

Hydraulic Institute Fall 2014 Meeting

Breakfast Briefing: DOE Pump Efficiency Rulemaking Update

Thursday, October 9, 2014
St. Louis, Missouri

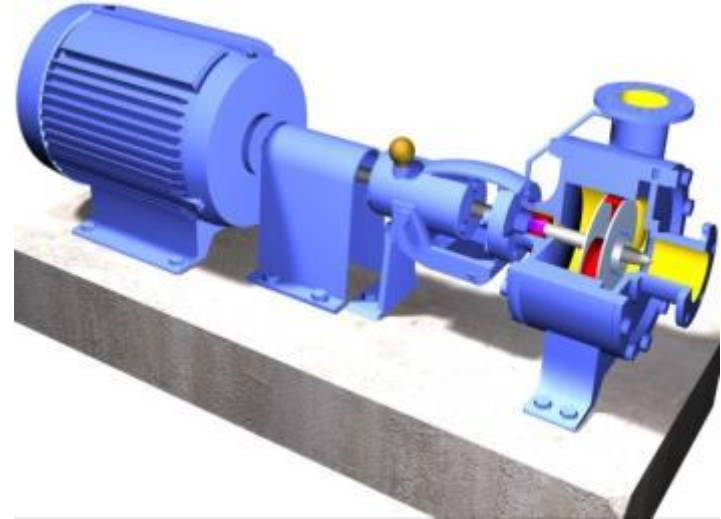


Speaker Panel

- Bob Asdal, Hydraulic Institute, Inc.
- Bob Barbour, TACO, Inc.
- Greg Case, TACO, Inc.
- Mark Handzel, Xylem, Inc.
- Greg Towsley, Grundfos USA

ASRAC Pumps Working Group

Results Summary



Energy Efficiency & Renewable Energy

PWG BACKGROUND

- On July 23, 2013, the Department of Energy (DOE) issued a Notice of Intent to Establish the Commercial/Industrial Pumps Working Group (PWG) To Negotiate a Notice of Proposed Rulemaking (NOPR) for Energy Conservation Standards for Commercial/Industrial Pumps
- The 16 member PWG, under the auspices of the Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC), met from December 2013 through June 2014, with the purpose of discussing and reaching a consensus on a proposed rule for the energy efficiency of commercial/industrial pumps

PWG-ASRAC Recent Accomplishment

- The last PWG meeting took place on June 19, 2014 culminating in a “Term Sheet” which was submitted to the ASRAC General Committee
- The ASRAC General Committee forwarded the agreed upon Term Sheet to the DOE for consideration in the development of a regulation
- This information can be found at: www.Pumps.org/DOERulemaking

Term Sheet Recommendations for DOE NOPR

Recommendation #1

The covered product, a ‘pump,’ will be defined as below subject to potential edits necessary to accomplish the same intent:

- ‘**Pump**’ is a device that moves liquids (which may include entrained gases, free solids, and totally dissolved solids) by physical or mechanical action and includes a bare pump and, if included by the manufacturer, the mechanical equipment, driver, and controls

Term Sheet Recommendations for DOE NOPR

Recommendation #2

The components of a 'pump' will be defined as:

- 'Bare pump' is a 'pump' excluding mechanical equipment, driver, and controls.
- 'Mechanical equipment' is any component that transfers energy from the driver to the bare pump.
- 'Driver' is the machine providing mechanical input to drive the bare pump directly or through the mechanical equipment, and may include an electric motor, internal combustion engine, or gas/steam turbine.
- 'Controls' means any device that can be used to control the driver.

Term Sheet Recommendations for DOE NOPR

Recommendation #3

- In this rulemaking, the metric will not cover non-electric drivers.
- The test procedure will specify that the bare pump rating calculations for the energy conservation standard also apply to pumps with non-electric drivers

Term Sheet Recommendations for DOE NOPR

Recommendation #4

The scope of this rulemaking will include the following pump types:

- End suction frame mounted/own bearings (ESFM/OH0, OH1)
- End suction close coupled (ESCC/OH7)
- Inline (IL/OH3, OH4, OH5)
- Radial split (multistage) vertical (RS-V/VS8)
- Vertical turbine submersible (VT-S/VS0)

