Template for ECCC2021

Influences of cold deformation and very low strain rate on the creep and mechanical behaviour of Sanicro 25 material

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**Summary**

Sanicro 25 is a newly developed high performance heat resistance austenitic stainless steel, which shows a good combination of high resistances to steam oxidation and hot corrosion, and very high creep rupture strength. This makes ……….

**Key Words**

Advanced coal power plants, heat resistant austenitic stainless steels, Sanicro 25, cold deformation, ductility, creep, fatigue.

**Introduction**

The demand for electric power has been continuously increasing around the world. Meanwhile the consciousness of the environmental impact from human action is growing. Although combustion processes generate carbon dioxide, ………..

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**Material and experimental details**

The material used was a tube material with a dimension of 38x8.8 mm. Table 1 shows the chemical composition of Sanicro 25. To study the influence of cold deformation on the creep behaviour, test samples were cut out of the wall and…………….

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**Results and discussion**

**Effect of cold deformation**

The influence of cold deformation on the creep property up to 38 000 hours at 650°C and 700°C is shown in Figure 1. The results show……….

**Effect of very slow strain rate**

Figure 2 shows the influence of very slow strain rate testing on the tensile properties of Sanicro 25 material. The results show that…………

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**Effect of cold deformation plus annealing**

The influence of annealing after cold deformation is shown in Figure 7. The results show that performing an annealing cycle after………

**Tables and Figures**

*Table 1 Chemical composition of Sanicro 25 (wt%)*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *C* | *Si* | *Mn* | *Cr* | *Ni* | *W* | *Co* | *Cu* | *Nb* | *N* |
| *<0.1* | *0.2* | *0.50* | *22.5* | *25.1* | *3.58* | *1.5* | *3.0* | *0.47* | *0.23* |

*Table 2 Test plan for creep testing of the cold deformed Sanicro 25 material*

*Table 3 Test plan for creep testing of the cold deformed plus solution annealed Sanicro 25 material (1215°C/30 minutes/air)*

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(a)

(b)

*Figure 1 Influence of cold deformation on the creep properties of Sanicro 25 tube material with a dimension of 38x8.8 mm, (a) creep test at 650°C, (b). Creep test at 700°C.*

**Conclusion**

The influences of cold deformation and very low strain rate on the creep and mechanical behaviour of Sanicro 25 material were studied in this paper. The followings can be concluded.

A cold deformation up to 25% plastic deformation will generally increase the creep strength of the material at 650-700°C, ………….

**Acknowledgments**

This paper is published by permission of Sandvik Materials Technology. Supports from Mr Pasi Kangas and Mr Glenn Darley are greatly acknowledged.

**References**

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