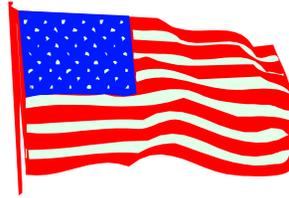


**CALIFORNIA BUILDING STANDARDS COMMISSION**

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Sacramento, CA 95833-2936  
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**This document is the**

**October 1, 2002 Errata**

**To The**

**2001 Edition of the California Code of Regulations  
Title 24, Part 4**

**The California Mechanical Code**

**Should you decide to print these 64 pages, we strongly suggest that you do so on buff colored paper so that you will quickly recognize them as errata pages.**

**This page and the next "cover page" are single sided. Thereafter, all pages are double sided for placement into your copy of the 2001 California Mechanical Code.**

**Sorry, we cannot provide a seven-hole punch for your pages.**

**California Mechanical Code  
(Part 4, Title 24, California Code of Regulations)**

**October 1, 2002 Errata**

It is suggested that the section number as well as the page number be checked when inserting this material and removing the superseded material. In case of doubt, rely on the section numbers rather than the page numbers since the section numbers must run consecutively.

It is further suggested that the superseded material be retained with this revision record sheet so that the prior wording of any section can be easily ascertained.

Please keep the removed pages with this revision record for future reference.

**Remove Old White Pages**

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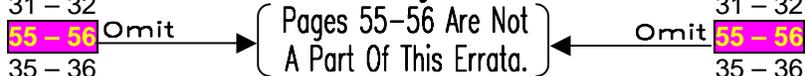
History Note Appendix

**Insert New Buff Colored Pages**

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History Note Appendix

Some Printed Cover Pages Contain An Error.



**Adopts only those section which are listed below:**

If there is an "X" under a particular state agency's acronym on this row, it means that particular state agency is adopting only specific model code or state-amended sections within this chapter. There will be an "X" in the column under the agency's acronym, as well as an "X" by each section that the agency has adopted.

**Example:**

**CHAPTER 2 — DEFINITIONS**

ENFORCING AUTHORITY		LOCAL BUILDING OFFICIAL				LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCY											
ADOPTING AGENCY		CA	HCD			DSA AC	SFM	DHS	AGR	BOC	BSC	CA SPCB	DSA SS	OSHPD				* DOSH	SL
Adopt only those sections which are listed below		1/AC	1	2									1	2	3	4			
202.0	CA	X	X	X	X	X	X						X	X	X	X			
202.0	UPC					X	X					X							

**Legend of Abbreviations of Adopting State Agencies**

- CA Department of Consumer Affairs:
  - Board of Barbering and Cosmetology
  - Board of Veterinary Medicine Examiners
  - Board of Pharmacy
  - Acupuncture Examining Committee
  - Bureau of Home Furnishings
- HCD Department of Housing and Community Development
- DSA/AC Division of the State Architect/Access Compliance
- SFM Office of the State Fire Marshal
- DHS Department of Health Services
- AGR Department of Food and Agriculture
- BOC Board of Corrections
- BSC California Building Standards Commission
- SPCB Structural Pest Control Board
- DSA/SS Division of the State Architect/Structural Safety Section
- OSHPD Office of Statewide Health Planning and Development
- DOSH Division of Occupational Safety and Health
- SL State Library

CHAPTER 1 -- ADMINISTRATION

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCIES												
	Adopting Agency	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH*	SL	
				1	1AC	2									1	2	3	4			
Adopt entire UMC chapter without amendments																					
Adopt entire UMC chapter as amended (amendments listed below)															X	X	X	X			
Adopt only those sections which are listed below	X	X	X	X	X	X	X	X	X	X	X	X	X	X							
101.0	CA						X	X					X	X							
101.1	CA														X	X	X	X			
101.2	CA			X		X															
102.0	CA			X		X	X	X					X	X	X	X	X	X			
103.0	CA			X		X	X	X					X								
103.1	CA			X		X	X	X					X	X	X	X	X	X			
103.1.1	CA																				
103.1.1.1	CA						X	X					X	X	X	X	X	X			
103.1.1.2	CA			X		X															
103.1.2	CA			X		X															
103.1.3	CA			X		X															
103.1.4	CA			X		X															
103.1.5	CA			X		X	X	X					X	X							
103.1.5.1	CA			X		X															
103.1.5.2	CA			X		X															
103.1.6	CA			X		X	X														
103.1.7	CA			X		X	X	X													
103.1.8	CA			X		X	X														
103.1.8.1	CA			X		X	X														
103.1.8.2	CA						X														
104.5.1	CA			X		X															
104.6	CA						X	X					X	X	X	X	X	X			
105.2	CA			X			X	X					X	X							
105.3	CA						X														
105.4	CA						X														
105.5.1	CA			X																	
105.5.1 (NOTE)	CA					X															
105.5.2	CA			X																	
105.5.3	CA					X															
106.2	CA			X																	
106.3	CA			X																	
106.4	CA			X		X															
106.1	CA						X														
106.1.1	CA			X		X	X	X					X	X	X	X	X	X			
106.1.1.1	CA									X											
106.1.1.2	CA										X										
106.1.1.3	CA											X									
106.1.1.4	CA		X																		
106.1.1.5	CA	X																			
106.1.1.6	CA								X												
106.1.1.8	CA			X																	
106.1.1.8.1	CA				X																
106.1.1.9	CA					X															
106.1.1.10	CA						X														
106.1.1.11	CA												X								
106.1.1.12	CA																				
106.1.1.12.1	CA														X	X	X	X			
106.1.1.12.2	CA														X						
106.1.1.12.3	CA																X				
106.1.1.12.4	CA																			X	
106.1.1.13	CA						X														
106.1.1.14	CA												X								
106.1.1.15	CA																				X
106.3	CA						X														
106.3.1	CA			X		X															
106.3.1.1	CA			X																	
106.3.1.2	CA					X															
106.3.1.3	CA			X																	
106.6.1	CA			X																	

**CHAPTER 1 -- ADMINISTRATION (Cont.)**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCIES													
	Adopting Agency	CEC	CA	HCD					DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH*	SL
				1	1AC	2											1	2	3	4		
Adopt entire UMC chapter without amendments																						
Adopt entire UMC chapter as amended (amendments listed below)																	X	X	X	X		
Adopt only those sections which are listed below	X	X	X	X	X	X	X	X	X	X	X	X	X	X								
108.10 CA			X																			
108.10.1 CA			X																			
108.10.2 CA					X																	
108.10.3 CA			X																			
108.10.4 CA			X																			
109.2 CA							X															
112.2.6 CA							X															
113.2.1 CA							X															
113.2.2 CA							X															
113.2.3 CA							X															
113.2.4 CA							X															
113.2.5 CA							X															
114.1.2 CA							X															
114.2.1.1 CA			X																			
114.2.2 CA							X															
114.6 CA			X																			
115.1.1 CA			X																			
116.5 CA							X															
118.0 CA							X					X										
119.0 CA							X	X				X	X	X	X	X	X	X	X			
120.0 CA							X	X				X	X	X	X	X	X	X				
121.0 CA												X	X	X	X	X	X	X				
121.1 CA							X	X				X	X	X	X	X	X	X				
121.2 CA							X															

\*DOSH has not adopted the 2000 edition of the Uniform Mechanical Code. The 1995 edition of the California Mechanical Code remains effective.

**CHAPTER 2 -- DEFINITIONS**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCIES													
	Adopting Agency	CEC	CA	HCD					DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH*	SL
				1	1AC	2											1	2	3	4		
Adopt entire UMC chapter without amendments													X									
Adopt entire UMC chapter as amended (amendments listed below)			X		X		X							X	X	X	X	X				
Adopt only those sections which are listed below																						
203.0 CA			X		X		X							X	X	X	X	X				
204.0 CA			X		X		X							X	X	X	X	X				
206.0 CA			X		X									X								
207.0 CA			X		X		X							X	X	X	X	X				
210.0 CA														X	X	X	X	X				
214.0 CA			X		X		X															
215.0 CA							X							X								
216.0 CA			X		X																	
217.0 CA			X		X		X							X	X	X	X	X				
218.0 Exception: (For HCD 1 & 2) CA			X		X																	
221.0 CA															X	X	X	X				
222.0 CA			X		X																	
223.0 CA			X		X		X							X	X	X	X	X				

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**CHAPTER 3 – GENERAL REQUIREMENTS**

ENFORCING AUTHORITY Adopting Agency	LOCAL BUILDING OFFICIAL					LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCIES											
	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
			1	1AC	2									1	2	3	4		
Adopt entire UMC chapter without amendments			X		X		X					X							
Adopt entire UMC chapter as amended (amendments listed below)												X	X	X	X	X			
Adopt only those sections which are listed below																			
304.2 Exception 2 CA													X	X		X			
304.4.1 CA												X							
313.0 CA													X	X		X			
314.1 CA													X			X			
314.2 CA														X		X			
315.1 CA													X			X			
315.2 CA														X		X			
315.3 CA															X				
316.0 CA													X	X		X			
Table 315 CA													X		X	X			

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**CHAPTER 4 – VENTILATION AIR SUPPLY**

ENFORCING AUTHORITY Adopting Agency	LOCAL BUILDING OFFICIAL					LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCIES											
	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
			1	1AC	2									1	2	3	4		
Adopt entire UMC chapter without amendments			X		X							X							
Adopt entire UMC chapter as amended (amendments listed below)							X						X	X	X	X	X		
Adopt only those sections which are listed below																			
401.0 CA							X						X	X	X	X			
403.0 Exception CA													X	X	X	X			
407.0 CA													X	X	X	X			
408.0 CA													X	X	X	X			
409.0 CA													X	X	X	X			
410.0 CA													X	X	X	X			
411.0 CA													X	X	X	X			
412.0 CA													X	X	X	X			
413.0 CA													X	X	X	X			
414.0 CA													X	X	X	X			
415.0 CA													X	X	X	X			
416.0 CA													X	X	X	X			
416.3 CA														X	X	X			
417.0 CA													X	X	X	X			
418.0 CA													X	X	X	X			
Table 4-A CA													X	X	X	X			
Table 4-B CA													X	X					
Table 4-C CA														X		X			

\*DOSH has not adopted the 2000 edition of the Uniform Mechanical Code. The 1995 edition of the California Mechanical Code remains effective.

**CHAPTER 5 – EXHAUST SYSTEMS**

ENFORCING AUTHORITY Adopting Agency	LOCAL BUILDING OFFICIAL					LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCIES											
	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
			1	1AC	2									1	2	3	4		
Adopt entire UMC chapter without amendments			X		X							X							
Adopt entire UMC chapter as amended (amendments listed below)						X	X					X	X	X		X			
Adopt only those sections which are listed below		X																	
501.0 UMC																			
502.0 UMC																			
503.0 UMC																			
504.1 UMC																			
505.1.1 CA												X							
505.12 UMC																			
505.12.1 UMC		X																	
505.7 UMC		X																	
507.7 UMC																			
509.2 UMC													X	X		X			
509.5 CA						X	X												
Table 5-1 UMC																			
Table 5-2 UMC																			
Table 6-7 UMC																			
Table 6-8 UMC																			

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**CHAPTER 6 – DUCT SYSTEMS**

ENFORCING AUTHORITY Adopting Agency	LOCAL BUILDING OFFICIAL					LOCAL FIRE OFFICIAL	LOCAL HEALTH OFFICIAL	STATE AGENCIES											
	CEC	CA	HCD			DSA AC	SFM	DHS	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SI
			1	1AC	2									1	2	3	4		
Adopt entire UMC chapter without amendments			X		X							X							
Adopt entire UMC chapter as amended (amendments listed below)						X						X	X	X	X	X			
Adopt only those sections which are listed below							X												
602.1 Exception CA													X	X	X	X			
602.3.1 CA													X	X	X	X			
605.0 CA												X	X	X	X	X			
605.1 CA													X	X		X			
605.2 CA													X	X		X			
606.8 CA						X													
607.1.1 CA						X								X	X		X		
607.1.2 CA						X													
609.2 CA						X													
610.1 UMC							X												
610.2 UMC							X												
610.5 UMC							X												
610.6 UMC							X												
610.7 UMC							X												
Table 6-7 UMC							X												
Table 6-8 UMC							X												

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**CHAPTER 7 – COMBUSTION AIR**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES											
	Adopting Agency	CEC	CA	HCD					DSA AC	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
				1	1AC	2									1	2	3	4		
Adopt entire UMC chapter without amendments				X		X	X	X				X	X							
Adopt entire UMC chapter as amended (amendments listed below)														X	X	X	X			
Adopt only those sections which are listed below																				
707.2.1	CA													X	X	X	X			

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**CHAPTER 8 – CHIMNEYS AND VENTS**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES											
	Adopting Agency	CEC	CA	HCD					DSA AC	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
				1	1AC	2									1	2	3	4		
Adopt entire UMC chapter without amendments				X		X	X					X	X	X	X	X	X			
Adopt entire UMC chapter as amended (amendments listed below)																				
Adopt only those sections which are listed below																				

DOSH has\* not adopted the 2000 edition of the Uniform Mechanical Code. The 1995 edition of the California Mechanical Code remains effective.

**CHAPTER 9 – SPECIAL FUEL-BURNING AND ENERGY-UTILIZING EQUIPMENT**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES											
	Adopting Agency	CEC	CA	HCD					DSA AC	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
				1	1AC	2									1	2	3	4		
Adopt entire UMC chapter without amendments							X					X	X			X				
Adopt entire UMC chapter as amended (amendments listed below)				X		X								X	X		X			
Adopt only those sections which are listed below								X												
904.8	CA															X	X		X	
907.2	UMC			†		†														
912.0	UMC							X												
912.0	CA													X	X		X			
915.6	UMC			†		†														

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State agency adopts the entire chapter except for those sections indicated by the following symbol: †

**CHAPTER 10 – STEAM AND HOT WATER BOILERS**

ENFORCING AUTHORITY Adopting Agency	LOCAL BUILDING OFFICIAL					LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES											
	CEC	CA	HCD					DSA AC	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
			1	1AC	2									1	2	3	4		
Adopt entire UMC chapter without amendments			X		X		X	X				X	X	X	X	X			
Adopt entire UMC chapter as amended (amendments listed below)																			
Adopt only those sections which are listed below																			

DOSH has\* not adopted the 2000 edition of the Uniform Mechanical Code. The 1995 edition of the California Mechanical Code remains effective.

**CHAPTER 11 – REFRIGERATION**

ENFORCING AUTHORITY Adopting Agency	LOCAL BUILDING OFFICIAL					LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES											
	CEC	CA	HCD					DSA AC	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
			1	1AC	2									1	2	3	4		
Adopt entire UMC chapter without amendments			X		X		X	X			X								
Adopt entire UMC chapter as amended (amendments listed below)											X	X	X	X	X				
Adopt only those sections which are listed below																			
1106.2.1	CA										X								
1107.5	CA											X	X	X	X				
Table 11-1	CA											X	X	X	X				
Table 11-2	CA											X	X	X	X				

DOSH has\* not adopted the 2000 edition of the Uniform Mechanical Code. The 1995 edition of the California Mechanical Code remains effective.

**CHAPTER 12 – HYDRONICS**

ENFORCING AUTHORITY Adopting Agency	LOCAL BUILDING OFFICIAL					LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES											
	CEC	CA	HCD					DSA AC	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
			1	1AC	2									1	2	3	4		
Adopt entire UMC chapter without amendments											X	X	X	X	X				
Adopt entire UMC chapter as amended (amendments listed below)			X		X						X								
Adopt only those sections which are listed below																			
1201.2.6.3	CA										X								
1201.3.5.2	CA		X		X														

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**CHAPTER 13 – FUEL GAS PIPING**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES										
	Adopting Agency	CEC	CA	HCD		DSA AC			DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
				1	1AC									2	1	2	3		
Adopt entire UMC chapter without amendments										X		X	X	X	X				
Adopt entire UMC chapter as amended (amendments listed below)																			
Adopt only those sections which are listed below																			

DOSH has\* not adopted the 2000 edition of the Uniform Mechanical Code. The 1995 edition of the California Mechanical Code remains effective.

**CHAPTER 14 – PROCESS PIPING**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES										
	Adopting Agency	CEC	CA	HCD		DSA AC			DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
				1	1AC									2	1	2	3		
Adopt entire UMC chapter without amendments							X				X	X	X	X					
Adopt entire UMC chapter as amended (amendments listed below)																			
Adopt only those sections which are listed below																			

DOSH has\* not adopted the 2000 edition of the Uniform Mechanical Code. The 1995 edition of the California Mechanical Code remains effective.

**CHAPTER 15 – SOLAR SYSTEMS**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES										
	Adopting Agency	CEC	CA	HCD		DSA AC			DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
				1	1AC									2	1	2	3		
Adopt entire UMC chapter without amendments																			
Adopt entire UMC chapter as amended (amendments listed below)																			
Adopt only those sections which are listed below				X		X													
1500 UMC				X		X													
1501 UMC				X		X													

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**CHAPTER 16 – STANDARDS**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES										
	Adopting Agency	CEC	CA	HCD		DSA AC			DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL
				1	1AC									2	1	2	3		
Adopt entire UMC chapter without amendments				X		X		X		X	X	X	X	X					
Adopt entire UMC chapter as amended (amendments listed below)																			
Adopt only those sections which are listed below																			

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**APPENDIX B – CHAPTER 16  
INSTALLATION AND TESTING OF OIL (LIQUID) FUEL-FIRED EQUIPMENT**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES												
	Adopting Agency	CEC	CA	HCD					DSA AC	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL	
				1	1AC	2									1	2	3	4			
Adopt entire UMC chapter without amendments				X		X	X														
Adopt entire UMC chapter as amended (amendments listed below)																					
Adopt only those sections which are listed below																					

\*DOSH has not adopted the 2000 edition of the Uniform Mechanical Code. The 1995 edition of the California Mechanical Code remains effective.

