(5/9/23)

The following document is a draft of the 2024 IECC Residential Public Comment Draft #1 showing in legislative format the proposals that appear within the Committee Action Report of the Public Comments/Code Changes to Public Comment Draft #1. This document will form the basis for the upcoming Public Comment period. Only substantive technical changes in legislative format will be open for comment in energy.cdpaccess during this comment period. As a result of the Consensus Committee balloting of the items within the Committee Action Report any changes to this draft will result in Public Comment Draft #2 and an update to the Committee Action Report will be issued. Should any new substantive technical changes come out of the Consensus Committee Balloting these changes will be open for public comment separately.

CHAPTER 1 [RE] SCOPE AND ADMINISTRATION

User note:

About this chapter: Chapter 1 establishes the limits of applicability of this code and describes how the code is to be applied and enforced. Chapter 1 is in two parts: Part 1ÑScope and Application (Sections R101 ÐR104) and Part 2ÑAdministration and Enforcement (Sections R105 ÐR110). Section R101 identifies which buildings and structures come under its purview and references other I-Codes as applicable. Standards and codes are scoped to the extent referenced (see Section R102.4).

This code is intended to be adopted as a legally enforceable document, and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the code official appointed by[NAME OF JURISDICTION] and shall be cited as such. It is referred to herein as Òthis code.Ó

R101.2 Scope (Not subject to public input). This code applies to the design and construction of detached one- and two-family dwellings and multiple single-family dwellings (townhouses) and Group R-2, R-3 and R-4 buildings three stories or less in height above grade plane.

R101.2.1 Appendices Provisions in the appendices shall not apply unless specifically adopted.

R101.3 Intent (Not subject to public input). The International Energy Conservation Code - Residential Provisions provide market-driven, enforceable requirements for the design and construction of residential buildings, providing minimum efficiency requirements for buildings that result in the maximum level of energy efficiency that is safe, technologically feasible, and life cycle cost effective, considering economic feasibility, including potential costs and savings for consumers

applicable codes or ordinances.

~~R101.5~~R101.4 Compliance. Residential buildings shall meet the provisions of IECCÑResidential Provisions. Commercial buildings shall meet the provisions of IECCÑCommercial Provisions.

~~R101.5.1~~R101.4.1 Compliance materials. The code official shall be permitted to approve specific computer software, worksheets, compliance manuals and other similar materials that meet the intent of this code.

SECTION R102
APPLICABILITY

~~R101.4~~R102.1 Applicability. 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 govern.

~~R101.4.1~~R102.1.1 Mixed residential and commercial buildings. Where a building includes both residential building and commercial building portions, each portion shall be separately considered and meet the applicable provisions of the IECCÑCommercial Provisions or IECCÑResidential Provisions.

~~R108.3~~R102.2 Other laws. The provisions of this code shall not be deemed to nullify any provisions of local, state or federal law.

~~R108.2~~R102.3 Application of references. References to chapter or section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

~~R108.1~~R102.4 Referenced codes and standards. The codes and standards referenced in this code shall be those indicated in Chapter 6 , and such codes and standards shall be considered as part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections R102.4.1 and R102.4.2.

~~R108.1.1~~R102.4.1 Conflicts. Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

~~R108.1.2~~R102.4.2 Provisions in referenced codes and standards. Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of

R103.2 Appointment

confirm compliance with this code.

of this code. The holders of such permit shall proceed at their own risk without assurance that the permit for the entire energy conservation system will be granted.

~~R103.4~~R105.4 Amended construction documents. Work shall be installed in accordance with the approved construction documents, and any changes made during construction that are not in compliance with the approved construction documents shall be resubmitted for approval as an amended set of construction documents.

~~R103.5~~R105.5 Retention of construction documents. One set of approved construction documents shall be retained by the

and foundations shall verify compliance with the code as to R-value, location, thickness, depth of burial and protection of insulation as required by the code and approved plans and specifications.

~~R105.2.2~~R107.2.2 Framing and air barrier rough-in inspection. Air barrier inspections at framing and rough-in shall be made before application of air permeable insulation and shall verify compliance with the code ~~as to: fenestration properties such as U-factor and SHGC~~ and proper installation; air leakage controls as required by the code;

through R105.4.1.3 and to authorize its work in the jurisdiction.

R107.4.1.1

SECTION R109
STOP WORK ORDER

R109.1 Authority. Where the code official finds any work regulated by this code being performed in a manner contrary to the provisions of this code or in a dangerous or unsafe manner, the code official is authorized to issue a stop work order.

R109.2 Issuance.

CHAPTER 2 [RE] DEFINITIONS

User note:

About this chapter: Codes, by their very nature, are technical documents. Every word, term and punctuation mark can add to or change the meaning of a technical requirement. It is necessary

~~A29 3= -97:/>/8> +8. /B:/<3/8-/. 38 >2/ +::63-+>398 90 /8138//<381 :<38-3:6/= >9 7+>/<3+6= 7/>29.= 9< =C=>/7 +8+6C=/=~~

AUTOMATIC. $/60 +->381 9:/<+>381 ,C 3>= 9A8 7/-2+83=7 A2/8 +->?+>/. ,C =97/ 37:/<=98+6 3806?/8-/ += 09< /B+7:6/ + -2+81/ 38 -?<</8> =></81>2 :</==?</ >/7:/<+>?</ 9< 7/-2+83-+6 -98031?<+>398 =/Manual G

AUTOMATIC SHUT-OFF CONTROL. ./@3-/ -+:+,6/ 90 +?>97+>3-+66C >?<8381 69+.= 900 A3>29?> manual 38>/<@/8>398Automatic =2?> 900 -98><96= 38-6?./ ./@3-/= =?-2 += ,?> 89> 6373>/. >9

09< ./=-<3,381 >2/ ./=318 69-+>398 +8. :2C=3-+6 -2+<+->/<3=>3-= 90 >2/ /6/7/8>= 90 + :<94/->

=:+-/= (+66 2/312> =2+66 ,/ 7/+=?</. 0<97 >2/ 0383=2/. 0699< 90 >2/ 0699< +>9@/ dwelling unit >9 >2/ ?8./<=3./

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ELECTRIC VEHICLE CAPABLE SPACE (EV CAPABLE SPACE). ./=318+>/. automobile parking space >2+> 3= :<9@3./. A3>2 /6/-><3-+6 380<+=><?->?</ =?-2 += ,?> 89> 6373>/. >9 <+-/A+C= -+,6/= /6/-><3-+6 -+:+-3>C +8. :+8/6,9+<. 9< 9>2/< /6/-><3-+6 .3=><3,?>398 /;?3:7/8> =:+-/ 8/-/==+<C 09< >2/ 0?>?</ 38=>+66+>398 90 +8 '$

ELECTRIC VEHICLE READY SPACE (EV READY SPACE). 8 automobile parking space >2+> 3= :<9@3./. A3>2 + ,<+8-2 -3<-?3> +8. /3>2/< +8 9?>6/> 4?8->398 ,9B 9< </-/:>+-6/ >2+> A366 =?::9<> +8 38=>+66/. '$

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). ;?3:7/8> 09< :6?1 38 :9A/< ><+8=0/< 38-6?.381 >2/ ?81<9?8./. 1<9?8./. +8. /;?3:7/8> 1<9?8.381 -98.?->9<= +8. >2/ /6/-><3- @/23-6/ -988/->9<= +>>+-2/. :6?1= :/<=98+6 :<9>/->398 =C=>/7 +8. +66 9>2/< 03>>381= ./@3-/= :9A/< 9?>6/>= 9< +::+<+>?= 38=>+66/. =:/-303-+66C 09< >2/ :?<:9=/ 90 ><+8=0/<<381 /8/<1C ,/>A//8 >2/ :</73=/= A3<381 +8. >2/ /6/-><3- @/23-6/

ELECTRIC VEHICLE SUPPLY EQUIPMENT INSTALLED SPACE (EVSE SPACE). 8 automobile parking space >2+> 3= :<9@3./. A3>2 + ./.3-+>/. '$ -988/->398

EMITTANCE. %2/ <+>39 90 >2/ <+.3+8> 2/+> 06?B /73>>/. ,C + =:/-3~~78>2+> /73>>/. ,C + ,6+-5,9.C +> >2/ =+7/ >/7:/<+>?</ +8. ?8./< >2/ =+7/ -98.3>398=~~ 7/+=?</. 98 + =-+6/ 0<97 >9 A2/</ + @+6?/ 90 38.3-+>/= :/<0/-> /73==398

ENCLOSED REFLECTIVE AIR SPACE. .. 8 ?8@/8>36+>/. -+@3>C A3>2 + emittance =?<0+-/ ,9?8./. 98 +66 =3./= ,C building -97:98/8>=

ENERGY ANALYSIS. 7/>29. 09< /=>37+>381 >2/ +88?+6 /8/<1C ?=/ 90 >2/

~~>2/ ./><37/8>+6 /00/ >= 90 >2/ /B>/<39< /8@3<987~~/8>

FENESTRATION. "<9.?->= -6+==303/. += /3>2/*vertical fenestration* 9<skylights.

Skylights. 6+== 9< 9>2/< ><+8=:+</8> 9< ><+8=6?-/8> 16+D381 7+>/<3+6 38=>+66/. +> + =69:/ 90 6/== >2+8 ./1<//= <+. 0<97 29<3D98>+6 38-6?.381 ?83> =5C6312>= >?,?6+< .+C6312>381

RATED DESIGN. ./=-<3:>398 90 >2/ :<9:9=/. ~~building~~

9:/<+>381 -98>38?9?=6C 9< >2<9?12 + :<91<+77/. 38>/<73>>/8> =-2/.?6/ >9 =+>3=0C >2/ A296/ 29?=/ ventilation <+>/=

WORK AREA. %2+> :9<>398 9< :9<>398= 90 building -98=3=>381 90 +66 </-98031?</. =:+-/= += 38.3-+>/. 98 >2/ construction documents Work area /B-6?./= 9>2/< :9<>398= 90 >2/ building A2/</ 38-3./8>+6 A9<5 /8>+36/. ,C >2/ 38>/8./. A9<5 7?=> ,/ :/<09<7/. +8. :9<>398= 90 >2/ building A2/</ A9<5 89> 383>3+66C 38>/8./. ,C >2/ 9A8/< 3= =:/-303-+66C </;?3</. ,C >23= -9./

ZONAL HEATING. ~~ 2/+>381 =C=>/7 38 A23-2 /+-2 D98/ 9< <997 2+= + =/:+<+>/ 2/+>/< A3>2~~ + ~~=3816/ -98><966/< 38 /+-2 D98~~/

ZONE. =:+-/ 9< 1<9?: 90 =:+-/= A3>238 + building A3>2 2/+>381 9< -996381 </;?3</7/8>= >2+> +</ =?003-3/8>6C =3736+< =9 >2+> ./=3</. -98.3>398= -+8 ,/ 7+38>+38/. >2<9?129?> ?=381 + =3816/ -98><966381 ./@3-/

CHAPTER 3 [RE] GENERAL REQUIREMENTS

User note:

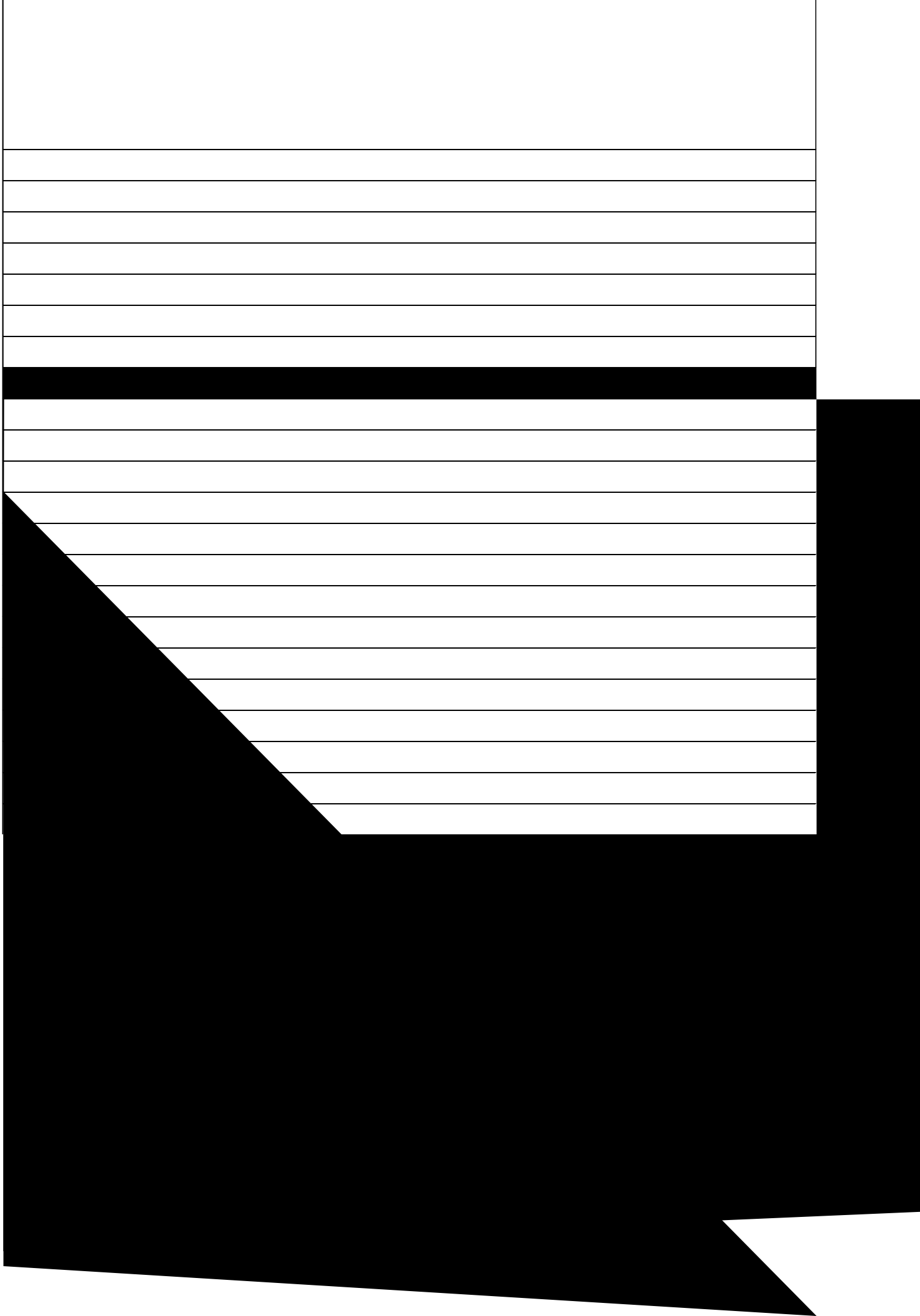
About this chapter: Chapter 3 addresses broadly applicable requirements that would not be at home in other chapters having more specific coverage of subject matter. This chapter establishes climate zone by US counties and territories and includes methodology for determining climate zones elsewhere. It also contains product rating, marking and installation requirements for materials such as insulation, windows, doors and siding.

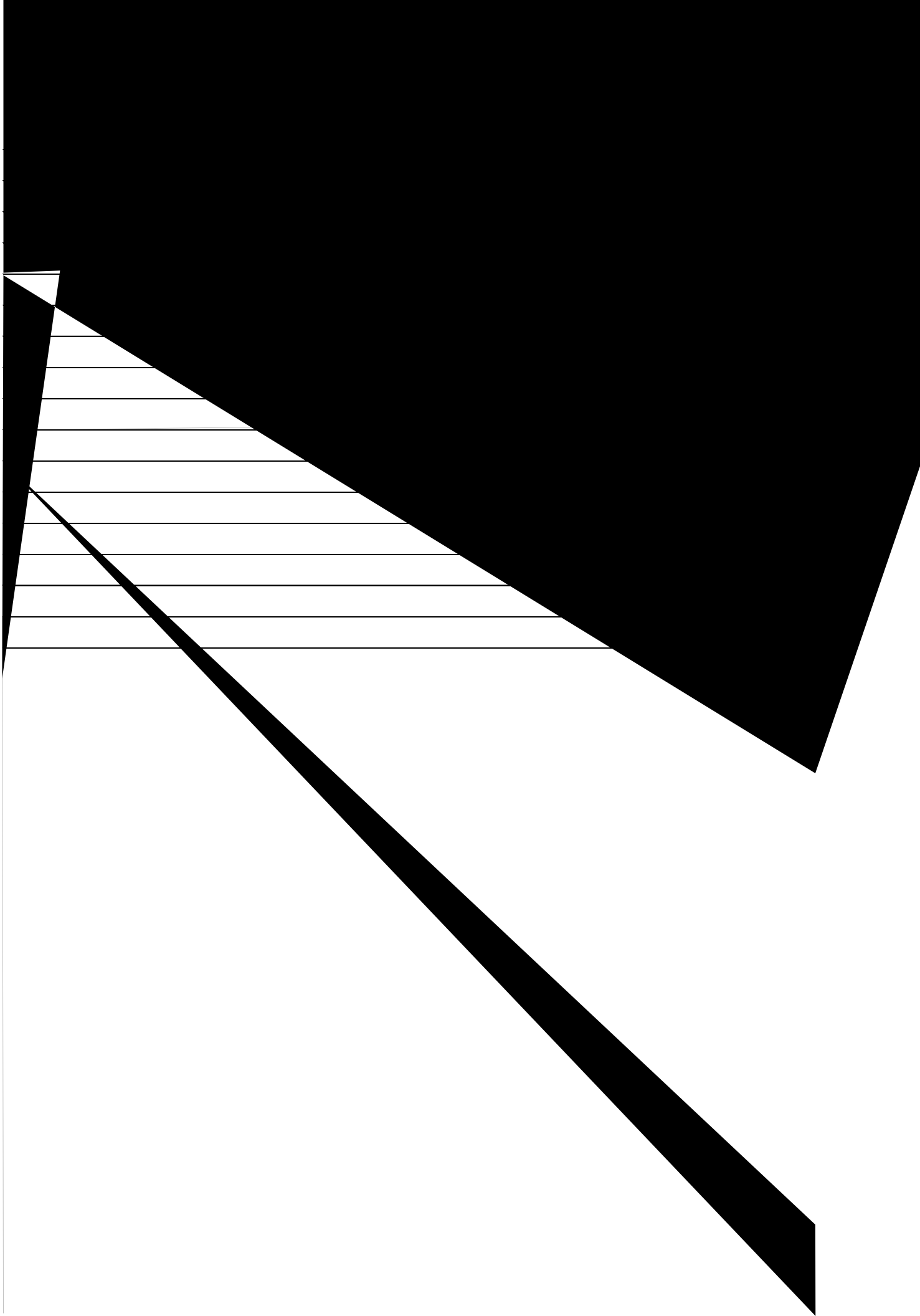
SECTION R301
CLIMATE ZONES

R301.1 General. Climate zones 9EB@ Figure R301.1 BE Table R301.1 F;4?? 58 HF87 9BE 78G8E@<A<A: G;8 4CC?<645?8 E8DH<E8@ Chapter 4 B64G<BAF ABG <A7<64 Table R301.1 F;4?? 58 4FF<:A87 climate zone

TABLE R301.1
CLIMATE ZONES, MOISTURE REGIMES, AND WARM HUMID DESIGNATIONS BY STATE, COUNTY AND TERRITORY[a]

US STATES
ALABAMA
HG4H:4
4?7J<A
4E5BHE
<55
?BHAG
H??B6>
HG?8E
4?;BHA
;4@58EF
;8EB>88
;<?GBA
;B6G4J
?4E>8
?4L
?85HEA8
B9988
B?58EG
BA86H;
BBF4
BI<A:GBA
E8AF;4J
H??@4A
4?8
4??4F
8"4?5
?@BE8
F64@5<4
GBJ4;
4L8GG8
E4A>?<A





E4;4@

E80Aóƒ

ï˜ĐÑ`,ˆ9õ”9 YC•  M•   (ƒ’3#YC•õ” E<4A4•   (ƒ’ HC•f™,D  ä™•   (ƒ‘6$9 o˜% ICÔ(ĐÑ`,ˆ9YOYC•õ—<@4•   (ƒ• ,5”

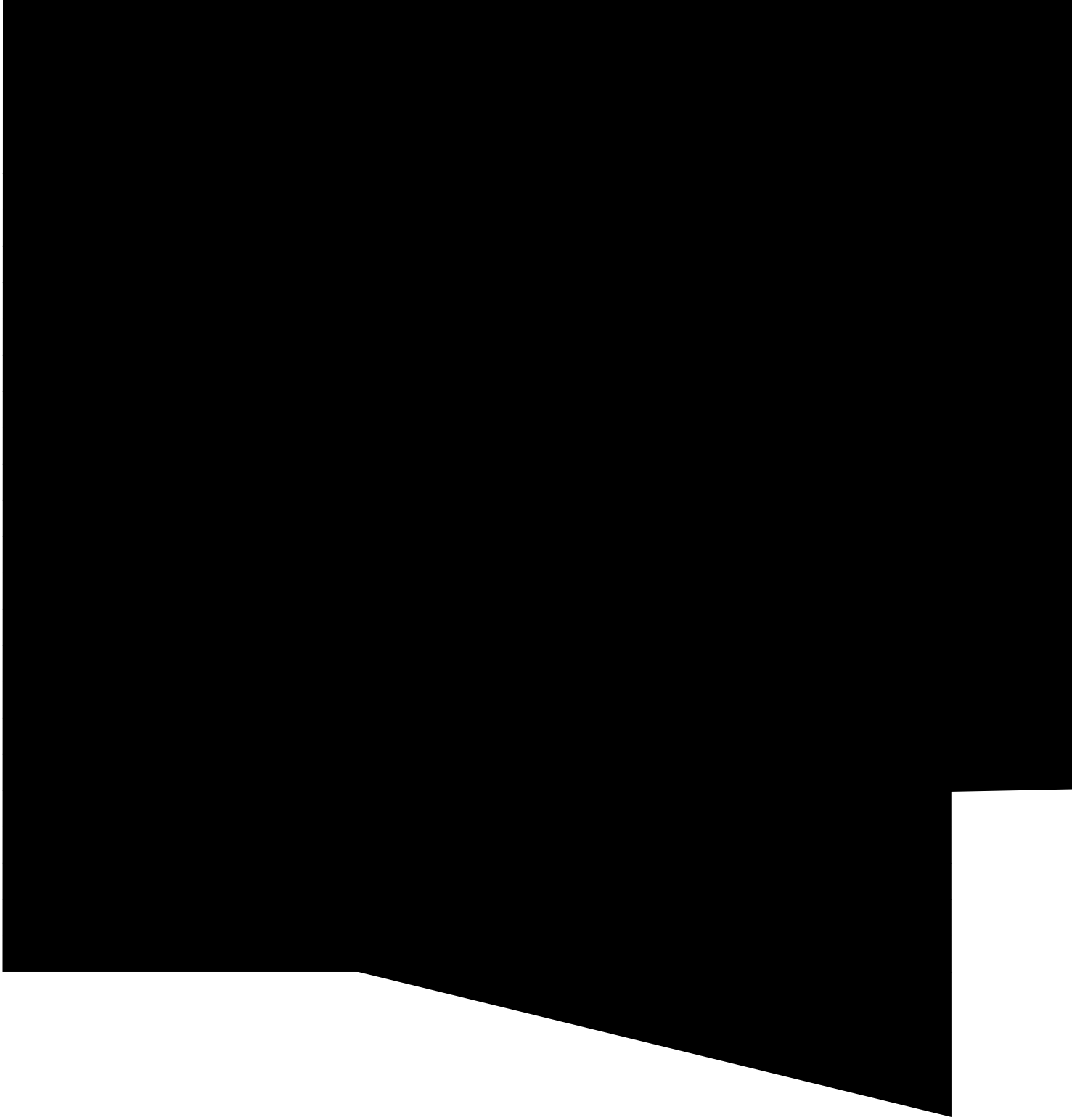
E4A>?<A

'E4<E<8
'H?4F><
)4A7B?C;
*4?<A8
*6BGG
*84E6L
*854FG<4A
*8I<8E
*;4EC
*G E4A6<F
*GBA8
,A<BA
-4A HE8A
.4F;<A:GBA
.;<G8
.BB7EH99
/8??
CALIFORNIA
?4@874
?C<A8
@47BE
HGG8
4?4I8E4F
B?HF4
BAGE4 BFG4
8? %BEG8
? BE47B
E8FAB
?8AA
H@5B?7G
@C8E<4?
ALB
"8EA
"<A:F
#4>8

#4FF8A
#BF A; C„`
$478E4

+E<A<GL
+H?4E8
+HB?H@A8
-8AGHE4
/B?B
/H54
COLORADO
74@F
?4@BF4
E4C4;B8
E6;H?8G4
464
8AG
BH?78E
EBB@9<8?7
;49988
;8L8AA8
?84E E88>
BA8=BF
BFG<??4
EBJ?8L
HFG8E
8?G4
8AI8E
B?BE8F
BH:?4F
4:?8
?58EG
? '4FB
E8@BAG
4E9<8?7
<?C<A
E4A7
HAA<FBA
<AF74?8

