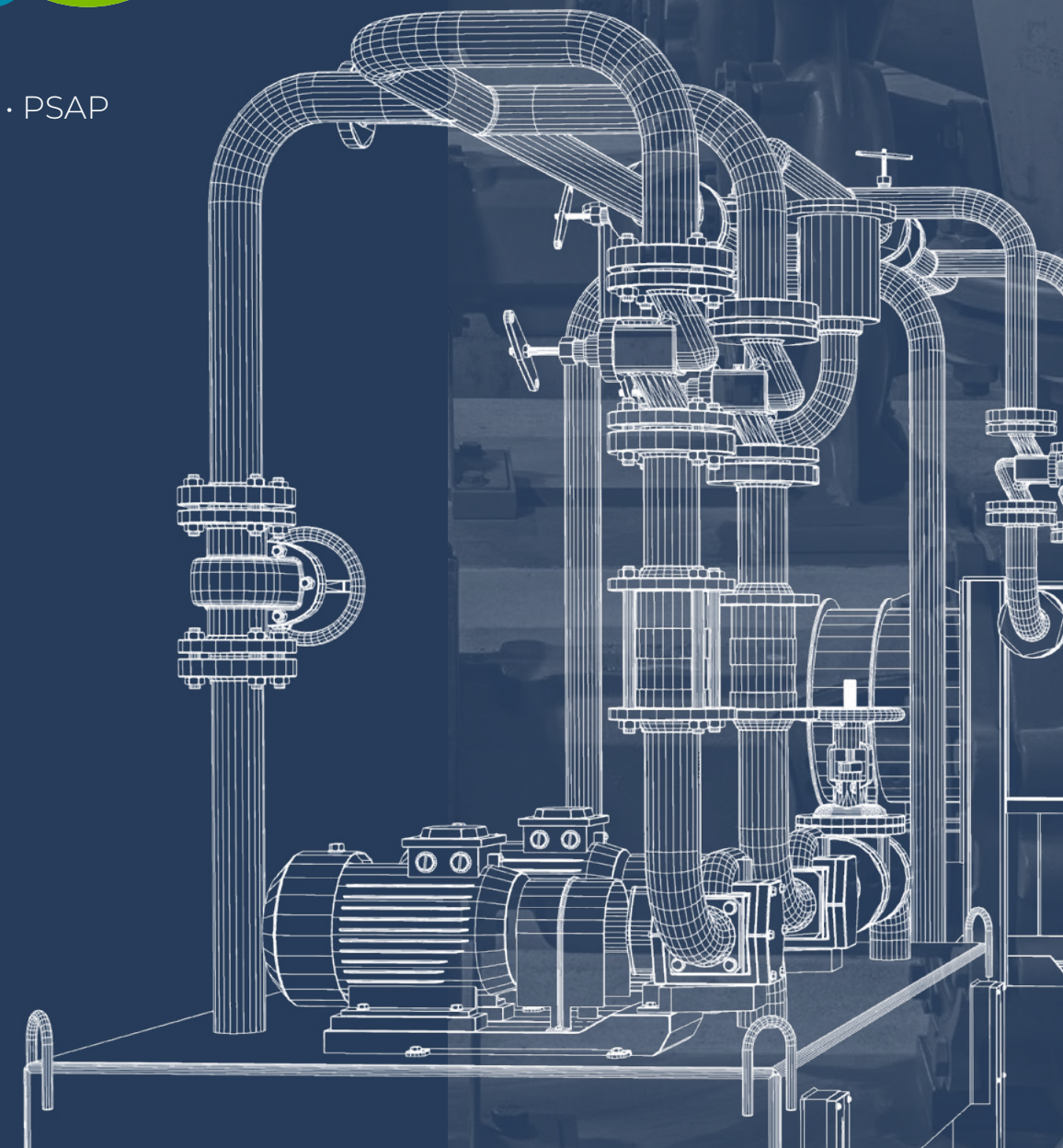
HYDRAULIC INSTITUTE | PUMP SYSTEMS MATTER

