

TC1

Technical Category Training

Certification

5 DAYS
TRAINING

Thermal Energy Recovery Technologist (TERT)

Training Summary

The Thermal Energy Recovery Technologist (TERT) course aims to develop professionals and certified experts in thermal energy recovery system using Pinch Technology. Successful participants of this course shall be awarded competency certification based on the level of completion. More than 7000 successful applications worldwide, including our own project experiences show that implementation of pinch technology typically provides an attractive payback period of less than three years.

*There are two modes of TERT Competency Training which you can choose from: Face to face training, and online self-paced training.

Certification Level Overview

- 1) Thermal Energy Recovery Technologist – Level 1: User
- 2) Thermal Energy Recovery Technologist – Level 2: Advanced
- 3) Thermal Energy Recovery Technologist – Level 3: Expert Certification
- 4) Thermal Energy Recovery Technologist – Level 4: Industrial Practitioner Certification

Learning Benefits

If you are an energy manager, energy auditor, or energy service company.

- 1) Equip yourself as a TERT to manage thermal energy. The anticipated enactment of the Malaysia Energy Efficiency & Conservation Act (EECA) shall unlock opportunities for energy managers with the competency to audit, manage, and optimize thermal energy systems apart from electrical energy.
- 2) Gain competency to perform practical retrofit of existing facilities. Learn from certified experts and practitioners on how to perform optimal thermal energy recovery analysis to retrofit existing facilities practically, and gain the support of top management to achieve triple bottom-line benefits.
- 3) Offer value-added energy audit services for the ASEAN community. If you are an energy auditor, you will be able to offer value-added energy audit services to your customer by incorporating thermal energy recovery of the process. You can also offer energy audit services under the newly announced Energy Audit Conditional Grant (EACG) which supports energy auditing of both electrical and thermal energy. Widespread and holistic implementation of Energy Management System covering thermal and electrical energy in the region is expected to significantly increase the demand for thermal energy analysis experts in Malaysia and across ASEAN.

If thermal energy is the leading energy cost in your manufacturing site.

1) Huge potential reduction in energy bills from thermal heat recovery.

Over 7000 successful process integration applications worldwide, including our project experiences have resulted in thermal energy savings of between 10 to 50%, and a payback period of less than 3 years. Our recent petroleum refinery retrofit project for example amassed an annual savings of USD 12 Million.

2) “We already have heat recovery systems in place. How could we benefit more?”

Our experience shows that plant renovation, plant expansion, the addition of new product lines, consideration of total site, and area-wide integration could lead to ample energy cost-saving potentials.

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TC1a Thermal Energy Recovery Technologist – Level 1 (3 days)

For TERT Level 1 competency, participants will be equipped with the basics of heat recovery, analysing thermal energy losses from the processes, energy-saving potentials, and the tools to target and design the maximum energy recovery system based on Pinch Technology. Participants will be trained by using excel tools for calculations and is also introduced to our proprietary Optimal Heat software. Participants need to submit the completed excel calculation as proof they have mastered the competency.

Learning Outcomes

- 1) Understand the benefits and application of heat integration.
- 2) Understand the basic concept on heat integration and Pinch Analysis.
- 3) Target maximum energy recovery by using Composite Curves and Problem Table Algorithm.
- 4) Extract correct stream data for heat integration analysis.
- 5) Design heat exchanger network that achieves the maximum energy recovery target.
- 6) Design heat exchanger network that achieves the maximum energy recovery target with stream splitting.
- 7) Determine the minimum number of units.
- 8) Design heat exchanger network that achieves the minimum number of units.
- 9) Make the correct placement for multiple utilities.
- 10) Familiarise with Optimal Heat software for heat integration.

Course Outline

- 1) Maximising Energy and Resource Cost Savings in Industry using Pinch Analysis.
- 2) Process Integration based on Pinch Analysis - The Basic Concepts.
- 3) Setting the Minimum Energy Targets (Energy Targeting) using Composite Curves.
- 4) Significance of Composite Curves.
- 5) Energy Targeting using Problem Table Approach (PTA) with working session.
- 6) Stream Data Extraction (SDE).
- 7) Stream Data Extraction (SDE) Working Session.
- 8) Design of Heat Recovery Network (HRN) by using Grid Diagram.
- 9) Transferring Grid Diagram back to Flowsheet.
- 10) Design of Complex HRN (with Stream Splitting).
- 11) Minimum Units Targets.
- 12) Reducing Number of Units.
- 13) Economic Analysis.
- 14) Multiple Utility Targeting and Optimisation using Grand Composite Curve (GCC).

TC1b Thermal Energy Recovery Technologist – Level 2 (2 days)

For TERT Level 2 competency, participants are exposed to more advanced Pinch Technology techniques to optimise capital and operating cost of the thermal energy recovery system, further recovery potential from process modification analysis, combined heat and power system integration and analysis, retrofit analysis and exploring multiple sites energy exchange potential. Participants need to submit the completed excel calculation as proof they have mastered the competency.

Learning Outcomes

- 1) Understand the importance of heat exchanger network retrofit.

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Thermal Energy Recovery Technologist (TERT) - cont.

- 2) Apply the steps to perform heat exchanger network retrofit.
- 3) Perform economic analysis and cost-benefit analysis for heat exchanger network design.
- 4) Perform retrofit case study.
- 5) Understand the basic concept of process modification.
- 6) Understand the combined heat & power system.
- 7) Understand the concept of total site heat integration.

Course Outline

- 1) Advanced Process Integration – Optimum DT_{min}.
- 2) Advanced Process Integration – Process Modification.
- 3) Advanced Process Integration – Combined Heat & Power.
- 4) Advanced Process Integration – Total Site Heat Integration.
- 5) Optimal Heat Demo.
- 6) Step-wise retrofit procedure.
- 7) Retrofit Analysis.
- 8) Economic Analysis and Cost Benefit Analysis.
- 9) Retrofit Case Study.

TC1c
Thermal Energy Recovery Technologist – Level 3 (1 day)

Certification

For TERT Level 3 competency, participants are required to demonstrate they can apply the knowledge of Level 1 and 2 to an industrial case study. They are required to complete an industrial case study assignment. In addition, they also need to take an examination to test their knowledge.

Learning Outcomes

- 1) Apply knowledge of TERT Level 1 and 2 to solve industrial case study.
- 2) Examine participants' TERT knowledge via examination.

Course Outline

- 1) Online Exam.
- 2) Industrial Project Case Study Presentation.

TC1d
Thermal Energy Recovery Technologist – Level 4 (By application)

Certification

For TERT Level 4 competency, participants need to demonstrate they have applied the TERT Level 1 to 3 knowledge to a real industrial case study. The participant needs to submit the project report. An evaluation committee will be appointed, which will vet the report in detail. There will be an evaluation session between the candidate and the evaluation committee. Upon satisfactory evaluation by the committee, the candidate will be awarded TERT Level 4.

Trainer Profile

Refer to Trainers:

- 1) Prof. Ir. Ts. Dr. Zainuddin Abdul Manan
- 2) Prof. Ir. Ts. Dr. Sharifah Rafidah Wan Alwi
- 3) Ir. Dr. Lim Jeng Shiun