/H@4
CONNECTICUT
4??
DELAWARE
4??
DISTRICT OF COLUMBIA
4??
FLORIDA
?46;H4
4>8E
4L



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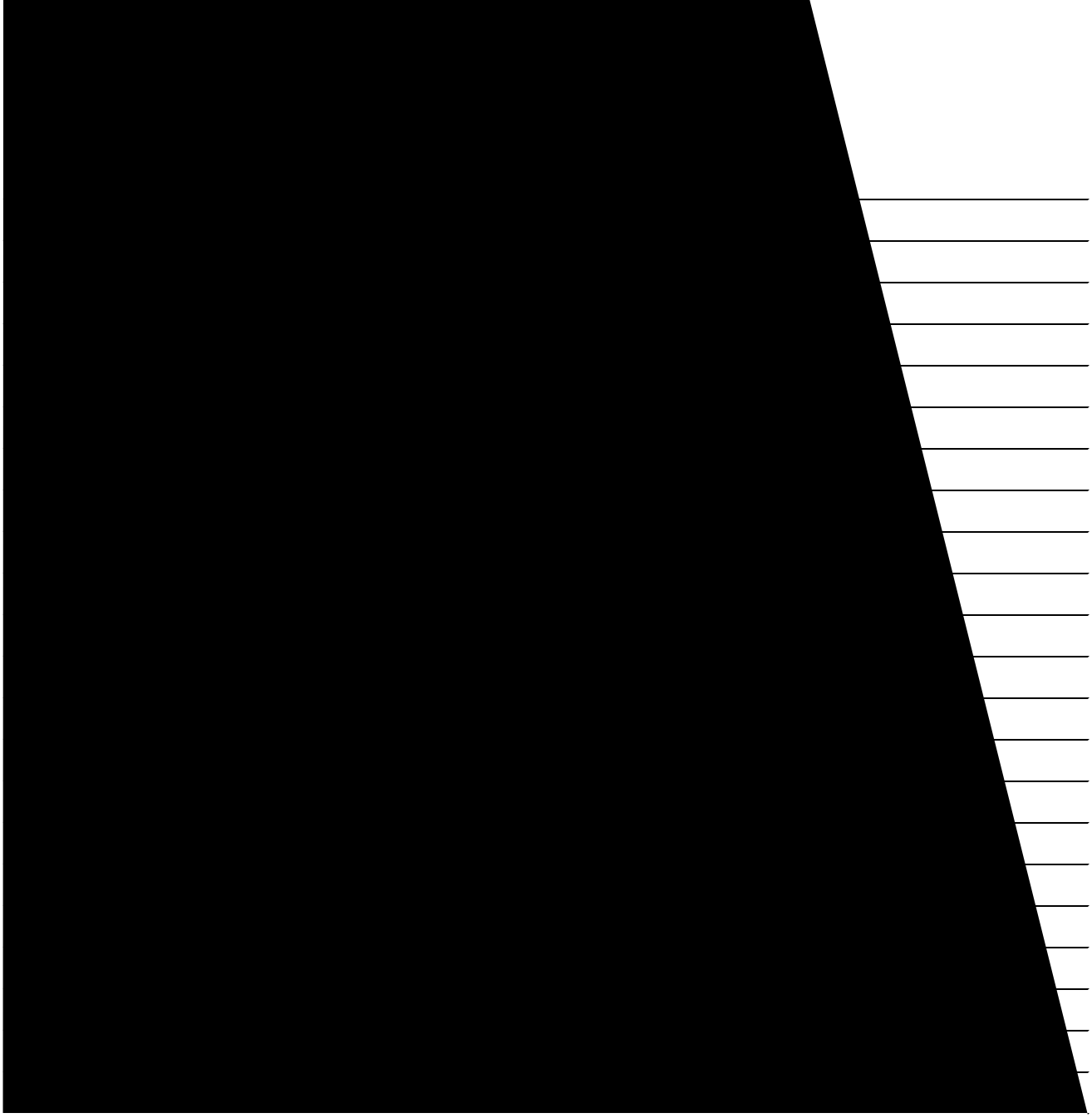

E47L
E88A8
J<AA8GG
458EF;4@
4??
4A6B6>
4E4?FBA
4EE<F
4EG
84E7
8AEL
BHFGBA
EJ<A
!46>FBA
!4FC8E
!899 4I<F
!8998EFBA
!8A><AF
!B;AFBA
!BA8F
#4@4E
#4A<8E
#4HE8AF
#88
#<58EGL
#<A6B?A
#BA:
#BJA78F
#H@C><A
$46BA
$47<FBA
$4E<BA
$6 H99<8
$6 AGBF;
$8E<J8G;8E

B<F8
BAA8E
BAA8I<??8
BHA74EL
HGG8
4@4F
4ALBA
4E<5BH
4FF<4
?4E>
?84EJ4G8E
HFG8E
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E4A>?<A
E8@BAG
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BB7<A:
74;B
!8998EFBA
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$47<FBA
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!46>FBA
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"8A74??
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$6 8AEL
$6#84A
$8A4E7
$8E68E
$BAEB8

$BAG:B@8EL
$BE:4A
$BH?GE<8
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'8BE<4
'8EEL
'<4GG
'<>8
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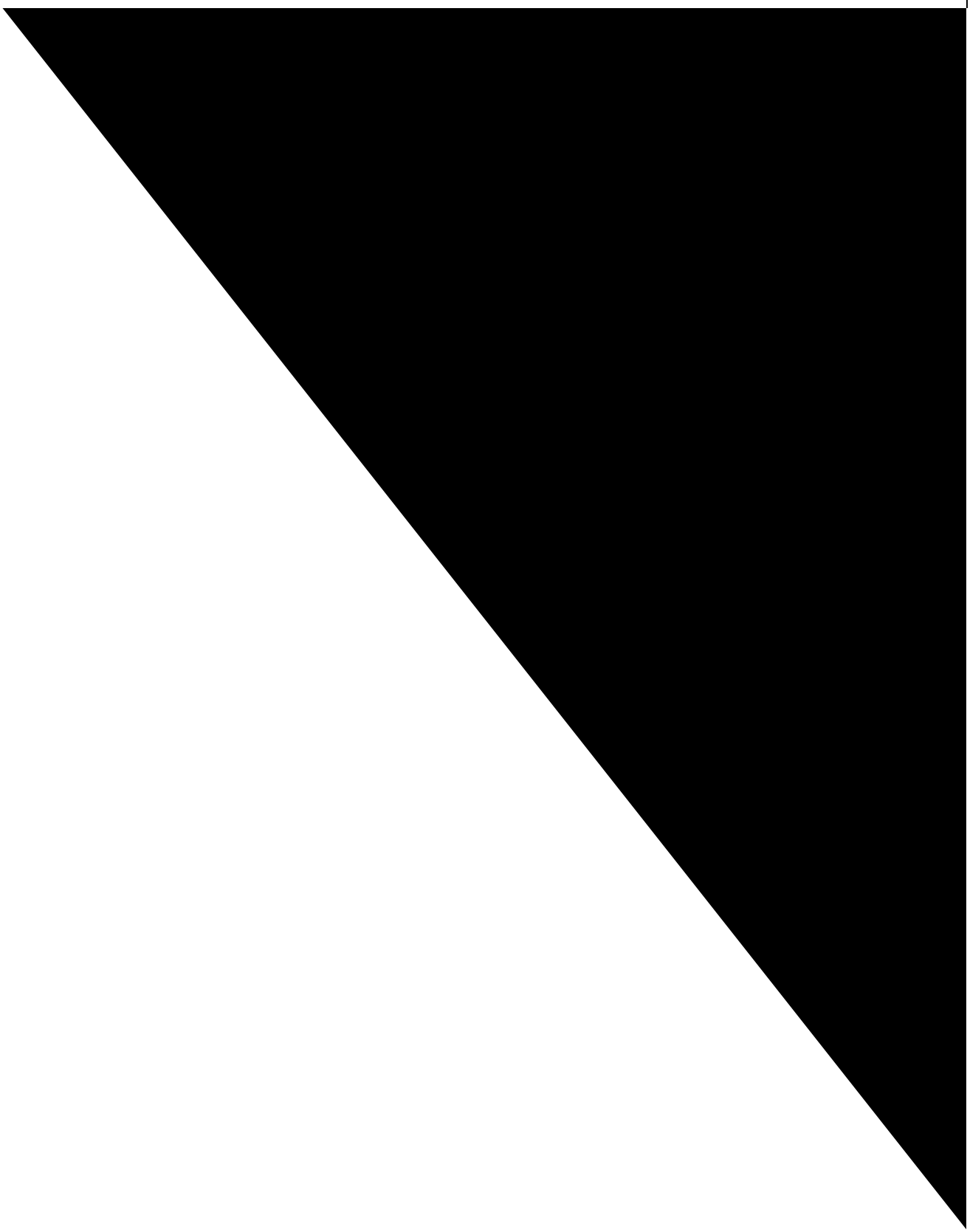

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*G4E>8
*G8H58A
*G !BF8C;
*H??<I4A
*J<GM8E?4A7
+<CC864AB8
+<CGBA
,A<BA
-4A78E5HE:;
-8E@<??<BA
-<:B
.454F;
.4EE8A
.4EE<6>
.4F;<A:GBA
.4LA8
.8??F
.;<G8
.;<G?8L
IOWA
74<E
74@F
??4@4>88
CC4ABBF8
H7H5BA
8AGBA
?46> 4J>
BBA8
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H6;4A4A
H8A4 -<FG4

HG?8E
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;8EB>88
;<6>4F4J
?4E>8
?4L
?4LGBA
?<AGBA
E4J9BE7
4??4F
4I<F
864GHE
8?4J4E8
8F $B<A8F
<6><AFBA
H5HDH8
@@8G
4L8GG8
?BL7
E4A>?<A
E8@BAG
E88A8
EHA7L
HG;E<8
4@<?GBA
4A6B6>
4E7<A
4EE<FBA
8AEL
BJ4E7
H@5B?7G

74
BJ4
!46>FBA
!4FC8E
!8998EFBA
!B;bC•c$ƒ}¦s7Ðñ€ #YDd$

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6BGG;8?5L
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-4A HE8A
.4C8??B
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BJ?8L
E4J9BE7
864GHE
<6><AFBA
BA<C;4A
BH:?4F
7J4E7F
?>
??<F
??FJBEG;
<AA8L
BE7
E4A>?<A
84EL
BI8
E4;4@
E4AG
E4L
E88?8L
E88AJBB7
4@<?GBA
4EC8E
4EI8L
4F>8??
B7:8@4A
!46>FBA
!8998EFBA
!8J8??
!B;AFBA
"84EAL
"<A:@4A
"<BJ4
#458GG8
#4A8

#84I8AJBEG;

#<A6B?A

#<AA

*87:J<6>
*8J4E7
*;4JA88
*;8E<74A
*;8E@4A
*@; 8G ñ€ 9` •!A3' 3•ŸYC” a70T‰vB39T‰v4E7

?4<5BEA8
BA6BE7<4
8 *BGB
4FG 4GBA)BH:8
4FG 4EEB??
4FG 8?<6<4A4
I4A:8?<A8
E4A>?<A
‡€4A6Ö ƒ€P
58E<4
58EI<??8
!46>FBA
!8998EFBA
!8998EFBA 4I<F
#494L8GG8
#49BHE6;8
#4 *4??8
#<A6B?A
#<I<A:FGBA
$47<FBA
$BE8;BHF8
%4G6;<GB6;8F

*G #4A7EL

AA8 EHA78?
4?G<@BE8
4?G<@BE8 6<GL
4?I8EG
4EB?<A8
4EEB??
86<?
;4E?8F
BE6;8FG8E
E878E<6>
4EE8GG
4E9BE7
BJ4E7
"8AG
$BAG:B@8EL
'E<A68 8BE:8RF
(H88A AA8RF
*B@8EF8G
*G $4ELRF
+4?5BG
.4F;<A:GBA
.<6B@<6B
.BE68FG8E
MASSACHUSETTS
4??

8AM<8
8EE<8A
E4A6;
4?;BHA
4FF
;4E?8IB<K
;85BL:4A
;<CC8J4
?4E8
?<AGBA
E4J9BE7
8?G4
<6><AFBA
4GBA
@@8G
8A8F88
?47J<A
B:85<6
E4A7 +E4I8EF8
E4G<BG
<??F74?8
BH:;GBA
HEBA
A:;4@
BA<4
BF6B
EBA
F458??4
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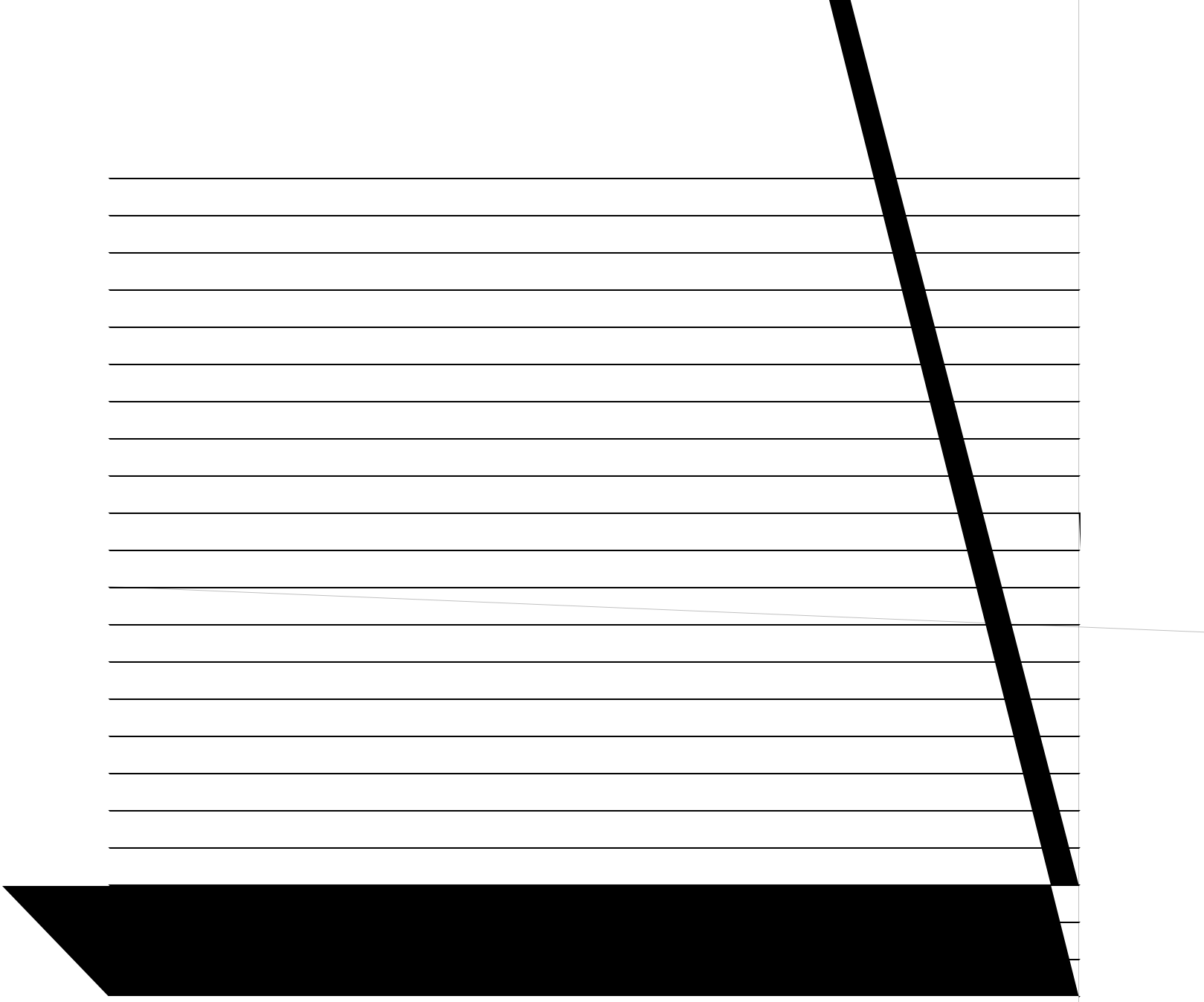

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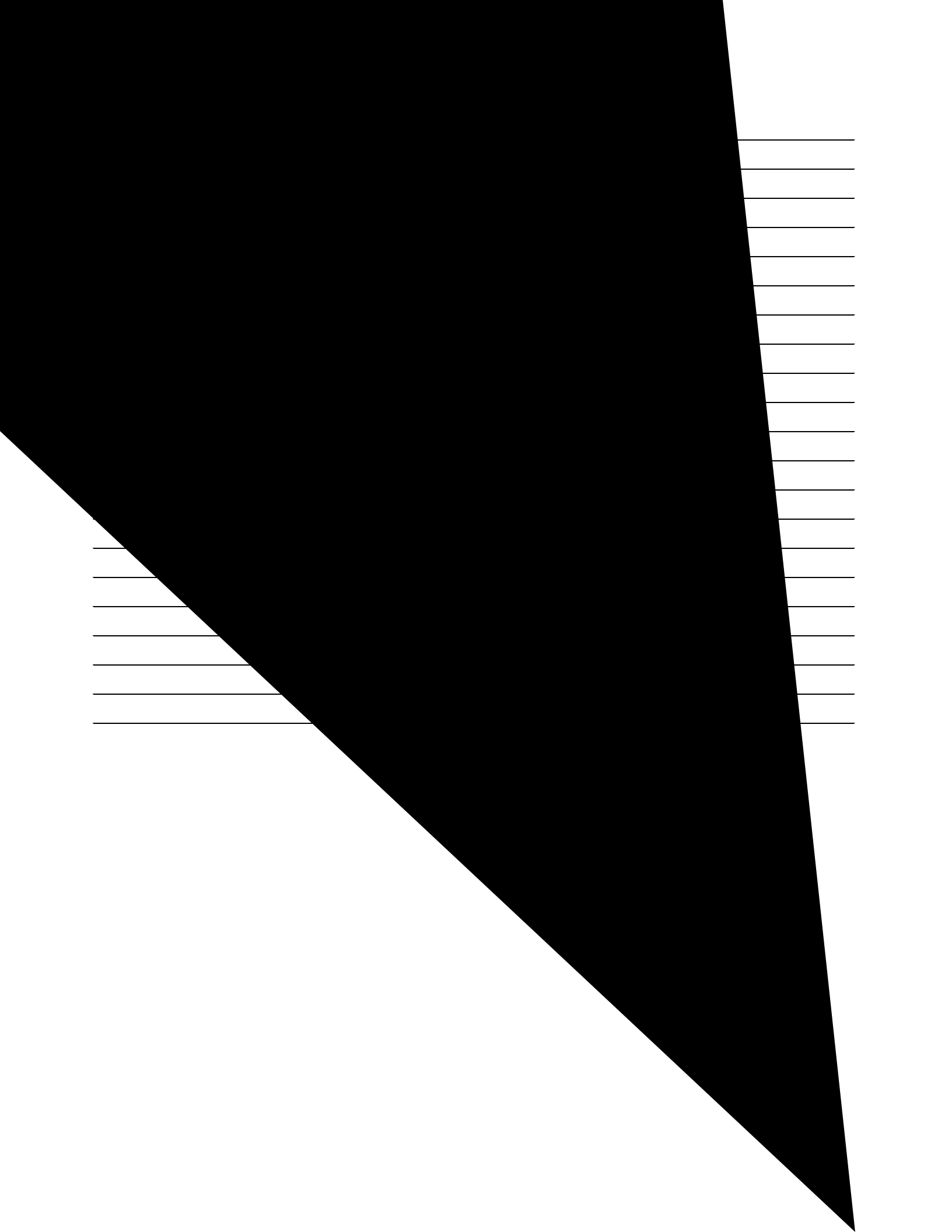

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GUAM
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R301.2 Warm Humid counties. A Table R301.1 .4E@ H@<7 6BHAG<8F 4E8 <78AG<9<87 5L 4A 4FG8E<F>

R301.3 Climate zone definitions. +B 78G8E@<A8 G;8 6?<@4G8 MBA8F 9BE ?B64G<BAF ABG ?<FG87 6B78 HF8 G;8 9B??BJ<A: <A9BE@4G<BA GB 78G8E@<A8 AH@58EF 4A7 ?8GG8EF <A 466BE74A68 J<G; G8@F G;EBH:;

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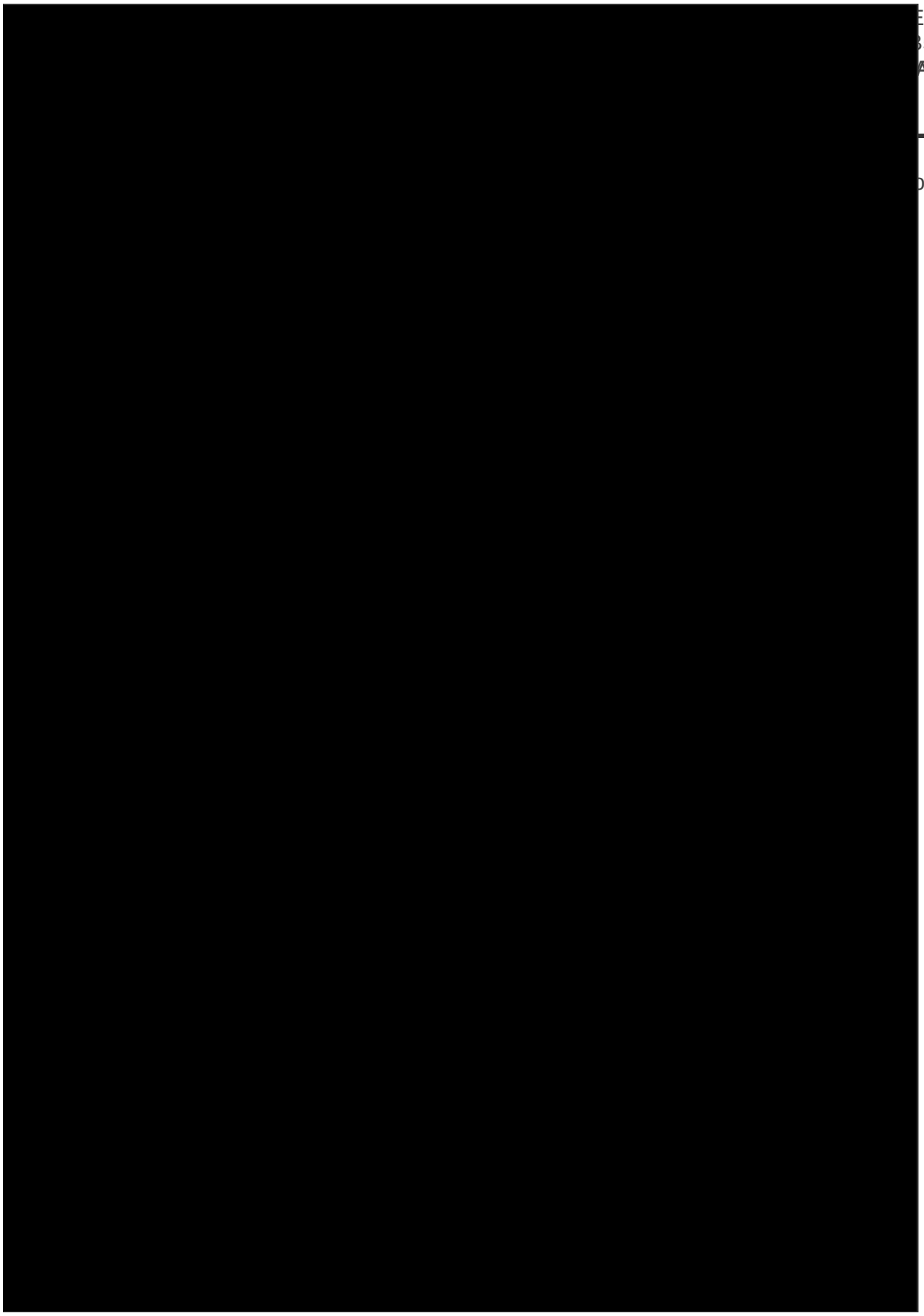
78G8E@<A8 G;8 @B<FGHE8 MBA8 9 G;8 @B<FGHE8 MBA8 <F ABG $4E<A8 G;8A HF8
789<A<G<BA GB 78G8E@<A8 J;8G;8E EL BE H@<7

EL 789<A<G<BA #B64G<BAF @88G6EA:G8B<4 <A G8@F G;EBH:;
%BG $4E<A8
9 C8E68AG BE @BE8 B9 G;8 CE86<C<G4G<BA <A6;8F @@ 7HE<A: G;8 ;<:; FHA C8E<B7
789<A87 4F CE<? G;EBH:; *8CG8@58E <A G;8 %BEG;8EA 8@<FC;8E8 4A7 &6GB58E G;EBH
$4E6; <A G;8 *BHG;8EA 8@<FC;8E8 G;8A G;8 7EL ;H@<7 G;E8F;B?7 <F <A 466BE74A68
J<G; DH4G<BA

4 5 8445 5 78 6 3 D

J;8E8
P AAH4? CE86<C<G4G<BA <A6;8F @@
T AAH4? @84A G8@C8E4GHE8 O O
9 58GJ88A 4A7 C8E68AG B9 G;8 CE86<C<G4G<BA 7HE<A: G;8 ;<:; FHA
C8E<B7 789<A87 4F CE<? G;EBH:; *8CG8@58E <A G;8 %BEG;8EA 8@<FC;8E8
G;EBH:; $4E6; <A G;8 *BHG;8EA 8@<FC;8E8 G;8A G;8 7EL ;H@<7 G;E8F;B?7 <F <A
466BE74A68 J<G; DH4G<BA

J;8E8
P AAH4? CE86<C<G4G<BA <A6;8F @@
T AAH4? @84A G8@C8E4GHE8 O O



E<B7 789<A87
358E G;EBH:; $4E6;
A68 J<G;

on 3-3)

TABLE R303.1.3(1)
DEFAULT GLAZED WINDOW, GLASS DOOR AND SKYLIGHT U-FACTORS

FRAME TYPE	WINDOW AND GLASS DOOR		SKYLIGHT	
	Single pane	Double pane	Single	Double
$8G4?				
$8G4? J<G; +;8E@4? E84>				
%BA@8G4? BE $8G4? ?47				
?4M87 ?B6>				

TABLE R303.1.3(2)
DEFAULT OPAQUE DOOR U-FACTORS

DOOR TYPE	OPAQUE U-FACTOR
,A<AFH?4G87 $8G4?	
AFH?4G87 $8G4?	
.BB7	
AFH?4G87 ABA@8G4? 87:8 ABG 8K6887<A: :?4M<A: 4AL :?4M<A: 7BH5?8 C4A8	

4A7 FLFG8@F G;4G E8DH<E8 CE8I8AG<I8 @4<AG8A4A68)8DH<E87 E8:H?4E @4<AG8A4A68 46G<
58 6?84E?L FG4G87 4A7 <A6BECBE4G87 BA 4 E847458?I<F;5?458? F;4?? <A6?H78 G;8 G<G?8 BE
CH5?<64G<BA AH@58E 9BE G;8 BC8E4G<BA 4A7 @4<AG8A4A68 @4AH4? 9BE G;4G C4EG<6H?4E @B
CEB7H6G

CHAPTER 4 [RE] RESIDENTIAL ENERGY EFFICIENCY

User note:

About this chapter:

"HK ;NBE=BG@L PA>K> :G !G>K@R .:MBG@ %G=>Q L<HK> BL =>M>KFBG>= BG :HK=:G<> PBMA R406 MA> !G>K@R .:MBG@ %G=>Q L<HK> ;HMA PBMA :G= PBMAHNM :GR HG LBM> @>G>K:M EBLM>= HG MA> <>KMB?B<:M>

0A> <H=> >=BMBHG NG=>K PAB<A MA> LMKN<MNK> PMA> I:MA NL>= :G= PA>K> :IIEB<:;E> MA> :==BMBHG:E >??B<B>G<R F>:LNK>L L>E><M>= ?HK <HFIEB:G<> PBMA .

