METALS

Nonferrous alloy type BR

- **Brass** (CuZn37)
- copper-zinc alloy
- non-magnetizable
- good to excellent corrosion resistance; all copper alloys resist corrosion by fresh water and steam
- excellent cold workability (forming)
- generally it is utilized when high mechanical properties are not required
- typical applications include tweezers for handling scratch-sensitive mechanical parts, watch components, magnets

Carbon steel type C

- **Carbon steel** (Material number 1.1221, Ck60, AISI 1060)
- contains from 0,57 to 0,65 wt% carbon
- magnetizable
- will be hardened by heat treatment, max. hardness 57 HRC
- poor resistance to corrosion
- used where strength and/or hardness are of primary concern.
- typical applications include tweezers and cutting tools for the electronic industry, watch-makers, jewellers applications

Nonferrous alloy type N

- **Nickel silver 65-18** (CuNi18Zn20)
- copper-nickel-zinc alloy
- non-magnetizable
- soft and elastic
- all copper alloys resist corrosion by fresh water and steam. Copper nickels provide superior resistance to saltwater corrosion, have high resistance to alkalies and organic acids, but have poor resistance to inorganic acids
- typical applications include handling of scratch-sensitive parts in electronic, micro-mechanical and jewellery applications

Superalloy NC

- **Ni-Cr-Mo superalloy**
- excellent/resistance to room temperature up to 800°C
- six times harder than antimagnetic stainless steel
- resistant to fatigue, very high shape retention
- fully non-magnetic
- excellent corrosion resistance to most chemicals, salts and acids
- typical applications include non-magnetic tools for electronic and watch industry applications and for laboratory and medical applications in aggressive chemical environments

Stainless steel type S

- **Martensitic higher carbon steel** (Material number 1.4034, DIN X46Cr13, AISI number 420)
- contains from 12.5 to 14.5 wt% chromium
- magnetizable
- can be hardened by heat treatment, forming should be done in the annealed condition
- less resistant to corrosion than the austenitic or ferritic grades
- used where strength and/or hardness are of primary concern and where the environment is relatively mild from a corrosive standpoint.
- typical applications include tweezers and cutting tools for the electronic industry, watch-makers, jewellers and laboratory and medical applications in mild aggressive chemical environments

Stainless steel type SA

- **low carbon austenitic steel** (Material number 1.4435, DIN X2CrNiMo18-14-3, AISI number 316L)
- contains from 16.5 to 18.5 wt% chromium and has important quantities of nickel and molybdenum as additional alloying elements
- non-magnetizable
- good corrosion resistance to most chemicals, salts and acids
- generally used where corrosion resistance and toughness are primary requirements
- typical applications include tweezers for the electronic industry, watch-makers, jewellers and laboratory and medical applications in moderately aggressive chemical environments

Nonferrous alloy type TA

- **Titanium Grade 1** (unalloyed titanium)
- engineering materials with extraordinary combination of properties: relatively low density (4.5 g/cm^3), good mechanical properties and a very high melting point that allows the use at high temperatures (1600°F, 870°C)
- good corrosion resistance at room temperature to air, marine and a variety of industrial environments
- good cold formability, high ductility
- fully non-magnetic
- generally it is used when in addition to the corrosion resistance, high strength-to-weight ratio is required
- bio-compatible (maintain cell integrity, no inflammatory response)
- typical applications include handling of components in cleaning/chemical processes also at high temperature, histology, biology, medicine, surgery

PLASTICS

Engineering plastic type CF

- **PA66/CF30** polyamide 66 reinforced with 30 wt% carbon fibre
- heat stabilized
- very high rigidity, excellent tensile and flexural strength, fatigue and creep resistance
- low friction, self lubricating properties, excellent wear and abrasion resistance
- good heat capability
- good chemical resistance (oils, grease, fuels, non polar solvents); not resistant to strong acids, alkalis and hot water or steam
- **ESD safe** material, (avoids dust attraction, sparks generation, ignition sources)
- very low coefficient of linear thermal expansion
- typical applications include handling of sensitive components and devices (electronic components, micro-mechanical parts, glass and ceramic substrates, capillary, etc.)

High-performance plastic type CP

- **PEEK/CF30** polyetheretherketone reinforced with 30 wt% carbon fibre
- very hard, rigid, high tensile and flexural strength, very high wear resistance
- high heat capability (260-300°C), good dimension stability, low thermal linear expansion coefficient
- excellent resistance to chemicals, aggressive agents and to thermal ageing
- **ESD safe** material, low surface resistivity (10^5 Ohm)
- typical applications include handling of components in cleaning/chemical/assembly processes also at high temperatures (soldering)

Engineering plastic type DG/DL

- **POM/GF30** acetal resin reinforced with 30 wt% glass fibre
- good tensile and flexural strength, fatigue and creep resistance
- low friction, good wear and abrasion resistance
- low moisture absorption
- good chemical resistance (oils, grease, fuels, organic solvents); not resistant to strong acids, alkalis and oxidizing agents; good hydrolytic resistance (hot water)
- insulating
- typical applications include handling of very scratch sensitive components

