



2023 Report

# Pressure Equipment Inspector Staffing



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## Introduction

**Thank you to everyone** who participated in and contributed to our latest edition of the Pressure Equipment/Inspector Ratio Benchmarking Survey. We would like to give special thanks to those that helped champion the survey within their respective companies. We are grateful for a community that is committed to the continued improvement of mechanical integrity and to the progression of our industry as a whole.

This report provides a benchmark of fixed equipment mechanical integrity (FEMI) inspection department staffing in comparison to the amount of pressure equipment for which facility inspectors are responsible. We hope to provide a basis to validate current inspection staffing levels or to substantively justify additional resources, as appropriate.

Great efforts have been made to assure reporting accuracy and quality. However, Inspectioneering makes no express or implied warranties concerning the information contained within. Inspectioneering expressly disclaims all warranties, including but not limited to warranties of merchantability and warranties of fitness for a particular purpose. The data provided in this report should be used strictly for informational purposes.

### Interpreting This Report

The core objective of this benchmarking survey and report is to answer the question: “How many pieces of **pressure equipment** are my **pressure equipment inspectors** responsible for?” We answer this question with a metric called the Pressure Equipment to Inspector Ratio (PE/I). For example, a PE/I of 200 suggests that each pressure equipment inspector is responsible for roughly 200 pieces of pressure equipment in a facility.

The intent of this report is to focus solely on pressure equipment. As such, it does NOT include data or analysis on piping or other non-pressure equipment.

### A Note on Data Quality

An adequate sample size is important when performing statistical analysis. This report includes industry-specific sections on oil refining, chemical/petrochemicals, and specialty/other chemicals, each of which received many submissions and have an acceptable amount of variance in their data. We have chosen to omit data from other facility types due to having a small sample size or a large variance in data. **Unless your facility is very similar in process units and staffing ideologies to the three included industries, we recommend using this data with caution.**

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## Introduction

### Definitions and Abbreviations

The report makes use of some common definitions and abbreviations:

- **BPD:** Barrels per day.
- **Certified Inspector:** Any Inspector who is certified to API 510 or an equivalent pressure equipment inspection code.
- **Inspector:** For the purpose of this report, an inspector is anyone responsible for the inspection of pressure equipment.
- **n:** The number of submissions/facilities included in a given measure.
- **Pressure Equipment:** For the purpose of this report, pressure equipment is defined as the sum of pressure vessels, heat exchangers, heaters, boilers, and incinerators. It does not include atmospheric storage tanks or piping.
- **Pressure Equipment to Inspector Ratio (PE/I):** The sum of all Pressure Equipment divided by the total number of full-time and full-time equivalent contractor Inspectors that are responsible for that equipment.

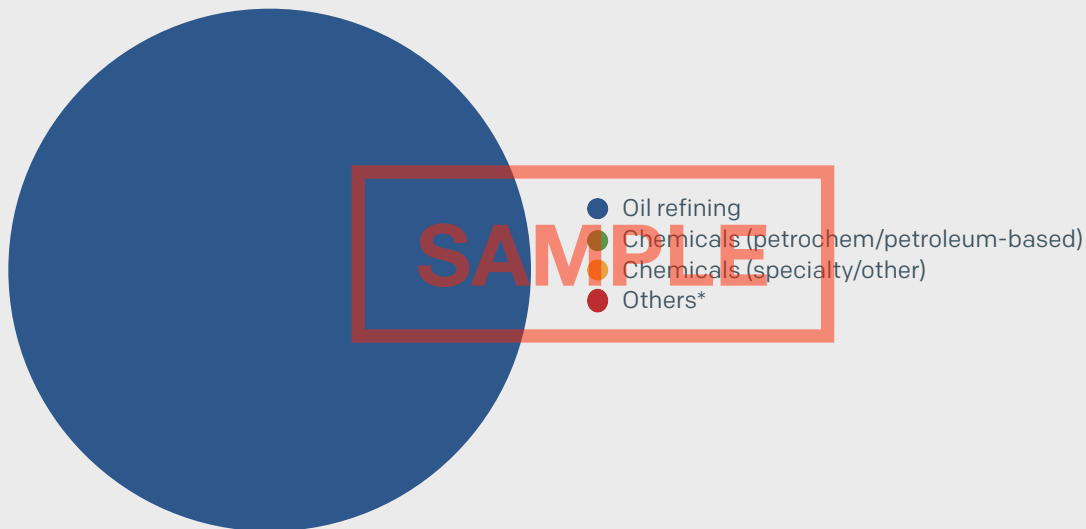
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## About the Survey Respondents

