

From the Workbench The Watch Case: Materials and Methods Part 1

by Theodore Diehl

The manufacture and finishing of watch cases has been the domain of specialists since time immemorial, partly because of the range of specialised skills required to achieve the result. Case-making for watches is generally kept quite separate from the quiet workbench of the master watchmaker. The work varies from the hot and messy melting down of ingots through to the precision soldering of tiny lugs and the cutting of hair-fine threads for screwed-down case-backs.

Consequently, most of the larger watch-making firms have built up intimate relationships, often of several decades standing, with particular case-making companies. Some have gone one step further and bought such firms outright, thus ensuring a steady supply, as well as the all-important predicate of 'in-house' manufacture – even then, companies still look externally for supplies of specific types of cases.

Steel

It is stating the obvious to say that the majority of quality wristwatches on the market today are made of steel, but there have, however, been large fluctuations in its popularity over time. Steel lost its low-end status during the first half of the 20th century when Walter Chrysler, in choosing to cover the tower façade of the famous Chrysler Building with sheets of stainless steel from Krupps, consciously or unconsciously thrust the material into the realm of functional fashion, where it has remained ever since. The modern taste for understatement, the appearance of ever more exotic alloys and the extremely high prices that vintage steel watches reach at auction are all indicators of the continued popularity of steel at the higher end of the market.

Steel exists in more than 3,000 alloys, which include varying proportions of other elements and which have enhanced properties such as malleability, the ability to be polished or resistance to scratching. The majority of cheaper watches are from the lower grades of steel; these usually cover the spectrum of more distinctly greyish colours. Because they are soft, they can be easily 'punched out' from blanks and machined in fewer steps than the harder varieties used by Rolex, Patek and other major houses. This steel takes on a sheen that echoes platinum's brilliance with a touch of bluish-white colouration. The polish it takes is also extremely deep, almost as if one could look right into it. The time and expense involved in such processes are such that more complicated cases are rarely made from steel – noble metals return far more against the cost of the investment.

Gold

Gold, like steel, also comes in a variety of grades, but with a much wider spectrum of available colours, ranging from white to red (including green)! Since 100% pure gold is too soft to be useful for cases, or even most jewellery, it is always mixed with copper, silver and minimal amounts of other metals. If you look carefully, you will discern that watches from different manufacturers that are both made of yellow 18 ct. gold have different hues. For instance,



the yellow and 'red' gold used by Patek both have very pale colouring (Patek does not even officially manufacture red-gold watches – they stick to the term *rosé*), whilst the yellow and red gold used by Breguet definitely tends towards a deeper reddish hue. This variation is due to the amounts of copper and silver present, which are together responsible for around 25% of the content in an 18 ct. gold mix.

Regarding the ever-popular white gold, there is much confusion in the market – even among writers and collectors of watches – regarding the rhodium plating of white gold, as well as its exact metallurgical content. Nickel used to be a prime component of white gold, and this mixture is still used by some in the jewellery industry. However, due to allergic reactions and health reasons, the nickel content in today's high-end white-gold products has been replaced by the very rare metal, palladium. Palladium has the additional benefit of lightening the total hue of the white-gold mix more than nickel.

Today, many still insist that all white gold is treated with rhodium plating to visually lighten it



even more, but this is simply a fallacy. It was once absolutely necessary, when nickel was still being utilised in the white-gold mix. This gave a brownish haze to the final product, and rhodium assisted in lightening the colour. (Many lower-market white-gold products, especially in the USA, are still using nickel compounds and therefore require plating.) Rhodium plating today, however, is *de rigueur* for sculpted white-gold watch cases, watch bands or for watch cases with soldered lugs, as the plating equalises the visual differences between the solder and case colour, which can be visually disruptive. Interestingly, both palladium and rhodium belong to the platinum group of metals.

In any case, whatever the type of steel or gold utilised, manufacturers who produce large numbers of watches will generally specify, quite exactly, the metallurgical mix they desire for their particular cases. They guard this information with great secrecy, as it directly affects the appearance, scratch resistance and image of the final product.

Platinum

Platinum remains the most expensive of the metals used for watch cases, and there are several reasons for this. Platinum ore must be mined in much larger quantities than gold ore in order to extract the same number of grams of material. It has a high melting point, requiring more extreme temperatures during the working process, is difficult to extrude and is also difficult to polish. Like gold, it is also available in several different alloys combined with iridium, palladium, copper, cobalt or ruthenium. Each has specialised characteristics (for example, platinum-cobalt combinations are most suited for complicated castings and shapes), although unlike the various gold mixes, these variants have no extreme colour differentiation.

Part of the higher cost is also a question of purity. Platinum is generally utilised in a much purer alloy form than gold. A platinum watch case will contain 95% platinum and only 5% trace metals – namely ruthenium, itself a rare metal and also a member of the platinum group – while an 18 ct. gold watch contains only 75% gold. The owner of a platinum watch enjoys the benefits of high scratch resistance similar to the highest grade steel, the pleasurable additional weight of the metal on the wrist and the extreme understatement of cool looks with a much higher price tag. ●

Next month

Part 2 will continue with coverage of watch case shapes and construction, waterproofing, lugs and crowns, with insights from some of the greatest watchmakers and brands today.