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**Use of Terms Yield
Strength and Yield
Point**

SAE Recommended Practice
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Ø USE OF TERMS YIELD STRENGTH AND YIELD POINT

1. DEFINITIONS AND APPLICATION:

Yield strength is the stress at which a material exhibits a specified limiting deviation from the proportionality of stress to strain. The deviation is expressed in terms of strain which may be measured either by the Percent Offset method or by the Extension Under Load method as described in ASTM E8. The method of measurement must be stated when reporting yield strength. The term is applicable to materials whose stress-strain diagram in the area of transition from elastic to plastic strain is a smooth curve as well as to those which exhibit an upper yield point or sharp knee.

Yield point is a special case of yield strength which is defined as the first stress in the material, less than the maximum attainable stress, at which an increase in strain occurs without an increase in stress. Since in their commercial form only ferrous metals exhibit this phenomenon and then only under some circumstances, it follows that the term yield point has only limited application to the results of tensile testing of ferrous metals and is not applicable to the testing of nonferrous metals.

2. RECOMMENDED USAGE:

- 2.1 Nonferrous Metals: Only the term yield strength is applicable. Specifications and test reports must always state the method of test and limiting values of strain.

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2.2 Ferrous Metals: Yield strength is the general term and it is applicable to stress-strain curves of both the smooth, rounded type, and the sharp kneed type. When reporting yield strength, the method of test and limiting values of strain must be stated.

Strictly interpreted, the term "yield point" is intended for application only in those cases in which the material exhibits the unique characteristics defined previously under yield point. However, there are some specifications which prescribe a yield point for materials which have smooth stress-strain curves. In such cases, a value equivalent to the yield point in practical significance may be determined by the use of dividers or by the Extension Under Load method.

For a more detailed discussion of the terms involved and a description of the applicable methods of test, refer to the following:

ASTM E6, Definitions Relating to Methods of Testing.

ASTM E8, Tension Testing of Metallic Materials.

ASTM A370, Mechanical Testing of Steel Products.

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