

COMPOSITIONS OF DIFFERENT ALLOYS

Alloys are materials composed of a mixture of elements including at least one metal, used as they often have superior properties to component elements. This table shows the main elements found in a number of different alloys, and their common uses. Compositions can vary in cases, and this is merely an overview.

KEY

Composition & trace elements

● Metal
 ● Non-metal

Major elements are given with percentages. Minor elements are given without percentages.

Alloy uses

AMALGAM

● Hg MIN 45% MAX 55%
● Ag MIN 22% MAX 32%

● Sn MIN 12% MAX 30%
● Cu MIN 12% MAX 24%

In older dental fillings, mining

BRASS

● Cu MIN 65% MAX 90%
● Zn MIN 10% MAX 35%

● Pb Older compositions contained lead, but no longer used due to toxicity.

Decoration, plumbing, instruments

BRONZE

● Cu MIN 78% MAX 95%
● Sn MIN 5% MAX 22%

● Al
 ● Mn
 ● Ni
 ● Zn
 ● As
 ● P
 ● Si

Instruments, guitar strings, medals

CAST IRON

● Fe MIN 96% MAX 98%
● C MIN 2% MAX 4%

● Si Similar in composition to steel, which has a lower carbon content.

Metal structures & bridges

ELEMENTS KEY

● Ag Silver	● Mn Manganese
● Al Aluminium	● Mo Molybdenum
● As Arsenic	● Nd Neodymium
● Au Gold	● Ni Nickel
● Bi Bismuth	● P Phosphorus
● C Carbon	● Pb Lead
● Ce Cerium	● Pd Palladium
● Cr Chromium	● Pt Platinum
● Cu Copper	● Sb Antimony
● Fe Iron	● Si Silicon
● Ge Germanium	● Sn Tin
● Hg Mercury	● Ti Titanium
● La Lanthanum	● V Vanadium
● Mg Magnesium	● Zn Zinc

CUPRONICKEL

● Cu MIN 70% MAX 90%
● Ni MIN 10% MAX 30%

● Mn
 ● Fe

Highly resistant to corrosion in seawater.

Coinage, marine engineering

GREEN GOLD

● Au 75%
 ● Ag MIN 6% MAX 25%
● Cu

Archaically known as electrum. Appears as greenish-yellow, rather than green.

Core of Nobel prize medals

MAGNALIUM

● Al MIN 50% MAX 95%
● Mg MIN 5% MAX 50%

● Cu
 ● Ni
 ● Sn

Creates crackling effects in fireworks

Aircraft and car parts, fireworks

MISCHMETAL

● Ce 50%
 ● La 25%
 ● Nd 15%

Range of rare earth elements also present. Mixed with iron oxide to harden for flints.

Cigarette lighter flints

NICHROME

● Ni MIN 60% MAX 80%
● Cr MIN 15% MAX 20%

● Fe
 ● Mn
 ● Si

Can be used for coils of electronic cigarettes.

Electric heaters, foam cutters

NITINOL

● Ni MIN 50% MAX 55%
● Ti MIN 45% MAX 50%

Shape memory alloy; if deformed, its original shape is recovered on heating.

Glasses frames

NORDIC GOLD

● Cu 89%
 ● Al 5%
 ● Zn 5%

● Sn 1%

Despite the name, doesn't contain any gold.

10, 20 and 50 cent Euro coins

PEWTER

● Sn MIN 85% MAX 99%
● Cu
 ● Sb
 ● Bi

Compositions used to commonly contain lead, but no longer do due to toxicity.

Decorative plates & vases

SOLDER

● Sn 90%
 ● Ag 5%
 ● Cu 5%

Solder compositions previously contained lead, now discouraged due to toxicity.

Joining electrical components

STEEL

● Fe MIN 50% MAX 99%
● C MIN 0.1% MAX 2.5%

● Cr
 ● Mn
 ● V
 ● Mo

Stainless steel: ~12% chromium

Structures, cutlery, car bodies, rails

STERLING SILVER

● Ag 92.5%
 ● Cu
 ● Pt
 ● Ge
 ● Zn

Must contain 92.5% silver; remainder is other metals, usually copper.

Cutlery, jewelry, musical instruments

WHITE GOLD

● Au 75%
 ● Pd 10%
 ● Ni 10%

● Zn 5%

Often plated with rhodium to enhance whiteness.

Jewelry

