



Workforce Development and Addressing the Knowledge Gap

November 8, 2023

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EPIC Conference, Buford, GA



**In a world
without
pumps, the
bucket is the
most valuable
household
tool.**

Pumps Are Everywhere!



In a world without pumps, the bucket is the most valuable household tool.

[READ WHY...](#)



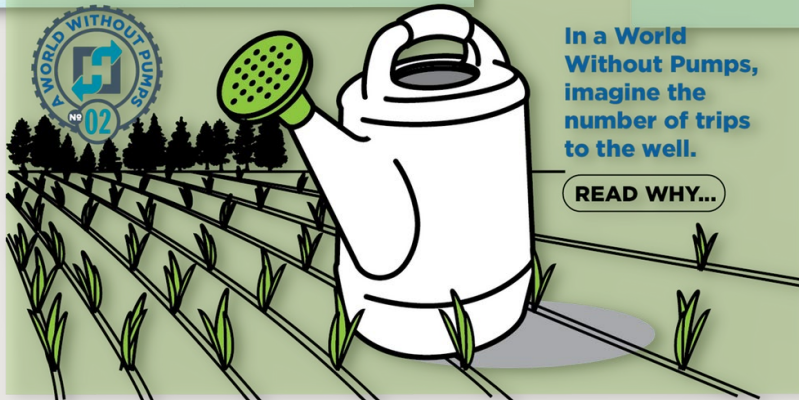
In a World Without Pumps, *girls* will need a new best friend.

[READ WHY...](#)



In a World Without Pumps, wellness comes slowly.

[READ WHY...](#)



In a World Without Pumps, imagine the number of trips to the well.

[READ WHY...](#)



In a World Without Pumps, there's no peanut butter in my PB&J!!!

[READ WHY...](#)



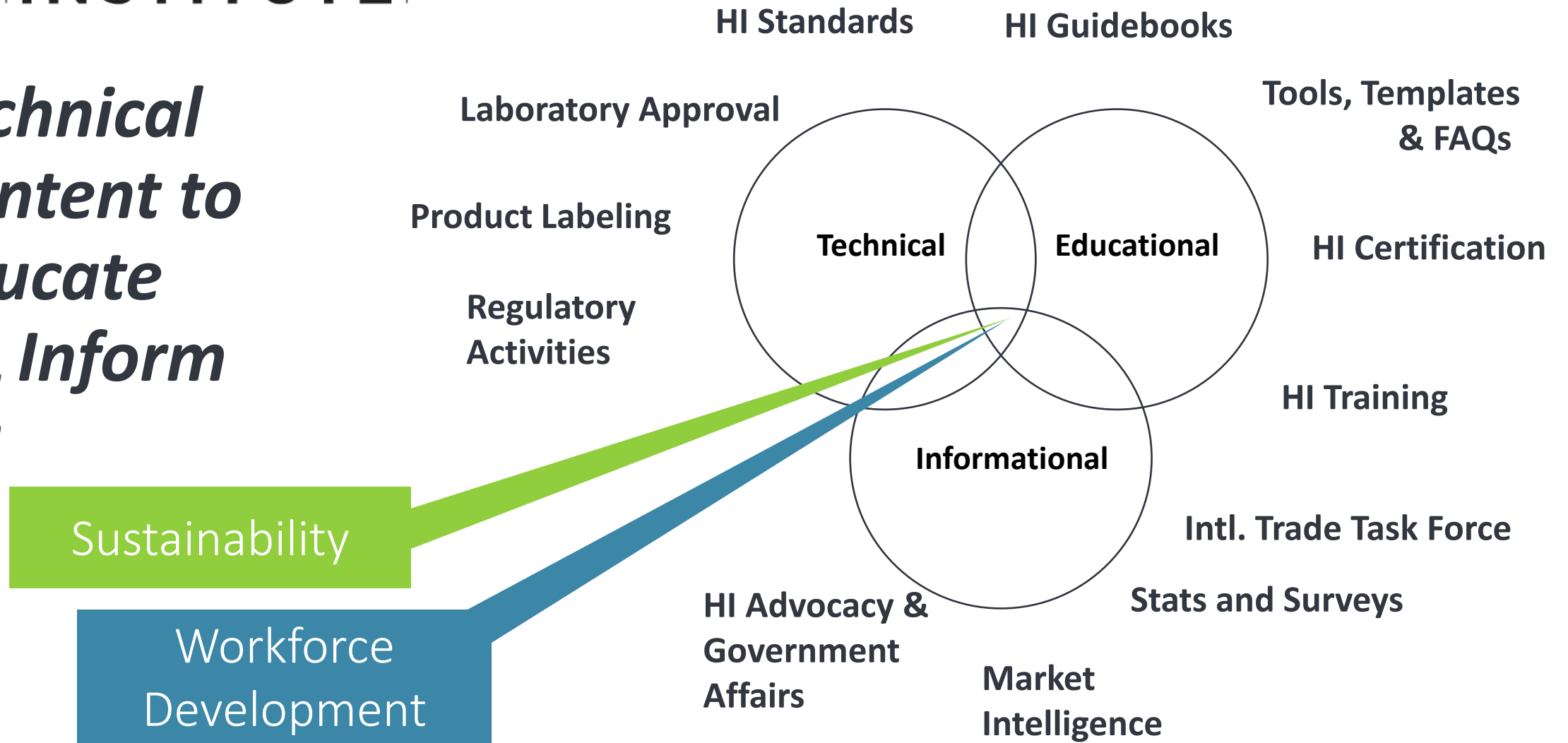
Moving towards
a Sustainable Future
through Efficient
Pumping Systems

Moving towards
a Sustainable Future
through Efficient
Pumping Systems

&

*A Skilled
Workforce*

***Technical
Content to
Educate
& Inform***





**PUMP
SYSTEMS
MATTER**

The Educational Foundation of the Hydraulic Institute

Workforce Development

- Training Courses and Curricula
- Certification and Professional Paths
- Tools and Reference Documents

ON-DEMAND PUMP & SYSTEM TRAINING

NEW



Introduction to Pump Fundamentals

Pump and System Fundamentals



Pump System Assessment



Pump System Optimization



Pump System Fundamentals



Workforce Development

Pump Industry Workforce Development



A resource for the development of the pump industry's workforce

pumps.org/pump-industry-workforce-development

What are the numbers?

