The SMAT process (Surface Mechanical Attrition Treatment)

Category: Materials
Reference: TDI0009

Broker Company Name: Tech2Market
Broker Name: Benoit Rivollet
Telephone: (+33)478828433
Email: brivollet@Tech2market.fr

Abstract:

SMAT is a surface treatment for severe plastic deformation of the derivated ultrasonic shot blasting. It allows the generation of a nanocrystalline layer on the surface of metal pieces while retaining the original microstructure.

Description:

It consists in impacting the metal surface to process with perfectly spherical balls with a diameter of a few millimeters following various directions. The balls are agitated by an ultrasonic generator for the duration of treatment, ranging from a few minutes to nearly an hour. Nanocrystallization of the material affects a thickness between 30 and 60 micrometers and is associated with a transition layer which improves the overall mechanical properties of the material.

Innovations and advantages of the offer:

The SMAT process improves:

• the yield point
• the stress before break
- fatigue life span
- the wear resistance
- the surface condition by decreasing roughness compared to a conventional shot blasting

Further Information:

The SMAT treatment can also be coupled with co-rolling to generate nanostructured multilayer composite structures with improved mechanical properties.

Application:

The SMAT treatment can have several applications:

- It can be used as a surface treatment to improve the mechanical and surface properties of metal parts.
- It can be used as pre-treatment, in particular to improve the diffusion of nitrogen or chromium in materials through its surface nanocrystallization.

Broker comments:

N/A

This technology description was downloaded from www.esa-tec.eu