Training and Certification Overview



PSC Level 1 · PSC Level 2 · PSAP

training.pumps.org



About the Hydraulic Institute™

Founded in 1917 the Hydraulic Institute™ is the largest association of pump manufacturers & suppliers in North America. As the global authority on pumps & pumping systems, HI's mission is to drive all pump system stakeholders towards a sustainable future by:

- Advancing Solutions for Pump System Performance and Efficiency
- Developing Standards and Technical Resources
- Educating the Global Marketplace
- Advocating for the Industry

About Pump Systems Matter™

Pump Systems Matter™ (PSM) is a nonprofit educational organization founded by the Hydraulic Institute, dedicated to advancing the performance, reliability, efficiency, and sustainability of pumping systems through workforce development, training, certification, and industry collaboration.

PSM serves as the industry's trusted resource for pump system knowledge and competency development, helping organizations build the skilled workforce needed to design, operate, maintain, assess, and optimize pumping systems that support critical infrastructure, manufacturing, industrial operations, commercial facilities, and municipal services.

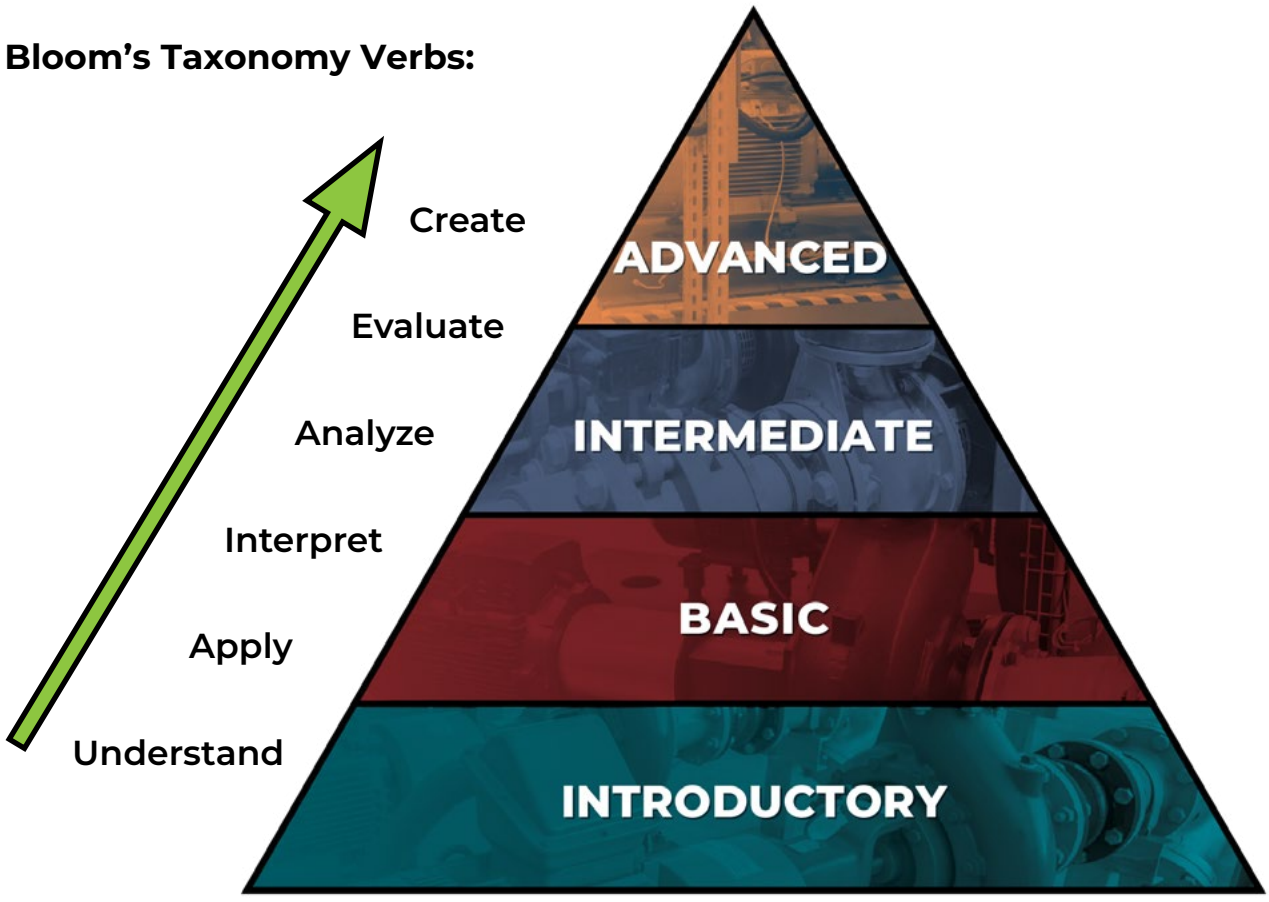
Today, PSM works across the entire pump system lifecycle by connecting technical knowledge, professional development, and independent certification to measurable business outcomes.

