Training Course on Fired Heaters and Heat Exchangers

Professional Development Training Course Outline

Category	Development	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

This intensive training course delves into the critical aspects of **fired heaters** and **heat exchangers**, two essential components in numerous industrial processes, including oil and gas, petrochemical, and power generation. Participants will gain a comprehensive understanding of their design principles, operational best practices, maintenance strategies, and safety protocols. Mastering these concepts is paramount for enhancing **energy efficiency**, minimizing operational downtime, ensuring **process safety**, and optimizing overall plant performance. The curriculum blends theoretical knowledge with practical insights, incorporating real-world case studies and interactive exercises to foster a deep and applicable understanding of these vital technologies. By focusing on the latest industry standards and emerging trends, this course equips professionals with the expertise to troubleshoot effectively, improve reliability, and contribute significantly to their organization's success in managing these critical assets.

Training Course on Fired Heaters and Heat Exchangers is meticulously designed to address the evolving demands of the industry, emphasizing the importance of **performance optimization** and **risk management** in the operation of fired heaters and heat exchangers. Through a structured learning approach, participants will explore advanced topics such as fouling mitigation, corrosion prevention, combustion control, and advanced inspection techniques. The course highlights the significance of adhering to stringent **safety regulations** and implementing proactive maintenance strategies to extend equipment lifespan and prevent costly failures. By investing in this training, organizations can empower their workforce with the specialized knowledge required to achieve operational excellence, improve **asset integrity**, and drive sustainable improvements in their processes involving these critical heat transfer systems.

Programme Curriculum

Training Course on Fired Heaters and Heat Exchangers

Introduction

This intensive training course delves into the critical aspects of **fired heaters** and **heat exchangers**, two essential components in numerous industrial processes, including oil and gas, petrochemical, and power generation. Participants will gain a comprehensive understanding of their design principles, operational best practices, maintenance strategies, and safety protocols. Mastering these concepts is paramount for enhancing **energy efficiency**, minimizing operational downtime, ensuring **process safety**, and optimizing overall plant performance. The curriculum blends theoretical knowledge with practical insights, incorporating real-world case studies and interactive exercises to foster a deep and applicable understanding of these vital technologies. By focusing on the latest industry standards and emerging trends, this course equips professionals with the expertise to troubleshoot effectively, improve reliability, and contribute significantly to their organization's success in managing these critical assets.

Training Course on Fired Heaters and Heat Exchangers is meticulously designed to address the evolving demands of the industry, emphasizing the importance of **performance optimization** and **risk management** in the operation of fired heaters and heat exchangers. Through a structured learning approach, participants will explore advanced topics such as fouling mitigation, corrosion prevention, combustion control, and advanced inspection techniques. The course highlights the significance of adhering to stringent **safety regulations** and implementing proactive maintenance strategies to extend equipment lifespan and prevent costly failures. By investing in this training, organizations can empower their workforce with the specialized knowledge required to achieve operational excellence, improve **asset integrity**, and drive sustainable improvements in their processes involving these critical heat transfer systems.

Course Duration

5 days

Course Objectives

1. Understand the fundamental principles of **heat transfer** in fired heaters and heat exchangers.
2. Identify and analyze different types of **fired heater design** and their applications.
3. Evaluate various types of **heat exchanger design**, including shell and tube, plate, and air-cooled exchangers.
4. Learn best practices for the efficient **operation of fired heaters**, including combustion control and draft management.
5. Master techniques for optimizing the **performance of heat exchangers**, focusing on heat recovery and pressure drop management.
6. Develop effective strategies for **fouling mitigation** and cleaning of heat transfer surfaces.
7. Implement robust **corrosion prevention** and material selection strategies for both fired heaters and heat exchangers.
8. Understand and apply relevant **industry standards and safety regulations** related to fired heaters and heat exchangers.
9. Learn various **inspection and testing methods** for assessing the condition and integrity of these assets.
10. Develop effective **maintenance and repair strategies** to maximize equipment lifespan and reliability.
11. Acquire skills in **troubleshooting common operational issues** in fired heaters and heat exchangers.
12. Understand the principles of **energy efficiency improvement** in heat transfer systems.

