

CHAPTER 3 [CE]
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 thermal climate zones for CARICOM Countries and also contains product rating, marking and installation requirements for materials such as insulation, windows, doors and siding.

SECTION C301
CLIMATE ZONES

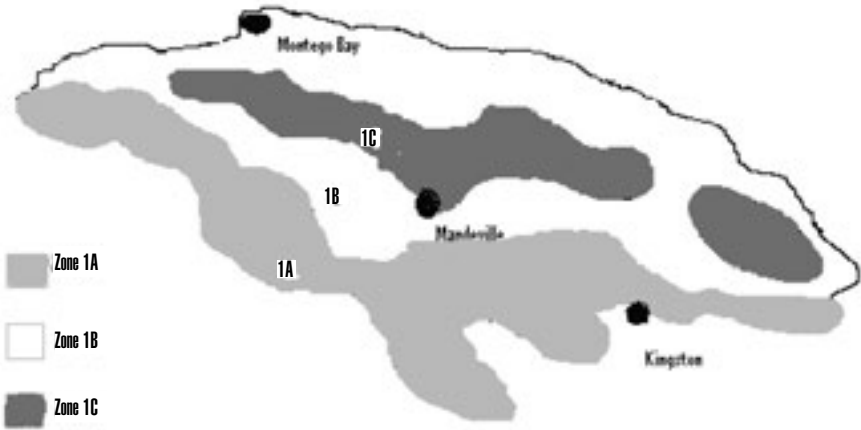
C301.1 General. *Climate zones* from Table C301.1 shall be used as an acceptable approximation for all locations throughout Jamaica in determining the applicable requirements from Chapter 4 [CE]. This was arrived at by using the climate zone classification for Puerto Rico and Hawaii that are tropical islands with similar latitude to Jamaica. The actual climate zone for a specific location anywhere in Jamaica shall be assigned according to Section C301.3.

C301.2 Warm humid locations. Warm humid locations are identified in Table C301.1.

C301.3 International climate zones. The *climate zone* for a specific location within Jamaica shall be determined by applying Table C301.3(1) and Table C301.3(2). Further details on the micro *climate zones* of Jamaica may be obtained from the Jamaica climate zone map of Figure C301.3 and Table C301.3(1).

SECTION C302
DESIGN CONDITIONS

C302.1 Interior design conditions. The interior design temperatures used for heating and cooling load calculations shall be a maximum of 22 °C (72 °F) for heating and minimum of 24 °C (75 °F) for cooling.



NOTES

1. The map shown in Figure C301.3 defines the climate zones of Jamaica for which the data in Table C301.3(1) are provided.

FIGURE C301.3
CLIMATE ZONES OF JAMAICA

TABLE C301.1
CLIMATE ZONES, MOISTURE REGIMES, AND WARM-HUMID
DESIGNATIONS BY COUNTY AND TERRITORY

Key: A – Moist, B – Dry, C – Marine. Absence of moisture designation indicates moisture regime is irrelevant.

