

NI1811-01 Low nickel release all-purpose master alloy for 750‰ (18 Kt) white gold

Technical datasheet and guideline for 18 Kt

GENERAL INFORMATION AND RECOMMENDED APPLICATIONS

Typology	Master alloy for gold
Production process	Universal
Color	White low nickel release

Product applications

Stamping production
 Casting without stones
 Casting in closed systems
 Age-hardening
 Ingot casting
 Continuous casting
 Sheet production
 CNC and lathe production

Color	Off-white
Density [g/cm ³]	14.6
Melting temperatures	Solidus [°C] 910 Liquidus [°C] 935
As cast hardness [HV 0.2]	183

FULL CHARACTERIZATION DATA

General characteristics

Ni release, average value [µg/cm ² /week]	0.04
Ni release, maximum value [µg/cm ² /week]	0.1
As cast grain size [µm]	65
Fluidity (grid filling test) [%]	98

Color coordinates

L*	86.7
a*	3
b*	11.8
c*	12.1
Color shade	Off-white

Mechanical characteristics

Tensile strength (Rm) [MPa]	565
Yield strength (Rp0.2) [MPa]	450
Elongation at rupture (A) [%]	35
As cast hardness [HV 0.2]	183
Hardness after 70% area red. [HV 0.2]	283
Hardness after annealing [HV 0.2]	192
Hardness after age-hardening [HV 0.2]	280

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CASTING PROCESSING PARAMETERS

Pre-mixing temperature [°C] **1050**

Casting temperatures	Metal - from [°C]	Metal - to [°C]	Flask - from [°C]	Flask - to [°C]
Thin (below 0.5 mm)	1020	1050	650	700
Medium (from 0.5 to 1.2 mm)	1000	1020	580	650
Thick (above 1.2 mm)	980	1000	460	600

Trees without stones

Let the flask cool down for 30-45 minutes, then quench in water.

MECHANICAL WORKING PARAMETERS

Pre-mixing temperature [°C] **1050**

Casting temperature	Metal - from [°C]	Metal - to [°C]
Ingot making	1010	1050
Continuous casting	1055	1100

Reccomended reductions	
Sheet - area or thickness [%]	70
Wire - diameter [%]	45

Mechanical working recommended annealing	Temperature - from [°C]	Temperature - to [°C]	Time [min]
> 5 mm	660	700	40
1 - 5 mm	660	700	35
< 1 mm	660	700	30

AGE HARDENING PROCESSING PARAMETERS

Single step age-hardening treatment	Temperature [°C]	Time [min]	Quenching
Age-hardening	275	90	Air or in furnace

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PRODUCT TECHNICAL GUIDELINES

Flasks temperatures and quenching time	For casting processes do not exceed 700°C for the investment flask. Use high quality investment in order to reduce reactivity between metal and flask. For casting without stones, quench within 20 minutes after pouring. For casting with stones quench within 45 minutes after pouring.
Microstructure of the item	The item before finishing, or at least the composing items before soldering should be thermally homogenized (760°C x 40' followed by quenching) or annealed (680°C x 30'). Thermal treatments must be done in furnace providing temperature control and protective atmosphere.
Surface porosity	An item without porosity generates on average a lower nickel release than a porous object.
Preliminary checks	A preliminary check on the process and on the kind of items to be produced has to be done, in order to identify possible critical steps. Some kinds of production processes or of finishing are incompatible with nickel release reduction: they have to be eliminated or at least limited and measured, even when using a low nickel release alloy. In order to minimize nickel release, it is important to obtain objects as much as possible without porosity, shiny, with homogeneous microstructure and with the minimum amount of soldered joints.
Pre-mixing	It is advised to pre-mix materials, by granulation or by casting of a semifinished item (bar, wire). This in order to optimize title and homogenization of the elements in the alloy.
Material re-usage	The maximum amount of reused metal allowed is of 50% in weight. The material should be clean, deoxidized and without inclusions. It's anyway advisable to not exceed 30% re-used metal.
Processing temperatures	Strictly respect process temperatures indicated in the technical chart. Preferably use casting systems that provide an easy measurement of the metal temperature.
Parts assemblies	Mechanical assemblies of items constituted by the same alloy at 750‰ title are to be preferred. Items of other compositions are allowed for assembly (mechanical or by soldering), provided that they are nickel-free.
Soldering	Soldering techniques that give a good process control are to be preferred: a. Furnace soldering (with or without soldering pastes) b. Laser soldering with or without external material (same composition of the alloy at 750‰ title). <u>Note</u> : although not forbidden, torch soldering is not advised.
Finishing and cleaning	Only mirror-finish, shiny surfaces are allowed; surface before plating should have the minimum roughness compatible with that accepted for goldsmithy finishing, after using polishing wheels with fine polishing pastes.
Post assemblies	Legor Group policy is that for post assemblies and parts in contact with pierced skin, nickel based alloys should be avoided; this because skin elicitation to nickel ions can occur even for release values that are compliant to the standards.

