15-DAY EXPRESS TERMS
FOR
PROPOSED BUILDING STANDARDS
OF THE
DIVISION OF THE STATE ARCHITECT - STRUCTURAL SAFETY (DSA-SS)

REGARDING THE ADOPTION BY REFERENCE OF THE
2009 EDITION OF THE UNIFORM MECHANICAL CODE (UMC)
INTO THE CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 4

Modifications to the express terms dated June 1, 2009 (as shown for the 45 day public comment period ending October 12, 2009) are indicated as follows:

1. New California amendment: All such language appears in *double underlined and in Italics*.
2. Repealed text: All such language appears in ~~double strikeout~~.

CHAPTER 2
DEFINITIONS

…

209 -G-

GALVANIZED STEEL – Any steel conforming to the requirements of ~~UMC Standard No. 2-2~~ *ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coat (Galvanized) or Zinc-Iron Alloy-Coat (Galvanized) by the Hot Dip Process*.

…

Specific Purpose and Rationale:
See purpose and rationale statements provided in Chapter 6 below.

CHAPTER 5
EXHAUST SYSTEMS

506.2 Construction. Ducts used for conveying products shall be of substantial airtight construction and shall not have openings other than those required for operation and maintenance of the system. Ducts constructed of steel shall comply with Table 5-5 or 5-6.

Exceptions:
(1) Class 1 product-conveying ducts that operate at less than four (4) inches (102 mm) water column (995.6 Pa) negative pressure and convey noncorrosive, nonflammable, and nonexplosive materials at temperatures not exceeding 250°F (121°C) may be constructed in accordance ~~with Tables 6-1, 6-2, 6-3, 6-4, 6-5, 6-7, 6-8, or, with prior approval, UMC Standard No. 6-2~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*.

(2) Ducts used in central vacuuming systems within a dwelling unit shall be constructed of materials in compliance with the applicable standards referenced in Chapter 17. Penetrations of fire-resistive walls, or floor-ceiling or roof-ceiling assemblies shall comply with the Building Code. Copper or ferrous pipes or conduit extending from within the separation between a garage and dwelling unit to the central vacuum unit may be used.

The use of rectangular ducts conveying particulates shall be subject to approval of the building official. The design of rectangular ducts shall consider the adhesiveness and buildup of products being conveyed within the duct.

Aluminum construction may be used in Class 1 duct systems only. The thickness of aluminum ducts shall be at least two Brown and Sharpe gauges thicker than the gauges required for steel ducts set forth in Tables 5-5 and 5-6.

Specific Purpose and Rationale:
See purpose and rationale statements provided in Chapter 6 below.

CHAPTER 6
DUCT SYSTEMS

...

601.3 *The performance criteria and requirements herein contemplate a duct that is a structural assembly having the capacity to support occupant health and safety while minimizing its own contribution to property damage under emergency conditions. Ducts can supply fresh or treated air in support of life and health, can convey products of combustion away from a fire zone, can maintain a pressure differential that facilitates evacuation and reduces the spread of fire and smoke, and can facilitate firefighter access to a fire source.*

602.1 General. Supply air, return air, and outside air for heating, cooling, or evaporative cooling systems shall be conducted through duct systems constructed of metal as set forth in the ~~Tables 6-1, 6-2, 6-3, 6-1, 6-7, 6-8, 6-9, and 6-10, or metal ducts complying with UMC Standard No. 6-2 or the referenced HVAC duct construction standard 2 or the referenced HVAC duct construction standard in Chapter 17~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*. Rectangular ducts in excess of two (2) inches w.g. shall comply with ~~UMC Standard No. 6-2 or the referenced HVAC duct construction standard in Chapter 17~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*. Ducts, plenums, and fittings may be constructed of concrete, clay, or ceramics when installed in the ground or in a concrete slab, provided the joints are tightly sealed.
...