Learning Path Overview

To address the pump industry's growing workforce development needs, the Hydraulic Institute worked with members and partners to develop two key resources: the *Fundamentals Body of Knowledge (HI 40.9)* and the *Program Guideline for Pump System Certification (HI 41.8)*. Together, these resources define foundational knowledge across pump and system design, application, installation, operation, and maintenance. Using Bloom's Taxonomy as a framework, the certification pathway organizes learning outcomes by increasing levels of knowledge, application, analysis, and evaluation.

Structured Learning Pathway

Pump Systems Matter (PSM) has aligned its training with the certification levels shown in the Pump System Training and Certification Alignment Pyramid below. This alignment creates a cohesive learning pathway that helps learners build the knowledge needed to optimize pumping system performance and progress through each certification level.



Organizational Adoption of HI/PSM Training and Certification



Build a More Capable, Consistent Pump System Workforce

Organizational adoption of HI and PSM training and certification creates a structured workforce development pathway that builds foundational knowledge, strengthens problem-solving skills, and validates competency through industry-recognized certifications.

Organizational Benefits

- **Workforce Consistency:** Establish a common technical foundation and shared language across engineering, sales, service, operations, and support teams.
- **Accelerated Development:** Guide employees through progressive learning and certification levels, from introductory training to advanced credentials.
- **Verified Competency:** Uses Hydraulic Institute certification to confirm knowledge and applied skills, not just course completion.
- **Improved Performance:** Strengthen capabilities in pump selection, system analysis, troubleshooting, optimization, and assessment.
- **Retention & Succession Planning:** Support career growth while building a pipeline of future technical leaders.
- **Scalable Learning:** Combine instructor-led and on-demand training to support onboarding, distributed teams, and certification preparation.

Value Across the Organization

- **Engineering:** Stronger fundamentals, analysis, and troubleshooting skills.
- **Sales & Business Development:** More effective customer conversations focused on reliability, efficiency, and lifecycle value.
- **Service:** Improved diagnostics and system-level problem solving.
- **Leadership:** Measurable workforce development, competency tracking, and succession planning.

Overview of Certification Levels

Pump System Certification (PSC) Level 1 establishes baseline competence in pump and system behavior. PSC Level 2 adds the diagnostic, testing, and optimization skills exercised during structured pump system assessments. Pump System Assessment Professional (PSAP) certification then validates the ability to perform full assessments leveraging PSC1/PSC2 content, life-cycle cost analysis, and standardized assessment processes.



