment Issues*
1215 – 1230	*Break*
1230 – 1300	***Failure Case Studies & Lessons Learned*** *Pipe Rupture Incidents • Flange Leak Failures • Thermal Stress Cracks • Poor Support Examples*
1300 - 1345	***Capstone Design Workshop*** *Mini-Project: Process Unit Piping Design • Apply B31.3 Rules • Prepare P&ID + Iso + Calc + Support Plan • Group Review and Feedback*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about t Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the "CAESAR II" simulator.



CAESAR II

Course Coordinator

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