Data for this report was gathered from September 2022 through January 2023. In that time, we received nearly 200 eligible submissions from a variety of facility types and from all six of the inhabited continents. The majority of submissions came from oil refineries, chemical/petrochemical facilities, and gas plants. In total, the survey data accounts for ### pieces of equipment and ### inspectors across the globe.

The following figures illustrate the wide variety of submissions that are incorporated into this report.

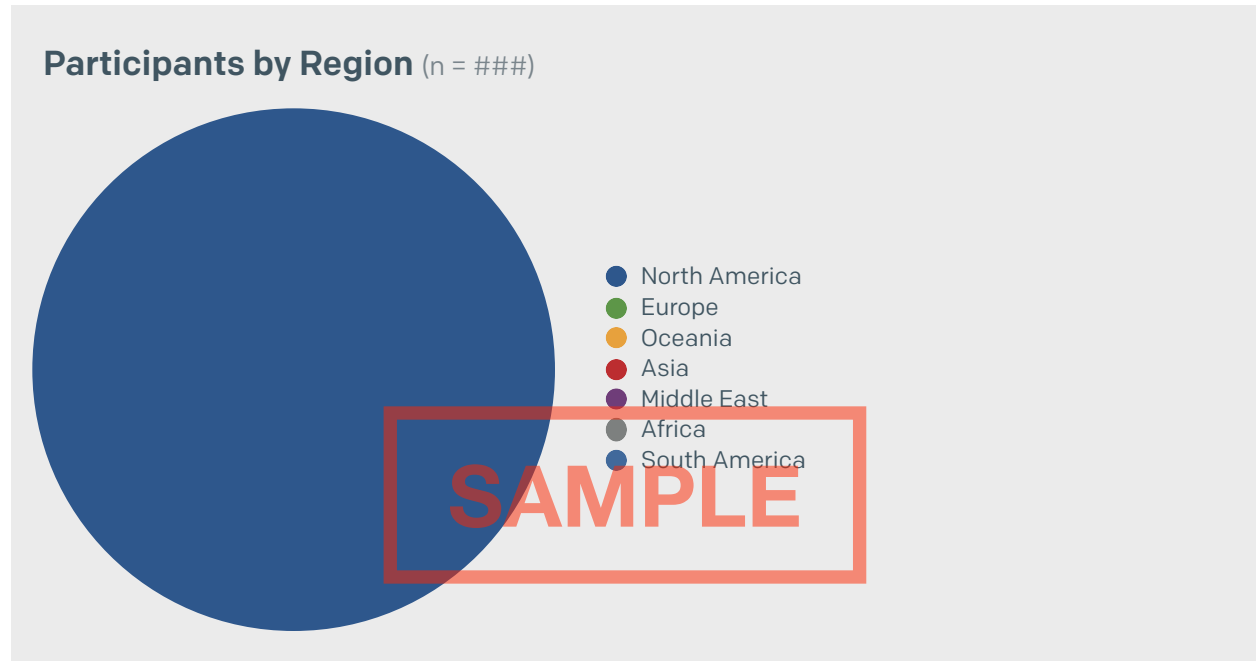
### Participants by Facility Type (n = ###)



\*Other facility types include gas plants, terminals, topsides/offshore platforms, steam injection production facilities, ethanol plants, gas-to-liquids plants, power and water facilities, and heavy oil upgrading facilities. These number of submissions from these types of facilities did not reach an adequate sample size to be used in this report's analysis.

## About the Survey Respondents

Submissions were received from all of the world's inhabited continents. The majority of submissions came from North America (###% from United States and ###% from Canada). The following chart shows the regional breakdown of submissions.



