ANSI/ASHRAE Addenda a, b, f, g, h, and i to
ANSI/ASHRAE Standard 90.2-2004

ASHRAE ADDENDA

2006 SUPPLEMENT

Energy-Efficient Design of Low-Rise Residential Buildings

See appendix for approval dates by the ASHRAE Standards Committee, the ASHRAE Board of Directors, and the American National Standards Insitute.

This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE Web site, http://www.ashrae.org, or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada).

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SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Consensus is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this standard as an ANS, as "substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution." Compliance with this standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

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The Manager of Standards of ASHRAE should be contacted for:

a. interpretation of the contents of this Standard,
b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard,
d. permission to reprint portions of the Standard.

CONTENTS

ANSI/ASHRAE Addenda to ANSI/ASHRAE Standard 90.2-2004 Energy-Efficient Design of Low-Rise Residential Buildings

NOTE

When addenda, interpretations, or errata to this standard have been approved, they can be downloaded free of charge from the ASHRAE Web site at http://www.ashrae.org.

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FOREWORD

The current language in the 2004 edition of Standard 90.2 has the potential for causing confusion when Section 8.7.1, which provides a choice of assessing duct location in the Annual Energy Cost Budget Method, is compared to Chapters 5 and 6 of the Standard. The prescriptive provisions in these Chapters do not cite such a distinction. This addendum is designed to address this difference with more concise text that coordinates the provisions.

Addendum a to 90.2-2004

8. ANNUAL ENERGY COST METHOD

Delete and substitute as shown.

~~8.7.1 Ducts. Ducts in the prescriptive design, if any, shall be assumed to be completely in unconditioned space spaces. Single family prescriptive designs shall comply with the provisions for ducts outside the conditioned space for each prescriptive envelope requirement.~~

8.7.1 Ducts. Ducts located in the prescriptive design shall be in the same location as the proposed design.

Exceptions to 8.7.1: The distribution factor in the prescriptive design shall be assumed to be 0.85 for both heating and cooling when:

a. the ducts are installed in conditioned attic spaces, or
b. the ducts are installed in conditioned crawlspaces, or
c. the building official determines that the building design has been specifically altered to move the distribution system inside the conditioned space.

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FOREWORD

These requirements for basement walls with interior insulation represent insulation levels necessary to ensure a minimal level of energy efficiency. The lack of basement insulation (when the interior insulation method is selected) makes 90.2-2004 less stringent than both Standard 90.2-2001 and the International Energy Conservation Code (all editions) in energy efficiency for buildings with these types of foundations. The insulation levels in this addendum are based on the 5-year payback analysis methodology that was used to develop the envelope requirements in 90.2-2004. The difference in the economic analysis for these proposed levels compared to the economic analysis underlying 90.2-2004 is that the estimated cost of the lost floor space is not accounted for because conditioned basements will normally already have furred-in walls.

In addition, clarifying footnotes are added to the tables. The footnote in Table 5.2 specifies that the builder can choose to use either the "below grade exterior insulation" or the "below grade interior insulation" requirements for walls. In other words, both the exterior and interior insulation do not apply--only one or the other does. This contrasts with the above-grade wall requirements, where both the cavity and continuous insulation requirements apply. The footnote for Table 5.11 provides the direction needed for the annual energy cost compliance method and the envelope performance path trade-off method.

Since the builder could choose the "below grade interior insulation" option of no insulation (R-0) in climate zones 3 and 4 instead of installing R-2.7 or R-4 exterior insulation, the "below grade exterior insulation" is set at R-0 in zones 3 and 4 for consistency.

Additional text has also been added to address the coordination with the proposed "note" in Table 5.11 and the relationship with provisions of Section 8.7.8 and Section A4.4.

Addendum b to 90.2-2004

Change to read as shown.