3A>K> : solar-ready zone BL IKHOB=>= MA> <>KMB?B<:M> LA:EE BG=B<:M> MA> EH<:MB =BF>GLBHGL

SECTION R402
BUILDING THERMAL ENVELOPE

R402.1 General. 0A> building thermal envelope LA:EE <HFIER PBMA MA> K>JNBK>=

~~R402.1.1 MAKHN@A~~ ~~R402.1.5~~ HG> H? MA> ?HEEHPBG@

/><MBHGL . MAKHN@A . HK

/><MBHGL . :G= .

Exceptions:

0A> ?HEEHPBG@ EHP >GiHK@R HK IHKMBHGL MA>K>H? L>I:K:M>= ?KHF MA> K>F:BG=>K H MA> ;NBE=BG@L PA>K> :G !G>K@R .:MBG@ %G=>Q L<HK> BL =>M>KFBG>= BG :HK=:G<> PBMA R406 MA> !G>K@R .:MBG@ %G=>Q L<HK> ;HMA PBMA :G= PBMAHNM :GR HG LBM> @>G>K:M EBLM>= HG MA> <>KMB?B<:M>

0A> <H=> >=BMBHG NG=>K PAB<A MA> LMKN<MNK> PMA> I:MA NL>= :G= PA>K> :IIEB<:;E> MA> :==BMBHG:E >??B<B>G<R F>:LNK>L L>E><M>= ?HK <HFIEB:G<> PBMA .

3A>K> : solar-ready zone BL IKHOB=>= MA> <>KMB?B<:M> LA:EE BG=B<:M> MA> EH<:MB =BF>GLBHGL

SECTION R402
BUILDING THERMAL ENVELOPE

R402.1 General. 0A> building thermal envelope LA:EE <HFIER PBMA MA> K>JNBK>= ~~R402.1.1 MAKHN@A~~ ~~R402.1.5~~ HG> H? MA> ?HEEHPBG@

/><MBHGL . MAKHN@A . HK

/><MBHGL . :G= .

Exceptions:

0A> ?HEEHPBG@ EHP >GiHK@R HK IHKMBHGL MA>K>H? L>I:K:M>= ?KHF MA> K>F:BG=>K H MA> ;NBE=BG@L PA>K> :G !G>K@R .:MBG@ %G=>Q L<HK> BL =>M>KFBG>= BG :HK=:G<> PBMA R406 MA> !G>K@R .:MBG@ %G=>Q L<HK> ;HMA PBMA :G= PBMAHNM :GR HG LBM> @>G>K:M EBLM>= HG MA> <>KMB?B<:M>

0A> <H=> >=BMBHG NG=>K PAB<A MA> LMKN<MNK> PMA> I:MA NL>= :G= PA>K> :IIEB<:;E> MA> :==BMBHG:E >??B<B>G<R F>:LNK>L L>E><M>= ?HK <HFIEB:G<> PBMA .

3A>K> : solar-ready zone BL IKHOB=>= MA> <>KMB?B<:M> LA:EE BG=B<:M> MA> EH<:MB =BF>GLBHGL

TABLE R402.1.2

MAXIMUM ASSEMBLY U-FACTORS[a]

?> .HH?L PBMA BGLNE:MBHG >GMBK>ER :;HO> =><D LA:EE <HFIER PBMA /><MBHG :G= MA>
. 1 ?:<MHKL H? 0:;E>

@> " ?:<MHKL ?HK LE:;L <HKK>LIHG= MH MA> . O:EN>L H? 0:;E> . :G= MA> BGLM:EE:MBH
<HG=BMBHGL H? /><MBHG .

R402.1.3 R-value alternative. LL>F;EB>L PBMA O:EN> H? BGLNE:MBHG F:M>KB:EL >JN:E MH C

TABLE R402.1.3
INSULATION MINIMUM R-VALUES AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	0	1	2	3	4 except Marine	5 and Marine 4	6	7 and 8
2!.0% (								

*.   *HM .>JNBK>=

<B <HGMBGNHNL BGLNE:MBHG

:   R O:EN>L :K> FBGBFNFL ?:<MHKL :G= /$# :K> F:QBFNFL 3A>K> BGLNE:MBHG BL BGLM:EE>= BG : <:OBMR MA:M BL E>LL MA:G MA> E:;>E HK =>LB@G MAB<DG>LL H? MA> BGLNE:MBH R O:EN> H? MA> BGLNE:MBHG LA:EE ;> GHM E>LL MA:G MA:M LI><B?B>= BG MA> M:;E>

~~;~~ ~~0A> ?>G>LMK:MBHG:MHK <HENFG >Q<EN=>L LDREB@AML 0A> /$# <HENFG :IIEB>L~~ MH :EE @E ~~?>G>LMK:M~~BHG

envelope thermal conductance TC_p BL E>LL MA:G HK >JN:E MH MA> K>JN:K<=MHM: building thermal
envelope MA>KF:E <HG=N<M:G<0> $_K$ NLBG@

NG<HFIK>LL>= . BGLNE:MBHG >QM>G=L HO>K MA> P:EE MHI IE:M> :M MA> >:O>L 0ABL K>=N<MBHG H? BGLNE:MBHG ?KHF MA> K>JNBK>= BGLNE:MBHG GHM :IIER MH MA> BGLNE:MBHG feGestration <KBM>KBSection R402.1.2 :G= MA>HFIHG>GM I>K?HKF:G<~~0HM:E 1~~ :EM>KG:MBGSection R402.1.5

R402.2.2 Ceilings without attics. 3A>K> Section R402.1.3 K>JNBK>L BGLNE:MBHG>L @K>:M>K MA:G .BG MA> BGM>KLMBMB:E LI:<> :;HO> :G= <>BEBG@ MA> LMKN<MNK:E KHH? =><D :G= MA> =>LB@G H? MA> KHH? <>BEBG@ :LL>F;ER =H>L GHM :EEHP LN??B<B>GM LI: K>JNBK>= BGLNE:MBHG MA> FBGBFNF K>JNBK>= BGLNE:MBHG MA> KHH? <>BEBG@ :LL>F;EB>L LA:EE ;> . %GLNE:MBHG LA:EE >QM>G= HO>K MA> MHI H? MA> P:EE IE:M> MH MA> HNM LN<A IE:M> :G= LA:EE GHM ;> <HFIK>LL>= 0ABL K>=N<MBHG H? BGLNE:MBHG ?KHF MA> K>JN H?Section R402.1.3 LA:EE ;> EBFBM>= MH LJN:K> ?>>M HK I>K<>GM H? MA> MHM:E BGLNE:M>= <>BEBG@ :K>: PAB<A>O>K BL E>LL 0ABL K>=N<MBHG LA:EE GHM :IER MH MA> I>K?HKF:G<~~0HM:E 1~~ :EM>KG:MBGSection R402.1.5

R402.2.3 Attic knee wall ~~MMB<~~ PHH= :MMB< knee wall :LL>F;EB>L MA:M L>I:K:M> conditioned space ?KHF NG<HG=BMHG>= :MMB< LI:<> ~~HLFIEE~~ LA:EE PBMA 0:;E> . ?HK PHH= ?K:F> P:EEL ~~F>>M MA> L:F> BGLNE:MBHG K>JNBK>F>GML :L :;HO> @K:M>>E P:EEL MMB<~~ knee wall :LL>F;EB>L LA:EE <HFIER PBMA /><MBHG . /N<A DG>> P:EEL LA:EE A:O>air barrier ;>MP>>G <HG=BMHG>= :G= NG<HG=BMHG>= LI:<>

R402.2.3.1 ~~Truss~~ Roof truss framing separating conditioned and unconditioned space 3A>K> PHH=O>KMB<:E KHH? MKNLL ?K:FBG@ F>F;>KL :K> NL>= MH conditioned space :G= NG<HG=BMHG>= LI:<> MA>R ~~HLFIEE~~ PBMA 0:;E> . ?HK PHH= ?K:F> P:EEL ~~F>>M MA> L:F> BGLNE:MBHG K>JNBK>F>GML :L :;HO> @K:M>>E P:EEL~~ /M>>E ?K:F> O>KMB<:E KHH? MKNLL ?K:FBG@ F>F;>KL NL>= MH conditioned space :G= NG<HG=BMHG>= LI:<> LA:EE <HFIER PBMA /><MBHG .

:=C:<>GM MH LH??BM :G= >:O> O>GML :??E>L LA:EE F:BGM:BG : G>M ?K>> :K>: HI>GBG@ >JN @K>:M>K MA:G MA> LBS> H? MA> O>GM 0A> ;:??E> LA:EE >QM>G= HO>K MA> MHI H? MA> :MMB< ;:??E> LA:EE ;> I>KFBMM>= MH ;> :GR LHEB= MA> ;??E> LA:EE ;> BGLM:EE>= MH MA> HNM>K >=@ H? MA> exterior wall MHI IE:M> LH :L MH IKHOB=> F:QBFNF LI:<> ?HK :MMB< BGLNE:MBHG <HO>K:@> MA> MHI IE:M> 3A>K> LH??BM O>GMBG@ BL GHM <HGMBGNHNL ;:??E>L LA:EE ;> BGLM:EE>= IK>O>GM ventilation air BG MA> >:O> LH??BM ?KHF ;RI:LLBG@ MA> ;:??E>

NG<HG=BMHG>= LI:<>L LN<A :L :MMB<L :G= <K:PE LI:<>L LA:EE ;> BGLNE:M>= MA> L:F>

"HK :BK I>KF>::E> BGLNE:MBHG

$HKBSHGM:E INEE =HPG LM:BK MRI> :<<>LL A:M<A>L BG <>BEBG@ :LL>F;EB>L MA:M
:<<>LL ?KHF<HG=BMBHG IGHG<HG=BMBHG>= LBG>LEBF:M> 6HG>L MAKHNL@EE

"EHHK ?K:FBG@ F>F;>KL MA:M :K> I:KM building thermal envelope LA:EE ;> :BK L>:E>=
MH F:BGM:BG continuous air barrier
+G> H? MA> ?HEEHPBG@ F>MAH=L
— %GLNE:MBHG Basic insulation

<HFIERBG@ PBMA /><MBHGL . HK crawl space wall BGLNE:MBHG LA:EE ;> BGLM:EE>= BG
:<<HK=:G<> PBMA MA> proposed design HK rated design 0A> IKHIHL>= HK rated design LA:EE
NL> :G :EM>KG:MBO> BGLNE:MBHG <HG?B@NK:MBHG :G= :LLH<B:M>= 1 ?:<MHK HK ?:<MH
PBMA II>G=BQ H? /$. ! HK PA>K> :=HIM>= II>G=BQ ." H? MABL <H=> 3A>K>
NL>= MH <HFIER PBMA /><MBHG . MA> 1 ?:<MHK HK ?:<MHK LA:EE ;> >JN:E MH HK E
MA:G MA> 1 ?:<MHK K>JNBK>= ;R 0:;E> . ?HK <K:PE LI:<> P:EEL

R402.2.12 Masonry veneer. %GLNE:MBHG LA:EE GHM ;> K>JNBK>= HG MA> AHKBSHGM:E IHKM ?HNG=:MBHG MA:M LNIIHKML : F:LHGKR O>G>>K

R402.2.13 Sunroom and heated garage insulation. Sunrooms >G<EHLBG conditioned space :G= A>:M>= @:K:@>L LA:EE F>>M MA> BGLNE:MBHG K>JNBK>F>GML H? MABL <H=>

Exception: "HK sunrooms

Exception: %G EBF:M> 6HG>L MAKHN@A sunrooms ?HK :G= A>:M>= @:K:@>L PBMA thermal isolation :G= >G<EHLBG@ conditioned space MA> fenestration U ?:<MHK LA:EE GHM >Q<>>= :G= MA> LDREB@AM U ?:<MHK LA:EE GHM >Q<>>=

*>P fenestration L>I:K:MBG@ sunroom HK A>:M>= @:K:@> PBMA thermal isolation ?KHF conditioned space LA:EE <HFIER PBMA building thermal envelope K>JNBK>F>GML H? MABL <H=>

R402.5 Air leakage. 0A> building thermal envelope LA:EE ;> <HGLMKN<M>= MH EBFBM :BK E>:D:@> :<<HK=:G<> PBMA MA> K>JNBK>F>GML H? Sections R402.5.1 MAKHN@A.

R402.5.1 Building thermal envelope. 0A> building thermal envelope LA:EE <HFIER PBMA Sections R402.5.1.1 MAKHN@A R402.5.1.5 0A> L>:EBG@ F>MAH=L ;>MP>>G =BLLBFBE:K F:M>KB:EL LA:EE :EEHP ?HK =B??>K>GMB:E >QI:GLBHG :G= <HGMK:<MBHG

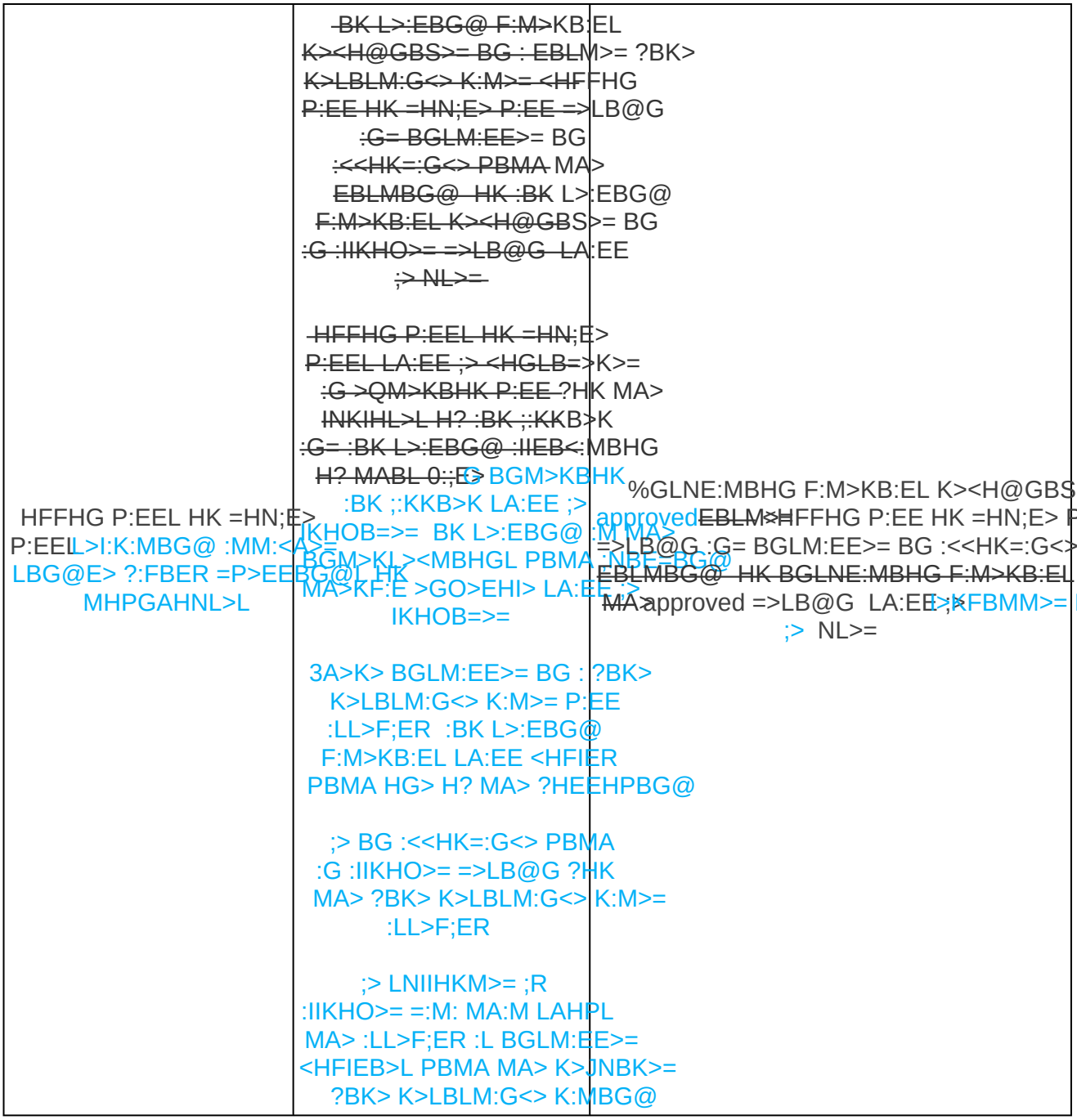
R402.5.1.1 Installation. Bƒð

TABLE R402.5.1.1
AIR BARRIER, AIR SEALING AND INSULATION INSTALLATION [a]

COMPONENT	AIR BARRIER, AIR SEALING CRITERIA	INSULATION INSTALLATION CRITERIA
#>G>K:E K>JNBK>F>GMLL	<HGMBGNHNL :BK ;:KKB>K LA:EE ;> BGLM:EE>= BG MA> building thermal envelope K>:DL HK CHBGML BG MA> :BK ;:KKB>K LA:EE ;> L>:E>=	BK I>KF>:;E> BGLNE:MBHG LA:EE GHM ;> NL>= :L : L>:EBG@ F:M>KB:E
>BEBG@ :MMB<	~~L>:E>=~~ G :BK ;:KKB>K LA:EE ;> BGLM:EE>= BG :GR =KHII>= <>BEBG@ HK LH??BM MH L>I:K:M> BM ?KHF NG<HG=BMBHG>= LI:<> <<>LL HI>GBG@ŁKHI =HPGLM:BKL HK DG>> P:EE =HHKL MH NG<HG=BMBHG>= :MMB< LI:<>L LA:EE ;> :BK L>:E>= PBMA @:LD>MBG@ F:M>KB:EL MA:M :EEHP ?HK	

.BF CHBLML	.BF CHBLML LA:EE BG<EN=> :G :BK ;:KKB>K	

*:KKHP <:OBMB>L	*:KKHP <:OBMB>L H? BG:M HK E>LL MA:M :K> GHM ;;E><MM ;> BGLNE:M>= LA:EE ;> :BK L>:E>=	<AML MH ;> BGLM:EE>= BG G:KKHP <:OBMB>L LA:E MH ?BM HK G:KKHP <:OBMB>L LA:EE ;> ?BE BMA BGLNE:MBHG MA:M HG BGLM:EE:MBHG K>:= <HG?HKFL MH MA> :O:BE:;E> <:OBMR LI:<>
#:K:@> L>I:K:MBHG	BK L>:EBG@ LA:EE ;> IKHOB=>= ;>MP>>G MA> @:K:@> :G= <HG=BMBHG>= LI:<>L	%GLNE:M>= IHKMBHGL H? MA> @:K:@> L>I:K:MBHG :LL>F;ER LA:EE ;> BGLM:EE>= BG :<<HK=:G<> PBMS Sections R303 :G= R402.2.8
.><>LL>= EB@AMBG@	.><>LL>= EB@AM ?BQMNK>L BGLM:EE>= BG MA> building thermal envelope LA:EE ;> :BK L>:E>= BG :<<HK=:G<> PBMS Section R402.5.5	.><>LL>= EB@AM ?BQMNK>L BGLM:EE>= BG MA> building thermal envelope LA:EE ;> :BKMB@AM :G= % K:M>= :G= LA:EE ;> ;NKB>= HK LNKKHNG=>= PBMA BGLNE:MBHG
,ENF;BG@ PBKBG@ HK HMA>K H;LMKN<MBHGL	EE AHE>L <K>:M>= ;R PBKBG@ IENF;BG@ HK HMA>K H;LMKN<MBHGL BG MA> ;;KKB>K :LL>F;ER LA:EE ;> :BK L>:E>=	%GLNE:MBHG LA:EE ;> BGLM:EE>= MH ?BEE MA> :O:BE:;E> LI:<> :G= LNKKHNG= PBKBG@ HMA>K HK HMA>K H;LMKN<MBHGL NGE>LL MA KBKNBK?=O:EN> <:G ;> F>M ;R BGLM:EEBG@ BGLNE:MBHG :G= :BK ;:KKB>K LRLM>FL <HFIE>M>ER MH MA> >QM>KBHK LB=> H? MA> H;LMKN<MBHGL
/AHP>KL MN;L :G= ?BK>IE:<>L :=C:<>GM MH building thermal envelope	G :BK ;:KKB>K LA:EE L>I:K:M> BGLNE:MBHG BG MA> building thermal envelope ?KHF MA> LAHP>K MN; :G= HK ?BK>IE:<> :LL>F;EB>L	!QM>KBHK ?K:F>= P:EEL :=C:<>GM MH LAHP>KL MN;L :G= ?BK>IE:<>L LA:EE ;> BGLNE:M>=



: %GLI><MBHG H? EH@ P:EEL LA:EE ;> BG :<<HK=:G<> PBMA MA<

; %GLNE:MBHG F:M>KB:EL K><H@GBS>= BG MA> ;NBE=BG@ LA:EE ;> M>LM>= ?HK :BK E>:D:@> >G<EHLNK> BL GHM K>JNBK>= BG NG<HG=BMBHG>= O>GMBE:M>= :MMB< LI CHBLML

R402.5.1.2 ~~Testing.~~ Air leakage testing. 0A> building HK >:<A dwelling unit BG MA> ;NBE=BG@ LA:EE ;> M>LM>= ?HK :BK E>:D:@>

K•r =

~~International Residential Code HK Section 403.3.2 H? MA> International Mechanical Code :L :IIEB<:;E> HK PBMA HMA> approved F>:GL H? O>GMBE:MBHG~~