## Survey Findings Across Industries

### Summary of PE/I Metrics Across Industries (n = ###)

Industry	n	Mean	1st Quartile	Median	3rd Quartile	Std. Dev.
Oil refining	###	###	###	###	###	###
Chemicals (Petrochem or Petroleum-Based)	###	###	###	###	###	###
Chemicals (Specialty/ Other)	###	###	###	###	###	###

The sections that follow will further explore the following data from each of these industries:

- PE/I and staffing summary statistics
- Throughput or pressure equipment count-related metrics
- Risk-based inspection metrics

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## Survey Findings Oil Refining

### Summary of PE/I Metrics (n = ###)

Mean	###
First quartile	###
Median	###
Third quartile	###
Standard deviation	###

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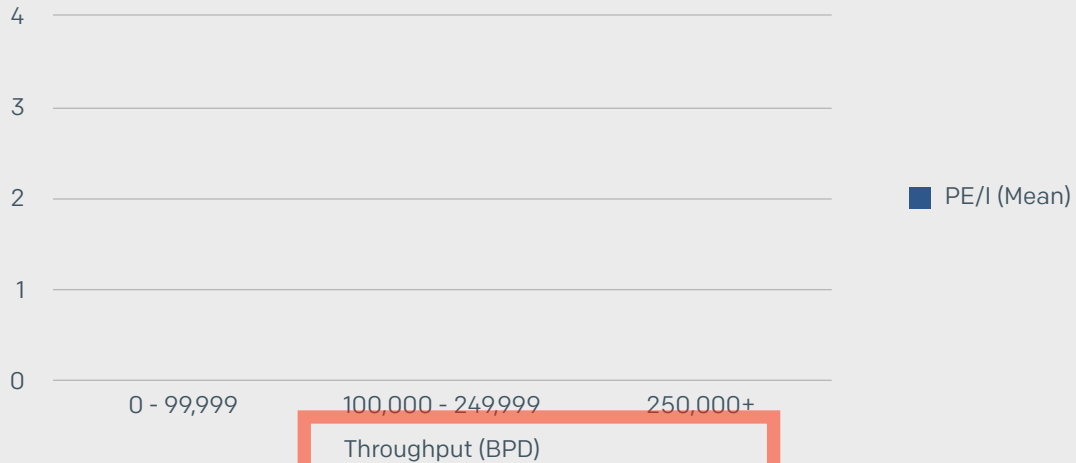
### Summary of Staffing Metrics (n = ###)

Percentage of inspectors that are employed by the facility's organization on a full-time basis	##%
Percentage of inspectors ( <b>full-time or contractor</b> ) that are certified to API 510 or equivalent	##%
Percentage of inspectors ( <b>full-time only</b> ) that are certified to API 510 or equivalent	##%
Percentage of inspectors ( <b>contractor only</b> ) that are certified to API 510 or equivalent	##%