TABLE 5.2 Prescriptive Envelope Criteria

Climate Zone	Below Grade Exterrior Insulation[a]		Below Grade Interior Insulation[a]
	Continuous Insulation	~~Depth Below Grade~~[a]	Interior Insulation
No.	R		R
1	0	~~H~~	0
2	0	~~H~~	0
3A, B	~~2.7~~**0**	~~H~~	0
3C	~~2.7~~**0**	~~H~~	0
4	4 **0**	~~F~~	0
5	5.4	~~F~~	~~0~~ **11**
6	8.1	~~F~~	~~0~~ **11**
7	10.8	~~F~~	~~0~~ **11**
8	10.8	~~F~~	~~21~~ **11**

[a] ~~H = Top half of wall insulated, F = Full wall height insulated~~

[a] Either the below grade exterior insulation or the below grade interior insulation requirements must be met. Insulation must extend the full height of the wall.

The remainder of the table, including footnote "b," is unchanged.

Change to read as shown.

TABLE 5.11 Performance Path Envelope Criteria

Climate Zone	Below Grade Exterior Insulation[a]		Below Grade Interior Insulation[a]
		~~Depth Below Grade~~	
No.	**U**		**U**
1	0.633	~~H~~	0.630
2	0.633	~~H~~	0.630
3A, B	~~0.234~~ **0.633**	~~H~~	0.630
3C	~~0.234~~ **0.633**	~~H~~	0.630
4	~~0.179~~ **0.633**	~~F~~	0.630
5	0.143	~~F~~	~~0.630~~ **0.079**
6	0.103	~~F~~	~~0.630~~ **0.079**
7	0.081	~~F~~	~~0.630~~ **0.079**
8	0.081	~~F~~	~~0.056~~ **0.079**

~~a. H = Top half of wall insulated, F = Full wall height insulated~~

a. Select the below grade exterior insulation U-factor from Table 5.11 if the proposed design has exterior below grade wall insulation. Select the below grade interior insulation U-factor from Table 5.11 if the proposed design has interior below grade wall insulation or no below grade wall insulation.

The remainder of the table, including footnote "b," is unchanged.

8. ANNUAL ENERGY COST METHOD

Add new text to Section 8.7.8 as shown.

8.7.8 Floors and Foundation Type. The prescriptive design shall have the same foundation type and floor constructions with the same fraction of each construction as the proposed design. The slab-on-grade perimeter shall be the same as in the proposed design. All floor conditions in the prescriptive design house shall be constructed and modeled in a manner consistent with that of the proposed design except that the prescriptive design shall meet the requirements of Section 5.

Select the below grade exterior insulation U-factor from Table 5.11 if the proposed design has exterior below grade wall insulation. Select the below grade interior insulation U-factor from Table 5.11 if the proposed design has interior below grade wall insulation or no below grade wall insulation.

NORMATIVE APPENDIX A

Add new text to Section A4.4 as shown.

A4.4 Below-Grade Envelope Options. The analysis of below-grade envelope options shall use the following equations. The thermal conductance of the below-grade envelope options shall exclude the interior and exterior air film coefficients and the surrounding soil.

No change to equation A-13.

Select the below grade exterior insulation U-factor from Table 5.11 if the proposed design has exterior below grade wall insulation. Select the below grade interior insulation U-factor from Table 5.11 if the proposed design has interior below grade wall insulation or no below grade wall insulation.

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FOREWORD

The Project Committee felt changes to the values in moderate climates are appropriate because of recent studies that examined the energy benefits of higher SHGC in moderate to cold climates revealed that higher values could have some benefit to energy savings. In particular, these studies found in Climate Zones 4 and 5 that higher values would not result in higher energy use and could permit the builders/designers more flexibility in choosing higher or lower SHGC depending on building location and fenestration orientation without having a detrimental impact on energy use.

Addendum f to 90.2-2004

Change to read as shown.

TABLE 5.2 Prescriptive Envelope Criteria

Climate Zone	Vertical Glazed Assemblies	
No.	**U**	**SHGC**
1	0.67	0.37
2	0.67	0.37
3A, B	0.47	0.40
3C	0.47	0.40
4	0.35	~~0.46~~ NR
5	0.35	~~0.46~~ NR
6	0.35	NR
7	0.35	NR
8	0.35	NR

The remainder of the table is unchanged.