~~R402.5.1.4~~ R402.5.1.2.1 Dwelling unit sampling. "HK ;NBE=BG@L PBMA >B@AM HK FHK> =P>EEBG@ NGBML @K>:M>K HK G HK I>K<>GM H? MA> =P>EEBG@ NGBML BL @K>:MBK ~~BG MA> ;NBE=BG@L~~ ;> M>LM>= 0>LM>= NGBML LA:EE BG<EN=> : MHI ?E NGBM : @KHNG= ?EHHK NGBM : FB==E> ?EHHK dwelling unit NGBM G=PBMA MA> E:K@>LM dwelling unit >G<EHLNK> :K>: 3A>K> MA> :BK E>:D:@> K:M> H? : M>LM>= NGBM BL @K MA:G MA> F:QBFNF I>KFBMM>= ~~MH MA> NGBM~~ MA> NGBM K> MA:G MA> F:QBFNF I>KFBMM>= ~~MH MA> NGBM~~ :G MA:M A:L : @K>:MBK E>:D:@> K:M> ~~:G :==BMBHG:MBK~~ MA:G MA> F:QBFNF I>KFBMM>= ~~MH MA> NGBM~~ K:M> ~~:G :==BMBHG:MBK~~ BG<EN=BG@ MA> <HKK><M>= NGBM LA:EE ;> M>LM>= 3A>K> ;NBE=BG@L A:O> ?>P>K MA:G >B@AM =P>EEBG@ NGBML dwelling unit LA:EE ;> M>LM>=

R402.5.1.3 Maximum air leakage rate 3A>K> M>LM>= BG :<<HK=:G<> PBMA /><MBHG . MA> :BK E>:D:@> K:M> ?HK buildings HK dwelling units LA:EE ;> :L ?HEEHPL 3A>K> <HFIERBG@ PBMA /><MBHG . MA> building HK dwelling units BG MA> building LA:EE A:O> :G :BK E>:D:@> K:M> GHM @K>:M>K MA:G :BK <A:G@>L I>K AHNK EBF:M> 6HG>L :G= :BK <A:G@>L I>K AHNK BG EBF:M> 6HG>L MAKHN@A :G= :BK <A:G@>L I>K AHNK BG EBF:M> 6HG>L MAKHN@A 3A>K> <HFIERBG@ PBMA /><MBHG . HK . MA> building HK =P>EEBG@ NGBML BG MA> building LA:EE A:O> :G :BK E>:D:@> K:M> GHM @K>:M>K MA:G :BK <A:G@>L I> AHNK HK <?F ?M (L Q F H? MA> building thermal envelope :K>: HK dwelling unit enclosure area :L :IIEB<:;E>

Exceptions:

3A>K> dwelling units :K> :MM:<A>= HK EH<:M>= BG :G . H<<NI:G<R :G= :K> M>LM>= PBMAHNM LBFNEM:G>HNLER M>LMBG@ units GM> :BK E>:D:@> K:M> BL I>KFBMM>= MH ;> GHM @K>:M>K MA:G (<?F ?M H? MA> dwelling unit enclosure area 3A>K> :=C:<>GM =P>EEBG@ NGBML :K> LBFNEM:G>HNLER M> BG :<<HK=:G<> PBMA /0) ! MA> :BK E>:D:@> K:M> BL I>KFBMM>= MH ;> GHM @K>:M>K MA:G <?F ?M(L Q F H? MA> dwelling unit enclosure area MA:M L>I:K:M>L conditioned space ?KHF MA> >QM>KBHK 3A>K> buildings A:O> LJN:K> ?>>M F HK E>LL HQ conditioned floor area MA> :BK E>:D:@> K:M>

NFRC 400 HK AAMA/WDMA/CSA 101/I.S.2/A440 ;R :G :<<K>=BM>= BG=>I>G=>GM E:;HK:MHKR :G= listed :G= labeled ;R MA> F:GN?:<MNK>K

Exception: /BM> ;NBEM PBG=HPL skylights :G= =HHKL

R402.5.5 Recessed lighting. .><>LL>= ENFBG:BK>L BGLM:EE>= BG MA> building thermal envelope LA:EE ;> L>:E>= MH EBFBM :BK E>:D:@> ;>MP>>G <HG=BMBHG>= :G= unconditioned spaces .><>LL>= ENFBG:BK>L LA:EE ;> % K:M>= labeled :L A:OBG@ :G :BK E>:D:@> K:M> H? GHM @K>:M>K MA:G <?F (L PA>G M>LM>= BG :<<HK=:G<> PBMA ASTM E283 :M : IK>LLNK> =B??>K>GMB:E H? IL? ,: .><>LL>= ENFBG:BK>L LA:EE ;> L>:E>= PBMA : @:LD>M HK <:NED>= ;>MP>>G MA> AHNLBG :G= MA> BGM>KBHK P:EE HK <>BEBG@ <HO>KBG@

R402.5.6 Air-Sealed electrical and communication outlet boxes . BK L>:E>= >E><MKB<:E :G= <HFFNGB<:MBHG HNME>M ;HQ>L MA:M I>G>MK:M> MA> air barrier H? MA> building thermal envelope LA:EE ;> <:NED>= M:I>= @:LD>M>= HK HMA>KPBL> L>:E>= MH MA> air barrier >E>F>GM ;>BG@

Exception: GR ?BK>IE:<> >JNBII>= PBMA :G HG =>F:G= BGM>K

IBEHM EB@AM :L =>?BG>= 6 V / *H V 1(

BL GHM <HGLB=>K>= MH A:O> : <HGMBGNHNLE

R403.2 Hot water boiler temperature reset. +MA>K MA:G PA>K> >JNBII>= PBMA M:GDE>LL =HF>LMB< P:M>K A>:MBG@ <HBE

HMA>K MA:G : ;HBE>K >JNBII>= PBMA : M:GDE>LL =HF>LMB< P:M>K

:=CNLMBG@ MA> P:M>K M>FI>K:MNK> LNIIEB>= ;

BG?>KK>= A>:M EH:= PBEE <:NL> :G BG<K>F>GM:E <A:G@> BG MA> M>FI>K:MNK> H? MA> P:M>K LNI

;HBE>K 0ABL <:G ;> :<<HFIEBLA>= PBMA HNM=HHK K>L>M BG=HHK K>L>M HK P:M>K M>FI>K:MNK>

R403.3 Duct systems. N<ML :G= :BK A:G=E>KL Duct systems LA:EE ;> BGLM:EE>= BG :<<HK=:G<> PBMA Sections R403.3.1 MAKHN@A .

Exception: Ventilation ductwork MA:M BL GHM BGM>@K Duct systems L>KOBG@ A>:MBG@ HK <HHEBG@ LRLM>FL

R403.3.1

Ductwork ~~EH<:M>=~~ BG <HGM:BG>= PBMABG P:EE HK ?EHHK ~~building~~ :LL>F;EB>L L>I:K:MBG@ NG<HG=BMBHG>= ?KHF conditioned space LA:EE <HFIER PBMA MA> ?HEEHPBG@

continuous air barrier LA:EE ;> BGLM:EE>= :L I:KM H? MA> building :LL>F;ER ;>MP>>G MA> ~~duct~~ ductwork :G= MA> NG<HG=BMBHG>= LI:<>

~~N<ML~~ Ductwork LA:EE ;> BGLM:EE>= BG :<<HK=:G<> PBMA /><MBHG .

Exception: 3A>K> MA> building :LL>F;ER <:OBMB>L <HGM:BG ~~=N<ML~~ BG@ ductwork A:O> ;>>G :BK L>:E>= BG :<<HK=:G<> PBMA /><MBHG . :G= BGLNE:M>= BG :<<HK=:G<> PBMA %M<F duct BGLNE:MBHG BL GHM K>JNBK>=

*HM E>LL MA:G . BGLNE:MBHG ~~=N<ML~~ HK GHM E>LL MA:G I>K<>GM H? MA> K>JNBK>= BGLNE:MBHG O:EN> LI><B?B>= BG 0:;E> . PAB<A>O>K BL @K>:M>K LA:EE ;> EH<:M>= ;>MP>>G MA> ~~duct~~ ductwork :G= MA> NG<HG=BMBHG>= LI:<>

~~"HK =N<ML BG MA> building :LL>F;EB>L MH ;> <HGLB=>K>= PBMABG conditioned space MA> :BK A:G=EBG@ >JNBIF>GM LA:EE ;> BGLM:EE>= PBMABG <HG=BMBHG>= LI:<>~~ />@F>GML H? ductwork <HGM:BG>= PBMABG MA>L> ;NBE=BG@ :LL>F;EB>L LA:EE GHM ;> <HGLB=>K>= <HFIE>M>ER BGLB=> <HG=BMBHG>= LI:<> BG /><MBHGL . .

~~R403.3.3~~ R403.3.5 ~~Ducts~~ Ductwork buried within ceiling insulation. 3A>K> LNIIER :G= K>MNKG ductwork ~~:BK =N<ML~~ :K> :KMB:EER HK <HFIE>M>ER ;NKB>= BG <>BEBG@ BGLNE:MBHG LN<A ductwork LA:EE <HFIER PBMA MA> ?HEEHPBG@

0A> LNIIER :G= K>MNKG ~~=N<ML~~ ductwork LA:EE ;> BGLNE:M>= PBMA A:O> :G BGLNE:MBHG ~~R O:EN>~~ GHM E>LL MA:G . BGLNE:MBHG

M :EE IHBGML :EHG@ MA> ~~=N<M~~ ductwork MA> LNF H? MA> <>BEBG@ BGLNE:MBHG :@:BGLM :G= :;HO> MA> MHI H? MA> ~~duct~~ ductwork :G= :@:BGLM :G= ;>EHP MA> ;HMMHF H? MA> ~~duct~~ ductwork LA:EE ;> GHM E>LL MA:G . >Q<EN=BG@ MA> H? MA> duct BGLNE:MBHG %G EBF:M> 6HG>L :G= MA> LNIIER ~~=N<ML~~ ductwork LA:EE ;> <HFIE>M>ER ;NKB>= PBMABG <>BEBG@ BGLNE:MBHG BGLNE:M>= MH GHM E>LL MA:G . :G= BG <HFIEB:G<> PBMA MA> O:IHK K>M:K=>K K>JNBK>F>GML H? Section 604.11 H? MA> International Mechanical Code HK Section M1601.4.6 H? MA> International Residential Code :L :IIEB<:;E>

Exception: /><MBHGL H? MA> LNIIER duct

~~duct~~ ductwork BGLNE:MBHG EN> H? .

~~R403.3.4~~ R403.3.6 Sealing. ~~N<ML :BK A:G=E>KL~~ Ductwork, air-handling units :G= ?BEM>K ;HQ>L LA:EE ;> L>:E>= &HBGML :G= L>:FL LA:EE <HFIER PBMA >BMA>K MA> International Mechanical Code HK MA> International Residential Code :L :IIEB<:;E>

~~R403.3.4.1~~ R403.3.6.1 Sealed ~~air handler~~ air-handling unit . ~~BK A:G=E>KL~~ BK A:G=EBG@ NGBML LA:EE A:O> : F:GN?:<MNK>K^L =>LB@G:MBHG ?HK :G :BK E>:D:@> H? GHM @K>:M>K I>K<>GM H? MA> =>LB@G :BK?EHP K:M> PA>G M>LM>= BG :<<HK=:G<> PBMA ASHRAE 193

~~R403.3.5~~ R403.3.7 Duct system testing.

~~TABLE R403.3.6~~TABLE R403.3.8
MAXIMUM TOTAL DUCT SYSTEM LEAKAGE

	~~.+1#$ %*~~	~~,+/0 +*/0.1 0%+*~~	
~~Duct systems serving more than 1,000 ft² of conditioned floor area~~	~~cfm/100 ft² (LPM/9.29 m²)~~	~~cfm/100 ft² (LPM/9.29 m²)~~	
~~BK A:G=E>K BL GHM BGLM:EE>=~~		~~*~~	
~~BK A:G=E>K BL BGLM:EE>=~~		~~———~~	
~~N<M LRLM>FL EH<:M>= BG <HG=BMBHG>= LI:<> PBMA :BK A:G=E>K BGLM:EE>=~~		~~———~~	
~~Duct systems serving less than or equal to 1,000 ft² of conditioned floor area~~	~~cfm (LPM)~~	~~cfm (LPM)~~	
~~BK A:G=E>K BL GHM BGLM:EE>=~~		~~*~~	
~~BK A:G=E>K BL BGLM:EE>=~~		~~———~~	
~~N<M LRLM>FL EH<:M>= BG <HG=BMBHG>= LI:<> PBMA :BK A:G=E>K BGLM:EE>=~~			

:G= LA:EE BG<EN=> MA> F>:LNK>= E>:D:@> ?KHF ;HM AMA> LNIIER :G= K>MNKG ductwork Duct system
M>LMBG@ LA:EE GHM ;> I>K?HKF>= B? MA> K>MNKG ductwork BL GHM BGLM:EE>=
< "HKduct systems MH ;> <HGLB=>K>= BGLB=> conditioned space PA>K> MA> ductwork BL EH<:M>= BG
O>GMBE:M>= :MMB< LI:<>L HK NGO>GM>= :MMB<L PBMA O:IHK =B??NLBHG K>M:K=>K ductsystem EH:D:@> MH
HNMLB=> FNLM <HFIER PBMA %M>F H? /><MBHG .
= ,KBHK MH <>KMB?B<:M> H? H<<NI:G<R PA>K> MA> :BK A:G=EBG@ NGBM BL GHM O>KB?B>= :L ;>
conditioned space MA> MHM:E =N<M LRLM>F E>:D:@> FNLM ;> K> M>LM>=

~~R403.3.7~~R403.3.9 Dwelling unit sampling "HK ;NBE=BG@L PBMA >B@AM HK FHK> =P>EEBG@ NG
duct LRLM>FL BG MA> @K>:M>K H? L>O>G HK I>K<>GM H? MA> =P>EEBG@ NGBML building BG MA>

?BMMBG@ HK :IIEBAG<>HGMKHEL LA:EE EBFBM INFI HI>K:MBHG ;R
/ANMMBG@ H?? MA> INFI PA>G MA> M>FI>K:MNK> L>GLHK =>M><ML HG> H
?HEEHPBG@
G BG<K>:L> BG MA> P:M>K M>FI>K:MNK> H? GHM FHK> MA:G
:;HO> MA> BGBMB:E M>FI>K:MNK> H? MA> P:M>K BG MA> IBI>
0A> M>FI>K:MNK> H? MA> P:M>K BG MA> IBI> K>:<A>L

(BFBMBG@ INFI HI>K:MBHG MH : F:QBFNF H? ?BO> FBGNM>L ?HEEHPBG@ :<MBO
*HM :<MBO:MBG@ MA> INFI ?HK :M E>:LM ?BO> FBGNM>L ?HEEHPBG@ LANMH??
M>FI>K:MNK> H? MA> P:M>K BG MA> IBI> >Q>>=L

R403.5.1.2 Heat trace systems. !E><MKB< A>:M MK:<> LRLM>FL LA:EE <HEPBMA
515.1 HKUL 515 HGMKHEL ?HK LN<A LRLM>FL LA:EE :NMHF:MB<:EER :=CNLM MA> >G>K@R
MA> A>:M MK:<BG@ MH F:BGM:BG MA> =>LBK>= P:M>K M>FI>K:MNK> BG MA> IBIBG@ BG :<<
MA> MBF>L PA>G A>:M>= P:M>K BL NL>= BG MA> H<<NI:G<R

R403.5.2 Hot water pipe insulation.

P:M>K LMHK:@> OHENF> H? @:EEHGL (MH @:EEHGL (:G= : G:F>IE:M> BGINM K:MBG@
>JN:E MH HK E>LL MA:G D3 LA:EE ;> IKHOB=>= PBMA =>F:G= K>LIHGLBO> <HGMKHEL BG :<<H
PBMA 0:;E> . ~~HK :GHMA>K >JNBO:E>GM~~ approved ~~LM:G=:K=~~

Exceptions:

3:M>K A>:M>KL MA:M :K> <:I:;E> H? =>EBO>KBG@ P:M>K :M : M>FI>K:MNK> H? T" T
HK @K>:M>K

3:M>K A>:M>KL MA:M <HFIER PBMA /><MBHG %2 ,:KM $(3 HK /><MBHG 4 H? MA> /)!
HBE>K :G= ,K>LLNK> 2>LL>E H=>

3:M>K A>:M>KL MA:M NL> IA:L> >E><MKB< IHP>K

TABLE R403.5.5
DEMAND RESPONSIVE CONTROLS FOR WATER HEATING

!JNBIF>GM 0RI>	HGMKHEL		
	):GN?:<MNK>= >?HK>	):GN?:<MNK>= +G HK ?M>K	
!E><MKB< LMHK:@> P:M>K A>:M>KL	$.% /M:G=:K= % , HK */% 0 (>O>E :G= :ELH <:I:;E> H? BGBMB:MBG@ P:M>K A>:MBG@ MH F>>M MA> L>M IHBGM BG K>LIHGL> MH : =>F:G= K>LIHGL> LB@G:E	$.% /M:G=:K= % , ~~*/% 0 (>O>E >Q<>IM \ ..BF>KL&:MM>K>F:GN>HFFNGB<:MBHG] LNG<MBHG:EBMR :L =>?BG>= BG MA> LM:G=:K=~~	

R403.6 Mechanical ventilation. 0A> buildings :G= dwelling units <HFIERBG@ PBMA ~~Section R402.5.1~~ /><MBHG . LA:EE ;> IKHOB=>= PBMA F><A:GB<:E ventilation MA:M <HFIEB>L PBMA MA> K>JNBK>F>GML H? /><MBHG) H? MA> International Residential Code HK International Mechanical Code :L :IIEB<:;E> HK PBMA HMA>K approved F>:GL H? ventilation +NM=HHK :BK BGM:D>L :G= >QA:NLML LA:EE A:O> automatic HK @K:OBMR =:FI>KL MA:M <EHL> PA>G MA> ventilation LRLM>F BL GHM HI>K:MBG@

R403.6.1 Heat or energy recovery ventilation. Dwelling units LA:EE ;> IKHOB=>= PBMA : A>:M K><HO>KR HK >G>K@R K><HO>KR ventilation LRLM>F BG EBF:M> 6HG>L :G= 0A> LRLM>F LA:EE ;> : ;:E:G<>= ventilation LRLM>F PBMA : L>GLB;E> K><HO>KR >??B<B>G<R /.! H? GH E>LL MA I>K<>GM :M T" T :M :G :BK?EHP @K>:M>K MA:G HK >JN:E MH MA> =>LB@G :BK?EHP LA:EE ;> =>M>KFBG>= ?KHF : EBLM>= O:EN> HK ?KHF BGM>KIHE:MBHG H? EBLM>= O:EN>L

R403.6.2

TABLE R403.6.2
WHOLE-DWELLING MECHANICAL VENTILATION SYSTEM FAN EFFICACY [a]

SYSTEM TYPE	AIRFLOW RATE (CFM)	MINIMUM EFFICACY (CFM/ WATT)	TEST PROCEDURE
$.2 HK !.2	GR	:	* /
$.2 !.2 HK ;:E:G<>=Balanced ventilation system PBMAHNM A>:M HK >G>K@R K><HO>KR	GR	:	$.2 HK !.2 * / :E:G<>= PBMAHNM A>:M HK >G>K@R K><HO>KR /$. ! /M:G=:K= */%) /M:G=:K= /$. ! */%) /M:G=:K=
.:G@> AHH=	GR		
%G EBG> LNIIER HK >QA:NLM ?:G	GR		
+MA>K >QA:NLM ?:G	X		
	:G=		
	X		
BK A:G=E>Kr-handling unit MA:M BL BGM>@K:M>= GMH M>LM>= :G listed $2 >JNBIF>GM			+NM=HHK :BK?EHP :L LI><EBK A:G=E>Kr-handling unit ?:G IHP>K =>M>KFBG>= BG :<<HK=:G<> PBMA MA> $2 :IIEB:G<> L :IIEB<:;E> 1/ >I:KMF>GM H? !G>K@R H=> H? ">=>K:E .>@NE:MBHGL +! ". HK HMA>K :IIKHO>M>LM F>MA K<>?>K>G<>= ;R /><MBHG H? MA> %! HFF>K<B:E ,KHOBLBHGL

"HK /% <N;B< ?HHM I>K FBGNM>{ L

: >LB@G HNM=HHK :BK?EHP K:M> P:MML H? ?:G NL>= LRLM>FL $.2L :G= !.2L =>M>KFBG> MA> >??B<:<R :L MA> HNM=HHK :BK?EHP =BOB=>= ;R MA> MHM:E ?:G IHP>K

R403.6.3 Testing.)><A:GB<:E ventilation LRLM>FL LA:EE ;> M>LM>= :G= O>KB?B>= MH IKHOB= MA> FBGBFNE ventilation ?EHP K:M>L K>JNBK>= Section R403.6 BG :<<HK=:G<> PBMA */% .!/*!0 % 3A>K> K>JNBK>= ;R MA> code official M>LMBG@ LA:EE ;> <HG=N<M>= ;R :G approved MABK= I:KMR PKBMM>G K>IHKM H? MA> K>LNEML H? MA> M>LM LA:EE ;> LB@G>= <HG=N<MBG@ MA> M>LM :G= IKHOB code official MA>

Exceptions:

'BM<A>G K:G@> AHH=L MA:M :K> =N<M>= MH MA> HNMLB=> PBMA HKBE<A@>KFF : E>G@MA H? ?M FF HK E>LL :G= GHM FHK> MA:G MPH T >E;HPL HK >JNBO:E>G LA:EE GHM K>JNBK> M>LMBG@ MABK= I:KMR M>LM LA:EE GHM ;> K>JNBK>= ventilation PA K>JNBK>= LRLM>F A:L :G BGM>@K:M>= =B:@GHLMB< MHHE NL>= ?HK :BK?EHP IKHO@KNK>;E>G:M K?EHP L>MMBG@L : NL>K BGM>K?:<> MA:M <HFFNGB<:M>L MA> BGLM:EE>= :BK?EHP K:M> 3A>K> M>LM>= BG :<<HK=:G<> PBMA /><MBHG . M>LMBG@ H? >:<A F><A:GB<: ventilation LRLM>F BL GHM K>JNBK>=

,:@> H?

R403.6.4 Dwelling unit sampling. "HK buildings PBMA >B@AM HK dwelling units MA> F><A:GB<:E ventilation

R403.9 Mechanical systems located outside of the building thermal envelope)><A:GB<:E LRLM>FL IKHOB=BG@ A>:M HNMLB=> H? MA> MA>KF:E building thermal envelope <HFIER PBMA /><MBHGL . MAKHN@A .

