United
PRECIOUS METAL REFINING, INC.

Technical sheet - Alloy 291

Color – Standard Yellow

Purpose – All- Purpose (Sheet, plate & wire

Karat – 9K-23K

Composition & Melting

Composition	Cu	Ag	Zn	Ni
	59.00%	30.00%	11.00%	0.00%

		Temperatures	
Melting	**Karat**	**°C**	**°F**
Initial	9K - 14K	950 °C - 980 °C	1742 °F - 1796 °F
	18K - 23K	1100 °C - 1120 °C	2012 °F - 2048 °F
Ingot	9K - 14K	940 °C - 970 °C	1724 °F - 1778 °F
	18K - 23K	1100 °C - 1110 °C	2012 °F - 2030 °F

- The alloy and fine gold should be melted together in a clean crucible. Place alloy in the bottom of the crucible and fine gold on top.
- Initial melting temperature should be obtained then reduced to the suggested ingot temperatures.
- The alloy should be mixed well with a stirring rod to ensure a good mix.
- Alloy should be poured into a preheated, vertical or lightly lubricated iron mold.
- Use a steady, even pouring motion slowing down at the end of the pour to prevent shrinkage at the top of the ingot.
- Use a round rod mold for wire and a 2-piece L shaped mold for plate and sheet.

Quenching

- The metal ingot should be removed from the mold and quenched immediately into a pickle solution or water.
- For heavy ingots a one- minute cooling period is recommended to avoid quench cracking.

Fabrication

- The metal ingot should be cleaned of all adhering oxides or fluxes before rolling.
- The ingot should be rolled or drawn to a 50% reduction in size before annealing.
- After initial annealing continue the reduction at 50% before annealing again.
- Clean the ingot after each anneal.
- Keep rolls, dies and metal clean to prevent defects in the finished stock.

Annealing

- Annealing temperature is **675°C/1250°F** for **20 minutes** & Quench immediately. Do not over anneal.
- A boric acid fire coat should be applied before annealing in open atmospheres.
- Over annealing can cause excessive grain growth and orange peel effect on the surface.

Note: There are proprietary metals in the formulation which are not included in the composition section.

Technical Assistance: Available… Call 1-800-999-3463 / 1-800-999-FINE

E-mail / techteam@unitedpmr.com Website / www.unitedpmr.com