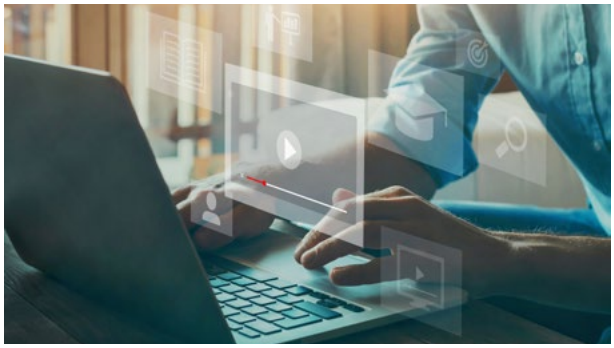




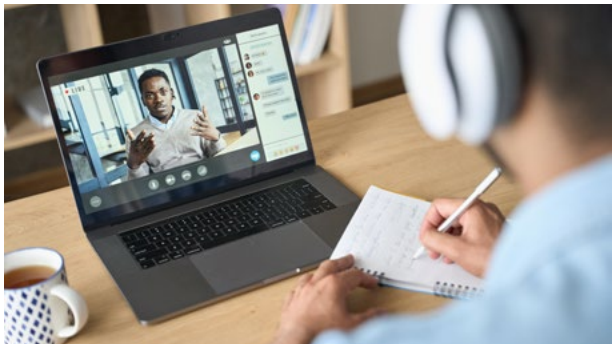
	PSC Level 1	PSC Level 2	PSAP
Learning Level	Introductory & Basic	Intermediate	Advanced
Target Audience	• Engineers (entry-level or new to the industry) • Sales/application personnel • Operation/maintenance technicians	• Engineers • Technical sales with a desire to advance knowledge • Senior technicians and operators	• Experienced Engineers • After-market and field services personnel • Technical sales with a desire to advance knowledge
Experience Level	0+ years	2+ years	5+ years
Recommended Training	• Introductory Pump & System Training • Basic Pump & System Training • PSC1 Level 1 Exam Prep *Approx. 20 hours*	• Intermediate Pump & System Training • PSC Level 2 Exam Prep *Approx. 20 hours*	• Pump System Optimization & Assessment (PSOA) Training • Pump Systems Assessment Professional (PSAP) Exam Prep *Approx. 14 hours*
Core Outcome	Interpret pump curves, apply system calculations, make informed hydraulic selections	Analyze system performance, troubleshoot issues, identify optimization opportunities	Conduct full pump system assessments, Life Cycle Cost (LCC) analysis, build business case for optimization

Training Format & Delivery Options

PSM Training is offered in two delivery methods to accommodate learner schedules, preferences, and organizational needs.



On-Demand (Self-Paced) training provides flexible, anytime access through the PSM online platform, featuring modules, quizzes, and interactive content.



Live Instructor-Led training is available virtually or in-person and includes expert-led instruction with real-time Q&A and discussion.

- Hybrid options also available.
- Private in person courses and exam proctoring can be delivered to groups of 10 or more and customized to meet organizational or team requirements.

Enrollment & Next Steps

For questions about enrollment, group training, exam scheduling, or selecting the appropriate pathway, please contact the HI Training and Certification team via email: training@pumps.org.

Knowledge Domains

Across all three certification levels, professionals are assessed within the same 16 knowledge domains, providing a consistent framework for competency development. As candidates advance, the expected level of mastery progresses, moving from **understanding and applying** concepts (Level 1), to **interpreting and analyzing** information (Level 2), and ultimately **evaluating and solving** complex pump system challenges (PSAP).

The following table provides an example of the progression of knowledge and skills across the 16 Knowledge Domains as individuals advance from **PSC Level 1** to **PSC Level 2** to **PSAP**. A full listing of the capabilities associated with each domain and certification level can be found in *Appendices A, B, and C of HI 41.8.*

Example domain capability progression for PSC Level 1 – PSC Level 2 – PSAP.
See *HI 41.8 Appendices A, B and C* for full listing of domain capabilities for each.

