

Charpy Q and A

1. What is a Charpy impact test?

The Charpy impact test, also known as the Charpy V-notch test, is a standardized high strain-rate test which determines the amount of energy absorbed by a material during fracture. This absorbed energy is a measure of a given material's notch toughness and acts as a tool to study temperature-dependent ductile-brittle transition.

2. Why is it important to check Charpy impact values?

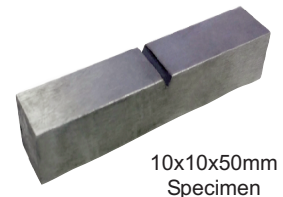
Ground engaging tools (GET) such as *bucket teeth* are subjected to great force and impact during use. GET with low Charpy values can fail, causing damage to equipment, costly downtime and increased operating costs. The results of Charpy impact tests on notched specimens, when correlated with service experience, have been found to accurately **predict** the likelihood of **brittle fracture**.

3. How is Charpy impact value calculated?

Charpy impact tests are performed on instrumented machines capable of measuring less than 1 ft-lbf to 300 ft-lbf at temperatures ranging from -320°F to over 2000°F. Specimens are made per **ASTM E23-00**. A 50x50x200mm keel block or sample GET item is machined to



produce 10x10x50mm V-notch specimens. The V-Notch specimens are super cooled to -40°F and subjected to a single application of force using a Charpy impact pendulum tester. The force measured at fracture is recorded as the Charpy impact value.



4. What are GETT requirements for Charpy impact and Brinell hardness values?

Point Tooth:

Charpy: Min. 14 ft-lbf/cm² per ASTM E23 and *Hardness:* 477-534BHN per ASTM E10

Weld-On Shank:

Charpy: Min. 36 ft-lbf/cm² per ASTM E23 and *Hardness:* 270-340BHN per ASTM E10

Bolt-On Shank:

Charpy: Min. 23 ft-lbf/cm² per ASTM E23 and *Hardness:* 340-430BHN per ASTM E10