This material is for educational purposes and does not make or imply any assurance or guarantee with respect to the life expectancy, durability or operating performance of materials, appliances, systems and equipment referred to in the information.

Review this document in conjunction with the National Building Code – 2023 Alberta Edition

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5.4.1.1. Required Resistance to Air Leakage
(See Note A-5.4.1.1.)
 	
1) Where a *building* component or assembly separates interior *conditioned space* from exterior space, interior space from the ground, or environmentally dissimilar interior spaces, the properties and position of the materials and components in those components or assemblies shall be such that they control air leakage or permit venting to the exterior so as to
   a) …
   e) minimize the ingress of airborne radon from the ground with an aim to controlling the indoor radon concentration to an acceptable level, and
 	
   f) …
 	
2) Except as provided in Sentence (3), an *air barrier system* shall be installed to provide the principal resistance to air leakage.
	5.4.1.1. Required Resistance to Air Leakage
	(See Note A-5.4.1.1.)
	
	1) Where a *building* component or assembly separates interior *conditioned space* from exterior space, interior space from the ground, or environmentally dissimilar interior spaces, the properties and position of the materials and components in those components or assemblies shall be such that they control air leakage or permit venting to the exterior so as to
	   a) …
	   e) minimize the ingress of airborne radon and other *soil* gases from the ground with an aim to controlling the indoor ~~radon concentration~~ concentrations of these gases to an acceptable level, and
	   f) …
	
	2) Except as provided in Sentence (~~3~~7), an *air barrier system* shall be ~~installed~~ designed and constructed to provide the principal resistance to air leakage to meet the requirements of Sentence (1).
	
	3) The *air barrier system* shall incorporate air barrier assemblies that meet the appropriate Performance Class as defined in Table 5.4.1.1. (See Note A-5.4.1.1.(3).)
	
	Table 5.4.1.1.
	Maximum Air Leakage Rates for Air Barrier Assemblies
	Forming Part of Sentences 5.4.1.1.(3) and (6) and 5.4.1.2.(1) and (2)
	
	| Performance Class
		Maximum Air Leakage Rate, $L/(s{\times}m^2)$, at a Pressure Differential of 75 Pa

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1	0.05
2	0.10
3	0.15
4	0.20

5	0.50 |
	
	4) The *air barrier system* shall be designed and constructed to be continuous
	   a) across construction, control and expansion joints,
	   b) across junctions between different air barrier assemblies, and
	   c) around penetrations through air barrier assemblies.
	(See Note A-5.4.1.1.(4).)
	
	5) The structural design of air barrier assemblies, including junctions between air barrier assemblies, subject to air pressure loads shall comply with Article 5.1.4.1. and Subsection 5.2.2.
	
	6) The maximum air leakage rates specified in Table 5.4.1.1. are permitted to be increased where it can be shown that the higher rate will not adversely affect any of
	   a) the health or safety of the *building* users,
	   b) the intended use of the *building*, or
	   c) the operation of *building* services.
	
	~~3~~7) An *air barrier system* is not required where it can be shown that uncontrolled air leakage will not adversely affect any of
	   a) the health or safety of *building* users,
		Inserted new Sentences (3) to (6).
		
		Note: Sentences (3) to (6) have been relocated from Article 5.4.1.2. as follows:
		   Sentence 5.4.1.1.(3) was 5.4.1.2.(1) with revisions.
		   Sentence 5.4.1.1.(4) was 5.4.1.2.(3) with revisions.
		   Sentence 5.4.1.1.(5) was 5.4.1.2.(4) with revisions.
		   Sentence 5.4.1.1.(6) was 5.4.1.2.(2) with revisions.

3) An *air barrier system* is not required where it can be shown that uncontrolled air leakage will not adversely affect any of a) the health or safety of *building* users,		

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b) the intended use of the *building*, or c) the operation of *building* services.	b) the intended use of the *building*, or c) the operation of *building* services. (See Note A-5.4.1.1.(7).)	