COUNTRY	LOCATION	WMO#	CZ	SI				I-P			
				Elev (m)	CDD10	HDD18	Precip (mm)	Elev (ft)	CDD50	HDD65	Precip (in)
Anguilla (AIA)^a	WALLBLAKE AIRPORT	–	0A	10 ^c	6691	0 ^c	617 ^c	33 ^c	10450 ^c	0 ^c	24 ^c
Antigua and Barbuda (ATG)^b	V.C. BIRD INTL AIRPORT	788620	0A	10	6249	0	883	33	11248	0	35
Bahamas (BHS)^b	LYNDEN PINDLING INTL AIRPORT	780730	1A	7	5643	9	1334	23	10157	16	53
	SETTLEMENT POINT	994390	1A	3	5322	19	1281	10	9580	34	50
Barbados (BRB)^b	GRANTLEY ADAMS INTL AIRPORT	789540	0A	56	6308	0	1155	184	11354	0	45
Belize (BLZ)^b	BELIZE/PHILLIP GOLDSON INTL AIRPORT	785830	0A	5	6145	0	1944	16	11061	0	77
Bermuda (BMU)^b	BERMUDA INTL AIRPORT	780160	2A	6	4596	88	1456	20	8273	158	57
British Virgin Islands (VGB)^a	TERRANCE B. LETTSOME INTL AIRPORT		0A	10 ^c	6453	0 ^c	841 ^c	33 ^c	10445 ^c	0 ^c	33 ^c
Cayman Islands (CYM)^a	OWEN ROBERTS INTL AIRPORT	–	0A	10 ^c	6620	0 ^c	1037 ^c	33 ^c	10889 ^c	0 ^c	41 ^c
Dominica (DMA)^a	DOUGLAS-CHARLES AIRPORT	–	0A	10 ^c	6288	0 ^c	878 ^c	33 ^c	10631 ^c	0 ^c	35 ^c
Grenada (GRD)^b	MAURICE BISHOP INTL AIRPORT	789580	0A	7	6378	0	1197	23	11480	0 ^c	47
Guyana (GUY)^b	CHEDDI JAGAN INTL AIRPORT	810020	0A	29	6136	0	2234	95	11045	0	88
Haiti (HTI)^a	PORT-AU-PRINCE AEROPORT INTL		0A	10 ^c	6848	0 ^c	1404 ^c	33 ^c	10278 ^c	0 ^c	55 ^c
Jamaica (JAM)^b	KINGSTON NORMAN MANLEY INTL AIRPORT	783970	1A	14	6608	0	730	46	11894	0	29
	MONTEGO BAY/SANGSTE INTL AIRPORT	783880	1B	8	6336	0	1184	26	11405	0	47
Montserrat (MSR)^a	JOHN A. OSBORNE AIRPORT	–	1A	10 ^c	5946	0 ^c	702 ^c	33 ^c	10615 ^c	0 ^c	28 ^c
Saint Lucia (LCA)^b	HEWANORRA INTL AIRPORT	789480	0A	10	6429	0	1128	33	11572	0	44
St. Kitts and Nevis (KNA)^a	ROBERT L. BRADSHAW INTL AIRPORT	–	0A	10 ^c	6388	0 ^c	696 ^c	33 ^c	10516 ^c	0 ^c	27 ^c
St. Vincent and the Grenadines (VCT)^a	ARGYLE INTL AIRPORT	–	0A	10 ^c	6647	0 ^c	582 ^c	33 ^c	10729 ^c	0 ^c	23 ^c
Suriname (SUR)	JOHAN A. PENGEL INTL AIRPORT at Zanderij	812250	0A	9	6264	0	2249	30	11275	0	89
	Paramaribo ^a	–	–	10 ^c	6361	0 ^c	2293 ^c	33 ^c	10688 ^c	0 ^c	90 ^c
Trinidad and Tobago (TTO)^b	ARTHUR NAPOLEON RAYMOND ROBINSON INTL AIRPORT	789620	0A	6	6307	0	1452	20	11353	0	57
	PIARCO INTL AIRPORT	789700	0A	15	6274	0	1781	49	11293	0	70
Turks and Caicos Islands (TCA)^a	PROVIDENCIALES INTL AIRPORT	–	0A	10 ^c	6439	0 ^c	673 ^c	33 ^c	10331 ^c	0 ^c	27 ^c

a. Calculated CARICOM Member State or Associate.

b. CARICOM Member State or Associate.

