

**PUMP SYSTEM ASSESSMENT PROFESSIONAL (PSAP)
PRACTICE ANALYSIS AND TEST SPECIFICATIONS**

This document represents a delineation of common or typical tasks (T) performed and knowledge (K) applied by Pump System Assessment Professionals. The PSAP exam covers three (3) major content domain areas found in the PSAP Practice Analysis and Test Specifications. The percentage listed to the left of each domain area represents the percentage of the exam that covers topics from that domain area.

(36%) Domain I Information/Data Gathering

T-1 Assess the presenting situation and determine if it is amenable to a pump system assessment (i.e. jointly determine the value proposition/objectives).

The successful performance of this task requires knowledge of:

- K-1 Pump types (e.g. centrifugal, positive displacement, vertical turbine, etc.)
- K-2 Pump system components (e.g. tanks, valves, pipes, sealing, heat exchangers, couplings, etc.)
- K-3 Pump system component interactions
- K-4 Standard pump system operating procedures
- K-5 Benefits of pump system optimization
- K-6 Factors that impact pump efficiency and reliability (e.g. size, age, installation, process change, fluid properties, pressure head flow, etc.)
- K-7 Factors that affect pump system reliability and efficiency (e.g. age, installation, piping modifications, system controls, hydraulic design modifications, instrumentation, operational parameters, etc.)
- K-8 Elements of lifecycle costing

T-2 Obtain and analyze initial information about the pump system (i.e. perform pre-screening).

The successful performance of this task requires knowledge of:

- K-1 Pump types (e.g. centrifugal, positive displacement, vertical turbine, etc.)
- K-2 Pump system components (e.g. tanks, valves, pipes, sealing, heat exchangers, couplings, etc.)
- K-3 Pump system component interactions
- K-4 Standard pump system operating procedures
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- K-6 Factors that impact pump efficiency and reliability (e.g. size, age, installation, process change, fluid properties, pressure head flow, etc.)
- K-7 Factors that affect pump system reliability and efficiency (e.g. age, installation, piping modifications, system controls, hydraulic design modifications, instrumentation, operational parameters, etc.)
- K-8 Elements of lifecycle costing

- K-9 Basic pump maintenance practices
- K-10 Piping and instrumentation diagrams
- K-11 Isometrics
- K-12 Process flow diagrams
- K-13 Blueprints

T-3 Assemble a pump system assessment team and define roles and responsibilities.

The successful performance of this task requires knowledge of:

- K-14 Key plant personnel (positions) needed on the assessment team
- K-15 Roles and responsibilities of an assessment team
- K-16 Field measurement parameters and their acceptable ranges

T-4 Make a visual assessment of the pump system or have the plant verify the accuracy of the information provided in order to confirm initial information, obtain additional information, and make a final determination of the project scope.

The successful performance of this task requires knowledge of:

- K-1 Pump types (e.g. centrifugal, positive displacement, vertical turbine, etc.)
- K-2 Pump system components (e.g. tanks, valves, pipes, sealing, heat exchangers, couplings, etc.)
- K-3 Pump system component interactions
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- K-8 Elements of lifecycle costing
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- K-12 Process flow diagrams
- K-13 Blueprints
- K-14 Key plant personnel (positions) needed on the assessment team
- K-15 Roles and responsibilities of an assessment team
- K-16 Field measurement parameters and their acceptable ranges
- K-17 Hydraulic and electrical formulae
- K-18 Measuring devices and their requirements and proper applications

T-5 Conduct a pump systems operations discussion with personnel in a position to answer questions, verify information previously obtained, and provide additional information.

The successful performance of this task requires knowledge of:

- K-1 Pump types (e.g. centrifugal, positive displacement, vertical turbine, etc.)
- K-2 Pump system components (e.g. tanks, valves, pipes, sealing, heat exchangers, couplings, etc.)
- K-3 Pump system component interactions
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- K-17 Hydraulic and electrical formulae
- K-18 Measuring devices and their requirements and proper applications
- K-19 Common operating problems and errors

T-6 Obtain real-time pump system operation data.

The successful performance of this task requires knowledge of:

- K-2 Pump system components (e.g. tanks, valves, pipes, sealing, heat exchangers, couplings, etc.)
- K-3 Pump system component interactions
- K-6 Factors that impact pump efficiency and reliability (e.g. size, age, installation, process change, fluid properties, pressure head flow, etc.)
- K-7 Factors that affect pump system reliability and efficiency (e.g. age, installation, piping modifications, system controls, hydraulic design modifications, instrumentation, operational parameters, etc.)
- K-16 Field measurement parameters and their acceptable ranges
- K-18 Measuring devices and their requirements and proper applications

(46%) Domain II Data Analysis

T-7 Cross-validate the pump system data previously collected or obtained in order to ensure accuracy.

The successful performance of this task requires knowledge of:

- K-2 Pump system components (e.g. tanks, valves, pipes, sealing, heat exchangers, couplings, etc.)
- K-3 Pump system component interactions
- K-6 Factors that impact pump efficiency and reliability (e.g. size, age, installation, process change, fluid properties, pressure head flow, etc.)
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- K-18 Measuring devices and their requirements and proper applications
- K-20 Pump and motor performance curves
- K-21 System curves
- K-22 Parameter estimation methods

T-8 Analyze the data based on the project scope and established boundary conditions.

The successful performance of this task requires knowledge of:

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- K-20 Pump and motor performance curves
- K-21 System curves
- K-22 Parameter estimation methods
- K-23 Data (electrical, vibration, thermography, etc.) and its relationship to reliability
- K-24 Reliability metrics

T-9 Interpret the results of the analyses to establish initial findings and possible options (e.g. equipment, controls, etc.) for pump system optimization.

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- K-23 Data (electrical, vibration, thermography, etc.) and its relationship to reliability
- K-24 Reliability metrics
- K-25 Currently available equipment and technology
- K-26 Industry best practices

- T-10 Evaluate the identified options to formulate specific recommendations for optimizing pump system efficiency and reliability

The successful performance of this task requires knowledge of:

- K-27 Basic financial analysis
- K-28 Utility rate structures and incentives
- K-29 Principles and techniques of prioritizing solutions

- T-11 Document findings and prepare a pump system assessment report that includes recommendations with costs and benefits.

The successful performance of this task requires knowledge of:

- K-30 Elements and layout of a pump system assessment report

(18%) Domain III Post-Assessment

- T-12 Present the report to the client/customer and assist in the transition from assessment to implementation.

The successful performance of this task requires knowledge of:

- K-14 Key plant personnel (positions) needed on the assessment team
- K-31 Presentation techniques
- K-32 Techniques for assisting clients/customers in aligning goals and strategies with assessment recommendations
- K-33 Implementation strategies

- T-13 Perform post-implementation measurement and verification and generate a report.

The successful performance of this task requires knowledge of:

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- K-21 System curves
- K-22 Parameter estimation methods
- K-23 Data (electrical, vibration, thermography, etc.) and its relationship to reliability
- K-24 Reliability metrics
- K-34 Commissioning

Knowledge Summary

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- K-29 Principles and techniques of prioritizing solutions
- K-30 Elements and layout of a pump system assessment report
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- K-32 Techniques for assisting clients/customers in aligning goals and strategies with assessment recommendations
- K-33 Implementation strategies
- K-34 Commissioning