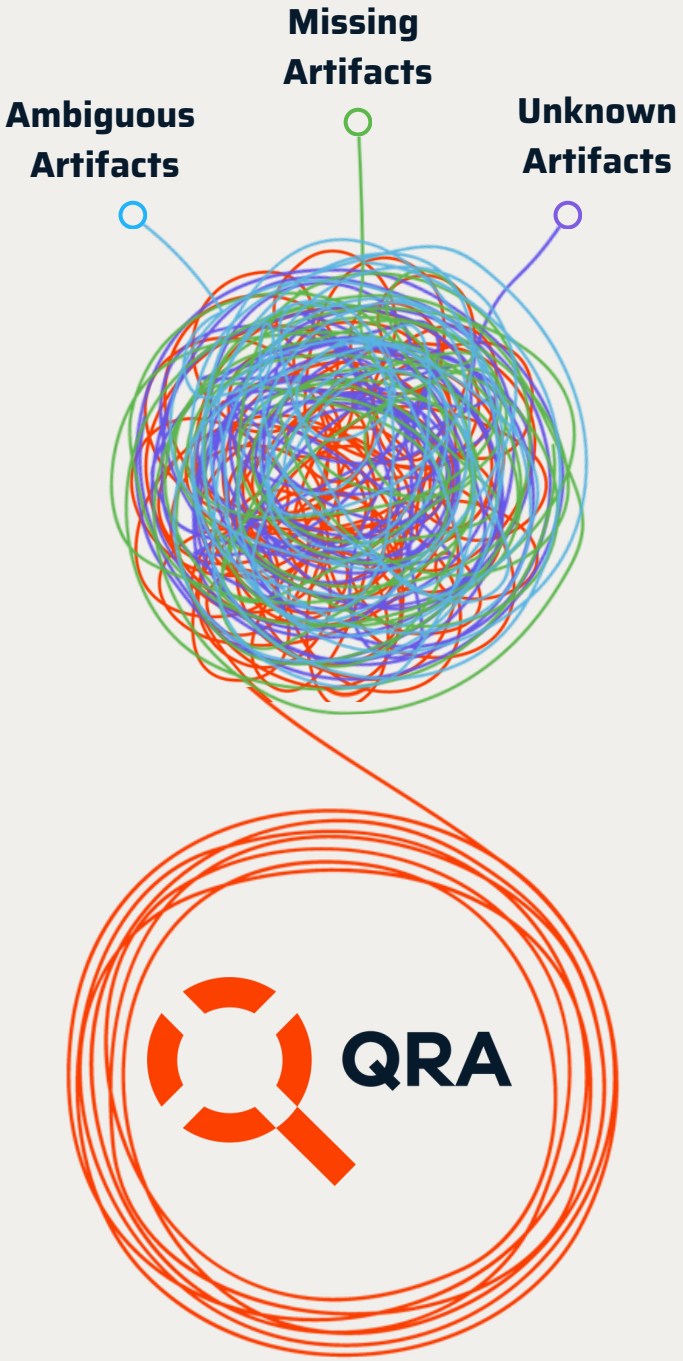
# Generate. Evaluate. Predict.




## Requirements Index and Insights

# REQINSIGHTS SUMMARY

An extensive internal analysis of over **12,000** requirements across multiple sectors revealed a new perspective on the barriers to project success.

**50**
Documents Analyzed

**12,955**
Requirements Analyzed

### Across Various Industries

- Oil & Gas
- Chemical
- Utilities
- Government
- Shipbuilding
- Automotive
- Electrical Manufacturing
- Defense & Space
- Software Development
- Telecommunications
- Medical Devices

# OVERALL RESULTS

## QVscribe Quality Analysis Score Distribution

Average of **2/5** QVscribe Quality Score.

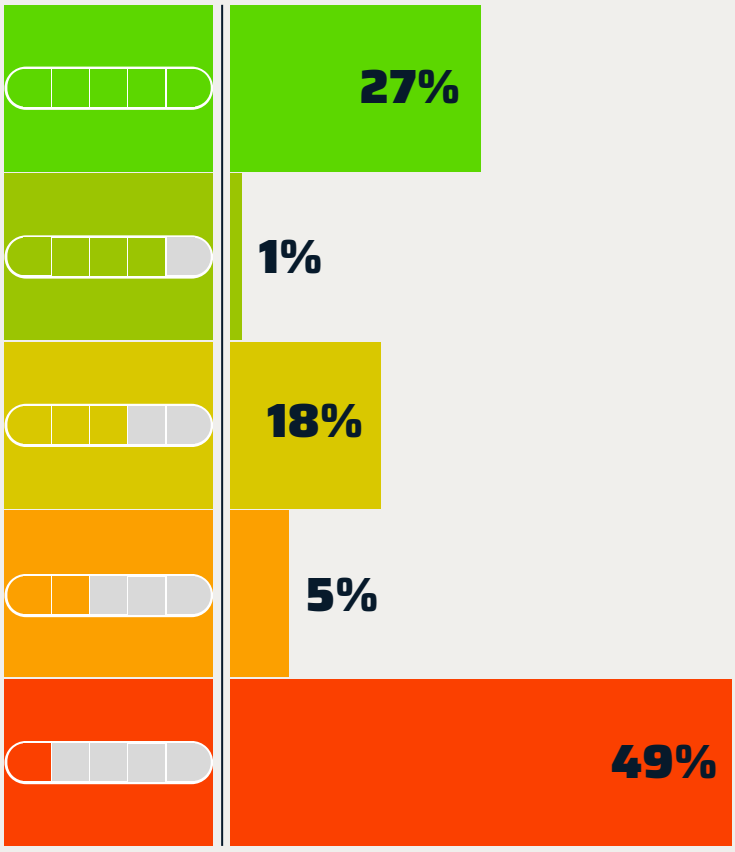
**5/5, Very Low Risk:** includes clear and unambiguous terminology to express the requirement.

