

Differences between Q345B and Q345E

Q345B and Q345E are both grades of low-alloy high-strength structural steel used in various construction and industrial applications. While they share many similarities, there are key differences between them, mainly related to their chemical composition, mechanical properties, and impact toughness. Here is a detailed comparison in English:

1. Chemical Composition

- **Q345B:**

- Carbon (C): $\leq 0.20\%$
- Silicon (Si): 0.50%
- Manganese (Mn): 1.70%
- Phosphorus (P): $\leq 0.035\%$
- Sulfur (S): $\leq 0.035\%$

- **Q345E:**

- Carbon (C): $\leq 0.20\%$
- Silicon (Si): 0.50%
- Manganese (Mn): 1.70%
- Phosphorus (P): $\leq 0.030\%$
- Sulfur (S): $\leq 0.030\%$
- Note: Q345E has stricter limits on Phosphorus and Sulfur compared to Q345B, making it a cleaner steel with fewer impurities.

2. Mechanical Properties

- **Yield Strength:**

- Q345B: ≥ 345 MPa
- Q345E: ≥ 345 MPa

- **Tensile Strength:**

- Q345B: 490-675 MPa
- Q345E: 490-675 MPa

- Both grades have similar yield and tensile strength requirements.



3. Impact Toughness

- **Q345B:**
 - The impact test is conducted at 20°C, indicating the steel's performance in normal temperature environments.
- **Q345E:**
 - The impact test is conducted at -40°C, demonstrating the steel's superior performance in low-temperature environments, making it more suitable for applications in cold climates.

4. Applications

- **Q345B:**
 - Generally used in general construction projects, bridges, vehicles, boilers, containers, and other structures that do not require high performance in low-temperature environments.
- **Q345E:**
 - Typically used in industries and projects that require high toughness and reliability in low temperatures, such as offshore structures, pipelines, and machinery operating in cold regions.

5. Quality Level

- Q345E is considered to have a higher quality level due to its stricter chemical composition requirements and better impact toughness at low temperatures compared to Q345B.

Summary

In summary, the main differences between Q345B and Q345E are the stricter chemical composition limits and the superior impact toughness of Q345E, making it more suitable for low-temperature applications. Both grades, however, offer similar mechanical properties in terms of yield and tensile strength.