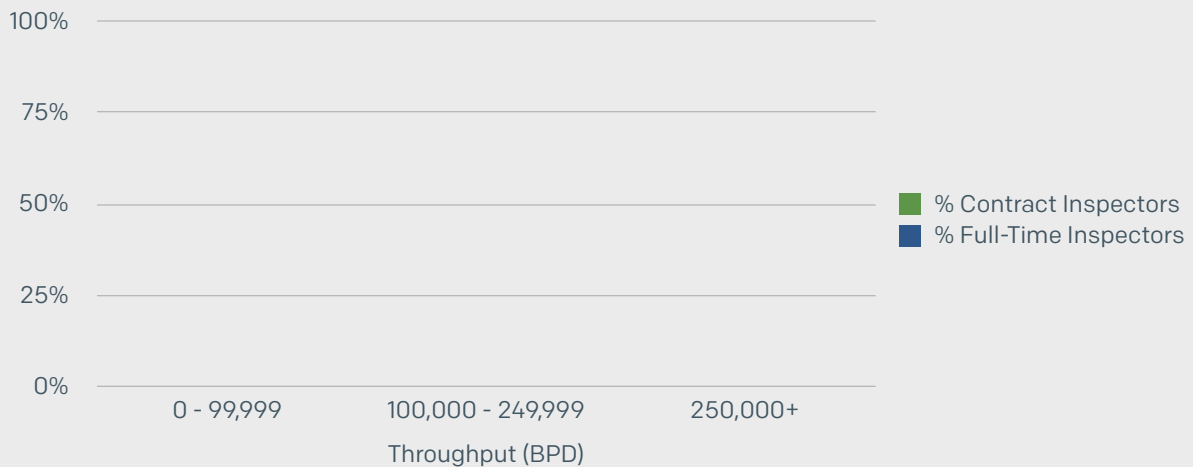
## Survey Findings Oil Refining

### Average PE/I by Throughput (n = ###)



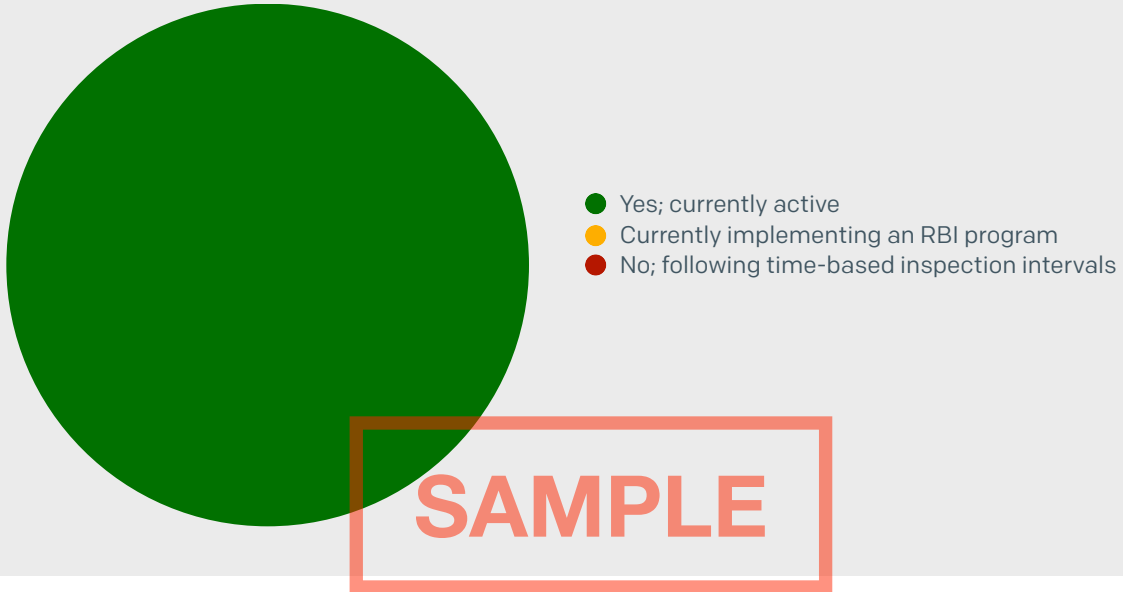
Throughput (BPD)  
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### Full-Time Company-Employed Inspectors by Throughput (n = ###)