Change to read as shown.

TABLE 5.11 Performance Path Envelope Criteria

Climate Zone	Vertical Glazed Assemblies	
No.	**U**	**SHGC**
1	0.67	0.37
2	0.67	0.37
3A, B	0.47	0.40
3C	0.47	0.40
4	0.35	~~0.46~~ NR
5	0.35	~~0.46~~ NR
6	0.35	NR
7	0.35	NR
8	0.35	NR

The remainder of the table is unchanged.

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FOREWORD

The project committee reviewed the high albedo roof provisions of Standards 90.2-2004, and determined the following changes were needed to clarify the requirements:

The present equation and multiplier table are replaced with a table that mimics Tables 5.2 and 5.11 in format, but that contains the U-factors and R-values applicable to the high albedo roof provisions intent. Table values are pre-calculated, therefore the calculation method is no longer necessary.

The values from the original table are changed to reflect recognition of zones 1 through 3 only. As a result of comments from others during the review that indicated concern about extending the value of high albedo roofs up to zone #5 as shown in Standard 90.2-2004 edition, consideration was made to return to the Standard 90.2-2001 Addendum "f" values which only extend the provisions up through zone #3. The multipliers used to generate the proposed table values were:

Zone #1 w/attics = 1.50, and w/o attics = 1.30

Zone #2 w/attics = 1.25, and w/o attics = 1.30

Zone #3 w/attics = 1.10, and w/o attics = 1.20

This addendum also makes the task of complying with the provisions more straightforward.

Finally Section 5.2 is made clearer with the inclusion of an "exception" that is intended to be exempt from the provisions associated with Table 5.2 and 5.11.

Addendum g to 90.2-2004

5. BUILDING ENVELOPE REQUIREMENTS

Add new text as shown.

5.2 Prescriptive Path Method. For one- and two-family dwellings and multi-family structures, the thermal resistance of the cavity insulation and the thermal resistance of the continuous insulation uninterrupted by framing, applied to the opaque building envelope components, shall be greater than or equal to the minimum R-values; the thermal transmittance of all assemblies shall be less than or equal to the maximum U-factors; and SHGC of all fenestration assemblies shall be less than or equal to the maximum SHGC criteria, shown in Table 5.2.

Exception: High albedo roofs in Section 5.5

Change to read as shown.

5.5 High Albedo Roofs. For roofs in climate zones 1, 2, or 3, where the exterior surface has either of the following:

a. a minimum total solar reflectance of 0.65 when tested in accordance with ASTM C1549, E903, or E1918 and a minimum thermal emittance of 0.75 when tested in accordance with ASTM E408 or C1371, or
b. a minimum solar reflectance index (SRI) of 75 calculated in accordance with ASTM E1980 for medium wind speed conditions,

the ~~U-factor~~ R-value of the proposed ceiling shall comply with the values in Table 5.5.1 or the U-factor of the proposed ceiling shall comply with the values in Table 5.5.2. ~~be permitted to be adjusted using Equation 5-11 for demonstrating compliance~~. The values for solar reflectance and thermal emittance shall be determined by a laboratory accredited by a nationally recognized accreditation organization, such as the Cool Roof Rating Council CRRC-1 Product Rating Program, and shall be labeled and certified by the manufacturer.

~~$U_{ceiling\ adj} = U_{ceiling\ proposed} \times Multiplier$ (5-11)~~

~~where~~

~~$U_{ceiling\ adj}$ = adjusted ceiling U-factor for use in demonstrating compliance~~

~~$U_{ceiling\ proposed}$ = U-factor of the proposed ceiling, as designed~~

~~*Multiplier* = ceiling U-factor multiplier from Table 5.5~~

~~**TABLE 5.5 Ceiling U-Factor Multiplier**~~

~~Zone~~	~~Ceilings with Attics~~	~~Ceilings without Attics~~
~~1~~	~~1.50~~	~~1.30~~
~~2~~	~~1.25~~	~~1.30~~
~~3~~	~~1.20~~	~~1.20~~
~~4~~	~~1.15~~	~~1.20~~
~~5~~	~~1.10~~	~~1.10~~
~~6, 7, 8~~	~~1.00~~	~~1.00~~

Add new tables as shown.