Items in parentheses represent DOE and ANSI/HI nomenclature

Term Sheet Recommendations for DOE NOPR

Recommendation #5A

- Circulators (CP1, CP2, CP3) will be held for additional informal negotiation between manufacturers, efficiency advocates, and other interested parties. Advocates to make initial proposal and manufacturers to respond with a goal by October. Stakeholders aim to present joint proposal to DOE by March/April 2015. Stakeholders request DOE commitment for technical support from consultants to facilitate analysis and test procedure development.
- ASRAC-approved negotiation to begin in March following joint proposal
(note: This is based on the availability of the DOE personnel and contractors)
- Goal for NOPR publication by end of September 2015
(note: This is based on the availability of the DOE personnel and contractors)

Recommendation #5B

- DOE should initiate a separate rulemaking on dedicated-purpose pool pumps by the end of calendar year 2014

Term Sheet Recommendations for DOE NOPR

Recommendation #6

This rulemaking will explicitly exclude the following types of pumps:

- Positive displacement pumps
- Axial/mixed flow pumps
- Double suction (DS) pumps
- Multistage axially split (AS) pumps
- Multistage radial split-horizontal (RS-H) pumps
- Multistage radial split vertical immersible pumps
- Vertical turbine (non-submersible) (VT) pumps

Term Sheet Recommendations for DOE NOPR

Recommendation #7

For the in-scope pump types, this rulemaking will be limited to pumps with the following characteristics:

- 1-200 Horsepower (shaft power at BEP at full impeller diameter) applies to number of stages required for testing to the standard
- 25 gallons/minute and greater (at BEP at full impeller diameter)
- 459 feet of head maximum (at BEP at full impeller diameter)
- Design temperature range from -10 to 120 degrees C
- Pumps designed for nominal 3600 or 1800 rpm driver speeds
- 6 inch or smaller bowl diameter (VT-S/HI VS0)

In addition, the pump certified rating for a given model will be based on testing at full impeller diameter.

Term Sheet Recommendations for DOE NOPR

Recommendation #8

It has been the intent of the working group to limit the scope of this rulemaking to pumps *designed for use in pumping clean water*. The rulemaking will explicitly exclude the following types of pumps that might otherwise meet the definition of an in-scope pump type:

- Wastewater, sump, slurry, solids handling
 - API 610 pumps
 - ASME/ISO chemical pumps
 - Fire pumps
 - if compliant with NFPA 20 and UL listed or FM approved
 - Self-priming pumps
 - Prime-assisted pumps
- Nuclear pumps
 - Complies with ASME Boiler and Pressure Vessel Code Section III or 10 CFR 50; Non Code or Code/Safety Related
- Navy pumps
 - MIL Specification Compliant (MIL-P-17639, MIL-P-17881, MIL-P-17840, MIL-P-18682, MIL-P-18472)
- Sanitary pumps
 - “Hygienic” or “sanitary” pumps are typically used in food processing and pharmaceutical applications. They are designed with special parameters, specific materials and surface finish to a variety of national and international rules and regulations that will minimize the biological growth inside the pump to protect public health. These design parameters and materials may result in lower efficiencies than for standard water pumps. Certifications for hygienic or sanitary products include, but are not limited to:
 - 3-A Sanitary Standards
 - EHEDG (European Hygienic Equipment Design Group) recommendations
 - QHD (Qualified Hygienic Design)

Term Sheet Recommendations for DOE NOPR

Recommendation #10

- Pump test procedure should be in accordance with HI 40.6 for determining bare pump performance.
- Note: The Hydraulic Institute has published the HI 40.6, “Methods for Rotodynamic Pump Efficiency Testing Standard.” This standard was submitted to the U.S. DOE on May 15, 2014 and will be subject to a separate notice of a test procedure rulemaking, anticipated in late 2014 or 1Q 2015. This standard is available in the HI e-store at: www.Pumps.org/HI-40.6.