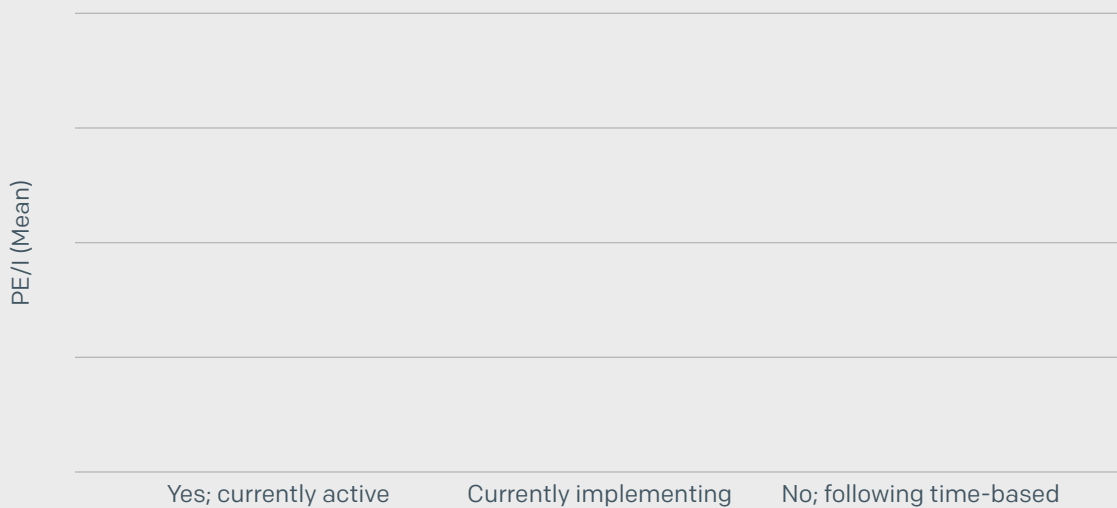


## Survey Findings Oil Refining

Does your facility currently have an active RBI program? (n = ###)



How do RBI programs impact PE/I in oil refining? (n = ###)



**Survey Findings** Chemicals (Petrochem/Petroleum-Based)

**Summary of PE/I Metrics** (n = ###)

Mean	###
.....	
First quartile	###
.....	
Median	###
.....	
Third quartile	###
.....	
Standard deviation	###



**Summary of Staffing Metrics** (n = ###)

Percentage of inspectors that are employed by the facility's organization on a full-time basis	###
.....	
Percentage of inspectors <b>(full-time or contractor)</b> that are certified to API 510 or equivalent	###
.....	
Percentage of inspectors <b>(full-time only)</b> that are certified to API 510 or equivalent	###
.....	
Percentage of inspectors <b>(contractor only)</b> that are certified to API 510 or equivalent	###

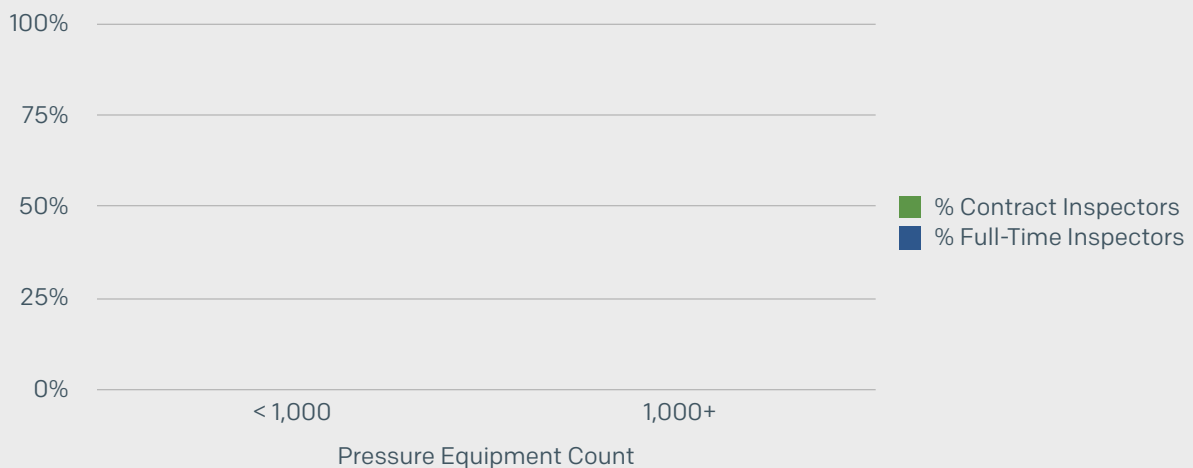
## Survey Findings Chemicals (Petrochem/Petroleum-Based)

