# Final Inspection and Customer Quality Optimization in Centrifugal Casting

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**Abstract:** The final inspection process in the metal casting industry is crucial to produce defect-free product delivery and customer satisfaction. This study analyses the final inspection and customer quality assurance process employed at Vijay Spheroidal Pvt Ltd (VSPL), a centrifugal casting industry leader. The paper describes the inspection process, tools, and quality documentation-related practices and their importance in achieving zero customer complaints and enhancing product reliability. The study illustrates how a tough final inspection process generates product excellence and enables the achievement of strategic goals, including reducing the Cost of Poor Quality (COPQ).

## Keywords: Final Inspection, Customer Quality, Centrifugal Casting, Visual Inspection, NDT, Dimensional Inspection

#### **1. INTRODUCTION**

Centrifugal casting industry giant in providing defect-free, high-quality castings for engineering applications of a critical nature. Metallurgy, design, machining, and quality control being its specialized domains, the company provides top-grade output designed to the specifications of various industries. The paper presented here deals with a specific study on the company's final inspection and customer quality processes and how they utilize Industry 4.0 tools.

#### **Final Inspection Methodology**

Final inspection is the concluding phase of the quality control cycle, ensuring that each component meets defined specifications before dispatch.

At VSPL, they involve:

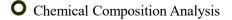
- **O** Visual Inspection: Detects surface defects like cracks and inclusions.
- **O** Hardness Testing: Uses dynamic hardness testers mainly to confirm surface integrity.
- Dimensional Inspection: Conducted with tools such as Vernier calipers, bore gauges, thread gauges and other quality tools.
- **O** Die Penetrant Testing: Detects surface discontinuities using capillary action.

**O** Ultrasonic Testing (UT): Identifies internal flaws, porosity, or inclusions.

These methods collectively ensure comprehensive evaluation before product release

#### **Quality Documentation**

Each product must pass the following documented checks:



- **O** Microstructure Evaluation
- **O** Tensile Strength Test
- Ultrasonic Test Certificate
- O Die Penetrant Test Certificate
- O Dimensional Certificate

These documents serve as traceable records of compliance with industry and customer standards.

**Results and Discussion** 

Inspections during this study revealed

O 100%-Dimensional Accuracy

O Zero Visual Defects

**O** All Mechanical Properties Within Specified Limits

O Successful Compliance with All Quality Reports

Final products were cleared for dispatch, demonstrating high reliability and process efficiency.

#### Conclusion

The final assessment system adopted by VSPL provides a comprehensive framework for defect identification and quality standard validation. By leveraging visual inspection, mechanical testing, and non-destructive testing methods, VSPL maintains higher product quality. Such a method ensures compliance with customer specifications, thus promoting long-term partnerships and maintaining a competitive advantage.

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