Knowledge Domain	PSC Level 1: Understand, Apply	PSC Level 2: Interpret, Analyze	PSAP: Evaluate, Assess, Optimize
1. Introduction to Pumps	Identify types, components, and operating principles.	No additional topics.	No additional topics.
2. Pump Performance Curves & Power Consumption	Read curves, identify POR and AOR, apply affinity rules and calculate power.	Calculate and analyze variable speed, series, and parallel curve effects.	Measure, create and evaluate curves to understand and improve operation.
3. Pump Systems	Define system curves and NPSHA/NPIPA.	Calculate system curve and NPSHA/NPIPA for various scenarios.	Measure system curve and NPSH/NPIP to determine operating point and NPSH margin.
4. Rotodynamic Pump Designs & Types	Describe pump designs, unique types, and components.	Analyze design features with respect to application.	Assess design and operation to improve reliability and efficiency for application requirements.
5. Positive Displacement Pump Designs & Types	Describe pump designs, major pump components and their purpose.	Analyze design features with respect to application.	Assess design and operation to improve reliability and efficiency for application requirements.
6. Pump Components & Accessories	Discuss the purpose of seals, bearings, couplings, and lubrication requirements.	Evaluate different bearing, seal and coupling types with respect to application.	Assess components, lubrication, installation and support systems for reliability improvement.

Knowledge Domain	PSC Level 1: Understand, Apply	PSC Level 2: Interpret, Analyze	PSAP: Evaluate, Assess, Optimize
7. Drivers & Drives	Describe types of motors, features and function of VFDs.	Apply principles to selection of motor and VFDs.	Evaluate the use of and installation of motors and VFDs with respect to efficiency and reliability.
8. System Design Considerations	Identify important system design considerations and standards.	Evaluate system design versus industry standards and the application of controls.	Assess system designs for reliability, efficiency, and additional operating requirements.
9. Varying the Pump Operating Point	Define the operating point and discuss methods to change flow and head.	Analyze control methods to maximize operation in the POR and AOR.	Evaluate controls for efficiency, reliability, and lifecycle cost.
10. Pump Selection & Specification	Select appropriate pump based on flow, head, and efficiency.	Evaluate application requirements to select appropriate pump(s).	Evaluate alternatives, rerates, and control changes with respect to efficiency and reliability.
11. Testing	Discuss common testing conducted on pumps and applicable standards.	Explain factory testing procedures, perform calculations and interpret results.	Plan, conduct and interpret field testing based on reported operational issues.
12. Installation, Commissioning & Startup	List key installation and startup considerations.	Evaluate installation and startup procedure versus standards and IOM.	Assess and recommend improvements to installation and startup with respect to operational issues.
13. Maintenance	Describe types of maintenance and typical preventative maintenance.	Evaluate reactive, preventative and predictive maintenance and analyze reliability with metrics.	Evaluate maintenance records in relation to assessment and make recommendations to improve operations.
14. Troubleshooting	List causes insufficient pressure and flow, high power or vibration and premature wear.	List causes of failure modes and identify solutions for common failure modes.	Determine the cause of undesirable operations or failures based on assessment of the pump system.
15. Pump System Optimization & Analysis	List components of pump life cycle cost and methods of optimization.	No additional topics.	Lead, plan and conduct assessments, quantify savings, and justify investments.
16. Markets & Applications	List typical application considerations for key markets.	Discuss market influences, trends, application factors and typical pumps.	No additional topics.

Pump System Certification (PSC) Level 1

What PSC Level 1 Certification Validates

Certified individuals can interpret pump system requirements to make informed pump type and hydraulic selections based on their understanding of performance curves, system curve interactions, varying operating points, efficiency, power consumption, and the effect on reliability. Certified individuals can read and apply pump and system curves, perform basic industry calculations, and speak the common technical language needed for more advanced training and certification.

