**A Flowmeter Recalibration Survey**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name: |  | | | | |
| Title: |  | | | | |
| Company: |  | | | | |
| Street: |  | | | | |
| City/State: |  | | Postal Code: | |  |
| Country: |  | Telephone: | |  | |
| Email: |  | | | | |

Flow Research is an international market research company located in Wakefield, Massachusetts in the United States. One of our research areas is the worldwide oil & gas industry, and the process control instrumentation used in its support.

Flow Research is conducting a survey of flowmeter users on behalf of the Flowmeter Recalibration Working Group (FRWG). This group is composed of over 20 flowmeter manufacturers, calibration companies, and end-users. Its purpose is to arrive at a set of criteria for determining when a flowmeter should be recalibrated. You can find out more about this group at [www.frwg.org](http://www.frwg.org).

We understand that you are the correct person to complete the survey below for your company. Your answers to this survey will greatly assist with the completion of the research project. We are very grateful for your participation. Please respond by April 20, 2018. Please return your completed survey to [jesse@flowresearch.com](mailto:jesse@flowresearch.com). You can also respond to our fax or to our address on the last page. We thank you in advance for your participation!

highlighted

*Please provide your responses in the areas that are And, your opinions matter a great deal. Please feel free to add your own comments.*

1. What is the principal nature of your business activity? *Please mark appropriate box.*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Oil or Gas production | | |
|  | Refining | |
|  | Oil or gas distribution (including pipelines and/or terminals | | | |
|  | Petrochemical | | |
|  | Chemical | | |
|  | Food and Beverage | | |
|  | Pharmaceutical | | |
|  | Power | | |
|  | Water and Wastewater | | |
|  | Other: |  | | | |

1. How would you classify your firm as a purchaser of flowmeters? *Please mark appropriate box.*

|  |  |  |
| --- | --- | --- |
|  | End-User | |
|  | Engineering / Construction Firm | | |
|  | Systems Integrator | |
|  | Other: |  | | |

1. What is the total number of flowmeters in use at your facility / in your company?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Total Units: |  |  |  | At facility? |  |  | In company? |

1. What is the total number of Coriolis, Ultrasonic, Turbine and/or Magnetic flowmeters in use at your facility / company?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Coriolis** | **Ultrasonic** | **Turbine** | **Magnetic** | **Differential Pressure**  **(DP)** |
| % of Total Number of units in use | % | % | % | % | % |

1. What percent of each of these types are used for custody transfer?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Coriolis** | **Ultrasonic** | **Turbine** | **Magnetic** | **Differential Pressure**  **(DP)** |
| % of each type used for Custody Transfer | % | % | % | % | % |

1. What types of fluids are measured by your Coriolis, Ultrasonic, Turbine, Magnetic and DP flowmeters **for custody transfer**? For what applications? *Please mark appropriate box(es).*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Fluid Type** | **Custody Transfer: Coriolis** | **Custody Transfer: Ultrasonic** | **Custody Transfer: Turbine** | **Custody Transfer: Magnetic** | **Custody Transfer: DP** | **Application(s)** |
| Crude Oil  (Upstream) |  |  |  |  |  |  |
| Refined Fuels  (Mid- and Downstream) |  |  |  |  |  |  |
| Non-petroleum Liquids (incl. water/wastewater) |  |  |  |  |  |  |
| Natural Gas |  |  |  |  |  |  |
| Industrial Gas |  |  |  |  |  |  |
| Steam |  |  |  |  |  |  |
| Air |  |  |  |  |  |  |

Questions **7** and **8** regard flowmeters used to measure **GAS..**

1. How often do you recalibrate your **custody transfer** Coriolis, Ultrasonic, Turbine and/or Differential Pressure flowmeters used to measure **gas**? *Please mark appropriate box(es).*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Recalibration Frequency** | **Custody Transfer: Coriolis** | **Custody Transfer: Ultrasonic** | **Custody Transfer: Turbine** | **Custody Transfer: DP** |
| Before each use |  |  |  |  |
| Every 3 months |  |  |  |  |
| Every 6 months |  |  |  |  |
| Every year |  |  |  |  |
| Every 3 years |  |  |  |  |
| Every 5 years |  |  |  |  |
| Other (please specify) |  |  |  |  |

