LUX101 - (375)

TECHNICAL AND USAGE DETAILS

MASTER ALLOY FOR YELLOW GOLD

Master alloy suitable for the production of 375‰, 417‰ and 585‰ yellow gold alloys (Ag20Zn16). The resulting gold alloy is for the production of investment cast items with or without precious stones. The 585‰ alloy hue is commonly known as “Hamilton yellow”, while the 375‰ alloy hue is known as “English yellow”. The gold alloy lends itself for hardening. All the most common investment casting techniques can be used.

APPLICATION FIELDS

CASTING

TAB.1 PHYSICAL CHARACTERISTICS

Colour	"ENGLISH" YELLOW
Colour coordinates	L*= 91.68
	a*= 1.09
	b*= 18.55
Density [g/cm^3]	11.08
Melting range Solidus - Liquidus	777 ÷ 869 °C

TAB.2 MECHANICAL CHARACTERISTICS

Condition	As cast	Hardened
Tensile strength [MPa]	375	
Yield strength [MPa]	169	
Elongations [%]	48	
Hardness [HV]	121	249

HARDNESS AFTER HARDENING [HV]

	250 °C	300 °C	350 °C
60 min	231	241	227
120 min	-	249	235
180 min	249	242	240

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INVESTMENT CASTING

CASTING

Put the alloy[1] inside a cold crucible. Reach a temperature of 100 ÷ 150 °C more than Liquidus, (as per Tab.1), then pour the metal inside the stabilized flasks at a temperature between 500 ÷ 700 °C. Choose temperatures among this range as a function of the dimension of the castings (for heavy pieces it is advisable a low temperature value, for lighter pieces it is advisable a higher one); each one of these temperatures has to be optimized in function to everyone's own manufacturing cycle.

COOLING

After casting, let the cast flasks rest in air for about 15 ÷ 20 minutes and then quench in water. The best timing choice depends on the pieces to be cast: in case of very heavy flasks wait a longer amount of time. For cooling flasks cast with stones, follow the instructions supplied by the producer of the stones.

CLEANING

Once the tree is obtained, clean it with a high pressured water jet, subsequently dip the tree in a 5 ÷ 10% hydrofluoric acid solution at 50 ÷ 60°C (122 ÷ 140°F), in order to remove investment residues. A stronger action of the hydrofluoric acid can be obtained by using an ultrasonic tank to combine the mechanical and chemical action together.

PICKLING

Use a 10 ÷ 15% sulphuric acid solution at 50 ÷ 60°C for a normal pickling. A stronger pickling action is obtained by adding small amounts of hydrogen peroxide (1 ÷ 5 ml/l) to the solution before use. Renew the sulphuric acid solution frequently.

SCRAPS REUSAGE

The scraps of this alloy can be reused. It is advisable to use a percentage of not more than 50% of scraps and sprues. The choice of the quantity of scraps to reuse depends on their grade of cleanliness, on the casting techniques applied and subsequently to the state of oxidation of the material and the grade of defection tolerated by the items to produce. It is recommended to clean very carefully the sprues from each investment remaining, which presence reduces the number of recasting the scraps can endure.

HEAT TREATMENTS

SOLUTION ANNEALING - CASTING

The solution annealing should be carried out on the cast pieces. The aim is to reduce or eliminate all the tensions accumulated by the casting itself, during cooling inside the flask, and consequently to increase the mechanical resistance of the cast pieces. Heat the castings in a furnace (if possible in a protected atmosphere) at a temperature of 75% of the Solidus value (as per Tab. 1) for a time between 10 ÷ 20 minutes. Cooling can be done abruptly in these three different ways: in water, oil or alcohol (these last two guarantee a very reduced presence of cooling tensions).

HARDENING

Age hardening can be done on finished items, after having taken to conclusion all the deformation steps to produce the piece itself. This heat treatment allows to increase the piece resistance to plastic deformation, which will have, as a consequence, a higher fragility. You have to proceed by heating the pieces to 275°C, keeping them under this temperature for a time between 60 and 180 minutes in function of the hardness value to be reached (please contact Progold to ask for hardness values). 180 minutes guarantee to obtain a hardness close to the highest value the alloy can reach. Further on proceed by cooling the pieces very slowly inside the furnace (when a furnace with protected atmosphere is available) or abruptly in the water. In case of problems due to oxidation, the heat treatment can be done by quenching the pieces in molten salts or oil.

1. In order to guarantee the correct functioning of the product it is advisable to use exclusively 99.99% pure gold. It is suggested to do a pre-melting (under protected atmosphere) of the alloy before using by putting inside the crucible, in a sequence, first the master alloy and then pure gold. If the shotmaker is not available it is advisable to put the alloy into the ingot mould, roll and then cut the sheet into small pieces.

2. All the data of this technical sheet refer to 9K alloyed gold. If the alloy is used for different finesses from those suggested, please contact Progold for further information. All data presented in this technical sheet have been obtained from samples produced and tested in Progold laboratories, with specific procedures and in compliance with the ASTM standards. Progold preserves the right to rectify the data of this sheet anytime by updating this publishment.