

# COBALT-CHROMIUM IMPLANT GRADE TUBING

## L605 a great material for stents

- Twice the strength of stainless steel with the same ductility
- Translates into thinner struts, improved deliverability
- Enhanced radio visibility thanks to its tungsten content
- Exceptional work hardening rate for a uniform expansion with minimal recoil

**Type analysis:** Cobalt 51% - Chromium 20% - Tungsten 15% - Nickel 10%

**Standards:** UNS R30605, AISI 670, W.Nr2.4964, ASTM F90 and ISO 5832-5

| <b>Typical Mechanical properties</b> | <u>UTS / Ksi</u> | <u>Yield / Ksi</u> | <u>Elongation %</u> |
|--------------------------------------|------------------|--------------------|---------------------|
| Annealed                             | 160              | 80                 | 45                  |
| Cold Worked 30%                      | 210              | 150                | 5                   |

These properties can be tuned to achieve specific requirements such as very small grain size or greater elongation.

## MP35N

- An excellent combination of strength, ductility and corrosion resistance
- In the annealed condition, 50% stronger than stainless steel for a similar ductility
- Ultrahigh tensile properties achievable through cold work and aging

**Type analysis:** Nickel 35% - Cobalt 35% - Chromium 20% - Molybdenum 10%

**Standards:** UNS R 30035, ASTM F 562 and ISO 5832-6

| <b>Typical Mechanical properties</b> | <u>UTS / Ksi</u> | <u>Yield / Ksi</u> | <u>Elongation %</u> |
|--------------------------------------|------------------|--------------------|---------------------|
| Annealed                             | 135              | 70                 | 50                  |
| Cold Worked and aged                 | 250              | 220                | 3                   |

## Phynox / Elgiloy / Conichrome

- Outstanding combination of mechanical strength, corrosion and fatigue resistance
- Material of choice when high stiffness or spring effects are sought.

**Type analysis:** Cobalt 40% - Chromium 20% - Nickel 16% - Iron 15% - Molybdenum 7%

**Standards:** ASTM F 1058, ISO 5832-7

| <b>Typical Mechanical properties</b> | <u>UTS / Ksi</u> | <u>Yield / Ksi</u> | <u>Elongation %</u> |
|--------------------------------------|------------------|--------------------|---------------------|
| Annealed                             | 140              | 65                 | 55                  |
| Spring temper                        | 250              | 225                | 5                   |

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# UNIQUE TUBING QUALITY

## Designed to meet the highest implant requirements

### Seamless tube with high concentricity

Being ourselves experts in welded and redrawn tubing, we are well aware of the risks of undetectable random defects that may appear with this technology.

Our opinion is that such hazards are not acceptable in a stent, which has also been the conclusion of the major slotted tube stent manufacturers in the USA.

However, seamless tube usually comes with eccentricity problems. Our original manufacturing process allows to keep this eccentricity quite low, with typical wall variations within plus or minus .0002 inches.

### Very smooth finish

We can keep the Ra value down to RMS 8 on the ID and RMS 4 on the OD. This smooth finish permits the stent manufacturer to perform a light electro-polishing with a good control of the implant dimensions.

Such an accuracy would be difficult to hold if a stronger electro-polishing was necessary to achieve the desired finish when starting from rougher surfaces.

### Small grain size

A fine grain is advantageous for fatigue resistance and also brings improved intergranular corrosion resistance.

### Accurate dimensions

Tight tolerances facilitate the following:

- a consistent cross sectional area which is correlated with stent mechanical properties such as radial strength and flexibility,
- a precise positioning within the collet of the laser fixture,
- a high accuracy of the laser cut dimensions, thanks to a circularity typically kept within .00012" and a wall within plus or minus .0002"

### Full certification and traceability

Minitubes certifies each batch and performs testing on the tubing as delivered which includes: micro-cleanliness, grain size test, mechanical properties, etc. We keep a full traceability on these products which includes documentation and samples from each lot.

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