**4/5, Low Risk:** may include excessive use of continuances and/or no directives.

**3/5, Medium Risk:** includes a single instance of a vague, subjective, or weak term, and/or a single negative imperative.

**2/5, High Risk:** includes multiple instances of vague, subjective, or weak terms, and/or negative imperatives.

**1/5, Very High Risk:** includes problems imperatives or more than two instances of problematic language. It is likely that important information will be missed in the execution of the project.



## EARS, Consistency, and Similarity

**41%** average Easy Approach to Requirement Syntax (EARS) conformance.

**37,336** potentially conflicting terms.

**2,642** potential duplications.

**Length** was the top cause of inconsistent units.

**6,667** potential contradictions

# SIMILARITY ANALYSIS

**>90% Similarity**

**2642 Requirements**

**75-90% Similarity**

**6667 Requirements**

***This includes both duplicate and contradicting requirements.**

## Duplicate Requirements

Duplicate requirements can confuse stakeholders and developers, leading to misunderstandings about the intended functionality of the system and might inadvertently inflate the scope of the project if not properly identified. This can lead to scope creep, where the project gradually expands beyond its original boundaries, resulting in increased costs and timelines.

**Clarity** is essential for ensuring everyone is on the same page regarding what needs to be built.

## Contradicting Requirements

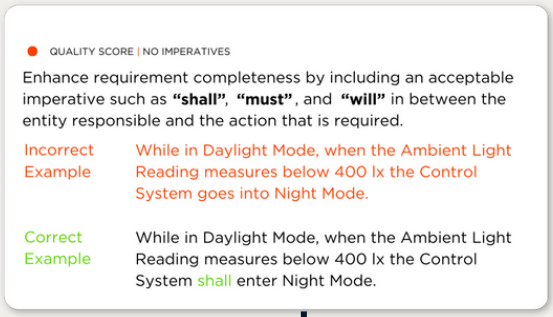
Contradicting requirements can waste time and resources during the development process and lead to compromised quality in the final product. When a project has requirements that contradict, there is potential for inconsistency in the implementation of the system, potentially resulting in errors, inefficiencies, or even system failures.

**Consistency** ensures that the system behaves predictably and reliably across different scenarios.

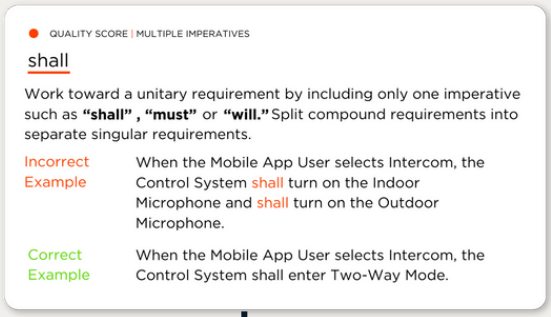
# PROBLEM TYPES

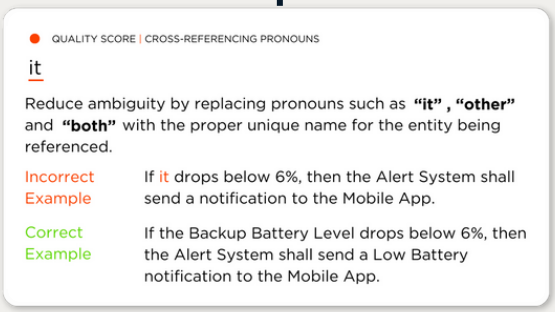
Of all the requirements we analyzed for this report...

27% had **no Imperatives**




19% used **multiple imperatives**




25% used **cross-referencing pronouns**

## Missing Imperatives or Multiple Imperatives

Words and phrases that command an action are missing. A proper requirement has exactly one imperative.