**APPENDIX C – CHAPTER 8  
SIZING OF CATEGORY 1 VENTING SYSTEMS**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES												
	Adopting Agency	CEC	CA	HCD					DSA AC	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL	
				1	1AC	2									1	2	3	4			
Adopt entire UMC chapter without amendments				X		X	X				X	X	X	X	X	X	X				
Adopt entire UMC chapter as amended (amendments listed below)																					
Adopt only those sections which are listed below																					

\*DOSH has not adopted the 2000 edition of the Uniform Mechanical Code. The 1995 edition of the California Mechanical Code remains effective.

**APPENDIX D**

ENFORCING AUTHORITY	LOCAL BUILDING OFFICIAL						LOCAL FIRE OFFICIAL SFM	LOCAL HEALTH OFFICIAL DHS	STATE AGENCIES												
	Adopting Agency	CEC	CA	HCD					DSA AC	DWR	AGR	BOC	BSC	DSA SS	OSHPD				DOSH	SL	
				1	1AC	2									1	2	3	4			
Adopt entire UMC chapter without amendments				X		X	X				X	X	X	X	X	X	X				
Adopt entire UMC chapter as amended (amendments listed below)																					
Adopt only those sections which are listed below																					

\*DOSH has not adopted the 2000 edition of the Uniform Mechanical Code. The 1995 edition of the California Mechanical Code remains effective.



# CHAPTER 1

## ADMINISTRATION

### Part I – General

#### 101.0 Title

**101.1 [For OSPHD 1, 2, 3, 4, SFM]** These regulations shall be known as the “California Mechanical Code,” which incorporates the 2000 revisions, copyrighted by the International Association of Plumbing and Mechanical Officials, to the Uniform Mechanical Code, may be sited as such, and will be referred to herein as “this code.”

**101.2 [For HCD 1 & HCD 2] Title - California Mechanical Code.** This document shall be known as the “California Mechanical Code.” Where a reference to the Uniform Mechanical Code or UMC appears in the text of this code, the reader shall understand the reference to be to the California Mechanical Code at Part 4 of Title 24, California Code of Regulations. The provisions contained in the California Mechanical Code of the (compiled) California Building Standards Code, Title 24, California Code of Regulations as defined in Health and Safety Code Section 18910, may be cited as such and are referred to hereafter as these regulations, “these mechanical standards” or “this code.”

#### 102.0 Purpose

The purpose of this code is to provide minimum standards to safeguard life or limb, health, property and public welfare by regulating and controlling the design, construction, installation, quality of materials, location, operation, and maintenance or use of heating, ventilating, cooling, refrigeration systems, incinerators and other miscellaneous heat-producing appliances within this jurisdiction. **[For BSC, DHS, DSA-SS, HCD 1 & HCD 2, OSPHD 1, 2, 3 & 4, SFM]** for the State of California and local enforcement agencies.

The purpose of this code is not to create or otherwise establish or designate any particular class or group of persons who will or should be especially protected or benefited by the terms of this code.

#### 103.0 Scope

**103.1 Applicability.** The provisions of this code shall apply to the erection, installation, alteration, repair, relocation, replacement, addition to, use or maintenance of any heating, ventilating, cooling, refrigeration systems, incinerators or other miscellaneous heat-producing appliances within this jurisdiction. **[For BSC, DHS, DSA-SS, HCD 1 &**

**HCD 2, OSPHD 1, 2, 3 & 4, SFM]** for the State of California and local enforcement agencies.

Additions, alterations, repairs and replacement of equipment or systems shall comply with the provisions for new equipment and systems, except as otherwise provided in Section 104.0 of this code.

Exception: **[For HCD 1]** Additions, Alterations or Repairs. The alteration, repairs, replacement, occupancy, use and maintenance provisions are superseded, in part, by State Housing Law, Health and Safety Code, Division 13, Part 1.5, Sections 17912, 17920.3, 17922(c), 17958.8 and 17958.9 and California Code of Regulations, Title 25, Chapter 1 (commencing with Section 1). Health and Safety Code Section 17958.8 is repeated here for clarity and reads as follows:

**Section 17958.8** Local ordinances or regulations governing alterations and repair of existing buildings shall permit the replacement, retention, and extension of original materials and the use of original methods of construction as long as the hotel, lodging house, motel, apartment house, or dwelling, or portions thereof, or building and structure accessory thereto, complies with provisions published in the State Building Standards Code and the other rules and regulations of the department or alternative local standards adopted pursuant to Section 17920.7 and does not become or continue to be a substandard building.

Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable.

**[For HCD 1 & HCD 2]** Mechanical standards in the code shall have no retroactive or retrospective effect or application on existing construction unless the term and time of application of such standards are specifically identified or specified in this code and California law.

The design and testing of equipment regulated by this code shall be subject to the approval of the Administrative Authority **[For BSC, DHS, DSA-SS, OSPHD 1, 2, 3 & 4, SFM]** enforcing agency provided in section 108.1.1.

The standards contained in Appendix A shall be considered as part of this code. Appendix B contains

recommended practices which shall not apply unless specifically adopted. Appendix C contains gas venting tables and is intended to serve only as a guide. Appendix D contains conversion tables and a table for determining the approximate minimum thickness for carbon sheet metal.

**103.1.1 Effective Date.**

**103.1.1.1 [For BSC, DHS, DSA-SS, OSPHD 1, 2, 3 & 4, SFM]** Unless otherwise noted herein, effective date is 180 days after the date of publication.

**103.1.1.2 [For HCD 1 & HCD 2]** One hundred and eighty days after the publication, or as otherwise noted herein.

**103.1.2 [For HCD 1 & HCD2] Availability of Codes.** A subsection of Health and Safety Code Section 18942 is repeated here for clarity and reads as follows:

**Section 18942(d).**

(1) Each city, county, and city and county, including charter cities, shall obtain and maintain with all revisions on a current basis, at least one copy of the building standards and other state regulations relating to buildings published in Titles 8, 19, 20, 24, and 25 of the California Code of Regulations. These codes shall be maintained in the office of the building official responsible for the administration and enforcement of this part.

(2) This subdivision shall not apply to any city or county which contracts for the administration and enforcement of the provisions of this part with another local government agency which complies with this section.

**103.1.3 [For HCD 1 & HCD 2] Applicability to Occupancy Groups.** The provisions of the model code, which are adopted by this Code, are applicable to all occupancy groups and uses regulated by this code. The amendments to the model codes are applicable only to those occupancies or uses which the state agency adopting the amendment is authorized to regulate as listed in Section 108.1.1.

**103.1.4 [For HCD 1 & HCD 2] Conflicts Between Codes.** When the requirements of this code conflict with the requirements of the California Building Code, Title 24, Part 2, the most restrictive requirement shall prevail. When the requirement of this code conflicts with the requirements of the California Plumbing Code, this code shall prevail.

**103.1.5 [For BSC, DHS, DSA-SS, HCD 1 & HCD 2, SFM] Non-Building Regulations.** Requirements contained in the U.M.C., or in any other reference standard, code, or documents, which are not buildings

standards as defined in Health and Safety Code Section 18909, shall not be construed as part of the provisions of this code.

**103.1.5.1 [For HCD 1 & HCD 2]** For the applicability of regulations relating to maintenance, operation, use, limitations or prohibitions, and similar non-building regulations, see other Titles of the California Code of Regulation.

**103.1.5.2 [For HCD 1 & HCD 2]** For the applicability of regulations relating to maintenance, operation, use, limitations or prohibitions, and similar non-building regulations, Title 25, California Code of Regulation, Chapter 1 (commencing with Section 1).

**103.1.6 [For HCD 1 & HCD 2, SFM] Validity.** In any chapter, section, subsection, sentence, clause or phrase of this code is for any reason held to be unconstitutional, contrary to statute, exceeding the authority of the State as stipulated by statutes, or otherwise inoperative, such decision shall not affect the validity of the remaining portion of this code.

**103.1.7 [For HCD 1 & HCD 2, SFM] Format.** This part fundamentally adopts the U.M.C. by reference on a chapter-by-chapter basis. Such adoption is reflected in the adoption tables of each chapter of this part. When the adoption table of a chapter of this part makes no reference to a specific chapter of the U.M.C., such chapter of the U.M.C. is not adopted as a portion of this code.

**103.1.8 [For HCD 1 & HCD 2, SFM] Standard Reference Documents.**

**103.1.8.1 [For HCD 1 & HCD 2, SFM] Codes and Standards Adoption.** The codes, standards and publications, adopted and set forth in this code, including other codes, standards and publications referred to therein, are by title and date of publication, hereby adopted as standard reference documents of this code.

**103.1.8.2 [For SFM]** When this code does not specifically cover any subject relating to building design and construction, recognized fire-protection engineering practices shall be employed. The National Fire Codes and the Fire Protection handbook of the National Fire Protection Association may be used authoritative guides in determining recognized fire-prevention engineering practices.

**104.0 Application to Existing Mechanical Systems**

**104.1 Additions, Alterations or Repairs.** Additions, alterations or repairs may be made to any mechanical system without requiring the existing mechanical system to comply with all the requirements of this code, provided the addition, alteration or repair conforms to that required for a new mechanical system. Additions, alterations or



alternate material, assembly of materials, equipment, method of construction, method of installation of equipment, or means of protection shall be made in writing to the enforcing agency by the owner or the owner's authorized representative and shall be accompanied by a full statement of the conditions. Sufficient evidence or proof shall be submitted to substantiate any claim that may be made regarding its conformance. The enforcing agency may require tests and the submission of a test report from an approved testing organization as set forth in Section 2.13, Title 19, California Code of Regulations, to substantiate the equivalency of the proposed alternate means of protection.

Approval of a request for use of an alternate material, assembly of materials, equipment, method of construction, method of installation of equipment, or means of protection made pursuant to these provisions shall be limited to the particular case covered by request and shall not be construed as establishing any precedent for any future request.

**105.4 Appeals. [For SFM]** When a request for an alternate means of protection has been denied by the enforcing agency, the applicant may file a written appeal to the state fire marshal for consideration of the applicant's proposal. In considering such appeal, the state fire marshal may seek the advice of the State Board of Fire Services. The state fire marshal shall, after considering all of the facts presented, including any recommendation of the State Board of Fire Services, determine if the proposal is for the purpose intended, at least equivalent to that specified in these regulations in quality, strength, effectiveness, fire resistance, durability and safety, and shall transmit such findings and his or her recommendations to the applicant and to the enforcing agency.

**105.5 Alternate for materials, design, tests and methods of construction.**

**105.5.1 [For HCD 1]** Notwithstanding other provisions of law, the method for approval of alternate materials, designs, tests and methods of construction set forth in State Housing Law, Health and Safety Code, Division 13, Section 17951(d) and the California Code of Regulations, Title 25, Division 1, Chapter 1. The applicable subsections of Health and Safety Code Section 17951(d) are repeated here for clarity and reads as follows:

**Section 17951(d).**

(2) The building department of any city or county may approve an alternate if it finds that the proposed design is satisfactory and that the material, appliance, installation, device, arrangement, method, or work offered is for the purpose intended, at least the equivalent of that prescribed in the California Building Standards Code or this part in performance, safety, and for

the protection of life and health.

(3) The building department of any city or county shall require evidence that any material, appliance, installation, device, arrangement, method of construction conforms to, or that the proposed alternate is at least equivalent to, the requirements of this part, building standards published in the California Building Standards Code, or the other rules and regulations promulgated pursuant to this part and in order to substantiate claims for alternates, the building department of any city or county may require tests as proof of compliance to be made at the expense of the owner or the owner's agent by an approved testing agency selected by the owner, or the owner's agent.

**NOTE: [For HCD 2]** Refer to Title 24, Part 4, Section 108.10

**105.5.2 [For HCD 1]** Notwithstanding other provisions of law, the method of approval of alternate materials, appliances, installation, device, arrangement, or method of construction are set forth in the Employee Housing Act, Health and Safety Code Section 17002 and California Code of Regulations, Title 25, Division 1, Chapter 1. Health and Safety Code Section 17002 is repeated here for clarity and reads as follows:

**Section 17002.** The provisions of this part are not intended to prevent the use of any material, appliance, installation, device, arrangement, or method of construction not specifically prescribed by this part if such alternate has been approved by the Department of Housing and Community Development.

The Department of Housing and Community Development may approve any such alternate if it finds that the proposed design is satisfactory and that the material, appliance, installation, device, arrangement, or method of construction offered is, for the purpose intended, at least the equivalent of that prescribed in this part in quality, strength, effectiveness, fire resistance, durability and safety, for the protection of life and health.

This section shall not apply to a local ordinance, which is applicable pursuant to Section 17001.

**105.5.3 [For HCD 2]** Notwithstanding other provisions of law, the method for approval of alternate materials, appliances, installation, device, arrangement, or method of construction are set forth in the Mobilehome Parks Act, Health and Safety Code, Section 18305 and California Code of Regulations, Title 25, Division 1, Chapter 2. The applicable

subsections of Health and Safety Code Section 18305 are repeated here for clarity and reads as follows:

Section 18305.

(a) This part is not intended to prevent the use of any material, appliance, installation, device, arrangement, or method of construction not specifically prescribed by this part and the rules and regulations adopted pursuant to this part, if the alternate used has been approved.

(b) The department may approve any alternate if it finds that the proposed design is satisfactory and that the material, appliance, installation, device, arrangement, method, or work offered is, for the purpose intended, at least the equivalent to that prescribed in this part and the rules and regulations adopted pursuant to this part in quality, strength, effectiveness, fire resistance, durability, safety, and for the protection of life and health.

(c) Whenever there is evidence that there is any material, appliance, installation, device, arrangement, or method of construction does not conform to the requirements of this part and the rules and regulations promulgated pursuant to this part, or in order to substantiate claims for alternates, the department may require proof of compliance to be made at the expense of the owner or his or her agent.

(d) The department shall notify the appropriate enforcement agency and plan checking agency of its findings.

(e) This section is not applicable to local regulations authorized by this part.

106.0 Modifications

106.1 Whenever there are practical difficulties involved in carrying out the provisions of this code, the Administrative Authority may grant modifications for individual cases. The Administrative Authority shall first find that a special individual reason makes the strict letter of this code impractical, the modification is in conformity with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of actions granting modifications shall be recorded and entered in the files of the code enforcement agency.

106.2 [For HCD 1] Local Variances. Health and Safety Code Section 17958.5 is repeated here for clarity and reads as follows:

Section 17958.5 Except as provided in Section 17922.6, in adopting the ordinances or regulations pursuant to Section 17958, a city or county may make such changes or modification in the

requirements contained in the provisions published in the California Building Standards Code and the other regulations adopted pursuant to Section 17922 as it determines, pursuant to the provisions of

Section 17958.7, are reasonably necessary because of local climatic, geological, or topographical conditions.

For purposes of this subdivision, a city and county may make reasonably necessary modifications to the requirements, adopted pursuant to section 17922, contained in the provisions of the code and regulations on the basis of local conditions.

106.3 [For HCD 1] Findings; Filings; and Rejections of Local Variances. The applicable subsection of Health and Safety Code Section 17958.7 are repeated here for clarity and reads as follows:

Section 17958.7

(a) Except as provided in Section 17922.6, the governing body of a city or county, before making any modifications or changes pursuant to section 17958.5, such make an express finding that such modifications or changes are reasonably necessary because of local climatic, geological, or topographical conditions. Such a finding shall be available as a public record. A copy of those findings, together with the modification or change expressly marked and identified to which each such finding refers, shall be filed with the California Building Standards Commission. No modification or change shall become effective or operative for any purpose until the finding and the modification or change have been filed with the California Building Standards Commission.

(b) The California Building Standards Commission may reject a modification or change filed by the governing body of a city or county if no finding was submitted.

106.4 [For HCD 1 & 2] Ratification by City Council. The applicable subsections of Health and Safety Code Section 13869.7 are repeated here for clarity and reads as follows:

Section 13869.7

(a) Any fire-protection district organized pursuant to Part 2.7 (commencing with Section 13800) of Division 12 may adopt building standards relating to fire and panic safety that are more stringent than those building standards adopted by the State Fire Marshal and contained in the California Building Standards Code. For these purposes, the district board shall be deemed a legislative body and the district shall be deemed a local agency. Any changes or modifications that are more stringent than the requirements published in the California



the state fire marshal may authorize such chief fire official and his or her authorized representatives, in their geographical area of responsibility, to make fire-prevention inspections of state-owned or state-occupied buildings, other than state institutions, for the purpose of enforcing the regulations relating to fire and panic safety adopted by the state fire marshal pursuant to this section and building standards relating to fire and panic safety published in the State Building Standards Code. Authorization from the state fire marshal shall be limited to those fire departments or fire districts which maintain a fire-prevention bureau staffed by paid personnel.

Any requirement or order made by any chief fire official pursuant to this section may be appealed to the state fire marshal. The state fire marshal shall, upon receiving an appeal and subject to the provisions of Chapter 5 (commencing with Section 18945) of Part 2.5 of Division 13 of the Health and Safety Code, determine if the requirement or order made is reasonably consistent with the fire and panic safety regulations adopted by the Office of the State Fire Marshal and building standards relating to fire and panic safety published in the California Mechanical Code.

The building official shall have the power to render interpretations of this code and to adopt and enforce rules and regulations supplemental to this code as may be deemed necessary in order to clarify the application of the provisions of this code. Such interpretations, rules and regulations shall be in conformity with the intent and purpose of this code.

**[For SFM]** Any person may request a code interpretation from the state fire marshal relative to the intent of any regulation or provision adopted by the state fire marshal. When the request relates to a specific project, occupancy or building, the state fire marshal shall review the issue with the appropriate local enforcing agency prior to rendering such code interpretation.

**108.1.1 [For HCD 1 & HCD 2]Application-Vesting authority.** When adopted by a State agency, the provisions of this code shall be enforced by the appropriate enforcing agency, but only to the extent of authority granted to such agency by the State Legislature.

**108.1.1.1 [for AGR]**

- AGR-Department of Food and Agriculture.
- Application-Dairies and places of meat inspection.
- Enforcing Agency-AGR.
- Authority Cited-AGR Code §18735, 19384, 33481 and 33731.
- Reference-AGR Code §18735, 19384, 33481 and

33731.