1. How do you have your Coriolis, Ultrasonic, Turbine and/or DP flowmeters recalibrated?

*Please mark appropriate box(es).*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Recalibration**  **Method** | **Custody Transfer:**  **Coriolis** | **Custody Transfer:**  **Ultrasonic** | **Custody Transfer:**  **Turbine** | **Custody Transfer: DP** |
| Run software program |  |  |  |  |
| Calibrate on-site using our equipment |  |  |  |  |
| Bring in an outside calibration company |  |  |  |  |
| Send out to an independent flow lab |  |  |  |  |
| Send to the manufacturer |  |  |  |  |
| On-site prover from our own company |  |  |  |  |
| On-site prover from an outside party |  |  |  |  |
| Diagnostics (e.g, meter verification) |  |  |  |  |
| Other (please specify) |  |  |  |  |

Questions **9** and **10** regard flowmeters used to measure **LIQUIDS..**

1. How often do you recalibrate your **custody transfer** Coriolis, Ultrasonic, Turbine, DP and/or Magnetic flowmeters used to measure liquids? *Please mark appropriate box(es).*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Recalibration Frequency** | **Custody Transfer: Coriolis** | **Custody Transfer: Ultrasonic** | **Custody Transfer: Turbine** | **Custody Transfer: DP** | **Custody Transfer:**  **Magnetic** |
| Before each use |  |  |  |  |  |
| Every 3 months |  |  |  |  |  |
| Every 6 months |  |  |  |  |  |
| Every year |  |  |  |  |  |
| Every 3 years |  |  |  |  |  |
| Every 5 years |  |  |  |  |  |
| Other (please specify) |  |  |  |  |  |

1. How do you have your Coriolis, Ultrasonic, Turbine or Magnetic flowmeters recalibrated?

*Please mark appropriate box(es).*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Recalibration**  **Method** | **Custody Transfer:**  **Coriolis** | **Custody Transfer:**  **Ultrasonic** | **Custody Transfer:**  **Turbine** | **Custody Transfer: DP** | **Custody Transfer:**  **Magnetic** |
| Run a self-diagnostic software program |  |  |  |  |  |
| Calibrate on-site  using our equipment |  |  |  |  |  |
| Bring in an outside calibration company |  |  |  |  |  |
| Send out to an independent flow lab |  |  |  |  |  |
| Send to the manufacturer |  |  |  |  |  |
| On-site prover from our own company |  |  |  |  |  |
| On-site prover from an outside party |  |  |  |  |  |
| Diagnostics  (e.g., meter verification) |  |  |  |  |  |
| Other (please specify) |  |  |  |  |  |

1. What factors determine when you have your Coriolis, Ultrasonic, Turbine, DP, and/or Magnetic flowmeters recalibrated? *Please mark appropriate box(es).*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Recalibration**  **Factor** | **Custody Transfer: Coriolis** | **Custody Transfer:**  **Ultrasonic** | **Custody Transfer:**  **Turbine** | **Custody Transfer:**  **DP** | **Custody Transfer:**  **Magnetic** |
| Government Regulation |  |  |  |  |  |
| Manufacturer’s Recommendation |  |  |  |  |  |
| A problem with the device or the process |  |  |  |  |  |
| A pre-determined contract interval |  |  |  |  |  |
| International Acceptance and Traceability |  |  |  |  |  |
| Quality Control Specifications |  |  |  |  |  |
| Other (please specify) |  |  |  |  |  |

1. Custody Transfer applications require a high degree of accuracy and repeatability. Where do you initially calibrate the flowmeters you use in Custody Transfer applications?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | % | By the manufacturer prior to delivery | | |
|  | % | At a calibration facility Where? | |  |
|  | % | Other: |  | |
| Total = | 100% |  | | |

1. You might have multiple reasons for deciding to recalibrate a flowmeter. What are your reasons for recalibrating your flowmeters used in Custody Transfer applications? *Please rank your reasons in their order of importance (1 = least important, 5 = most important).*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Importance** | | | | |
|  | LEAST IMPORTANT MOST IMPORTANT | | | | |
| **Recalibration Factor** | **1** | **2** | **3** | **4** | **5** |
| Company policy |  |  |  |  |  |
| Contract requirements |  |  |  |  |  |
| Regulations |  |  |  |  |  |
| Manufacturer recommendation |  |  |  |  |  |
| Lifecycle cost management |  |  |  |  |  |

