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Protective Coating – Corrosion Protection

Code: 2012 Fuel Gas Code **Date:** August 20, 2019
Section: 403.8
Code: 2018 Residential Code
Section: G2414.8

Question:
Is copper alloy piping, or other metal piping exempt from the corrosion protection requirements of 403.8[i]?

Answer:
No.

First, refer to the following code sections for related prescriptive methods in certain locations:

- NC FGC Section 404.4 for protective sleeve requirements of gas piping through a foundation wall below grade. Also see:

- NC FGC Section 404.7 for metal piping passing through an outside wall and ferrous metal installed outdoors.

Section 403.8 is broader in context and could mean passing through any wall or being in any corrosive environment.

Although corrosion resistant, there are building materials that are corrosive to copper and copper alloys and other metal piping and there will be instances where physical separation and/or corrosion protection coatings are required to prevent corrosion. NC Code officials have witnessed instances of metallic piping failing from corrosion much sooner than the anticipated life of the material.[ii]

However, this is a performance code section[1]. Other than 404.4 and 404.7, there are no prescriptive examples provided for which materials are corrosive to the metal piping or what level of protection is required. Therefore, the responsibility for understanding the sources of corrosion and subsequent protection are the responsibility of the design professional or installing

[1] The NC FGC has provided a prescriptive means of protection, see NCFGC Section 404.7, for minimal protection of ferrous metal gas piping, and galvanized piping requirements for corrosion protection requirements.

contractor. Bear in mind, the materials causing corrosion[2] may be a building material unrelated to the piping itself other than being in contact with the piping.

In the event of fuel gas piping failure, the respective licensing boards of the design professional or contracting board can determine the adequacy of the installation and if any remedy is warranted.

Informational Sources
A suggested source for copper alloy compatibilities is:

https://www.copper.org/resources/properties/protection/

The Copper Alloys Properties Database at the preceding link is an interactive database that provides the use with the properties of 24 copper and copper alloys against 185 environments with alloy-environment combinations being rated from "Not Acceptable" to "Excellent" along with short comments expanding upon the ratings.

Considerable knowledge of the alloy and the potential corrosion source at the elemental level is required to use this database. Consultation with the copper tubing manufacturer and/or the material manufacturer in contact with the copper may be the most practical way to determine any corrosion protection requirements. This database link is provided for informational purposes only.

Keywords:
bronze

[i] **403.8 Protective coating.** Where in contact with material or atmosphere exerting a corrosive action, metallic *piping* and fittings coated with a corrosion-resistant material shall be used. External or internal coatings or linings used on *piping* or components shall not be considered as adding strength.

[ii] The code official is not expected to have the laboratory means required to determine the exact cause of failure.

[2] Common materials include certain treated wood formulae, mortar or concrete mix with fly-ash cinders, and, for copper alloy piping, ammonia-containing materials or environment.