

Modern Jeweler

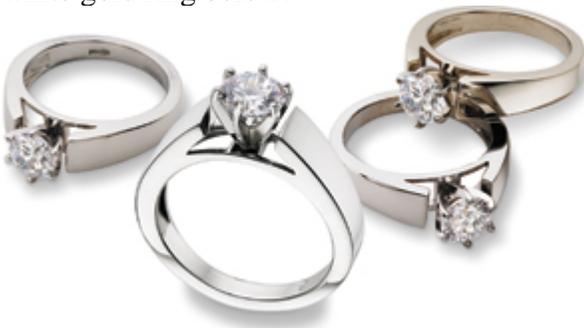
Updated: May 1st, 2007 03:04 PM EDT

White Knights

Can new alloys that don't need rhodium plating solve the problems with white gold?



Three rings made from different alloys by Stuller, (800) 877-7777. At left, a platinum ring. At right, an unplated conventional 14k white gold alloy above and an unplated "X1" white gold ring below.



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From left to right: Platinum, "Precise White Gold," rhodium, and 14k gold rings from W.R. Cobb, (800) 428-0040.



Wedding bands in a variety of white metals from Hoover & Strong, (800) 759-9997. From left to right: 14k nickel white gold, 18k palladium white gold, 950 "TruPd" palladium, and platinum.



A white gold grading template with foil rectangles for color matching is available from the Manufacturing Jewelers & Suppliers of America for \$195, (401) 274-3840.

By [David Federman](#)

Until a year ago, jeweler Mark Fingerman saw white gold as a necessary nuisance, if not an evil. Because sales at Valentino's, his Navato, California, store were 80 percent vanilla versions of the metal, he resigned himself to the constant cost of rhodium replating and

the occasional head and gem replacement when overly rigid nickel white gold prongs broke.

And, oh yes, he had a third complaint. Some customers developed allergic reactions to white gold because it contained nickel as a bleaching agent. "Chlorine leaches nickel out of gold," Fingerman explains, "and that's a real problem in a state where swimming pools and hot tubs are almost as numerous as cars."

Fingerman contemplated switching to palladium, but he dreaded the time and expense of waging a one-man education campaign on behalf of an unknown precious metal. "I didn't see any choice but to stick with the status quo and continue to sell white gold, despite its problems," he says.

Then he got a call from a friend, Tim Wallace, who runs a nearby custom design trade shop. Wallace had just finished putting a new alloy, "Precise White Gold" from W.R. Cobb, Cranston, Rhode Island, through its paces and had regained his faith in the metal. "It was so white it didn't need rhodium plating," Wallace says. "What's more, its nickel content was so low that the metal was very workable and I didn't have to worry about prong failure." Last, but light years from least, nobody complained of skin troubles—a common nickel-related ailment.

Today, Fingerman has joined Wallace as a born-again believer in white gold. "You can tell your readers that Precise White Gold saved the day for me," Fingerman says. "I use no other alloy now."

This doesn't mean he isn't keeping a lookout for other new-breed nickel white golds. Every time he hears of one, he investigates it. So does Wallace. "No one's going to let Cobb have the market in the new problem-solver nickel white golds to itself. I expect to see competition," he says.

The competition is already here. Among others, Stuller, the Lafayette, Louisiana, jewelry and gem giant, recently launched its new "X1" white gold alloy with much fanfare. Marketing director Steve MacDiarmid says the company considered experimenting with other metals like palladium but stuck with the tried and true. "We decided to develop an alloy that would escape the usual objections to nickel white gold," he says. "Many of our customers tell us that we've succeeded."

But there are some refiners and manufacturers who say that developing a hassle-free nickel white gold can't be done. Why do they feel such a goal is a metallurgical mission impossible?

PLUGGED NICKEL

It's one thing to get an itch for white gold, another to get an itch from it. That's what happens to one out of every ten women who wear the world's most popular platinum alternative—if, as is usually the case, it contains nickel and the nickel comes in contact

with their skin. Mind you, we're not talking about casual contact, at least not the first time. Women usually become sensitized to nickel as a consequence of body piercing—not just ears, but, nowadays, numerous body parts. Afterwards, normal skin contact can trigger various dermatological reactions from slight rashes to severe blotching. Thankfully, there are nickel sensitivity tests, but we're not aware of many jewelers who offer them.

