



HALCOR

TALOS[®]
ACR DUAL



In the manufacture of components for Heating, Ventilation, Air-Conditioning and Refrigeration (HVACR) applications, copper tubing has been a choice of preference proven through time. Based upon this success story, HALCOR is reinventing the use of copper material in HVACR tubing with the help of a novel production technology that retains the advantages of copper while at the same time achieving product differentiation and competitive market prices. TALOS DUAL tubes are innovatively engineered to provide optimized solutions by combining the strength and reliability of copper with the competitiveness and weight benefits of aluminum.

PRODUCT DESCRIPTION

TALOS DUAL tubes consist of two seamless metallic layers, an inside layer made from copper and an outside layer made from aluminum. The two layers are unified by strong metallurgical bonds between the copper and the aluminum. This fundamental material unification enables the TALOS DUAL tube to behave like a seamless homogeneous tube, exhibiting however unique properties that originate from its constituents.

The advantageous characteristics of each of the two constituent materials are unified into the TALOS DUAL tubes. The inside layer of TALOS DUAL made from copper, provides high strength, durability and excellent corrosion resistance, and ensures the compatibility with copper-based HVACR systems by being connected with copper tubing or other elements made from copper and copper-alloys (e.g. brass). At the same time, the outside layer of TALOS DUAL made from aluminium, contributes in the strength resistance of the tube and offers price and weight reductions. When TALOS DUAL is joined externally with other aluminium elements, as for example with the aluminium fins of a heat-exchanger coil, or the aluminium absorber sheet of a solar collector, the external layer of aluminium enables an optimum material combination.

APPLICATIONS

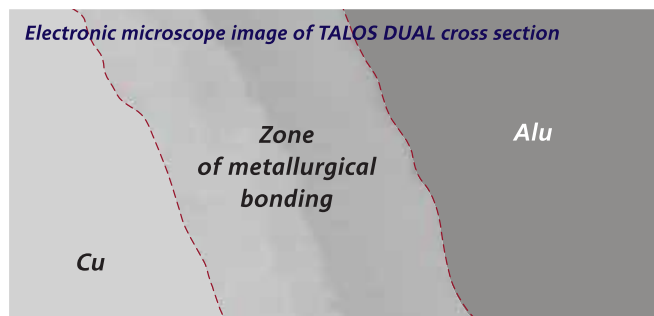
TALOS DUAL tubes are supplied in standard sizes used in the HVACR industry or in customised sizes for OEM applications that require a "tailor-made" combination of properties like pressure resistance, flexibility, heat conductivity, weight per meter etc. TALOS DUAL may be processed using methods and tooling similar to copper tubes (e.g. cutting, expanding, bending, etc.) at the same levels of high productivity.

MATERIAL

- High Purity Copper (with a minimum 99.9% copper content)
- Aluminum or Aluminum Alloy (with a minimum 99.7% aluminum content)

ADVANTAGES

- Retention of the advantageous properties of copper
- Lower total price compared to copper (per meter)
- Reduced weight per meter
- Product can be optimally tailored-made
- Balanced material combination within HVACR systems
- and components



TALOS DUAL fulfils the pressure requirements of HVACR systems operating with the latest generation of HFC refrigerants (e.g. R410A) and exceeds the safety factors for pressure prescribed by industry standards (e.g. EN-378):

TALOS DUAL Installation Tubes	Max. Working Pressure	Ultimate Pressure Strength	Expansion
1/4" x 0.80mm	55 Bar (800psi)	> 3.5 x Max. Working Pressure	> 40%
3/8" x 0.80mm	55 Bar (800psi)	> 3.5 x Max. Working Pressure	> 40%
1/2" x 1.00mm	55 Bar (800psi)	> 3.5 x Max. Working Pressure	> 40%
5/8" x 1.25mm	55 Bar (800psi)	> 3.5 x Max. Working Pressure	> 40%



TALOS DUAL tubes may be joined with copper tubes and other copper elements (e.g. copper return bends in heat exchangers) by expanding the tube end and exposing the internal copper layer of TALOS DUAL for a copper-to-copper contact. Direct connection between two TALOS DUAL tubes may be performed by expanding one end and inserting the other. In such cases, only ZnAl brazing alloy shall be used and a copper-to-aluminum joint is established.