**Recommendation:** Ensure a single imperative is present in the requirement.

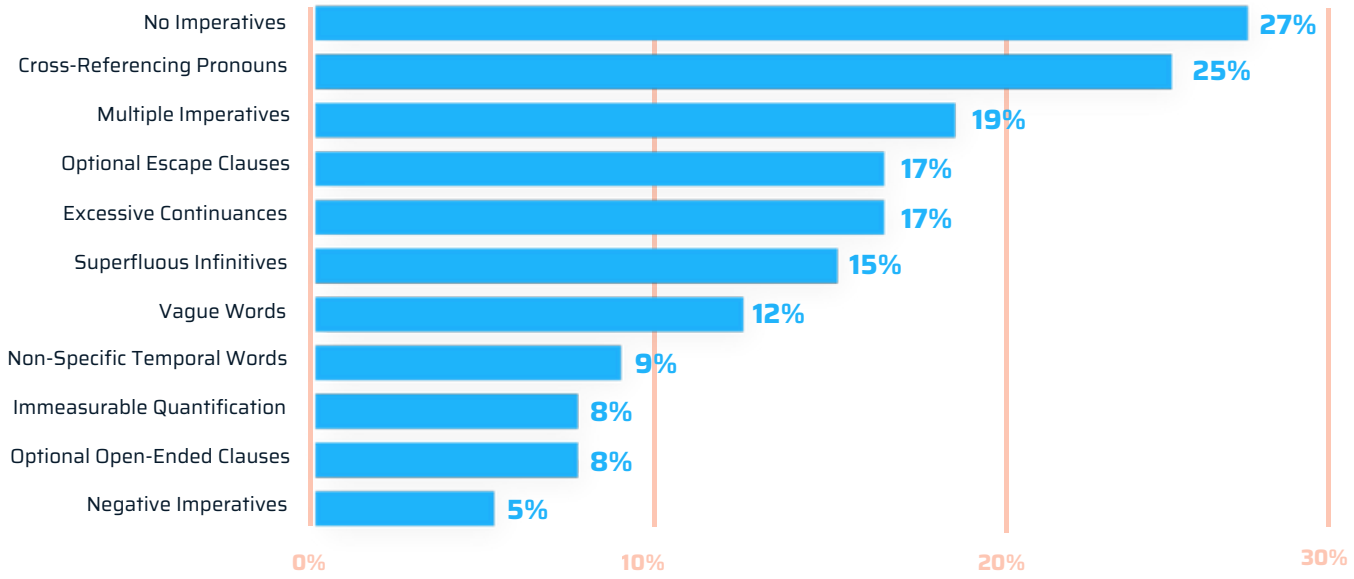
## Cross-Referencing Pronouns

Words and phrases to reference a person or object without specifying who or what it is; for example, words such as **"it"**, **"this"**, **"he"**, **"she"**, **"they"**, **"them"**, **"other"**, or **"both"**.
A proper requirement should avoid the use of pronouns or cross-referencing pronouns.

**Recommendation:** Repeat nouns in full instead of using pronouns to refer to nouns in other requirements.

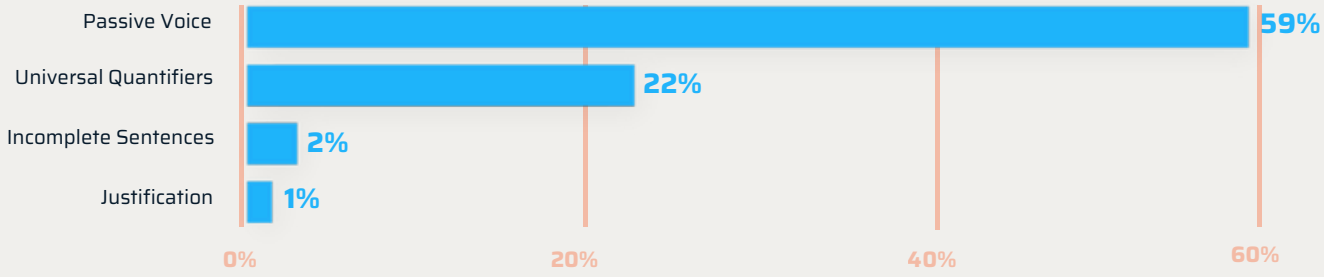
# QVSCRIBE PROBLEM TYPES AND QUALITY WARNINGS