**108.1.1.2 [for BOC]**

- BOC-Board of Corrections.
- Application-Local detention facilities.
- Enforcing Agency-BOC.
- Authority Cited-Penal Code §6030.
- Reference-Penal Code §6030.

**108.1.1.3 [for BSC]**

- BSC-California Building Standards Commission.
- Application-State buildings (all occupancies), including buildings constructed by the Trustees of the CA State Universities and Colleges and the Regents of the University of CA where no state agency has the authority to adopt building standards applicable to such buildings.

Enforcing Agency-State or local agency specified by the applicable provisions of law.

- Authority Cited-H&SC §3981 and §18934.5.
- Reference-H&SC §18901 through 18949.6.

**108.1.1.4 [for CA]** CA-Department of Consumer Affairs.

1. CA; Board of Barber Examiners.
  - Application-Barber shops.
  - Enforcing Agency-State or local agency specified by applicable provisions of law.
  - Authority Cited-Business and Professions Code (B&PC) §6508.
  - Reference-B&PC §6549, 6549.1, 6549.6, 6586.5, 6588, 6590, 6591 and 6593.
2. CA; Board of Cosmetology.
  - Application-School of Cosmetology and Electrology.
  - Enforcing Agency-State or local agency specified by applicable provisions of law.
  - Authority Cited-B&PC §7310 and 7311.
  - Reference-B&PC §7310, 7311, 7384.5, 7384.6 and 7391.
3. CA; Board of Funeral Directors.
  - Application-Funeral homes.
  - Enforcing Agency-State or local agency specified by applicable provisions of law.
  - Authority Cited-B&PC §7606 and 7740.
  - Reference-B&PC §7606 and 7740.
4. CA; Medical Board of California; Acupuncture Committee.
  - Application-Acupuncture offices.
  - Enforcing Agency-State or local agency specified by applicable provisions of law.
  - Authority Cited-B&PC §4933.









institution for the housing of any person of any age when such person is referred to or placed within such home or institution for protective social care and supervision services by any governmental agency.

Authority Cited-H&SC §13143.6.

Application-Tents, awnings or other fabric enclosures used in connection with any occupancy.

Authority Cited-H&SC §13116.

Fire alarm devices, equipment and systems in connection with any occupancy.

Authority Cited-H&SC §13114.

Hazardous materials.

Authority Cited-H&SC §13143.9.

Flammable and combustible liquids.

Authority Cited-H&SC §13143.6.

Enforcing Agency-The responsibility for enforcement of building standards adopted by the State Fire Marshal and published in the California Building Standards Code relating to fire and panic safety and other regulations of the Office of the State Fire Marshal shall be as follows:

1. The city, county, or city and county with jurisdiction in the area affected by the standard or regulation shall delegate the enforcement of the building standards relating to fire and panic safety and other regulations of the State Fire Marshal as they relate to Group R, Division 3 dwellings to either of the following:

1.1 The chief of the fire authority of the city, county, or city and county, or an authorized representative.

1.2 The chief building official of the city, county, or city and county, or an authorized representative.

2. The chief of any city or county fire department or of any fire-protection district, and authorized representatives, shall enforce within the jurisdiction the building standards and other regulations of the State Fire Marshal, except those described in Items 1 and 4.

3. The State Fire Marshal shall have authority to enforce the building standards and other regulations of the State Fire Marshal in areas outside of corporate cities and districts providing fire-protection services.

4. The State Fire Marshal shall have authority to enforce the building standards and other regulations of the state fire marshal in corporate cities and districts providing fire-protection services on request of the chief fire official or the governing body.

5. Any fee charged pursuant to the enforcement

authority of this section shall not exceed the estimated reasonable cost of providing the service for which the fee is charged pursuant to §66014 of the Government Code.

**108.1.1.14 [for SHB/DSA] State Historical Building Code Advisory Board-DSA.**

Application-Qualified historical buildings and structures and their associated sites.

Enforcing Agency-State or local agency specified by the applicable provisions of law.

Authority Cited-H&SC §18959.5.

Reference-H&SC §18950 through 18961.

**108.1.1.15 [for SL] State Librarian.**

Application-Public library construction and renovation using funds from the CA Library Construction and Renovation Bond Act of 1988.

Enforcing Agency-State librarian.

Authority Cited-Education Code §19960.

Reference-Education Code §19950 through 19981.

**108.2 Deputies.** In accordance with the prescribed procedures and with the approval of the appointing authority, the Administrative Authority may appoint such number of technical officers and inspectors and other employees as shall be authorized from time to time. The Administrative Authority may deputize such inspectors or employees as may be necessary to carry out the functions of the code enforcement agency.

**108.3 Right of Entry.** When it is necessary to make an inspection to enforce the provisions of this code, or when the Administrative Authority has reasonable cause to believe that there exists in a building or upon a premises a condition which is contrary to or in violation of this code which makes the building or premises unsafe, dangerous or hazardous, the Administrative Authority may enter the building or premises at reasonable times to inspect or to perform the duties imposed by this code, provided that if such building or premises be occupied that credentials be presented to the occupant and entry requested. If such building or premises be unoccupied, the Administrative Authority shall first make a reasonable effort to locate the owner or other person having charge or control of the building or premises and request entry. If entry is refused, the Administrative Authority shall have recourse to the remedies provided by law to secure entry.

**[For SFM]** The fire chief of any city, county or fire-protection district, or such person's authorized representative, may enter any state institution or any

other state-owned or state-occupied building for the purpose of preparing a fire-suppression preplanning program or for the purpose of investigating any fire in a state-occupied building.

The state fire marshal, his or her deputies or salaried assistants, the chief or any city or county fire department or fire protection district and his or her authorized representatives may enter any building or premises not used for dwelling purposes at any reasonable hour for the purpose of enforcing this chapter. The owner, lessee, manager or operator of any such building or premises shall permit the state fire marshal, his or her deputies or salaried assistants and the chief of any city or county fire department or fire-protection district and his or her authorized representatives to enter and inspect them at the time and for the purpose stated in this section.

**108.3.1 [For HCD 1 & HCD 2] Right of Entry For Enforcement.**

**108.3.1.1 [For HCD 1] Authority to Enter and Inspect Premises.** Health and Safety Code Sections 17050(i) and 17970 are repeated here for clarity and reads as follows:

**Section 17050(i).** The enforcement agency may:

- (1) Enter public or private properties to determine whether there exists any employee housing to which this part applies.
- (2) Enter and inspect all employee housing wheresoever situated, and inspect all accommodations, equipment, or paraphernalia connected therewith.
- (3) Enter and inspect the land adjacent to the employee housing to determine whether the sanitary and other requirements of this part, the building standards published in the California Building Standards Code relating to employee housing, and the other rules and regulations adopted pursuant to this part have been or are being complied with.

**Section 17970.** Any officer, employee, or agent of an enforcement agency may enter and inspect any building or premises whenever necessary to secure compliance with, or prevent a violation of, any provision of this part, the building standards published in the State Building Standards Code, and other rules and regulations promulgated pursuant to the provisions of this part which the enforcement agency has the power to enforce.

**108.3.1.2 [For HCD 2] Authority to Enter and Inspect Premises.** The applicable subsections of Health and Safety Code Section 18400 are repeated here for clarity and reads as follows:

**Section 18400.** (a) The department shall enforce this part and the rules and regulations adopted pursuant to this part, except as provided in Section 18300.

(b) The officers or agents of the enforcement agency may do either of the following:

- (1) Enter public or private property to determine whether there exists any park to which this part applies.
- (2) Enter and inspect all parks, wherever situated, and inspect all accommodations, equipment, or paraphernalia used in connection therewith, including the right to examine any registers of occupants maintained therein in order to secure the enforcement of this part and the regulations adopted pursuant to this part.

**108.3.1.3 [For HCD 1] Limitations on Authority to Enter.** Notwithstanding other sections of law, Health and Safety Code Section 17972 is repeated here for clarity and reads as follows:

**Section 17972.** No person authorized by this article to enter buildings shall enter any dwelling between the hours of 6 o'clock p.m. of any day and 8 o'clock a.m. of the succeeding day, without the consent of the owner or of the occupants of the dwelling, nor enter any dwelling in the absence of the occupants without a proper written order executed and issued by a court having jurisdiction to issue the order.

**108.4 Stop Orders.** When any work is being done contrary to the provisions of this code, the Administrative Authority may order the work stopped by notice in writing served on any persons engaged in the doing or causing such work to be done, and such persons shall forthwith stop work until authorized by the Administrative Authority to proceed with the work.

**108.5 Authority to Disconnect Utilities in Emergencies.** The Administrative Authority or the Administrative Authority's authorized representative shall have the authority to disconnect fuel gas utility service, or energy supplies to a building, structure, premises or equipment regulated by this code in case of emergency where necessary to eliminate an immediate hazard to life or property. The Administrative Authority shall, whenever possible, notify the serving utility, the owner and occupant of the building, structure or premises of the decision to disconnect prior to taking such action, and shall notify such serving utility, owner and occupant of the building, structure or premises in writing of such disconnection immediately thereafter.















structure shall be used or occupied, and no change in the existing occupancy classification of a building or structure or portion thereof shall be made, until the building official has issued a Certificate of Occupancy therefore as provided herein.

**Exception:** Group R, Division 3 and Group M Occupancies.

Issuance of a Certificate of Occupancy shall not be constructed as an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Certificates presuming to give authority to violate or cancel the provisions of this code or other ordinances of the jurisdiction shall not be valid.

**118.2 Change in Use.** Changes in the character or use of a building shall not be made except as specified in Section 3405 of the Uniform Building Code.

**118.3 Certificate Issued.** After the building official inspects the building or structure, in accordance with Section 104.2 of the Uniform Building Code, and finds no violations of the provisions of this code or other laws which are enforced by the code enforcement agency, the building official shall issue a Certificate of Occupancy which shall contain the following:

1. The building permit number.
2. The address of the building.
3. The name and address of the owner.
4. A description of that portion of the building for which the certificate is issued.
5. A statement that the described portion of the building has been inspected for compliance with the requirements of the California Building Standards Code for the group and division of occupancy and the use for which the proposed occupancy is classified.
6. The name of the building official.

**118.4 Temporary Certificate.** If the building official finds that no substantial hazard will result from occupancy of any building or portion thereof before the same is completed, a temporary Certificate of Occupancy may be issued for the use of a portion or portions of a building or structure prior to the completion of the entire building or structure.

**118.5 Posting.** The Certificate of Occupancy shall be posted in a conspicuous place on the premises and shall not be removed except by the building official.

**119.0 Format [For BSC, DHS, DSA-SS, OSHPD 1, 2, 3 & 4, SFM]**

This part fundamentally adopts the UMC by reference on a chapter-by-chapter basis. Such adoption is reflected in the adoption table of each chapter of this

part. When the adoption table of a chapter of this part makes no reference to a specific chapter of the UMC, such chapter of the UMC is not adopted as a portion of this code.

**120.0 Validity [For BSC, DHS, DSA-SS, OSHPD 1, 2, 3 & 4 SFM]**

If any chapter section, subsection, sentence, clause or phrase of this code is for any reason held to be unconstitutional, contrary to statute, exceeding the authority of the state as stipulated by statutes, or otherwise inoperative, such decision shall not affect the validity of the remaining portion of this code.

**121.0 Standard Reference Documents**

**121.1 [For BSC, DHS, DSA-SS, OSHPD 1, 2, 3 & 4, SFM]** The codes, standards and publications adopted and set forth in this code, including other codes, standards and publications referred to therein are, by title and date of publication, hereby adopted as standard reference documents of this code.

**121.2 [For SFM]** When this code does not specifically cover any subject relating to building design and construction, recognized fire-protection engineering practices shall be employed. The National Fire Codes and the Fire Protection handbook of the National Fire Protection Association may be used as authoritative guides in determining recognized fire-prevention engineering practices.

**TABLE 1-1  
Mechanical Permit Fees**

**Permit Issuance**

- 1. For the issuance of each permit.....\*
- 2. For issuing each supplemental permit for which the original permit has not expired or been canceled or finaled.....\*

**Unit Fee Schedule**

**Note:** the following do not include permit-issuing fees.

**1. Furnaces**

- For the installation or relocation of each forced-air or gravity-type furnace or burner, including ducts and vents attached to such appliance, up to and including 100,000 Btu/h (29.3 kW).....\*
- For the installation or relocation of each forced-air or gravity-type furnace or burner, including ducts and vents attached to such appliance over 100,000 Btu/h (29.3 kW).....\*
- For the installation or relocation of each floor furnace, including vent.....\*
- For the installation or relocation of each suspended heater, recessed wall heater or floor-mounted unit heater.....\*

**2. Appliance Vents**

- For the installation, relocation or replacement of each appliance vent installed and not included in an appliance permit .....

**3. Repairs or Additions**

- For the repair of, alteration of, or addition to each heating appliance, refrigeration unit, cooling unit, absorption unit, or each heating, cooling, absorption, or evaporative cooling system, including installation of controls regulated by this code.....\*

**4. Boilers, Compressors and Absorption Systems**

- For the installation or relocation of each boiler or compressor to and including three (3) horsepower, or each absorption system to and including 100,000 Btu/h (29.3 kW).....\*
- For the installation or relocation of each boiler or compressor over three (3) horsepower (2.24 kW) to and including 15 horsepower (11.19 kW), or each absorption system over 100,000 Btu/h (29.3 kW) and including 500,000 Btu/h (146.48 kW).....\*
- For the installation or relocation of each boiler or compressor over 15 horsepower (11.19 kW) to and including thirty (30) horsepower (22.37 kW), or each absorption system over 500,000 Btu/h (146.48 kW) to and including 1,000,000 Btu/h (29.3 kW) .....
- For the installation or relocation of each boiler or compressor over thirty (30) horsepower (22.37 kW) to and including fifty (50) horsepower (37.3 kW), or for each absorption system over 1,000,000 Btu/h (292.95 kW) to and including 1,750,000 Btu/h (512.66 kW) .....
- For the installation or relocation of each boiler or compressor over fifty (50) horsepower (37.3 kW), or each absorption system over 1,750,000 Btu/h (512.66 kW).....\*

**5. Air Handlers**

- For each air-handling unit to and including 10,000 cfm (4.72 m<sup>3</sup>/S), including ducts attached thereto.....\*

**Note:** This fee shall not apply to an air-handling unit which is a portion of a factory-assembled appliance, cooling unit, evaporative cooler or absorption unit for which a permit is required elsewhere in this code.

**6. Evaporative Coolers**

- For each air-handling unit over 10,000 cfm (4.72 m<sup>3</sup>/S) .....
- For each evaporative cooler other than portable type.....\*



recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved by the Administrative Authority [For OSHPD 1, 2, 3 & 4, SFM] or enforcing agency.

**ASSEMBLY BUILDING [Not adopted by HCD]** is a building or a portion of a building used, [For SFM] or intended to be used for the gathering together of fifty (50) or more persons for such purposes as deliberation, education, instruction, worship, entertainment, amusement, drinking, dining or awaiting transportation. [for SFM] or education; or structure or portion thereof used or intended to be used for the showing of motion pictures when an admission fee is charged and when such building or structure is open to the public and has a capacity of 10 or more persons.

**Exception: [For HCD 1 & 2]** Refer to the California Building Code, Title 24, Part 2 for use and occupancy classification.

**AZEOTROPE** is a refrigerant blend comprising multiple components of different volatiles that, when used in refrigeration cycles, do not change volumetric composition or saturation temperature as they evaporate or condense at constant pressure.

**204.0 -B-**

**BOILER, HIGH PRESSURE** is a boiler furnishing steam at pressures in excess of fifteen (15) pounds per square inch (103.4 kPa) or hot water at temperatures in excess of 250°F (121°C) or at pressures in excess of 160 pounds per square inch (1102.4 kPa).

**BOILER ROOM** is any room containing a steam or hot water boiler.

**BREECHING** is a metal connector for medium- and high-heat appliances.

**BRINE** is any liquid used for the transmission of heat without a change in its state, having no flash point or a flash point above 150°F (66°C), as determined by the requirements of the Fire Code. (See U.F.C. Standard 2-2 in Appendix A.)

**BRINE [For SFM]** is a liquid used for the transmission of heat without a change in its state, having no flash point above 150 F (65.5 C ), as determined by the requirements of UMC Standard 2-3 or in accordance with Section 5415 (f)Title 8, California Code of Regulations.

**Btu/h** is the listed maximum capacity of any appliance, absorption unit or burner expressed in British thermal units input per hour, unless otherwise noted.

**BUILDING [For HCD 1 & 2]** Health and Safety Code Section 17920 (b) is repeated her for clarity

and read as follows:

Section 17920(b). "Building means a structure subject to this part."

**BUILDING CODE [Not adopted by HCD 1 & 2]** is the building code, which is adopted by this jurisdiction. [For DSASS, OSHPD 1, 2, 3 & 4, SFM] For purpose of the California Mechanical Code, "Building Code" shall be the most recent edition of the California Building Code.

**Exception: [For HCD 1 & 2]** Whenever the term "Building Code" is used in this code, it shall mean the California Building Code, Title 24, Part 2.

**BUILDING OFFICIAL [Not adopted by HCD].** See ADMINISTRATIVE AUTHORITY. [For DSASS, OSHPD 1, 2, 3 & 4] For the State of California, "Building Official" shall be the "Enforcing Agency" as specified in Section 108.

**Exception: [For HCD 1 & 2]** "Building Official" shall be the "Enforcing Agency" as specified in the appropriate subsections of Section 108.1.1 of this code

**BUILDING OFFICIAL [For SFM]** is the officer charged with the administration and enforcement of this code, or a regularly authorized deputy. See "Enforcing Agency" For the State of California, "Building Official" shall be the "Enforcing Agency" as specified in Section 108.

**205.0 -C-**

**CAS NUMBER** is the Chemical Abstract System Registry Number.

**CENTRAL HEATING PLANT or HEATING PLANT** is environmental heating equipment installed in a manner to supply heat by means of ducts or pipes to areas other than the room or space in which the equipment is located.