### Average PE/I by Pressure Equipment Count (n = ###)



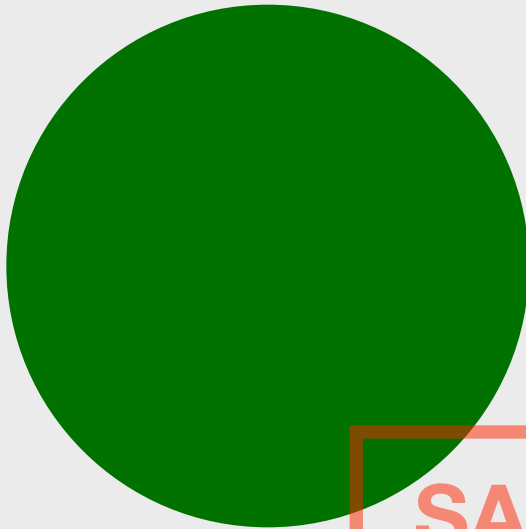
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### Full-Time Company-Employed Inspectors by Equipment Count (n = ###)



## Survey Findings Chemicals (Petrochem/Petroleum-Based)

Does your facility currently have an active RBI program? (n = ###)



- Yes; currently active
- Currently implementing an RBI program
- No; following time-based inspection intervals

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How do RBI programs impact PE/I in petrochem facilities? (n = ###)

PE/I (Mean)



Yes; currently active

Currently implementing

No; following time-based

**Survey Findings** Chemicals (Specialty/Other)

**Summary of PE/I Metrics** (n = ###)

Mean	###
First quartile	###
Median	###
Third quartile	###
Standard deviation	###

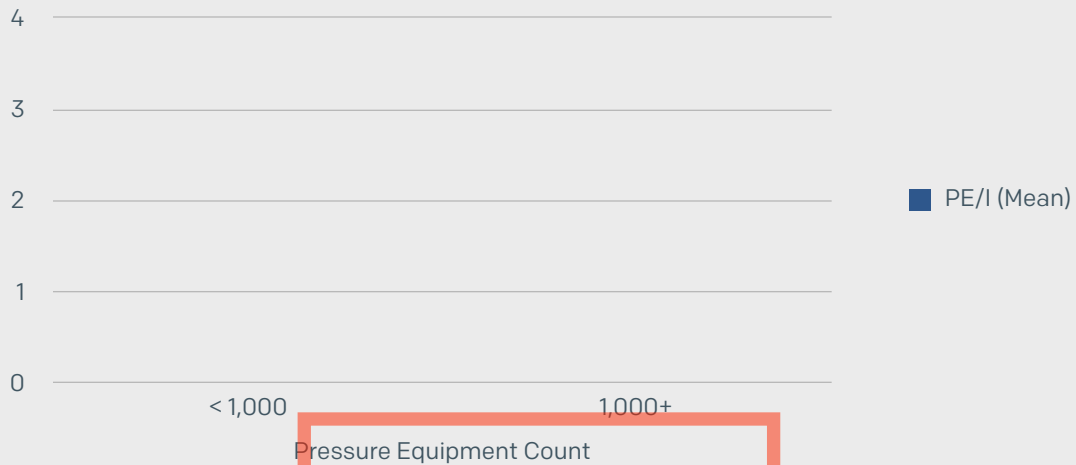


**Summary of Staffing Metrics** (n = ###)

Percentage of inspectors that are employed by the facility's organization on a full-time basis	###%
Percentage of inspectors ( <b>full-time or contractor</b> ) that are certified to API 510 or equivalent	###%
Percentage of inspectors ( <b>full-time only</b> ) that are certified to API 510 or equivalent	###%
Percentage of inspectors ( <b>contractor only</b> ) that are certified to API 510 or equivalent	###%