TABLE 5.5.1 High Albedo Roof—Ceiling Insulation (R-Values)

Zone	Ceilings with Attics		Ceilings w/o Attics	
	Wood R-Value	Steel R-Value	Wood R-Value	Steel R-Value
1	20	20	10	15
2	24	24	17	16
3	27	27	18	18

TABLE 5.5.2 High Albedo Roof—Ceiling Insulation (U-Factors)

Zone	Ceilings with Attics		Ceilings w/o Attics	
	Wood R-Value	Steel R-Value	Wood R-Value	Steel R-Value
1	0.054	0.057	0.082	0.109
2	0.045	0.048	0.053	0.109
3	0.040	0.042	0.049	0.096

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FOREWORD

The ASHRAE Standard 90.2-2004 climatic data for China contains a single location (Shanghai/Hongqiao) and two locations in Taiwan. This limited data is not adequate to effectively use the standard in China. The SPC 169 Weather Data for Building Design Standards has similar climatic data and SPC 169 is working on the development of a standard that will contain all of the data required by 90.1 and 90.2, including China, when completed. In the interim, this addendum adds the current climatic data for just China (368 locations) and Taiwan (38 locations) until the SPC 169 work is published.

In addition to adding the new data for China and Taiwan the addendum corrects errors identified in Malaysia and Mexico.

Addendum h to 90.2-2004

Make the following changes to Table 9.3.

TABLE 9.3 International Climate Zones

Country / City	Province/Region	Zone
Malaysia		
Kuala Lumpur		1
Penang/Bayan Lepas		1
Mexico		
Guadalajara	Jalisco	~~1~~ 3 A,B
Merida	Yucatan	1
Mexico City	Distrito Federal	3 A,B
Monterrey	Nuevo Laredo	~~3 A,B~~ 2
Tampico	Tamaulipas	1
Veracruz	Veracruz	~~3 C~~ 1

TABLE 9.3 International Climate Zones *(Continued)*

Country / City	Province/Region	Zone
Taiwan		
~~Tainan~~		~~1~~
~~Taipei~~		~~2~~
Alisan Shan		4
Chiayi (TW-AFB)		2
Ciayyi		1
Chilung		2
Chinmen		2
Dawu		1
Hengchun		1
Hengchun/Wu Le Tien		1
Hsinchu/Singjo		2
Hua Lien		2
Hwalien		1
Joyutang		2
Kao Hsiung Int. Arpt.		1
Kao Hsiung		1
Kungkuan		2
Kungshan		1
Lan Yu		2
Makung		2
Matsu Island		3 A,B
North Pingtung		1
Peng Hu		1
Penkaiyu		2
Sing Jo		2
Sinkung		1
South Pingtung		1
Taichung		2
Taichung/Shui Nan		2
Tainan (TW-AFB)		1
Tainan		1
Taipei		2
Taipei/Chiang Kai Shek		2
Taipei/Sungshan		2
Taitung		1
Taitung/Fongyentsun		1
Taoyuan (AB)		2
Tung Shih		1
Wu-Chi		2
Yilan		2