**CHIMNEY** is a vertical shaft enclosing one or more flues for conveying flue gases to the outside atmosphere.

**Factory-Built Chimney** is a listed chimney.

**Masonry Chimney** is a chimney of solid masonry units, bricks, stones, listed masonry units or reinforced concrete, lined with suitable flue liners.

**Metal Chimney** is a chimney constructed of metal with a minimum thickness not less than 0.127 inch (3.23 mm) (No. 10 manufacturer's standard gage) steel sheet.

**CHIMNEY CLASSIFICATIONS:**

**Chimney, Residential Appliance-Type** is a factory-built or masonry chimney suitable for removing products of combustion from

**FORCED AIR-TYPE CENTRAL FURNACE** is a central furnace equipped with a fan or blower which provides the primary means for circulation of air.

**Horizontal-Type Central Furnace** is a furnace designed for low headroom installations with air flow through the appliance in a horizontal path.

**Upflow-Type Central Furnace** is a furnace designed with air flow essentially in a vertical path, discharging air at or near the top of the furnace.

**Downflow-Type Central Furnace** is a furnace designed with air flow essentially in a vertical path, discharging air at or near the bottom of the furnace.

**Enclosed Furnace** is a specific heating or heating and ventilating furnace incorporating an integral total enclosure and using only outside air for combustion.

**FRACTIONATION** is a change in composition of a blend by preferential evaporation of the more volatile component or condensation of the less-volatile component.

**FUSIBLE PLUG** is a device arranged to relieve pressure by operation of a fusible member at a predetermined temperature.

## 209.0

–G–

**GALVANIZED STEEL** is any steel conforming to the requirements of UMC Standard No. 2-2.

**GENERATOR** is a device equipped with a means of heating used in an absorption system to drive refrigerant out of solution.

**GRAVITY HEATING SYSTEM** is any heating system consisting of a gravity-type warm air furnace, together with all air ducts or pipes and accessory apparatus installed in connection therewith.

**GRAVITY-TYPE WARM AIR FURNACE** is a warm air furnace depending primarily on circulation of air through the furnace by gravity. This definition also shall include any furnace approved with a booster-type fan which does not materially restrict free circulation of air through the furnace when the fan is not in operation.

## 210.0

–H–

**HAZARDOUS LOCATION** is any area or space where combustible dust, ignitable fibers or flammable, volatile liquids, gases, vapors or mixtures are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

**HEALTH FACILITIES [OSHPD 1, 2, 3 & 4]** are those buildings specified within the statutory

authority of the Office of Statewide Health Planning and Development.

**HEAT (ENERGY) RECOVERY VENTILATOR** is a device intended to remove air from buildings, replace it with outside air, and in the process transfer heat from the warmer to the colder airstreams.

**HEATING DEGREE DAY** is a unit, based upon temperature difference and time, used in estimating fuel consumption and specifying nominal annual heating load of a building. For any one day when the mean temperature is less than 65°F (18°C), there exist as many degree days as there are Fahrenheit degrees difference in temperature between mean temperature for the day and 65°F (18°C).

**HEATING EQUIPMENT** includes all warm air furnaces, warm air heaters, combustion products vents, heating air-distribution ducts and fans, all steam and hot water piping, together with all control devices and accessories installed as part of, or in connection with, any environmental heating system or appliance regulated by this code.

**HEATING SYSTEM** is a warm air heating plant consisting of a heat exchanger enclosed in a casing, from which the heated air is distributed through ducts to various rooms and areas. A heating system includes the outside air, return air and supply air system and all accessory apparatus and equipment installed in connection therewith.

**HEAT PUMP** is a refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.

**HIGH SIDE** are the parts of a refrigeration system subjected to approximately condenser pressure.

**HOOD** is an air intake device connected to a mechanical exhaust system for collecting vapors, fumes, smoke, dust, steam, heat or odors from, at or near the equipment, place or area where generated, produced or released.

## 211.0

–I–

**IDLH (Immediately Dangerous to Life and Health)** is a concentration of airborne contaminants, normally expressed in parts per million (ppm) or milligrams per cubic meter (mg/m<sup>3</sup>), which represents the maximum level from which one could escape within thirty (30) minutes without any escape-impairing symptoms or irreversible health effects. This level is established by the National Institute of Occupational Safety and Health (NIOSH).

**INDUSTRIAL HEATING EQUIPMENT** includes appliances, devices or equipment used, or intended



reads as follows:

**Section 17920(i).** “ Listing agency” means an agency approved by the department that is in the business of listing and labeling products, materials, equipment, and installations tested by an approved testing agency, and that maintains a periodic inspection program on current production of listed products, equipment, and installations, and that , at least annually, makes available a published report of these listings.

**LOW PRESSURE HOT WATER-HEATING BOILER** is a boiler furnishing hot water at pressures not exceeding 160 pounds per square inch (1102.4 kPa) and at temperatures not exceeding 250°F (121°C).

**LOW PRESSURE STEAM-HEATING BOILER** is a boiler furnishing steam at pressures not exceeding fifteen (15) pounds per square inch (103.4 kPa).

**LOW SIDE** refers to the parts of a refrigeration system subjected to approximate evaporator pressure.

**215.0 –M–**

**MACHINERY** is the refrigeration equipment forming a part of the refrigeration system, including, but not limited to, the following: compressors, condensers, liquid receivers, evaporators and connecting piping.

**MACHINERY ROOM [For SFM, DSA/SS]** is a room in which a refrigeration system is permanently installed and operated but not including evaporators located in a cold storage room, refrigerator box, air-cooled space or other enclosed space. Closets solely contained within, and opening only into, a room shall not be considered machinery rooms, but shall be considered a part of the machinery rooms in which they are contained or open into. It is not the intent of this definition to cause the space in which unit or self-contained systems of Group I refrigerants are locate to be classified as machinery rooms.

**MANUFACTURER** is the company or organization which evidences its responsibility by affixing its name, trademark or trade name to equipment or devices.

**MANUFACTURER'S INSTALLATION INSTRUCTIONS** are printed instructions included with equipment or devices for the purpose of providing information regarding safe and proper installation whether or not as part of the conditions of listing.

**216.0 –N–**

**NONCOMBUSTIBLE**, as applied to building construction material, means a material which in the form in which it is used is either one of the following:

1. Material of which no part will ignite and burn when subjected to fire.
2. Material having a structural base of noncombustible material as defined in 1 above, with a surfacing material not over 1/8 inch (3.2 mm) thick which has a flame-spread index not higher than fifty (50).

**NONCOMBUSTIBLE** does not apply to surface finish materials. Material required to be noncombustible for reduced clearances to flues, heating appliances or other sources of high temperature shall refer to material conforming to 1. above. No material shall be classed as noncombustible which is subject to increase in combustibility or flame-spread index beyond the limits herein established, through the effects of age, moisture or other atmospheric condition.

**NUISANCE [For HCD 1 & HCD 2]** Health and Safety Code Section 17920(k) is repeated for clarity and reads as follows:

**Section 17920(k)** “Nuisance” means any nuisance defined pursuant to Part 3 (commencing with Section 3479) of Division 4 of the Civil Code, or any other form of nuisance recognized at common law or in equity.

**217.0 –O–**

**OCCUPANCY** is the purpose for which a building or part thereof is used or intended to be used.

**OCCUPANCY CLASSIFICATION. [FOR DSA/SS, OSHPD 1, 2, 3 & 4, SFM]** Shall be those as shown in the California Building Code, for the purpose of this code, certain occupancies are defined as follows:

**Note: [For HCD 1 & HCD 2]** The occupancy classification requirements are adopted as amended by the State Fire Marshal. See Section 103.1.4 of this code if there is a conflict.

**Group A Occupancies**

Group A Occupancies include the use of a building or structure, or a portion thereof, for the gathering together of fifty (50) or more persons for purposes such as civic, social or religious functions, recreation, education or instruction, food or drink consumption, or awaiting transportation. A room or space used for assembly purposes by less than fifty (50) persons and accessory to another occupancy shall be included as a part of that major occupancy. Assembly occupancies shall include the following:

**Division 1.** A building or portion of a building having an assembly room with an

occupant load of 1,000 or more and a legitimate stage.

**Division 2.** A building or portion of a building having an assembly room with an occupant load of less than 1,000 and a legitimate stage.

**Division 2.1.** A building or portion of a building having an assembly room with an occupant load of 300 or more without a legitimate stage, including such buildings used for educational purposes and not classed as a Group B or E Occupancy.

**Division 3.** A building or portion of a building having an assembly room with an occupant load of less than 300 without a legitimate stage, including such buildings used for educational purposes and not classed as a Group B or E Occupancy.

**Division 4.** Stadiums, reviewing stands and amusement park structures not included within other Group A Occupancies. Specific and general requirements for grandstands, bleachers and reviewing stands are in the Building Code.

**Exception:** Amusement buildings, or portions thereof, which are without walls or a roof and constructed to prevent the accumulation of smoke in assembly areas.

**Group B Occupancies**

Group B Occupancies shall include buildings, structures, or portions thereof, for office, professional or service-type transactions, which are not classified as Group H Occupancies. Such occupancies include occupancies for the storage of records and accounts and eating and drinking establishments with an occupant load of less than fifty (50).

**Group C Occupancies: [For SFM]**

1. *Organized Camp is a site with program and facilities for the primary purposes of providing an outdoor group living experience with social, spiritual, educational or recreational objectives for five days or more during one or more seasons per year. (see Section 18897 of the Health and Safety Code.)*

**Group E Occupancies**

**Division 1.** Any building used for educational purposes through the 12th grade by fifty (50) or more persons for more than twelve (12) hours per week or four hours in any one day.

**Division 2.** Any building used for educational purposes through the 12th grade by less than fifty (50) persons for more than twelve (12) hours per week or four hours in any one day.

**Division 3.** Any building or portion thereof used for day-care purposes for more than six persons.

**Group F Occupancies**

Group F Occupancies shall include the use of a building or structure, or a portion thereof, for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified as Group H Occupancies.

**Division 1.** Moderate-hazard factory and industrial occupancies shall include factory and industrial uses which are not classified as Group F, Division 2 Occupancies.

**Division 2.** Low-hazard factory and industrial occupancies shall include facilities producing noncombustible or nonexplosive materials which, during finishing, packing or processing, do not involve a significant fire hazard.

**Group H Occupancies**

Group H Occupancies shall include buildings or structures, or portions thereof, that involve the manufacturing, processing, generation or storage of materials that constitute a high fire, explosion or health hazard. For definitions, identification and control of hazardous materials and pesticides, and the display of nonflammable solid and nonflammable or noncombustible liquid hazardous materials in Group B, F, M or S Occupancies, see the Fire Code.

**Division 1.** Occupancies with a quantity of material in the building in excess of those listed in the Building Code, which present a high explosion hazard.

**Division 2.** Occupancies where combustible dust is manufactured, used or generated in such a manner that concentrations and conditions create a fire or explosion potential.

Occupancies with a quantity of material in the building in excess of those listed in the Building Code, which present a moderate explosion hazard or a hazard from accelerated burning.

**Division 3.** Occupancies where flammable solids, other than combustible dust, are manufactured, used or generated.

**Division 4.** Repair garages not classified as

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**218.0** **–P–**

**PEL (PERMISSIBLE EXPOSURE LIMIT)** is the maximum permitted eight-hour time-weighted average concentration of an airborne contaminant. The maximum permitted time-weighted average exposures to be utilized are those published in 29 CFR 1910.1000.

**PEX.** Cross-linked Polyethylene.

**PIPING** is the pipe or tube mains for interconnecting the various parts of a system. Piping includes pipe, tube, flanges, bolting, gaskets, valves, fittings, the pressure-containing parts of other components such as expansion joints, strainers and devices which serve such purposes as mixing, separating, snubbing, distributing, metering or controlling flow, pipe-supporting fixtures and structural attachments.

**PLENUM** is an air compartment or chamber including uninhabited crawl spaces, areas above a ceiling or below a floor, including air spaces below raised floors of computer/data processing centers, or attic spaces, to which one or more ducts are connected and which forms part of either the supply air, return air or exhaust air system, other than the occupied space being conditioned.

**PLUMBING CODE [Not adopted by HCD]** is the Uniform Plumbing Code promulgated by the International Association of Plumbing and Mechanical Officials as adopted by this jurisdiction.

**Exception:** *[For HCD 1 & HCD 2] Whenever the term "Plumbing Code" is used in this code, it shall mean the California Plumbing Code, Title 24, Part 6.*

**PORTABLE COOLING UNIT** is a self-contained refrigerating system, not over three horsepower rating, which has been factory-assembled and tested, installed without supply air ducts and without connecting any refrigerant-containing parts. This definition shall not include an absorption unit.

**PORTABLE EVAPORATIVE COOLER** is an evaporative cooler which discharges the conditioned air directly into the conditioned area without the use of ducts and can be readily transported from place to place without dismantling any portion thereof.

**PORTABLE HEATING APPLIANCE** is a heating appliance designed for environmental heating which may have a self-contained fuel supply and is not secured or attached to a building by any means other than by a factory-installed power supply cord.

**PORTABLE VENTILATING EQUIPMENT** is ventilating equipment that can be readily transported from place to place without dismantling a portion thereof and which is not connected to a duct.

**POSITIVE DISPLACEMENT COMPRESSOR** is a compressor in which increase in pressure is attained

by changing the internal volume of the compression chamber.

**POWER BOILER PLANT.** One or more power steam boilers or power hot water boilers and connecting piping and vessels within the same premises.

**PRESSURE, DESIGN** is the maximum working pressure for which a specific part of a refrigeration system is designed.

**PRESSURE, FIELD TEST** is a test performed in the field to prove system tightness.

**PRESSURE-IMPOSING ELEMENT** is a device or portion of the equipment used for the purpose of increasing the pressure of the refrigerant vapor.

**PRESSURE-LIMITING DEVICE** is a pressure-responsive mechanism designed to automatically stop the operation of the pressure-imposing element at a predetermined pressure.

**PRESSURE-RELIEF DEVICE** is a pressure-actuated valve or rupture member or fusible plug designed to automatically relieve excessive pressure.

**PRESSURE VESSEL—REFRIGERANT** is a refrigerant-containing receptacle which is a portion of a refrigeration system, but shall not include evaporators, headers or piping of certain limited size and capacity.

**PRESSURE TEST** is the minimum gage pressure to which a specific system component is subjected under test condition.

**219.0** **–Q–**

No definitions.

**220.0** **–R–**

**RADIANT HEATER** is a heater designed to transfer heat primarily by direct radiation.

**RECEIVER, LIQUID** a vessel permanently connected to a refrigeration system by inlet and outlet pipes for storage of liquid.

**REFRIGERANT SAFETY CLASSIFICATIONS.** The safety classification is made up of a letter (A or B), which indicates the toxicity class, followed by a number (1, 2, or 3), which indicates the flammability class. Refrigerant blends are similarly classified, based on the compositions at their worst cases of fractionation, as separately determined for toxicity and flammability. In some cases, the worst case of fractionation is the original formulation.

**TOXICITY:** Classes A and B signify refrigerants with "lower toxicity" and "higher toxicity", respectively, based on prescribed measures of chronic (long-term, repeated exposures) toxicity.

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**FLAMMABILITY:** Class 1 indicates refrigerants that do not show flame propagation in air when tested by prescribed methods at specified conditions. Classes 2 and 3 signify refrigerants with “lower flammability” and “higher flammability”, respectively. The distinction depends on both the lower flammability limit (LFL) and heat of combustion.

**REFRIGERATION MACHINERY ROOM** is a space that is designed to safely house compressors and pressure vessels.

**REFRIGERATION SYSTEM, ABSORPTION** is a heat-operated closed-refrigeration cycle in which a secondary fluid, the absorbent, absorbs a primary fluid, the refrigerant that has been vaporized in the evaporator.

**REFRIGERATION SYSTEM, MECHANICAL** is a combination of interconnected refrigerant containing parts constituting one closed refrigerant circuit in which a refrigerant is circulated for the purpose of extracting heat and in which a compressor is used for compressing the refrigerant vapor.

**REFRIGERATION SYSTEM, SELF-CONTAINED** is a complete factory-assembled and tested system that is shipped in one or more sections and has no refrigerant-containing parts that are joined in the field by other than companion or block valves.

**REFRIGERATION ROOM or SPACE** is a room or space in which an evaporator or brine coil is located for the purpose of reducing or controlling the temperature within the room or space to below 68°F (20°C).

**RESIDENTIAL BUILDING** is a building or portion thereof designed or used for human habitation.

**RISER HEAT PIPE** is a duct which extends at an angle of more than forty-five (45) degrees (0.79 rad) from the horizontal. This definition shall not include any boot connection.

**ROOM HEATER** is a freestanding, nonrecessed, environmental heating appliance installed in the space being heated and not connected to ducts.

**ROOM LARGE IN COMPARISON WITH SIZE OF EQUIPMENT** is a room having a volume of at least twelve (12) times the total volume of a furnace or air-conditioning appliance and at least sixteen (16) times the total volume of a boiler. Total volume of the appliance is determined from exterior dimensions and includes fan compartments and burner vestibules when used. When the actual ceiling height of a room is greater than eight (8) feet (2438 mm), the volume of the room is figured on the basis of a ceiling height of eight (8) feet (2438 mm).

**RUPTURE MEMBER** is a pressure-relief device that

operates by the rupture of a diaphragm within the device on a rise to a predetermined pressure.

**221.0 –S–**

**SEAM, WELDED.** See JOINT, WELDED.

**SELF-CONTAINED** means having all essential working parts, except energy and control connections, so contained in a case or framework that they do not depend on appliances or fastenings outside of the machine.

**SHAFT** is an interior space enclosed by walls or construction extending through one or more stories or basements which connects openings in successive floors or floors and roof, to accommodate elevators, dumbwaiters, mechanical equipment or similar devices to transmit light or ventilation air.