Okay, if nickel is so hazardous, why not ban its use in gold? Some countries have, but not many. Not surprisingly, the reasons nickel remains a legal additive are economic. Hands down, it is the cheapest gold whitener. What's more, this additive is getting cheaper all the time—at least, relative to other bleaching agents. Platinum has soared. And palladium—superior to nickel as a whitener—is closing in on \$400 per ounce. Nickel, by dramatic comparison, costs only \$20 per ounce.

No wonder nickel white gold has become a refuge for cost-conscious refiners and jewelry manufacturers. And that's the rub.

When studies revealing the nickel sensitivity problem were published in Europe early in the 1990s, the European Union formed a task force to set nickel content and release standards. The first set of standards known as the Nickel Directive was proposed in 1994 but adoption was delayed until nickel testing standards could be developed. In the meantime, three countries—Denmark, Germany, and Sweden—banned nickel gold alloys outright. Palladium became the default whitener. Elsewhere, alas, the jewelry industry was left with a choice of additives.

Today, American jewelers aren't given much of a choice. Most make do with nickel, although adopting palladium would probably be the wisest way to go. Don't take my word for it. Just ask the Nickel Institute, the trade group which promotes the interests of nickel miners. At their web site, they advise, as follows: "The metal that will determine whether nickel will be released from nickel-containing gold alloys is palladium: the higher the palladium content, the less nickel will be released."

Combo palladium-nickel alloys sound like a good idea because they are likely to reduce nickel release—if only by lowering the amount of it used in alloys. Alas, notes Igor Shersher of Platina Casting in New York, attempts to market palladium-nickel equal-blends, common in the 1980's, have been completely abandoned. Today, he says, "If you want to whiten gold, you've got a choice between nickel or palladium and not any combination of the two."

Why has this choice been allowed to persist? Price is the culprit. While most refiners offer nickel and palladium white gold alloys, nickel alloys, which are generally 20 percent cheaper, are the runaway best sellers.

Given this reality, can manufacturers produce nickel white golds that solve the chronic problems of these alloys? Remember this: Nickel doesn't just endanger health. Alloys with high nickel content are so hard and rigid that they can endanger prongs.

The trouble is, as you reduce nickel content, the alloy looks yellower—which forces jewelers to add a final but very temporary bright-white rhodium finish. It is widespread disgust with limited-life rhodium plating that is driving jewelers to other white metals.

But now refiners and manufacturers are offering new non-toxic nickel white golds that they say have the metallurgical give-and-take older nickel alloys lack. What's more, they don't need rhodium plating.

Such alloys, these makers say, greatly reduce the health risks associated with nickel. And they substantiate their claims with testing results from recognized assaying labs. Do users of these alloys agree?

WHITE WITHOUT BLIGHT

If you've been reading recent sales literature on nickel white gold alloys, chances are very good that you've seen marketing boasts such as these: "passes European nickel-release tests," or "meets, or exceeds, European nickel-release standards."

Nickel release has become a big buzz phrase in the U.S. jewelry industry. In the late 1990's, says metallurgist Stewart Grice of Hoover & Strong, Richmond, Virginia, the focus of the nickel controversy shifted from content, which in high-nickel alloys was usually between 10 and 12 percent, to release. "What mattered most in developing nickel white gold standards wasn't the amount of nickel in a gold alloy but how much of it was released from the surface of a jewelry piece during direct and prolonged skin contact," he says. "To test for this, alloy samples were immersed in artificial sweat solutions for weeks at a time, and then the solution was measured for its nickel content. If it measured below a certain level, the alloy was judged safe to wear."

That minimum release was set at 0.5 micrograms per square centimeter per week and took effect in 1998. Stuller decided to play it even safer and go for a far lower minimum. Its X1 white gold alloy measured at 0.1 micrograms—which is nearly nil.

But why cling to nickel? America has no nickel-release or content standards. The government doesn't even require warnings that nickel is a hazardous material. As a result, the U.S. is an open market for nickel white gold. Companies must use it to stay competitive. Is there a way to balance competition with conscience? So far the only way has been to voluntarily adopt European nickel-release standards and to prove compliance by submitting alloy samples to recognized nickel testing labs in England.

There's only one problem. Results for sweat tests vary widely from lab to lab and from sample to sample. Grice explains why: "When combined at high temperatures, nickel and gold mix well. But as they cool, they tend to separate and so nickel content isn't uniform. It can be great in one area and minuscule in another." To bring widely divergent sweat test results into greater agreement, labs were allowed to multiply them by a factor of 0.10. Suddenly, the pass rates for nickel alloys were much higher than before.