R403.9.1 Heating outside a building /RLM>FL BGLM:EE>= MH IKHOB=> A>:M building thermal envelope : LA:EE ;> K:=B:GM LRLM>FL /N<A A>:MBG@ LRLM>FL LA:EE ;> <HGMKHEE>= ;R :G H<<NI:G<R L> =>OB<> HK : MBF>K LPBM<A LH MA:M MA> LRLM>F BL :NMHF:MB<:EER => >G>K@BS>= PA>G H< GHM IK>L>GM

~~R403.9~~R403.9.2 Snow melt and ice system controls. /GHP :G= B<> F>EMBG@ LRLM>FL LNIIEB>= MAKHN@A >G>K@R L>KOB building thermal envelope LA:EE BG<EN=BG@ automatic <HGMKHEL <:I:;E> H? LANMMBG@ H?? MA> LRLM>F PA>G MA> I:O>F>GM M>FI>K:MNK> BL @K>:M>K MA:G T" T IK><BIBM:MBHG BL GHM ?:EEBG@ automatic :GK manual <HGMKHE MA:M PBEE :EEHP LANMH?? PA>G HNM=HHK M>FI>K:MNK> BL @K>:M>K MA:G T" T

~~R403.10~~R403.9.3 Roof and gutter deicing controls .HH? :G= @NMM>K =>B<BG@ LRLM>FL BG<EN=BG@ ;NM GHM EBFBM>= MH L>E? K>@NE:MBG@ automatic <HGMKHEL :K> <HG?B@NK>= MH LANM H?? MA> LRLM>F PA>G MA> HNM=HHK M>FI>K:MNK> BL :;HO> T F:QBFNF :G= LA:EE BG<EN=> HG> H? MA> ?HEEHPBG@ FHBLMNK> L>GLHK <HG?B@NK>= MH LANM H?? MA> LRLM>F BG MA> :;L>G<> H? FHBLM ~~IKH@K:FF:;E> MBF>K <HG?B@NK>= MH LANM H?? MA> LRLM>F ?HK AHNKL~~ FBGBFNF :M =:REB@AM L>GLHK HK HMA>K F>:GL <HG?B@NK>= MH LANM H?? MA> LRLM>F ;>MP>>G LNGKBL>

R403.9.4 Freeze protection system controls "K>>S> IKHM><MBHG LRLM>FL LN<A :L A>:M MK:<BG@ H? HNM=HHK IBIBG@ :G= A>:M >Q<A:G@>KL BG<EN=BG@ L>E? K>@NE:MBG@ automatic <HGMKHEL <HG?B@NK>= MH LANM H?? MA> LRLM>FL PA>G HNM=HHK :BK M> :K> :;HO> T" T HK PA>G MA> <HG=BMBHGL H? MA> IKHM><M>= ?ENB= PBEE IK>O>GM ?K>>S

~~R403.11~~R403.10 Energy consumption of pools and spas. 0A> >G>K@R <HGLNFIMBHG H? IHHEL :G= I>KF:G>GM LI:L LA:EE ;><HGMKHEE>= ;R MA> K>JNBK> Sections R403.10.1 MAKHN@A R403.10.3

~~R403.11.1~~R403.10.1 Heaters. 0A> >E><MKB< IHP>K MH A>:M>KL LA:EE ;> <HGMKHEE>= ;R LPBM<A MA:M BL :G BGM>@K:E I:KM H? MA> A>:M>K FHNGM>= HG MA> >QM>KBHK H? MA> A>:M PBMA ready access HK >QM>KG:E MH :G= PBMABG ?>>M FF H? MA> A>:M>K +I>K:MBHG H? L LPBM<A LA:EE GHM <A:G@> MA> L>MMBG@ heated A>:MAK LPBM<A>L LA:EE ;> BG :==BMBHG MH : <BK<NBM ;K>:D>K ?HK MA> IHP>K MH MA> A>:M>K #:L ?BK>= A>:M>KL LA:EE GHM ;> >JNE <HGMBGNHNLER ;NKGBG@ B@GBMBHG IBEHML

~~R403.11.2~~R403.10.2 Time switches. 0BF> LPBM<A>L HK HMA>K <HGMKHE F>MAH=L MA:M < :NMHF:MB<:EER AHNKL :G= INFI FHMHKL H?? :G= HG :<<HK=BG@ MH : IK>L>M L<A>=NE> LA:I ;> BGLM:EE>= ?HK A>:M>KL :G= INFI FHMHKL $>:M>KL :G= INFI FHMHKL MA:M A:O> ;NBEM BG LPBM<A>L LA:EE ;> BG <HFIEB:G<> PBMA MABL L><MBHG

Exceptions:

3A>K> IN;EB< A>:EMA LM:G=:K=L K>JNBK> AHNK INFI HI>K:MBHG ,NFIL MA:M HI>K:MLHE:K on-site renewable energy :G= P:LM> A>:M K><HO>KR IHHE A>:MBG@ LRLM>FL

~~R403.11.3~~R403.10.3 Covers. +NM=HHK A>:M>= IHHEL :G= HNM=HHK I>KF:G>GM LI:L LA:EE ;> IKHOB=>= PBMA : O:IHK K>M:K=:GM <HO>KR IHHE A>:MBG@ LRLM>FL K>M:K=:GM F>:GL

Exception: 3A>K> FHK> MA:G I>K<>GM H? MA> >G>K@R ?HK A>:MBG@ <HFINM>= HO>K HI>K:MBHG L>:LHG H??>GM MA:G <:E>G=:K FHGMAL BL ?KHF : A>:M INFI HK site

,:@> H?

renewable energy LRLM>F <HO>KL HK HMA>K O:IHK K>M:K=:GM F>:GL LA:EE GHM ;> K>JNBK>

~~R403.12~~R403.11 Portable spas. 0A> >G>K@R <HGLNFIMBHG H? >E><MKB< IHP>K>= IHKM:;E> LI:L LA:E ;> <HGMKHEE>= ;R MA> K>JNBK>F>GML H? APSP 14

~~R403.13~~R403.12 Residential pools and permanent residential spas. 3A>K> BGLM:EE>= MA> >G>K@R <HGLNFIMBHG H? K>LB=>GMB:E LPBFFBG@ IHHEL :G= I>KF:G>GM K>LB=>GMB LA:EE ;> <HGMKHEE>= BG :<<HK=:G<> PBMA MA> K>JNBK>F>GML H? APSP 15

R403.13 Gas fireplaces. #:L ?BK>IE:<> LRLM>FL LA:EE GHM ;> >JNBII>= PBMA continuous pilot :G= LA:EE ;> >JNBII>= PBMA on-demand pilot intermittent ignition HK interrupted ignition :L =>?BG>= ;R */% 6

Exception: #:L ?BK>= :IIEB:G<>L NLBG@ IBEHML ?HK LA>K:F:E MKBF:;NLMBHG L:?>MR =>OB<>

~~R402.5.2.1~~R403.13.1 Gas fireplace efficiency. ~~EE~~ 2>GM>=@:L ?BK>IE:<> A>:M>KL LA:EE A:O> : ?BK>IE:<> >??B<B>G<R "! K:MBG@ GHM E>LL MA:G I>K<>GM :L =>M>KFBG>= ~~K:M>= MH~~ */% 6 / LA:EE ;> listed

TABLE R404.1
LIGHTING POWER ALLOWANCES FOR BUILDING EXTERIORS

:L> LBM> :EEHP:G<>	—— P:MML
1G<HO>K>= I:KDBG@ :K>:L :G= =KBO>L	—— 3 ?M
NBE=BG@ #KHNG=L	
3:EDP:RL :G= K:FIL ~~E>LL MA:G ?>>M P~~B=>	3 EBG>:K ?HHM
~~3:EDP:RL :G= K:FIL ?>>M PB=> HK @K>:~~M>K IE:S: :K>:L ~~LI><B:E ?>:MNK> :K~~>:L	—— 3 ?M
BGBG@ :K>:L	—— 3 ?M
/M:BKP:RL	!Q>FIM~~— 3 ?M ¯~~
,>=>LMKB:G MNGG>EL	—— 3 ?M
(:G=L<:IBG@	—— 3 ?M
NBE=BG@ !GMK:G<>L :G= !QBML	
,>=>LMKB:G :G= O>AB<NE:K >GMK:G<>L :G= >QBML	— 3 EBG>:K ?HHM H? HI>GBG@
!GMKR <:GHIB>L	—— 3 ?M

"HK /% P:MM I>K LJN:K> ?HHM P F ?HHM FF

R404.1.1 Exterior lighting. HGG><M>= >QM>KBHK EB@AMBG@ ?HK #KHNI . . :G= . K>LB=>GMB:E ;NBE=BG@L LA:EE <HFIER PBMA/><MBHGL . MAKHN@A .

Exceptions:

— (B@AMBG@ ?HK P:M>K ?>:MNK>L :G= LPBFFBG@ IHHEL

;R MA> IKHI>KMR HPG>K HK HPG>K^L :NMAHKBS>= :@>GM PAB<A =>FHGLMK:M>L MA:M PA>K> .! L H
:K> :LLH<B:M>= PBMA MA:M IHKMBHG H? K>G>P:;E> >G>K@R NL>= MH <HFIER PBMA MABL <H=> M
! L LA:EE ;> K>M:BG>= HK K>MBK>= HG ;>A:E? H? MA> IKHI>KMR HPG>K

R404.5 Electric readiness. 3:M>K A>:M>KL AHNL>AHE= <EHMA>L =KR>KL <HGO>GMBHG:E <HHDBG
<HGO>GMBHG:E HO>GL :G= <HHDBG@ :IIEB:G<>L fuel MGAM HK liquid fuel /RLM>FL NLBG@ ?HLLBE
?N>E P:M>K A>:M>KL AHNL>AHE= <EHMA>L =KR>KL <HGO>GMBHG:E <HHDBG@ MHIL HK <HGO
LA:EE <HFIER PBMA K>JNBK>F>GML M? <MBHGL . MAKHN@A .

R404.5.1 Cooking products appliances . G BG=BOB=N;E K:G<A <BK<NBM HKB@BG:M>L PBMA : K:MBG@
GHM E>LL MA:G OHEML :FI>K>L LA:EE ;> BGLM:EE>= :G= M>KFBG:M> PBMABG MAK>>
H? <HGO>GMBHG:E <HHDBG@ MHIL <HGO>GMBHG:E HO>GL <HHDBG@ :IIEB:G<>L GHM BGLM:EE>= BG :G BG=BOB=N;E =P>EEBG@ NGBM ;HMA

Exception: HHDBG@ :IIEB:G<>L GHM BGLM:EE>= BG :G BG=BOB=N;E =P>EEBG@ NGBM

R404.5.2 Household Clothes Dryers. G BG=BOB=N;E K:G<A <BK<NBM HKB@BG:M>L PBMA : K:MBG@ GHM E>LL MA:G OHEML :FI>K>L LA:EE ;> BGLM:EE>= :G= M>KFBG:M> PBMABG MAK>> ?>>M FF >:<A AHNL>AHE= <EHMA>L =KR>K

Exception: EHMA>L =KR>K A:M L>KO> FHK> MA:G dwelling unit :G= :K> EH<:M>= HNMLB=> H? : =P>EEBG@ NGBM BGLM:EE>= BG :G BG=BOB=N:E =P>EEBG@ NGBM

R404.5.3 Water heaters. G BG=BOB=N;E K:G<A <BK<NBM HKB@BG:M>L PBMA : K:MBG@ GHM E>LL MA:G >BMA> OHEML :FI>K>L HK 2 :FI>K>L LA:EE ;> BGLM:EE>= :G= M>KFBG:M> PBMABG MAK>> ?>>M FF H? >:<A ?HLLBE ?N>E K A>:M>K

Exception: 3:M>K A>:M>K BG : <>GMK:EBS>= P:M>K A>:MBG@ >KRBMG@ FNEMBIE> =P>EEBG@ NGBML BG : . H<<NI:G<R

R404.5.4 Electrification-ready circuits. 0A> NGNL>= <HG=N<MHKL K>JNBK>= ;R /><MBHGL . MAKHN@A . LA:EE ;> E:;>E>= PBMA MA> PHK= \LI:K>] /I:<> LA:EE ;> K>L>KO>= BG MA> >E><MKB<:E I:G>E BG PAB<A MA> ;K:G<A <BK<NBM HKB@BG:M>L ?HK MA> BGLM:EE:MBH =>OB<> :I:<BMR ?HK MA> <BK<NBML K>JNBK>= ;R /><MBHGL . MAKHN@A . LA:EE ;> BG<EN=>= BG MA> EH:= <:E<NE:MBHGL H? MA> HKB@BG:E BGLM:EE:MBHG

R404.6 Renewable energy infrastructure. 0A> building LA:EE <HFIER PBMA MA> K>JNBK>F>GML H? . HK .

R404.6.1 One- and two- family dwellings and townhouses. +G> :G= MPH ?:FBER =P>EEBG@L :G= MHPGAHNL>L LA:EE <HFIER PBMA /><MBHGL . MAKHN@A .

Exceptions:

dwelling unit PBMA : I>KF:G>GMER BGLM:EE>= renewable energy LRLM>F
dwelling unit PBMA solar-ready zone :K>: MA:M BL E>LL MA:G LJN:K> ?>>M F H? KHH? :K>: HKB>GM>= ;>MP>>G =>@K>>L :G= =>@K>>L H? MKN> GHKMA
dwelling unit PBMA E>LL MA:G LJN:K> ?>>M H? KHH? :K>: HKB>GM>= ;>MP>>G =>@K>>L :G= =>@K>>L H? MKN> GHKMA
P>EEBG@ NGBML PA>K> I>K<>GM H? MA> solar-ready zone :K>: BL LA:=>= ?KHF =BK><M ;>:F LNGEB@AM ;R G:MNK:E H;C><ML HK ;R LMKN<MNK>L MA:M :K>:GHM ?HK building H? MA> FHK> MA:G :GGN:E AHNKL ;>MP>>G : F :G= I F
dwelling unit MA:M <HFIEB>L PBMA II>G=BQ .
dwelling unit PBMA : K>G>P:;E> >G>K@R IHP>K INK<A:L> :@K>>F>GM PBMA : =NK:MBH H? GHM E>LL MA:G R>:KL ?KHF : NMBEBMR HK : <HFFNGBMR K>G>P:;E> >G>K@R ?:< ?HK GHM E>LL MA:G I>K<>GM H? MA> dwelling unit PAHE> ;NBE=BG@<MKB< NL> HG :G :GGN:E ;:LBL

,:@> H?

dwelling unit PBMA >LL MA:G HK >JN:E MH LJN:K> ?>>M IH? living space ?EHHK :K>:

R404.6.2.2 Construction document requirements for a solar-ready zone. Construction documents LA:EE BG=B<:M>:MA> solar-ready zone

R404.6.2.3 Solar-ready zone area. 0A> MHM sE solar-ready zone :K>: LA:EE ;> GHM E>LL MA:G I>K<>GM H? MA> KHH? :K>: <:E<NE:M>= :L MA> AHKBSHGM:EER IKHC><M>= @KHLL E>LL MA> :K>: <HO>K>= ;R I>GMAHNL>L F><A:GB<:E >JNBIF>GM KHH?MHI LMKN<MNK>L LD H<<NIB>= KHH? =><DL O>@>M:MBO> KHH? :K>:L :G= F:G=:MHKR :<<>LL HK L>M ;:<D :K>:L K>JNBK>= ;R MAInternational Fire Code 0A> solar-ready zone LA:EE ;> : LBG@E> :K>: HK LF:EE>K L>I:K:M>= LN; SHG> :K>:L !:<A LN; SHG> LA:EE ;> GHM E>LL MA:G ?>>M FF BG PB=MA BG MA> G:KKHP>LM =BF>GLBHG

R404.6.2.4 Obstructions. Solar-ready zones LA:EE ;> ?K>> ?KHF H;LMKN<MBHGL BG<EN=BG IBI>L O>GML =N<ML $2 >JNBIF>GM LDREB@AML :G= KHH? FHNGM>= >JNBIF>GM

R404.6.2.5 Roof loads and documentation. <HEE:M>K:E =>:= EH:= H? GHM E>LL MA:G

3A>K> LN;LM:GMB:MBHG A:L approved MA:M F>>MBG@ MA> K>JNBK>F>GML H? /><MBH
. PBEE :EM>K MA> EH<:E NMBEBMR BG?K:LMKN<MNK> =>LB@G K>JNBK>F>GML
LB=> H? MA> F>M>K LH :L MH BG<K>:L> MA> NMBEBMR LB=> <HLM MH MA> ;NBE=>K H
FHK> MA:G I>K dwelling unit

R404.7.2 EV Capable Spaces. !:<A EV capable space NL>= MH F>>M MA> K>JNBK>F>GML H?
/><MBHG . LA:EE <HFIER PBMA :EE H? MA> ?HEEHPBG@

<HGMBGNHNL K:<>P:R HK <:;E> :LL>F;ER LA:EE ;> BGLM:EE>= ;>MP>>G :G >G<EHLNK>
HNME>M EH<:M>= PBMA>BG FF H? MA>EV capable space :G= : LNBM:;E>
I:G>E;H:K= HK HMA>K HGLBM> >E><MKB<:E =BLMKB;NMBHG >JNBIF>GM
%GLM:EE>= K:<>P:R HK <:;E> :LL>F;ER LA:EE ;> LBS>= :G= K:M>= MH LNIIER : FBGBFNF
<BK<NBM <:I:<BMR BG :<<HK=:G<> PBMA><MBHG .
0A> >E><MKB<:E =BLMKB;NMBHG >JNBIF>GM MH PAB<A MA> K:<>P:R HK <:;E> :LL>F;ER <
LA:EE A:O> LN??B<B>GM =>=B<:M>= LI:<> :G= LI:K> >E><MKB<:E <:I:<BMR ?HK : IHE> <B
;K>:D>K HK L>M H? ?NL>L
0A> >E><MKB<:E >G<EHLNK> HK HNME>M :G= MA> >E><MKB<:E =BLMKB;NMBHG >JNBIF>G
;> F:KD>= "HK ?NMNK> >E><MKB< O>AB<E> LNIIER >JNBIF>GM !2/!

R404.7.3 EV Ready Spaces. !:<A ;K:G<A <BK<NBM L>KO>E EV ready spaces LA:EE <HFIER PBMA
:EE H? MA> ?HEEHPBG@

0>KFBG:M> :M :G HNME>M HK >G<EHLNK> EH<:M>=>PBMABG FF H? >:<A EV
ready space BM L>KO>E G= F:KD>= "HK >E><MKB< O>AB<E> LNIIER >JNBIF>GM !2/!
$:O> > L>KO>= ;R :G: FBGBFNF>E><MKB<:E =BLMKB;NMBHG >JNBIF>GM <BK<NBM<:I:<BMR BG
:<<HK=:G<> PBMA /><MBHG .
> =>LB@G:M>= HG MA> I:G>E;H:K= HK HMA>K >E><MKB<:E =BLMKB;NMBHG >JNBIF
=BK><MHLAEE =>LB@G:M> MA> ;K:G<A :LBK<NBM><MKB< O>AB<E> LNIIER >JNBIF>GM
!2/!

;K:G<A <BK<NBM LA:EE A:O> : K:M>= <:I:<BMR GHM E>LL MA:G D2 HK :M

0A> IKHIHL>= MH building thermal envelope MA>KF:E <HG=N<M:G<= 1 0PAB<A BL MA> LNF H? MA> 1 ?:<MHK MBF>L :LL>F;ERLK?EE ;> E>LL MA:G HK >JN:E MH building thermal envelope MA>KF:E <HG=N<M:G<= 1 0 NLBG@ MA> IK>L<KBIMBO> 1 ?:<MHK 1 ?:<MHK2KHF 0:;E> . FNEMBIEB>= ;R BG EBF:M> 6HG>L :G= :G= BG EBF:M> 6HG>L MAKHN@A BG :<<HK=:G<> PBMA !JN:MBHG /><MBHG . 0A> :K>: P>B@AM>= F:QBFNF fenestration /$# I>KFBMM>= BG EBF:M> 6HG>L MAKHN@A LA:EE ;>

"HK ;NBE=BG@L PBMAHNM : ?N>E ;NKGBG@ :IIEB:G<> ?HK LI:<> A>:MBG@ HK P:M>K A>:M :GGN:E energy cost H? MA> IKHIHL>= =>LB@GM BL E>LL MA:G HK >JN:E MH I>K<>GM H? MA> :GGN:E energy cost H? MA> standard reference design - "HK ;NBE=BG@L A dwelling unit PBMA :HG> HK HK> ?N>E ;NKGBG@ :IIEB:G<>L ?HK LI:<> A>:MBG@ HK P:M>K A>:MBG@ HK ;HM :GGN:E energy cost H? MA> dwelling unit IKHIHL>= =>LB@GM BL E>LL MA:G HK >JN:E MH I>K<>GM H? MA> :GGN:E energy cost H? MA> standard reference design "HK :EE HMA>K dwelling units MA> :GGN:E energy cost H? MA> proposed design LA:EE ;> E>LL MA:G HK >JN:E MH I>K<>GM H? MA> :GGN:E energy cost H? MA> standard reference design "HK >:<A =P>EEBG@NGBMPBMA @K>:M>K MA:G LJN:K> ?>>M H? living space ?EHHK :K>: EH<:M>= :;HO> grade plane MA> :GGN:E energy cost H? MA> dwelling unit IKHIHL>= =>LB@GM A:EE ;> K>=N<>= ;R :G :==BMBHG:E I>K<>GM H? energy cost H? MA> LM:G=:K= K>?>K>G<> =>LB@GM K@R IKB<>L LA:EE ;> M:D>G ?HK approved LHNK< approved ;R MA> code official LN<A :L MA> >I:KMF>GM H? !G>K@R !G>K@R %G?HKF:MBHG =FBGBLMK:MBHG' !G>K@R :M: /RLM>F ,KB<>L :G= !QI>G=BMNK>L K>IHKML H=> H??B<B:EL LA:EE ;> I>KFBMM> K>JNBK> MBF> H? NL> IKB<BG@ energy cost <:E<NE:MBHGL

Exceptions:

0A> >G>K@R NL> ;:L>= HG LHNK<> >G>K@R >QIK>LL>= BG MN HK MN I>K LJN:K ?HHM conditioned floor area LA:EE ;> I>KFBMM>= MH ;> LN;LMBMNM>= ?HK MA> >G>K <HLM 0A> LHNK<> >G>K@R FNEMBIEB>K ?HK ?N>EL HMA>K MA:G >E><MKB<EE;R LHNK<>L LA:EE ;> 0A> LHNK<> >G>K@R FNEMBIEB>K ?HK ?N>EL HMA>K MA:G >E><MKB<EE;R LHNK<>L LA:EE ;> H;M:BG>= ?KHF /$. ! /M:G=:K= 0:;E>L ' ' HK ' HK ?KHF :GHMA>K =:M: LHNK<> :IIKHO>= ;R MA code official

0A> >G>K@R NL> ;:L>= HG LBM> >G>K@R >QIK>LL>= BG MN HK MN I>K LJN:K> ?HH conditioned floor area LA:EE ;> I>KFBMM>= MH ;> LN;LMBMNM>= ?HK MA> ?HK >G>K@R <H :G :EE >E><MKB< ;NBE=BG@ PBMA HG LBM> K>G>P:;E> >G>K@R BGLM:EE>=

TABLE R405.2
REQUIREMENTS FOR SIMULATED BUILDING PERFORMANCE

SECTION[a]	TITLE
General	
.	

R403.10	!G>K@R <HGLNFIMBHG H? IHHEL :G= LI:L
R403.11	,HKM:;E> LI:L
R403.12	.>LB=>GMB:E IHHEL :G= I>KF:G>GM K>LB=>GMB:E LI:L
.	#:L ?BK>IE:<>L
Electrical Power and Lighting Systems	
R404.1	(B@AMBG@ >JNBIF>GM
R404.2	%GM>KBHK EB@AMBG@ <HGMKHEL
.	!E><MKB< K>:=BG>LL
.	.>G>P:;E> >G>K@R BG?K:LMKN<MNK>
.	!E><MKB< 2>AB<E> IHP>K MK:GL?>K BG?K:LMKN<MNK>

: .>?>K>G<> MH : <H=> L><MBHG BG<EN=>L :EE MA> K>E:MBO> LN;L><MBHGL >Q<>IM :L BG=B<
M:;E>

R405.3 ~~Documentation.~~ Compliance documentation ~~H<NF>GM:MBHG H? MA> LH?MP:K>~~ NL>= ?HK ~~MA>IKHIHL>==>LB@G :G= MA> I:K:F>M>KL ?HK MA> ;~~ building ~~BG>LA:EE ;> BG :<<HK=:G<>~~ PBMA ~~Sections R405.3.1 MAKHNG@405.3.2.2~~ 0A> ?HEEHPBG@ <HFIEB:G<> K>IHKML PAB<A =H<NF>GM MA:M I>K?HKF:G<> H? MA> proposed design <HFIEB>L PBMA MA> K>JNBK>F>GML H? /><MBHG . LA:EE ;> LN;FBMM>= MH~~ building ~~official

<HFIEB:G<> K>IHKM BG :<<HK=:G<> PBMA /><MBHG . LA:EE ;> LN;FBMM>= PBMA MA :IIEB<:MBHG ?HK~~ building ~~I>KFBM

1IHG <HFIE>MBHG H? ~~building~~ : <HG?BKF>= <HFIEB:G<> K>IHKM BG :<<HK=:G<> PBMA /><MBH . ;:L>= HG MA> <HG?BKF>= <HG=BMBHG H~~ building ~~LA:EE ;> LN;FBMM>= MH~~ building ~~official ;>?HK> : <>KMB?B<:M> H? H<<NI:G<R BL BLLN>=

~~R405.3.1 Compliance software tools. H<NF>GM:MBHG O>KB?RBG@ MA:M MA> F>MAH=L :<<NK:<R H? MA> <HFIEB:G<> LH?MP:K> MHHEL <HG?HKF MH MA> IKHOBLBHGL H?~~ MABL L><M ~~IKHOB=>= MH MA~~ official.

