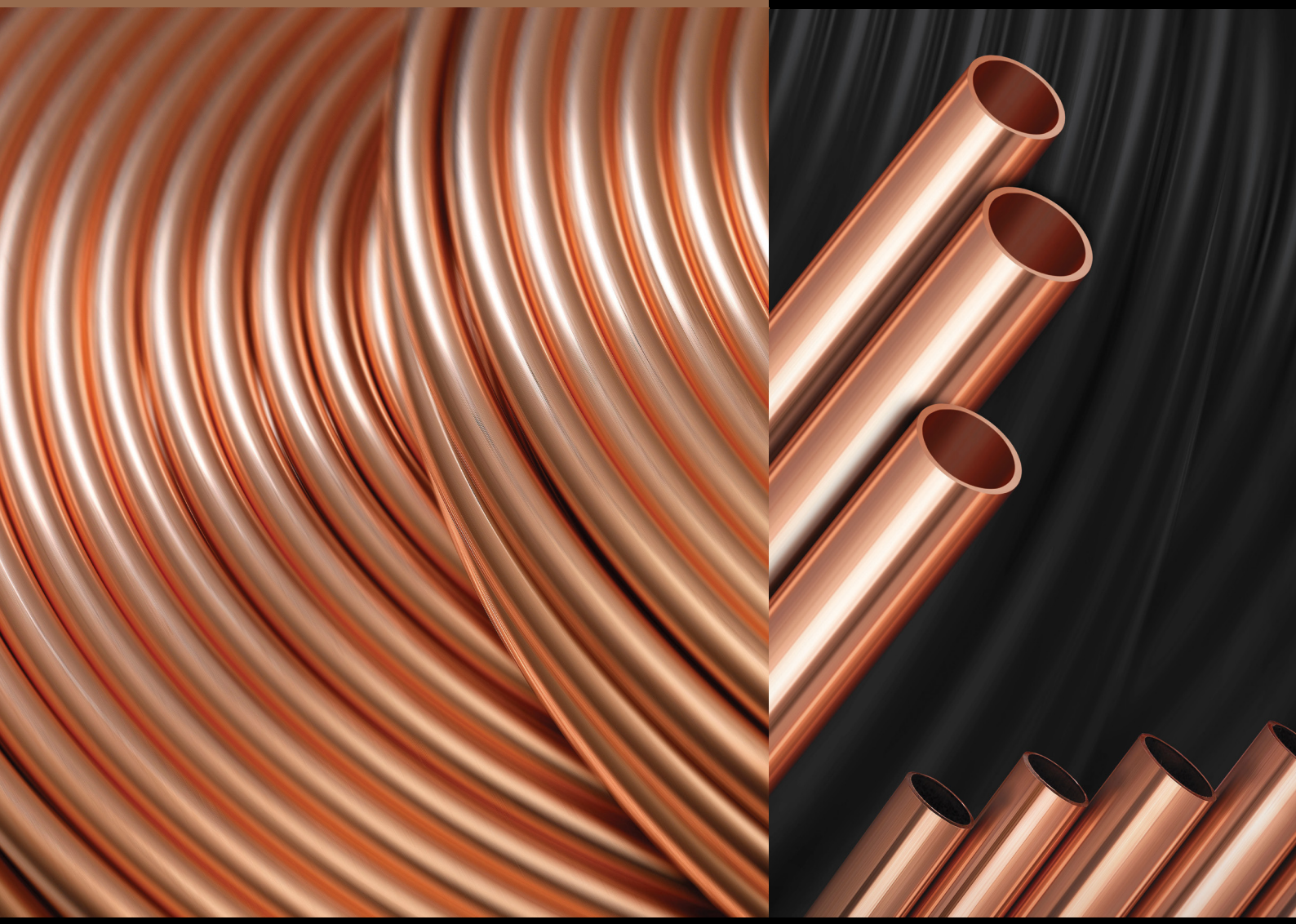
Clean
Beyond Standards

COPPER TUBES

TALOS®



HALCOR

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Copper is an ideal material for tubes used in water installations due to its inherent properties. One primarily advantageous property of copper as material for plumbing systems is its ability to resist corrosion.