c. RETScreen Expert Data

TABLE C301.3(1)
UNSTATED CLIMATE ZONE DEFINITIONS

MAJOR CLIMATE-TYPE DEFINITIONS	
Marine (C) Definition—Locations meeting all four criteria: 1. Mean temperature of coldest month between -3 °C (27 °F) and 18 °C (65 °F). 2. Warmest month mean < 22 °C (72 °F). 3. At least four months with mean temperatures over 10 °C (50 °F). 4. Dry season in summer. The month with the heaviest precipitation in the cold season has at least three times as much precipitation as the month with the least precipitation in the rest of the year. The cold season is October through March in the Northern Hemisphere and April through September in the Southern Hemisphere.	
Dry (B) Definition—Locations meeting the following criteria: 1. Not Marine (C) 2. If 70% or more of the precipitation, P , occurs during the high sun period, then the dry/humid threshold is $P_{mm} < 20.0 \times (T + 14)$ (SI) [$P_{in} < 0.44 \times (T - 7)$ (I-P)] 3. If between 30% and 70% of the precipitation, P , occurs during the high sun period, then the dry/humid threshold is $P_{mm} < 20.0 \times (T + 7)$ (SI) [$P_{in} < 0.44 \times (T - 19.5)$ (I-P)] 4. If 30% or less of the precipitation, P , occurs during the high sun period, then the dry/humid threshold is $P_{mm} < 20 \times T$ (SI) [$P_{in} < 0.44 \times (T - 32)$ (I-P)] where: P = Annual precipitation, in. (mm) T = Annual mean temperature, °F (°C) Summer or high sun = April through September in the Northern Hemisphere and October through March period in the Southern Hemisphere Winter or cold season = October through March in the Northern Hemisphere and April through September in the Southern Hemisphere	
Humid (A) Definition—Locations that are not marine and not dry.	
Warm-humid Definition—Humid (A) locations where either of the following wet-bulb temperature conditions shall occur during the warmest six consecutive months of the year: 1. 19.4 °C (67 °F) or higher for 3,000 or more hours; or 2. 22.8 °C (73 °F) or higher for 1,500 or more hours.	

For IP: °C = [(°F - 32)] / 1.8, 1 mm = 0.03937 in.

TABLE C301.3(2)
UNSTATED THERMAL CLIMATE ZONE DEFINITIONS [SOURCE: ASHRAE STANDARD 169—2013]

THERMAL ZONE	NAME	SI UNITS	IP UNITS
0	Tropical ^a	6000 < CDD10 °C	10,800 < CDD50 °F
1	Very Hot	5000 < CDD10 °C ≤ 6000	9000 < CDD50 °F ≤ 10,800
2	Hot	3500 < CDD10 °C ≤ 5000	6300 < CDD50 °F ≤ 9000
3	Warm	CDD10 °C ≤ 3500 AND HDD18 °C ≤ 2000	CDD50 °F ≤ 6300 AND HDD65 °F ≤ 3600

a. ASHRAE Standard 169—2013 uses the term “Extremely hot.”

SECTION C303
MATERIALS, SYSTEMS AND EQUIPMENT

C303.1 Identification. Materials, systems and equipment shall be identified in a manner that will allow a determination of compliance with the applicable provisions of this code.

C303.1.1 Building thermal envelope insulation. An R -value identification mark shall be applied by the manufacturer to each piece of *building thermal envelope* insulation 305 mm (12 in) or greater in width. Alternatively, the insulation installers shall provide a certification listing the type, manufacturer and R -value of insulation installed in each element of the *building thermal envelope*. For blown or sprayed insulation (fibreglass and cellulose), the initial installed thickness, settled thickness, settled R -value,

installed density, coverage area and number of bags installed shall be *listed* on the certification. For sprayed polyurethane foam (SPF) insulation, the installed thickness of the areas covered and R -value of installed thickness shall be *listed* on the certification. For insulated siding, the R -value shall be labelled on the product’s package and shall be *listed* on the certification. The insulation installer shall sign, date and post the certification in a conspicuous location on the job site.

Exception: For roof insulation installed above the deck, the R -value shall be labelled as required by the material standards specified in Table 1508.2 of the *Jamaica Building Code*.

C303.1.1.1 Blown or sprayed roof/ceiling insulation.

The thickness of blown-in or sprayed roof/ceiling insulation (fibreglass or cellulose) shall be written in mm (in) on markers that are installed at least one for every 28 m² (300 ft²) throughout the attic space. The markers shall be affixed to the trusses or joists and marked with the minimum initial installed thickness with numbers not less than 25 mm (1 in) in height.

Each marker shall face the attic access opening. Spray polyurethane foam thickness and installed *R*-value shall be *listed* on certification provided by the insulation installer.

C303.1.2 Insulation mark installation. Insulating materials shall be installed such that the manufacturer's *R*-value mark is readily observable upon inspection.

C303.1.3 Fenestration product rating. *U*-factors of fenestration products shall be determined as follows:

1. For windows, doors and skylights, *U*-factor ratings shall be determined in accordance with NFRC 100.
2. Where required for garage doors and rolling doors, *U*-factor ratings shall be determined in accordance with either NFRC 100 or ANSI/DASMA 105.

U-factors shall be determined by an accredited, independent laboratory, and *labelled* and certified by the manufacturer.