Term Sheet Recommendations for DOE NOPR

Recommendation #11

- [The metric for assessing compliance with the standard should be PEI, which is constructed based on values of PER.]
- **Pump Energy Index (PEI) CL and VL:** PER_{CL} and PER_{VL} , for a given pump model (at full impeller diameter), over the PER_{CL} for a minimally compliant pump (PER_{STD}) serving the same hydraulic load:

$$PEI_{CL} = \left[\frac{PER_{CL}}{PER_{STD}} \right]$$

$$PEI_{VL} = \left[\frac{PER_{VL}}{PER_{STD}} \right]$$

- **Pump Energy Rating (PER) CL and VL:** equally weighted average electric input power to the ‘pump’ measured (or calculated) at the driver input or, when present, controls input, over a specified load profile:

$$PER_{CL} = \sum_i \omega_i (P^{in}_i)$$

$$PER_{VL} = \sum_i \omega_i (P^{in}_i)$$

Where:

- w_i = weight at each load point i
- P^{in}_i = power input to the “pump” at the driver, inclusive of the controls if present, (hp)
- i = Percentage of flow at the best efficiency point (BEP) of the pump
- i = 110%, 100%, 75% of Best Efficiency Point (BEP) flow at nominal speed for uncontrolled pumps
- i = 25%, 50%, 75%, and 100% of BEP flow at nominal speed for pumps sold with motors and controls

Pump Efficiency Index – Most Recent Update from DOE

- The efficiency rule is expected to be at a Pump Efficiency Index (Constant Load) PEI_{CL25} . This corresponds to the elimination of approximately 25% of the least efficient products sold in the USA market.
- The equivalent EU MEI is in the range of MEI12 to MEI64, depending upon the product and speed. The equivalent average EU MEI for all products is MEI33, which is less than the EU regulation of MEI40.
- PEI_{CL25} will apply to ESCC, ESFM, IL and VT-S products. PEI_{CL} for RS-V will be equivalent to the corresponding EU regulation for the MEI level for the same product.
- Pump Manufacturers will be able to use Pump Efficiency Index (Variable Load) PEI_{VL} with a motor and drive to pass the PEI_{25} . If listed on the DOE website with the motor and drive, it must be sold with that motor and drive to be compliant.

Term Sheet Recommendations for DOE NOPR

Recommendation #12

Pumps are labeled based on the configuration in which they are sold. The following information would be required to be included on a pump nameplate:

Bare Pump	Bare Pump + Motor	Bare Pump + Motor + Controls
PEI _{CL} Model number Impeller diameter for each unit	PEI _{CL} Model number Impeller diameter for each unit	PEI _{VL} Model number Impeller diameter for each unit

NOTE: A new HI Pump and Extended Product Labelling Committee is meeting at the Fall 2014 Meeting, and will be collaborating with the ACEEE Extended Product Labeling Initiative Team.

Term Sheet Recommendations for DOE NOPR

Recommendation #13

- Recommended data to be included in certification reports/database:
 - Manufacturer name
 - Model number(s)
 - Equipment class
 - PEI_{CL} or PEI_{VL} as applicable
 - BEP flow rate and head
 - Rated speed
 - Number of stages tested
 - Full impeller diameter (in.)
 - Whether the PEI_{CL} or PEI_{VL} is calculated or tested
 - Input power to the pump at each load point i (P^{in}_i)

Term Sheet Recommendations for DOE NOPR

Recommendation #14

Certification for RS-V and VT-S pumps shall be based on testing with the following number of stages:

- RS-V: 3 stages
- VT-S: 9 stages
- If a model is not available with that specific number of stages in the given scope, the model will be tested and certified with the next closest number of stages offered for sale by the manufacturer.
- If only fewer than the required number of stages are available, rate with the highest number of stages offered for sale. If only more than the required number of stages are available, rate with the lowest number of stages offered for sale.

[Note: These requirements are similar to EU Regulations]

NOPR TIMELINE

- The DOE will spend the rest of 2014 completing in-depth studies of the recommendations, vetting their impacts with other federal departments whose approval is required in developing the NOPR.
- The DOE is targeting the end of 2014 to the NOPR for pump energy efficiency ratings and the test procedure. Most likely it will clear the Federal Register towards the end of January 2015.
- The public will have 60 days to comment on the NOPR with a public meeting in Washington, DC scheduled for public comment.
- After the close of the comment period the DOE will go dark again and revise the NOPR according to their interpretation of the public's comments.
- A Final Rule is expected to be published in late 2015, approximately 6 months after the end of the public comment period.
- The ASRAC PWG recommended a 4-year effective date for compliance after publishing the Final Rule in the Federal Register.