5.4.1.2. Air Barrier System Properties
 	
1) Except as provided in Sentence (2), air barrier materials intended to provide the principal resistance to air leakage shall
  a) have an air leakage characteristic not greater than 0.02 L/(s·m²) measured at an air pressure difference of 75 Pa, when tested in accordance to ASTM E 2178, "Air Permeance of Building Materials," or
  b) conform to CAN/ULC-S741, "Air Barrier Materials – Specification."
(See Note A-5.4.1.2.(1) and (2).)
 	
2) The air leakage limit specified in Sentence (1) is permitted to be increased where it can be shown that the higher rate of leakage will not adversely affect any of
  a) the health or safety of the *building* users,
  b) the intended use of the *building*, or
  c) the operation of *building* services.
(See Note A-5.4.1.2.(1) and (2).)
 	
3) The *air barrier system* shall be continuous
  a) across construction, control and expansion joints,
  b) across junctions between different *building* assemblies, and
  c) around penetrations through the *building* assembly.
 	
4) The structural design of *air barrier systems* installed in assemblies subject to air pressure loads shall comply with Article 5.1.4.1. and Subsection 5.2.2.
	5.4.1.2. Air Barrier ~~System Properties~~ **Assemblies**
	
	~~**1)** Except as provided in Sentence (2), air barrier materials intended to provide the principal resistance to air leakage shall~~
	  ~~a) have an air leakage characteristic not greater than 0.02 L/(s·m²) measured at an air pressure difference of 75 Pa, when tested in accordance to ASTM E 2178, "Air Permeance of Building Materials," or~~
	  ~~b) conform to CAN/ULC-S741, "Air Barrier Materials – Specification."~~
	~~(See Note A-5.4.1.2.(1) and (2).)~~
	
	~~**2)** The air leakage limit specified in Sentence (1) is permitted to be increased where it can be shown that the higher rate of leakage will not adversely affect any of~~
	  ~~a) the health or safety of the *building* users,~~
	  ~~b) the intended use of the *building*, or~~
	  ~~c) the operation of *building* services.~~
	~~(See Note A-5.4.1.2.(1) and (2).)~~
	
	~~**3)** The *air barrier system* shall be continuous~~
	  ~~a) across construction, control and expansion joints,~~
	  ~~b) across junctions between different *building* assemblies, and~~
	  ~~c) around penetrations through the *building* assembly.~~
	
	~~**4)** The structural design of *air barrier systems* installed in assemblies subject to air pressure loads shall comply with Article 5.1.4.1. and Subsection 5.2.2.~~
	
	1) Except as provided in Sentences (2) and (3), air barrier assemblies not in contact with the ground shall
	  a) conform with CAN/ULC-S742, "Standard for Air Barrier Assemblies – Specification," and
	  b) meet the selected Performance Class of Table 5.4.1.1.
	(See Note A-5.4.1.2.(1).)
	
	2) Air barrier assemblies not evaluated in accordance with CAN/ULC-S742, "Standard for Air Barrier Assemblies – Specification," shall be designed and constructed
	  a) to meet or exceed the selected Performance Class of Table 5.4.1.1., and
	  b) with at least one air barrier material intended to provide the primary resistance to air leakage that meets the requirements of CAN/ULC-S741, "Standard for Air Barrier Materials – Specification."
	(See Note A-5.4.1.2.(2).)
	
	3) Air barrier assemblies covered in Subsections 5.9.2., 5.9.3. and 5.9.4. shall meet the air barrier performance criteria defined in those Subsections.
	
	4) Below-*grade* air barrier assemblies in contact with the ground shall minimize the ingress of airborne radon and other *soil* gases. (See Note A-5.4.1.2.(4).)
		All sentences have been deleted and replaced with new ones.
		
		Note the contents of Article 5.4.1.2. have been moved to Article 5.4.1.1. with revisions. See Article 5.4.1.1. above for details.

