

Copper-aluminium casting alloy **TUBG** alloy 1690

TUBG is a construction material with good corrosion resistance. The temperature dependence of the strength values in the range of -200°C and +200°C is low. Therefore TUBG is also suitable for use in low-temperature technology.

ZOLLERN brand	TUBG
EN designation	CuAl10Fe2-C
EN material no:	CC331G

EN 1982

// National designations / ISO

DIN	G-CuAl10Fe
DIN	2.0940
USA	≈ C9520
GB	AB1
F	≈ U - A10Fe3

≈ (substantial coherence)

// Composition (mass fraction in %) EN 1982, BS1400*

Cu	Al	Fe	Ni	Mn
83.0 – 89.5	8.5 – 10.5	1.5 – 3.5	max. 1.5 max. 1.0*	max. 1.0
Pb	Si	Sn	Zn	Mg
max. 0.10 max. 0.03*	max. 0.20	max. 0.20 max. 0.10*	max. 0.50	max. 0.05

// Strength properties at room temperature

(minimum values)

	[1] EN 1982 [2] BS 1400	R _m N/mm ²	R _{p0.2} N/mm ²	A ₅ %	HB
[1] Sand casting		500	180	18	100
[1] Mask mould casting		500	180	18	100
[1] Centrifugal casting		550	200	18	130
[2] Sand casting		500	170	18	-
[2] Centrifugal casting		560	200	20	-

// Strength properties

at elevated temperatures (reference values)

Temperature	°C	20	150	200	250	300
Tensile strength	R _m N/mm ²	500	440	415	395	370
0.2% limit	R _{p0.2} N/mm ²	180	177	175	173	172
Elongation	A ₅ %	12	14	14	14	13

// Physical properties

Density at 20 °C	7.5 kg/dm ³
Melting temperature/range	1040 – 1060 °C
Specific heat capacity at 20°C	0.452 J/g x °C
Thermal conductivity at 20°C	0.63 W/cm °C
Electrical conductivity at 20°C	5 – 7 MS/m 8 – 12 % IACS
Electrical resistance at 20°C	0.14 – 0.20 Ω mm ² /m
Coefficient of linear expansion in the range 20 – 200°C	16 x 10 ⁻⁶ °C ⁻¹
Shrinkage	approx. 1.5 – 2 %
Young's modulus	115 KN/mm ²
Permeability	< 1.3

// Dynamic strength values

at room temperature (reference values)

Bending fatigue strength R _{bw} at 10 ⁸ load cycles	210 N/mm ²
Notched impact energy (ISO - V/KV)	50 joules

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Areas of application

TUBG is used

- in general mechanical engineering for mechanically stressed components such as levers, housings, bearing bushes and roller bearing cages.
- Gear-selector forks, synchroniser rings, pinions and bevel gears made from TUBG are used in gearbox construction.
- Other areas of application include parts subjected to corrosive stress such as bucket wheels, pump impellers and housings as well as fittings for the chemical industry.

Machinability

Carbide tools are needed for turning and milling and sharp drill bits are needed for drilling and thread cutting. This results in machinability that is better than that of austenitic steel.

Shorter rolling and flowing chips are formed.

Relaxation annealing approx. 550 - 580 °C

Soft soldering not recommendable

Brazing poor, fluxes containing fluoride and chloride (type F – SH 1) silver solders are advantageous

Welding good, both TIG, MIG and also electrode manual welding are possible. Suitable filler material CuAl9Ni4Fe2Mn2 = CF310G or S-CuAl8Ni2

Galvanisability possible, good cleaning and pretreatment necessary