**SHAFT ENCLOSURE** is the walls or construction forming the boundaries of a shaft.

**SMOKE DETECTOR** is an approved device that senses visible or invisible particles of combustion.

**STATE BUILDING CODE [For OSHPD 1, 2, 3 & 4]** is the most recent edition of the California Building Code.

**STRENGTH, ULTIMATE** is the highest stress level which the component can tolerate without rupture.

**222.0 –T–**

**TESTING AGENCY [For HCD 1 & HCD 2]** Health and Safety Code Section 17920(m) is repeated for clarity and reads as follows:

**Section 17920(m)** “Testing agency” means an agency approved by the department as qualified and equipped for testing of products, materials, equipment, and installations in accordance with nationally recognized standards.

**223.0 –U–**

**UMC [For HCD 1 & 2, SFM, DSA/SS, OSHPD 1, 2, 3 & 4]** is the most recent edition of the Uniform Mechanical Code published by the International Association of Plumbing and Mechanical Officials.

**UMC STANDARDS [For HCD 1 & 2, SFM, DSA/SS, OSHPD 1, 2, 3 & 4]** are the Uniform Mechanical Code Standards included in Appendix A of the most recent edition of the Uniform Mechanical Code published by the International Association of Plumbing and Mechanical Officials.

**UNCONFINED SPACE** is a room or space having a volume equal to at least fifty (50) cubic feet (1.42 m<sup>3</sup>) per 1000 Btu/h (0.293 kW) of the aggregate input rating of all fuel-burning appliances installed in that

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# CHAPTER 4

## VENTILATION AIR SUPPLY

### 401.0 General

This chapter contains requirements for evaporative cooling systems and makeup air requirements for direct-gas fired heaters, industrial air heaters and miscellaneous heaters. Ventilation air supply requirements for specific occupancies are found in the Building Code. **[For OSHPD 1, 2, 3 & 4]** See part III. **[For SFM]** Air filters shall comply with all requirements of State Standard 12-71-1.

#### Part I – Ventilation Air

### 402.0 Makeup Air

Makeup air requirements for direct gas-fired heaters, industrial air heaters and miscellaneous heaters are found in Chapters 5 and 9.

#### Part II – Evaporative Cooling Systems

**403.0 General.** Evaporative cooling systems shall comply with this chapter.

Except for Section 906.0, evaporative cooling systems shall be provided with outside air as specified for cooling systems in this code.

Air ducts and fire dampers which are a portion of an evaporative cooling system shall comply with this code.

**Exception:** **[For OSHPD 1, 2, 3 & 4]** Direct evaporative cooling systems where the air directly contacts the wetted surface or spray shall be limited in health facilities to nonpatient areas such as laundry rooms, food preparation areas and boiler or machinery rooms. Similar with high heating-producing equipment will be considered when specifically approved by the enforcing agency. The evaporative pads, if used, shall be a synthetic type. Filters shall be required in accordance with Tables 4-B and 4-C except utility type rooms i.e.: boiler or machinery rooms.

**404.0 Location.** Evaporative cooling systems shall be installed so as to minimize the probability of damage from an external source.

**405.0 Access, Inspection and Repair.** Evaporative coolers shall be accessible for inspection, service and replacement without removing permanent construction.

**406.0 Installation.** An evaporative cooler supported by the building structure shall be installed on a substantial level base and shall be secured directly or indirectly to the building structure by suitable means to prevent displacement of the cooler.

Modifications made to the supporting framework of buildings as a result of the installation shall be in accordance with the requirements of the Building Code. Openings in exterior walls shall be flashed in an approved manner in accordance with the requirements of the Building Code.

An evaporative cooler supported directly by the ground shall be isolated from the ground by a level concrete slab extending not less than three (3) inches (76 mm) above the adjoining ground level.

An evaporative cooler supported on an above-ground platform shall be elevated at least six (6) inches (152 mm) above adjoining ground level.

#### Part III – Ventilation for Health Care Facilities **[For OSHPD 1, 2, 3 & 4]**

### Section 407.0 - Ventilation System Details **[For OSHPD 1, 2, 3 & 4]**

#### 407.1 General.

**407.1.1** All supply-air and exhaust-air systems shall be mechanically operated and such systems for areas listed in Table 4-A shall be operated continuously. Natural ventilation through windows or other openings such as louvers will be considered as supplemental to the required mechanical ventilation systems.

**Exceptions:** 1. Natural ventilation shall not be used in negative-pressure isolation rooms and positive-pressure isolation rooms.

2. The number of air changes may be reduced to 25 percent of the indicated value in Table 4-A, when the room is unoccupied, if provisions are made to ensure the following: (1) the number of air changes indicated is reestablished whenever the space is occupied and (2) the pressure relationship with the surrounding rooms is maintained when the air changes are reduced. In areas requiring no continuous directional control as identified in accordance with Table 4-A, ventilation systems may be shut down when the space is unoccupied and ventilation is not otherwise required. Ventilation shall not be reduced in rooms specifically used for airborne infection control, such as waiting rooms,

triage rooms, corridors, reception areas, areas adjacent to waiting areas, negative pressure isolation rooms, negative pressure exam room, negative pressure x-ray treatment rooms, and positive pressure isolation rooms. All operating and delivery rooms shall maintain a minimum of six air changes per hour when not in use.

**407.1.2** Fans serving exhaust systems shall be located at the discharge end of the system. The ventilation rates shown in Table 4-A shall be considered as minimum acceptable rates and shall not be construed as precluding the use of higher ventilation rates if they are required to meet design conditions.

**407.1.3 Services/Systems and Utilities.** See Section 313.2.

**407.2 Outdoor Air Intakes and Exhaust Outlets.**

**407.2.1 Outdoor Air Intakes.** Outdoor air intakes shall be located at least 25 feet (7.62 m) from exhaust outlets of ventilating systems, combustion equipment stacks, medical-surgical vacuum systems, cooling towers and areas that may collect vehicular exhaust or other noxious fumes. The bottom of outdoor air intakes shall be located as high as practicable, but not less than 10 feet (3048 mm), above ground level. If installed through the roof, they shall be located 18 inches (457 mm) above roof level or 3 feet (914 mm) above a flat roof where heavy snowfall is anticipated.

**Exceptions:** 1. These dimensions may be reduced if it is demonstrated by the submission of details and calculations that location of intakes with respect to exhausts and their orientation, or the use of special filters, provides equal performance.

2. The requirements regarding the bottom of outdoor air intakes and installation through the roof do not apply to skilled nursing facilities, intermediate-care facilities or nonsensitive areas in correctional treatment centers.

**407.2.2 Exhaust Outlets.** Exhaust outlets shall be located a minimum of 10 feet (3048 mm) above adjoining grade and 10 feet (3048 mm) from doors, occupied areas and operable windows.

**Exception:** Negative-pressure isolation rooms shall comply with Section 414.1.

**407.3 Air Balance.**

**407.3.1** The ventilation systems shall be designed and balanced to provide the general air balance relationship to adjacent areas shown in Table 4-A. The ventilation systems shall be balanced in accordance with the latest edition of standards published by the Associated Air Balance Council (AABC) or the National Environmental Balancing

Bureau (NEBB).

**407.3.2** Where the variation in static pressure drop across filters is a significant portion of the total pressure drop, static pressure or pressure differential controls or constant volume devices may be required to ensure the maintenance of air balance relationships shown in Table 4-A regardless of filter loading.

**Exception:** This section does not pertain to skilled nursing facilities, intermediate-care facilities and nonsensitive areas in correctional treatment centers, except for negative-pressure isolation rooms and positive-pressure isolation rooms.

**407.4 Air Circulation.**

**406.4.1** Air shall be introduced at the cleanest areas and removed at the dirtiest areas in order to reduce changes of airborne cross infection as follows:

**407.4.1.1** Air supplied to operating rooms, cardiac catheterization labs, cystoscopy rooms, delivery rooms and nurseries, shall be delivered at or near the ceiling of the area served, and all air removed from the area shall be removed near floor level. At least two exhaust or recirculation air inlets shall be used in all operating and delivery rooms and shall be located not less than 3 inches (76 mm) nor more than 8 inches (203 mm) above the finished floor.

**Exception:** For negative-pressure isolation rooms and positive-pressure isolation rooms, see Sections 414.0 and 415.0.

**407.4.1.2** Room supply air outlets and room recirculation and exhaust air inlets installed in nonsensitive areas shall be located not less than 3 inches (76 mm) above the floor.

**Exception:** For negative-pressure isolation rooms and positive-pressure isolation rooms, see Sections 414.0 and 415.0.

**407.4.1.3** Corridors shall not be used to supply air to or exhaust air from any room except to ventilate small rooms [30 square feet (2.79 m<sup>2</sup>) or less] which are mechanically exhausted, such as bathrooms, toilet rooms and janitors' closets opening directly on corridors.

**407.4.1.4** No space above a ceiling may be utilized as an outside-air, supply-air, exhaust-air or return-air plenum.

**Exception:** Designs specifically approved by the enforcing agency.

**407.5 Variable Air Volume.**

**407.5.1 Variable Air Volume Systems (VAV).** Variable air volume systems subjecting the patient to a fluctuating air movement are not acceptable for negative-pressure isolation rooms, positive-pressure isolation rooms or those critically sensitive areas listed in Table 315. For nonsensitive areas, variable



listed in Table 4-B.

**408.4.2** Noncentral air systems serving individual rooms shall comply with Table 4-B.

**Section 409.0 - Ducts [For OSHPD 1, 2, 3 & 4]**

**409.1** Ducts which penetrate construction, intended for X-ray or other radiation protection, shall not impair the effectiveness of the protection.

**409.2** Duct linings and their use shall meet the requirements of Chapter 6, California Mechanical Code.

**409.3** Cold-air ducts shall be insulated wherever necessary or to prevent condensation problems.

**409.4** The anchorage and supporting structural elements for airducts shall be designed to withstand the lateral forces as required by the California Building Code, Title 24, Part 2.

**Section 410.0 - Laboratories [For OSHPD 1, 2, 3 & 4]**

**410.1** The minimum amount of outdoor air in laboratories shall be provided in accordance with Table 4-A. A filter with 90 percent average efficiency shall be installed in the air-supply system at its entrance to the media transfer room.

**410.2** Laboratory hoods for general use shall have a minimum average face velocity of 75 feet per minute (380 m/s). Hoods in which infectious or highly radioactive materials are processed shall have a face velocity of 100 feet per minute (510 m/s) and each shall have an independent exhaust system with the fan installed at the discharge point of the system. Bacteriological safety cabinets used for processing infectious materials shall have an average face velocity of 50 to 70 feet per minute (255 m/s to 355m/s) and shall be equipped with a means for disinfection.

**410.3** Duct systems serving fume hoods shall be constructed of stainless steel of a type which will resist corrosion by materials normally handled. Duct systems serving fume hoods used for purposes other than those needed for routine diagnostic laboratory procedures and in which highly radioactive materials or a significant volume of highly oxidizing agents are used shall be constructed of USS 18-8 stainless steel or the equivalent for a minimum distance of 10 feet (3048 mm) from the hood. Such ducts shall be equipped with wash down facilities and shall be consistent with fire safety requirements. Fire dampers and smoke dampers shall not be installed in laboratory hood exhaust systems.

**410.4** The exhaust from all laboratory hoods in which infectious or radioactive materials are processed shall be equipped with filters having a 99 percent efficiency

based on the DOP (dioctylphthalate) test method. Filter frames shall be durable and carefully dimensioned, and shall provide an airtight fit with the enclosing duct work. All joints between filter segments and the enclosing duct work shall be gasketed or sealed to provide a positive seal against air leakage.

**Section 411.0 - Kitchen and Dining Areas [For OSHPD 1, 2, 3 & 4]**

**411.1** The air from dining areas may be used to ventilate the food preparation areas only after it has passed through a filter with at least an 80 percent average efficiency.

**Exception:** For skilled nursing facilities, intermediate care facilities and correctional treatment centers, the air from dining areas may be used to ventilate food preparation areas only after it has passed through a filter with a 50 percent average efficiency.

**Section 412.0 - Boiler, Mechanical and Electrical Rooms [For OSHPD 1, 2, 3 & 4]**

**412.1** Boiler, heater and electrical equipment rooms shall be provided with outdoor air so as to maintain combustion rates of equipment and temperatures in the rooms and in adjoining areas as rated in this chapter.

**412.2** Floor surfaces in occupied spaces above such rooms should not exceed a temperature of 85°F (29.4°C), and suitable insulation may be required.

**Section 413.0 - Odorous Rooms [For OSHPD 1, 2, 3 & 4]**

**413.1** Rooms in areas where excessive heat or moisture is generated, where objectional odors or dust are present, or where flammable or toxic gases may accumulate, which are used by health facility personnel or patients, shall be provided with exhaust ventilation to change the air a minimum of ten times per hour.

**413.2** Kitchens, morgues and laundries located inside a hospital building or skilled nursing facility in which patients are accommodated, or treated, shall be ventilated with exhaust systems which will provide a minimum of ten air changes per hour and prevent odors from entering patient areas.

**Section 414.0 - Negative-Pressure Isolation Rooms [For OSHPD 1, 2, 3 & 4]**

**414.1 Exhaust Systems.** A separate, dedicated exhaust system shall be provided for negative-

(14.65 kW), but not exceeding 65,000 Btu/h (19.1 kW) shall require twelve (12) inch (305 mm) vent termination clearances. The bottom of the vent terminal and the air intake shall be located at least twelve (12) inches (305 mm) above grade.

Venting systems shall terminate at least three (3) feet (914 mm) above an outside- or makeup-air inlet located within ten (10) feet (3048 mm) and at least four (4) feet (1219 mm) from a property line, except a public way.

**806.7 Outdoor Appliances with Integral Vents.** Appliances listed for outdoor installation incorporating integral venting means shall be considered as being properly vented when they are installed in accordance with their listings and the manufacturer's instructions. Venting systems shall terminate at least four (4) feet (1219 mm) below or four (4) feet (1219 mm) horizontally from, and at least one (1) foot (305 mm) above a door, an openable window or a gravity-air inlet into a building. Venting systems shall terminate not less than three (3) feet (914 mm) above a forced-air inlet located within ten (10) feet (3048 mm) and at least four (4) feet (1219 mm) from a property line, except a public way.

#### **807.0 Vents for Wall Furnaces Requiring a Type BW Gas Vent**

In addition to other requirements specified in this chapter, gas-burning vented wall furnaces requiring a Type BW gas vent shall be vented to comply with the following requirements:

**807.1** Type BW gas vents shall be attached to a solid header plate designed for the vented wall furnace installed. This attachment shall be made by a base plate furnished with the gas vent used.

**807.2** The stud space in which a Type BW gas vent is installed shall be free of obstructions, except for fire-stop spacers that are required for multistory Type BW gas vents. All ceiling plates and floor plates through which the gas vent passes shall be cut flush with the adjacent wall studs.

**807.3** Clearance of Type BW gas vent from any material shall be that space provided by the base plate, ceiling plate spacer straps and fire-stop spacers, furnished with the gas vent used. When Type BW gas vent is located in a stud space, care shall be exercised so that clearances provided by spacers are maintained after application of wall coverings and other parts of the construction. A sheet metal barrier shall be installed between a BW gas vent located in a stud space and wall covering constructed of perforated lath, metal lath or building paper.

**807.4** Type BW gas vent listed only for single-story use shall be installed only in a single-story building or on the top story of a multi-story building. Type BW

gas vent listed for multi-story use may be installed in single- or multi-story buildings.

**807.5** A stud space that contains a Type BW gas vent, which is serving a vented wall furnace installed in a single-story building or in the top story of a multi-story building, shall be open to an attic space or to a ventilated roof flashing equipped with a storm collar.

**Exception:** In lieu of a ventilated roof flashing, this stud space may be ventilated by providing an opening in the wall covering, within twelve (12) inches (305 mm) of the upper portion of the stud space, opening into a room served by the wall furnace.

Where a Type BW gas vent extends into an attic space, a metal sleeve not less than 0.016 inch (0.41 mm) (No. 26 manufacturer's standard gage) steel, having the same area as the opening through the ceiling plate, shall extend around the gas vent from the top of the ceiling plate into the attic at least twelve (12) inches (305 mm) or to a point two (2) inches (51 mm) below the roof sheathing, whichever is less. This sleeve shall be securely fixed in position.

**Exception:** The metal sleeve will not be required if fire-stop spacers are required at the ceiling plate by Section 807.6 of this section.

**807.6** The stud space in which a vented recessed wall furnace is installed shall be ventilated at the first ceiling plate level above the furnace by the ceiling plate spacer furnished with the gas vent used. Fire-stop spacers furnished with the gas vent used shall be installed at each subsequent ceiling plate through which the gas vent passes.

**807.7** A suitable metal guard shall be installed at the floor line of each floor through which the gas vent passes to assure required clearance from combustible material and to prevent damage to the vent.

**807.8** When a Type BW gas vent is installed in an existing building, the wall covering one side of the vent shall be completely open for installation and inspection.

**807.9** Type BW gas vents shall extend from the header plate of the vented wall furnace to a point above the highest ceiling plate through which the vent passes, without offsets or crossovers therein. After a Type BW gas vent passes through the highest ceiling plate above the furnace which it serves, the vent system may be completed with Type B gas vent of the same manufacturer, and offsets or break-overs shall be limited to those specified in Section 805.0.

#### **808.0 Size of Gravity Venting System**

Gravity venting systems shall have an internal cross-sectional area equivalent to the area of the vent collar on the appliance.

**Exception:** Pressurized venting systems which are an integral part of a listed appliance employing plastic pipe are regulated under the fifth paragraph of Section 801.0 and Column IV of Table 8-3.

Gravity venting systems shall have an area of at least seven (7) square inches (4516 mm<sup>2</sup>) unless the venting system is an integral part of a listed appliance.