## Problem Types (%)




***These Problem Types each have a negative impact on the QVscribe Quality Score.**

## Quality Warnings (%)




***Quality Warnings do not impact the overall score but do pose potential risks depending on the context of usage.**

## PROBLEM WORDS

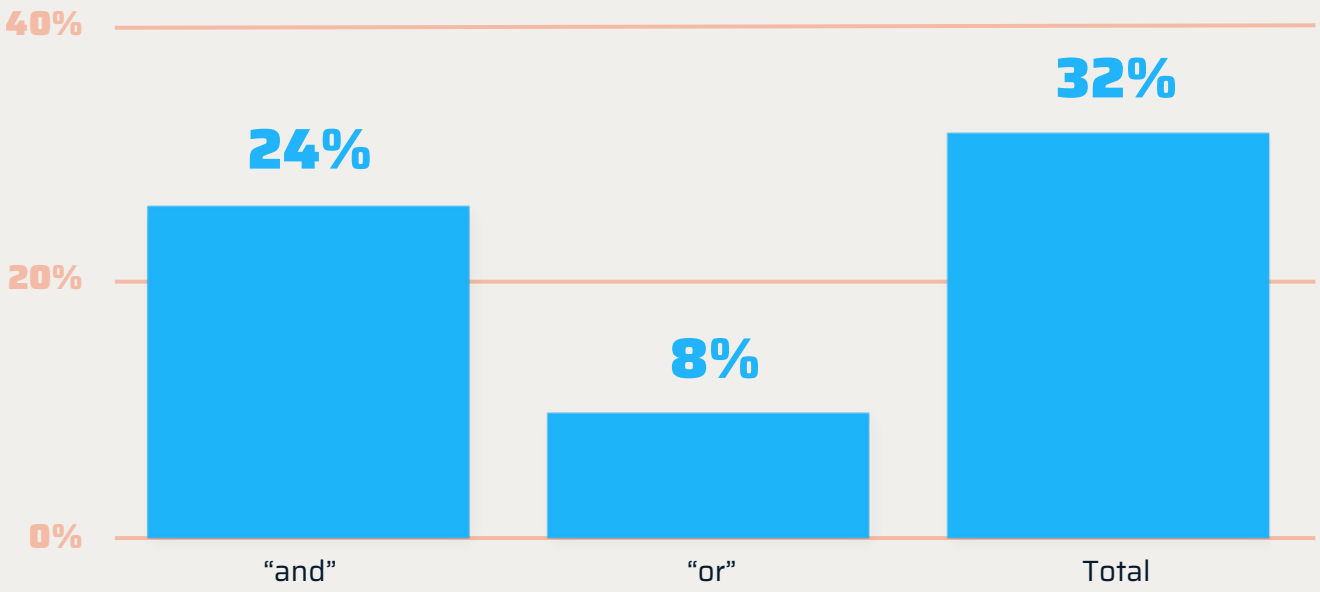
55 “Problem Words” were identified based on the top three Problem Types for each document. These words were repeated throughout thousands of requirements.

**Total number of problem words counted: 8033**

## EXCESSIVE CONTINUANCES

Excessive Continuances are words or phrases that follow the requirement’s imperative and introduce more detail to the specification. A proper requirement avoids excessive use of continuances and combinators (generally no more than two).

This was not included in the results, as **“or”** and **“and”** are not problem words in themselves, it is the excessive use within a single requirement that is an issue.




***Only instances where excessive continuances were triggered in an individual requirement were counted.**

# QRA & THE ENGINEER SURVEY: THE CURRENT STATE OF REQUIREMENTS

| 159 | 19 | 21 |
|---|---|---|
| Survey Responses | Participating Industries | Questions |

Technology is transforming requirements, enhancing their functionality. Mapping this evolving landscape is crucial for successfully navigating the growing complexity of development.

QRA partnered with The Engineer to launch a research survey to understand the dynamic relationship between engineers and quality requirements.

The survey explores challenges and opportunities in requirements, providing an in-depth, comprehensive view of their current state.

We have transformed the results into **industry-specific infographics** and a comprehensive market research paper, offering actionable insights for organizations to enhance their approach.

## SURVEY METHODOLOGY

The survey was sent out through three eblasts promoting this survey over a period of a month to The Engineer's audience of magazine readers & bulletin subscribers. The survey was also promoted by a series of posts on The Engineer's social media pages. To encourage responses, The Engineer offered the respondents the opportunity to enter a prize draw to win a £250 voucher.