5.8.1.4. Detailed Method for Calculating ASTC
 	
4) The direct sound reduction index for the separating assembly in situ shall be determined using Clause (a) or (b), depending on the type of construction:
  a) for a lightweight separating wall or floor assembly with wood or steel framing, the index shall be taken as equal to the sound transmission loss, without correction;
	5.8.1.4. Detailed Method for Calculating ASTC
	
	4) The direct sound reduction index for the separating assembly in situ shall be determined using Clause (a) or (b), depending on the type of construction:
	  a) for a ~~lightweight~~ separating wall or floor assembly with lightweight wood or steel framing, the index shall be taken as equal to the sound transmission loss, without correction;	

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b) for a heavyweight separating wall or floor assembly of concrete or masonry, the index shall be determined in accordance with the detailed method for structure-borne transmission presented in ISO 15712-1, "Building Acoustics - Estimation of Acoustic Performance of Buildings From the Performance of Elements - Part 1: Airborne Sound Insulation Between Rooms."	b) for a ~~heavyweight~~ separating wall or floor assembly ~~of concrete or masonry~~ that behaves like a homogeneous panel, the index shall be determined in accordance with the detailed method for structure-borne transmission presented in ISO 15712-1, "Building Acoustics - Estimation of Acoustic Performance of Buildings From the Performance of Elements - Part 1: Airborne Sound Insulation Between Rooms.~~"~~ (see Note A-5.8.1.4.(4)(b)).	
5) The flanking sound reduction index for each flanking path at each edge of the separating assembly shall be determined using Clause (a), (b) or (c), depending on the type of construction: a) for a lightweight separating wall or floor assembly with wood or steel framing and connected lightweight flanking assemblies with wood or steel framing, the index shall be taken as equal to the normalized flanking level difference re-normalized for the *ASTC* field situation in accordance with Annex F of ISO 15712-1, "Building Acoustics - Estimation of Acoustic Performance of Buildings From the Performance of Elements - Part 1: Airborne Sound Insulation Between Rooms"; b) for a heavyweight separating wall or floor assembly of concrete or masonry and connected flanking assemblies of concrete or masonry, the index shall be determined in accordance with the detailed method for structure-borne transmission presented in ISO 15712-1, "Building Acoustics - Estimation of Acoustic Performance of Buildings From the Performance of Elements - Part 1: Airborne Sound Insulation Between Rooms"; c) for a mixture of lightweight framed assemblies and heavyweight concrete or masonry assemblies, the index shall be determined in accordance with Clause (a) or (b).	**5)** The flanking sound reduction index for each flanking path at each edge of the separating assembly shall be determined using Clause (a), (b) or (c), depending on the type of construction: a) for a ~~lightweight~~ separating wall or floor assembly with lightweight wood or steel framing and connected ~~lightweight~~ flanking assemblies with lightweight wood or steel framing, the index shall be taken as equal to the normalized flanking level difference re-normalized for the *ASTC* field situation in accordance with Annex F of ISO 15712-1, "Building Acoustics - Estimation of Acoustic Performance of Buildings From the Performance of Elements - Part 1: Airborne Sound Insulation Between Rooms."~~;~~ b) for a ~~heavyweight~~ separating wall or floor assembly ~~of concrete or masonry~~ that behaves like a homogeneous panel and connected flanking assemblies ~~of concrete or masonry~~ that behave like a homogeneous panel, the index shall be determined in accordance with the detailed method for structure-borne transmission presented in ISO 15712-1, "Building Acoustics - Estimation of Acoustic Performance of Buildings From the Performance of Elements - Part 1: Airborne Sound Insulation Between Rooms"~~;~~ (see Note A-5.8.1.4.(4)(b)), c) for a mixture of assemblies with lightweight ~~framed assemblies and heavyweight concrete or masonry~~ wood or steel framing and assemblies that behave like a homogeneous panel, the index shall be determined in accordance with Clause (a) or (b) (see Note A-5.8.1.4.(4)(b)).	
