

-continued

|          | C    | Si  | Mn  | Cr    | Ni   | Mo   | N   |
|----------|------|-----|-----|-------|------|------|-----|
| Alloy 5  | .010 | .29 | .42 | 25.16 | 5.68 | 4.03 | .37 |
| Alloy 6  | .010 | .27 | .37 | 25.03 | 6.85 | 4.03 | .29 |
| Alloy 7  | .014 | .27 | .46 | 24.98 | 6.78 | 3.98 | .32 |
| Alloy 8  | .015 | .29 | .41 | 24.97 | 6.21 | 4.01 | .36 |
| Alloy 9  | .010 | .23 | .38 | 24.97 | 7.03 | 4.00 | .29 |
| Alloy 10 | .011 | .24 | .39 | 25.10 | 7.26 | 4.03 | .29 |

The results are shown below:

|          | Remarks                | Equation (3)  |
|----------|------------------------|---------------|
| Alloy 3  | OK                     | 23.21         |
| Alloy 4  | Many nitrogen blisters | 17.96 (<18.9) |
| Alloy 5  | Many nitrogen blisters | 15.48 (<18.9) |
| Alloy 6  | OK                     | 22.64         |
| Alloy 7  | OK                     | 20.50         |
| Alloy 8  | Nitrogen blisters      | 18.28 (<18.9) |
| Alloy 9  | OK                     | 22.58         |
| Alloy 10 | OK                     | 22.65         |

It is evident that those alloys in which the value of equation (3) is <18.9 show the presence of nitrogen blisters and are outside the scope of the invention even though the composition fulfills the claimed range.

We claim:

1. A high nitrogen-containing duplex stainless steel with high corrosion resistance, good structure stability, and good workability and weldability, characterized in that the alloy contains, in % by weight, max 0.05% C, 23-27% Cr, 5.5-9% Ni, 0.25-0.40% N, max 0.8% Si, max 1.2% Mn, 3.5-4.9% Mo, max 0.5% Cu, max 0.5% W, max 0.010% S, up to 0.5% V, up to 0.18% Ce, balance Fe with incidental impurities and in which the contents of the alloying elements are adjusted that the following conditions are fulfilled:

(a)  $\% Cr + 3.3 (\% Mo) + 16 (\% N) - 1.6 (\% Mn) - 122 (\% S) > 39.1;$

(b)  $\frac{\% M}{\% N} < 3;$

(c)  $65 < 71.1 + 9 (7.5 - \% Ni) + 190 (0.03 - \% C) + 160 (0.25 - \% N) + 5.3 (\% Cr - 25) + 8 (\% Mo - 4) < 75;$

(d)  $\% N \geq \frac{1075 - 16(\% Cr - 25) + 52(\% Mo - 4)}{4064};$

(e) the ferrite content after solution heat treatment at about 1075° C. is between 30 and 55%; and

(f)  $\frac{\% Cr + (\% Mo)^{1.8} + 5 \% Si + \% W + 0.2 \% Mn}{50 \% N + \% ferrite} < 0.75$

2. Alloy according to claim 1, characterized in that the content of C is max 0.03%.

3. Alloy according to claim 1, characterized in that the content of Si is max 0.5%.

4. Alloy according to claim 1, characterized in that the content of N is 0.28-0.36%.

5. Alloy according to claim 1, characterized in that the Cr content is 24.5-27% and the Ni content is 6.5-8.5%.

6. Alloy according to claim 1, characterized in that the content of Mo is 3.8-4.9%.

7. Alloy according to claim 6, characterized in that the content of Mo is 4.05-4.9%.

8. A high nitrogen containing duplex stainless steel alloy according to claim 1 in a solution heated, cold worked and welded state used in applications where the presence of chloride ions gives rise to a high corrosivity.

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