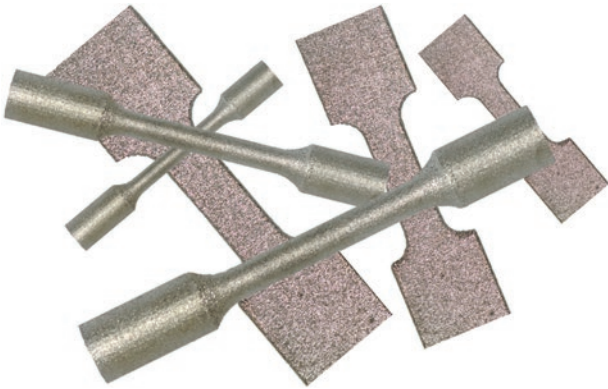


# EFFECT OF SPECIMEN GEOMETRY, SIZE, AND SURFACE CONDITION ON MATERIAL PROPERTIES

Specimens made according to standards, such as DIN or ISO, are usually used to evaluate and to compare material properties. The focus of the project is to investigate if material properties determined by tensile test, fatigue test, and fatigue crack growth test are affected by shape, size, and surface roughness of the used specimens. The materials examined are X2CrNiMo17-12-2 (1.4404) and AISi10Mg (3.2382), both commonly used in industry.



**FIGURE 1:** Sample Parts

In the industrial environment, specimens tested to determine material properties are standardized in size, shape and surface condition. The characteristic values ascertained on this basis, which are listed in material data sheets, can be verified by customers. In addition, specimens manufactured according to standards ensure the comparability between material properties between different materials and suppliers. In the field of additive manufacturing research, often small specimens are processed due to lack of material and restricted building space. In order to save material and time in using faster methods of processing and machining specimens, specimens with reduced size, other shape and different surface conditions required by standards like DIN, EN and ISO are of interest for economical material testing.

## Objective

The material properties of specimens made of X2CrNiMo17-12-2 and AISi10Mg with different size, shape and surface roughness are to be determined.

## Project Scope

Specimens in three sizes, two shapes (round and flat) as well as different surface conditions (as built, sand blasted and vibratory grinded) are studied. The influence of different conditions on the hardness and material behavior in the tensile test and fatigue test is investigated as well as crack growth rate on specimens with different size and surface roughness.

## PROJECT OVERVIEW

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