5.8.1.5. Simplified Method for Calculating ASTC **5)** The weighted flanking sound reduction index for each flanking path at each edge of the separating assembly shall be determined using Clause (a) or (b), depending on the type of construction: a) for a lightweight separating wall or floor assembly with wood or steel framing and connected lightweight flanking assemblies with wood or steel framing, the index shall be taken as equal to the weighted normalized flanking level difference re-normalized for the *ASTC* field situation in accordance with Annex F of ISO 15712-1, "Building Acoustics – Estimation of Acoustic Performance of Buildings From the Performance of Elements - Part 1: Airborne Sound Insulation Between Rooms"; b) for a heavyweight separating wall or floor assembly of concrete or masonry and connected flanking assemblies of concrete or masonry, the index shall be determined in accordance with the simplified method for structure-borne transmission presented in ISO 15712-1, "Building Acoustics - Estimation of Acoustic Performance of Buildings From the Performance of Elements – Part 1: Airborne Sound Insulation Between Rooms."	**5.8.1.5. Simplified Method for Calculating ASTC** **5)** The weighted flanking sound reduction index for each flanking path at each edge of the separating assembly shall be determined using Clause (a) or (b), depending on the type of construction: a) for a ~~lightweight~~ separating wall or floor assembly with lightweight wood or steel framing and connected ~~lightweight~~ flanking assemblies with lightweight wood or steel framing, the index shall be taken as equal to the weighted normalized flanking level difference re-normalized for the *ASTC* field situation in accordance with Annex F of ISO 15712-1, "Building Acoustics - Estimation of Acoustic Performance of Buildings From the Performance of Elements - Part 1: Airborne Sound Insulation Between Rooms"; b) for a ~~heavyweight~~ separating wall or floor assembly ~~of concrete or masonry~~ that behaves like a homogeneous panel and connected flanking assemblies ~~of concrete or masonry~~ that behave like a homogeneous panel, the index shall be determined in accordance with the simplified method for structure-borne transmission presented in ISO 15712-1, "Building Acoustics - Estimation of Acoustic Performance of Buildings From the Performance of Elements - Part 1: Airborne Sound Insulation Between Rooms.~~"~~ (see Note A-5.8.1.4.(4)(b)).	
5.9.1.1. Compliance with Applicable Standards **Table 5.9.1.1.** **Standards Applicable to Environmental Separators and Assemblies Exposed to the Exterior** Forming Part of Sentence 5.9.1.1.(1) | Issuing Agency	Document Number	Title of Document | |---|---|---| | | | | | | | | | CGSB | CAN/CGSB-11.5-M | Hardboard, Precoated, Factory Finished, for Exterior Cladding | | | | |	**5.9.1.1. Compliance with Applicable Standards** **Table 5.9.1.1.** **Standards Applicable to Environmental Separators and Assemblies Exposed to the Exterior** Forming Part of Sentence 5.9.1.1.(1) | Issuing Agency	Document Number	Title of Document | |---|---|---| | ANSI | A135.6 | Engineered Wood Siding | | ASTM | C1280 | Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing | | ~~CGSB~~ | ~~CAN/CGSB-11.5-M~~ | ~~Hardboard, Precoated, Factory Finished, for Exterior Cladding~~ | | CGSB | CAN/CGSB-12.9 | Spandrel glass |	Table of standards has been updated, some new standards have been added and some standards have been removed.

