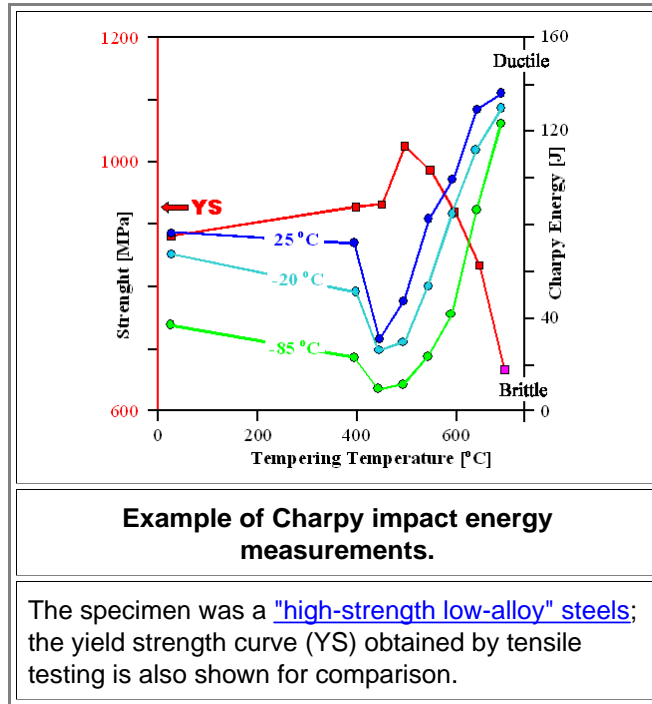


## Charpy Impact Test: Example

### Illustration

The example shown is from the [set of experiments](#) I used to illustrate the equivalence of hardness and yield strength; [this link](#) leads to the actual paper

● Here is the set of data:



We have three series of tests with 8 specimens per series to get statistically significant data. After "tempering", meaning holding the samples at the temperatures indicated for 1 hour and then let them cool to room temperature, [Charpy impact tests](#) were done at the *three* temperatures indicated.

● What we see is:

- The steel is always more brittle at lower testing temperatures.
- Tempering around 500 °C (932 °F) produces very brittle steel. At -85 °C (- 121 °F) the steel is brittle like glass
- Tempering at other temperatures is better with respect to brittleness. High-temperature tempering produces steel quite ductile at room temperature (25 °C) and below.
- Unfortunately - but expected - the yield strength or hardness shows opposite behavior. It is highest for brittle steel.
- The best compromise between brittleness and hardness is found for tempering at 600 °C (1112 °F). I'm sure you see why.

There are many more examples for Charpy impact energy measurements in a [science module](#) in chapter 9