

• **both statements are true**

Constituents in Amalgam:

Basic constituents:

- **Silver (Ag) (40-70%)**
 - increases strength
 - increases expansion
- **Tin (Sn) 25-27%** **Note:** Influences the amalgam in an opposite manner to silver.
 - decreases expansion
 - decreased strength
 - increases setting time
- **Copper (Cu) 6% or more:** **Note:** New alloys called "**high copper**" contain 9-30% copper. These alloys have less marginal breakdown and are less likely to corrode.
 - ties up tin: reducing gamma-2 formation
 - increases strength
 - reduces tarnish and corrosion
 - reduces creep: reduces marginal deterioration
- **Mercury (Hg) 3% max.:**
 - activates reaction
 - only pure metal that is liquid
- **spherical alloys**
 - require less mercury
 - smaller surface area easier to wet
 - 40% to 45% Hg
- **admixed alloys**
 - require more mercury
 - lathe-cut particles more difficult to wet
 - 45% to 50% Hg

Other constituents:

- **Zinc (Zn) 1% or less:** used in manufacturing, decreases oxidation of other elements (*sacrificial anode*)
 - Provides better clinical performance: less marginal breakdown
 - Causes delayed expansion with low Cu alloys if contaminated with moisture during condensation
- **Palladium (Pd) 1% or less:** reduced corrosion, greater luster
- **Indium (In) 1% or less:**
 - decreases surface tension
 - reduces amount of mercury necessary
 - reduces emitted mercury vapor
 - reduces creep and marginal breakdown
 - increases strength
 - must be used in admixed alloys