### About The Engineer

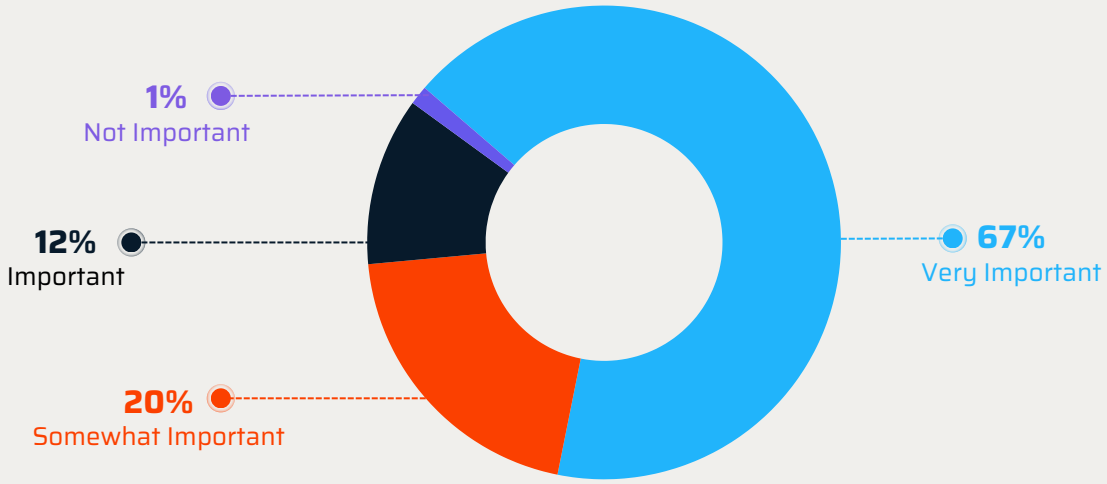
Founded in 1856 by Edward Charles Healey, The Engineer is a London-based monthly magazine covering the latest innovations in engineering and technology in the UK and internationally.

QRA

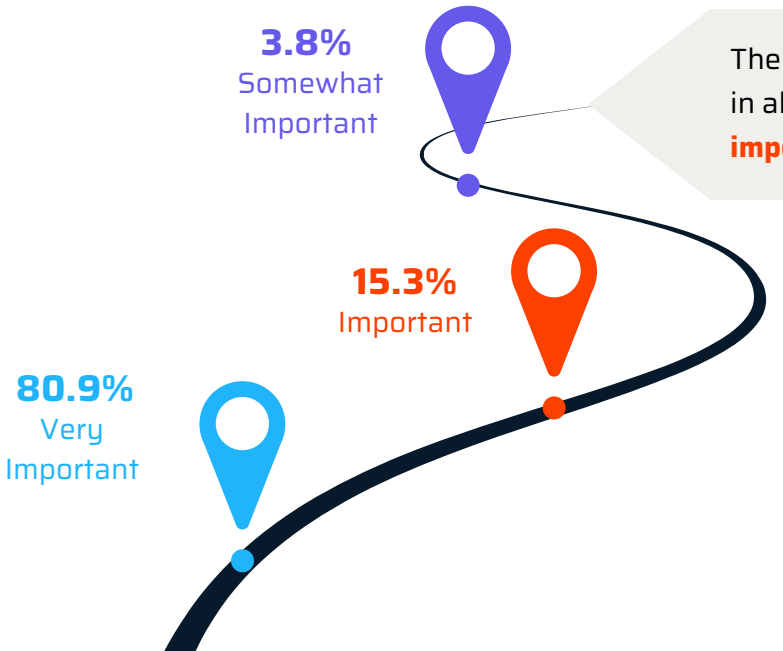
THE ENGINEER

# A PREVIEW FOR REQUIREMENTS LEADERS INTERESTED IN UNDERSTANDING INDUSTRY NORMS

## How Important to a Successful Product or Project Outcome Does Your Organization Consider the Quality of the Technical Requirements?