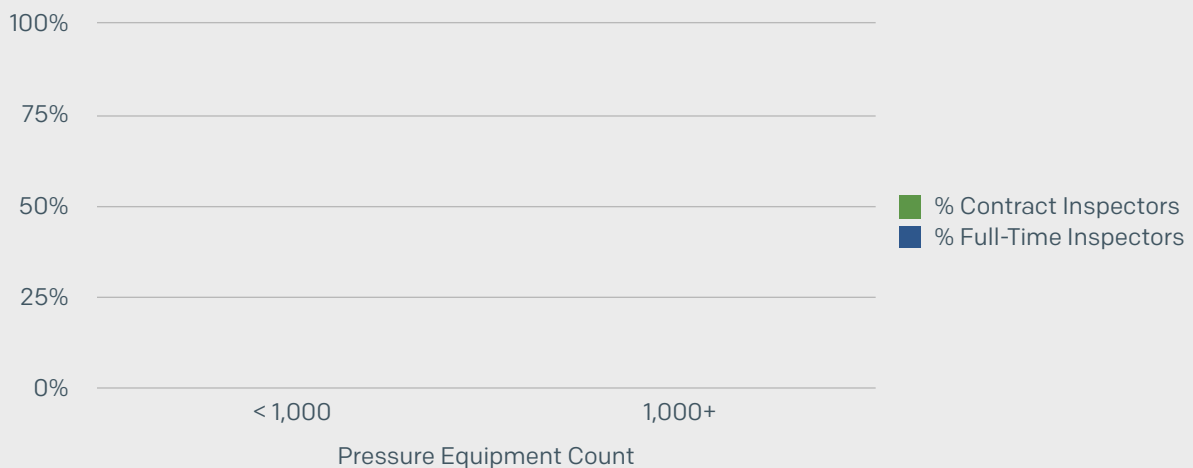
## Survey Findings Chemicals (Specialty/Other)

### Average PE/I by Pressure Equipment Count (n = ###)



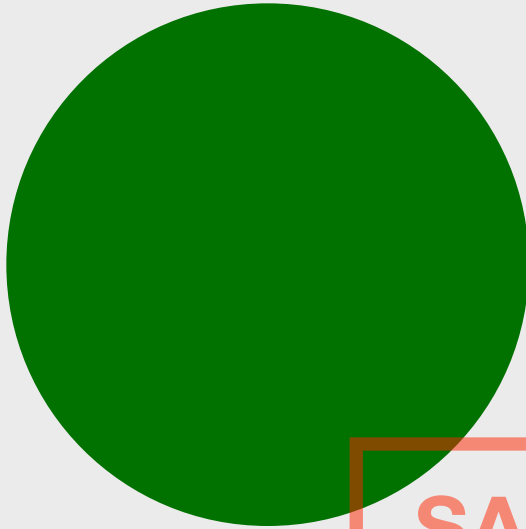
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### Full-Time Company-Employed Inspectors by Equipment Count (n = ###)



## Survey Findings Chemicals (Specialty/Other)

Does your facility currently have an active RBI program? (n = ###)



- Yes; currently active
- Currently implementing an RBI program
- No; following time-based inspection intervals

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How do RBI programs impact PE/I in specialty chemicals? (n = ###)

PE/I (Mean)



Yes; currently active

Currently implementing

No; following time-based



## Feedback

Inspectioneering would like to extend a special thanks to every company who participated in this benchmarking survey. We hope you find the information contained within this report to be helpful.

Inspectioneering conducts benchmarking surveys covering a variety of mechanical integrity management topics. **Help us determine future surveys by providing your feedback!** Please submit your suggestions using the directions below.

**Requesting further information on this survey and report:** If you need clarification or would like to further discuss the data we obtained when conducting this survey, please email your questions and comments to [inquiries@inspectioneering.com](mailto:inquiries@inspectioneering.com).

Furthermore, this report should not be considered final. We may make amendments and updates in the future based on your feedback. Send us a message if you have any suggestions as to additional data or metrics we can provide.

**Submitting suggestions for future surveys:** Please send any ideas, thoughts, and suggestions for other potential benchmarking surveys to Nick Schmoyer ([nschmoyer@inspectioneering.com](mailto:nschmoyer@inspectioneering.com)). Be sure to include what you would like to be accomplished with the survey/report as well as any proposed benchmarking questions.

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## About Inspectioneering

Inspectioneering is a global publisher and media company whose mission is to *educate, inspire, connect,* and *advance* the mechanical integrity and reliability community. We are motivated by the belief that increased mechanical integrity intelligence can help improve organizational efficiency, increase equipment reliability, protect workers and the environment, and in the end, lead to a more successful business enterprise.

### For more information about Inspectioneering:

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