Indeed, Gregory Raykhtsaum and D.P. Agarwal of Leach & Garner Company, North Attleboro, Massachusetts, ran European-method release tests on a wide variety of nickel alloys—one of which was 100 percent pure nickel—for the Santa Fe Symposium in May 2001. Although many of these alloys—including the pure nickel alloy—initially flunked the test, they passed when allowable adjustments of test results were performed. As a result, Raykhtsaum is no believer in current nickel-release test methodology.

How, you might ask, did an all-nickel alloy pass the nickel-release test? Chris Corti, a consultant with the World Gold Council, explains: "The nickel release test is not about nickel content, but about how much dissolves out of the alloy surface in simulated sweat. Hence it's a corrosion test, one for which it would be relatively easy to design nickel-containing alloys that pass the EU nickel test. However, these alloys may not be amenable for jewelry fabrication."

Both Stuller and Cobb say their nickel white golds are amenable for jewelry fabrication and achieve maximum whiteness for such alloys—so much so that they don't need the rhodium plating common with nickel white golds.

BEHIND THE RHODIUM EXTERIOR

Although America is governed by precious metals marking laws and regulations, rhodium plating escapes any legal obligation to be marked or even disclosed—perhaps because there is precious, not base, metal below the coating. Nevertheless, most buyers of rhodium-plated white gold jewelry do not know that their pieces owe their final whiteness to what might be considered a rhodium-leaf exterior that will almost assuredly wear away in a relatively short time.

Unfortunately, manufacturers can't afford to make thick rhodium plating. It's not just the platinum-family metal's current catapulting cost of \$3,000-plus per ounce that is to blame. "Thickness is limited for technical and not just economic reasons," Corti says. "The heavier the coating, the greater the build up of internal stress. And the greater the stress, the greater the chance the plating has of cracking and scaling off."

Stuller and Cobb set out to develop nickel white golds with a whiteness so high that they wouldn't need a final rhodium finish. But they didn't just do so to achieve surface beauty that would do away with the need for rhodium plating. Nickel is a hardener as well as a whitener that is famous—or, should we say, infamous—for creating metal rigidity that results in prong failure. By using certain trace elements to inhibit the release of nickel, Stuller says its X1 alloy has the wonderful whiteness nickel can impart with minimal worry of skin trouble and prong failure. Cobb says the nickel levels in its Precise White Gold are low.

But rhodium finishes remain addictive. Many even think the look they give is to be expected of white gold—despite its temporary nature. Corti wants disclosure of rhodium plating to be required "on a right-to-know basis." For him, rhodium plating is a material fact that would affect the decision to buy white gold jewelry if known prior to purchase.

How ironic it seems when Stuller concedes that many users of its X1 white gold still opt for rhodium plating—even though the company makes clear it is unnecessary.

The chronic allegiance to rhodium plating is understandable. It is the whitest precious metal after silver—whiter than platinum or palladium. And a little dab will do the job nicely, especially in light of its exorbitant price.

But long before rhodium prices headed for outer space, plating was, in reality, "rhodium flash." The word plating is really an exaggeration. This is why the life expectancy of most rhodium coverings is a year or two. Wallace says that's a generous time estimate; six months is more like it. When consumers invariably see the far yellower metal underneath, they return to the seller who usually refinishes the piece free of charge to restore its old alabaster charm.

Can rhodium failure be averted? Corti thinks that is best done by making palladium a mandatory whitener for gold and banning nickel use in gold alloys altogether. This would certainly make white gold even more of a precious metal. Nevertheless, don't expect palladium white gold to replace nickel white gold any time soon—not unless the industry lobbies for a ban or a standard.

So here is where things stand. Nickel will remain the overwhelming gold whitener of choice. And as long as it does, consumer-conscious manufacturers will develop creative alloys to inhibit its risks to settings and the skin they touch.

But the best cure for nickel, says both Corti and Grice, will remain palladium. For this to happen, this relative newcomer must make big inroads in its own right. Then, and only then, the industry may do what many experts recommend: decide palladium white gold is preferable for the buying public—price be damned. That's a lot to ask of a regulation-averse industry. On the other hand, with campaigns proliferating against "dirty gold," removing nickel may be one powerful way to signal that jewelers are committed to clean up.

In the meantime, jewelers like Fingerman and Wallace swear new non-toxic nickel alloys are all the answer that is needed to the white gold problem.