

**COURSE OVERVIEW PE0154**  
**Bulk Liquid Storage Management & Tanks Cleaning**

**Course Title**

Bulk Liquid Storage Management & Tanks Cleaning

**Course Date/Venue**

November 10-14, 2024/TBA Meeting Room,  
 The H Dubai Hotel, Sheikh Zayed Rd - Trade  
 Centre, Dubai, UAE

**Course Reference**

PE0154

**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 Bulk Liquid Storage Management and Tanks Cleaning. It covers the basics of storage facilities, types of liquids stored and their importance in various industries; the design elements of storage tanks, materials used and how they cater to different storage needs; the different types of storage tanks covering above-ground, underground, vertical, horizontal, single and double-walled tanks; the safety measures in bulk liquid storage including fire prevention, leak detection and containment measures; and the international, national and regional regulations on bulk liquid storage.



Further, the course will also discuss the daily operations of storage tanks, including filling, monitoring, and draining processes; the regular and preventive maintenance routines and inspections for different types of tanks; the issue of corrosion, common causes, prevention measures and maintenance practices; the lifespan of storage tanks, when to repair versus replace and cost considerations; and the emergency response planning and the importance of regular tank cleaning.

During this interactive course, participants will learn the common contaminants and their risks; the tank cleaning methods, safety measures during tank cleaning and waste management; the automated tank cleaning and non-man entry techniques; the role of technology in tank cleaning, environmental considerations and tank cleaning best practices; the quality assurance in bulk liquid storage and maintaining product integrity; the storage and cleaning procedures, preparing regulatory audits and reviewing hazardous materials regulations; and the potential consequences of non-compliance including penalties, shutdowns and environmental harm.

### **Course Objectives**

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

- Apply and gain an in-depth knowledge on bulk liquid storage management and tanks cleaning
- Discuss the basics of storage facilities, types of liquids stored and their importance in various industries
- Identify the design elements of storage tanks, materials used and how they cater to different storage needs
- Recognize the different types of storage tanks covering above-ground, underground, vertical, horizontal, single and double-walled tanks
- Analyze safety measures in bulk liquid storage including fire prevention, leak detection and containment measures
- Identify the international, national and regional regulations on bulk liquid storage
- Apply the daily operations of storage tanks, including filling, monitoring, and draining processes
- Carryout regular and preventive maintenance routines as well as inspections for different types of tanks
- Identify the issue of corrosion, common causes, prevention measures and maintenance practices
- Discuss the lifespan of storage tanks, when to repair versus replace and cost considerations
- Apply emergency response planning and discuss the importance of regular tank cleaning
- Recognize the common contaminants and their risks as well as employ tank cleaning methods, safety measures during tank cleaning and waste management
- Carryout automated tank cleaning and non-man entry techniques
- Identify the role of technology in tank cleaning, environmental considerations and tank cleaning best practices
- Implement quality assurance in bulk liquid storage and maintain product integrity
- Document storage and cleaning procedures, prepare regulatory audits and review hazardous materials regulations
- Identify the potential consequences of non-compliance including penalties, shutdowns and environmental harm

### 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, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.

### Who Should Attend

This course covers systematic techniques and methodologies on bulk liquid storage management and tanks cleaning for process engineers, mechanical engineers, marine terminal staff, marine operation staff, managers, operations and any other professional interested in knowing more about tank farms and storage tanks.

### 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\$ 7,500** per Delegate + **VAT**. 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: -

- 
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.

- 
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.

