

Maximizing Machinery Reliability...

Precision Pump Repair

Seminar Synopsis

Outline

1.0 Introduction

- 1.1 Instructor and Class Introductions
- 1.2 Seminar Overview, Objectives, and Schedule
- 1.3 Pump Reliability and Precision Maintenance Overview
 - 1.3.1 Overview of 4 Maps; Application, Installation, Operation, Preservation

2.0 Preservation: Pump Rebuild and Installation Fundamentals

2.1 Introduction

- A. Why to Perform a Precision Rebuild
- B. Detection of Impending Pump Failure
- C. Finding Root Causes of Pump Failure
- D. General Requirements...cleanliness, correct tools, etc.

2.2 Dimensions, Tolerances & Fits

- A. Fits and Tolerances Overview
- B. Fit Terminology
- C. Fitting Practices and Guidelines
- D. Fits Activity

2.3 Precision Measurement

- A. Overview
- B. Outside Micrometers
- C. Dial Indicators
- D. Telescoping Gauges

2.4 Torquing and Tensioning

- A. Torque Terminology
- B. Common Torquing Methods and Tools
- C. Proper Use of Torque Wrenches
- D. Torque Sequence
- E. Torque Amounts

2.5 Precision Pump Assembly

- A. Eccentricity
- B. Runout
- C. Accumulation of Tolerances
- D. Keys
- E. Setscrews
- F. Pulled Threads

Maximizing Machinery Reliability...

Precision Pump Repair

Seminar Synopsis

- 2.6 Pre-alignment Checks
 - A. Pre-alignment Procedures Overview
 - B. Pre-alignment Checklist
 - C. Soft Foot

- 2.7 Precision Alignment Overview
 - A. Alignment Process Overview
 - B. Precision Alignment Methods

3.0 Pump Inspections

- 3.1 General Inspection Criteria...the centrifugal pump report page 1
- 3.2 Pump Foundation & Piping
- 3.3 Pump Coupling
- 3.4 Pump Bowl
- 3.5 Pump Impeller
- 3.6 Rear Cover
- 3.7 Mechanical Seal
- 3.8 Shaft
- 3.9 Power Frame
- 3.10 As-found Alignment

4.0 Precision Pump Rebuild and Installation Procedures

- 4.1 The centrifugal pump report page 2
- 4.2 Hands-on Activities

5.0 Conclusions

Maximizing Machinery Reliability...

Precision Pump Repair

Seminar Synopsis

Associated Task(s)

PMPT1: When given an assigned pump to rebuild and install, perform the task in a manner that demonstrates proficient knowledge and skills with the fundamentals of precision maintenance, including:

- A. A precision mentality
- B. Proper interpretation of dimensions and tolerances
- C. Proper fitting practices
- D. Proper use of precision measurement tools
- E. Proper use of fasteners, torquing, and tensioning
- F. Precision assembly techniques
- G. Precision alignment techniques
- H. Proper inspection of pump components
- I. Proper documentation of all inspections, measurements, and results

Seminar Objectives

Upon successful completion of the seminar, the student will be able to:

PMP1: Explain the benefits of precision pump maintenance and key components of a precision mentality.

PMP2: Properly use the following instruments to obtain measurements with an accuracy of +/- the instrument's smallest graduation:

- A. Outside Micrometers
- B. Dial Indicators
- C. Telescoping Gauges

PMP3: Explain and demonstrate how to interpret and apply pump dimensions, tolerances and fit information provided by manufacturers or facility-specific literature.

PMP4: When given maintenance tasks that include use of fasteners, properly perform each of the following:

- A. Determine the fastener torque
- B. Determine and use the proper torquing procedure and sequence.

PMP5: When given pump rebuild and installation tasks, explain and demonstrate how to properly perform the given task, including:

- A. Proper use of keys, length, fits, & positioning
- B. Proper use of set screws, length, & assembly
- C. Minimizing eccentricity during assembly
- D. Minimizing axial runout during assembly

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PMP6: Properly inspect and document conditions of the following pump components and items:

- A. Pump Foundation & Piping
- B. Pump Coupling
- C. Pump Bowl
- D. Pump Impeller
- E. Rear Cover
- F. Mechanical Seal
- G. Shaft
- H. Power Frame
- I. As-found Alignment

PMP 7: Properly rebuild and install pumps in accordance with each of the precision maintenance skills above and according to approved Great Lakes Chemical procedures.