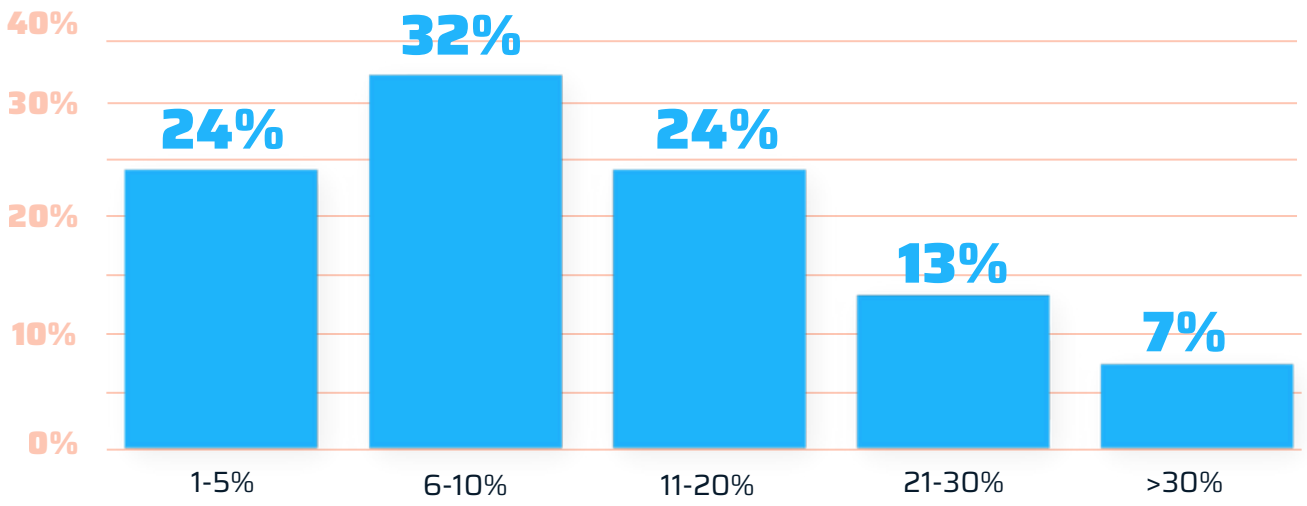



## How Important to a Successful Product or Project Outcome Do You Consider the Quality of the Technical Requirements?



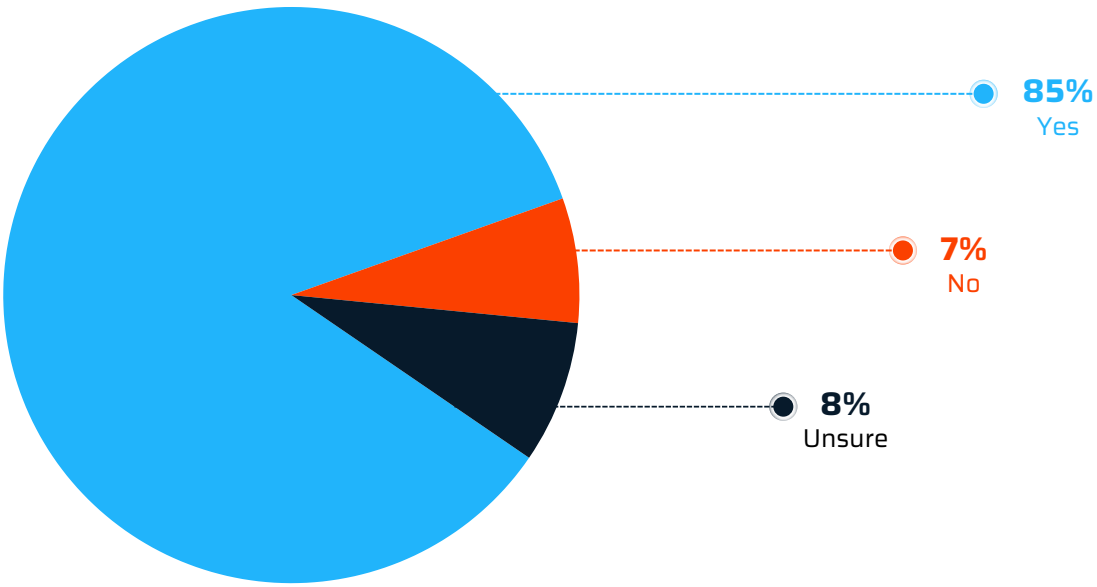

The data is clear: technical professionals in all industries understand the **importance of quality requirements**.

## What Percentage of the Total Project Budget Is Allocated to Creating and Maintaining Requirements?




Industry leaders invest in **human capital and technology at the requirement stage**, embedding innovation throughout every stage of the engineering process.

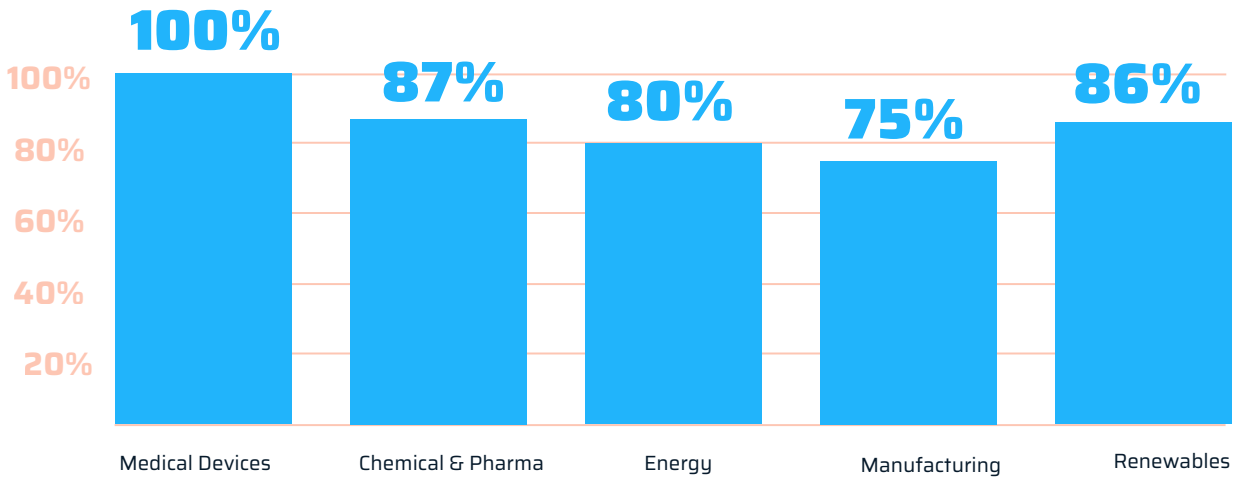
## Do You Have Tools and Processes in Place to Manage and Process Technical Requirements?