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CGSB	CAN/CGSB-12.10-M	Glass, Light and Heat Reflecting	~~CGSB~~	~~CAN/CGSB-12.10-M~~	~~Glass, Light and Heat Reflecting~~		
CGSB	CAN/CGSB-12.11-M	Wired Safety Glass	~~CGSB~~	~~CAN/CGSB-12.11-M~~	~~Wired Safety Glass~~		
CGSB	37-GP-56M	Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing	~~CGSB~~	~~37-GP-56M~~	~~Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing~~		
CGSB	CAN/CGSB-93.3-M	Prefinished Galvanized and Aluminum-Zinc Alloy Steel Sheet for Residential Use	~~CGSB~~	~~CAN/CGSB-93.3-M~~	~~Prefinished Galvanized and Aluminum-Zinc Alloy Steel Sheet for Residential Use~~		
CGSB	CAN/CGSB-93.4	Galvanized Steel and Aluminum-Zinc Alloy Coated Steel Siding, Soffits and Fascia, Prefinished, Residential	~~CGSB~~	~~CAN/CGSB-93.4~~	~~Galvanized Steel and Aluminum-Zinc Alloy Coated Steel Siding, Soffits and Fascia, Prefinished, Residential~~		
CSA	A123.1/A123.5	Asphalt Shingles Made From Organic Felt and Surfaced with Mineral Granules/Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules	~~CSA~~	~~A123.1/A123.5~~	~~Asphalt Shingles Made From Organic Felt and Surfaced with Mineral Granules/Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules~~		
			CSA	A123.5	Asphalt shingles made from glass felt and surfaced with mineral granules		
			CSA	CAN/CSA-A123.16	Asphalt-coated glass-base sheets		
			CSA	A123.23	Product specification for polymer-modified bitumen sheet, prefabricated and reinforced		
CSA	CAN3-A123.52-M	Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3	~~CSA~~	~~CAN3-A123.52-M~~	~~Asphalt Shingle Application on Roof Slopes 1:6 to Less Than 1:3~~		
			ULC	CAN/ULC-S717.1	Standard for Flat Wall Insulating Concrete Form (ICF) Units – Material Properties		

Notes to Table 5.9.1.1.:

(1) See Note A-Table 5.9.1.1.

(2) The *flame-spread rating* of gypsum board shall be determined in accordance with CAN/ULC-S102 in lieu of ASTM E 84 as indicated in ASTM C 1396/C 1396M.

(3) The *flame-spread rating* of glass mat gypsum panels shall be determined in accordance with CAN/ULC-S102 in lieu of ASTM E 84 as indicated in ASTM C 1658/C 1658M.

(4) For the purpose of compliance with Part 5, ASTM D 3019 shall only apply to the non-fibered and non-asbestos-fibered types of asphalt roll roofing.

Notes to Table 5.9.1.1.:

(1) See Note A-Table 5.9.1.1.

(2) The *flame-spread rating* of gypsum board shall be determined in accordance with CAN/ULC-S102 in lieu of ASTM E-84 as indicated in ASTM C-1396/C-1396M.

(3) The *flame-spread rating* of ~~glass mat~~ gypsum panels shall be determined in accordance with CAN/ULC-S102 in lieu of ASTM E-84 as indicated in ASTM C-1658/C-1658M.

(4) For the purpose of compliance with Part 5, ASTM D-3019/D3019M shall only apply to the non-fibered and non-asbestos-fibered types of asphalt roll roofing.

5.9.2.3. Structural and Environmental Loads, Air Leakage and Water Penetration

1) Windows, doors, skylights and their components shall be designed and constructed in accordance with

    a) Article 5.1.4.1., Section 5.4. and Section 5.6., or

    b) Article 5.9.2.2., where they are covered in the scope of the standards listed in Sentence 5.9.2.2.(1).

(See Note A-5.9.2.3.(1).)

5.9.2.3. Structural and Environmental Loads, Air Leakage and Water Penetration

1) Windows, doors, skylights and their components shall be designed and constructed in accordance with

    a) Article 5.1.4.1., Section 5.4. and Section 5.6., where they are not covered in the scope of the standards listed in Sentence 5.9.2.2.(1), or

    b) Article 5.9.2.2., where they are covered in the scope of the standards listed in Sentence 5.9.2.2.(1).

(See Note A-5.9.2.3.(1).)