602.3 Factory-Made Air Ducts. Factory-made air ducts shall be approved for the use intended or shall conform to the requirements of the referenced standard for air ducts in Chapter 17. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other suitable identification indicating compliance with the referenced standard for air ducts in Chapter 17 and its class designation. These ducts shall be listed and shall be installed in accordance with the terms of their listing ~~and the requirements of UMC Standard No. 6-5~~. Flexible air connectors are not permitted

602.4 Joints and Seams of Ducts. Joints of duct systems shall be made substantially air-tight by means of tapes, mastics, gasketing, or other means.

Crimp joints for round ducts shall have a contact lap of at least 1-1/2 inch (38 mm) and shall be mechanically fastened by means of at least three (3) sheet-metal screws equally spaced around the joint, or an equivalent fastening method.

Joints and seams for 0.016 inch (0.41 mm) (No. 28 gauge) and 0.013 inch (0.33 mm) (No. 30 gauge) residential rectangular ducts shall be as specified in ~~Table 6-1~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard* for 0.019 inch (0.48 mm) (No. 26 gauge) material.

Joints and seams for rectangular duct systems shall be as specified in ~~Table 6-1~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*.

Joints and seams for flat oval ducts and round ducts in other than single-dwelling units shall be as specified in ~~Table 6-8~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*. Joints and seams and all reinforcements for factory-made air ducts and plenums shall meet with the conditions of prior approval in accordance with the installation instructions that shall accompany the product. Closure systems for rigid air ducts and plenums shall be listed in accordance with UL 181A, *Standard for Closure Systems for Use with Rigid Air Ducts and Air Connectors*. Closure systems for flexible air ducts shall be listed in accordance with UL 181B, *Standard for Closure Systems for Use with Flexible Air Ducts and Air Connectors*.

602.5 Metal. Every duct, plenum, or fitting of metal shall comply with ~~Table 6-1 or 6-8~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*.

~~**Exceptions:**~~
~~(1) Ducts, plenums, and fittings for systems serving single-dwelling units may comply with Table 6-9.~~

~~(2) Duct systems complying with UMC Standard No. 6-2 or the referenced HVAC duct construction standard in Chapter 17, with prior approval, or duct systems complying with UL 181, *Standard for Factory-Made Air Ducts and Air Connectors*.~~
~~(3) Duct systems complying with the UMC Standard No. 6-2 or the referenced HVAC duct construction standard in Chapter 17, with prior approval.~~

602.6 Tin. Existing tin ducts may be used when cooling coils are added to a heating system, provided the first ten (10) feet (3,048 mm) of the duct or plenum measured from the cooling coil discharge are constructed of metal of the gauge thickness set forth in ~~Tables 6-1, 6-8, or 6-9 of this chapter~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard* or are of approved material and construction. Tin ducts completely enclosed in inaccessible concealed areas need not be replaced. All accessible ducts shall be insulated to comply with ~~Table 6-6 of this chapter~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*. For the purpose of this subsection, ducts shall be considered accessible where the access space is thirty (30) inches (762 mm) or greater in height.

603.0 Quality of Material. Galvanized steel shall be of lock-forming quality with a minimum coating of 1.25 ounces of zinc per square foot (0.04 kg/m3) conforming to the requirements of ~~UMC Standard No. 2-2~~ *ASTM A653/A653M-03 Standard Specification for Steel Sheet, Zinc-Coat (Galvanized) or Zinc-Iron Alloy-Coat (Galvanized) by the Hot Dip Process*.

604.2 Metal Ducts. Ducts shall be securely fastened in place at each change of direction and as set forth in ~~Table 6-7~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*. Vertical rectangular ducts and vertical round ducts shall be supported as set forth in ~~Table 6-7, Part A~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*. Riser ducts shall be held in place by means of metal straps or angles and channels to secure the riser to the structure.

Metal ducts shall be installed with at least four (4) inches (102 mm) separation from earth. Metal ducts when installed in or under a concrete slab shall be encased in at least two (2) inches (51 mm) of concrete.

Ducts shall be installed in a building with adequate clearance so as to permit retaining the full thickness of fireproofing on structural members.

