

EDS

Engineering,
GM DAEWOO Auto & Technology
Standards

TEST METHOD OF IMPACT FOR METALLIC MATERIALS

EDS-T-7115

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VERSION: 3

1. PURPOSE

This standard specifies the CHARPY impact test for metallic materials (hereinafter referred to as the "impact test") so that it aims at performing a correct test.

2. SCOPE

This standard specifies the impact test. However, it does not apply to the metal with low impact value such as the cast iron, the alloy for die castings.

3. DEFINITION

3.1. Impact test: A test, to be made on a CHARPY impact testing machine for the determination of the of the absorbed energy, impact value, percent fracture and transition temperature specified in 3.2, 3.3 and 3.4 to 3.11, in which a test piece, which is supported on two supports of 40mm distance from each other and so located that its notch meets the middle between the supports is broken in the middle of the face opposite to the notch by one blow of the hammer.

3.2. Absorbed energy: The energy (kgf.m) {J} required for breaking the test piece on the impact testing machine.

3.3. Impact value: The quotient (kgf.m/cm²){J/cm²} of absorbed energy (kgf.m) {J} divided by the original cross-sectional area of the notched part(cm²).

3.4. Percent brittle fracture: The percentage of the area of brittle fracture to the total area of fracture of a test piece. The brittle fracture surface is that in which many crystal grains show cleavage or intercrystalline fracture and looks shiny (Fig. 1).

3.5. Percent ductile fracture: The percentage of the area of ductile fracture to the total area of fracture of a test piece. The ductile fracture surface is that which shows fibrous shear fracture and looks dull (Fig. 2).

3.6. Transition temperature: When test pieces are subjected to the tests at varied temperatures, the detected temperature at which the material exhibits a significant change in behavior such as the steep fall(or rise) in absorbed energy or the change in appearance of fracture surface from ductile to brittle(or from brittle to ductile).

3.7. Transition curve: The curves showing the relations between the testing temperature and the behavior such as absorbed energy, or fracture appearance at the transition temperature and its vicinity (Fig. 3).

3.8. Fracture surface transition temperature: The transition temperature corresponding to the change in appearance of fracture surface, i.e. the temperature at which specific percent brittle fracture or percent ductile fracture is observed (Fig. 3).

Remark: In the impact test using No. 2 test piece, the temperature at which percent ductile fracture becomes 50% is generally specified.

3.9. Energy transition temperature: The temperature which corresponds to the average obtained from the absorbed energy corresponding to the lowest temperature at which the percent ductile fracture is 100% and the absorbed energy corresponding to the highest temperature at which the percent brittle fracture is 100%(Fig. 3).

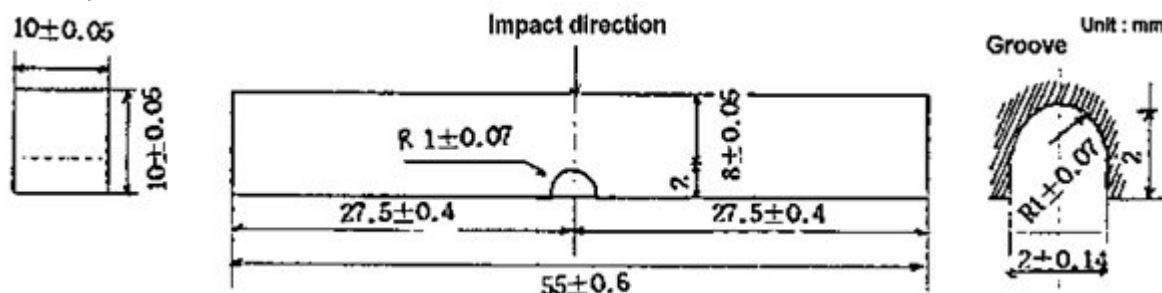
3.10. Lateral expansion: Increase in the width of fracture surface of the test piece on the impact side (the opposite side to notch) over the original one (Fig. 2).

3.11. Lateral expansion transition temperature: The transition temperature which corresponds to the change in lateral expansion, i.e. the temperature at which the lateral expansion becomes a specific value.

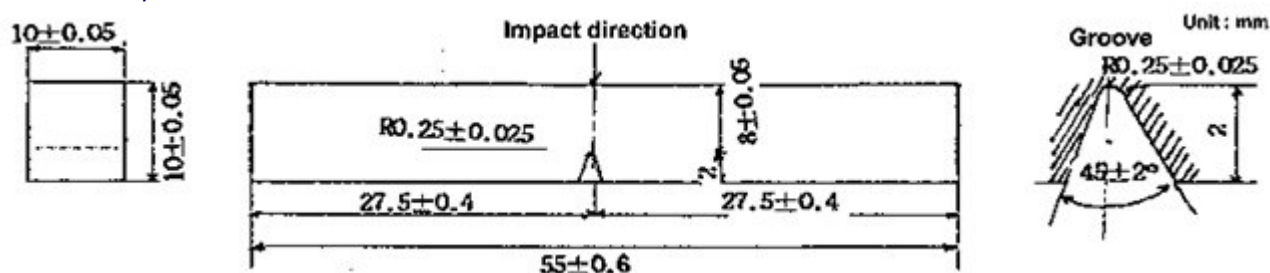
Remark: The lateral expansion transition temperature is generally obtained by impact test for No. 2 test piece.

4. TEST PIECE

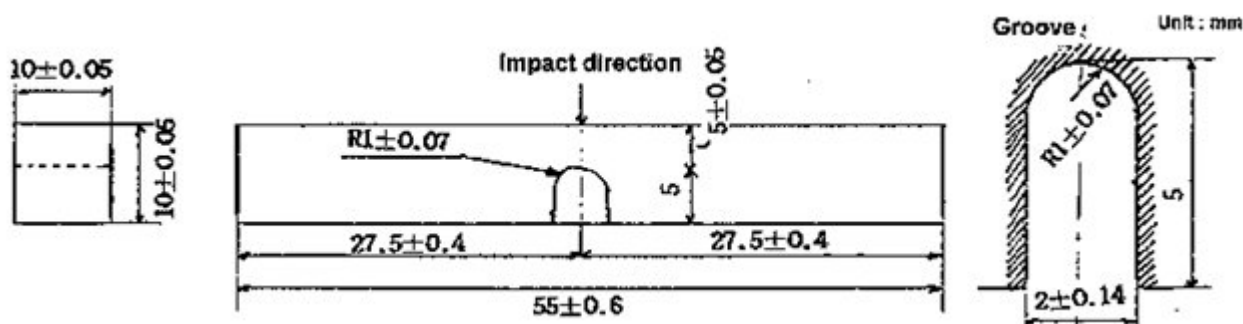
4.1. No. 1 test piece



4.2. No. 2 test piece



4.3. No. 3 test piece



5. TESTING MACHINE