The data is clear!

50
million

Quit their job in 2022

9.6
million

Job opening (July '23)

51%

Looking for a new job

That is not the whole story!

62%

Have indicated that they have started, or intend to start, their own business

48%

Gen Z employees have a side job, or alternate means of making money

76%

Connect learning to long term success and the ability to move up

Today's Workforce

41%

of employees **report**
unmanageable levels of
stress



54%

of employees **feel**
overworked



80%

of employees **are**
disengaged



Need for Workforce Development

Growing Knowledge Gap

More Positions than Job Seekers

Onboard quickly, and train employees

Knowledge is Retiring

Limited time and resources available

HI's Workforce Development Initiative

➤ Marketing Campaigns



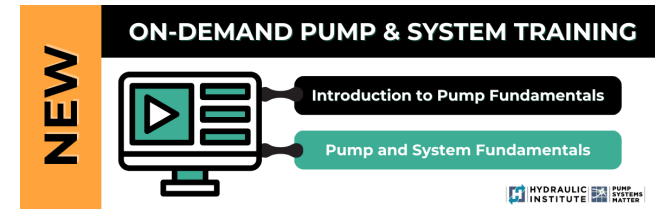
PUMP PROS KNOW



➤ Student and University Outreach



➤ Workforce Development through Training



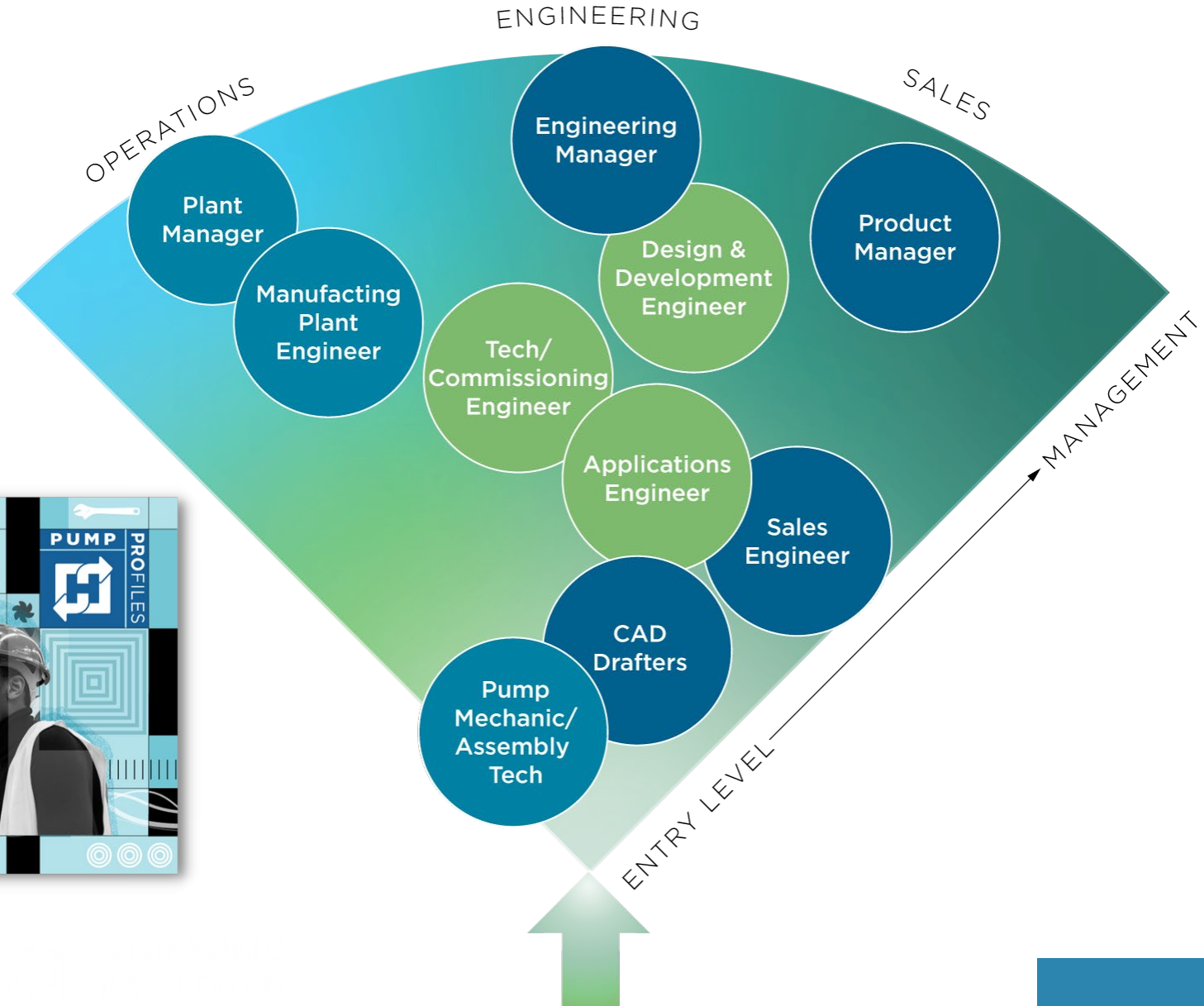
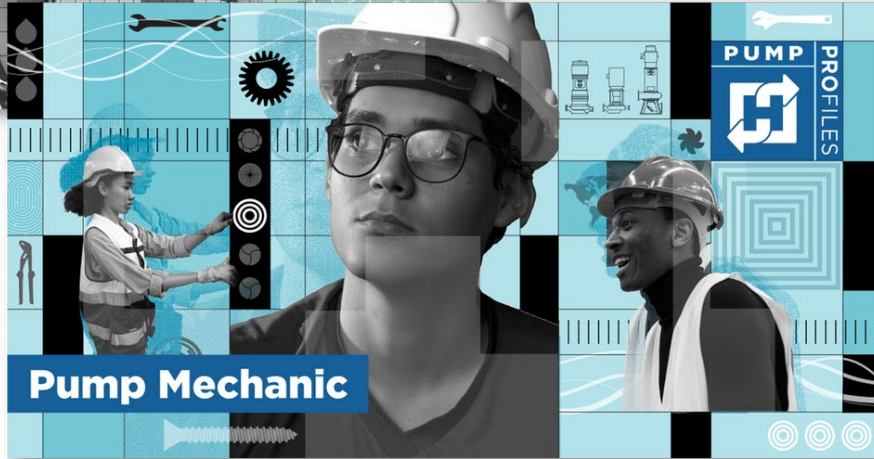
➤ Certification on Fundamentals