### 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. Andrew Ladwig** is a **Senior Process Engineer** with over **25 years** of extensive experience within the **Oil & Gas, Refinery, Petrochemical & Power** industries. His expertise widely covers in the areas of **Ammonia Manufacturing & Process Troubleshooting, Ammonia Storage & Loading Systems, Ammonia Plant Operation, Troubleshooting & Optimization, Ammonia Recovery, Ammonia Plant Safety, Hazard of Ammonia Handling, Storage & Shipping, Operational Excellence** in **Ammonia Plants, Fertilizer Storage Management (Ammonia & Urea), Fertilizer Manufacturing Process Technology, Sulphur Recovery, Phenol Recovery & Extraction, Wax Sweating & Blending, Petrochemical & Fertilizer Plants, Nitrogen Fertilizer Production, Petroleum Industry Process Engineering, Separators in Oil & Gas Industry, Gas Testing & Energy Isolations, Gas Liquor Separation, Industrial Liquid Mixing, Wax Bleachers, Extractors, Fractionation, Operation & Control of Distillation, Process of Crude ATM & Vacuum Distillation Unit, Water Purification, Steam & Electricity, Flame Arrestors, Coal Processing, Environmental Emission Control, R&D of Wax Blending, Wax Molding/Slabbing, Industrial Drying, Principles, Selection & Design, Certified Process Plant Operations, Control & Troubleshooting, Operator Responsibilities, Storage Tanks Operations & Measurements, Process Plant Troubleshooting & Engineering Problem Solving, Process Plant Performance, Efficiency & Optimization, Continuous Improvement & Benchmarking, Process Troubleshooting Techniques, Oil & Gas Operation/Introduction to Surface Facilities, Pressure Vessel Operation, Process Equipment Performance & Troubleshooting, Plant Startup & Shutdown, Startup & Shutdown the Plant While Handling Abnormal Conditions, Process Gas Plant Start-up, Commissioning & Problem Solving, Process Liquid, Process Handling & Measuring Equipment, Steam Trap Design, Operation, Maintenance & Troubleshooting, Steam Trapping & Control, Column, Pump & Exchangers, Troubleshooting & Design, Rotating Equipment Operation & Troubleshooting, Control & ESD System, Root Cause Analysis (RCA), Dangerous Goods, Production Optimization, Permit to Work (PTW), Project Engineering, Data Analysis, HAZOP Study, Sampling & Analysis, Job Analysis Techniques, Hazardous Material Classification & Storage/Disposal, Risk Monitoring Authorized Gas Tester (AGT), Confined Space Entry (CSE), Process Hazard Analysis (PHA), Personal Protective Equipment (PPE), Fire & Gas, First Aid and Occupational Health & Safety.**

During his career life, Mr. Ladwig has gained his practical experience through his various significant positions and dedication as the **Warehouse Manager, Quality Manager, Business Analyst, Process Engineer, HSE Supervisor, Senior Process Controller, Process Controller, Safety Officer, Senior Lecturer** and **Senior Consultant/Trainer** for various companies such as the Sasol Ltd., Sasol Wax, Sasol Synfuels, just to name a few.

Mr. Ladwig is a **Registered SAQA Qualification (NQF Level 4) in Chemical Operations**. Further, he is a **Certified Multi-Skilled in Instrumentation and Mechanical**, a **Certified Instructor/Trainer** and has delivered various trainings, workshops, seminars, courses and conferences internationally.

### **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: Introduction to Bulk Liquid Storage Management**

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Overview of Bulk Liquid Storage:</b> Basics of Storage Facilities, Types of Liquids Stored & their Importance in Various Industries
0930 – 0945	Break
0945 – 1030	<b>Design of Storage Tanks:</b> Introduction to the Design Elements of Storage Tanks, Materials Used & How they Cater to Different Storage Needs
1030 – 1130	<b>Understanding the Different Types of Storage Tanks:</b> Discussion on Above-Ground, Underground, Vertical, Horizontal, Single & Double-Walled Tanks
1130 – 1230	<b>Safety Features in Bulk Liquid Storage:</b> Analysis of Safety Measures, Including Fire Prevention, Leak Detection & Containment Measures
1230 – 1245	Break
1245 – 1330	<b>Regulatory Compliance:</b> An Overview of International, National & Regional Regulations on Bulk Liquid Storage
1330 – 1420	<b>Case Study:</b> Analysis of a Real-Life Bulk Liquid Storage Facility, its Design, Safety Measures & Regulatory Compliance
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day One