TABLE 9.3 International Climate Zones *(Continued)*

Country	City	Province/Region	Zone
China			
	~~Shanghai/Hongqiao~~		~~3 A,B~~
	Anqing	Anhui	3 A,B
	Bengbu		3 A,B
	Fuyang		3 A,B
	Hefei/Luogang		3 A,B
	Huang Shan (Mtns)		5
	Huoshan		3 A,B
	Changting	Fujian	3 A,B
	Fuding		3 A,B
	Fuzhou		2
	Jiuxian Shan		4
	Longyan		2
	Nanping		2
	Pingtan		2
	Pucheng		3 A,B
	Shaowu		3 A,B
	Xiamen		2
	Yong'An		2
	Dunhuang	Gansu	5
	Hezuo		7
	Huajialing		7
	Jiuquan/Suzhou		6
	Lanzhou		5
	Mazong Shan (Mount)		7
	Minqin		5
	Pingliang		5
	Ruo'ergai		7
	Tianshui		4
	Wudu		3 C
	Wushaoling (Pass)		7
	Xifengzhen		5
	Yumenzhen		6
	Zhangye		6
	Fogang	Guangdong	2
	Gaoyao		2
	Guangzhou/Baiyun		2
	Heyuan		2
	Lian Xian		2
	Lianping		2
	Meixian		2
	Shangchuan Island		2

TABLE 9.3 International Climate Zones *(Continued)*

Country	City	Province/Region	Zone
	Shantou		2
	Shanwei		2
	Shaoguan		2
	Shenzhen		2
	Xinyi		2
	Yangjiang		2
	Zhangjiang		1
	Beihai	Guangxi	2
	Bose		2
	Guilin		2
	Guiping		2
	Hechi/Jnchengjiang		2
	Lingling		3 A,B
	Liuzhou		2
	Longzhou		2
	Mengshan		2
	Nanning/Wuxu		2
	Napo		2
	Qinzhou		2
	Wuzhou		2
	Bijie	Guizhou	4
	Dushan		3 A,B
	Guiyang		3 A,B
	Luodian		2
	Rongjiang/Guzhou		2
	Sansui		3 A,B
	Sinan		3 A,B
	Weining		4
	Xingren		3 A,B
	Zunyi		3 A,B
	Danxian/Nada	Hainan	1
	Dongfang/Basuo		1
	Haikou		1
	Qionghai/Jiaji		1
	Sanhu Island		1
	Xisha Island		1
	Yaxian/Sanya		1
	Baoding	Hebei	4
	Chengde		5
	Fengning/Dagezhen		6
	Huailai/Shacheng		5
	Leting		5

TABLE 9.3 International Climate Zones *(Continued)*

Country	City	Province/Region	Zone
	Qinglong		5
	Shijiazhuang		4
	Tangshan		5
	Weichang/Zhuizishan		6
	Xingtai		3 A,B
	Yu Xian		6
	Zhangjiakou		5
	Aihui	Heilongjiang	7
	Anda		7
	Baoqing		7
	Fujin		7
	Hailun		7
	Harbin		7
	Hulin		7
	Huma		8
	Jixi		7
	Keshan		7
	Mudanjiang		7
	Qiqihar		7
	Shangzhi		7
	Suifenhe		7
	Sunwu		7
	Tailai		7
	Tonghe		7
	Yichun		7
	Anyang/Zhangde	Henan	3 A,B
	Boxian		3 A,B
	Gushi		3 A,B
	Lushi		4
	Nanyang		3 A,B
	Xihua		3 A,B
	Xinyang		3 A,B
	Zhengzhou		3 A,B
	Zhumadian		3 A,B
	Fangxian	Hubei	4
	Guanghua		3 A,B
	Jiangling/Jingzhou		3 A,B
	Macheng		3 A,B
	Wuhan/Nanhu		3 A,B
	Yichang		3 A,B
	Zaoyang		3 A,B
	Zhongxiang		3 A,B