13. Explore the latest **technological advancements** and emerging trends in fired heater and heat exchanger technology.

Organizational Benefits

- Reduced operational costs through improved **energy efficiency**.
- Minimized downtime due to enhanced equipment reliability and proactive maintenance.
- Improved **process safety** and reduced risk of accidents.
- Extended equipment lifespan through proper operation and maintenance practices.
- Enhanced problem-solving capabilities of the workforce.
- Compliance with relevant industry standards and regulations.
- Increased asset integrity and optimal performance.
- A more knowledgeable and skilled technical team.

Target Audience

1. Process Engineers
2. Maintenance Engineers and Technicians
3. Operations Personnel
4. Plant Managers
5. Safety Officers
6. Inspection Engineers
7. Reliability Engineers
8. Technical Trainers

Course Outline

Module 1: Fundamentals of Heat Transfer and Thermodynamics

- Basic principles of conduction, convection, and radiation.
- Thermodynamic laws and their application in heat transfer systems.
- Heat transfer coefficients and thermal resistance.
- Log Mean Temperature Difference (LMTD) and effectiveness-NTU methods.
- Case Study: Analysis of heat loss in a refinery process and potential for recovery.

Module 2: Fired Heater Design and Operation

- Types of fired heaters: cabin, box, cylindrical.
- Components of a fired heater: burners, tubes, refractory, stack.
- Combustion principles and burner technology.
- Draft systems and their control.
- Case Study: Troubleshooting burner instability issues in a crude oil heater.

Module 3: Heat Exchanger Design and Types

- Classification of heat exchangers: shell and tube, plate, air-cooled, compact.
- Constructional features and materials of construction.
- Flow arrangements: parallel flow, counterflow, crossflow.
- Heat transfer enhancement techniques.
- Case Study: Selection of the appropriate heat exchanger type for a specific chemical process.

Module 4: Operation and Performance Optimization of Heat Exchangers

- Start-up and shutdown procedures.

- Monitoring key operating parameters: temperature, pressure, flow rate.
- Performance evaluation and analysis.
- Strategies for maximizing heat recovery.
- Case Study: Optimizing the performance of a feed water heater in a power plant.

Module 5: Fouling and Corrosion in Heat Transfer Equipment

- Types of fouling: scaling, deposition, biological fouling.
- Mechanisms of corrosion: uniform, pitting, galvanic, stress corrosion cracking.
- Fouling mitigation techniques: chemical, mechanical, operational.
- Corrosion prevention methods: material selection, inhibitors, cathodic protection.
- Case Study: Implementing a chemical cleaning program to remove fouling from a cooling water heat exchanger.

Module 6: Inspection, Maintenance, and Repair of Fired Heaters and Heat Exchangers

- Non-destructive testing (NDT) methods: UT, RT, MT, PT.
- Visual inspection and condition assessment.
- Preventive maintenance strategies and scheduling.
- Repair techniques for tubes, shells, and other components.
- Case Study: Planning and executing a turnaround maintenance for a large fired heater.

Module 7: Safety and Environmental Considerations

- Hazards associated with fired heaters and heat exchangers.
- Safety devices and interlock systems.
- Emergency shutdown procedures.
- Environmental regulations and emission control.
- Case Study: Investigation of a fire incident in a fired heater and lessons learned.

Module 8: Advanced Topics and Emerging Trends

- Computational Fluid Dynamics (CFD) applications in heat transfer analysis.
- Advanced materials for high-temperature and corrosive environments.
- Smart monitoring and predictive maintenance technologies.
- Energy integration and waste heat recovery systems.
- Case Study: Application of CFD to optimize flow distribution in a complex heat exchanger network.

Training Methodology

This course employs a blended learning approach, incorporating:

- Interactive lectures and presentations.
- Group discussions and knowledge sharing.
- Practical exercises and problem-solving sessions.
- Real-world case study analysis.
- Visual aids, including diagrams, videos, and simulations.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com