#### **Day 2: Operation & Maintenance of Storage Tanks**

0730 – 0830	<b>Routine Operations:</b> Introduction to the Daily Operations of Storage Tanks, Including Filling, Monitoring & Draining Processes
0830 – 0930	<b>Inspection &amp; Maintenance:</b> Explanation of Regular & Preventive Maintenance Routines, as well as Inspections for Different Types of Tanks
0930 – 0945	Break
0945 – 1100	<b>Corrosion &amp; Its Prevention:</b> Deep Dive into the Issue of Corrosion, Common Causes, Prevention Measures, & Maintenance Practices
1100 – 1230	<b>Life Cycle Management of Storage Tanks:</b> Discussion on the Lifespan of Storage Tanks, when to Repair versus Replace & Cost Considerations
1230 – 1245	Break
1245 – 1330	<b>Emergency Response Planning:</b> Creating & Practicing an Effective Response Plan for Emergencies, such as Leaks or Fires
1330 – 1420	<b>Case Study:</b> An Examination of a Maintenance Event or Emergency Response Scenario at a Storage Facility
1420 – 1430	<b>Recap</b>
1430	Lunch & End of Day Two

#### **Day 3: Introduction to Tank Cleaning**

0730 – 0830	<b>Why Tank Cleaning Matters:</b> Understanding the Importance of Regular Tank Cleaning for Safety, Efficiency & Regulatory Compliance
0830 – 0930	<b>Common Contaminants &amp; Their Risks:</b> Examination of Common Contaminants Found in Tanks, Risks Associated & Preventive Measures
0930 – 0945	Break



0945 - 1100	<b>Overview of Tank Cleaning Methods:</b> Introduction to Manual, Automated & Non-Man Entry Tank Cleaning Methods
1100 - 1230	<b>Safety Measures During Tank Cleaning:</b> Detailed Look at Safety Considerations During Cleaning, such as Ventilation, Confined Space Entry & the use of Personal Protective Equipment
1230 - 1245	Break
1245 - 1330	<b>Waste Management:</b> Handling & Disposal of Waste Materials Generated During Tank Cleaning
1330 - 1420	<b>Case Study:</b> Analysis of a Tank Cleaning Operation, Looking at the Method Used, Safety Measures & Waste Disposal
1420 - 1430	<b>Recap</b>
1430	Lunch & End of Day Three

**Day 4: Advanced Tank Cleaning Techniques**

0730 - 0830	<b>Automated Tank Cleaning:</b> Detailed Study of Automated Cleaning Systems, their Benefits, Limitations & Ideal Applications
0830 - 0930	<b>Non-Man Entry Techniques:</b> Deep Dive into Techniques Like Robotics & Chemical Cleaning, Focusing on Safety & Efficiency
0930 - 0945	Break
0945 - 1100	<b>Role of Technology in Tank Cleaning:</b> Overview of Recent Technological Advancements Aiding the Tank Cleaning Process
1100 - 1230	<b>Environmental Considerations:</b> Analysis of How to Minimize Environmental Impact During Tank Cleaning Operations
1230 - 1245	Break
1245 - 1330	<b>Tank Cleaning Best Practices:</b> Comprehensive List of Best Practices for a Safe & Efficient Tank Cleaning Process
1330 - 1420	<b>Case Study:</b> A Real-World Example of a Complex Tank Cleaning Operation, Focusing on the Techniques Used, Challenges Faced & Solutions Implemented
1420 - 1430	<b>Recap</b>
1430	Lunch & End of Day Four