Pump System Certified
Level 1 and Level 2

PSC



Pump PROfiles Campaign





A World Without Pumps Campaign



In a World Without Pumps, nothing happens in Las Vegas.

[READ WHY...](#)



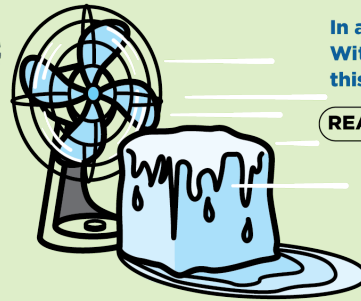
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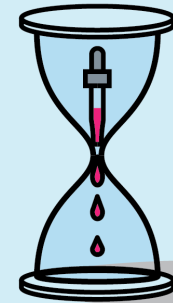
In a World Without Pumps, poop is no joke.

[READ WHY...](#)



In a World Without Pumps, this is cool.

[READ WHY...](#)



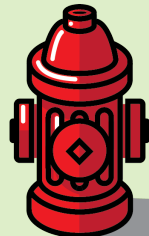
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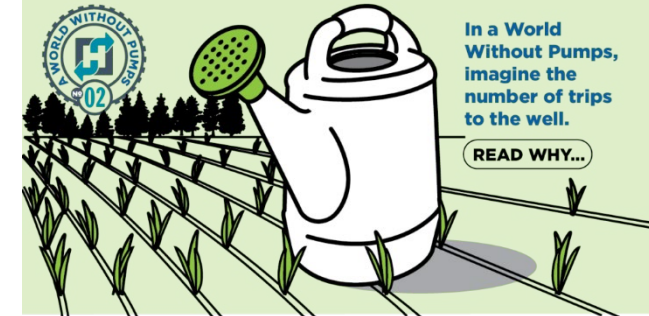
In a World Without Pumps, only dogs know what this is for.

[READ WHY...](#)



In a World Without Pumps, there's no peanut butter in my PB&J!!!

[READ WHY...](#)

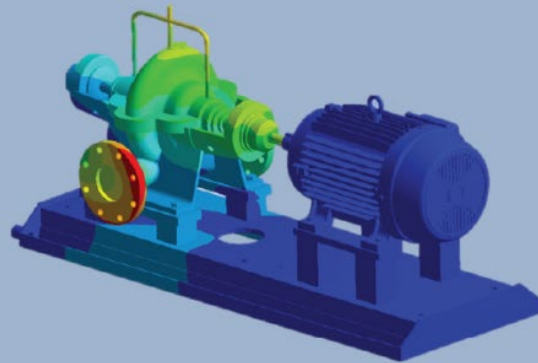


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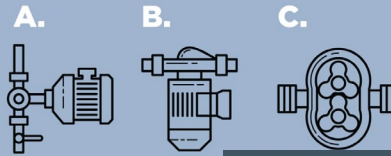
[READ WHY...](#)



The Effects of Forces and Moments on Pump Nozzles



How to select the right pump for the right application...