TABLE 9.3 International Climate Zones *(Continued)*

Country	City	Province/Region	Zone
	Changde	Hunan	3 A,B
	Chenzhou		3 A,B
	Nanyue		4
	Sangzhi		3 A,B
	Shaoyang		3 A,B
	Tongdao/Shuangjiang		3 A,B
	Wugang		3 A,B
	Yuanling		3 A,B
	Yueyang		3 A,B
	Zhijiang		3 A,B
	Abag Qi/Xin Hot	Inner Mongolia	7
	Arxan		8
	Bailing-Miao		7
	Bayan Mod		6
	Bugt		7
	Bugt		6
	Chifeng/Ulanhad		6
	Dongsheng		6
	Duolun/Dolonnur		7
	Ejin Qi		6
	Erenhot		7
	Guaizihu		5
	Hailar		8
	Hails		6
	Haliut		6
	Hohhot		6
	Huade		7
	Jartai		5
	Jarud Qi/Lubei		6
	Jining		7
	Jurh		7
	Lindong/Bairin Zuoq		6
	Linhe		6
	Linxi		7
	Mandal		6
	Naran Bulag		7
	Nenjiang		7
	Otog Qi/Ulan		6
	Tongliao		6
	Tulihe		8
	Uliastai		7
	Xi Ujimqin Qi		7

TABLE 9.3 International Climate Zones *(Continued)*

Country City	Province/Region	Zone
Xilin Hot/Abagnar		7
Xin Barag Youqi		7
Dongtai	Jiangsu	3 A,B
Ganyu/Dayishan		4
Liyang		3 A,B
Lusi		3 A,B
Qingjiang		3 A,B
Shenyang/Hede		4
Xuzhou		3 A,B
Ganzhou	Jiangxi	2
Guangchang		2
Ji'An		2
Jingdezhen		3 A,B
Lu Shan (Mountain)		4
Nanchang		3 A,B
Nancheng		3 A,B
Xiushui		3 A,B
Xunwu		2
Yichun		3 A,B
Changbai	Jilin	7
Changchun		6
Changling		6
Dunhua		7
Huadian		7
Ji'An		6
Linjiang		6
Qian Gorlos		7
Yanji		6
Chaoyang	Liaoning	5
Dalian/Dairen/Luda		5
Dandong		5
Haiyang Island		5
Jinzhou		5
Kuandian		6
Qingyuan		6
Shenyang/Dongta		6
Siping		6
Yingkou		6
Zhangwu		6
Beijing/Peking	Municipalities	4
Cangzhou		3 A,B
Shanghai		3 A,B

TABLE 9.3 International Climate Zones *(Continued)*

Country City	Province/Region	Zone
Shanghai/Hongqiao		3 A,B
Tianjin/Tientsin		4
Yanchi	Ningxia	5
Yinchuan		5
Zhongning		5
Daqaidam	Qinghai	7
Darlag		7
Delingha		7
Dulan/Qagan Us		7
Gangca/Shaliuhe		7
Golmud		6
Henan		7
Lenghu		7
Madoi/Huangheyan		8
Qumarleb		8
Tongde		7
Tuotuohe/Tanggulash		8
Wudaoliang		8
Xining		6
Yushu		7
Zadoi		7
Ankang/Xing'an	Shaanxi	3 A,B
Baoji		4
Hanzhong		4
Hua Shan (Mount)		6
Tongchuan		5
Xi'An		4
Yan An		5
Yulin		5
Chengshantou (Cape)	Shandong	4
Dezhou		3 A,B
Haiyang		4
Heze/Caozhou		3 A,B
Huimin		4
Jinan/Sinan		3 A,B
Linyi		4
Longkou		4
Quingdao/Singtao		4
Rizhao		4
Tai Shan (Mtns)		6
Weifang		4
Xinxian		4

TABLE 9.3 International Climate Zones *(Continued)*

Country City	Province/Region	Zone
Yanzhou		4
Yiyuan/Nanma		4
Datong	Shanxi	6
Hequ		6
Jiexiu		5
Lishi		5
Taiyuan/Wusu/Wusu		5
Wutai Shan (Mtn)		8
Yangcheng		4
Yuanping		5
Yuncheng		3 A,B
Yushe		5
Barkam	Sichuan	5
Batang		3 C
Chengdu		3 A,B
Da Xian		3 A,B
Daocheng/Dabba		6
Dawu		5
Emei Shan		7
Fengjie		3 A,B
Garze		6
Jiulong/Gyaisi		5
Kangding/Dardo		5
Langzhong		3 A,B
Liangping		3 A,B
Litang		7
Luzhou		3 A,B
Mianyang		3 A,B
Nanchong		3 A,B
Neijiang		3 A,B
Pingwu		3 C
Songpan/Sungqu		6
Wanyuan		3 C
Xichang		3 A,B
Ya'An		3 A,B
Yibin		3 A,B
Youyang		3 C
Hong Kong Intl Arpt	SAR	2
Baingoin	Tibet	7
Dengqen		7
Lhasa		5
Lhunze		6