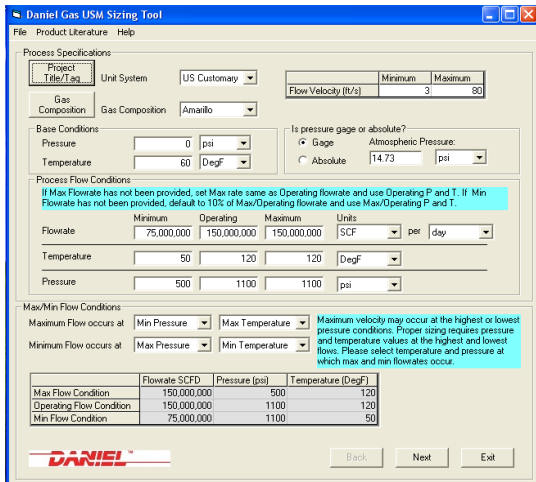
**Day 5: Quality Assurance & Regulatory Compliance**

0730 - 0830	<b>Quality Assurance in Bulk Liquid Storage:</b> Understanding the Importance of QA, Processes & Maintaining Product Integrity
0830 - 0930	<b>Documenting Storage &amp; Cleaning Procedures:</b> Discussion on Maintaining Proper Records of all Procedures, Inspections & Maintenance Activities
0930 - 0945	Break
0945 - 1030	<b>Regulatory Audits:</b> Preparation for Local, State, Federal & Industry Audits & Inspections
1030 - 1130	<b>Hazardous Materials Regulations:</b> Deep Dive into Regulations Concerning the Storage & Handling of Hazardous Materials
1130 - 1230	<b>Non-compliance:</b> Understanding the Potential Consequences of Non-Compliance, Including Penalties, Shutdowns & Environmental Harm
1230 - 1245	Break
1245 - 1345	<b>Case Study:</b> Review of a Company Dealing with a Regulatory Issue, Focusing on the Problem, the Company's Response & the Final Outcome
1345 - 1400	<b>Course Conclusion</b>
1400 - 1415	<b>POST-TEST</b>
1415 - 1430	Presentation of Course Certificates
1430	Lunch & End of Course



## Simulators (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 our state-of-the-art simulators “Gas Ultrasonic Meter Sizing Tool”, “Liquid Turbine Meter and Control Valve Sizing Tool”, “Liquid Ultrasonic Meter Sizing Tool”, “Orifice Flow Calculator” and “ASPEN HYSYS” simulator.



**Daniel Gas USM Sizing Tool**

Process Specifications

Project Title / Tag: [ ] Unit System: US Customary

Gas Composition: Amairlo

Flow Velocity (ft/s): Minimum [3] Maximum [80]

Base Conditions

Pressure: 0 psi

Temperature: 60 DegF

Is pressure gage or absolute?  Gage Atmospheric Pressure: 14.73 psi

Process Flow Conditions

If Max Flowrate has not been provided, set Max rate same as Operating flowrate and use Operating P and T. If Min Flowrate has not been provided, default to 10% of Max/Operating flowrate and use Max/Operating P and T.

Flowrate	Minimum	Operating	Maximum	Units
	75,000,000	150,000,000	150,000,000	SCF per day

Temperature: 50 120 120 DegF

Pressure: 500 1100 1100 psi

Max/Min Flow Conditions

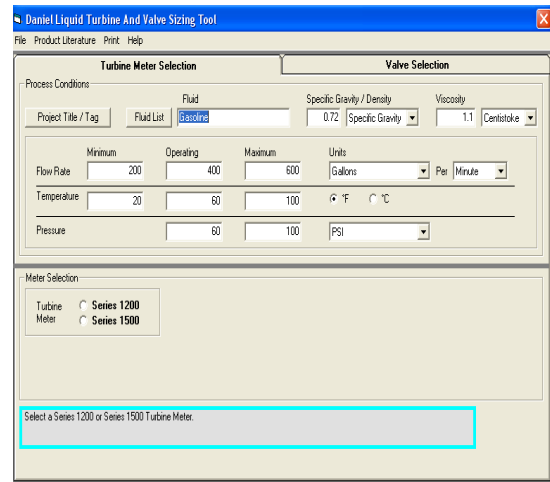
Maximum Flow occurs at: Min Pressure Max Temperature

