MATRIX QUANTUM SDN. BHD. 202201044306 (1490003-X)
Lot 180, Jalan 1A, Kampung Baru Subang,
40150 Shah Alam, Selangor Darul Ehsan.
Tel: 03-58926806 Email: matrixquantum88@gmail.com

TRAINING SCHEDULE & OUTLINE

Course Tittle	**Boiler Design Insight - Practical Perspective**
Training Provider	**Matrix Quantum Sdn. Bhd.**
Duration	**2 Days**
Date	**TBA**
Time	**8.30am – 5.00pm**
Speaker	**Mohd Fauzi bin Mat Rasid – Boiler Engineer Grade (JKKP 2025/JS01/1590)**

About the Training:
This 2-day program is designed to provide steam engineers and plant personnel with a clear and practical understanding of boiler design concepts from an operational perspective. Rather than focusing on complex calculations, the course emphasizes the fundamental principles behind boiler design and how these principles directly influence safety, reliability, and performance in real plant operation.

Participants will gain valuable insights into design philosophy, heat transfer, circulation, and pressure component integrity—while understanding how deviations from design conditions can lead to equipment damage and operational risks.

Through structured explanations and practical discussion-based scenarios, this program bridges the gap between design intent and day-to-day operation, enabling participants to make better decisions, prevent failures, and operate boilers more safely and efficiently.

This course is highly suitable for Steam Boiler Engineers, plant engineers, and technical managers seeking to enhance their competency while fulfilling Continuous Education Program (CEP) requirements for license renewal.

Training Outcomes:
Upon completion of this training, participants will be equipped to immediately implement best practices of:

1. Explain the fundamental philosophy of boiler design and its relationship to operating limits and safety requirements.
2. Describe the basic heat transfer mechanisms within a boiler and their impact on efficiency and performance
3. Understand the principles of boiler circulation and the importance of maintaining adequate flow conditions
4. Identify key pressure parts in a boiler and explain their role in maintaining pressure integrity
5. Recognize common damage mechanisms and relate them to deviations from design conditions
6. Evaluate the operational risks associated with exceeding design limits such as pressure, temperature, and flow
7. Apply practical reasoning to assess operating conditions and prevent potential boiler failures

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	TIME	DESCRIPTION	REMARK
DAY 1	8.30-8.45	REGISTRATION DAY 1	
	8.45-9.00	INTRODUCTION AND ICE BREAKING	
	9.00-10.30	MODULE 1	
	10.30-11.00	TEA BREAK	
	11.00-12.30	MODULE 2	
	12.30-14.00	LUNCH AND ZOHOR PRAYER BREAK	
	14.00-15.30	MODULE 3	
	15.30-15.45	TEA BREAK	
	15.45-17.15	MODULE	
	17.15	ADJOURN DAY 1	
DAY 2	8.30-8.45	REGISTRATION DAY 4	
	8.45-9.00	RECAP OF PREVIOUS DAY LESSONS	
	9.00-10.30	MODULE 4	
	10.30-11.00	TEA BREAK	
	11.00-12.30	MODULE 5	
	12.30-14.00	LUNCH AND ZOHOR PRAYER BREAK	
	14.00-15.30	MODULE 6	
	15.30-15.45	TEA BREAK	
	15.45-17.15	MODULE 6	
	17.15	END OF COURSE	

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MODULE OUTLINE DETAILS

1. **MODULE 1 – BOILER DESIGN PHYLOSOPHY & OPERATING LIMIT**

   Focus: Understanding the intent behind boiler design and why limits must be respected

   Coverage:

   - Design pressure vs operating pressure
   - Design temperature concept
   - Safety margins and design philosophy
   - Importance of operating within limits
   - Relationship between design and protection systems (alarm/trip)

2. **MODULE 2 – HEAT TRANSFER**

   Focus: Understanding how heat is transferred and what affects performance

   Coverage:

   - Radiation and convection (practical view)
   - Furnace vs convective sections
   - Heat transfer efficiency
   - Impact of fouling and slagging
   - Effect of poor heat absorption on tube temperature

3. **MODULE 3 – CIRCULATION & FLOW**

   Focus: Critical role of circulation in protecting boiler tubes

   Coverage:

   - Natural circulation concept
   - Density difference principle
   - Importance of flow stability
   - Relationship between flow and heat removal
   - Risks associated with inadequate circulation

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4. MODULE 4 – PRESSURE PART & DESIGN AWARENESS

Focus: Understanding structural integrity of boiler components

Coverage:

- Overview of drum, headers, and tubes
- Basic concept of stress and thickness
- Pressure containment principle
- Impact of pressure and temperature on material
- Consequences of overstressing components

5. MODULE 5 – DESIGN VS DAMAGE MECHANISM

Focus: Linking operational conditions to equipment degradation

Coverage:

- Overheating mechanisms
- Corrosion (internal & external)
- Erosion effects
- Thermal fatigue
- How operating conditions influence damage initiation

6. MODULE 6 – DEVIATION FROM DESIGN

Focus: Recognizing risks when operating outside design conditions

Coverage:

- Concept of normal vs abnormal operation
- Typical deviations:
  - Flow reduction
  - Temperature excursion
  - Pressure increase
  - Heat imbalance
- Consequences of deviation on safety and reliability
- Practical discussion using operational scenarios