~~R405.3.2 Compliance report. HFIEB:G<> LH?MP:K> MHHEL LA:EE @>G>K:M> : K~~>IHKM MA ~~=H<NF>GML MA:M~~ proposed design ~~<HFIEB>L PBMA~~ Section R405.3 ~~<HFIEB:G<> K>IHKM~~ HG ~~MA>~~proposed design ~~LA:EE ;> LN;FBMM>= PBMA MA> :IIEB<:MBHG ?HK MA> ;NBE=BG@ I>KFBM <HFIE>MBHG H? MA> ;NBE=BG@BKF><HFIEB:G<> K>IHKM ;:L>= HG MA> <HG?BKF>= <HG=BMBHG H MA> ;NBE=BG@ LA:EE ;> LN;FBMM>= MH~~ building ~~official ;>?HK> : <>KMB?B<:M> H? H<<NI:G<R BL BLLN>=~~

~~HFIEB:G<> K>IHKML LA:EE BG<EN=> BG?HKF:MBHG BG :<~~Sections~~ R405.3.2.1 :G= R405.3.2.2~~

~~R405.3.2.1 Compliance report for permit application. <HFIEB:G<> K>IHKM LN;FB~~MM>= ~~PBMA MA> :IIEB<:MBHG~~ building ~~I>KFBM LA:EE BG<EN=> MA> ?~~HEEHPBG@

- ~~Building LMK>>M :==K>LL HK MA~~ building ~~site B=>GMB?B<~~:MBHG
- ~~0A> G:F> H? MA> BG=BOB=N:E I>K?HKFBG@ MA> :G:ERLBL :G= @>G>K:MB~~G@ MA> <H ~~K>IHK~~M
- ~~0A> G:F> :G= O>KLBHG H? MA> <HFIEB:G<> LH?MP~~:K> MHHE
- ~~H<NF>GM:MBHG H? :EE BGINML >GM>K>= BGMH MA> LH?MP:K> NL>= MH~~ IKH=N<> M ~~?HK MA> K>?>K>G<> =>LB@G :G= HK MA>~~ K:M>= AHF>

— ~~<>KMB?B<:M> BG=B<:MBG@ proposed design <HFIEB>L PBMA Section R405.3~~

~~0A> <>KMB?B<:M> LA:EE =H<NF>GM MA> ;NBE=BG@ <HF@HG<GML?B<:MB~~HGL MA:M

~~:K> BG<EN=>= BG MA> <:E<NE:MBHG BG<EN=BG@ <HFIHG>GM E>:D:@> BG~~LNE:MBH

~~U ?:<MHKL duct LRLM>F :G= building thermal envelope :BK E>:D:@> M>~~LMBG@

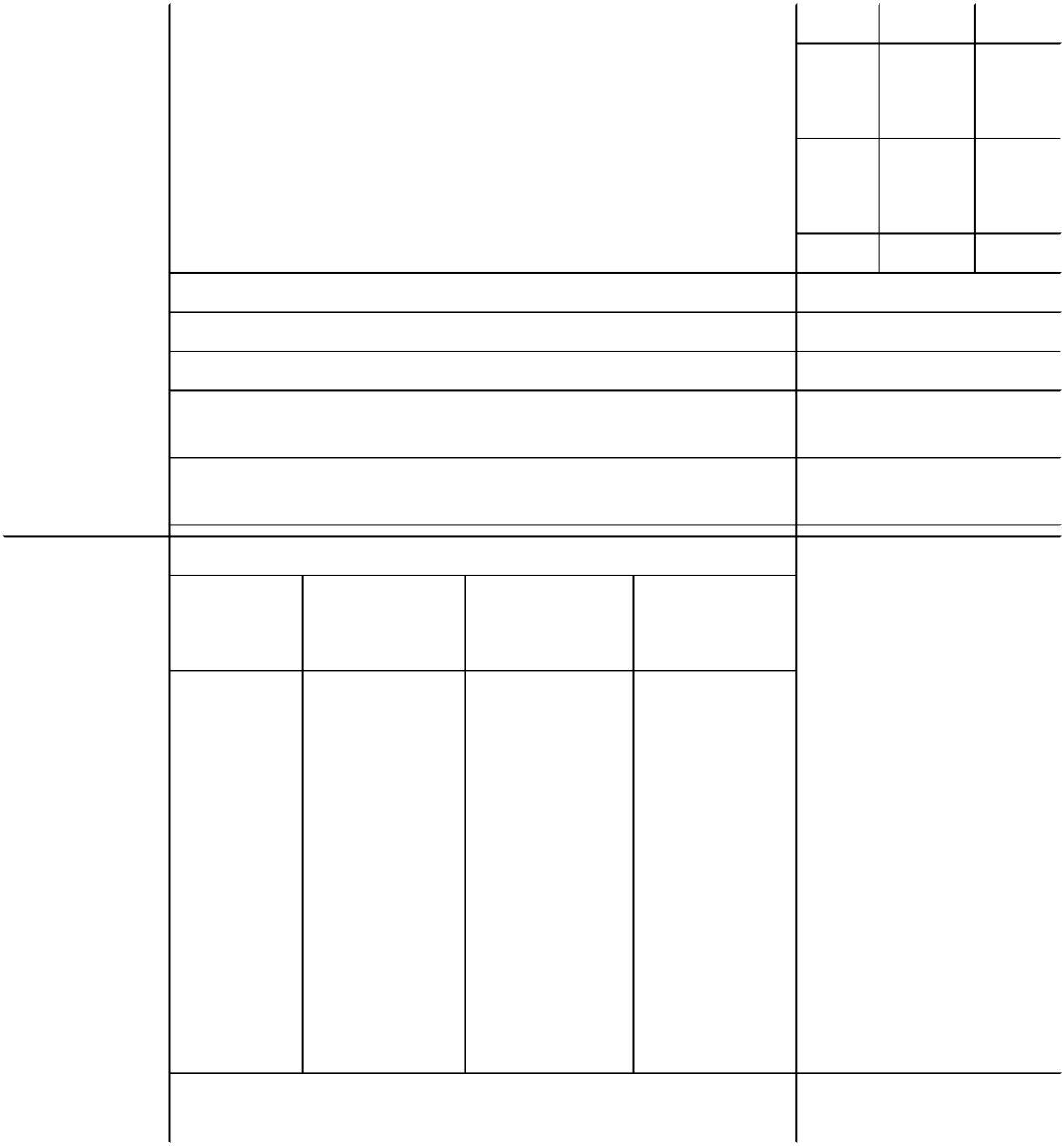
~~:LLNFIMBHGL :G= MA> MRI> :G= K:M>= >??B<B>G<B>L H? IKHIHL>= A>:~~MBG@ <HH

TABLE R405.4.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
;HO> @K:=> P:EEL	0RI> F:LL PA>K> MA> IKHIHL>= P:EE BL : F:LL P:EE HMA>KPBL> PHH= ?K:F>	L IKHIHL>=
	#KHLL :K>: L:F> :L IKHIHL>=	L IKHIHL>=
	U ?:<MHK :L LI><B?B>Table R402.1.2	L IKHIHL>=
	/HE:KK>?E><M:G<>;LHKIM:G<> ——	L IKHIHL>=
	!FBMM:G<>	L IKHIHL>=
:L>F>GM :G= <K:PE LI:<> P:EEL	0RI> L:F> :L IKHIHL>=	L IKHIHL>=
	#KHLL :K>: L:F> :L IKHIHL>=	L IKHIHL>=
	U ?:<MHK :L LI><B?B>Table R402.1.2 PBMA MA> BGLNE:MBHG E:R>K HG MA> BGM>KBHK LB=> H? MA> P:EEL	L IKHIHL>=
;HO> @K:=> ?EHHKL	0RI> PHH= ?K:F>	L IKHIHL>=
	#KHLL :K>: L:F> :L IKHIHL>=	L IKHIHL>=
	U ?:<MHK :L LI><B?B>Table R402.1.2	L IKHIHL>=
>BEBG@L	0RI> PHH= ?K:F>	L IKHIHL>=
	#KHLL :K>: L:F> :L IKHIHL>=	L IKHIHL>=
	U ?:<MHK :L LI><B?B>Table R402.1.2	L IKHIHL>=
.HH?L	0RI> <HFIHLBMBHG LABG@E> HG PHH= LA>:MABG@	L IKHIHL>=
	#KHLL :K>: L:F> :L IKHIHL>=	L IKHIHL>=
	/HE:K:;LHKIM:G<>K>?E><M:G<> ——	L IKHIHL>=
	!FBMM:G<>	L IKHIHL>=
MMB<L	0RI> O>GM>= PBMA :G :I>KMNK> H?K ?M?M H? <>BEBG@ :K>:	L IKHIHL>=
"HNG=:MBHG	0RI> L:F> :L IKHIHL>=	L IKHIHL>=
	"HNG=:MBHG P:EE HK LE:; >QM>GLMBHG :;HO> @K:=> ?HHM <F "HNG=:MBHG P:EE HK LE:; >QM>GLBHG ;>EHP @K:=> L:F> :L IKHIHL>= "HNG=:MBHG P:EE HK LE:; I>KBF>M>K E>G@MA L:F> :L IKHIHL>= /HBE <A:K:<M>KBLMB<L L:F> :L IKHIHL>=	L IKHIHL>=
	"HNG=:MBHG PLE<MHKK LE:;G= LE:; HG @K:=> F ?:<MHK :L LI><B?B>= BG 0:;E> .	
+I:JN> =HHKL	K>: ?M	L IKHIHL>=
	+KB>GM:MBHG *HKMA	L IKHIHL>=
	U ?:<MHK L:F> :L ?>G>LMK:MBHG :L LI><B?B>Table BG R402.1.2	L IKHIHL>=

2>KMB<:E ?>G>LMK:MBHG HMA>K MA:G HI:JN> =HHKL	0HM:E :K>A: : 0A> IKHIHL>= @E:SBG@ :K>: PA>K> MA> IKHIHL>= @E:SBG@ :K>: BL E>LL MA:G I>K<>GM H? MA> <HG=BMBHG>= ?EHHK :K>: ; I>K<>GM H? MA> <HG=BMBHG>= ?EHHK :K>: PA>K>	

	0A> F><A:GB<:E O>GMBE:MBHG K:M> LA:EE ;> BG :==BMBHG MH MA> :BK E>:D:@> K:M> :G= LA:EE ;> MA> L:F> :L BG MA> IKHIHL>= =>LB@G ;NM GHM @K>:M>K MA:G Q) PA>K> ` " ` *;K <?F) PA>K> MA> F>:LNK>= :BKE>:D:@>Q<A:G@> K:M> BL :BK <A:G@>L I>K AHNK :M ,:L<:EL :G= HMA>KPBL>) FBGBFNF - - MA> IKHIHL>= F><A:GB<:E O>GMBE:MBHG K:M> <?F " <HG=BMBHG>= ?EHHK :K>: ?M *;K GNF;>K H? ;>=KHHFL 0A> F><A:GB<:E O>GMBE:MBHG LRLM>F MRI> LA:EE ;> MA> L:F> :L BG MA> IKHIHL>= =>LB@G $>:M K><HO>KR HK >G>K@R K><HO>KR LA:EE ;> FH=>E>= ?HK F><A:GB<:E O>GMBE:MBHG PA>K> K>JNBK>= ;R /><MBHG . K><HO>KR HK >G>K@R K><HO>KR LA:EE GHM ;> FH=>E>= ?HK F><A:GB<:E O>GMBE:MBHG PA>K> GHM K>JNBK>= ;R /><MBHG	0A> F>:LNK>= F><A:GB<:E O>GMBE:MBHG <?F - LA:EE ;> BG :==BMBHG MH MA> F>:LNK>= :BK E>:D:@> K:M>G= LA:EE ;> :L IKHIHL>=
)><A:GB<:E Dcã¤Ää³ãÐ		



	Duct system E>:D:@> MH HNMLB=> "HKduct systems L>KOBG@ ?M F H? <HG=BMBHG>= ?EHHK :K>: MA> =N<M E>:D:@> MH HNMLB=>K:M> LA:EE ;> <?F (FBG I>K ?M F H? <HG=BMBHG>= ?EHHK :K>: "HKduct systems L>KOBG@ W ?M F H? <HG=BMBHG>= ?EHHK :K>: MA> =N<M E>:D:@> MH HNMLB=>K:M> LA:EE ;> <?F (FBG	N<M /RLM>F (>:D:@> MH +NMLB=> 0A> F>:LNK>= MHM:E =N<M LRLM>F E>:D:@> K:M> LA:EE ;> >GM>K>= BGMH MA> LH?MP:K> :L MA> =N<M LRLM>F E>:D:@> MH HNMLB=> K:M> Exceptions: ~~3A>G~~ 3A>K> duct system E>:D:@> MH HNMLB=> BL M>LM>= BG :<<HK=:G<> */% .!/*!0 % HK /0) ! MA> F>:LNK>= O:EN> LA:EE ;> I>KFBMM>= MH ;> K:M>= ~~3A>G~~3A>K> MHM:E duct system E>:D:@> BL F>:LNK>= PBMAHNM MA> space conditioning equipment ~~:BK A:G=E~~>K BGLM:EE>= MA> LBFNE:MBHG O:EN> LA:EE ;> <?F (FBG I>K ?M F H? <HG=BMBHG>= ?EHHK :K>:

	BLMKB;NMBHG /RLM>F !??B<B>G<R /! "HK /AR=KHGB< LRLM>FL :G= =N<ME>LL LRLM>FL : MA>KF:E =BLMKB;NMBHG LRLM>F >??B<B>G<R /! H? LA:EE ;> :IIEB>= MH =N<ME>LL LRLM>FL MA> A>:MBG@ :G= <HHEBG@ LRLM>F >??B<B>G<R LA:EE ;> :L LI><B?B>= BG	BLMKB;NMBHG /RLM>F !??B<B>G<R /! "HK BLMKB;NMBHG LRLM>FL :G= =N<ME>LL LRLM>FL /! MA> A>:MBG@ :G= <HHEBG@ LRLM>F >??B<B>G<R LA:EE ;> :L LI><B?B>= BG Table R405.4.2(2)
0A>KFHLM:M	0RI>):GN:E <HHEBG@ M>FI>K:MNK> L>MIHBGM $>:MBG@ M>FI>K:MNK> L>MIHBGM T"	T" F> :L standard reference design
>ANFB=BLM:M	3A>K> : F><A:GB<:E O>GMBE:MBHG LRLM>F PBMA E:M>GM A>:M K><HO>KR BL GHM LI><B?B>= BG MA> IKHIHL>= =>LB@G *HG> 3A>K> MA> IKHIHL>= =>LB@G NMBEBS>L : F><A:GB<:E O>GMBE:MBHG LRLM>F PBMA E:M>GM A>:M K><HO>KR >ANFB=BLM:M MRI> F:GN:E L>MIHBGM K>E:MBO> ANFB=BMR >ANFB=B?B>K PAHE> =P>EEBG@ PBMA BGM>@K:M>= >G>K@R ?:<MHK EBM>KL D3A	/:F> :L standard reference design

"HK /% LJN:K> ?HHM F KBMBLA MA>KF:E NGBM & IHNG= I>K LJN:K> ?HHM D@ F @:EEHG 1/ (T T" =>@K>> K:=

: 3A>K> K>JNBK>= ;R MA> <H=> H??B<B:E M>LMBG@ LA:EE ;> <HG=N<M>= ;R :$HNKEB>= I:KMR <:E<NE:MBHGL :L LI><B?B>= BG MA> /$Handbook of Fundamentals, HK MA> >JNBO:E>GM LA:EE ;> NL>= MH =>M>KFBG> MA> >G>K@R EH:=L K>LNEMBG@ ?KHF BG?BEMK:MBHG

; 0A> <HF;BG>= :BK >Q<A:G@> K:M> ?HK BG?BEMK:MBHG :G= F><A:GB<:E O>GMBE:MBH =>M>KFBG>= BG :<<HK=:G<> PBMA !JN:MBHG H? /$Handbook of Fundamentals, I:@> :G= MA> \3AHE> AHNL> 2>GMBE:MBHG] IKHOBLBHGL H? /$Handbook of Fundamentals, I:@> ?HK BGM>KFBMM>GM F><A:GB<:E O>GMBE:MBHG

< 0A>KF:E LMHK:@> >E>F>GM LA:EE F>:G : <HFIHG>GM MA:M BL GHM I:KM H? MA> ?EHHKL <>BEBG@L MA:M BL I:KM H? : I:LLBO> LHE:K LRLM>F :G= MA:M IKHOB=>L MA>KF:E LMHK:@ >G<EHL>= P:M>K <HENFGL KH<D ;>=L HK IA:L> <A:G@> <HGM:BG>KL MA>KF:E LMHK:@> >E> LA:EE ;> BG MA> L:F> KHHF :L ?>G>LMK:MBHG MA:M ?:<>L PBMABG =>@K>>L K:= H? LHNMA HK LA:EE ;> <HGG><M>= MH LN<A : KHHF PBMA IBI>L HK =N<ML MA:M :EEHP MA> >E>I :<MBO>ER <A:K@>=

= "HK : proposed design PBMA FNEMBIE> A>:MBG@ <HHEBG@ HK P:M>K A>:MBG@ LRLM>F =B??>K>GM ?N>E MRI>L MA> :IIEB<:;E> LM:G=:K= K>?>K>G<> =>LB@G LRLM>F <:I:<BMB>L MRI>L LA:EE ;> P>B@AM>= BG :<<HK=:G<> PBMA MA>BK K>LI><MBO> EH:=L :L <:E<NE:M>= ;R : >G@BG>>KBG@ IK:<MB<> ?HK >:<A >JNBIF>GM :G= ?N>E MRI> IK>L>GM

> "HK : proposed design PBMAHNM : IKHIHL>= A>:MBG@ LRLM>F : A>:MBG@ LRLM>F A:OBG@ IK>O:BEBG@ ?>=>K:E FBGBFNF >??B<B>G<R LA:EE ;> :LLNF>= Standard reference design :G= proposed design

? "HK : proposed design ~~AHF>~~ PBMAHNM : IKHIHL>= <HHEBG@ LRLM>F :G >E><MKB< :BK <HG=B A:OBG@ MA> IK>O:BEBG@ ?>=>K:E FBGBFNF >??B<B>G<R LA:EE ;> :LLNF>= Standard reference design :G= MA> proposed design

@ "HK : proposed design PBMAHNM : IKHIHL>= P:M>K A>:M>K MA> ?HEEHPBG@ :LLNFIMBHGL LA:
F:=> ?HK ;HMA MA> IKHIHL>= =>LB@G standard reference design "HK : IKHIHL>= =>LB@G
PBMA : A>:M INFI P:M>K A>:M>K MA> ?HEEHPBG@ :LLNFIMBHGL LA:EE ;> standard ?HK MA>
reference design >Q<>IM MA> ?N>E MRI> LA:EE ;> >E><MKB<
"N>E 0RI> /:F> :L MA> IK>=HFBG:GM A>:MBG@ ?N>E MRI>
.:M>= /MHK:@> 2HENF> #:EEHGL
K:P ,:MM>KG)>=BNF

E +GER L><MBHGduletwork

TABLE R405.4.2(2)
DEFAULT DISTRIBUTION SYSTEM EFFICIENCIES FOR PROPOSED DESIGNS[a]

DISTRIBUTION SYSTEM CONFIGURATION AND CONDITION	FORCED AIR SYSTEMS	HYDRONIC

?BG:E <HG?BKF>= <>KMB?B<:M> BG=B<:MBG@ <HFIEB:G<> ;:L>= HG BGLI><MBH
LM:M>F>GM BG=B<:MBG@:M;NBEMail <HFIEB>L PBMA /><MBHG . 0A>

TABLE R406.2
REQUIREMENTS FOR ENERGY RATING INDEX

SECTION[a]	TITLE
General	
R401.3	>KMB?B<:M>
Building Thermal Envelope	
R402.1.1	2:E8K3K2>D423F423C3A4D3E>4 0.5035E1e
R402.2.4	!:O> ;:??E>
R402.2.5.1	

R403.11	,HKM:;E> LI:L
R403.12	.>LB=>GMB:E IHHEL :G= I>KF:G>GM K>LB=>GMB:E LI:L
.	#:L ?BK>IE:<>L
Electrical Power and Lighting Systems	
R404.1	(B@AMBG@ >JNBIF>GM
R404.2	%GM>KBHK EB@AMBG@ <HGMKHEL
.	!E><MKB< K>:=BG>LL
.	.>G>P:;E> >G>K@R BG?K:LMKN<MNK>
.	!E><MKB< 2>AB<E> IHP>K MK:GL?>K BG?K:LMKN<MNK>

: .>?>K>G<> MH : <H=> L><MBHG BG<EN=>L :EE H? MA> K>E:MBO> LN;L><MBHGL >Q<>IM :L B MA> M:;E>

R406.3 Building thermal envelope 0A> IKHIHL>= MHM Building thermal envelope MA>KF:E <HG=N<M:G<> 0 ~~1 PAB<A BL LNF HU~~ ?:<MHK MBF>L :LL>F;ER :K>A:EE ;>E>LL MA:G HK >JN:E MH MA> building thermal envelope MA>KF:E <HG=N<M:G<> 0 1 NLBG@ MA> IK>L<KBIMBO> ?:<MHK :G= " ?:<MHKL ?KHF Table R402.1.2 FNEMBIEB>= ;R BG EBF:M> 6HG>L :G= :G= ;R BG EBF:M>L 6HG>L MAKHN@A BG :<<HK=:G<> PBMA >JN:MBHG :G= . 0A> :K>: P>B@AM>= F:QBFNF fenestration /$# I>KFBMM>= BG EBF:M> 6HG>L MAKHN@A LA:EE ;>

R406.4 Energy Rating Index. 0A> !G>K@R .:MBG@ %G=>Q !.% LA:EE ;> =>M>KFBG>= BG :<<HK=:G<> PBMA !/% RESNET/ICC 301 0A> F><A:GB<:E ventilation

TABLE R406.5
MAXIMUM ENERGY RATING INDEX

CLIMATE ZONE	ENERGY RATING INDEX NOT INCLUDING OPP	ENERGY RATING INDEX WITH OPP
		—
		—
		—
		—
		—
		—
		—

R406.6 Verification by approved agency. 2>KB?B<:MBHG H? <HFIEB:G<> LH?MP:K> MHHEL :L HNMEBG> ~~Sections R406.4~~ /><MBHGL . :G= ~~R406.6~~ . LA:EE ;> <HFIE>M>= ;R :G approved MABK= I:KMR ~~2>KB?B<:MBHG~~ H? <HFIEB:G<> PBMA ~~Section~~ R406.2 LA:EE ;> <HFIE>M>= ;R MA> :NMAHKBMR A:OBG@ CNKBL=B<MBHG ~~approved~~ HKMABK= I:KMR BGLI><MBHG :@>G<R BG :<<HK=:G<> PBMA ~~Section R107.4~~ /><MBHG .

R406.7 Documentation. H<NF>GM:MBHG H? MA> LH?MP:K> NL>= MH =>MEKFBG= MA> I:K:F>M>KL ?HK MA> ERI reference design ~~residential building~~ LA:EE ;> BG :<<HK=:G<> PBMA ~~Sections~~ R406.7.1 MAKHNG@ R406.7.4

R406.7.1 Compliance software tools. /H?MP:K> MHHEL NL>= ?HK =>M>KFBG LA:EE ;> ~~Approved~~ /H?MP:K> .:MBG@ 0HHEL approved LH?MP:K> K:MBG@ MHHEL :L =>LBG@ <<HK=:G<> ~~PBMA RESNET/ICC 301~~ */% .!/*!0 % /H?MP:K> O>G=HKL LA:EE IN;EBLA HG : IN;EB<ER :O:BE:;E> P>;LBM> =H<NF>GM:MBHG MA:M MA> LH?MP:K> MHHE A:L ;>>G O:EB=:M>= NLBG@ MA 0B>K M>LM IKH<>=NK> BG */% /$. ! /M:G=:K=

R406.7.2 Compliance report. HFIEB:G<> LH?MP:K> MHHEL LA:EE @>G>K:M> : K>IHKM MA =H<NF>GML MA:M ~~AHF> :G= MA> !.%~~ <HK> ERI H? MA> rated design :G= :L ;NBEM dwelling unit <HFIEB>L PBMA ~~Sections~~ R406.2 R406.3 :G= R406.4 :G= . HFIEB:G<> =H<NF>GM:MBHG LA:EE ;> <K>:M>= ?HK MA> proposed design :G= LA:EE ;> LN;FBMM>= PBMA MA> :IIEB<:MBHG ?HK MA> ;NBE=BG@ I>KFBM HG?BKF>= <HFIEB:G<> =H<NF>GML H? MA> dwelling unit ;NBEM LA:EE ;> <K>:M>= :G= LN;FBMM>= code official ?HK K>OB>P ;>?HK> : <>KMB?B<:M> H? H<<NI:G<R BL BLLN>= HFIEB:G<> K>IHKML LA:EE BG<EN=> BG?HKF:MBHG BG :<<HK=:G<> PBMA ~~Sections~~ R406.7.2.1 :G= R406.7.2.2

R406.7.2.1 Proposed compliance report for permit application. HFIEB:G<> K>IHKML LN;FBMM>= PBMA MA> :IIEB<:MBHG ?HK : ;NBE=BG@ I>KFBM LA:EE BG<EN=> MA> ?HEEHPB Building LMK>>M :==K>LL HK IHMAHK site B=>GMB?B<:MBHG ><E:K> !.% HG MBME> t@> building IE:GL 0A> G:F> H? MA> BG=BOB=N:E I>K?HKFBG@ MA> :G:ERLBL :G= @>G>K:MBG@ MA> <H K>IHKM 0A> G:F> :G= O>KLBHG H? MA> <HFIEB:G<> LH?MP:K> MHHE H<NF>GM:MBHG H? :EE BGINML >GM>K>= BGMH MA> LH?MP:K> NL>= MH IKH=N<> M ?HK MA> ERI K>?>K>G<> =>LB@G HKMA> rated design ~~AHF>~~

,:@> H?