# INDUSTRY BREAKDOWN

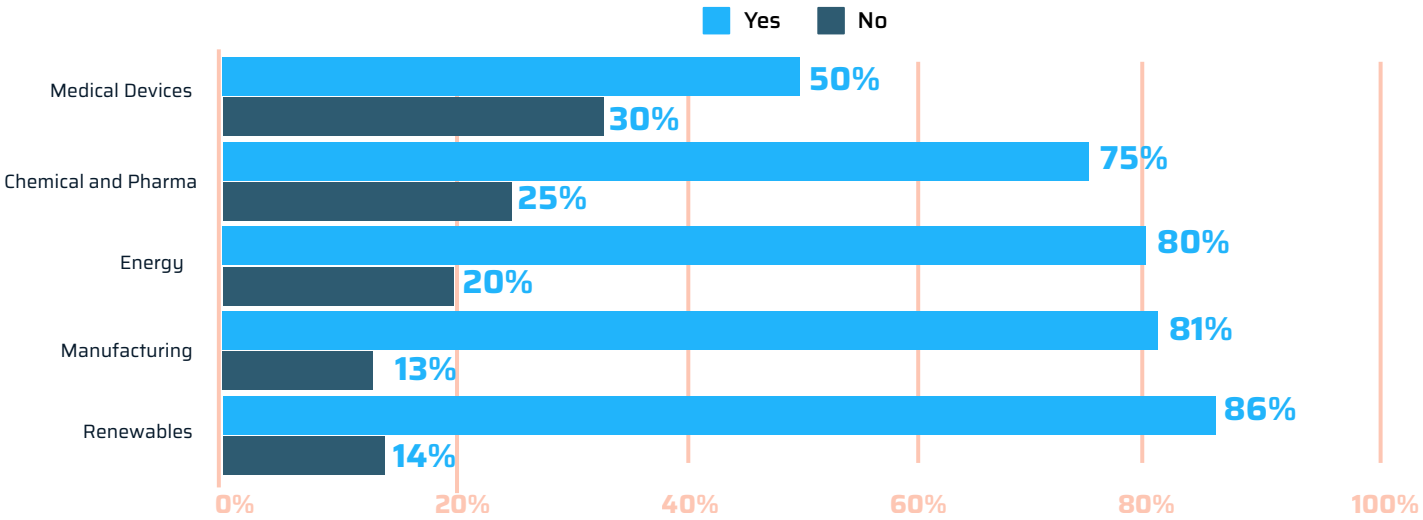
Segmenting the data by industry results in tailored insights and statistical benchmarks allowing your team to navigate the specific dynamics of your industry.

## How Important to a Successful Product or Project Outcome Do You Consider the Quality of the Technical Requirements?




Engineers in the medical device industry prioritize **high-quality technical requirements** due to the critical need for regulatory compliance, patient safety, and managing the complexity of their products. However, the industry might need a software upgrade.