Other HI DOE Related Developments

- During the June 2014 HI-NAM Manufacturing Summit, in Washington DC, a delegation of HI members met with members of the House Energy and Commerce Committee and the Senate Energy and Natural Resources Committee to discuss the DOE rulemaking on pumps
- A position paper was developed to help inform members of Congress and the pump industry about the DOE rulemaking...and to address key issues. This document was presented to the House and Senate representatives on June 10th.
- HI 40.6 Standard released on May 15, 2014 to the U.S. DOE

Other HI Potential DOE-related Initiatives:

Additional Discussion Points:

- HI 40.6 Standard as a launching point for rulemaking and HI's Pump Test Lab Approval Program
- Pump Test Lab Approval Program and Pump Labelling Initiative as a way to facilitate pump OEM's engagement with utility companies (rebates, incentives and end-user benefits)
- Coalition with NEMA: Motor Driven Systems Coalition with other vertical trade associations, including AMCA and CAGI
- Collaborative Efforts with the Association of Pool and Spa Professionals: New HI Test Standard?

In Summary

HI representatives on the DOE ASRAC Working Groups accomplished their goals:

- Recommendation agreed upon with energy advocates is in near alignment with EU regulations for covered products and efficiency standards and also includes a metric for “extended products”
- The recommended four year time period for implementation allows adequate time for the industry to become compliant with the rulemaking/regulation
- The DOE ASRAC Term Sheet includes recommendations on Labeling, Certification Reporting and Testing that align with HI’s objectives

Last remaining step will be to review the actual NOPR issued by the DOE to insure alignment with the Working Groups’ recommendation. Expect HI and member engagement within 60 day public comment period after Notice of Proposed Rulemakings are issued.

Hydraulic Institute – DOE Rulemaking

The screenshot shows the Hydraulic Institute website's "Membership" page, specifically the "DOE Rulemaking Update" section. The page features a navigation bar with links for Home, Membership, Products, About Pumps, Energy Savings, Industry News, and Collaboration. The main content area is titled "DOE Pump Efficiency Rulemaking" and includes a photograph of the U.S. Capitol building. Below the photo, there is a section for "Special information regarding the May 28th and 29th ASRAC Working Group Meeting in Washington DC," followed by a list of topics discussed during the meeting. A "Register for this Meeting Now" section provides details about future ASRAC meetings and a list of dates and times for the upcoming sessions.

Hydraulic Institute
Creating Pump Standards Since 1917

Membership

DOE Rulemaking Update

DOE Pump Efficiency Rulemaking

Special information regarding the May 28th and 29th ASRAC Working Group Meeting in Washington DC:

At the May 28th and 29th ASRAC Pump Working Group meeting DOE consultants presented extensive material on subjects critical to the next steps and negotiations associated with the evolving pump efficiency rules. These subjects, which involve significant financial analysis, are detailed in the slides that are linked below. The five PowerPoint slide decks in PDF format include:

- ECC Impact on Consumers, Shipments Model, and National Impact Analysis
- Engineering Analysis Updates
- Manufacturers Impact Analysis
- US vs. EU PEL "C" Values
- PER "C" Value Update

Important Special ASRAC Meeting on June 4, 2014 from 1:00 - 3:00pm EDT - Please Plan to Attend (if your pumps are within the scope of the DOE rulemaking)

Register for this Meeting Now

Future ASRAC PWG Meetings: Currently two more ASRAC Pump Working Group meetings are scheduled in June and July, and have been extended to three days each. DOE is trying to wrap up negotiations over these sessions. In-person attendance is, of course, an option, if, however, you want to attend the meeting via the web, here's the link you will need to register:

- Tuesday, June 17, 2014 9:00am - 5:00pm EDT
- Wednesday, June 18, 2014 9:00am - 5:00pm EDT
- Thursday, June 19, 2014 9:00am - 3:00pm EDT
- Wednesday, July 23, 2014 9:00am - 5:00pm EDT
- Thursday, July 24, 2014 9:00am - 6:00pm EDT
- Friday, July 25, 2014 9:00am - 3:00pm EDT

For more information, and to stay informed, visit:
www.Pumps.org/DOERulemaking