<>KMB?B<:M> BG=B<:MBG@ proposed design MA:M MA> A:L :G !.% E>LL MA:G HK >JN:E
MH MA> :IIKHIKB:M> L<HK> BG=B<:M>= Table R406.5 PA>G <HFI:K>= MH MA> !.%
K>?>K>G<> =>LB@G 0A> <>KMB?B<:M> LA:EE =>LB@G:M> MA> building <HFIHG>GM >G>K@R
LI><B?B<:MBHGL MA:M :K> BG<EN=>= BG MA> <:E<NE:MBHG <HFIHG>GM E>O>E@
BGLNE:MBHG R-O:EN>L HK U ?:<MHKL :LLNF>= duct LRLM>F :G= building thermal
envelope :BK E>:D:@> M>LMBG@ K>LNEML MA:M MA> IMA :G= K:M>= >??B<B>G<B>L H?
IKHIHL>= A>:MBG@ <HHEBG@ F><A:GB<:E ventilation :G= L>KOB<> P:M>K A>:MBG@
>JNBIF>GM MH ;> BGLM:EE>= on-site renewable energy LRLM>FL PBEE ;> BGLM:EE>= MA>
<>KMB?B<:M> LA:EE K>IHKM MA> MRI> :G= IKH=N<MBHG LBS> H? MA> IKHIHL>= LRLM
3A>G : LBM> LI><B?B< K>IHKM BL GHM @>G>K:M>= MA> proposed design LA:EE ;> ;:L>=
HG MA> PHKLM <:L> HKB>GM:MBHG :G= <HG?B@NK:MBHG H? MA> dwelling unit AKIM>=

R406.7.2.2 Confirmed compliance report for a certificate of occupancy. <HG?BKF>=
<HFIEB:G<> K>IHKM LN;FBMM>= ?HK H;M:BGBG@ MA> <>KMB?B<:M> H? H<<NI:G<R LA:EE ;
:G= :==K>LL LI><B?B< :G= BG<EN=> MA> ?HEEHPBG@
Building

SECTION R407
TROPICAL CLIMATE REGION COMPLIANCE PATH

R407.1 Scope. 0ABL L><MBHG >LM:;EBLA>L :EM>KG:MBO> <KBM>KB: ?HK K>LB=>GMB:E ;NBE=BG@ K>@BHG :M >E>O:MBHGL E>LL MA:G ?>>M F :;HO> L>: E>O>E

TABLE R407.1
MINIMUM ROOF REFLECTANCE AND EMITTANCE OPTIONS [a]

0AK>> R>:K :@>= LHE:K K>?E><M:G<> :G= R>:K :@>= MA>KF:E >FBMM:G<>
0AK>> R>:K :@>= LHE:K K>?E><M:G<> BG=>Q

: 0A> NL> H? :K>: P>B@AM>= :O>K:@>L MH <HFIER PBMA MA>L> K>JNBK>F>GML LA:EE ;> I>KF
):M>KB:EL E:<DBG@ R>:K :@>= M>LM>= O:EN>L ?HK >BMA>K LHE:K K>?E><M:G<> HK MA>KF:E
LA:EE ;> :LLB@G>= ;HMA : R>:K :@>= LHE:K K>?E><M:G<> BG :<<HK=:G<> PBMA /><MBHG
:G= : R>:K :@>= MA>KF:E H?
; @>= LHE:K K>?E><M:G<> M>LM>= BG :<<HK=:G<> PBMA /0) /0) ! HK /0)
! HK .. /
< @>= MA>KF:E M>LM>= BG :<<HK=:G<> PBMA /0) HK /0) ! HK ..
/
= /HE:K K>?E><M:G<> BG=>Q /.% LA:EE ;> =>M>KFBG>= BG :<<HK=:G<> PBMA /0) ! NLBG@ :
<HGO><MBHG <H>??B<B>GM H? `M N A 3 PM ` ' :E<NE:MBHG H? :@>= /.% LA:EE ;>
;:L>= HG :@>= M>LM>= O:EN>L H? LHE:K K>?E><M:G<> :G= MA>KF:E

R407.2 Tropical climate region. HFIEB:G<> PBMA MABL L>K MBHG>L MA> ?HEEHPBG@
*HM FHK> MA:G HG> A:E? H occupied LI:<> BL :BK <HG=BMBHG>=
0A> occupied LI:<> BL GHM A>:M>=
/HE:K PBG= HK HMA>K K>G>P:;E> >G>K@R LHNK<> LNIIEB>L GHM E>LL MA:G I>K<>GM
>G>K@R 3 service water heating
#E:SBG@ BG conditioned spaces A:L : solar heat gain coefficient /$# H? E>LL MA:G HK >JN:E
MH HK A:L :G HO>KA:G@ PBMA : IKHC><MBHG ?:<MHK >JN:E MH HK @K>:M>K MA:G
,>KF:G>GMER BGLM:EE>= EB@AMBG@ BL BG Section R404 PBMA
0A> >QM>KB K H? LNK?:<> <HFIEB>L PBMA HG> H? MA> H MBHGL BG H?
MA>

space ?EHHK :K=H<:M>= :;HOgrade plane 0H >:KG <K>=BM :L LI><B?B>= BG 0:;E> . ?HK MA> :IIEB<:;E> Climate Zone, !:<A >:<A F>:LNK> L>E><M>?HK <HFIEB:GLA:EE>>M<HFIER PBMA MA> K>E>O:GM IEB<:;E> LN;L><MBHGL H? /><MBHG:G= K><>BO> <K>=BM :L LI><B?B>= BG 0:;E> . ?HK MA> LI><B?B>= Climate Zone !:<A dwelling unit HKsleeping unit LA:EE <HFIER PBMA MA> L>E><M>= F>:LNK> MH >:KG <K>=BGM>KIHE:MBHG H? <K>=BML ;>MP>>G F>:LNK>L LA:EE GHM ;> I>KFBMM>=

,:@> H?

TABLE R408.2
CREDITS FOR ADDITIONAL ENERGY EFFICIENCY

)>:LNK> *NF;>K	)>:LNK> >L<KBIMBHG	K>=BM 2:EN>								
		EBF:M> 6HG>	EBF:M> 6HG>	EBF:M> 6HG>	EBF:M> 6HG> >Q<>IM):KBG>	EBF:M> 6HG> —):KBG>	EBF:M> 6HG>	EBF:M> 6HG>	EBF:M> 6HG>	EBF:M> 6HG>
.	X .>=N<MBHG BG MHM:E 1—									
.	X K>=N<MBHG BG MHM:E 1—									
.	K>=N<MBHG BG MHM:E 1—									
.	K>=N<MBHG BG MHM:E 0		0	0	0	0	0	0	0	0
.	K>=N<MBHG BG MHM:E 0		0	0	0	0	0	0	0	0
.	K>=N<MBHG BG MHM:E 0		0	0	0	0	0	0	0	0
.	K>=N<MBHG BG MHM:E 0		0	0	0	0	0	0	0	0
.	1 ?:<MHK ^±a‹&„ #p									

0 1 ? €iH 1 ?ë'k (A“ë vc(%2h

. – <	W $:BK E>:D:@> K:M>PBMA ;:E:G<>= O>GMBE:MBHG balanced ventilation system							–0	–0	–0
. – <	W $:BK E>:D:@> K:M>PBMA !.2 HK $.2 BGLM:EE>=							—0	—0	—0
. – <	W $:BK E>:D:@> K:M>PBMA !.2 HK $.2 BGLM:EE>=							—0	—0	—0
. :	!G>K@R >??B<B>GM :IIEB:G<>L									
.	.>G>P:;E> +G LBM> K>G>P:;E> >G>K@R F>:LNK>L									
.	+?? LBM> K>G>P:;E> >G>K@R F>:LNK>L	0	0	0	0	0	0	0	0	0
. <	>F:G= K>LIHGLBO> MA>KFHLM:M									
.	3AHE> AHF> EB@AMBG@ <HGMKHE									
.	$B@A>K >??B<:<R EB@AMBG@									

: 3A>K> MA> F>:LNK> BL L>E><M>= >:<A =P>EEBG@ NGBM LE>>IBG@ NGBM :G= <HFFHG :K>:L PA>K> MA> BL :IIEB<:;E> FNLM A:O> MA> F>:LNK> BGLM:EE>=

; 3A>K> FNEMBIE> A>:MBG@ HK <HHEBG@ LRLM>FL :K> BGLM:EE>= <K>=BML LA:EE ;> =>M>KFBG>= NLE :O>K:@> H? MA> LJN:K> ?HHM:@> L>KO>= ;R >:<A LRLM>F

< 3A>K> MA> F>:LNK> BL L>E><M>= >:<A =P>EEBG@ NGBM :G= LE>>IBG@ NGBM FNLM <HFIER PBMA MA> F

= 3A>K> MA> F>:LNK> BL L>E><M>= >:<A =P>EEBG@ NGBM LA:EE ;> L>KO>= ;R : P:M>K A>:M>K F>>MB :IIEB<:;E> K>JNBK>F>GML 3A>K> FNEMBIE> L>KOB<> P:M>K A>:MBG@ LRLM>FL :K> BGLM:EE>= <K>=BM

R408.2.1 Enhanced building thermal envelope options. "HK MA> >GA:G<>= >GO>EHI> <K>=BMA> MA> building thermal envelope LA:EE E>>M MA> K>JNBK>F>GMER PBMA HG> HK H?KMA> ?HEEHPBG@ !BMA>/><MBHG . HK . K>=BM LA:EE HGER ;> I>KFBMM>= ?KHF HG> F>:LNK> /><MBHG . /><MBHG .

R408.2.1.1 Enhanced building thermal envelope performance UA 0A> IKHIHL>= MHMbuilding

TABLE R408.2.1.3
MINIMUM ROOF REFLECTANCE[a]

.++" /(+,!	0$.!! 5! . #! /+(. .!"(! 0 * ! %* !4
~~(HP LEHI>~~Low slope	
~~/M>>I LEHI>~~Steep slope	

:

— #K>:M>K MA:G HK >JN:E MH "1! G:MNK:E @:L ?NKG:<> :G= $/," /!!. :BK

FNLM ;> =HG>

—

TABLE R408.2.3
Service water-heating efficiencies

)>:LNK> *NF;>K	3:M>K $>:M>K	/BS> :G= K:P ,:MM>KG	0RI>	!??B<B>G<R
. :	#:L ?BK>= LMHK:@> P:M>K A>:M>KL HIMBHG	EE LMHK:@> OHENF>L .EE =K:P I:MM>KGL		1!" X
. ;	#:L ?BK>= LMHK:@> P:M>K A>:M>KL HIMBHG	W @:EEHGL)>=BNF		1!" X
		W @:EEHGL $B@A		1!" X
		)>=BNF HK $B@A @:EEHGL		1!" X
		EE LMHK:@> OHENF>L .:M>= BGINM <:I:<BMR MN A		1!" X HK ! ₘWt”ƒB=5ç•B qQ‘ }.
EE LMHK:@> OHENF>L				

EE LMHK:@> OHENF>L

BLMKB;NMBHG LRLM>F <K>=BM MA> 0A>K> 3A>K> MA> LHNK<> H? A>:M>= P:M>K :G= MA> M>KFBG:MBHG H? MA> LNIIER IBI> PA>G <:E<NE:M>= NLBG@ L><MBHG A>:M>= P:M>K BL : <BK<NE:MBHG EHHI MA> EHHI LA:EE ;> IKBF>= PBMA water system 0A>K> LA:EE ;> : =>=B<:M>= K>MNKG EBG> ?HK MA> EHHI MA:M ;>@BGL :?M ;K:G<A MH MA> E:LM ?BQMNK> HG MA> LNIIER IHKMBHG H? MA> EHHI :G= KNGL ;:<D MH A>:M>K 3A>G MA> AHM P:M>K LHNK<> BL MA> G>:K>LM IKBF>= IENF;BG@ EHHI HK MKNGD M ;> IKBF>= PBMA :G HG =>F:G= K><BK<NE:MBHG INFI :G= FNLM KNG : =>=B<:M>= :F;B>GM K>M EBG> ?KHF MA> ?NKMA>LM ?BQMNK> HK >G= H? EHHI MH MA> P:M>K A>:M>K %G HK=>K MI MA> =P>EEBG@ FNLM A:O> : FBGBFNF H? ;:MAKHHFL

0H ?B>E= HK IE:G K>OB>P O>KB?R MA:M MA> LRLM>F F>>ML MA> IK>L<KB;>= EBFBM ?HEEHPBG@ FNLM ;> =HG>

— M IE:G K>OB>P K>?>K>G<BG@ HNG<>L H? P:M>K I>K ?HHM H? MN;> HG IE:GL :L I>K

.

~~TABLE R403.5.4~~ TABLE R408.2.3.1

INTERNAL VOLUME OF VARIOUS WATER DISTRIBUTION TUBING

+1* !/ +" 3 0!. ,!. "++0 +" 01 !									
+)% (/%6! BG<A>L	+,,!. 05,!)	+,,!. 05,! (	+,,!. 05,! '	,2 0/ / .	,2 / $	,2 / $	,! .0 / .	+),+/%0! /0) "	,!4 0/ / .
				*					
			—						

"HK /% ?HHM FF BG<A FF EBJNB= HNG<> (HS ?M @ F

* *HM :O:BE:;E>

R408.2.3.1.1 Water volume determination 0A> P:M>K OHENF> BG MA> IBIBG@ ;>MP>>G : LHNK<> H? A>:M>= P:M>K :G= MA> M>KFBG:MBHG H? : ?BQMNK> LNIIER LA:EE ;> <:E<N :<<HK=:G<> PBMA MABL L><MBHG 3:M>K A>:M>KL <BK<NE:MBG@ P:M>K LRLM>FL :G= A M>FI>K:MNK> F:BGM>G:G<> LRLM>FL LA:EE ;> <HGLB=>K>= MH ;> LHNK<>L H? A>:M>= P: 0A> OHENF> LA:EE ;> MA> LNF H? MA> BGM>KG:E OHENF>L H? IBI> ?BMMBG@L O:EO :G= F:GB?HE=L ;>MP>>G MA> G>:K>LM LHNK<> H? A>:M>= P:M>K :G= MA> M>KFBG:MB MA> ?BQMNK> LNIIER IBI> 0A> OHENF> BG MA> IBIBG@ LA:EE ;> =>M>KFBG>= ?KHI . 0A> OHENF> <HGM:BG>= PBMABG ?BQMNK> LANMH?? O:EO>L PBMABG ?E>QB LNIIER <HGG><MHKL MH : ?BQMNK> ?BMMBG@ :G= PBMABG : ?BQMNK> ?BMMBG@ L BG MA> P:M>K OHENF> =>M>KFBG:MBHG 3A>K> A>:M>= P:M>K BL LNIIEB>= ;R : K><BK< LRLM>F HK A>:M MK:<>= IBIBG@ MA> OHENF> LA:EE BG<EN=> MA> IHKMBHG H? MA> ? ;K:G<A IBI> MA:M LNIIEB>L P:M>K MH MA> ?BQMNK>

R408.2.4 More efficient ~~duct~~ thermal distribution system option. 0A> MA>KF:E =BLMKB;NMBHG LRLM>F LA:EE ~~=>M HG> H? MA>~~ <HFIER PBMA HG> H? MA> ?HEEHPBG@ ~~<B>G~~ <B>L

~~I>K<>GM H?~~ 0A> =N<ME>LL MA>KF:E =BLMKB;NMBHG LRLM>F HK AR=KHGB< MA>KF:E =B LRLM>F BL EH<:M>= <HFIE>M>ER ~~BGLB=>~~ BG MA> <HG=BMBHG>= LI:<> MA> building thermal envelope

~~I>K<>GM H? duct MA>KF:E =BLMKB;NMBHG LRLM>F~~ 0A> space conditioning >JNBIF>GM BL EH<:M>= BGLB=> <HG=BMBHG>= LI:<> %G :==BMBHG I>K<>GM H? ductwork BL EH<:M>= ~~BG~~ <HFIE>M>ER BGLB=> conditioned space :L =>?BG>= ;R BM>F :G= BM>F Section R403.3.4

0A> space conditioning equipment BL EH<:M>= BGLB=> conditioned P @–=

TABLE R408.2.6

/><MBHG————————. 0A>KFHLM:ML <HGMKHEEBG@ FNEMB LM:@> $2 LRLM>FL LA

CHAPTER 5 [RE] EXISTING BUILDINGS

User note:

About this chapter: Many buildings are renovated or altered in numerous ways that could affect the energy use of the building as a whole. Chapter 5 requires the application of certain parts of Chapter 4 in order to maintain, if not improve, the conservation of energy by the renovated or altered building.

SECTION R501

signed by the owner, a registered design professional, or a representative of the State Historic Preservation Office or the historic preservation authority having jurisdiction, demonstrating that compliance with that provision would threaten, degrade or destroy the historic form, fabric or function of the building.

~~R501.7~~R501.6 Any unconditioned or low-energy space that is altered to become conditioned space shall be required to be brought into full compliance with ~~this code~~Section R502.

Exception: Where the simulated performance option in Section R405 is used to comply with this section, the annual energy cost of the proposed design is permitted to be 110 percent of the annual energy cost otherwise allowed by Section R405.2.

SECTION R502
ADDITIONS

R502.1 General. Additions to an existing building, building system or portion thereof shall conform to the provisions of this code as those provisions relate to new construction. Additions shall not create an unsafe or hazardous condition or overload existing building systems.

R502.2 Prescriptive compliance. Additions shall comply with Sections R502.2.1 through.R502.2.5.

R502.2.1 Building thermal envelope. New building thermal envelope assemblies that are part of the addition shall comply with Sections R402.1 , R402.2, R402.4.1 through R402.4.5, and R402.5.

Exception: New building thermal envelope assemblies are exempt from the requirements of Section R402.5.1.2 .

R502.2.2

SECTION

2. Roof replacements or a roof ~~for roofs with~~ alteration that includes removing and replacing the roof covering where the roof assembly includes insulation entirely above the roof deck, Where limiting conditions require use of an approved design to minimize deviation from Section R402.1 for a Group R-2 building, a registered design professional or other approved source shall provide construction documents that identify the limiting conditions and the means to address them.
3. Conversion of an unconditioned attic space into conditioned space.
4. Replacement of ceiling finishes exposing cavities or surfaces of the roof-ceiling.

~~Exceptions: Where compliance with Section R402.1 cannot be met due to limiting conditions on an existing roof, the following shall be permitted to demonstrate compliance with the insulation requirements:~~

~~1. Construction documents that include a report by a registered design professional or other approved source documenting details of the limiting conditions affecting compliance with the insulation requirements.~~
~~2. Construction documents that include a roof design by a registered design professional or other approved source that minimize deviation from the insulation requirements.~~
~~3. Conversion of an unconditioned attic space into conditioned space, and~~
~~4. Replacement of ceiling finishes exposing cavities or surfaces of the roof-ceiling construction to which insulation can be applied.~~

R503.1.1.3 Above-grade wall alterations Above-grade wall alterations shall comply with the following ~~requirements as applicable~~:

1. Where ~~interior finishes are removed exposing~~ wall cavities are exposed, and the ~~existing cavity~~exposed cavities shall be filled with ~~existing or new~~ insulation complying with Section R303.1.4. New cavities created shall be insulated in accordance with Section R402.1 or an approved design that minimizes deviation from Section R402.1. 4.

~~Where any of the above requirements are applicable, the above-grade wall alteration shall comply with the insulation and water vapor retarder requirements of Section~~Sections ~~R702.7 and R703.1.1 of the International Residential Code. or Section 1404.3 of the International Building Code, as applicable. Where the exterior wall coverings are removed and replaced, the above-grade wall alteration shall comply with the water and wind resistance requirements of Section R703.1.1 of the International Residential Code or Section 1402.2 of the International Building Code, as applicable.~~

R503.1.1.4 Floor alterations Where cavities in a floor or floor overhang are exposed ~~an alteration to a floor or floor overhang exposes cavities or surfaces to which insulation can be applied~~ and the floor or floor overhang is part of the building thermal envelope, the floor or floor overhang shall comply ~~be brought into compliance~~ with Section R402.1 or an approved design. ~~This requirement shall apply to floor alterations where the floor cavities or surfaces are exposed and accessible prior to construction.~~

R503.1.1.5 Below-grade wall alterations Where an unconditioned ~~a~~ below-grade space is changed to conditioned space, the ~~below-grade walls~~building thermal envelope walls enclosing such space shall be insulated ~~where required~~ in accordance with Section R402.1. Where the below-grade space is conditioned space and where building thermal envelope walls enclosing such space ~~a below-grade wall is~~ are altered ~~by removing or adding interior finishes, it~~ they shall be insulated ~~where required~~ in accordance with Section R402.1.

R503.1.1.6 Air barrier ~~Building~~ Altered building thermal envelope assemblies ~~altered in accordance with Section R503.1.1~~ shall be provided with an air barrier in accordance with Section R402.5. ~~The~~ Such air barrier ~~shall~~need not be ~~required to be made~~ continuous with unaltered portions of the building thermal envelope. Testing requirements of Section R402.5.1.2 shall not be required.

R503.1.2 Heating and cooling systems. New heating and cooling systems and ductwork ~~duct systems~~ that are part of the alteration shall comply with Section R403 and this section. Alterations to existing heating and cooling systems and ductwork ~~duct systems~~ shall comply with this section.

Exception: Where ~~ducts~~ductwork from an existing heating and cooling system ~~are~~ is extended ~~to an addition~~.

R503.1.2.1 ~~Ducts~~ Ductwork HVAC ~~ducts~~ductwork newly installed as part of an alteration shall comply with Section R403.

Exception: Where ~~ducts~~ductwork from an existing heating and cooling system ~~are~~is extended ~~to an addition~~.

R503.1.2.2 System sizing New heating and cooling equipment that is part of an alteration shall be sized in accordance with Section R403.7 based on the existing building features as modified by the alteration.

Exception: Where it has been demonstrated to the code official that compliance with this section would result in heating or cooling equipment that is incompatible with the remaining portions of the existing heating or cooling system.

R503.1.2.3 Duct system

2. Roof repairs.
3. Repairs where only the bulb, ballast or both within the existing luminaires in a space are replaced provided that the replacement does not increase the installed interior lighting power.

SECTION R505
CHANGE OF OCCUPANCY OR USE

R505.1 General. Any space that is converted to a dwelling unit or portion thereof from another use or occupancy shall comply with this ~~code~~chapter.

Exception: Where the simulated building performance option in Section R405 is used to comply with this section, the annual energy cost of the proposed design is permitted to be 110 percent of the annual energy cost allowed by Section R405.2 .

R505.1.1 Unconditioned space. Any unconditioned or low-energy space that is altered to become a conditioned space shall comply with ~~Section R502~~ Section R501.6.