1. What are the criteria you use in selecting a recalibration facility?

*Please rank in order of importance (1 = least important, 5 = most important).*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | **Importance** | | | | |
|  | | LEAST IMPORTANT MOST IMPORTANT | | | | |
| **Calibration Facility Selection Factor** | | **1** | **2** | **3** | **4** | **5** |
| Price | |  |  |  |  |  |
| Distance | |  |  |  |  |  |
| Availability | |  |  |  |  |  |
| Accuracy | |  |  |  |  |  |
| Capacity and sizing | |  |  |  |  |  |
| Client specification(s) | |  |  |  |  |  |
| International acceptance and accreditation | |  |  |  |  |  |
| Turnaround time | |  |  |  |  |  |
| Ease of witnessing | |  |  |  |  |  |
| Availability of different transition pieces | |  |  |  |  |  |
| Low pressure calibration for 300#, 150# meters | |  |  |  |  |  |
| Availability of high pressure for 600# meters | |  |  |  |  |  |
| Other: |  |  |  |  |  |  |

1. What percent of your **non**-Custody Transfer Coriolis, Ultrasonic, Turbine, and/or Magnetic flowmeters do you have recalibrated, and what is the average interval between calibrations?

|  |  |  |
| --- | --- | --- |
| **%** | **Flowmeter Type** | **Interval Between Calibrations** |
| % | Coriolis |  |
| % | Ultrasonic |  |
| % | Turbine |  |
| % | Magnetic |  |

1. Is the above average turnaround time acceptable to you?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Yes |  |  | No |

1. Who decides where your flowmeters will be recalibrated?

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | % | The manufacturer / supplier | | | | | |  | |  | |  |
|  | % | Our client / contractual partner | | | | | |  |  | | |  |
|  | % | We do | | Relevant Title: | |  | | | | | | |
|  | % | Other: |  | | | | | | | | | |
| Total = | 100% |  | | |  | |  | | | |  | |

1. We are also interested in other flowmeter types used to measure gas and liquids. If you are also a user of Vortex, Thermal, Differential Pressure, or Positive Displacement flowmeters, how often are these flowmeter types recalibrated at your company or facility?

|  |  |  |
| --- | --- | --- |
| **%** | **Flowmeter Type** | **Interval Between Calibrations** |
| % | Vortex |  |
| % | Thermal |  |
| % | Differential Pressure |  |
| % | Positive Displacement |  |

1. Do you have any other comments that you believe would help us understand how to determine when a flowmeter should be recalibrated and how often?

|  |
| --- |
|  |

1. Would you like to join our effort? Do you have articles or data relevant to the topic of flowmeter recalibration that you would like to submit to the Flow Recalibration Working Group? If so, please provide any details here or feel free to submit them directly to [jesse@flowresearch.com](mailto:jesse@flowresearch.com). We are building a knowledge base on flowmeter recalibration.

|  |
| --- |
|  |

*Thank you very much for your participation!*

► Please see the next page for important information.

Please return this questionnaire to: Flow Research, Inc.

27 Water Street

Wakefield, MA 01880

United States

[1] 781 245-3200

[1] 781 224-7552 (fax)

You can also email your completed questionnaire to: [jesse@flowresearch.com](mailto:jesse@flowresearch.com).

Would you like to learn more about Flow Research? We’d be happy to send you information about us and, if you would like, a summary of the activities of the Flow Recalibration Working Group.. We also have a new CD called “Go with the Flow” that includes a large number of flowmeter articles and other information. We’d be happy to send you this CD.

Please indicate your preference(s) below. *Please be certain to include your email and mailing addresses on the front page of this questionnaire for any materials you would like to receive.*

|  |  |
| --- | --- |
| **Mark your selection(s)** | Flow Research Products and Services |
|  | More information about the Flow Recalibration Working Group (free) |
|  | “Go with the Flow” CD (free) |
|  | Oil’s Wild Ride, 3rd Edition – White Paper on Oil Prices (free) |
|  | More information about Flow Research (free) |
|  | All of the above |

