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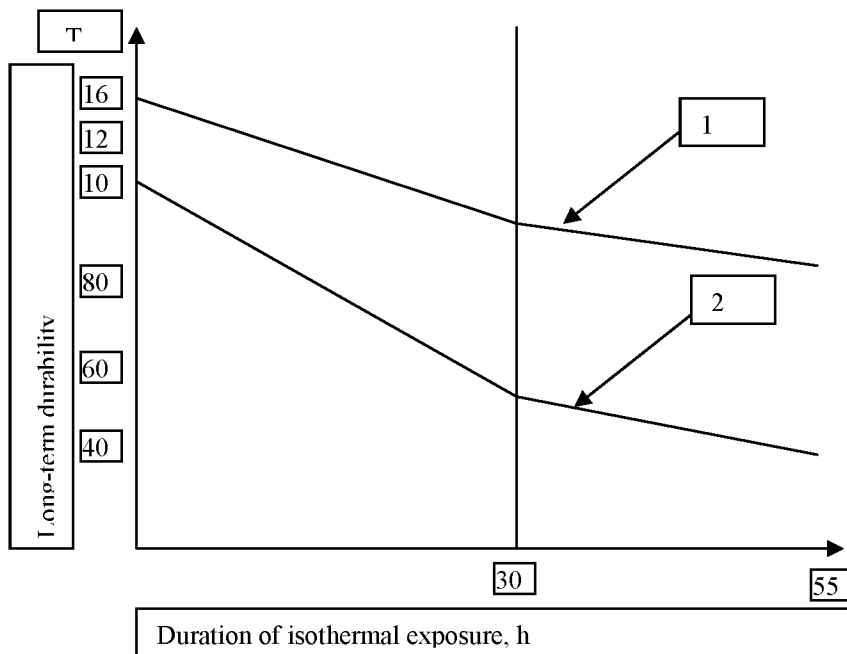
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**INFLUENCE OF YTTRIUM ON THE DURABILITY OF HEAT-
RESISTANT NICKEL ALLOYS (HNA)**

Diagram - Effect of yttrium on durability of HNA.

Increasing the long-term strength (durability) of high-temperature nickel alloys (HNA) is necessary to extend the resource of turbine blades.



As is known, the optimal content of yttrium for HNA is 0.01%. Such a content of yttrium makes it possible to slow down phase reactions during prolonged heating.

The ability of yttrium as a surface-active element to locally alloy the phase interfaces makes it possible to slow down diffusion processes, increase the structural stability and high-temperature strength of the alloy, which is confirmed by the test results.

Samples with the addition (Position 1) and without the addition of yttrium (Position 2) were subjected to heat treatment (aging). Isothermal exposure was 300 and 550 hours.

As can be seen from the graph, the long-term durability of the alloy with yttrium is higher than without it.

After 300 hours of aging, the life of the alloy without yttrium decreases by a factor of 3, and that of an alloy with yttrium by 1.8 times.

After 550 hours, the life of the alloy has decreased by 4 and 2.9 times, respectively.

Compared to testing oxidized samples (aging for 550 hours), the level of durability for metal with yttrium is on average 2 times higher than that for metal without yttrium.