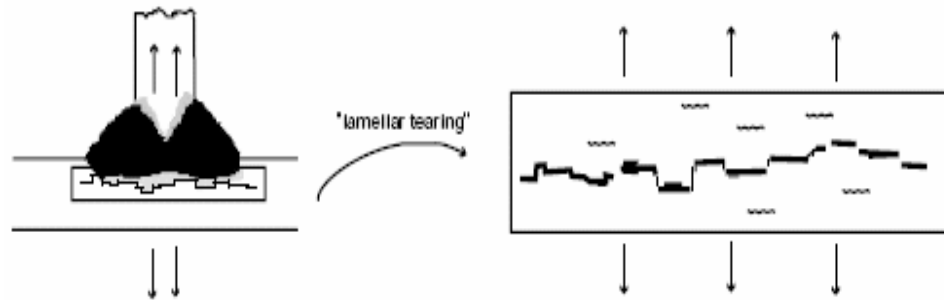




## Z-qualities/Z-testing

### "Lamellar tearing"

As a rule, welding produces considerable stresses in the base material which can result in the formation of cracks. These cracks, which most often occur parallel to the surface of the plate are called "lamellar tearing" and bring about a deterioration of the steel in the through thickness direction.



In welded steel constructions, where the load is carried in the through thickness direction of the plate, lamellar tearing may lead to tear fracturing. In the context of structural components, a tear fracture may have grave consequences!

### Z-qualities

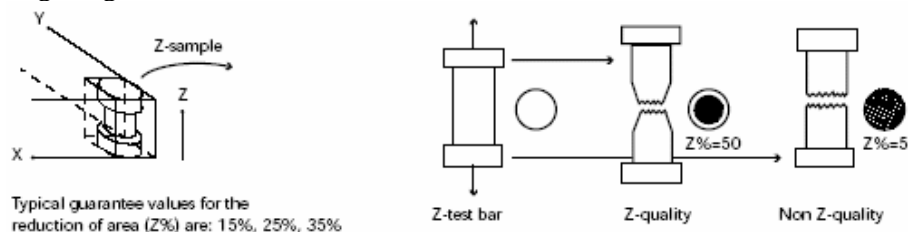
Normal quality steel plates are usually supplied with guarantees of mechanical properties either in the rolling direction of the plate or in the width of the plate (x- and y-directions respectively). The properties in the through thickness direction (z-direction) are not specified.

Using a special production process which includes reduction of the sulphur content in the steel, it is however possible to supply plates (so-called Z-qualities) with specified properties in the through thickness direction. Z-qualities minimize the risk of lamellar tearing.

Ordering Z-qualities is recommended in all places where welding is combined with stresses in the through thickness direction of the plate. All standard plate grades can be supplied as Z-qualities.

### Z-testing

Before Z-quality plates are delivered, special Z-samples are taken on which the reduction of area in the fracture during tensile testing is recorded. A high value of the reduction of area is a sign of good Z-characteristics.



### Norms and rules

Z-testing can be carried out in accordance with norms and rules from:

- EN 10164: Z15, Z25, Z35.
- SEL-096: Z15, Z25, Z35.
- Classification societies: Det Norske Veritas, Lloyd's Register, Germanischer Lloyd, Bureau Veritas, American Bureau of Shipping.
- Or by agreement:
  - Z15: Z% average = 15%, Z% minimum = 10%
  - Z25: Z% average = 25%, Z% minimum = 15%
  - Z35: Z% average = 35%, Z% minimum = 25%

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