### 809.0 Multiple-Appliance Venting Systems

Two or more oil- or gas-burning appliances may be connected to a common venting system, or automatically controlled gas appliances may be vented into the same chimney serving liquid-fuel-fired appliances, provided: (a) the gas appliances are each equipped with a safety shutoff device, (b) each oil appliance is equipped with a primary safety control, and (c) the venting system is designed to meet the requirements of Section 801.0 of this code, or the venting system complies with the following requirements:

**809.1** Appliances which are connected to a common venting system shall be located within the same story of the building, except designed vent systems as provided by Section 801.0.

**809.2** Two or more connectors shall not enter a common venting system unless the inlets are offset in such a manner that no portion of an inlet is opposite the other inlets.

**809.3** When two or more appliances are connected to one venting system, the venting system area shall be not less than the area of the largest vent connector plus 50 percent of the areas of the additional vent connectors.

**809.4** Each vent connector of a multiple venting system shall have the greatest possible rise consistent with the headroom available between the draft hood outlet, the barometric damper or the flue collar and the point of interconnection to a manifold, to a common vent or to a chimney.

### 810.0 Existing Venting Systems

An existing venting system shall not be connected to a replaced appliance unless the venting system complies with all the following requirements:

**810.1** The venting system shall have been lawfully installed in compliance with the code in effect at the time of its installation and shall be in a safe condition.

**810.2** The internal area of the venting system shall comply with Section 808.0 for a single-appliance venting system and Section 809.0 for multiple-appliance venting systems.

**810.3** The venting system shall be connected to the appliance in a safe manner.

### 811.0 Draft Hoods

An appliance draft hood shall be located in the same room or space as the combustion air opening of the appliance.

A draft hood shall be installed in the position for which it was designed and shall be located so that the draft hood relief opening is at least six (6) inches (152 mm) from any surface other than the appliance it serves, measured in a direction 90 degrees (1.57 rad) to the plane of the relief opening. When a greater clearance is indicated by the appliance approval, as shown on the appliance label, the greater clearance shall be provided.

### 812.0 Types of Chimneys

**812.1 Factory-Built Chimneys.** Factory-built chimneys shall be installed in accordance with the terms of their listing, the manufacturer's installation instructions and the applicable requirements of this code. Factory-built chimneys shall terminate as required for unlisted single-wall metal chimneys in Table 8-4.

Chimneys used with fireplaces or heating appliances in which solid or liquid fuel is used shall be maintained with a spark arrestor as required for incinerators.

**Exception:** Chimneys which are located more than 200 feet (60960 mm) from any mountainous, brush-covered or forest-covered land or land covered with flammable material and are not attached to any structure having less than Class C roofing, as set forth in the Building Code.

**812.2 Masonry Chimneys.** Masonry chimneys shall be constructed to meet the requirements of Section 813.0.

**812.3 Metal Chimneys.** Metal chimneys shall be constructed to meet the requirements of Section 814.0.

### 813.0 Masonry Chimneys

**813.1 Design.** Masonry chimneys shall be designed, anchored, supported and reinforced as required in Chapters 16, 18 and 31 of the Building Code.

**813.2 Gas Venting into Existing Masonry Chimneys.** Existing lined masonry chimneys and unlined chimneys with not more than one side exposed to the outside may be used to vent gas appliances, provided:

**813.2.1** An approved liner shall be installed in an existing unlined masonry chimney when deemed necessary by the Administrative Authority considering local problems of vent gas condensate.

**813.2.2** The effective cross-sectional area is not more than four times the cross-sectional area of the vent and chimney connectors entering the chimney.

**813.2.3** The effective area of the chimney when connected to more than one appliance shall be not less than the area of the largest vent or chimney connector plus 50 percent of the area of the additional vent or chimney connectors.

**813.2.4** Automatically controlled gas appliances connected to a chimney which also serves equipment burning liquid fuel shall be equipped with an automatic pilot. A gas appliance vent connector and a chimney connector from an appliance burning liquid fuel may be connected into the same chimney through separate openings, provided the gas appliance is vented above the liquid fuel-burning appliance, or both may be connected through a single opening if joined by a suitable fitting located at the chimney.

**813.2.5** The chimney passageway shall be examined to ascertain that it is clear and free of obstructions and shall be cleaned if previously used for venting solid- or liquid-fuel-burning appliances.

**813.2.6** The vent or chimney connector shall enter the chimney at least six (6) inches (152 mm) from the bottom of the chimney. The chimney shall be provided with a cleanout. If six (6) inches (152 mm) are not available, a cleanout shall be provided by installing a capped tee in the vent connector next to the chimney.

Unlined chimneys with more than one side exposed to the outside shall be lined with an approved liner unless otherwise approved by the Administrative Authority.

When inspection reveals that an existing chimney is not safe for the intended application, it shall be rebuilt to conform to chimney standards of the Building Code or replaced with an approved gas vent or factory-built chimney complying with Section 812.1.

## 814.0 Metal Chimneys

### 814.1 General

**814.1.1 Limitations.** Unlisted single-wall metal chimneys (smokestacks) shall not be installed within a dwelling unit of a Group R Occupancy.

Metal chimneys shall not be carried up inside ventilating ducts unless such ducts are

constructed and installed as required by this code for chimneys and are used solely for exhaust of air from the room or space in which the appliances served by the metal chimneys are located.

**814.1.2 Construction.** Unlisted metal chimneys shall be riveted or welded and, unless structurally self-supporting, shall be guyed securely or firmly anchored to or otherwise supported by the building or structure served thereby. All joints shall be liquidtight or of such a design that liquid will drain to the interior of the chimney.

**814.1.2.1 Design.** Metal chimneys shall have a minimum thickness of 0.127 inch (3.23mm) (No. 10 manufacturer's standard gage) steel and shall be designed and constructed as specified in this chapter and Chapter 16 and 22 of the Uniform Building Code.

**814.1.3 Lining.** Metal chimneys shall be lined as required by Table 8-4.

**814.1.4 Termination.** Metal chimneys shall terminate as required by Table 8-4.

**814.1.5 Clearance.** Clearance from combustible construction shall be in accordance with Table 8-4 and the applicable requirements for each classification of chimney as required by this chapter.

When a metal chimney passes through a ceiling or roof constructed of combustible materials, it shall be protected by an approved ventilating thimble extending not less than nine (9) inches (229 mm) below and nine (9) inches (229 mm) above the ceiling or roof construction. Thimbles shall be of a size to provide a clearance on all sides of the chimney at least eighteen (18) inches (457 mm), except that for chimneys of low-heat appliances the clearance may be reduced to at least six (6) inches (152 mm).

**814.1.6 Support.** Metal chimneys shall be supported on properly designed foundations of masonry or reinforced concrete or on noncombustible material having a fire-resistance rating of not less than three hours, provided such supports are independent of the building construction and the load is transferred to the ground.

**814.1.7 Enclosure Required for Interior Chimneys.** Metal chimneys or parts thereof in a building exceeding one story in height shall be enclosed above the story in which the appliance served is located, in walls of noncombustible construction having a fire-resistive rating of not less than one hour if the building is less than four stories in height, and not less than two hours if the building is four stories or more in height, with a space on all sides between the

chimney and the enclosing walls sufficient to render the entire chimney accessible for examination and repair. The enclosing walls shall be without openings.

**Exception:** Doorways equipped with a fire assembly having a one-hour fire-resistive rating may be permitted at each floor level for inspection purposes.

**814.2 Metal Chimneys for Building Heating and Industrial-Type Low-Heat Appliances.** When a metal chimney used for building heating and industrial-type low-heat appliances is located in the same story of a building as that in which the appliances connected thereto are located, it shall have a clearance of not less than eighteen (18) inches (457 mm) from any combustible material. Interior metal chimneys over eighteen (18) inches (457 mm) in diameter shall have a clearance of not less than four (4) inches (102 mm); those less than eighteen (18) inches (457 mm) in diameter shall have a clearance of at least two (2) inches (51 mm) from noncombustible construction.

When a metal chimney serving only building heating and industrial-type or low-heat appliances passes through a roof constructed of combustible material, the roof shall be guarded by a ventilating thimble of galvanized steel or approved corrosion-resistant metal extending at least nine (9) inches (229 mm) below and nine (9) inches (229 mm) above the roof construction, and of a size to provide not less than six (6) inch (152 mm) clearance on all sides of the chimney; or the combustible material in the roof construction shall be cut away so as to provide not less than eighteen (18) inch (457 mm) clearance on all sides of the chimney, with any material used to close up such opening entirely noncombustible.

**814.3 Metal Chimneys for Medium-Heat Appliances.** Metal chimneys for medium-heat appliances and producing flue gases having a temperature above 1000°F (538°C), measured at the entrance to the chimney, shall be lined with medium-duty firebrick which is in accordance with recognized building code standards, laid in fireclay mortar. The lining shall be at least 2-1/2 inches (64 mm) thick for chimneys having a diameter or greatest cross-section dimension of eighteen (18) inches (457 mm) or less and shall have a thickness of not less than 4-1/2 inches (114 mm) laid on a 4-1/2 inch (114 mm) bed for chimneys having a diameter or greatest cross-section dimension greater than eighteen (18) inches (457 mm). The lining shall start two (2) feet (610 mm) or more below the lowest chimney connector entrance and shall extend to a height of at least twenty-five (25) feet (7620 mm) above the highest chimney connector entrance.

Where a metal chimney serving a medium-heat

appliance passes through a roof constructed of combustible material, the roof shall be guarded by a ventilating thimble of galvanized iron or approved corrosion-resistant metal extending not less than nine (9) inches (229 mm) below and nine (9) inches (229 mm) above the roof construction and of a size to provide not less than eighteen (18) inch (457 mm) clearance on all sides of the chimney.

Where a metal chimney used for medium-heat appliances is located in the same story of a building as that in which the appliances connected are located, it shall have a clearance of not less than thirty-six (36) inches (914 mm) from any combustible material. Such interior metal chimneys over eighteen (18) inches (457 mm) in diameter shall have a clearance of not less than four (4) inches (102 mm), and those eighteen (18) inches (457 mm) or less in diameter a clearance of not less than two (2) inches (51 mm) from noncombustible construction.

**814.4 Metal Chimneys for High-Heat Appliances.** Metal chimneys for high-heat appliances shall be lined with high-duty firebrick as specified in recognized building code standards, not less than 4-1/2 inches (114 mm) thick laid on the 4-1/2 inch (114 mm) bed in refractory mortar as specified in recognized building code standards. The lining shall start two (2) feet (610 mm) or more below the lowest chimney connector entrance and shall extend to a height of at least twenty-five (25) feet (7620 mm) above the highest chimney connector entrance. Chimneys terminating twenty-five (25) feet (7620 mm) or less above a chimney connector entrance shall be lined to the top.

#### **814.5 Metal Chimneys for Incinerators**

##### **814.5.1 Residential-Type Incinerators.**

Galvanized steel pipe not less than 0.129 inch (3.28 mm) (No. 10 galvanized-sheet gage number) or other equivalent noncombustible, fire- and corrosion-resistant material may be used for residential-type incinerators installed in locations such as open sheds, breezeways or carports, provided the pipe is exposed and readily examinable for its full length and clearance not less than eighteen (18) inches (457 mm) is maintained from combustible material. The pipe shall extend at least three (3) feet (914 mm) above the highest point where it passes by or through a roof and at least two (2) feet (610 mm) higher than any portion of a building within ten (10) feet (3048 mm). If the pipe passes through a roof constructed of combustible material, it shall be guarded by a ventilating thimble of galvanized sheet steel or approved corrosion-resistant noncombustible material extending not less than nine (9) inches (229 mm) below and nine (9) inches (229 mm) above the roof construction and

outside of the building by continuous ducts.

**1106.7.2** A mechanical exhaust system arranged to provide a complete change of air in such room or space at least every 20 minutes and to discharge to the outside of the building.

**Exceptions:**

1. A condensing unit in a room or space if the cubical content exceeds 1000 cubic feet per horsepower (38.50 m<sup>3</sup>/kW) of the unit.
2. A condensing unit in a room or space that has permanent gravity ventilation having an area of two (2) square feet (0.19 m<sup>2</sup>) or more to other rooms or openings exceeding 1000 cubic feet per horsepower (38.50 m<sup>3</sup>/kW).

**1106.8 Prohibited Locations.** Refrigeration systems or portions thereof shall not be located within a required exit enclosure. Refrigeration compressors exceeding five (5) horsepower (3.68 kW) rating shall be located at least ten (10) feet (3048 mm) from an exit opening in a Group A; Group B; Group E; Group F; Group I; Group R, Division 1; or Group S Occupancy unless separated by a one-hour fire-resistive occupancy separation.

**1106.9 Condensation Control.** Piping and fittings which convey brine, refrigerant or coolants which during normal operation could reach a surface temperature below the dew point of the surrounding air and which are located in spaces or areas where condensation could cause a hazard to the building occupants, damage to the structure, electrical or other equipment shall be protected to prevent such an occurrence.

**1106.10 Condensate.** Condensate from air-cooling coils shall be collected and drained to an approved location. Drain pans and coils shall be arranged to allow thorough drainage and access for cleaning. Where temperatures can drop below freezing, heat tracing and insulation of condensate drains shall be installed.

**1106.11 Defrost.** When defrost cycles are required for portions of the system, provisions shall be made for collection and disposal of the defrost liquid in a safe and sanitary manner.

**1106.12 Overflows.** Where condensate or defrost liquids are generated in an attic or furred space and structural damage may result from overflow, provisions for overflow shall be provided.

**1106.13 Condensate, Defrost and Overflow Disposal.** Disposal of condensate, defrost or overflow discharges shall comply with Section 310.0.

**1107.0 Refrigeration Machinery Rooms**

**1107.1 When Required.** Refrigeration systems shall

be provided with a refrigeration machinery room when any of the following conditions exist:

**1107.1.1** The quantity of refrigerant in a single, independent refrigerant circuit of a system exceeds Table 11-1 amounts.

**1107.1.2** Direct-and indirect-fired absorption equipment.

**Exceptions:**

1. Systems containing less than thirty-five (35) pounds (16 kg) of refrigerant R-717 and located in an approved exterior location.

2. Direct and indirect-fired lithium bromide absorption systems using water as the refrigerant.

Refrigeration machinery rooms shall house all refrigerant-containing portions of the system other than the piping and evaporators permitted by Section 1105.3, discharge piping required of this chapter, and cooling towers regulated by this chapter, Part II, and their essential piping.

**1107.1.3** An A1 system having an aggregate combined compressor horsepower of 100 (73.55 kW) or more.

**1107.2 Dimensions.** Refrigeration machinery rooms shall be of such dimensions that all system parts are readily accessible with adequate space for maintenance and operations. An unobstructed walking space at least three (3) feet (914 mm) in width and six (6) feet eight (8) inches (2032 mm) in height shall be maintained throughout allowing free access to at least two sides of all moving machinery and approaching each stop valve. Access to refrigeration machinery rooms shall be restricted to authorized personnel and posted with a permanent sign.

**1107.3 Exits.** Exits shall comply with the Building Code for special hazards.

**1107.4 Refrigerant-Vapor Alarms.** Machinery rooms shall have approved refrigerant-vapor detectors, located in an area where refrigerant from a leak is likely to concentrate, and shall activate visual and audible alarms. Alarms shall be activated at a value not greater than one half the immediately dangerous to life or health (IDLH), or measurement consistent therewith; the PEL, or measurement consistent therewith; or 25 percent of the LFL, whichever is less.

**1107.5 Separation.** Refrigeration machinery rooms shall be separated from other portions of the building as required in *[For OSHPD 1, 2, 3 & 4] Chapter 28, Mechanical Systems* and the special hazards provisions of the Building Code. Penetrations shall be sealed to inhibit the passage of refrigerant vapor.

**1107.6 Combustion Air and Return Air.** Combustion air or return air shall not be taken from or through a refrigeration machinery room.

**Exceptions:**

1. Refrigeration machinery rooms used exclusively for direct-fired absorption equipment.
2. Direct-vented combustion equipment.

**1107.7 Special Requirements.** Open flames or devices having an exposed surface exceeding 800°F (427°C) are prohibited in refrigeration machinery rooms.

**Exceptions:**

1. Momentary temperature excursions such as electrical contacts in A1 and B1 systems.
2. Refrigeration machinery rooms used exclusively for direct-fired absorption equipment.

**1108.0 Refrigeration Machinery Room Ventilation**

**1108.1 General.** Refrigeration machinery rooms shall be provided with a continuous source of outside air for ventilation and removal of rejected heat.

**1108.2 Refrigeration Machinery Rooms.** Refrigeration machinery rooms shall be provided with dedicated mechanical exhaust systems. The exhaust systems shall have the capacity to achieve each of the following:

**1108.2.1** Continuously maintain the refrigeration machinery room at 0.05-inch (12.44 Pa) water gauge negative relative to adjacent spaces calculated by:

$$Q = 2610 \sqrt{p} \quad (11-1)$$

**Exception:** Refrigeration machinery rooms located in entirely detached structures and more than twenty (20) feet (6096 mm) from property lines or openings into buildings.

**1108.2.2** Continuously provide 0.5 cubic foot per minute of air flow per gross square foot (2.54 L/s/m<sup>2</sup>) of floor area within the refrigeration machinery rooms as calculated by:

$$Q = 0.5 A_{gf} \quad (11-2)$$

**1108.2.3** Limit the temperature rise within the refrigeration machinery room to a maximum of 104°F (40°C) as calculated by:

$$Q = q / 1.08 T \quad (11-3)$$

**1108.2.4** Provide emergency purge of escaping refrigerant as calculated by:

$$Q = 100 \sqrt{G} \quad (11-4)$$

WHERE:

$q$  = Btu/h of all heat-producing equipment.

$Q$  = air-flow rate, cubic feet per minute (cfm).

$\Delta p$  = pressure difference, inches water gage.

$A_e$  = equivalent leakage area, square feet (see the Building Code).

$A_{gf}$  = gross floor area, square feet.

$\Delta T$  = temperature difference between machinery room and supply air (°F).

$G$  = refrigerant mass in largest system, lbs.

**1108.3 Distribution of Ventilation.** Exhaust inlets or permanent openings shall be located to provide ventilation throughout the entire refrigeration machinery room.

