

Cours 1

Selection of materials

Selecting the right material from the many thousands that are available poses a serious problem. The decision can be based on several criteria. The in-service conditions must be characterized, for these will dictate the properties required of the material. A material does not always have the maximum or ideal combination of properties. Thus, it may be necessary to trade off one characteristic for another.

The classic example includes strength and ductility. Normally, a material having a high strength will have only a limited ductility. A second selection consideration is any deterioration of material properties that may occur during service operation.

Probably the most important consideration is that of economics. A material may be found that has the ideal set of properties but is extremely expensive. Some compromise is inevitable. The cost of a finished piece also includes any cost occurring during fabrication to produce the desired shape. For example: commodity plastics like polyethylene or polypropylene cost about \$ 0.50/lb, whereas engineering resins or Nylon cost \$ 1,000/lb.

Glossary

Available: disponibles

Will dictate: dictera

Strength: the power to resist stress or strain; the maximum load, i.e. the applied force, a ductile material can withstand without permanent deformation

Ductility, *n* ductile, *adj* : a material's ability to suffer measurable plastic deformation before fracture.

Some compromise is inevitable: Un certain compromis est inévitable.

Corrosive, *n*, *adj* to corrode, corrosion: a corroding substance, e.g. an acid.

Commodity: article of trade.

lb: pound= 453.592 grams

Resin: a natural substance, e.g. amber, or a synthetic compound, which begins in a highly viscous state and hardens when treated.

Compound: a pure, macroscopically homogeneous substance consisting of atoms/ions of two/more different elements that cannot be separated by physical means

viscous, *adj* viscosity, *n* : having a relatively high resistance to flow.