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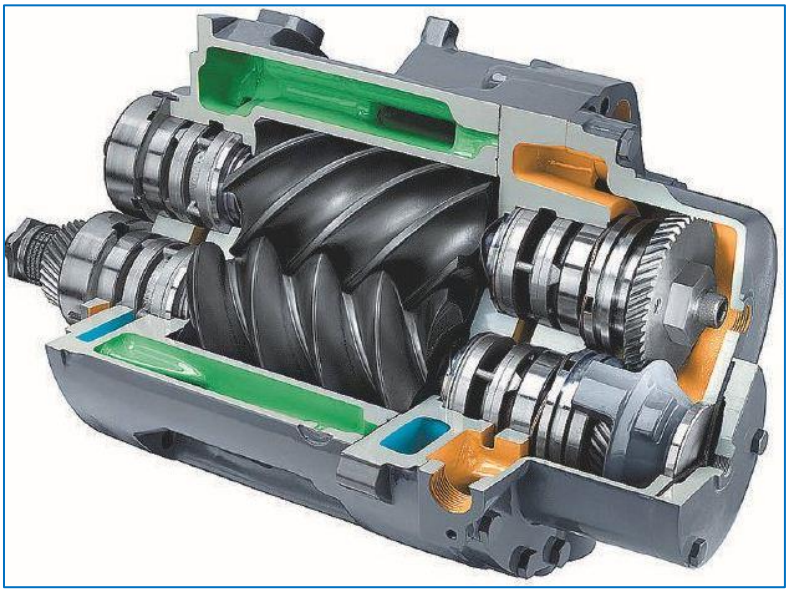

MU093:
Screw Compressors: Operation, Maintenance & Troubleshooting

Training Description:

This course will focus on the working principle and classifications of compressors, screw compressor, the components of each type, the application of each of them in the plant. The course will focus on the screw compressor's operation and operational problems, and the required maintenance. This course offers a firm understanding of the selection, troubleshooting and fault diagnoses of compressors and its supporting systems.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Define the working principle of the compressors, the application, and the compressor classification
- ✓ Define the working principle of each type of compressors, and the components of each
- ✓ Describe the operational problems that could happen in compressor (positive displacement and roto-dynamic compressors) during operation
- ✓ Identify the causes of the defects
- ✓ List the possible corrective actions concerning the defect
- ✓ Describe the required maintenance for each type
- ✓ Describe the checks and inspections performed during compressor overhauling.
- ✓ Get to know methods for troubleshooting

Training Designed for:

This course is intended for Maintenance and Operation Engineers, Maintenance and Operation Supervisors, Operation Supervisors and Senior Technicians. The course will also benefit anyone who expects to become involved in any stage in project applications.

Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request."

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

- ❖ PRE-TEST
- ❖ Introduction
- ❖ The function of compressors in the plant
- ❖ Classification of compressors: Dynamic and positive displacement compressors
- ❖ Classification of dynamic compressors and the working principle of each type
- ❖ Centrifugal compressor components and their functions
- ❖ Axial flow compressor components and their function
- ❖ Surge and surge control systems

- Flow control in case of axial flow and centrifugal compressors
- Compressor prime-movers
- Operation and maintenance problems of screw compressors
- Operation and maintenance problems of centrifugal compressors
- Operation and maintenance problems of axial flow compressors

DAY TWO:

- Positive displacement compressors: How it works? Classification
  - The reciprocating compressor
  - Principle of operation and the compressor component
  - Multi-stage compressors
  - Compressor operation and maintenance
- Screw compressors
  - Principle of operation and the compressor components
  - Compressor operation and maintenance
  - The compressor selection for specific application, the required information to order new compressor for certain application
- Centrifugal Compressors Operation
  - Compressors material selecting and testing
  - Compressors start-up and testing
  - Minimum flow protection
  - Compressor capacity control
- Centrifugal Compressor Maintenance
  - Mechanical seals
  - Couplings and Alignment
  - Causes of failure
  - Maintenance & Troubleshooting
  - Effect of fouling
  - Overhaul Philosophy
- Reciprocating Compressors
  - Types of Reciprocating compressors
  - Valves and unloaders
  - Fixtures
  - Piston and rings
  - Piston rod packing
  - Capacity control
  - Overhaul of reciprocating compressors
  - Effect of Gas Quality on operation

DAY THREE:

- Maintenance Concepts & Control
  - Maintenance Theories and Strategies
  - Breakdown, Preventive & Proactive Strategies
  - Detection, Analysis, Correction & Verification, RCA
- Troubleshooting & Fault Diagnosis

- General Issues and Problem Diagnosis
- Condition monitoring, vibration, thermo-graphy, oil analysis, ultrasound
- Performance monitoring
- Bearing types & selection

DAY FOUR:

- ❖ Failure Analysis
  - Fatigue and fracture
  - Corrosion & Material loss mechanisms
  - Trouble Shooting & Predictive Maintenance
- ❖ Vibration Analysis
  - Vibration concepts
  - On-line/Off-line monitoring
  - Frequency analysis
  - Enveloping/Demodulation
- ❖ Specific Fault Diagnosis
  - Diagnosis of Rotating Unbalance
  - What is rotating unbalance? Causes
  - Types of Unbalanced = Single plane, Couple & Dynamic
  - Diagnosis of unbalance
  - Eccentricity of rotating components
  - Forces associated with unbalance
  - Types of balancing & balancing machines
  - Recommend vibration and balance tolerance

DAY FIVE:

- ❖ Diagnosing Misalignment
  - Different types misalignment = Parallel (offset), Angular, Combined
  - Diagnosis and Repair
  - Alignment techniques
- ❖ Diagnosis of Gear problems
  - Different types of Gears
  - Gear Mesh Frequencies
  - Misalignment/Eccentricity of gears
  - Diagnosis Mechanical looseness problems
- ❖ Diagnosing Bearing Problems (Fluid Film & Rotating Element)
  - Life of Bearings, Failure Modes – Diagnosis & Repair
  - Examples of Failed Bearings, How bearings fail
  - Inspection & Monitoring
- ❖ Case studies
- ❖ Course Conclusion
- ❖ POST-ASSESSMENT and EVALUATION

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:
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