**1108.4 Intermittent Control of the Ventilation Systems.** Fans providing refrigeration machinery room temperature control or automatic response to refrigerant gas in order to maintain concentrations below the PEL may be automatically controlled to provide intermittent ventilation as conditions require.

**1108.5 Emergency Control of the Ventilation Systems.** Fans providing emergency purge ventilation for refrigerant escape shall have a clearly identified switch of the break-glass type providing "on"-only control immediately adjacent to and outside of each refrigerant machinery room exit. Purge fans shall also respond automatically to the refrigerant concentration detection system set to activate the ventilation system at no more than 25 percent of the LFL or 50 percent of the IDLH or a measure equivalent thereto, whichever is less. An emergency purge control shall be provided with a manual reset only.

**1108.6 Central Control of Ventilation Systems.** Mechanical ventilation systems shall have switches to control power to each fan. The switches shall be key operated or within a locked glass-covered enclosure at an approved location adjacent to and outside of the principal entrance to the machinery room. Necessary keys shall be located in a single approved location. Switches controlling fans providing continuous ventilation shall be of the two position, on-off type. Switches controlling fans providing intermittent or emergency ventilation shall be of the three position, automatic on-off type. Switches shall be labeled identifying both function and specific fan controlled. Two colored and labeled indicator lamps responding to the differential

**TABLE 11-1**  
**Refrigerant Groups<sup>1</sup>, Properties<sup>2</sup> and Allowable Quantities<sup>3, 4</sup>**

x 0.016 = kg/m<sup>3</sup>

Refrigerant	Chemical Formula	Chemical Name <sup>4</sup> (Composition for Blends)	Chemical Abstract Service Number	Safety Group <sup>1</sup>	PEL <sup>5</sup> (ppm)	IDLH <sup>6</sup> (ppm)	LFL <sup>7</sup> (%V in air)	Specific Gravity (air=1)	Pounds per 1000 cf of Space <sup>8</sup>
R-11	CCl <sub>3</sub> F	Trichlorofluoromethane	75-69-4	A1	1000 <sup>9</sup>	5000 <sup>10</sup>	N/A	4.74	1.60
R-12	CCl <sub>2</sub> F <sub>2</sub>	Dichlorodifluoromethane	75-71-8	A1	1000	50,000	N/A	4.17	12.00
R-22	CHClF <sub>2</sub>	Chlorodifluoromethane	75-45-6	A1	1000 <sup>11</sup>	50,000 <sup>12</sup>	N/A	2.99	9.40
R-113	CCl <sub>2</sub> FCClF <sub>2</sub>	1,1,2-trichloro-1,2,2-trifluoroethane	76-13-1	A1	1000	4500	N/A	6.47	1.90
R-114	CClF <sub>2</sub> CClF <sub>2</sub>	1,2-dichloro-1,1,2,2-tetrafluoroethane	76-14-2	A1	1000	50,000	N/A	5.90	9.40
R-123	CHCl <sub>2</sub> CF <sub>3</sub>	2,2-dichloro-1,1,1-trifluoroethane	306-83-2	B1	10 <sup>11</sup>	4000 <sup>12</sup>	N/A	5.28	0.40
R-134a	CF <sub>3</sub> CH <sub>2</sub> F	1,1,1,2-tetrafluoroethane	811-97-5	A1	1000 <sup>11</sup>	50,000 <sup>12</sup>	N/A	3.52	16.00
R-500	azeotrope	R-12/152a (73.8/26.2)		A1	1,000 <sup>11</sup>	50,000 <sup>12</sup>	N/A	3.43	12.00
73.8%	CCl <sub>2</sub> F <sub>2</sub>	Dichlorodifluoromethane	75-71-8						
26.2%	CH <sub>3</sub> CHF <sub>2</sub>	1,1-difluoroethane	75-37-6						
R-502	azeotrope	R-22/115(48.8/51.2)		A1	1000 <sup>11</sup>	50,000 <sup>12</sup>	N/A	3.85	19.00
48%	CHClF <sub>2</sub>	Chlorodifluoroethane	75-45-6						
51.2%	CClF <sub>2</sub> CF <sub>3</sub>	1-chloro-1,1,2,2,2-pentafluoroethane	76-15-3						
R-717	NH <sub>3</sub>	Ammonia	7664-41-7	B2	50 <sup>13</sup>	500	15.5	0.59	0.022
R-744	CO <sub>2</sub>	Carbon Dioxide	124-38-9	A1	5000	50,000	N/A	1.52	5.70

1 Refrigerant safety group designation is in accordance with Section 1102.0.

2 Refrigerant properties are those needed for this chapter.

3 Allowable quantities are for high-probability systems under Section 1103.0 only.

4 Chemical name shown is the preferred name.

5 PELs that designated in 29 CFR 1910.1000 unless otherwise indicated.

6 IDLH is that designated by NIOSH unless otherwise designated.

7 LFL is percent refrigerant by volume in air at 68°F (20°C) and 29.92 in Hg (101.3 kPa); "not applicable (not flame limits)".

8 Pounds of refrigerant in a high-probability system per 1000 cubic feet (28.3 kg/m<sup>3</sup>) of occupied space. See Section 1104.0. This column does not apply to refrigerant machinery rooms or areas covered by Section 1106.0.

9 The PEL value shown is the TLV-C recommended by ACGIH.

10 The IDLH value shown is reduced from that designated by NIOSH in light of cardiac sensitization potential.

11 A PEL has not yet been established; the value given was determined in a consistent manner.

12 An IDLH has not yet been established; the value given was determined in a consistent manner.

13 OSHA PEL is 50 ppm; ACGIH TLV-TWA is 25 ppm.

14 **[For OSHPD 1,2 & 4]** The quantity of refrigerant in each system is limited to 50% of the amount listed.

*Exception: kitchens, laboratories, and mortuaries.*

**TABLE 11-2  
Permissible Refrigeration Systems<sup>1</sup>**

Occupancy Group and Division	High-Probability System	Low-Probability System	Machinery Room			
A-1	Group A1 only	Any	Any			
A-2.1	Group A1 only	Any	Any			
A-3	Group A1 only	Any	Any			
A-4	Group A1 only	Any	Any			
B	Group A1 only <sup>2</sup>	Any	Any			
E-1	Group A1 only	Any	Any			
E-2	Group A1 only	Any	Any			
E-3	Group A1 only	Any	Any			
F-1	Group A1 only <sup>2</sup>	Any	Any			
F-2	Any <sup>2</sup>	Any	Any			
H-1	Any	Any	Any			
H-2	Any	Any	Any			
H-3	Any	Any	Any			
H-4	Group A1 only	Any	Any			
H-5	Group A1 only	Any	Any			
H-6	Group A1 only	Any	Any			
H-7	Any	Any	Any			
I-1.1	None	Any	Any			
C A		<b>[For OSHPD 1, 2, 3 &amp; 4]</b>	I-1.1	Group A1 only	Any	Any
			I-1.2	Group A1 only	Any	Any
C A		<b>[For OSHPD 1, 2, 3 &amp; 4]</b>	I-2	Group A1 only	Any	Any
			I-3	None	Any	Any
			I-3	Group A1 only	Any	Any
M	Group A1 only <sup>2</sup>	Any	Any			
R-1	Group A1 only	Any	Any			
R-2	Group A1 only	Any	Any			
R-3	Group A1 only	Any	Any			
S-1	Group A1 only <sup>2</sup>	Any	Any			
S-2	Any <sup>2</sup>	Any	Any			
S-3	Group A1 only	Any	Any			
S-4	Group A1 only	Any	Any			
S-5	Group A1 only	Any	Any			
U-1	Any	Any	Any			
U-2	N/A	N/A	N/A			

<sup>1</sup>See Section 1105.0.

N/A—Not applicable.

<sup>2</sup>Any refrigerant may be used within a high-probability system when the room or space complies with Section 1105.3.

**TABLE 11-3  
Value of *f* for Equation 11-7**

Refrigerant Number	<i>f</i>
11	1.0
12	1.6
22	1.6
113	1.0
114	1.6
115	2.5
123	1.0
134a	1.6
152a	1.0
500	1.6
502	2.5
717	0.5
744	1.0

which shall not contain stones, boulders, cinder-fill or other materials which would damage or break the piping or cause corrosive action. Mechanical devices such as bulldozers, graders, etc., may then be used to complete backfill to grade. Fill shall be properly compacted. Suitable precautions shall be taken to ensure permanent stability for pipe laid in filled or made ground.

#### 1201.2.8 Pressure Testing

**1201.2.8.1 Responsibility.** The equipment, material and labor necessary for inspection or test shall be furnished by the person to whom the permit is issued or by whom inspection is requested.

**1201.2.8.2 Media.** The piping shall be tested with water.

**1201.2.8.3 Pressure Test.** Piping shall be tested with a hydrostatic pressure of not less than 100 psig (689 kPa), but at least fifty (50) psig (345 kPa) greater than operating pressure. This pressure shall be maintained for at least thirty (30) minutes. Required tests shall be conducted by the owner or contractor in the presence of an authorized inspector. The piping being tested shall remain exposed to the inspector and shall not leak during the test.

**1201.2.8.4 Moved Structures.** Piping systems of a building and parts thereof, that are moved from one foundation to another, shall be completely tested as prescribed elsewhere in this section for new work, except that walls or floors need not be removed during such test when equivalent means of inspection acceptable to the Administrative Authority are provided.

**1201.2.8.5 Test Waived.** No test or inspection shall be required where a system, or part thereof, is set up for exhibition purposes and has no connection with a water system.

**1201.2.8.6 Exceptions.** In cases where it would be impractical to provide the aforementioned tests, or for minor installations and repairs, the Administrative Authority at his discretion may make such inspection as he deems advisable in order to assure himself that the work has been performed in accordance with the intent of this chapter.

**1201.3** Those portions of the hot-water piping systems in which the continuous pressure-temperature relationship does not exceed the following may be

constructed of polybutylene pipe or tubing of SDR-11 conforming to specification ASTM D 3309.

Temperature, °F (°C)	Pressure, psi (kPa)
73 (23)	200 (1379)
180 (82)	100 (689)
200 (93)	8 (55)

Polybutylene also may be used for applications requiring up to one year total exposure at conditions of 210°F (99°C), 150 psi (1027 kPa), typical conditions for temperature and pressure-relief valve discharge lines in heating systems.

#### 1201.3.1 Materials and Construction

**1201.3.1.1 PB Pipe and Tubing.** Pipe shall be IPS or copper tube size polybutylene, both SDR-11 conforming to ASTM D 3309.

**1201.3.1.2 Fittings.** Fittings shall be of polybutylene or metal.

**1201.3.1.3 Insulation.** Coverings and insulation used on hot-water pipes shall be of materials suitable for the operating temperature of the system. The insulation, jackets and lap-seal adhesives shall be tested as a composite product and shall have a flame spread of not more than 25 and a smoke-developed rating of not more than 50 when tested in accordance with building code standards.

**1201.3.1.4 Gaskets.** Flanged PB systems may be installed without gaskets.

**1201.3.1.5 Hangers, Sleeves and Anchors.** Hangers, sleeves and anchors shall be suitable for the use intended as recommended by the manufacturer's installation instructions.

**1201.3.1.6 Standards.** All piping, tubing, valves, joints, fittings, devices and materials shall be free of defects and comply with nationally recognized standards approved by the Administrative Authority.

**1201.3.1.7 Marking.** Materials and devices shall be suitably identified.

**1201.3.2 Fabrication of Joints.** Joints shall be made by one or more of the following methods:

**1201.3.2.1 Socket Fusion.** Polybutylene socket fittings may be heat fused to the pipe.

**1201.3.2.2 Crimp/Insert Fittings.** Insert fittings of metal with crimp rings of aluminum or copper may be used.

**1201.3.2.3 Compression Fittings.** Metallic or polybutylene fittings utilizing compression seals are acceptable.

**1201.3.2.4 Transition Fittings.** Connections to other piping materials shall be made by

approved types of special transition fittings.

**1201.3.3 Changes in Direction.** Changes in direction shall be made by the appropriate use of fittings or with pipe bends having a radius of not less than 10 diameters of the pipe. No forming equipment or heating is required.

**1201.3.4 Hangers and Supports.** Piping and equipment shall be adequately supported to the satisfaction of the Administrative Authority. Hot-water piping shall be supported, anchored and provided with swing joints, expansion loops or joints, or utilize the pipe's flexibility to avoid excessive strain on piping, equipment or the building structure to the satisfaction of the Administrative Authority.

### 1201.3.5 Installation Details

**1201.3.5.1 Piping Embedded in Structure.** Piping shall not be built into or embedded in concrete or masonry, except where used for radiant panel heating or cooling. See Part II of this chapter.

**1201.3.5.2 Cutting Structure.** Structural members shall not be seriously weakened or impaired by cutting or notching. *[For HCD 1 & HCD 2] Structural modifications shall be made in compliance with the California Building Code, Title 24, Part 2.*

**1201.3.5.3 Under Walls or Foundations.** All piping passing under load-bearing foundations shall be protected by sleeving.

**1201.3.5.4 Openings into Buildings.** Voids around piping passing through concrete or masonry floors or walls shall be appropriately sealed at the opening into the building. Sleeves shall be provided at such openings.

#### 1201.3.5.5 Aboveground Piping

**1201.3.5.5.1 Sleeves.** Sleeves shall be installed where piping passes through masonry or concrete, or through any fire separation.

**1201.3.5.5.2 Insulation.** The temperature of surfaces within normal reach of building occupants shall not exceed 140°F (60°C), unless they are protected by suitable insulation. Where sleeves are installed, any insulation shall continue full sized through them.

#### 1201.3.5.6 Belowground Piping

**1201.3.5.6.1 Protection of Structure.** All trenches deeper than the footings of any building or structure and paralleling the same shall be at least 45 degrees therefrom, unless otherwise permitted by the Administrative Authority.

**1201.3.5.6.2 Mechanical Equipment.** Use of mechanical excavating equipment is prohibited within two (2) feet (609.6 mm) of existing piping or appurtenances.

**1201.3.5.6.3 Boring and Pulling.** Boring pipe shall be at least one size larger than the pipe to be laid. Pulling force shall not exceed the tensile yield strength of the pipe.

**1201.3.5.6.4 Backfilling.** All excavations shall be completely backfilled as soon after inspection as practicable. Adequate precaution shall be taken to ensure proper compaction of the backfill around piping without damage to such piping. Trenches shall be backfilled in thin layers to twelve (12) inches (304.8 mm) above the top of the piping with clean earth which shall not contain stones, boulders, cinderfill or other materials which would damage or break the piping. Mechanical devices such as bulldozers, graders, etc., may then be used to complete backfill to grade. Fill shall be properly compacted. Suitable precautions shall be taken to ensure permanent stability for pipe laid in filled or made ground.

**1201.3.5.6.5 Pipe or Tube under Concrete.** Pipe or tubing installed beneath footings or slabs shall be in continuous lengths or with fused joints.

### 1201.3.6 Pressure Testing

**1201.3.6.1 Responsibility.** The equipment, material and labor necessary for inspection or test shall be furnished by the person to whom the permit is issued or by whom inspection is requested.

**1201.3.6.2 Media.** The piping shall be tested with water.

**1201.3.6.3 Pressure Test.** Piping shall be tested with a hydrostatic pressure of not less than 100 psig (689 kPa) or 1.5 times the system design operating pressure. The pressure shall be maintained for 30 minutes, at which time the indicated pressure may have decreased due to the initial expansion of the pipe. After 30 minutes, adjust the system to the required pressure and visually inspect for leaks. Required tests shall be conducted by the owner or contractor in the presence of an authorized inspector. The piping being tested shall remain exposed to the inspector and shall not leak during the test.





**Table 13-11**

Copper Tube – Low Pressure  
 Maximum Delivery Capacity\* of Cubic Feet of Gas Per Hour of Copper Tube Carrying Natural Gas of 0.60\*\* Specific Gravity at Low Pressure (Less than 14 inches Water Column) Based on Pressure Drop of 0.50 Inch Water Column:

Length of Tube, feet	Outside Diameter of Tube, inches						
	3/8 (10 mm)	1/2 (15 mm)	5/8 (18 mm)	3/4 (20 mm)	7/8 (22 mm)	1-1/8 (28 mm)	1-3/8 (34 mm)
10	24	50	101	176	250	535	963
20	17	34	69	121	172	368	662
30	13	27	56	97	138	295	531
40	11	23	48	83	118	253	455
50	10	21	42	74	105	224	403
60	9.1	19	38	67	95	203	365
70	8.4	17	35	62	84	197	336
80	7.8	16	33	57	81	174	313
90	7.3	15	31	54	76	163	293
100	6.9	14	29	51	72	154	277
125	6.1	13	26	45	64	136	245
150	5.6	11	23	41	58	124	222
175	5.1	11	21	38	53	114	205
200	4.8	10	20	35	50	106	190
250	4.2	8.7	18	31	44	94	169

\*Includes 20% factor for fittings.

\*\*For other pressure drops values see Table 13-12.

**Table 13-12**

Specific Gravity  
 Multipliers to be Used with Copper Tube when Specific Gravity of Gas is other than 0.60.

Specific Gravity	Multiplier	Specific Gravity	Multiplier
.35	1.31	1.00	.78
.40	1.23	1.10	.74
.45	1.16	1.20	.71
.50	1.10	1.30	.68
.55	1.04	1.40	.66
.60	1.00	1.50	.63
.65	.96	1.60	.59
.70	.93	1.70	.58
.75	.90	1.80	.56
.80	.87	1.90	.56
.85	.84	2.00	.55
.90	.82	2.10	.54

Adjustment for a gas with an average specific gravity (relative density) other than 0.60 is achieved by multiplying the CFH values of Tables 13-11, 13-13, or 13-14 by the appropriate multiplier.