Minimum Flow occurs at: Max Pressure Min Temperature

	Flowrate SCFD	Pressure (psi)	Temperature (DegF)
Max Flow Condition	150,000,000	500	120
Operating Flow Condition	150,000,000	1100	120
Min Flow Condition	75,000,000	1100	50

DANIEL

**Gas Ultrasonic Meter (USM) Sizing Tool Software**



**Daniel Liquid Turbine And Valve Sizing Tool**

Turbine Meter Selection

Process Conditions

Fluid: Gasoline

Specific Gravity / Density: 0.72

Viscosity: 1.1 Centistoke

Flow Rate: Minimum 200 Operating 400 Maximum 600 Units: Gallons Per Minute

Temperature: 20 60 100 °F °C

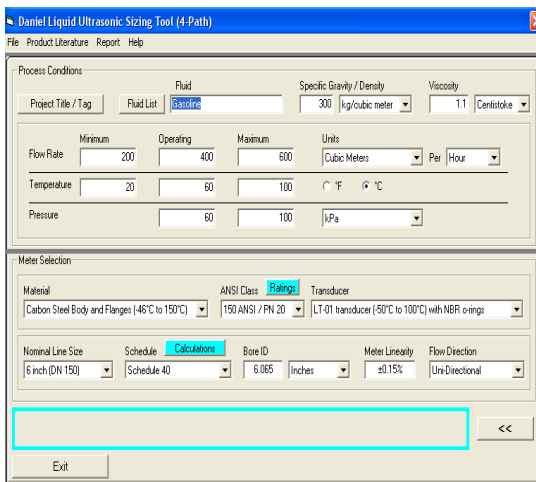
Pressure: 60 100 PSI

Meter Selection

Turbine Meter:  Series 1200  Series 1500

Select a Series 1200 or Series 1500 Turbine Meter.

**Liquid Turbine Meter and Control Valve Sizing Tool Software**



**Daniel Liquid Ultrasonic Sizing Tool (4-Path)**

Process Conditions

Fluid: Gasoline

Specific Gravity / Density: 300 kg/cubic meter

Viscosity: 1.1 Centistoke

Flow Rate: Minimum 200 Operating 400 Maximum 600 Units: Cubic Meters Per Hour

Temperature: 20 60 100 °F °C

Pressure: 60 100 kPa

Meter Selection

Material: Carbon Steel Body and Flanges (-46°C to 150°C)

ANSI Class: Ratings

Transducer: LT-01 transducer (50°C to 100°C) with NBR o-rings

Nominal Line Size: 6 inch (DN 150)

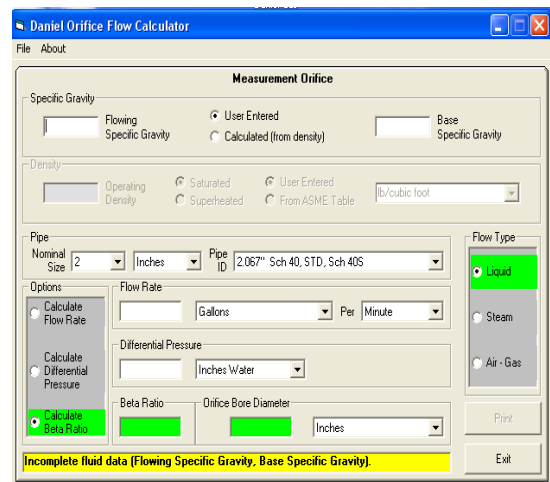
Schedule: Schedule 40

Bore ID: 6.065 inches

Meter Linearity: ±0.15%

Flow Direction: Uni-Directional

**Liquid Ultrasonic Meter Sizing Tool Software**



**Daniel Orifice Flow Calculator**

Measurement Orifice

Specific Gravity:  Flowing Specific Gravity  User Entered  Calculated (from density)  Base Specific Gravity

