Yield Stress And Yield Strength

For the majority of materials, the yield strength decreases with increasing temperature. In metals, this decrease in yield strength is due to the thermal activation of dislocation motion, resulting in easier plastic deformation at higher temperatures. 8731c28880

Willam–Warnke yield criterion This yield criterion has the functional form. stress tensor, σ c {\displaystyle \sigma _{c}} is the yield stress in uniaxial compression, and θ {\displaystyle \theta } is the Lode angle given by θ The Willam–Warnke yield criterion is a function that is used to predict when failure will occur in concrete and other cohesive-frictional materials such as rock, soil, and ceramics 8731c28880

For ductile materials, the yield... 8731c28880

Yield (engineering) The yield strength or yield stress is a material property and is the stress corresponding In materials science and engineering, the yield point is the point on a stress–strain curve that indicates the limit of elastic behavior and the beginning of plastic behavior. Once the yield point is passed, some fraction of the deformation will be permanent and non-reversible and is known as plastic deformation. permanent and non-reversible and is known as plastic deformation. Below the yield point, a material will deform elastically and will return to its original shape when the applied stress is removed 8731c28880

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Specified minimum yield strength Specified Minimum Yield Strength (SMYS) means the specified minimum yield strength for steel pipe manufactured in accordance with a listed specification1 Specified Minimum Yield Strength (SMYS) means the specified minimum yield strength for steel pipe manufactured in accordance with a listed specification1. This is a common term used in the oil and gas industry for steel pipe used under the jurisdiction of the United States Department of Transportation. It is an indication of the minimum stress a pipe may experience that will cause plastic (permanent) deformation 8731c28880

== See also == 8731c28880

Stress–strain curve These curves reveal many of the properties of a material, such as the Young's modulus, the yield strength, and the ultimate tensile strength. modulus, the yield strength, and the ultimate tensile strength. It is obtained by gradually applying load to a

test object and measuring the deformation, from which the stress and strain can be determined (see tensile testing). Generally speaking, curves that represent the relationship between stress and strain in any In engineering and materials science, a stress–strain curve for a material gives the relationship between the applied pressure, known as stress, and amount of deformation, known as strain 8731c28880

Bresler–Pister yield criterion This yield criterion The Bresler–Pister yield criterion is a function that was originally devised to predict the strength of concrete under multiaxial stress states. Bresler–Pister yield criterion is a function that was originally devised to predict the strength of concrete under multiaxial stress states. This yield criterion is an extension of the Drucker–Prager yield criterion and can be expressed on terms of the stress invariants as 8731c28880

The yield strength anomaly in β-brass was one of the earliest discoveries such a phenomenon, and several other ordered intermetallic alloys demonstrate this effect. Precipitation-hardened superalloys exhibit a yield strength anomaly... 8731c28880 The Drucker–Prager yield criterion has the form 8731c28880 In some cases, a yield strength anomaly refers to a decrease in the ductility of a material with increasing temperature, which is also opposite the trend in the majority of materials. Anomalies in ductility can be more clear, as an anomalous effect on yield strength can be obscured by its typical decrease with temperature. In concert with yield strength or ductility anomalies, some materials demonstrate extrema in other temperature dependent properties, such as a minimum in ultrasonic damping, or a maximum in electrical conductivity. 8731c28880 (8731c28880 J 8731c28880 Generally speaking, curves that represent the relationship between stress and strain in any form of deformation can be regarded as stress–strain curves. The stress and strain can be normal, shear, or a mixture, and can also be uniaxial, biaxial, or multiaxial, and can even change with time. The form of deformation can be compression, stretching, torsion, rotation, and so on. If not specified otherwise, the term "stress–strain curve" typically refers to the relationship between the axial normal stress and axial normal strain of materials measured in a tension test. 8731c28880 There are two ways that stress and strain are commonly defined mathematically. These are Engineering stress-strain, and... 8731c28880 σ 8731c28880

Yield surface Further deformation of the material causes the stress state to remain on the yield surface, even though the shape and size of the surface may change as the plastic deformation evolves. The yield surface is usually convex and the state of stress of inside the yield surface is elastic. When the stress state lies on the surface the material is said to have reached its yield point and the material is said to have become plastic. The yield surface is usually convex and the state of stress of A yield surface is a five-dimensional surface in the six-dimensional space of stresses. A yield surface is a five-dimensional surface in the six-dimensional space of stresses. This is because stress states that lie outside the yield surface are non-permissible in rate-independent plasticity, though not in some models of viscoplasticity 8731c28880

Yield strength anomaly , the stress necessary to initiate plastic yielding) In materials science, the yield strength anomaly refers to materials wherein the yield strength (i. , the stress necessary to initiate plastic yielding) increases with temperature. e. In materials science, the yield strength anomaly refers to materials wherein the yield strength (i. e 8731c28880

J 8731c28880 History of the petroleum industry in the United States 8731c28880 == General concepts == 8731c28880

Von Mises yield criterion Mises stress reaches a value known as yield strength, σ y {\displaystyle \sigma _{\text{y}}}. The von Mises stress is used to predict yielding of materials In continuum mechanics, the maximum distortion energy criterion (also von Mises yield criterion) states that yielding of a ductile material begins when the second invariant of deviatoric stress 8731c28880

Bigoni–Piccolroaz yield criterion The Bigoni-Piccolroaz yield surface is thought as a direct interpolation The Bigoni–Piccolroaz yield criterion is a yielding model, based on a phenomenological approach, capable of describing the mechanical behavior of a broad class of pressure-sensitive granular materials such as soil, concrete, porous metals and ceramics. be represented in the Haigh–Westergaard stress space as a convex smooth surface 8731c28880

Drucker–Prager yield criterion equivalent stress, σ m {\displaystyle \sigma _{m}} is the hydrostatic stress, and a , b {\displaystyle a,b} are material constants. It and its many variants have been applied to rock, concrete, polymers, foams, and other pressure-dependent materials. The criterion was introduced to deal with the plastic deformation of soils. The Drucker–Prager yield criterion The Drucker–Prager yield criterion is a pressure-dependent model for determining whether a material has failed or undergone plastic yielding 8731c28880

The yield surface is usually expressed in terms of (and visualized in) a three-dimensional principal stress space (8731c28880 == Definition == 8731c28880 The yield strength or yield stress is a material property and is the stress corresponding to the yield point at which the material begins to deform plastically. The yield strength is often used to determine the maximum allowable load in a mechanical component, since it represents the upper limit to forces that can be applied without producing permanent deformation. For most metals, such as aluminium and cold-worked steel, there is a gradual onset of non-linear behavior, and no precise yield point. In such a case, the offset yield point (or proof stress) is taken as the stress at which 0.2% plastic deformation occurs. Yielding is a gradual failure mode which is normally not catastrophic, unlike ultimate failure. 8731c28880 J 8731c28880 The SMYS is required to determine the maximum allowable operating pressure (MAOP) of a pipeline, as determined by Barlow's Formula which is P = (2 * S * T)/(OD * SF), where P is pressure, OD is the pipe’s outside diameter, S is the SMYS, T is its wall thickness, and SF is a [Safety Factor]. 8731c28880

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