UMC TIA 001-21

UNIFORM MECHANICAL CODE TIA FORM – 2021

Reference Code Section: Section 1109.2, Section 1109.7, Table 1701.1

Submitter Name: Donald J Berger
Company: National ITC Corporation
Address: 2540 Severn Ave., Suite 200, Metairie, LA 70002
Phone number: 888-234-6834

Proposed language for TIA:

1. Revise Section 1109.2 to read as follows:

1109.2 Joints. Iron or steel pipe joints shall be of approved threaded, flanged, or welded types. Exposed threads shall be tinned or coated with an approved corrosion inhibitor. Copper or copper alloy pipe joints of iron pipe size shall be of approved threaded, flanged, ~~press-connect~~ or brazed types. Copper tubing joints and connections shall be connected by approved flared, lapped, swaged, ~~or~~ brazed joints~~,~~ or soldered joints~~, or mechanical joints that comply with UL 207 either individually or as part of an assembly or a system by an approved nationally recognized laboratory~~. Piping and tubing shall be installed so as to prevent vibration and strains at joints and connections.

2. Delete text from Section 1109.7 to read as follows:

1109.7 Pipe Enclosure. Refrigerant piping and tubing shall be installed so that it is not subject to damage from an external source. Soft annealed copper tubing shall not exceed 1 3/8 inches (35 mm) nominal size. Mechanical joints~~, other than approved press-connect joints,~~ shall not be made on tubing exceeding ¾ of an inch (20 mm) nominal size. Soft annealed copper tubing conveying refrigerant shall be enclosed in iron or steel piping and fittings, or in conduit, molding, or raceway that will protect the tubing against mechanical injury from an exterior source.

Exceptions:

(1) Tubing entirely within or tubing within 5 feet (1524 mm) of a refrigerant compressor where so located that it is not subject to external injury.

(2) Copper tubing serving a dwelling unit, where such tubing contains Group A1 refrigerant and is placed in locations not subject to damage from an external source.

3. Delete text from Table 1701.1 (Referenced Standards) as follows:

TABLE 1701.1
REFERENCED STANDARDS

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTION
~~UL 207-2009~~	~~Refrigerant-Containing Components and Accessories, Nonelectrical (with revisions through June 27, 2014)~~	~~Refrigeration Components~~	~~1109.2~~

(portions of table not shown remain unchanged)

Substantiation:

Technical Merit:
The UL 207-2009 Refrigerant-Containing Components and Accessories, Nonelectrical (with revisions through June 27, 2014) is the referenced standard in Table 1701.1 of the UMC 2021 for mechanical joints complying with UL 207, as identified in Section 1109.2. The scope of the referenced UL 207-2009 Refrigerant-Containing Components and Accessories, Nonelectrical (with revisions through June 27, 2014) clearly states in Section 1.2 "These requirements do not apply to: a) Electric valves and electric refrigeration controllers, hermetic refrigerant motor-compressors, **tubing fittings such as flare or compression type fittings, and the like, which are covered in or as part of separate, individual requirements."**

As the scope of the referenced UL 207-2009 (with revisions through June 27, 2014) excludes tubing fittings from the standard, the UL 207-2009 (with revisions through June 27, 2014) standard should be removed from the UMC 2021 Table 1701.1 as a referenced standard for any and all mechanical joints as identified in Section 1109.2.

Although tubing fittings are excluded from the scope of the UL 207-2009, terminology for joints and fittings are included in the UL 207-2009 in regard to the design, construction, and testing of refrigerant containing component assemblies and accessories, as the joints and fittings are integral parts of such components. The type of joints identified in the UL 207-2009 are brazed, mechanical, soldered, and welded; all of which are **defined in the UL 207-2009 to be gastight joints obtained by the joining of metal parts**. The solder joining requiring a joining temperature above 400 °F but not exceeding 800 °F, while the braze joining requires a minimum joining temperature of 800 °F. However, the UL 207-2009 (with revisions through June 27, 2014) does not include the terms of press-connect joint, press-connect fitting, or O-ring anywhere in the standard. As there is no existing terminology for press-connect fittings or any fitting that relies upon an O-ring for a seal in the UL 207-2009 (with revisions through June 27, 2014), it should be noted that the UL 207-2009 (with revisions through June 27, 2014) should have never been referenced for such fittings and shall be removed as a referenced standard in Section 1109.2 of the UMC-2021.

The word "press-connect," where listed in Section 1109.2 as an approved joint type for use on copper and copper alloy pipe of iron pipe size, shall be deleted, as no established standard exist for the design, construction, or testing of press-connect connections for use on copper and copper alloy pipe of iron pipe size for refrigeration applications.

Approved flare joints and connections shall remain in Section 1109.2, as long standing established standards do exist for such mechanical joints and connections as referenced in the UMC-2021, Table 1701.1.

The words, "other than approved press-connect joints" shall be deleted from Section 1109.7 as Section 1109.2 does not list press-connect as an approved mechanical joint or connection for use on tubing, and the UL 207-2009 (with revisions through June 27, 2014) has been substantiated as the incorrect referenced standard for such joints or connections as referenced in the UMC-2021, Section 1109.2.

UMC TIA 001-21

UMC-2021 Section 1109.1 requires refrigeration piping shall be metallic. Section 1109.1.1 requires that copper and copper alloy refrigeration piping shall comply with ASME B31.5-2016 as referenced in UMC 2021 Table 1701.1. The ASME B31.5-2016 defines a mechanical joint as "a joint obtained by joining of metal parts through a positive holding mechanical construction" and defines piping as "the pipe and tube for interconnecting the various parts of the refrigeration system, which includes pipe, tube, flanges, bolting, gaskets, valves, and fittings…."

The ASME B31.5-2016, Section 515.2 requires that piping joints with applicable standards may be used within the limitations of applicable standards or specifications listed in Table 526.1 with two additional requirements for suitability and applicability limitations. ASME B31.5-2016 Section 515.3 requires piping joints without applicable standards as listed in Table 526.1, that "the engineer shall determine that the type of fittings selected is adequate and safe for the design conditions" and that it meets the additional requirements of Section 515.2 of the ASME B31.5-2016. This requirement would theoretically render any joining system that does not have established standards to be an "engineered joining system."

In consideration of the substantiation provided, only pipe or tube joint types that have an established standard as listed in ASME B31.5-2016 Table 526.1 and are in full compliance with ASME B31.5-2016, Section 515.2, and are of full metallic construction, shall be listed in UMC-2021, Section 1109.2 for use on refrigerant piping systems.

Emergency nature:
The allowance for the use of press-connect connections as mechanical joints complying with UL 207-2009 (with revisions through June 27, 2014) on refrigeration piping systems in the UMC-2021 poses the potential of compromised refrigeration piping systems due to the lack of an established referenced standard for the design, construction, and testing of such fittings employing a non-metallic sealing mechanism for use on refrigeration piping systems.

As the submitted substantiation establishes refrigeration piping systems must comply with ASME B31.5-2016 and that UMC-2021, Section 1109.1 requires refrigeration piping shall be metallic, the potential for catastrophic failure exist, thereby posing a safety and health risk to the public.

Submitter signature (required):  Date: 9·20·2021

Mail to: Codes Department · IAPMO · 4755 E. Philadelphia Street · Ontario · CA · 91761-2816
FAX: 909-472-4246