Commercially available silver-bearing solders for HVACR applications may be used, together with a suitable flux, to produce a copper-to-copper joint and maintain the copper continuity inside the network of tubes and system components. Silver-bearing solders have a history of use throughout the HVACR industry worldwide due to their versatility, ductility and strength. Since soldering requires low thermal energy input, it does not affect the parts in the joint and so preserves the unique properties of TALOS DUAL. Alternatively, Zinc/Aluminum brazing alloys may be used for joining TALOS DUAL to copper or TALOS DUAL to aluminium. Zinc/Aluminum alloys have been developed for use in the refrigeration and A/C industry for joining copper to aluminium. Depending on the particular connection and the application requirements, different alloys are recommended:

Alloy	Type	Composition	Melting Temperature Range	Joint
Sn96Ag4	Solder	96% Sn, 4% Ag	221-225 °C	Cu-Cu
Sn95Ag5	Solder	95% Sn, 5% Ag	221-245 °C	Cu-Cu
Sn94Ag6	Solder	94% Sn, 6% Ag	221-260 °C	Cu-Cu
Sn97Cu3	Solder	97% Sn, 3% Cu	227-310 °C	Cu-Cu
Zn98Al2	Brazing	98% Zn, 2% Al	380-405°C	Cu-Cu,Cu-Alu
Zn85Al15	Brazing	85% Zn, 15% Al	380-450°C	Cu-Cu,Cu-Alu
Zn78Al22	Brazing	78% Zn, 22% Al	420-460°C	Cu-Cu,Cu-Alu

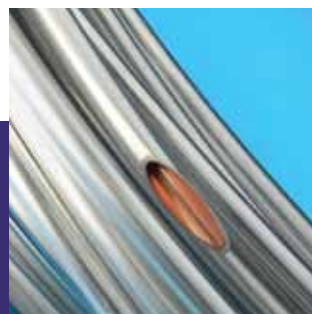
All of the above alloys required the use of an appropriate flux.

TALOS DUAL tubes are supplied depending on the application in either PNC coils, LWC coils or straight lengths, with smooth or grooved inner surface, plain or pre-insulated on the exterior with a high-performance thermal insulation made from cross-linked polyethylene (PEX) foam.

PRODUCT SPECIFICATIONS

- Company standard TB 01

The TALOS DUAL tube range for ACR installations is currently under approval by the German TÜV certification body (Ref. No: 1326W151500_R1).



AVAILABILITY

PNC Coils	10 - 50m
LWC Coils	50 - 300kg
Straight Lengths	0.30 - 6.0m

SIZES

	Installation Tubes	OEM Applications
Outside diameter	1/4", 3/8", 1/2" and 5/8"	from 6mm to 20mm
Wall thickness	0.80 - 1.25mm	0.30 - 1.50mm

PACKAGING

PNC Coils	In protecting carton boxes on wooden pallet
LWC Coils	On wooden pallet with cardboard inserts and protective film
Straight Lengths	Bundles wrapped with protective film in wooden boxes

INSULATION TECHNICAL PROPERTIES

Material	PE-X foam
Density ACC. TO DIN 53420 ASTM D 1667	30-33 Kg/m3
Thermal Conductivity Coefficient (λ) ACC. TO ASTM C 335	0,035 W/m.K
Vapour-water Diffussion Resistance Coefficient (μ) ACC. TO DIN 52615	> 9.000
Working Temperature	-80°C to +110°C
Fire Resistance	EN 13501-1 CLASS E, DIN 4102 B2, BS 476, NF P 92 501-M1
Resistance To Chemical Agents ACC. to ASTM 543-56 T	Very Good
Sound Absorption ACC. TO DIN 4109 300- 2500Hz	~60%

Values are listed, as obtained under standard laboratory conditions and may be amended, without prior notice.

