



## RA 602 CA Baskets Increase Production and Reduce Distortion

RA 602 CA has successfully replaced alloy 600 fixtures at one producer of high speed steel drill bits. Eighteen bar frame baskets were supplied to the end user in January 2005. Each basket is 7 inches high, 22 inches wide, and 34-1/2 inches long.

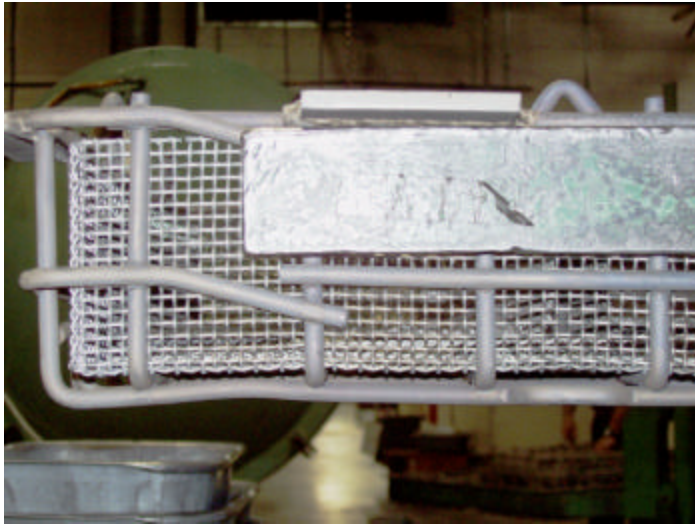
Drill bits are produced primarily out of M2 and M-50 tool steels, which are vacuum treated at 2050-2150°F. A typical cycle lasts 20-45 minutes and is followed by a 2 bar nitrogen quench. This is followed by a tempering treatment at 1050°F. Typically a set of baskets will be exposed to 6 cycles per day.

Distortion has been a major issue with previous baskets, which leads to frequent restraightening. Historically, baskets were constructed from 1/2 inch diameter alloy 600 round bar. Typically the bottoms sagged and the sides bowed inward after a few cycles. After three months, the end user

reports the 3/8 inch diameter RA 602 CA baskets hold their shape much better than the larger diameter alloy 600 baskets. The photos show the RA 602 CA baskets after approximately 90 days in service or just over 500 cycles. Some restraightening has been required on the new baskets, but much less frequently than the previous baskets. During straightening, the RA 602 CA alloy has displayed excellent retained ductility.

The maximum load in the vacuum furnace is 600 pounds. This includes the weight of the drill bits and alloy fixturing. RA 602 CA baskets saved weight for two reasons: reduced cross section and the lower density of RA 602 CA. By switching to 0.375 inch diameter RA 602 CA, the weight of each basket was reduced approximately 25 lbs (47.5% weight reduction). As a result, more parts are processed in the same equipment and roughly 15% more parts can be processed per furnace load.

RA 602 CA alloy is a 62Ni-25Cr-2.2Al-Y-Zr-Ti alloy. It is stocked by Rolled Alloys in plate, sheet, round bar, and welding consumables. A full data sheet (Bulletin 1602) on RA 602 CA is available by request from Rolled Alloys or can be downloaded at the [www.rolledalloys.com](http://www.rolledalloys.com) website.



| 1,000 Hr Average Stress to Rupture, psi |           |           |
|---|-----------|-----------|
|   | RA 602 CA | Alloy 600 |
| 1200° F                                 | 37,700    | 14,500    |
| 1400° F                                 | 17,400    | 5,600     |
| 1600° F                                 | 4,600     | 3,000     |
| 1800° F                                 | 2,300     | 1,800     |
| 2000° F                                 | 1,250     | 920       |

| Alloy       | Density (lb/in <sup>3</sup> ) | Weight (lb/ft) Approximate |                |               |
|-------------|-------------------------------|----------------------------|----------------|---------------|
|             |                               | 3/8" (0.375")              | 12 mm (0.472") | 1/2" (0.500") |
| RA 602 CA   | 0.285                         | 0.378                      | 0.598          | 0.670         |
| RA600       | 0.306                         | 0.405                      | N/A            | 0.720         |
| Haynes 230® | 0.324                         | 0.428                      | N/A            | 0.762         |

602 CA is a registered trademark of ThyssenKrupp VDM  
 Haynes 230 is a registered trademark of Haynes International

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