

Heraeus



Nb HT 1600
Micro-doped Nb alloy

Nb HT 1600 Micro-doped Nb alloy

- Nb HT 1600 is a new developed micro-doped Nb alloy
- Ht 1600 was developed as a Nb alloy with a high temperature stability. This was achieved by the micro-doping. A second effect of that micro-doping is an improvement of the mechanical properties.
- In comparison with standard NbZr1% the yield strength could be doubled and the tensile strength is increased by the factor of 1,5 with almost the same elongation values.
- Caused by these improves mechanical properties, the Nb HT 1600 wire could be ideally used as construction wire.
- Compared with Nb or NbZr1%, this new alloy offers the possibility to use smaller dimensions and therefore less material but it keeps the same stability.

Bending „one side fixed“

$$\sigma_{crit} = \frac{Mb}{W} = \frac{F \times L \times 32}{\pi \times d^3}$$

F; L; π ; 32 = const

$$d^3 \approx (\sigma_{crit})^{-1}$$

$$d \approx (\sigma_{crit})^{-1/3}$$

- $d_{HT1600} = d_{NbZr1\%} \times 0,78$
- diameter with the same bending property



Comparison of the mechanical properties between NbZr1% and new alloy „HT 1600“:

Property	Yield Strength	Tensile Strength	Elongation A _{L 254}	
Material	NbZr1%	130 MPA	230 MPA	28 %
	HT1600	270 MPA	375 MPA	25 %

NbZr1% HT1600 Diameter

0,76 mm	0,59 mm
0,72 mm	0,56 mm
0,60 mm	0,47 mm
0,50 mm	0,39 mm
0,35 mm	0,27 mm

- $d \sim (\sigma_{crit})^{-1/3}$
- $d_{HT1600} = d_{NbZr1\%} \times (270/130)^{-1/3}$
- $d_{HT1600} = d_{NbZr1\%} \times 0,78$
- > ~40 % less Material
- > ~22 % less Shadow
- $d_{HT1600} = d_{NbZr1\%} \times 0,78$

Possible applications:

- Frame work and support parts for HD lamps

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