Supports for rectangular ducts as set forth in ~~Table 6-7~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*, when suspended from above, shall be installed on two opposite sides of each duct and shall be riveted, bolted, or metal screwed to each side of the duct at not more than the intervals specified.

Horizontal round ducts forty (40) inches (1,016 mm) or less in diameter when suspended from above shall be supported at intervals not more than as set forth in ~~Table 6-7~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard* with one hanger installed to comply with the requirements listed below:

604.5 Support of Ducts. Installers shall provide the manufacturer's field fabrication and installation instructions.

In the absence of specific supporting materials and spacing, approved factory-made air ducts may be installed as set forth in ~~Table 6-10~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*.

605.0 Insulation of Ducts.
Supply-, return-air ducts and plenums of a heating or cooling system shall be insulated to achieve the minimum thermal (R) value as set forth in ~~Tables 6-6-A and B~~ *SMACNA/ANSI 006-2006 HVAC Duct Construction Standards - Metal and Flexible or another approved duct construction standard*.

…

[DELETE TABLES 6-1 through 6-10]

~~**TABLE 6-1 Duct Construction for 4 Feet Duct Lengths**~~
~~**[SMACNA HVAC Duct Construction Standards; Second Edition – 1995]**~~

~~**TABLE 6-2 Duct Construction for 5 Feet Duct Lengths**~~

~~[SMACNA HVAC Duct Construction Standards; Second Edition - 1995]~~

~~TABLE 6-3~~
~~THICKNESS ADJUSTMENTS~~

~~TABLE 6-4~~
~~DIMENSION ADJUSTMENTS~~

~~TABLE 6-5~~
~~REINFORCEMENTS~~

~~TABLE 6-6-A (I-P Units)~~
~~Minimum Duct Insulation R-Valuea Cooling and Heating Only Supply Ducts and Return Ductsd, e~~

~~TABLE 6-6-B (I-P Units)~~
~~Minimum Duct Insulation R-Valuea Combined Heating and Cooling Ductsd, e~~

~~TABLE 6-7~~
~~Duct Support~~

~~TABLE 6-8~~
~~Construction Details for Round and Flat Oval Ducts~~

~~TABLE 6-9~~
~~Thickness of Metal Ducts and Plenums Used for Heating or Cooling for a Single Dwelling Unit~~

~~TABLE 6-10~~
~~Alternate Supports for Factory-Made Air Ducts~~

Specific Purpose and Rationale:

The 2009 UMC refers to an outdated SMACNA duct construction standard (1995 version), and includes tables, and an Appendix extracted from this now outdated standard. SMACNA updated this standard in 2006, and it is now ANSI approved, entitled "ANSI/SMACNA 006-2006 HVAC Duct Construction Standards - Metal and Flexible." However, the updated standard was published after the deadline for submitting code proposals for the 2009 UMC, resulting in its omission. IAPMO is of in the process of updating this reference, but will not complete this process prior to the adoption of the 2010 California Mechanical Code.

The outdated reference, out of date tables and Appendix create conflict between code enforcement agencies, contractors and design engineering firms. HVAC contractors and design firms are currently using the 2006 version of SMACNA in their system duct design. Moreover, the 1995 version *is no longer published or available.*

In addition, the 2009 UMC, Chapter 17, Standards Table 17-1 only lists the updated 2006 SMACNA standard and does not list the outdated 1995 version referenced in the text of the code. This creates both confusion and a potential for conflict. The data within the SMACNA standard has been tested and promulgated through a consensus based process and should only be used in whole. Continued use of outdated partial extracts in the UMC will create confusion and inconsistency.

Finally, the ANSI/SMACNA 006-2006 HVAC Duct Construction Standards - Metal and Flexible are already referenced in the other major industry HVAC documents, including:

- ASHRAE Standard 62.1
- ASHRAE Fundamentals Handbook
- National Fire Protection Association 90A, 90B, 96
- US Army Corp of Engineers
- International Mechanical Code
- International Energy Conservation Code

By adopting the 2006 SMACNA HVAC Duct Construction Standards into the 2010 California Mechanical Code, the State will ensure consistency with these other industry documents. In addition, much of the Federal stimulus money for energy efficiency requires the use of the most updated energy efficiency standards. The use of the outdated 1995 SMACNA HVAC Duct Construction Standards could potentially conflict with some of these requirements.