TALOS DUAL is the optimum solution for connecting split-type air-conditioning units because it is designed to retain the copper advantages. The internal layer of TALOS DUAL made from high purity copper and of high surface cleanness acc.to EN-12735, conveys the refrigerant through the network of copper tubes in the system. Because the inside copper layer comes into contact with the brass connection fittings, the internal copper continuity of the A/C system is retained. For the external protection of the connection, the TALOS DUAL tube is complemented with two alternative systems; an application-specific heat-shrinkable jacket, or a purpose-made brass flare nut:



* The heat-shrinkable jacket is used together with the standardized flare nut that is fitted on the A/C units. The jacket covers externally the joint and has an internal adhesive coating that, when heated, melts and flows to form a positive environmental seal.

The coating adheres to the outer layer of TALOS DUAL, as well as, the brass flare nut, creating a durable barrier to moisture penetration. The durable protection of the jacket has been proven by accelerated corrosion testing in salt-fog chamber following the industry standard ASTM B-117 test procedure. This specific type of jacket is supplied by HALCOR in packaged ready-to-use pre-cut lengths.



* The specially-designed flare nut is used as a replacement of the standardized flare nut that is fitted on the A/C units. The nut consists of a brass body with an integrated polymeric adapter and an elastomeric O-ring seal. The design of the flare nut isolates the brass and aluminium materials and thus protects the connection against the external environment, as proven by accelerated corrosion testing in salt-fog chamber according to ASTM B-117. This purpose-made flare nut is supplied by HALCOR for each size of TALOS DUAL tube, and is also compatible with standardized copper tubes.



is also compatible with standardized copper tubes.

Both connecting proposals for installing TALOS DUAL to A/C systems ensure a long-term durability of the connection. The choice is up to the installer, if he prefers to keep the flare nut provided with the system and apply the heat-shrinkable jacket, or to use the replacement flare nut provided by HALCOR instead. The final result is an inner copper system with additional external protection.

1. Installation directions with standardized flare nut.



1. Deburring



2. Position of jacket and standardized flare nut



3. Flaring



4. Inspection



5. Installation of standardized flare nut (tightening torque acc. to A/C unit manual)



6. Heat application



7. Completed connection

2. Installation directions with specially-designed flare nut.



1. Deburring



2. Position of TALOS DUAL flare nut



3. Flaring



4. Inspection



5. Installation of TALOS DUAL flare nut (tightening torque acc. to A/C unit manual)



6. Completed connection

HALCOR is a large-scale modern industrial company with over sixty years of expertise in metal processing. It holds a significant position in European and global markets, with five modern plants, four in Greece and one in Bulgaria.

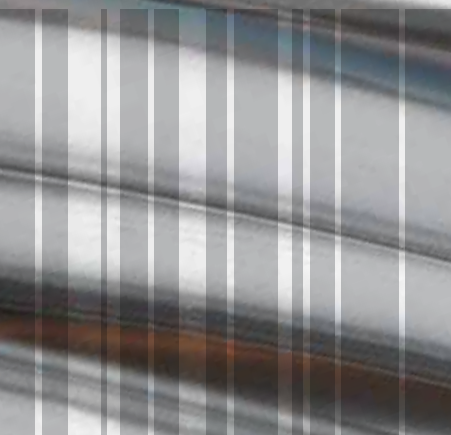
The company is dedicated to achieving high quality. It has ISO 9001 certification, uses state-of-the-art technology and employs highly skilled personnel. Substantial, continuous investment in research and knowhow development allows the company to create innovative new products, which support its aim of being a market leader.

At the same time, HALCOR is committed to sustained development and environmental protection. As such, its production processes are regulated by an ISO 14001 certified Environmental Management System.

Aiming at the total satisfaction of all of its customers' needs, the company focuses on responding reliably and rapidly to demand. It provides exceptional support for its products, which are distributed to more than fifty countries worldwide. HALCOR combines size, strength and technology to achieve its overall vision of putting metals at man's disposal.



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