Certification Details

Learning Level	Introductory & Basic
Audience	Entry-level engineers, Sales & application personnel, Operations & maintenance technicians
Exam	Online proctored; 2.5 hours, multiple choice, formula sheet provided
Credential	PSC Level 1 Certificate + Digital Badge + HI Certified Individuals List

Recommended Learning and Certification Path – PSC Level 1

Step	Product	Format
1	Introductory Pump & System Training	Live or On-Demand
2	Basic Pump & System Training	Live or On-Demand
3	PSC Level 1 Exam Prep	Live or On-Demand
4	PSC Level 1 Certification Exam	Online or Live Proctored

For a full training outline, refer to https://training.pumps.org/PSCCertificationTrainingOutlines and knowledge domains on pages 6–7.

Pump System Certification (PSC) Level 2

What PSC Level 2 Certification Validates

This certification builds on PSC Level 1 foundational knowledge by expanding depth and complexity of competencies within all 16 core knowledge domains. While PSC Level 1 validates foundational fluency, PSC Level 2 focuses on interpretation, diagnostics, and applied system behavior in real-world environments. Certified individuals demonstrate the ability to analyze pump and pumping system behavior and apply intermediate-level calculations, selection methodologies, and design considerations to evaluate operating performance, efficiency, and reliability.

Certification Details

Learning Level	Intermediate
Audience	Engineers, Technical sales with a desire to advance knowledge, Senior technicians & operators
Exam	Online proctored; 3 hours, multiple choice, formula handbook provided
Credential	PSC Level 2 Certificate + Digital Badge + HI Certified Individuals List

Recommended Learning and Certification Path – PSC Level 2

Introductory and Basic Pump & System Training and PSC Level 1 Certification is not a required prerequisite but highly recommended depending on experience level.

Step	Product	Format
1	Intermediate Pump & System Training	Live or On-Demand
2	PSC Level 2 Exam Prep	Live or On-Demand
3	PSC Level 2 Certification Exam	Online or Live Proctored

For a full training outline, refer to https://training.pumps.org/PSCCertificationTrainingOutlines and knowledge domains on pages 6–7.

PSAP PROFESSIONAL Pump System Assessment Professional (PSAP)

What PSAP Certification Validates

Certified individuals demonstrate advanced competencies, including hydraulic system behavior analysis, pump performance diagnostics, cost savings quantification, field data collection and analysis, and the ability to build a compelling business case for pump system optimization.

Certification Details

Learning Level	Advanced
Audience	Experienced engineers, After-market and field services personnel, Technical sales with a desire to advance knowledge
Exam	Online proctored; 3.5 hours, 100 multiple-choice questions, Formula sheet provided
Credential	PSAP Certificate + Digital Badge + HI Certified Individuals List

Recommended Learning and Certification Path – PSAP

Basic Pump and System Training, Intermediate Pump and System Training and PSC Levels 1 & 2 Certifications are not required prerequisites but highly recommended depending on experience level.

Step	Product	Format
1	Pump System Optimization & Assessment (PSOA) Training	Live or On-Demand
2	PSAP Exam Prep	Live or On-Demand
3	PSAP Certification Exam	Online or Live Proctored

For a full training outline, refer to https://training.pumps.org/PSCCertificationTrainingOutlines and knowledge domains on pages 6–7.

Advancing Workforce Capability Through Certification

HI and PSM training and certification provide a structured pathway for building pump system knowledge, validating competency, and supporting long-term workforce development. From PSC Level 1 foundational knowledge to PSC Level 2 applied analysis and PSAP advanced assessment, each level helps professionals strengthen the skills needed to improve pump system reliability, efficiency, and performance.

For organizations, this pathway creates a consistent technical foundation across teams while supporting onboarding, professional development, certification preparation, and succession planning. By aligning learning with recognized certification levels and the 16 Knowledge Domains, employers can help employees progress with greater clarity, confidence, and measurable capability.

To get started, visit the HI Certification Overview page, review the program links provided, or contact the HI Training and Certification team at training@pumps.org for enrollment guidance, group training options, exam scheduling, or pathway planning support.



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