The proposal does the following:

- Moves the definition for the scope of this section that was contained in Appendix A (A6.201) to the body of the code in Section 601.0.
- Amends Section 602.1 to replace the references to the outdated extracts of the 1995 SMACNA HVAC Duct Construction Standards with a reference to the 2006 SMACNA HVAC Duct Construction Standards.
- Updates the Standards listed in Chapter 17. 2009 UMC incorrectly identifies the 2006 SMACNA HVAC Duct Construction Standards as a "2005" standard.
- Eliminates Tables 6.1 through 6.10, which contain outdated extracts from the 1995 SMACNA HVAC Duct Construction Standards.
- Eliminates Appendix A, which contains simplified and outdated extracts from the 1995 SMACNA HVAC Duct Construction Standards. (Except for Section 6.201 - Scope, which will be moved to the body of the code in Section 601.0).

By simply referencing the 2006 ANSI/SMACNA HVAC Duct Construction Standards and not replacing the deleted tables and Appendix A, the Code will be simplified and will eliminate confusion and conflict. The new standards are more complex and involved than the 1995 standards. As a result, including selected or simplified extracts within the code may lead to inaccuracies and misapplication of the standard.

CHAPTER 17
STANDARDS

Part I – Standards Adopted as Part of This Code.

~~**UMC Standard 2-2**~~
~~UMC Section 209.0, 603.~~
~~Title and Source: Galvanized Sheet Metals.~~
~~This test Standard has been deleted from the UMC. The tentative Specification A525-64T of the American Society for Testing and Materials has been withdrawn and replaced by A653 / A653-03 Standard Specification for Steel Sheet, Zinc-Coat (Galvanized) or Zinc-Iron Alloy-Coat (Galvanized) by the Hot-Dip Process.~~

~~**UMC Standard 6-2**~~
~~UMC Section 506.2, 602.1, 602.5~~
~~Title and Source: *Metal Ducts, First Edition, 1985 HVAC Duct Construction Standards, Metal and Flexible*, published by the Sheet Metal and Air Conditioning Contractors National Association.~~

~~**UMC Standard 6-5**~~
~~UMC Section 602.3~~
~~Title and Source: *Installation of Factory Made Air Ducts, Fibrous Glass Duct Construction Standards*, published by the North America Insulation Manufacturers Association; and *Flexible Duct Performance and Installation Standards* – 4th Edition published by the Air Diffusion Council.~~

CHAPTER 17
STANDARDS TABLE 17-1
Standards for Equipment and Materials

~~SMACNA-2005~~ ANSI/SMACNA 006-2006	HVAC Duct Construction Standards Metal and Flexible 3rd edition	Ducts, Metal and Flexible	506.2, 602.1, *602.4, 602.5, 602.6, 604.2 604.5 and 605.0* ~~Tables 6-1 and 6-2~~

Specific Purpose and Rationale:

See purpose and rationale statements provided in Chapter 6 above.

[DO NOT ADOPT APPENDIX A]

~~**APPENDIX A**~~
~~**UNIFORM MECHANICAL CODE STANDARD NO. 2-2**~~
~~**STANDARD FOR GALVANIZED SHEET METALS**~~

~~**APPENDIX A**~~
~~**UNIFORM MECHANICAL CODE STANDARD NO. 6-2**~~
~~**STANDARD FOR METAL DUCTS**~~

~~**APPENDIX A**~~
~~**UNIFORM MECHANICAL CODE STANDARD NO. 6-5**~~
~~**STANDARD FOR INSTALLATION OF FACTORY-MADE AIR DUCTS**~~

Specific Purpose and Rationale:
See purpose and rationale statements provided in Chapter 6 above.