The corrosion resistance of copper tubes is largely due to the interaction of water flowing inside the tube which features a thin layer of copper oxide {CuO}. In fact, copper has high affinity with oxygen hence quickly after manufacture of the tube a thin layer of copper oxide {CuO} is formed, which adheres to the metal surface. Water molecules react with the oxide during normal use and they form a copper hydroxide {$Cu(OH)_2$}, which again has almost similar affinity with the underlying metallic copper. This newly formed layer of **copper hydroxide** is in fact the **protective substance**, offering chemical and mechanical stability.

In real world, submicron irregularities (peaks and troughs) are always present on metallic surfaces even when "mirror finish" is attained. A measure of the magnitude of these irregularities is the roughness parameter Ra, which for copper tubes is <0.5μm. Lubricating oils used in the tube manufacturing process could be trapped in such irregularities. Such traps interrupt the continuity of the protective layer, thus reduce the effectiveness of the above mechanism. The objective for a "durable" tube will be the **complete removal of any trace of oil** even when trapped in subsurface cavity.

The cleaning method applied in TALOS® copper tubes is simple and effective. Air is enriched with pre-calculated amount of oxygen and is forced into the tubes at temperatures that exceed the lubricant's flash point. The result of this cleaning process is a tube surface fully covered with copper oxide, whilst the lubricants have been decomposed and "burned" by the excess of oxygen. This in effect facilitates the formation of the copper hydroxide {$Cu(OH)_2$}, when water is introduced in the installation.

Microscopic view (x5000) of well developed copper hydroxide {$Cu(OH)_2$} protective layer formed on the inner surface of TALOS® copper tube.

This cleaning process by "inner surface oxidation" has been a state of the art in the industry and has been applied by established manufacturers of copper tubes. In certain cases, the same process was applied with the use of a mixture of neutral (noble) gases and oxygen. Evidently the end result of the aforementioned oxidizing gases, i.e. the formation of an oxide layer, "guarantees" the effective removal of the tube drawing lubricants and ensures the generation a healthy continuous film of protective hydroxide layer.

European as well as international norms have recognized the value of "tube cleanliness" and have specified a "maximum level" of remaining organic matter (in effect oil residues). In particular, European norm EN1057 specifies that a level of 0.20mg/dm² is not to be exceeded. The effectiveness of the TALOS® cleaning process for removal of oils has been tested and certified by well recognized quality organizations (see below Table). The measured levels are much lower that "the upper limit" of the European norms EN1057.

All of the above, combined with HALCOR's advanced production technology, excellent technical support and fast responsiveness on demand, makes TALOS® copper tubes a trademark product on the market and the ideal choice for all plumbing applications.

MANUFACTURERS	**Certified Dimensions*** For 1 mm wall thickness (non-coated)		
	HARD R290	**HALF-HARD R250**	**SOFT R220**
HALCOR TALOS	**DN10 to DN22 TC MAX ≤ 0,10 mg/dm²** **DN28 to DN54 TC MAX ≤ 0,20 mg/dm²**	**DN10 to DN28 TC MAX ≤ 0,10 mg/dm²**	**DN10 to DN22 TC MAX ≤ 0,06 mg/dm²**
WIELAND-WERKE AG SANCO	DN10 to DN22 TC MAX ≤ 0,10 mg/dm² DN28 to DN42 TC MAX ≤ 0,20 mg/dm²	DN12 to DN28 TC MAX ≤ 0,10 mg/dm²	DN10 to DN22 TC MAX ≤ 0,06 mg/dm²
TREFIMETAUX SAS SCUDO	DN10 to DN22 TC MAX ≤ 0,10 mg/dm² DN28 TC MAX ≤ 0,20 mg/dm²	DN12 to DN28 TC MAX ≤ 0,10 mg/dm²	DN10 to DN22 TC MAX ≤ 0,06 mg/dm²

*** according to official site of the NF mark, 30/03/2020 (http://cdn.afnor.org/download/produits/FR/NF090.pdf), TC MAX = Maximum carbon content**

Halcor is the copper tubes division of ElvalHalcor and together with four more companies form the copper segment of ElvalHalcor that specializes in the production, processing and marketing of copper and copper alloys products with dynamic commercial presence in the European and global markets. For more than 80 years, Halcor has been offering innovative and added-value solutions that meet contemporary client demands in fields, such as plumbing, HVAC&R, renewable energy, architecture, engineering and industrial production.