Density:  Operating Density  Saturated  Superheated  User Entered  From ASME Table  lb/cubic foot

Pipe: Nominal Size 2 Inches Pipe ID 2.067" Sch 40, STD, Sch 40S

Options:  Calculate Flow Rate  Calculate Differential Pressure  Calculate Beta Ratio

Flow Rate:  Gallons Per Minute

Differential Pressure:  Inches Water

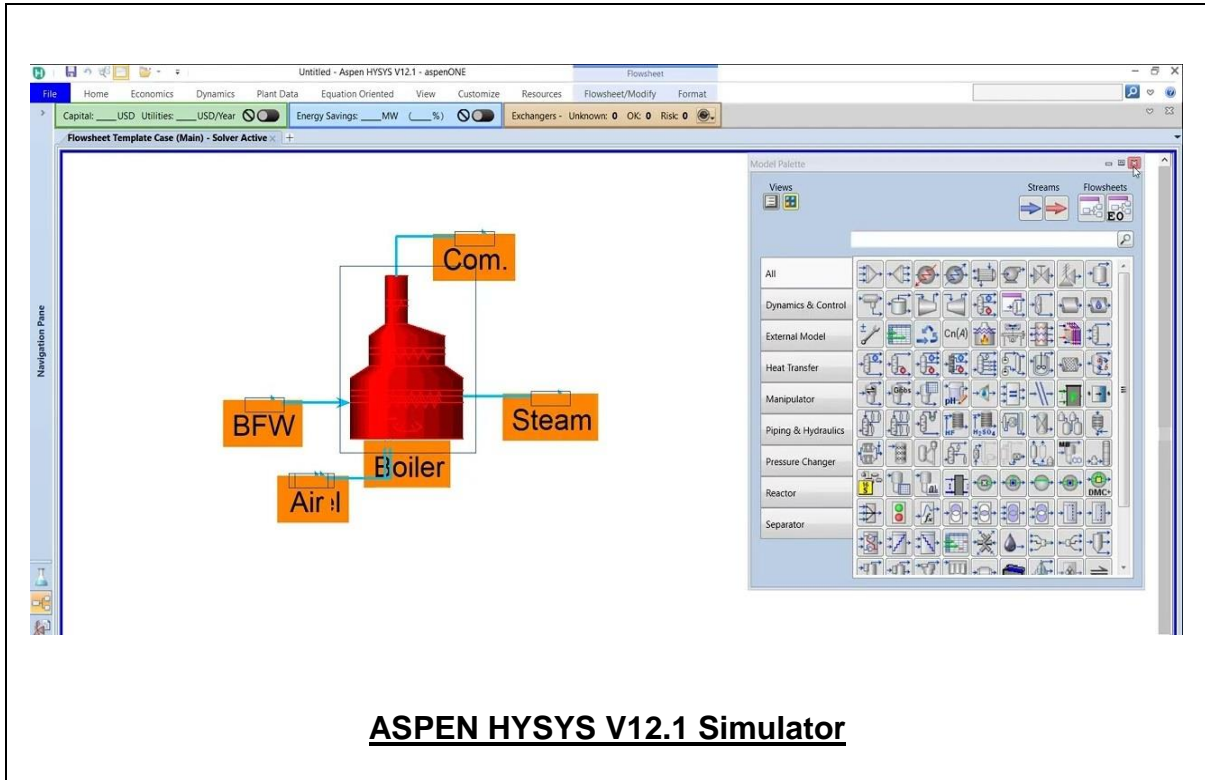
Beta Ratio:  Orifice Bore Diameter:  Inches

Flow Type:  Liquid  Steam  Air - Gas

Incomplete fluid data (Flowing Specific Gravity, Base Specific Gravity).

**Orifice Flow Calculator Software**





**Course Coordinator**

Mari Nakintu, Tel: +971 2 30 91 714, Email: [mari1@haward.org](mailto:mari1@haward.org)