TABLE 9.3 International Climate Zones *(Continued)*

Country City	Province/Region	Zone
Nagqu		7
Nyingchi		5
Pagri		7
Qamdo		5
Shiquanhe		7
Sog Xian		7
Tingri/Xegar		7
Xainza		7
Xigaze		6
Akqi	Xinjiang	6
Alar		5
Altay		7
Andir		5
Bachu		5
Balguntay		6
Bayanbulak		8
Baytik Shan (Mtns)		7
Fuyun		7
Hami		5
Hoboksar		7
Hotan		4
Jinghe		6
Kaba He		7
Karamay		6
Kashi		5
Korla		5
Kuqa		5
Mangnai		7
Pishan		4
Qijiaojing		5
Qitai		6
Ruoqiang		5
Shache		5
Tacheng		6
Tikanlik		5
Turpan		3 A,B
Urumqi		6
Yining		5
Yiwu/Araturuk		7
Baoshan	Yunnan	3 C
Chuxiong		3 C
Dali		3 C

TABLE 9.3 International Climate Zones *(Continued)*

Country City	Province/Region	Zone
Deqen		6
Guangnan		3 A,B
Huili		3 C
Huize		3 C
Jiangcheng		2
Jinghong		1
Kunming/Wujiaba		3 C
Lancang/Menglangba		2
Lijing		3 C
Lincang		3 A,B
Luxi		3 C
Mengding		2
Mengla		2
Mengzi		2
Ruili		2
Simao		3 A,B
Tengchong		3 C

TABLE 9.3 International Climate Zones *(Continued)*

Country City	Province/Region	Zone
Yuanjiang		1
Yuanmou		2
Zhanyi		3 C
Zhaotong		4
Dachen Island	Zhejiang	3 A,B
Dinghai		3 A,B
Hangzhou/Jianqiao		3 A,B
Kuocang Shan		5
Lishui		3 A,B
Qixian Shan		4
Qu Xian		3 A,B
Shengsi/Caiyuanzhen		3 A,B
Shengxian		3 A,B
Shipu		3 A,B
Taishan		3 A,B
Tianmu Shan (Mtns)		5
Wenzhou		3 A,B

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

This addendum updates the standards referenced by Standard 90.2-2004. In one case both the standard and Table 5.9.1 are updated in order to coordinate the proposed change. The standards shown have been reviewed and references have been revised in preparation for the 2007 edition of Standard 90.2.

Addendum i to 90.2-2004

5. BUILDING ENVELOPE REQUIREMENTS

Revise Table 5.9.1 as shown.

TABLE 5.9.1 Maximum Allowable Air Infiltration Rates[a], Window and Doors

Description	Air Infiltration Limit [b]	Reference Standard
Aluminum windows and sliding doors	0.37	~~ANSI/AAMA/NWWDA 101/I.S.2~~ AAMA/WDMA/CAS 101/I.S.2/A440
PVC windows and sliding doors	0.37	~~ANSI/AAMA/NWWDA 101/I.S.2~~ AAMA/WDMA/CAS 101/I.S.2/A440
Wood windows and sliding doors	0.34	~~ANSI/AAMA/NWWDA 101/I.S.2~~ AAMA/WDMA/CAS 101/I.S.2/A440
Wood doors	0.34	~~ANSI/AAMA/NWWDA 101/I.S.2~~ AAMA/WDMA/CAS 101/I.S.2/A440
Windows not covered above	0.34 cfm/ft of sash crack	
Fixed windows	0.34 cfm/ft^2 of window area	
Swinging Doors	0.50 cfm/ft^2 of door area	