How to calculate pump system energy costs



The economics of pump selection



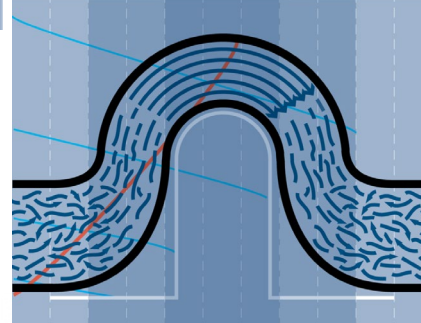
Efficiency

and/or

Reliability

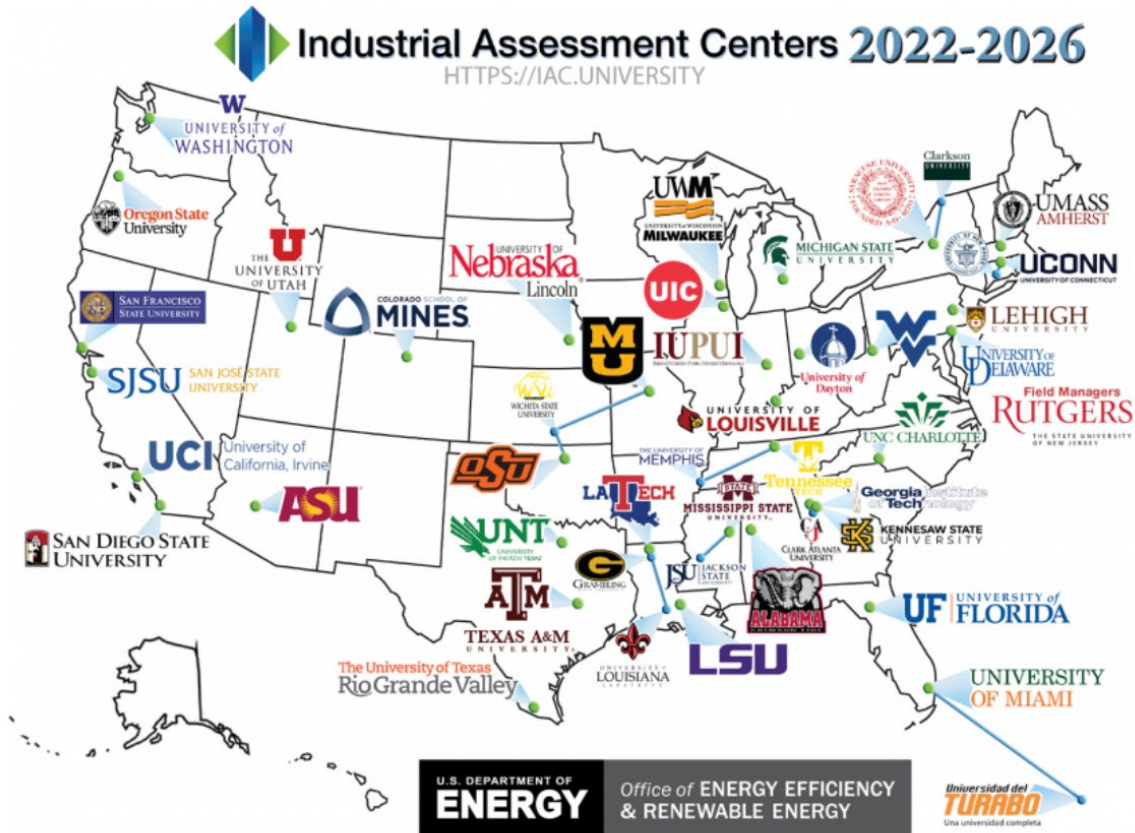


The effect of pump operating point on reliability.

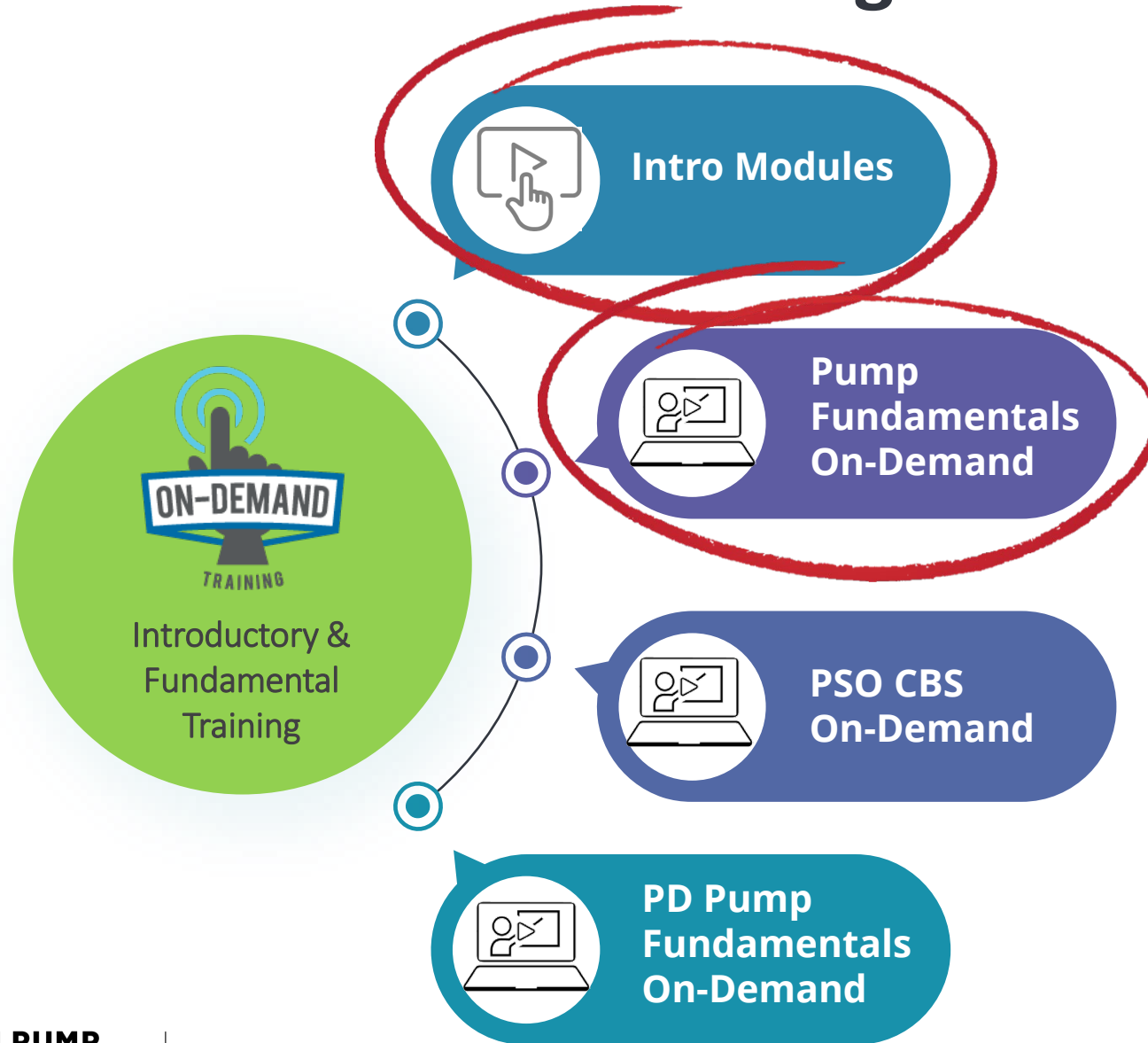


How to measure energy consumption

University and Student Engagement



Introductory and Fundamental Training



Introduction to Pump Fundamentals



On-Demand

**Introduction to
Pump Fundamentals**

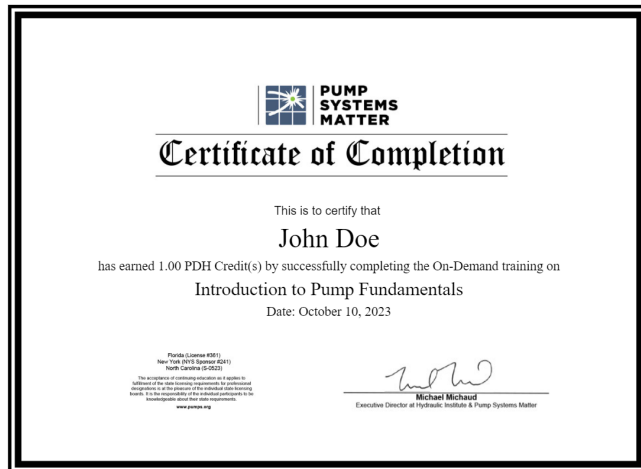
Training Program Overview:

This training bundle is designed to provide attendees the introductory knowledge on all aspects of the pump, system and components. Attendees will leave with a basic knowledge and understanding of pumps and their function. Any person who is interested to gather knowledge about pumps and see themselves as a future employee in Pump Industry will benefit from this training

**Free for ALL HI Members &
Standards Partners**

Introduction to Pump Fundamentals

- 6 Introductory Modules
- Quiz After Each Module
- Upon the successful completion of the On-Demand Training bundle you will receive a Certificate of Completion. 1.5 PDHs | 0.15 CEUs | 1.5 CONTACT HOURS



Introduction to Pump Fundamentals

Pumps

Pump Drivers

Fluid Properties

System Hydraulics

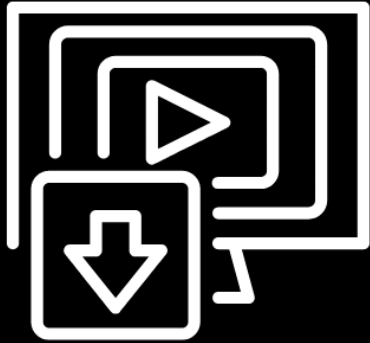
Basic Operating Theory

Pump Selection & Data



On-Demand

Pump and System Fundamentals



On-Demand

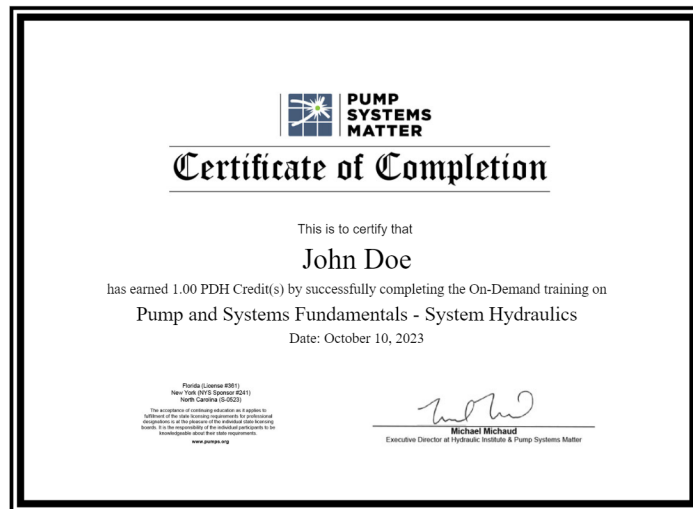
Pump and System Fundamentals Training

Training Program Overview:

This training bundle is designed to provide participants fundamental knowledge on all aspects of the system, pump, and components. From calculating system head to factors that affect reliability, pump selection and everything in between, attendees will leave with knowledge they need to perform their job more effectively. The bundle is laid out in a logical progression of topics starting with system hydraulics and power consumption and then transitioning to the pumps, their operation, impact on reliability and proper pump selection. It then transitions to the important components in or used with pumps such as bearings, couplings, motors and variable frequency drives. Any technical employees in the fluid handling industry will benefit from this training.

Pump and System Fundamentals

- 13 Training Sections / 51 Total Modules
- Quiz After Each Module
- Upon the successful completion of each On-Demand Training section you will receive a Certificate of Completion. 1 PDHs | 0.1 CEUs | 1 CONTACT HOURS



Pump and System Fundamentals Training

Pump Power & Efficiency

Variable Frequency Drives

Rotodynamic Pumps

Variable Speed Pumping

Positive Displacement Pumps

Mechanical Seals

NPSHA & Total Head Calculations

Rolling Element Bearings

Pump Reliability & Performance

Flexible Couplings

Pump Selection

System Hydraulics

Induction Motors

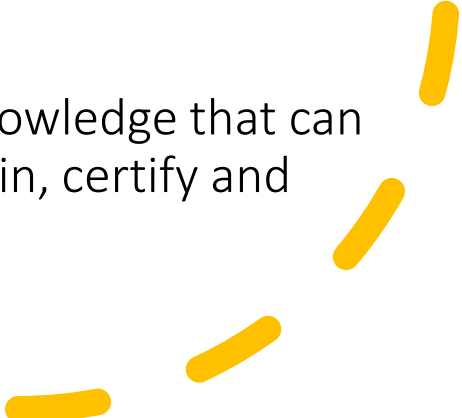
Bundle them all!



On-Demand

A New Personnel Certification for the Pump Industry

In alignment with the HI Board's **strategic direction on workforce development**, the Certification Programs Steering Committee (CPSC) is moving forward with establishing a **new personnel certification** scheme based on the **fundamentals of pumps, pump systems, and system components**.

- Sets a benchmark and validates fundamental knowledge requirements that should be common across job functions within the Pump Industry.
 - The term “Pump Industry” is used generally to describe pump and related equipment manufacturers, pump system sales representatives, consultants, designers, construction contractors, owners and operators, or anyone that has an interest in working in the industry.
 - Provides a defined pathway of fundamental knowledge that can be utilized by employers to attract, engage, train, certify and retain talent in the pump industry.
- 