Products lacking such a *labelled U*-factor shall be assigned a default *U*-factor from Table C303.1.3(1) or C303.1.3(2). The solar heat gain coefficient (SHGC) and *visible transmittance* (VT) of glazed fenestration products (windows, glazed doors and skylights) shall be determined in accordance with NFRC 200 by an accredited, independent laboratory, and *labelled* and certified by the manufacturer. Products lacking such a *labelled* SHGC or VT shall be assigned a default SHGC or VT from Table C303.1.3(3).

TABLE C303.1.3(2)
DEFAULT DOOR U-FACTORS

DOOR TYPE	U-FACTOR
Uninsulated Metal	6.81 W/m ² • K
	(1.20 Btu/h • ft ² • °F)
Insulated Metal (Rolling)	5.11 W/m ² • K
	(0.90 Btu/h • ft ² • °F)
Insulated Metal (Other)	3.41 W/m ² • K
	(0.60 Btu/h • ft ² • °F)
Wood	2.84 W/m ² • K
	(0.50 Btu/h • ft ² • °F)
Insulated, nonmetal edge, max 45% glazing, any glazing double pane	1.99 W/m ² • K
	(0.35 Btu/h • ft ² • °F)

TABLE C303.1.3(3)
DEFAULT GLAZED FENESTRATION SHGC AND VT

	SINGLE GLAZED		DOUBLE GLAZED		GLAZED BLOCK
	Clear	Tinted	Clear	Tinted	
SHGC	0.8	0.7	0.7	0.6	0.6
VT	0.6	0.3	0.6	0.3	0.6

TABLE C303.1.3(1)
DEFAULT OPAQUE DOOR U-FACTORS

FRAME TYPE	SINGLE PANE	DOUBLE PANE	SKYLIGHT	
			Single	Double
Metal	6.81 W/m ² • K	4.54 W/m ² • K	11.36 W/m ² • K	7.38 W/m ² • K
	(1.20 Btu/h • ft ² • °F)	(0.80 Btu/h • ft ² • °F)	(2.00 Btu/h • ft ² • °F)	(1.30 Btu/h • ft ² • °F)
Metal with Thermal Break	6.25 W/m ² • K	3.69 W/m ² • K	10.79 W/m ² • K	6.25 W/m ² • K
	(1.10 Btu/h • ft ² • °F)	(0.65 Btu/h • ft ² • °F)	(1.90 Btu/h • ft ² • °F)	(1.10 Btu/h • ft ² • °F)
Nonmetal or Metal Clad	5.39 W/m ² • K	3.12 W/m ² • K	9.94 W/m ² • K	5.96 W/m ² • K
	(0.95 Btu/h • ft ² • °F)	(0.55 Btu/h • ft ² • °F)	(1.75 Btu/h • ft ² • °F)	(1.05 Btu/h • ft ² • °F)
Glazed Block	3.41 W/m ² • K			
	(0.60 Btu/h • ft ² • °F)			

C303.1.4 Insulation product rating. The thermal resistance (R -value) of insulation shall be determined in accordance with the U.S. Federal Trade Commission R -value rule (CFR Title 16, Part 460) in units of $\text{h} \cdot \text{ft}^2 \cdot ^\circ\text{F}/\text{Btu}$ at a mean temperature of 24°C (75°F).

C303.1.4.1 Insulated siding. The thermal resistance (R -value) of insulated siding shall be determined in accordance with ASTM C1363. Installation for testing shall be in accordance with the manufacturer's instructions.

C303.2 Installation. Materials, systems and equipment shall be installed in accordance with the manufacturer's instructions and the *Jamaica Building Code*.

C303.2.1 Protection of exposed foundation insulation. Insulation applied to the exterior of basement walls, crawl space walls and the perimeter of slab-on-grade floors shall have a rigid, opaque and weather-resistant protective covering to prevent the degradation of the insulation's thermal performance. The protective covering shall cover the exposed exterior insulation and extend not less than 153 mm (6 inches) below grade.

C303.2.2 Multiple layers of continuous insulation board. Where two or more layers of continuous insulation board are used in a construction assembly, the continuous insulation boards shall be installed in accordance with Section C303.2. Where the continuous insulation board manufacturer's instructions do not address installation of two or more layers, the edge joints between each layer of continuous insulation boards shall be staggered.