High performance plastic type SV

- **PVDF** polyvinylidene fluoride carbon fibre reinforced
- excellent mechanical strength and toughness
- smooth surface
- heat stabilized, high heat capability, continuous use temperature up to 150°C
- high purity (clean room and medical devices approved, low extraction value)
- excellent chemical resistance to most aggressive substances (mineral and organic acids) and solvents (hydrocarbons, alcohols, halogenated), resistant to halogens
- outstanding resistance to hydrofluoric acid (40% conc., 90°C), nitric acid (50% conc., 90°C), hydrochloric acid (36% conc., 90°C)
- high abrasion resistant
- resistant to UV and nuclear radiation (sterilisation)
- **ESD safe** (avoids dust attraction, sparks generation, ignition sources)
- typical applications include handling of very scratch- and contamination-sensitive components, cleaning and etching processes

CERAMIC

Advanced Ceramic type MZ

- **Zirconia Toughened Alumina (ZTA)**
- a superior combination of high strength (from zirconia) and high hardness (from alumina)
- relatively low density
- no open porosity
- very hard surface, good abrasion and wear resistance
- good flexural strength and fracture toughness
- excellent thermal properties and high temperature stability
- extreme corrosion resistance, nearly chemically inert
- electrically insulative
- typically applications includes soldering processes, handling of components during thermal and chemical processes. Generally used when very rigid tips are required

ESD GRIPS & COATINGS

Engineering grip type DR

- **NBR** vulcanized nitrile rubber
- very soft and elastic, good tear resistance
- outstanding abrasion/wear resistance (improved lifetime)
- good chemical resistance (oils, grease, fuels, acid, detergents and soaps); good hydrolytic resistance (hot water)
- electrically static dissipative, low surface resistivity (108 Ohm), ESD-safe material!
- typical applications include ESD-safe handles, floor and work surface mats

Engineering grip type DN

- **PVC FOAM**
- very soft and elastic, good tear resistance
- very good abrasion/wear resistance (improved lifetime)
- good chemical resistance (oils, grease, fuels, acids, detergents and soaps, alcohols)
- electrically static dissipative, ESD-safe material!
- typical applications include ESD-safe handles, floor and work surface mats

Engineering coating type EP

- **EP** polyester epoxy coating comprise essentially polyester and epoxy resins
- Impact resistant surface with excellent flow; good elasticity
- Can operate continuously at temperatures up to 120°C.
- This coating provides an insulating coating with surface resistance > 10^{12} Ohm
- Good resistance to many diluted acids and alkalis. Contact with organic solvents is possible conditionally and for short term. Resistance should be investigated for the case in question
- Typical applications include tweezers handles (better grip, high comfort)

Engineering coating type NE

- **NE** polyester epoxy coating comprise essentially polyester and epoxy resins, plus the electrically conductive additives
- Impact resistant surface with excellent flow; good elasticity
- Can operate continuously at temperatures up to 120°C
- This coating provides a ESD Safe coating with surface resistance 10^{5}-10^{6} Ohm
- Good resistance to many diluted acids and alkalis. Contact with organic solvents is possible conditionally and for short term. Resistance should be investigated for the case in question
- Typical applications include tweezers handles (better grip, high comfort)

Engineering coating type NP

- Pure nickel coating
- Generally used to improve the resistance of tools made of carbon steel. The coating is deposited by electroplating technique.
- Hard and elastic, very good resistance to mechanical stress.
- Improved resistance to wear and abrasion.
- Superior corrosion resistance to saltwater, alkalies and organic acids

Engineering coating type TE

- **TE** is a solvent-based liquid Teflon® coating formulated with special blends of fluoropolymers and other high-performance resins to improve toughness and abrasion resistance
- Substances will permanently adhere to a Teflon® finish. Although tacky materials may show some adhesion, almost all substances release easily
- The coefficient of friction of this Teflon® coating is generally in the range of 0.20 to 0.25, depending on the load, sliding speed, and particular Teflon® coating used.
- Since surfaces coated with Teflon® are both oleophobic and hydrophobic, they are not readily wetted. Cleanup is easier and more thorough - in many cases, surfaces are self-cleaning
- Can operate continuously at temperatures up to 150°C and can be used for intermittent service up to 200°C.
- Over a wide range of frequencies, Teflon® has high dielectric strength, low dissipation factor, and very high surface resistivity
- Many Teflon® industrial coatings withstand severe temperature extremes without loss of physical properties. Teflon® industrial coatings may be used at temperatures as low as -270°C/-454°F
- TE is normally unaffected by mild chemical environments. It has good resistance to diluted acids, diluted and concentrated alkalis and organic solvents
- Typical applications include tweezers for the handling of very scratch-sensitive components or wafers