10. NORMATIVE REFERENCES

Change the following:

Organization/Standard(s)	Title	Section Number(s)
AAMA **American Architectural Manufacturers Association** **De Plaines, IL**		
~~ANSI/AAMA/NWWDA 101/I.S.2 (1997)~~ AAMA/WDMA/CAS 101/I.S.2/A440-05	~~Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors~~ Standard Specification for Windows, Doors and Unit Skylights	Table 5.9.1
ASTM **American Society of Testing and Materials** **West Comshohocken, PA**		
ASTM C90 (~~2001a~~ 2005)	Standard Specification for Loadbearing Concrete Masonry Units	5.3
ASTM C1371 (~~1998~~ –04a)	Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissiometers	5.5
ASTM C1549 (~~2002~~ -04)	Standard Test method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer	5.5
ASTM E408 (1971) (Reapproved ~~1996~~ 2002)	Standard Test Method for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques	5.5
ASTM E779 (~~1987~~ 2003)	Standard Test Method for Determining Air Leakage Rate by Fan Pressurization	8.8.3.4.3
ASTM E1980 (~~1998~~ –01)	Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Surfaces Opaque Surfaces	5.5
~~**NCC**~~ ~~**National Climate Center**~~ ~~**Ashville, NC**~~ **NREL/RReDC** **National Renewable Energy Laboratory** **Golden, CO**		
~~TMY (1981)~~ TMY2 Data	Typical Meteorological Year	8.8.5.4

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APPENDIX
18-MONTH SUPPLEMENT
ADDENDA TO ANSI/ASHRAE STANDARD 90.2-2004

This 18-month supplement includes Addenda *a*, *b*, *f*, *g*, *h*, and *i* to ANSI/ASHRAE Standard 90.2-2004. The following table lists each addendum and describes the way in which the standard is affected by the change. It also lists the ASHRAE and ANSI approval dates for each addendum.

Addendum	Sections Affected	Description of Changes*	Approval Dates Standards Committee ASHRAE BOD ANSI
90.1a	Table 5-1 and Section 10	The change updates the references in Section 10 and the metal stud correction factors in Table 5-1	1/21/06 1/26/06 4/10/06
90.1b	Section 5.9.2.3, Fenestration Load Change	This changes the fenestration trade-off equation.	1/21/06 1/26/06 4/10/06
90.1f	Section 5.2.2.1.4 and Table 5-1	These changes to Section 5.2.2.1.4 and Table 5-1 reflect modification to the text to accurately depict the material under consideration in Table 5-1. Accomplished in part by substituting the word “Steel” for “Metal” and “Size of Members” to Nominal Stud Size” to be more consistent with the steel industry terminology and dimensional designations as well as coordination with national model building codes and standards.	1/21/06 1/26/06 4/10/06
90.1g	Section 8.7.1, Ducts and 8.7.6, Doors	The change in Section 8.7.6 to the assumption of wood doors for the reference case removes a penalty for using the performance path, while recognizing the common practice of using wood entry doors.	1/21/06 1/25/06 4/10/06
90.1h	Section 6.3.3, Ventilation	This addendum addresses inconsistencies between current text and that of referenced codes and standards. It deletes text on ventilation and combustion air, references ANSI/ASHRAE Standard 62 for outdoor air and exhaust air requirements, and references applicable state or local codes for combustion air.	1/21/06 1/25/06 4/10/06
90.1i	Section 5.3.6 and 5.5.6	This addendum addresses the issue of heavy termite infestation traveling through or behind slab edge insulation.	1/21/06 1/25/06 4/10/06

*These descriptions may not be complete and are provided for information only.

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the standards and guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive technical committee structure, continue to generate up-to-date standards and guidelines where appropriate and adopt, recommend, and promote those new and revised standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating standards and guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.