WHAT TENSION CAN A GLUE COMPOUND CONTAIN?

The stress-strain diagram shows the mechanical properties of the adhesive. From the diagram it can be deduced how much, at an amount of applied stress (vertical axis), the material stretches (horizontal axis).
To properly understand the stress-strain diagram, it is important to know a number of concepts.

In the first phase A of the stress-strain diagram, an elastic behavior is shown. As soon as the applied stress is removed, the material will regain its original length. There is complete restoration.
In this first phase, the stretch is proportional to the applied stress. This is also called linear elastic or proportional distortion. The limit of the proportional elasticity is called the proportionality limit.
The proportionality limit is indicated with point 1. From the proportionality limit to the elastic limit, there is also elastic deformation, but this no longer runs linearly. Non-linear elastic means that with increasing stress the length of the material increases relatively more, or the increased strain is greater than the increased stress.

The elasticity limit (upper yield strength) indicates where the deformation is elastic in nature. The material under this point will return to its original length and shape when the stress is removed. The elasticity limit is just below the upper yield point, indicated with point 2.

In the phase B, the beginning indicated by point 3, the material begins to flow. Applied stress creates plastic deformation. From here, the material is permanently deformed.

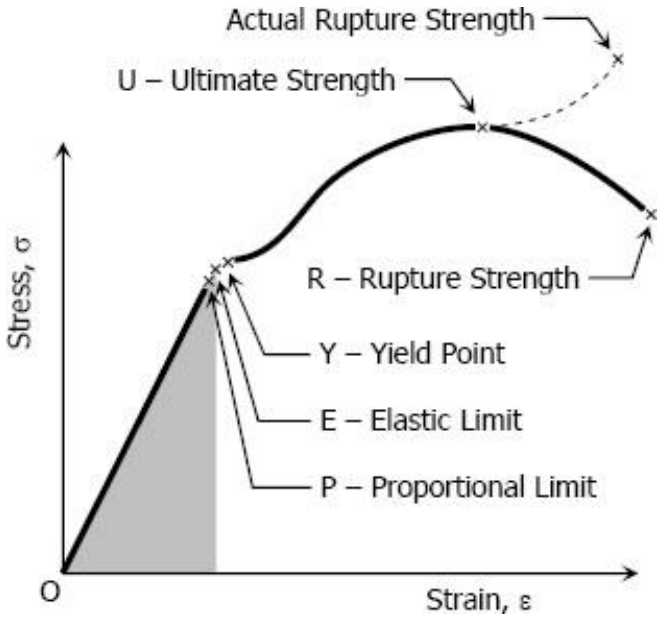
From the yield strength to the maximum stress there is plastic deformation (this phase, designated C, is called reinforcement). The maximum stress is the limit to which the material can deform without causing constriction / breakage. The tensile strength is indicated with point 4.

Then the material is pulled apart so much that it dilutes locally until it finally breaks, indicated by point 5: the breaking stress. This is the point at which the material ultimately collapses under the applied stress. The constriction preceding this begins at the tensile strength until the break point is reached. The breaking stress is lower than the maximum stress.

- Elastic Limit
  The elastic limit is the limit beyond which the material will no longer go back to its original shape when the load is removed, or it is the maximum stress that may e developed such that there is no permanent or residual deformation when the load is entirely removed.

- Elastic and Plastic Ranges
  The region in stress-strain diagram from O to P is called the elastic range. The region from P to R is called the plastic range.

- Yield Point
  Yield point is the point at which the material will have an appreciable elongation or yielding without any increase in load.



- Ultimate Strength
  The maximum ordinate in the stress-strain diagram is the ultimate strength or tensile strength.

- Rapture Strength
  Rapture strength is the strength of the material at rupture. This is also known as breaking strength.

- Modulus of Resilience
  Modulus of resilience is the work done on a unit volume of material as the force is gradually increased from O to P, in N·m/m3. This may be calculated as the area under the stress-strain curve from the origin O to up to the elastic limit E (the shaded area in the figure). The resilience of the material is its ability to absorb energy without creating permanent distortion.

- Modulus of Toughness
  Modulus of toughness is the work done on a unit volume of material as the force is gradually increased from O to R, in N·m/m3. This may be calculated as the area under the entire stress-strain curve (from O to R). The toughness of a material is its ability to absorb energy without causing it to break.

- Working Stress, Allowable Stress, and Factor of Safety
  Working stress is defined as the actual stress of a material under a given loading. The maximum safe stress that a material can carry is termed as allowable stress. The allowable stress should be limited to values not exceeding the proportional limit. However, since proportional limit is difficult to determine accurately, the allowable tress is taken as either the yield point or ultimate strength divided by a factor of safety. The ratio of this strength (ultimate or yield strength) to allowable strength is called the factor of safety.