## Do you have Tools and Processes in Place to Manage and Process Technical Requirements?

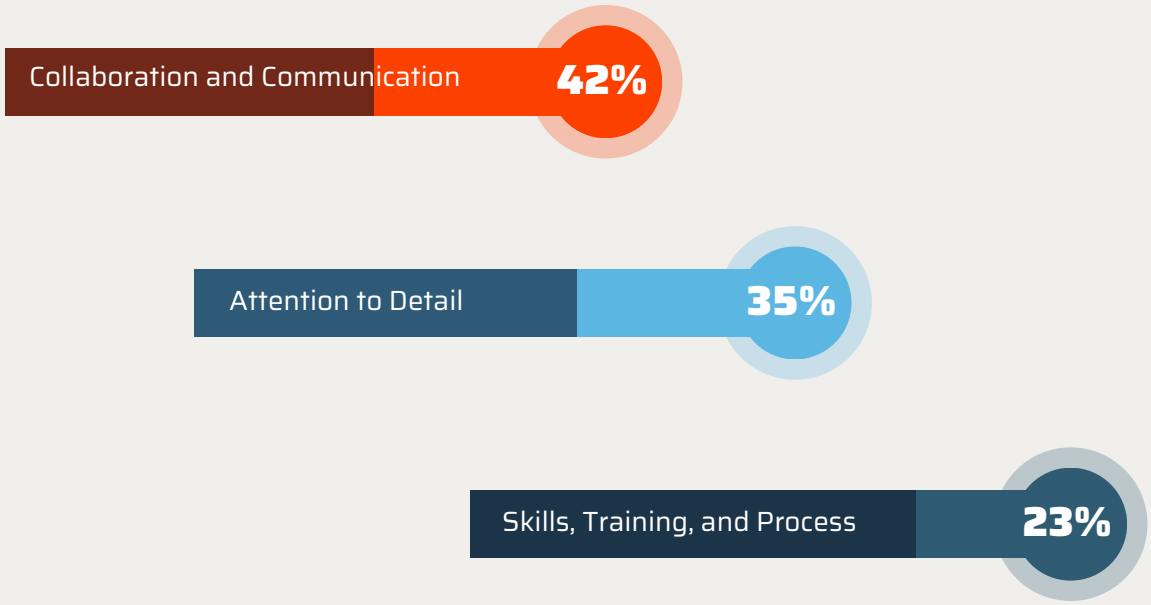


Each industry is different. Pinpointing those differences and how they impact requirement quality is essential to engineering success.

From our results outlined in our automotive-specific infographic, **Navigating the Road Ahead** we get a better, industry-specific understanding of what makes a successful requirement author.

Automotive

## What Would You Consider To Be the Most Significant Differentiator Between Requirements Writers That Produce Top Quality and Those That Produce Low Quality?



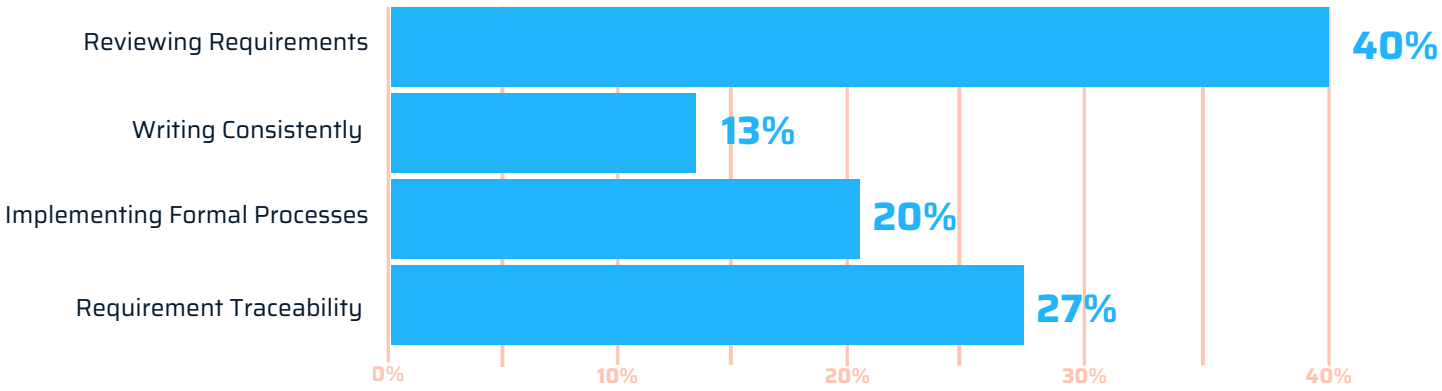

The automotive industry must prioritize communication and collaboration to enhance their requirements process.

Investing in communication tools and fostering a collaborative culture will significantly improve the quality of requirements and lead to a comprehensive understanding of engineering project needs.

**Navigating the Skies and Beyond**, our Aerospace infographic, highlights gaps in the current requirement authoring process illustrating that this industry specifically could benefit from a stronger requirement review process.

Aerospace

## For Which Aspects of the Requirements Process Would Your Team Benefit From Having Additional Support?




Creating quality requirements goes beyond just following standard protocols. It requires a deep understanding of the **unique challenges and nuances within your specific industry** that might prevent achievement.

By implementing tools that improve communication, setting up a thorough review process, and maintaining high-quality assurance standards, you can develop **a well-rounded strategy for long-term success.**

## DIVE INTO THE DETAILS:

### LEARN MORE ABOUT YOUR INDUSTRY'S REQUIREMENTS

**PARTICIPATING INDUSTRIES:**

- Automotive
- Medical devices
- Renewables
- Civil & Structural
- Aerospace
- Defence & security
- Oil & gas
- Manufacturing
- Energy
- Pharmaceuticals

## ABOUT QRA CORP

At QRA, we believe that too many high-value engineers spend too much time on low-value work. This underemployment restricts progress and ultimately limits society. Our central conceit is that recent technology, purposely applied, can expand humankind's reach, can wield complexity, and can help bring to life the most advanced cyber-physical systems. This fuels our mission to increase productivity in complex product development by 10x.

We build software tools that automate the generation, evaluation, and prediction of engineering artifacts necessary to specify, design, and certify the remarkable systems our customers build. Armed with our unwavering mission, and our core values of Tenacity, Agency, and Openness, we aim to deliver the right information, to the right people, at the right time. This is our path.

## OUR INTEGRATIONS




For more information about QRA and how we can help your requirements process, visit

**qracorp.com/eds**