R506
~~ADDITIONAL EFFICIENCY PACKAGE OPTIONS~~

R506.1 ~~General~~ ~~Where required in Section R502 or R503, the building shall comply with one or more additional efficiency package options in accordance with the following:~~

1. ~~Enhanced~~ building thermal ~~envelope performance in accordance with Section R408.2.1.~~
2. ~~More efficient HVAC equipment performance in accordance with Section R408.2.2.~~
3. ~~Reduced energy use in service water-heating in accordance with Section R408.2.3.~~
4. ~~More efficient duct thermal distribution system in accordance with Section R408.2.4.~~
5. ~~Improved air sealing and efficient ventilation system in accordance with Section R408.2.5.~~

CHAPTER 6 [RE] REFERENCED STANDARDS

User note: PLEASE NOTE THAT REFERENCES TO CODE SECTIONS HAVE NOT BEEN CORRELATED IN THIS DRAFT

About this chapter: This code contains numerous references to standards promulgated by other organizations that are used to provide requirements for materials and methods of construction. Chapter 6 contains a comprehensive list of all standards that are referenced in this code. These

ACCA

Air Conditioning Contractors of America
1330 Braddock Place, Suite 350
Alexandria, VA 22314

AHRI

Air-Conditioning, Heating, & Refrigeration Institute
2111 Wilson Blvd, Suite 500
Arlington, VA 22201

AISI

American Iron and Steel Institute
25 Massachusetts Avenue, NW, Suite 800
Washington, DC 20001

ANSI

American National Standards Institute
25 West 43rd Street, 4th Floor
New York, NY 10036

ANSI/ASHRAE 140-2017 : 2020 Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs
R406.7.1

ANSI/CTA 2045-B February 2021 : Modular Communications Interface for Energy

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APSP

Pool & Tub Alliance (formerly the APSP)
2111 Eisenhower Avenue, Suite 500
Alexandria, VA 22314

ASHRAE

ASHRAE
180 Technology Parkway NW
Peachtree Corners, GA 30092

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

BPVC: Boiler and Pressure Vessel Code
R403.5.4

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

C1313/C1313M-13(2019): Standard Specification for Sheet Radiant Barriers for Building Construction Applications
R303.2.2

C1363Ñ19: : Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
R303.1.4.1

C1371-15(2022) : Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers
Table R408.2.1.3

C1549-2016: Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
R408.2.1.3

C1743-2019: Standard Practice for Installation and Use of Radiant Barrier Systems (RBS) in Residential Building Construction
R402.3

Sys2.1smT Be74Reflectan254 (Sys2.1s TJ576arrier) -321..0078 0.6941 0.9686 rg 164.0124 474.369340d (:rrier) -321.12.7

E1554/E1554MÑ E2013:

CRRC

Cool Roof Rating Council
2435 North Lombard Street
Portland, OR 97217

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

CTA

Consumer Technology Association
Technology & Standards Department
1919 S Eads Street
Arlington, VA 22202

DASMA

Door & Access Systems Manufacturers Association
1300 Sumner Avenue
Cleveland, OH 44115-2851

DOE

US Department of Energy
1000 Independence Avenue SW
Washington, DC 20585

~~AAMA~~ FGIA

Fenestration & Glazing Industry Alliance (formerly American Architectural Manufacturers Association)
~~1827 Walden Office Square~~1900 E. Golf Road
Suite ~~550~~250
Schaumburg, IL 60173-4268

HVI

Home Ventilating Institute
1740 Dell Range Blvd, Ste H, PMB 450
Cheyenne, WY 82009

ICC

International Code Council, Inc.
~~500 New Jersey Avenue NW6th Floor~~
200 Massachusetts Avenue NW Suite 250

Washington, DC 20001

ANSI/APSP/ICC 14Ñ2019: : American National Standard for Portable Electric Spa Energy Efficiency

R403.11

ANSI/APSP/ICC 15aÑ2020: :

R201.3 , R303.1.1 , R303.2 , R402.1.1 , R402.2.11.1 , R403.3.5 , R403.3.6 , R403.6 , R501.7

IEC

IEC Regional Centre for North America
446 Main Street 16th Floor
Worcester, MA 01608

IEC 62746-10-1 - 2018: : Systems interface between customer energy management system and the power management system - Part 10-1: Open automated demand response
R408.2.10.1

IEEE

Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, 17th Floor
New York, NY 10016-5997

515.1Ñ2012: : IEEE Standard for the Testing, Design, Installation and Maintenance of Electrical Resistance Trace Heating for Commercial Applications
R403.5.1.2

NFPA

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471

70Ñ20: : National Electrical Code
R501.7

NFRC

National Fenestration Rating Council, Inc.
6305 Ivy Lane, Suite 140
Greenbelt, MD 20770

100Ñ2023: : Procedure for Determining Fenestration Products U-factors
R303.1.3

200Ñ2023: : Procedure for Determining Fenestration Product Solar Heat Gain Coefficient

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OpenADR

OpenADR Alliance
111 Deerwood Road, Suite 200
San Ramon, CA 94583

RESNET

Residential Energy Services Network, Inc.
P.O. Box 4561
Oceanside, CA 92052-4561

ANSI/RESNET/ICC 301Ñ2022: : Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index- -includes Addendum A Approved July 28, 2022; Addendum B Approved October 12, 2022 and Addendum C

R406.4 , R406.7.1 , R406.7.6

ANSI/RESNET/ICC 380Ñ2022: : Standard for Testing Airtightness of Building, Dwelling Unit and Sleeping Unit Enclosures; Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems

R402.5.1.2 , R403.3.7

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

127Ñ2011: : Standard for Factory-Built FireplacesÑwith Revisions through February 2020

R402.5.2

515Ñ2015: : Electric Resistance Trace Heating for Commercial Applications

R403.5.1.2

UL 2202-2009: Electric Vehicle (EV) Charging System - with revisions through February 2018

R404.7

UL2594-2016: Standard for Electric Vehicle Supply Equipment

R404.7

US-FTC

United States-Federal Trade Commission
600 Pennsylvania Avenue NW
Washington, DC 20580

CFR Title 16 (2015): : R-value Rule

R303.1.4

WDMA

Window and Door Manufacturers Association
~~2025 M Street NW, Suite 800~~
2001 K Street NW, Suite 300
Washington, DC ~~20036-3309~~ 20006

AAMA/WDMA/CSA 101/I.S.2/A440Ñ22: : North American Fenestration Standard/ Specification for ~~Windows, Doors and Skylights~~ windows, doors, and skylights

R402.5.3

APPENDIX RA

APPENDIX RB SOLAR-READY PROVISIONSÑDETACHED ONE- AND TWO-FAMILY DWELLINGS AND TOWNHOUSES

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.
User note:

About this appendix: Harnessing the heat or radiation from the sunÕs rays is a method to reduce the energy consumption of a building. Although Appendix RB does not require solar systems to be installed for a building, it does require the space(s) for installing such systems, providing pathways for connections and requiring adequate structural capacity of roof systems to support the systems.

SECTION RB101
SCOPE

RB101.1 General. These provisions shall be applicable for new construction where solar-ready provisions are required.

SECTION RB102
GENERAL DEFINITION

SOLAR-READY ZONE. A section or sections of the roof or building overhang designated and reserved for the future installation of a solar photovoltaic or solar thermal system.

SECTION RB103
SOLAR-READY ZONE

RB103.1 General. New detached one- and two-family dwellings, and townhouses with not less than 600 square feet (55.74 m^2) of roof area oriented between 110 degrees and 270 degrees of true north shall comply with Sections RB103.2 through RB103.8.

Exceptions:

1. New residential buildings with a permanently installed on-site renewable energy system.
2. A building where all areas of the roof that would otherwise meet the requirements of Section RB103 are in full or partial shade for more than 70 percent of daylight hours annually.

RB103.2 Construction document requirements for solar-ready zone . Construction documents shall indicate the solar-ready zone.

RB103.3 Solar-ready zone area. The total solar-ready zone area shall be not less than 300 square feet (27.87 m^2) exclusive of mandatory access or setback areas as required by the International Fire Code . New townhouses three stories or less in height above grade plane and with a total floor area less than or equal to 2,000 square feet (185.8 m^2) per dwelling shall have a solar-ready zone area of not less than 150 square feet (13.94 m^2). The solar-ready zone shall be composed of areas not less than 5 feet (1524 mm) in width and not less than 80 square feet (7.44 m^2) exclusive of access or setback areas as required by the International Fire Code .

RB103.4 Obstructions. Solar-ready zones shall be free from obstructions, including but not limited to vents, chimneys, and roof-mounted equipment.

RB103.5

signage, rooftop equipment, trees and roof plantings.

RB103.6 Capped roof penetration sleeve. A capped roof penetration sleeve shall be provided adjacent to a solar-ready zone located on a roof slope of not greater than 1 unit vertical in 12 units horizontal (8-percent slope). The capped roof penetration sleeve shall be sized to accommodate the future photovoltaic system conduit, but shall have an inside diameter of not less than $1^1/_4$ inches (32 mm).

RB103.7 Roof load documentation. The structural design loads for roof dead load and roof live load shall be clearly indicated on the construction documents.

RB103.8 Interconnection pathway. Construction documents shall indicate pathways for routing of conduit or plumbing from the solar-ready zone to the electrical service panel or service hot water system.

RB103.9 Electrical service reserved space. The main electrical service panel shall have a reserved space to allow installation of a dual pole circuit breaker for future solar electric installation and shall be labeled ÒFor Future Solar Electric.Ó The reserved space shall be positioned at the opposite (load) end from the input feeder location or main circuit location.

RB103.10 Construction documentation certificate. A permanent certificate, indicating the solar-ready zone and other requirements of this section, shall be posted near the electrical distribution panel, water heater or other conspicuous location by the builder or registered design professional.

APPENDIX RC ZERO NET ENERGY RESIDENTIAL BUILDING PROVISIONS

The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance.

User Note:

2. The requirements of ASHRAE/IES Standard 90.2, including:
    2.1 The ERI requirements of ASHRAE/IES 90.2 Table 6-1 without the use of on-site power production (OPP),
    2.2 The requirements of Sections R402.4.1.1, R402.4.1.2, R406.3, R404.5 (Electric Readiness), R404.7 (Electric Vehicle Power Transfer Infrastructure), and
    2.3 The maximum ERI including adjusted OPP of Table RC103.5~~3~~ determined in accordance with RC103.4~~3~~.

~~RC103.2~~RC103.3 Building thermal envelope. [no change, same as R406.3]

~~RC103.3~~RC103.4 Energy Rating Index ~~zero net energy score~~. The Energy Rating Index (ERI) not including renewable energy resources shall be determined in accordance with RESNET/ICC 301.The Energy Rating Index (ERI) including renewable energy resources shall be determined in accordance with ANSI/RESNET/ICC 301, except where electrical energy is provided from a community renewable energy facility (CREF) or contracted from a physical or financial renewable energy power purchase agreement that meets requirements of RC406.4.1, on-site power production (OPP) shall be adjusted in accordance with Equation RC-1.

~~IECC2024D2RERE_AppxRC_SecRC103.3_Eq1_62~~
(Equation RC-1)

OPP_{kWh} = Annual electrical energy from on-site renewable energy, in units of kilowatt-hours (kWh).
$CREF_{kwh}$ = Annual electrical energy from a community renewable energy facility (CREF), in units of kilowatt-hours (kWh).
$PPPA_{kwh}$ = Where not included as OPP, the annual electrical energy contracted from a physical renewable energy power purchase agreement, in units of kilowatt-hours (kWh).
$FPPA_{kwh}$ = Where not included as OPP, the annual electrical energy contracted from a financial renewable energy power purchase agreement (FPPA), in units of kilowatt-hours (kWh).

~~RC103.3.1~~RC103.4.1 ~~Power purchase agreement~~ Renewable energy contract. The renewable energy shall be delivered or credited to the building site under an energy contract with a duration of not less than 10 years. The contract shall be structured to survive a partial or full transfer of ownership of the building property.

~~RC103.4~~RC103.5 ERI-based compliance. Compliance based on an ERI analysis requires that the rated ~~proposed~~ design and confirmed built dwelling be shown to have an ERI less than or equal to both values indicated in Table RC103.5~~3~~ when compared to the ERI reference design.

TABLE RC103.3

APPENDIX RD

APPENDIX RE ALL-ELECTRIC RESIDENTIAL BUILDINGS

RE101
GENERAL

RE101.1 Intent The intent of this Appendix is to amend the International Energy Conservation Code to reduce greenhouse gas emissions and improve the safety and health of buildings by not permitting combustion equipment in buildings.

RE101.2 Scope This appendix applies to new residential buildings.

RE102
GENERAL DEFINTITIONS

RE102.1 ALL-ELECTRIC BUILDING. A building that contains no combustion equipment, or plumbing for combustion equipment, installed within the building, or building site.

APPLIANCE. A device or apparatus that is manufactured and designed to utilize energy and for which this code provides specific requirements.

COMBUSTION EQUIPMENT. Any equipment or appliance used for space heating, service water heating, cooking, clothes drying and/or lighting that uses fuel gas or fuel oil.

EQUIPMENT. Piping, ducts, vents, control devices and other components of systems other than appliances that are permanently installed and integrated to provide control of environmental conditions for buildings. This definition shall also include other systems specifically regulated in this code.

~~FUEL GAS. A natural gas, manufactured gas, liquified petroleum gas or a mixture of these.~~

FUEL OIL. Kerosene or any hydrocarbon oil having a flash point not less than 100¡F (38¡C).

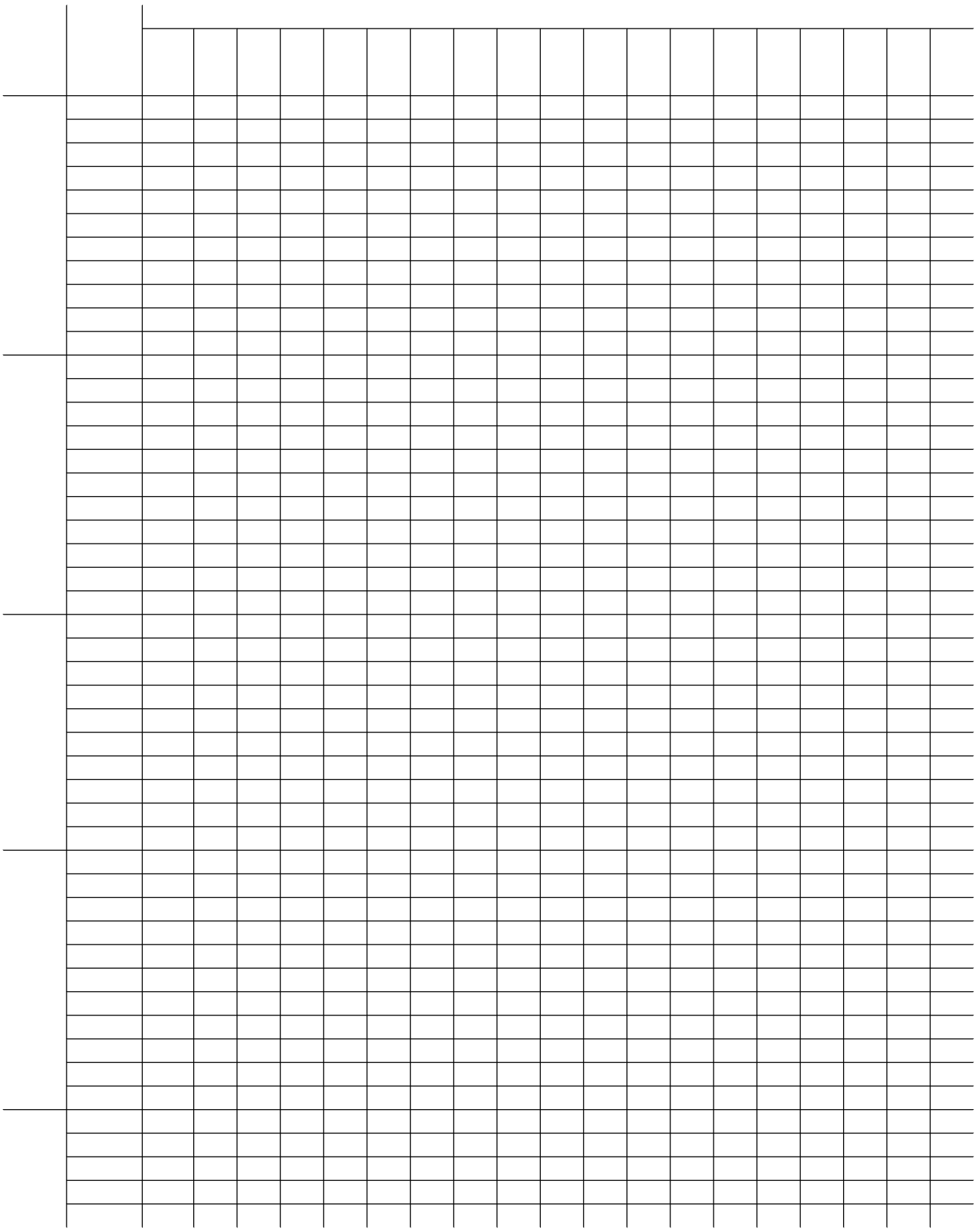
RE103
ALL-ELECTRIC RESIDENTIAL BUILDINGS

RE103.1 Application Residential buildings shall be all-electric buildings and comply with ~~Section R401.2.5 and~~ either Sections R401.2.1, R401.2.2, R401.2.3 or R401.2.4.

APPENDIX RF ALTERNATIVE BUILDING THERMAL ENVELOPE INSULATION R-VALUE OPTIONS

RF101
GENERAL

RF101.1 General This appendix shall be used as a basis to determine alternative building assembly and insulation component R-value solutions that comply with the maximum U-factors and F-factors in Table R402.1.2 of this standard. Alternative building assembly insulation solutions determined in accordance with this appendix also shall comply with the requirements of Section R702.7 of the International Residential Code



b. Table values are based on the parallel path calculation procedure as applicable to wood-frame assemblies and requires compliance with the following assembly conditions:
    1. Maximum framing fractions of 28% (assumed for 12Óoc studs), 25% (assumed for 16Óoc studs), and 22% (assumed for 24Óoc studs) with 4% attributed to headers in all cases. The framing fraction is the percentage of overall opaque wall area occupied by framing members.
    2. Wood framing materials or species with a minimum thermal resistivity of R-1.25 per inch.
    3. Exterior sheathing with a minimum R-value of R-0.62 as based on wood structural panel. For walls having no exterior sheathing or sheathing of lesser R-value, footnote d shall be used to adjust the tabulated U-factor.
    4. Siding of a minimum R-0.62 as based on the assumption of vinyl siding. For walls with siding having a lower R-value, footnote d shall be used to adjust the tabulated U-factor.
    5. Interior finish of a minimum R-0.45 based on 1/2Ó gypsum. For walls having no interior finish or a finish of lesser R-value, footnote d shall be used to adjust the tabulated U-factor.
    6. Cavity insulation with a rated R-value installed as required by the manufacturerÕs installation instructions to satisfy the indicated installed R-value, considering a reduced R-value for compression in an enclosed cavity where applicable.
    7. Continuous insulation specified in accordance with the indicated rated R-value and installed continuously over all exterior wood framing, including studs, plates, headers, and rim joists.
    8. Indoor air film R-value of 0.68 and outdoor air-film R-value of 0.17.

c.

APPENDIX RG
2024 IECC STRETCH CODE

RG101
COMPLIANCE

RG101.1 (R405.2) SIMULATED BUILDING PERFORMANCE COMPLIANCE Compliance based on simulated building performance requires that a building comply with of the following:

1. The requirements of the sections indicated within Table R405.2.
2. The proposed total building thermal envelope thermal conductance TC, shall be less than or equal to the building thermal envelope thermal conductance TC using the prescriptive U-factors and F-factors from Table R402.1.2 multiplied by 1.08 in Climate Zones 0, 1, and 2, and 1.15 in Climate Zones 3 through 8 in accordance with Equation 4-2 and Section R402.1.5. The area-weighted maximum fenestration SHGC permitted in Climate Zones 0 through 3 shall be 0.30.

3. For each dwelling unit with one or more fuel burning appliances for space heating or water heating, or both, the annual energy cost of the dwelling unit shall be less than or equal to 70 percent of the annual energy cost of the standard reference design. For all other dwelling units, the annual energy cost of the dwelling unit shall be less than or equal to 75 percent of the annual energy cost of the standard reference design. For each dwelling unit with greater than 5,000 square feet (465 m2) of living space located above grade plane, the annual energy cost of the dwelling unit shall be reduced by an additional 5 percent of annual energy cost of the standard reference design. Energy prices shall be taken from an approved source, such as the Department of Energy, Energy Information AdministrationÕs State Energy Data System Prices and Expenditures reports. Code officials shall be permitted to require time-of-use pricing in energy cost calculations.

   Exceptions:

   1. The energy use based on source energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost. The source energy multipliers for electricity shall be 2.51. The source energy multiplier for fuels other than electricity shall be 1.09.
   2. The energy use based on site energy expressed in Btu or Btu per square foot of conditioned floor area shall be permitted to be substituted for the energy cost.

RG101.2 (R406.5) ERI-based compliance Compliance based on an ERI analysis requires that the rated design and each confirmed as-built dwelling unit be shown to have an ERI less than or equal to the applicable value indicated in Table R406.5 where compared to the ERI reference design as follows:

1. Where on-site renewables are not installed, the maximum ENERGY RATING INDEX NOT

2. For

TABLE RG101.2 (R406.5)
MAXIMUM ENERGY RATING INDEX

CLIMATE ZONE	ENERGY RATING INDEX NOT INCLUDING OPP	ENERGY RATING INDEX WITH OPP
0-1	46	27
2	46	26
3	45	24
4	48	32
5	49	37
6	48	39
7	47	43
8	47	43

RG101.3 Additional energy efficiency credit requirements Residential buildings shall earn not less than twenty credits from not less than two measures specified in Table R408.2. Five additional credits shall be earned for dwelling units with more than 5,000 square feet (465 m^2) of living space located above grade plane. To earn credit as specified in Table R408.2 for the applicable Climate Zone, each measure selected for compliance shall comply with the applicable subsections of Section R408. Each dwelling unit or sleeping unit shall comply with the selected measure to earn credit. Interpolation of credits between measures shall not be permitted.

APPENDIX RH
OPERATIONAL CARBON RATING AND ENERGY REPORTING

RH101
GENERAL DEFINITIONS

$CO2_e$ INDEX

3. For all-electric dwelling units, maximum $CO2_e$ Index of 65, not including OPP, determined in accordance with ANSI/RESNET/ICC 301. For mixed-fuel dwelling units, a maximum $CO2_e$ Index established at the time of adoption of this Appendix by the authority having jurisdiction based on the $CO2_e$ emissions data specific to the jurisdiction.

RH102.4 Confirmed compliance report for a certificate of occupancy A confirmed compliance report submitted for obtaining the certificate of occupancy shall be made site and address specific and include the following:

1. Building street address or other building site identification.
2. Declaration of ERI and $CO2_e$ Index on title page and on building plans.
3. The name of the individual performing the analysis and generating the report.
4. The name and version of the compliance software tool.
5. Documentation of all inputs entered into the software used to produce the results for the ERI reference design and the as-built dwelling unit.
6. A final confirmed certificate indicating that the as-built building has been verified to comply with Sections R406.2, R406.4, and R406.5. The certificate shall report the energy features that were confirmed to be in the building, including: component-level insulation R-values or U-factors; results from any required duct system and building thermal envelope air leakage testing; and the type and rated efficiencies of the heating, cooling, mechanical ventilation, and service water-heating equipment installed. The certificate shall report the estimated dwelling unit877827nt-68.41n (th) -25568.41n nit877b-68.41n 236mix7 (unit877371.,mix7 fina32 -326.4s

5. Where on-site photovoltaic panel systems have been installed, the array capacity, inverter efficiency, panel tilt and orientation shall be noted on the certificate.
6. For buildings where an Energy Rating Index score is determined in accordance with Section N1106, the Energy Rating Index score and CO_2e Index, both with and without any on-site generation, shall be listed on the certificate.
7. The code edition under which the structure was permitted.
8. Where a solar-ready zone is provided, the certificate shall indicate the location, and dimensions.

RH406
ERI AND CO2E INDEX COMPLIANCE

RH406.2 ERI and CO_2e Index compliance. Compliance based on ERI and CO_2e Index requires that the rated design and as-built dwelling unit meet all of the following:

1.

APPENDIX

5. Buildings with a physical renewable energy power purchase agreement with a duration of not less than 15 years from a utility or a community renewable energy facility and for not less than 80 percent of the estimated whole-building electric use on an annual basis. This exception shall not apply where off-site renewable energy credits are used to comply with the requirements of Section N1108.
6. Buildings that demonstrate compliance in accordance with Section RI103.1.1.1

RI103.1.1.1 Alternate capacity determination Where compliance is demonstrated in accordance with Section N1105 Simulated Building Performance and the proposed design and standard reference design are adjusted in accordance with Items (1) and (2), the required capacity of the installed renewable energy systems shall be permitted to differ.

1. Proposed Design. Where applicable, the proposed design shall comply with one of the following:
   1.1 Where one or more systems providing on-site renewable energy are included in the construction documents, the systems shall be modeled in the proposed design with a design capacity not greater than the required capacity in accordance with Section RI103.1.1. A combination of on-site renewable energy systems shall be permitted to be included in the proposed design.
   1.2 Where no on-site renewable energy systems are specified in the construction documents, no on-site renewable energy systems shall be modeled in the proposed design.
2. Standard Reference Design. Where applicable, the standard reference design shall comply with one of the following:
   2.1 Where a proposed design includes one or more on-site renewable energy systems the same systems shall be modeled identically in the standard reference design except the total rated capacity of all systems shall be equal to the required capacity in accordance with Section RI103.1.1. Where more than one type of on-site renewable energy system is modeled, the total capacity of each system shall be allocated in the same proportion as in the proposed design.
   2.2 Where the proposed design does not include any on-site renewable energy systems, an unshaded photovoltaic system shall be modeled in the standard reference design in accordance with the performance criteria in Table RI103.1.1.1(1).

RI103.1.2 ERI With OPP Requirements. Where compliance is demonstrated in accordance with Section R406.5 using the Energy Rating Index With OPP, a project shall comply with the requirements of this Appendix if the rated proposed design and confirmed built dwelling are shown to have an ERI less than or equal to the values in Table RP103.1.2.

TABLE RI103.1.2
MAXIMUM ENERGY RATING INDEX INCLUDING OPP

CLIMATE ZONE	ENERGY RATING INDEX WITH OPP
0-1	35
2	34
3	33
4	40
5	43
6	43
7 & 8	46

RI103.1.3 ERI With OPP Requirements. Where compliance is demonstrated in accordance with Section N1106.5 using the Energy Rating Index With OPP, a project shall comply with the requirements of this Appendix if the rated proposed design and confirmed built dwelling are shown to have an ERI less than or equal to the values in Table RI103.1.3.

RI103.2 Renewable energy certificate (REC) documentation Where RECs are associated with renewable energy power production required by Section RI103.2 or RI103.3, documentation shall comply with Section N1104.4 Renewable energy certificate (REC) documentation.