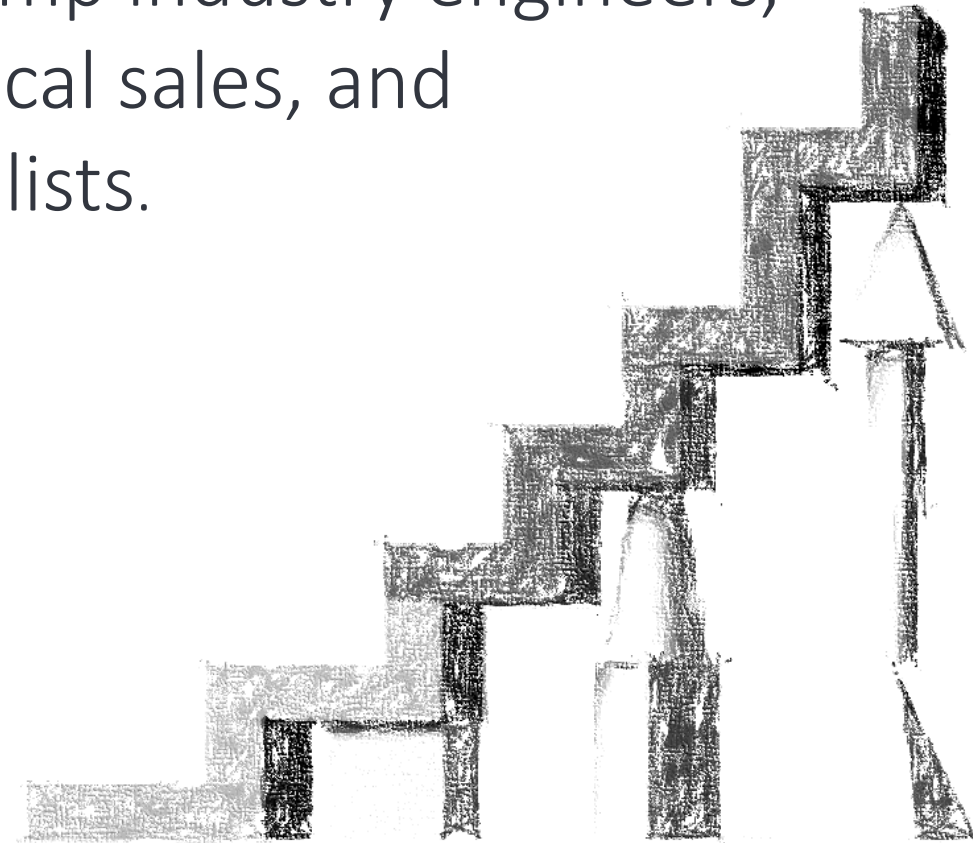
Pump Systems Certified Level 1 and Level 2

Level 1

- Foundational building blocks for entry level technical employees and non-technical employees in the pump industry.

Level 2

- Foundational building blocks for pump industry engineers, technical sales, and specialists.



Pump Systems Certified Level 1 and Level 2

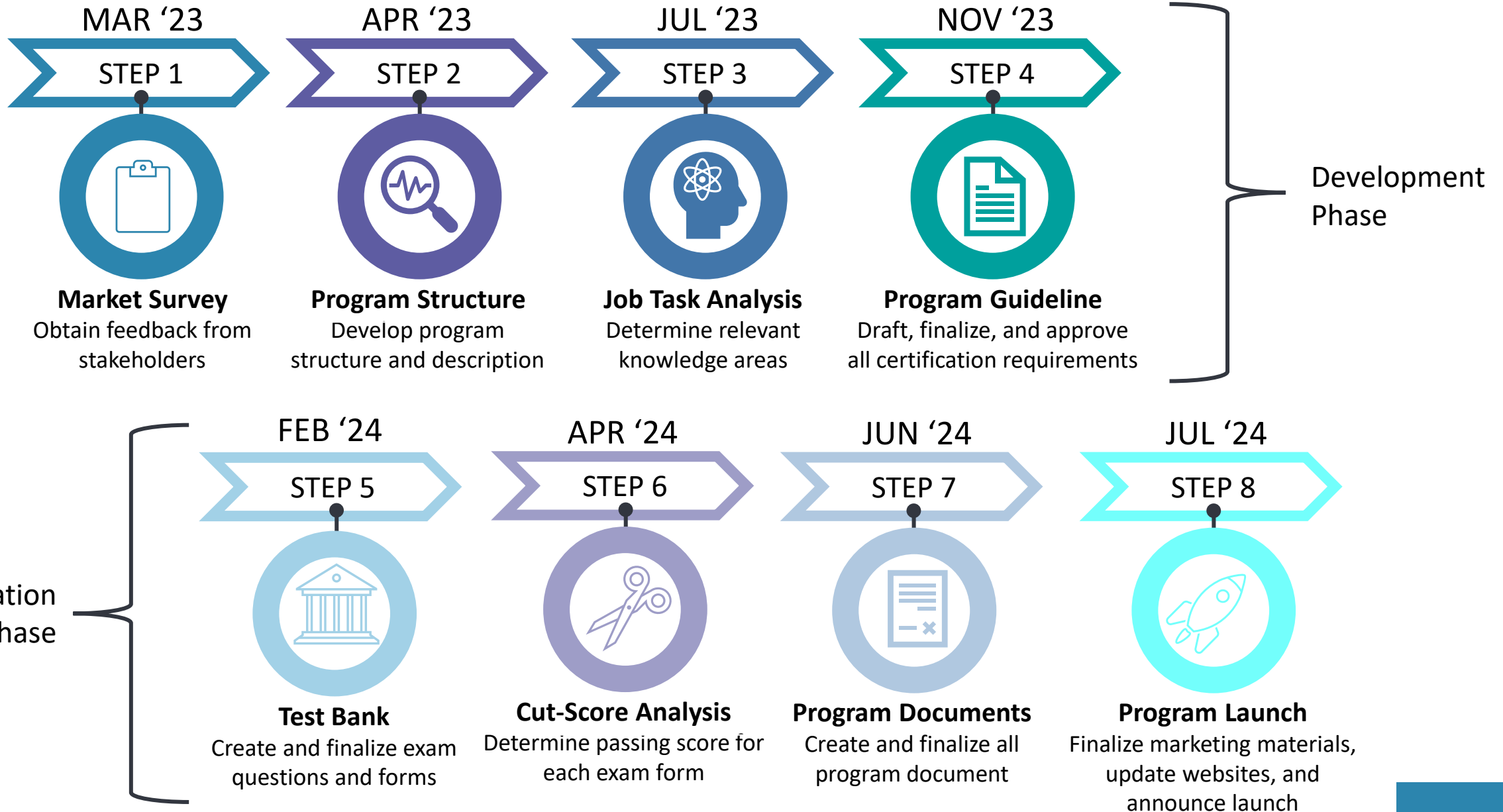
Level 1

- General fundamental building blocks required of pump industry professionals.
- Broad concepts that are beneficial to many job functions rather than detailed job specific requirements.
- Anyone interested in the pump industry. Examples include:
 - College student with interest in the pump industry.
 - Entry level engineer hired into the pump industry.
 - Engineers new to the pump industry or interested in the pump industry.
 - Sales, marketing, and applications employees new to the pump industry.
 - Technicians