**Table 13-13**

Copper Tube – Medium Pressure  
 Maximum Delivery Capacity\* of Cubic Feet of Gas Per Hour of Copper Tube Carrying Natural Gas of 0.60\*\* Specific Gravity at Medium Pressure (2.0 psig) Based on Pressure Drop of 1.0 psig:

Length of Tube, feet	Outside Diameter of Tube, inches						
	3/8 (10 mm)	1/2 (15 mm)	5/8 (18 mm)	3/4 (20 mm)	7/8 (22 mm)	1-1/8 (28 mm)	1-3/8 (34 mm)
10	222	458	932	1629	2311	4937	8889
20	153	315	641	1120	1589	3393	6109
30	123	253	515	899	1276	2725	4906
40	105	216	440	770	1092	2332	4199
50	93	192	390	682	968	2067	3721
60	84	174	354	618	877	1873	3372
70	78	160	325	569	807	1723	3102
80	72	149	303	529	750	1603	2886
90	68	140	254	496	704	1504	2708
100	64	132	268	469	665	1421	2558
125	57	117	238	415	589	1259	2267
150	51	106	215	376	534	1141	2054
175	47	97	198	346	491	1050	1890
200	44	91	184	322	457	976	1758
250	39	80	163	286	405	865	1558

\*Includes 20% factor for fittings.

\*\*For other pressure drops values see Table 13-12.

**Table 13-14**

Copper Tube – High Pressure  
 Maximum Delivery Capacity\* of Cubic Feet of Gas Per Hour of Copper Tube Carrying Natural Gas of 0.60\*\* Specific Gravity at High Pressure (5.0 psig) Based on Pressure Drop of 3.50 psig:

Length of Tube, feet	Outside Diameter of Tube, inches						
	3/8 (10 mm)	1/2 (15 mm)	5/8 (18 mm)	3/4 (20 mm)	7/8 (22 mm)	1-1/8 (28 mm)	1-3/8 (34 mm)
10	462	954	1941	3392	4812	10279	18504
20	318	656	1334	2331	3307	7064	12718
30	255	527	1071	1872	2656	5673	10213
40	218	451	917	1602	2273	4855	8741
50	194	399	812	1420	2015	4303	7747
60	175	362	736	1287	1825	3899	7019
70	161	333	677	1184	1679	3587	6458
80	150	310	630	1101	1562	3337	6008
90	141	291	591	1033	1466	3131	5637
100	133	274	558	976	1385	2958	5324
125	118	243	495	865	1227	2621	4719
150	107	220	448	784	1112	2375	4276
175	98	203	413	721	1023	2185	3934
200	91	189	384	671	952	2033	3659
250	81	167	340	594	843	1802	3243

\*Includes 20% factor for fittings.

\*\*For other pressure drops values see Table 13-12.

**Part II – Manufactured/Mobile Home (M/H) and  
Recreational Vehicle Parks  
Fuel Gas Equipment and Installation**

**1319.0 General**

Except as otherwise permitted or required by this appendix, all fuel gas equipment and installations in M/H and R/V and manufactured home parks shall comply with the provisions of this Code. The provisions of this appendix do not apply to M/H and R/V and manufactured home gas piping and equipment.

**1320.0 Permits**

Before any gas equipment or installations are constructed or altered in a M/H and R/V and manufactured home park, a written permit shall be obtained from the Administrative Authority as provided in Chapter 1 of this Code.

**1321.0 Plans**

Two complete sets of plans and specifications shall be submitted with the application as provided in Chapter 1 of this Code. Load calculations of the gas piping system shall be provided with the plans.

**1322.0 Required Gas Supply**

The minimum hourly volume of gas required at each M/H and R/V and manufactured home lot outlet or any section of the M/H and R/V and manufactured home park gas piping system shall be calculated as shown in Table 13-15.

**TABLE 13-15**

Demand Factors for Calculating Master Meter  
Gas Piping Systems in M/H and R/V and  
Manufactured Home Parks

Number of M/H and RV and Manufactured Lots	BTU/Hr. per M/H and RV and Manufactured Lots	Watts per M/H and RV and Manufactured Lots
1	250,000	73,275
2	234,000	68,585
3	208,000	60,965
4	192,000	56,295
5	184,000	53,930
6	174,000	50,999
7	166,000	48,655
8	162,000	47,482
9	158,000	46,310
10	154,000	45,137
11-20	132,000	38,689
21-30	124,000	36,344
31-40	118,000	34,586
41-60	112,000	32,827
Over 60	102,000	29,896

**1323.0** Required gas supply for buildings or other fuel gas consuming appliances connected to the M/H and R/V and manufactured home park gas piping system shall be calculated as provided in Part I of this appendix.

**1324.0 Installation**

**1324.1** All gas piping installed below ground shall have a minimum earth cover of eighteen (18) inches (457 mm).

**1324.2** No gas piping shall be installed above ground under any M/H and R/V and manufactured home.

**1325.0 Location**

Gas piping shall not be installed underground beneath buildings or that portion of the M/H and R/V and manufactured home lot reserved for the location of M/H and R/V and manufactured home, M/H and R/V and manufactured home accessory buildings or structures, concrete slabs, or automobile parking, unless installed in a gastight conduit.

The conduit shall be of material approved for installation underground beneath buildings and not less than Schedule 40 pipe. The interior diameter of the conduit shall be not less than one-half (1/2) inch (15 mm) larger than the outside diameter of the gas piping.

The conduit shall extend to a point not less than twelve (12) inches (305 mm) beyond any area where it is required to be installed, or the outside wall of a building, and the outer ends shall not be sealed. Where the conduit terminates within a building, it shall be readily accessible and the space between the conduit and the gas piping shall be sealed to prevent leakage of gas into the building.

A gas piping lateral terminating in a M/H and R/V and manufactured home lot outlet riser surrounded by a concrete slab shall not be required to be installed in a conduit, provided the concrete slab is entirely outside the wall line of the M/H and R/V and manufactured home, is not continuous with any other concrete slab, and is used for stabilizing other utility connections.

**1326.0 System Shutoff Valve**

A readily accessible and identified, approved shutoff valve controlling the flow of gas to the entire gas piping system shall be installed near the point of connection to the service piping or supply connection of the liquefied petroleum gas tank.

**1327.0 M/H and R/V and Manufactured Home Lot Shutoff Valve**

Each M/H and R/V and manufactured home lot

# HISTORY NOTE APPENDIX

## California Mechanical Code (Title 24, Part 4, California Code of Regulations)

For prior history, see the History Note Appendix to the California Mechanical Code 1998 Triennial Edition Published in December 1998 and effective July 1, 1999.

1. (HCD 2/01) Adoption of the 2000 edition of the Uniform Mechanical Code of the International Association of Plumbing and Mechanical Officials (CCR, Title 24, Part 4) with necessary amendments for hotels, motels, lodging houses, apartment houses, dwellings, employee housing, factory-built housing and permanent buildings and accessory buildings in mobile home parks and special-occupancy parks. Approved by the Building Standards Commission on September 25, 2001 and effective on November 1, 2002.

2. (OSHPD 3/01) Adoption of the 2000 edition of the Uniform Mechanical Code of the International Association of Plumbing and Mechanical Officials (CCR, Title 24, Part 4) with necessary amendments for hospital buildings, nursing homes, correctional treatment centers, and licensed clinics. Approved by the Building Standards Commission on September 25, 2001 and effective on November 1, 2002.

3. (SFM 2/01) Adoption of the 2000 edition of the Uniform Mechanical Code of the International Association of Plumbing and Mechanical Officials (CCR, Title 24, Part 4) with amendments for the State Fire Marshal regulated occupancies. Approved by the Building Standards Commission on November 29, 2001 and effective on November 1, 2002.

4. (HCD 2/01) Adoption of the 2000 edition of the Uniform Plumbing Code of the International 2001 California Plumbing Code Association of Plumbing and Mechanical Officials (CCR, Title 24, Part 5) with necessary amendments for hotels, motels, lodging houses, apartment houses, dwellings, employee housing, factory-built housing and permanent buildings and accessory buildings in mobile home parks and special-occupancy parks. Approved by the Building Standards Commission on May 2, 2002 and effective on November 1, 2002.

4. (DSA/SS 3/01) Adoption of the 2000 edition of the Uniform Mechanical Code of the International Association of Plumbing and Mechanical Officials (CCR, Title 24, Part 4) with amendments for public schools, community col-

leges and state-owned or state-leased essential service buildings. Approved by the Building Standards Commission on November 29, 2001 and effective on November 1, 2002.

### October 1, 2002 Errata

Page xiv: Add an "x" in the Local Fire Official/SFM column for Section 104.6. Delete the row which refers to Section 105.6

Page xv: In Chapter 1 – Administration (Cont'd.) matrix table under Local Fire Official/SFM add an "x" for Section 120.0. In Chapter 2 – Definitions matrix table add an "x" under the OSHPD 1 heading for Sections 217.0, 210.0 and 223.0. In the DOSH heading, add an "\*" after DOSH and delete "x" under DOSH heading for Sections 217.0, 210.0 and 223.0.

Page xvi: In Chapter 3 – General Requirements matrix table under the OSHPD 2 heading delete "x" for Table 315 CA and Under OSHPD 3 add an "x" for Table 315 CA.

Page xvii: In Chapter 9 – Special Fuel-Burning And Energy-Utilizing Equipment matrix table, under both the HCD 1 and HCD 2 heading delete the "x" from the row "Adopt entire UMC chapter without amendments" and place the "x" in the row "Adopt entire UMC chapter as amended (amendments listed below)". Below the row for Section 904.8 insert a new row for "907.2 UMC" and place a "†" under the HCD 1 and HCD 2 headings. After row 912.0 CA add a new row "915.6 UMC" and place a "†" under the HCD 1 and HCD 2 headings. In the footnote add: "State agency adopts the entire chapter except for those sections indicated by the following symbol: †"

Page xix: In Chapter 12 – Hydronics matrix table under both the HCD 1 and HCD 2 heading delete the "x" from the row "Adopt entire UMC chapter without amendments" and place the "x" in the row "Adopt entire UMC chapter as amended (amendments listed below)". After the row 1201.2.6.3 CA add a new row "1201.3.5.2 CA" and place an "x" under the HCD 1 and HCD 2 headings. Under the DSA/SS heading, move the "x" from the blank

row to the 1201.3.6.3 row.

Page xx” In the Chapter 14 – Process Piping matrix table remove the “+” below the HCD 1 and HCD 2 headings.

Page xxiii: In the Appendix C – Chapter 8 matrix table delete the heading “Sizing Of Venting Systems ... For Use With Type B Vents” and insert the heading “Sizing Of Category 1 Venting Systems”.

Page 1: For Section 101.0, Section 101.1, Section 101.2, Section 102.0 the first paragraph of Section 103.1 and the last three lines of the second paragraph under [For HCD 1 & 2] add the margin tape “L” for local enforcement. In Section 101.2 revise title to read [For HCD 1 & HCD 2]. In Section 102.0 add the underlined to the following: [For BSC, DHS, DSA-SS, HCD 1 & HCD 2, OSHD 1, 2, 3 & 4, SFM] and after the words “for the State of California” delete [For HCD 1 & 2]. In Section 103.0 add the underlined to the following: [For BSC, DHS, DSA-SS, HCD 1 & HCD 2, OSHD 1, 2, 3 & 4, SFM] and after the words “for the State of California and” delete [For HCD 1 & 2]. Under the exception [For HCD 1} after 17922(c)” insert “17958.8 and “. Revise the heading “[For HCD 1 & 2]” to “[For HCD 1 & HCD 2]”

Page 2: For Section 103.1.1 et seq., Section 103.1.3, Section 103.1.4, Section 103.1.5, Section 103.1.6, Section 103.1.7, Section 103.1.8, Section 103.1.8.1 and Section 103.1.8.2 add the margin tape “L” for local enforcement. In Section 103.1.1.2, Section 103.1.2, Section 103.1.3, Section 103.1.4, Section 103.1.5, Section 103.1.5.1, Section 103.1.5.2, Section 103.1.6, Section 103.1.7, Section 103.1.8 and Section 103.1.8.1 revise all references to “HCD 1 & 2” to read “HCD 1 & HCD 2”

Page 3: For Section 104.6, Section 105.0, Section 105.2 and Section 105.3 add the margin tape “L” for local enforcement. In Section 104.5.1 revise “[For HCD 1 & 2]” to “[For HCD 1 & HCD 2]”.

Page 4: Continue margin tape “L” for local enforcement through Section 105.3 and Section 105.4. In third last line of Section 179519(d) subparagraph (3) revise “...expense of the owner’s agent...” to “...expense of the owner or owner’s agent...”.

Page 5: For Section 106.4 et seq. add the margin tape “L” for local enforcement. In Section 17958.5 after the words “regulations pursuant to” add the words “Section 17958, a city or county may make such changes or modification in the requirements contained in the provisions published in the California Building Standards Code and the other regulations adopted pursuant to Section 17922 as it deter-

mines, pursuant to”. In the third line of Section 17958.7 after the words “making any modifications or changes” add the words “pursuant to Section 17958.5, shall make an express finding that such”.

Page 6: Continue the margin tape “L” through Section 106.4. In Section 108.1 under [For SFM] add the margin tape “L” for local enforcement.

Page 7: Continue the margin tape “L” for local enforcement through Page 6 through Section 108.1.1. In Section 108.1.1 revise title to read “108.1.1 [For HCD 1 & HCD 2] Application-Vesting Authority. When adopted by a State agency ...”.

Page 8: In Section 108.1.1.8.1 revise “[For HSC 1/AC]” to “[For HCD 1/AC]”.

Page 9: In Section 108.1.1.9 under Application, revise “mobile home” to “mobilehome”.

Page 11: For Section 108.1.1.13 add the margin tape “L” for local enforcement.

Page 12: Continue margin tape “L” for local enforcement through Section 108.1.1.13. In Section 108.3 under the [For SFM] heading add the margin tape “L” for local enforcement for the last 5 lines of the paragraph.

Page 13: Continue the margin tape “L” for local enforcement through the balance of Section 108.3 [For SFM].

Page 15: For Section 109.2 and its NOTE:, add the margin tape “L” for local enforcement.

Page 16: For Section 113.2.2 Exception: [For SFM], Section 113.2.3, Section 113.2.4 and Section 113.2.5 add the margin tape “L” for local enforcement.

Page 17: Continue the margin tape “L” for local enforcement through the balance of Section 113.2.5. For Section 114.1.2 and Section 114.2.2 add the margin tape “L” for local enforcement.

Page 20: For Section 116.5, Section 118.0 and Section 118.1 add the margin tape “L” for local enforcement.

Page 21: Continue the margin tape “L” for local enforcement through the balance of Section 118.1. For Section 118.2, Section 118.3, Section 118.4, Section 118.5, Section

119.0, Section 120.0, Section 121.0, Section 121.1 and Section 121.2 add the margin tape "L" for local enforcement.

Page 25: Under Approved [For HCD 1 & HCD 2] revise "Health and Safety Code Section 17920(a)..." to "Health and Safety Code Section 17920(a) ..."

Page 26: For the balance of APPROVED AGENCY, for ASSEMBLY BUILDING and its Exception: and for BRINE [For SFM] add the margin tape "L" for local enforcement. In BRINE [For SFM] revise the second line to read "transmission of heat without ...". In BUILDING OFFICIAL revise the title to read "[Not adopted by HCD] See ADMINISTRATIVE AUTHORITY ...". In BUILDING OFFICIAL [For SFM] in the third line after the words "... this code, or a regularly ..." insert the word "authorized".

Page 30: Under LISTED [For HCD 1 & HCD 2] in the indented paragraph bold the heading "Section 17920(h)" Under LISTING AGENCY [For HCD 1 & HCD 2] in the second line revise "Section 17920(I)" to "Section 17920(i)"

Page 31: Under OCCUPANCY CLASSIFICATION NOTE: revise "[For HCD 1 & 2]" to "[For HCD 1 & HCD 2]"

Page 35: Under PLUMBING CODE Exception: revise "[For HCD 1 & 2]" to "[For HCD 1 & HCD 2]"

Page 51: In Section 401.0 for the sixth line add margin double bars for change. For the two lines of the title for Part III add margin double bars for change

Page 53: In Section 408.2 add "[For OSHPD 1]" to the title. In Section 408.3 add "[For OSHPD 2 & 4]" to the title. In Section 408.4 add "[For OSHPD 3]" to the title

Page 54: For the last three lines of Section 410.3 add margin double bars for change.

Page 92: In Section 813.1 after the words "... reinforced as required in " add the words "Chapters 16, 18 and 31 of".

Page 93: Insert the following: "Section 814.1.2.1 Design. Metal chimneys shall have a minimum thickness of 0.127 inch (3.23 mm) (No. 10 manufacturer's standard gage) steel and shall be designed and constructed as specified in this chapter and Chapters 16 and 22 of the Uniform Building code."

Page 125: For the third and fourth lines of Section 1107.5 add margin double bars for change.

Page 133: In the Table title after "Quantities3" add "14". Under the column Pounds per 1000 cf of Space8, for the row R-123 revise 1.60 to 0.4 and add margin double bars for change, and for the row R-500/73.8%/26.2% revise 16.00 to 12.00 and add margin double bars for change. For footnote number 14 add margin double bars for change.

Page 134: At [For OSHPD 1, 2, 3 & 4] I-1.1 and [For OSHPD 1, 2, 3 & 4] I-3 add margin double bars for change.

Page 141: At Section 1201.3 et seq. remove the italics and the CA margin tape.

Page 142: Remove all italics from this page except for in Section 1201.3.5.2 the words "[For HCD 1 & HCD 2] Structural modifications shall be made in compliance with the California Building Code, Title 24, Part 2." and add margin "CA" for those 4 lines. Add margin double bars for change for both columns for the entire page.

Page 151: In Section 1501.0 under Section 801.5 Paragraph (b) in the last line revise it to read "... include, at a minimum, all of the following:"

Page 251: In Table 13-13 change Length of Tube, feet, "175" to "200" and "200" to "250" and delete bottom "250". Immediately below row "150", insert a new row for "

175	47	97	198	346	491	1050	1890
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". In Table 13-14, in the row for 50 of Length of Tube, feet, revise the right had column for 1-3/8 to read "7747".