Level 2

- General engineering principles that benefit pump industry professionals in technical positions.
- The knowledge requirements apply concepts through engineering principles and calculations, which are beneficial broadly to all technical positions.
 - Technical employees with typically 0 – 4 years of experience in the pump industry.
 - Technical Sales Representatives
 - Non-engineers that have a minimum of four years of experience.

Develop a Fundamental Level Certification



Training Audiences



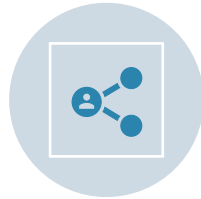
Engineers: This group includes design engineers, project engineers, and other technical professionals who are responsible for the design and development of pumping systems. Their training needs may include topics such as pump selection, system design, fluid mechanics, and engineering calculations.



Assessors and inspectors: This group includes professionals who are responsible for inspecting and assessing pumping systems for compliance with industry standards, regulations, and best practices. Their training needs may include topics such as inspection procedures, quality control, and documentation requirements.



End-users and customers: This group includes the end-users of pumping systems, as well as the customers who purchase and use pumping products and services. Their training needs may include topics such as product usage, system optimization, and customer service.



Sales and marketing: This group includes sales representatives, product managers, and other professionals who are responsible for selling and promoting pumping products and services. Their training needs may include topics such as product knowledge, sales techniques, customer relationship management, and market analysis.



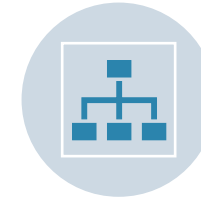
Purchasing and procurement: This group includes professionals who are responsible for purchasing and procurement of pumping equipment and related materials. Their training needs may include topics such as vendor management, procurement procedures, and contract negotiation.



Regulatory and compliance professionals: This group includes professionals who are responsible for ensuring that pumping systems comply with relevant regulations and standards. Their training needs may include topics such as regulatory compliance, quality control, and documentation requirements.



Operators and maintenance personnel: This group includes operators, mechanics, and other personnel who are responsible for operating, maintaining, and repairing pumping systems. Their training needs may include topics such as equipment operation, maintenance procedures, troubleshooting, and safety.



Executives and management: This group includes senior executives and managers who are responsible for setting the strategic direction of the organization and managing its operations. Their training needs may include topics such as financial management, leadership, and organizational development.

Training Levels

Specialized Certification (PSAP, ETC)



Introductory:

This level of training is designed to provide a basic awareness and introduction to a topic. It focuses on building knowledge and creating awareness among learners. The content is informative and aims to familiarize participants with key concepts and terminology.



Basic:

This level of training is designed for individuals who are new to the subject matter. It covers fundamental concepts, skills, and practices. Participants acquire a foundational understanding of the topic and develop basic competencies.



Intermediate:

This level of training is designed for individuals who have some experience and knowledge in the subject matter. It builds upon the foundational concepts and expands the breadth and depth of understanding. Participants develop more advanced skills and competencies.



Advanced:

This training is designed for individuals with a strong foundation and substantial experience who seek to enhance their broad skills and knowledge further. Advance training delves into complex concepts, advanced techniques, and specialized applications. Participants refine their expertise, broaden their skill set, and deepen their understanding, achieving a higher level of proficiency without necessarily specializing in a specific area.



Specialist:

This level of training is designed for individuals who have extensive experience and specialized knowledge in a specific area within the subject matter. It delves deeper into specific topics, techniques, or applications. Participants acquire advanced expertise and skills within the specialized area.



Expert:

This level of training is designed for individuals who are recognized as authorities or leaders in the field. It covers highly advanced and specialized topics, often pushing the boundaries of current knowledge. Participants gain mastery in the subject matter and possess comprehensive expertise.

Level 1

Level 2

HI 40.9-Pump Industry Fundamentals Body of Knowledge

Overview:

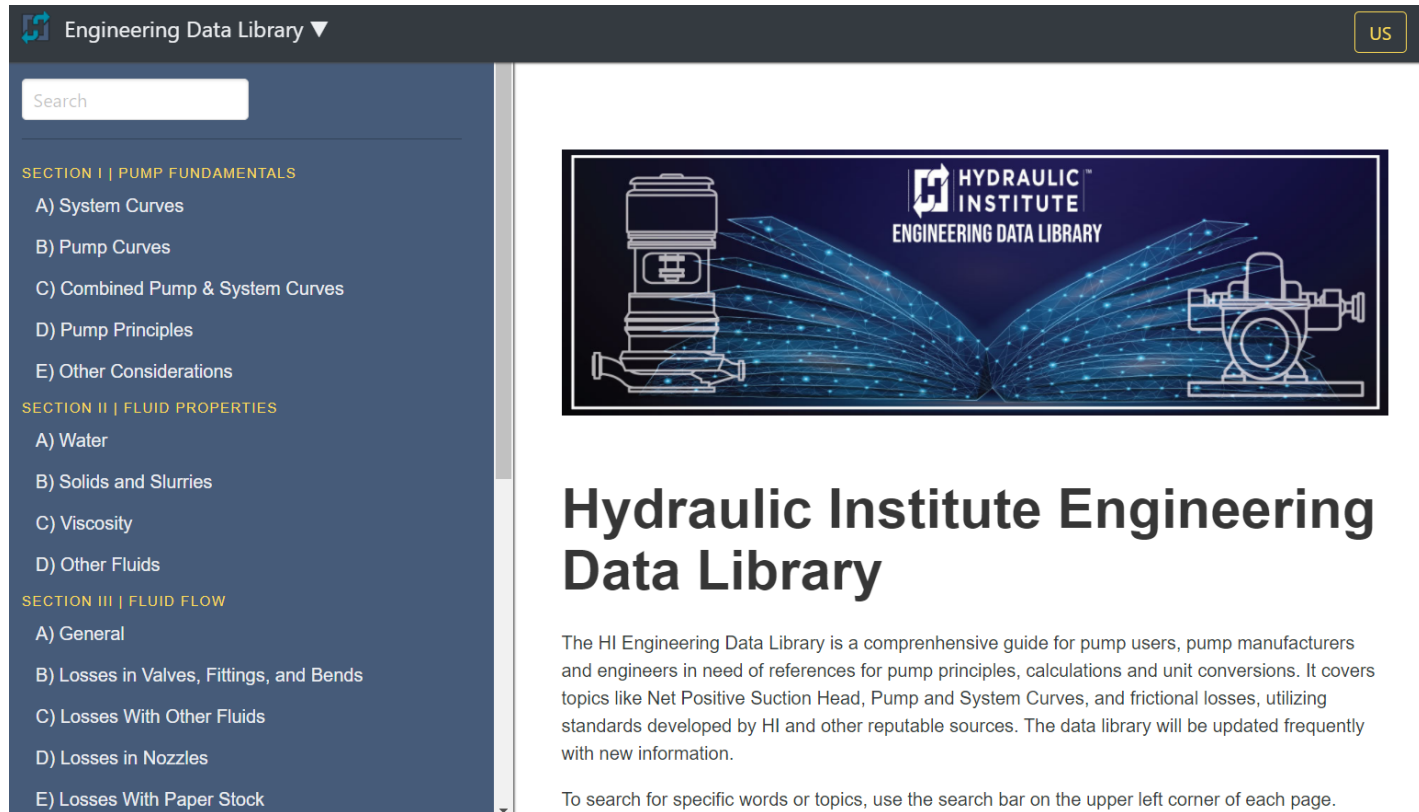
The Pump Industry Fundamentals Body of Knowledge covers general pump system fundamental knowledge requirements (learning outcomes) that should be common across job functions and industries. Each learning outcome contains multiple primary topics required for professionals working in the pump and fluid handling industries; however, it does not provide the actual training. The learning outcomes described cut across engineering, manufacturing, sales, distribution, consultants, owners and operators of the pumping system. It is understood that certain markets will have specific knowledge requirements, but it is not the intent of this document to cover these in detail.

This Body of Knowledge is intended to act as a roadmap to guide the user in their quest to outline fundamental training or knowledge requirements for markets and job positions in the pump industry.

Pump Industry Fundamentals Body of Knowledge



NEW Engineering Data Library



The screenshot shows the website's navigation menu on the left, categorized into three sections: Pump Fundamentals, Fluid Properties, and Fluid Flow. The main content area features a banner with a stylized book and pump icons, followed by the title 'Hydraulic Institute Engineering Data Library' and a descriptive paragraph about the library's purpose. A search bar is located at the top left of the page.

Engineering Data Library ▼ US

Search

SECTION I | PUMP FUNDAMENTALS

- A) System Curves
- B) Pump Curves
- C) Combined Pump & System Curves
- D) Pump Principles
- E) Other Considerations

SECTION II | FLUID PROPERTIES

- A) Water
- B) Solids and Slurries
- C) Viscosity
- D) Other Fluids

SECTION III | FLUID FLOW

- A) General
- B) Losses in Valves, Fittings, and Bends
- C) Losses With Other Fluids
- D) Losses in Nozzles
- E) Losses With Paper Stock

HYDRAULIC INSTITUTE
ENGINEERING DATA LIBRARY

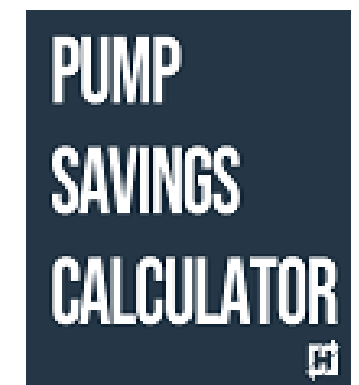
Hydraulic Institute Engineering Data Library

The HI Engineering Data Library is a comprehensive guide for pump users, pump manufacturers and engineers in need of references for pump principles, calculations and unit conversions. It covers topics like Net Positive Suction Head, Pump and System Curves, and frictional losses, utilizing standards developed by HI and other reputable sources. The data library will be updated frequently with new information.

To search for specific words or topics, use the search bar on the upper left corner of each page.



toolbox with
software, training
& calculators



<https://edl.pumps.org>

www.pumps.org/freetools

Pump Industry Career Center



Career Tools, Resume and LinkedIn Profile tips

Check Lists for Up-Skilling

PUMP PROS KNOW



Training and Prep Materials for Career Advancement



PUMP SYSTEMS MATTER

Internships and Job Opportunities

Certification for Industry Professionals



Profiles of Core Industry Positions



Social Media Campaigns and University outreach



PUMP SYSTEMS ASSESSMENT
PROFESSIONAL

Pump System Certified
Level 1 and Level 2

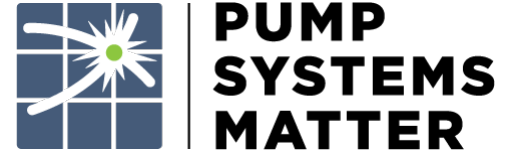
PSC



Driving all Pump System stakeholders towards a sustainable future

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

pumps.org



Driving all Pump Systems to run at Best Efficiency Point (BEP)

- Developing and delivering training and tools focused on increasing pump system efficiency and reliability

training.pumps.org



TRAINING MODULE

INTRODUCTION TO BASIC OPERATING THEORY

