STANDARD AND LIGHTWEIGHT BLOCKS

CINDERCRETE PRODUCTS LTD.

A Heidelberg Materials Company

CINDERCRETE PRODUCTS LTD.
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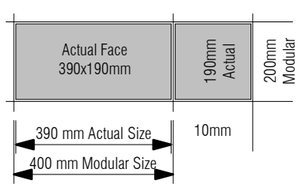
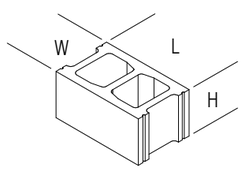
Cindercrete Standard Concrete Masonry Units Reference Chart

	STANDARD	HALF HIGH	HALF	CORNER	BOND BEAM LINTEL	KO BOND BEAM	SINGLE BULLNOSE	SINGLE BULLNOSE HALF	DOUBLE BULLNOSE	DOUBLE BULLNOSE HALF	SPECIAL BLOCKS	UNIVERSAL BLOCKS
100mm	100mm Standard **90W 190H 390L**	100mm Half High **90W 90H 390L**	100mm Half **90W 190H 190L**	100mm L-Corner Return			100mm Single Bullnose **90W 190H 390L**		100mm Double Bullnose **90W 190H 390L**	100mm Double Bullnose Half **90W 190H 190L**		
150mm	150mm Standard **140W 190H 390L**	150mm Half High **140W 90H 390L**	150mm Half **140W 190H 190L**		150mm Bond Beam Lintel **140W 190H 390L**	150mm Knock Out Lintel **140W 190H 390L**	150mm Single Bullnose **140W 190H 390L**	150mm Single Bullnose Half **140W 190H 190L**	150mm Double Bullnose **140W 190H 390L**	150mm Double Bullnose Half **140W 190H 190L**		**140W 190H 190L**
200mm	200mm Standard **190W 190H 390L**	200mm Half High **190W 90H 390L**	200mm Half Sash End **190W 190H 190L**	200mm End Block **190W 190H 390L**	200mm Bond Beam Lintel **190W 190H 390L**	200mm Knock Out Lintel **190W 190H 390L**	200mm Single Bullnose **190W 190H 390L**	200mm Single Bullnose Half **190W 190H 390L**	200mm Double Bullnose **190W 190H 390L**	200mm Double Bullnose Half **190W 190H 190L**	200mm Squint Block **190W 190H 337L**	**190W 190H 190L**
250mm	250mm Standard **240W 190H 390L**	250mm Half High **240W 90H 390L**	250mm Half Sash End **240W 190H 190L**	250mm L-Corner Return **240W 190H 390/337L**	250mm Bond Beam Lintel **240W 190H 390L**	250mm Knock Out Lintel **240W 190H 390L**	250mm Single Bullnose **240W 190H 390L**	250mm Single Bullnose Half **240W 190H 190L**	250mm Double Bullnose **240W 190H 390L**	250mm Double Bullnose Half **240W 190H 190L**		
300mm	300mm Standard **290W 190H 390L**	300mm Half High **290W 90H 390L**	300mm Half No Sash **290W 190H 190L**	300mm End Block **290W 190H 390L**		300mm Knock Out Lintel **290W 190H 390L**	300mm Single Bullnose **290W 190H 390L**	300mm Single Bullnose Half **290W 190H 190L**	300mm Double Bullnose **290W 190H 390L**	300mm Double Bullnose Half **290W 190H 190L**		

1. For all specialty blocks, please provide required drawings and inquire with your local sales representative for budgetary pricing and timelines





PRODUCT TECHNICAL DATA SHEET

CINDERCRETE PRODUCTS LTD.
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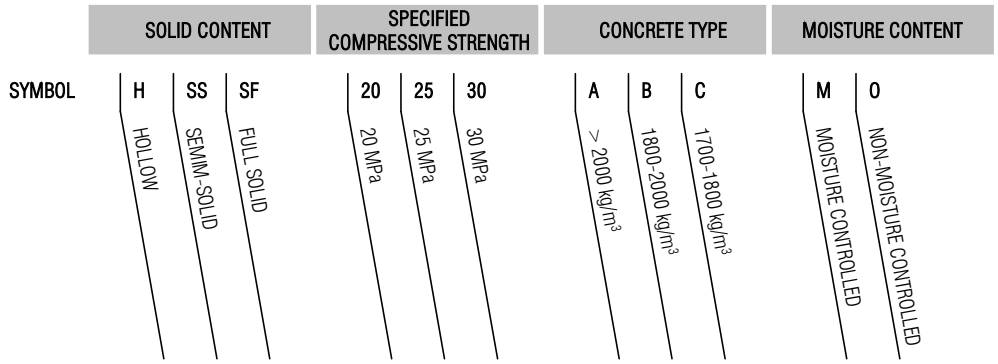
THE FACET DESIGNATION SYSTEM

The Facet Designation System for Specifying Concrete Masonry Units CSA A165.1 The facet designation sysem is unquie to the CSA A165 Series. It is a convenient and simple means for users to specify the desired properties of a concrete block masonry unit needed for a particular application. As it's basis, the facet designation system uses each of the four physical properties identified in the A165.1 standard.

FACET (Physical Properties, Table 1, CSA A165.1)



Each property is represented by a facet. Each facet is assigned various symbols. Each symbol within a facet represents a particular sub-property or identification for the unit. Table 1 in CSA A165.1, "Physical Properties", identifies facet, symbol, and property, and serves as the basis for the facet designation system. To demonstrate its use, Table 1 is adapted and presented below. To fully classify, and therefore fully specify a concrete block masonry unit, all four facets must be used by assigning that symbol to each property which represents the sub-property of choice for design. The specified physical properties for the unit apply at the point of manufacture and at the time of shipment by the manufacturer. Whereas multiple combinations are possible under the facet designation system, a manufacturer may not produce all of the various units needed to meet all of the various combinations. However, a manufacturer is typically positioned to produce a wide range of product, sufficient to allow a designer to select a unit that will satisfy a particular design need [Ref #3]

TYPICAL BLOCK PHYSICAL PROPERTIES

	Product Property	CSA	ASTM
Standard Concrete	Compressive Strength (min)	> 15 MPa	> 2000 psi
	Absorption (max)	< 175 kg/m³	< 13 lb/ft³
	Density (min)	> 2000 kg/m³	> 125 lb/ft³
Standard Lightweight Concrete	Compressive Strength (min)	> 15 MPa	> 2000 psi
	Absorption (max)	< 225 kg/m³	< 15 lb/ft³
	Density (min)	1700 - 1800 kg/m³	> 105 - 125 lb/ft³

Based on CSA a165.1 and ASTM C90

PRODUCT TECHNICAL DATA SHEET

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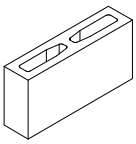
EXPLANATORY NOTES

PHYSICAL PROPERTIES OF STANDARD METRIC CONCRETE BLOCK SHEETS TO BE USED IN CONJUCTION WITH THE DATA SHEETS

NOTE: COMMENT

1. THE FOUR FACET SYSTEM OF DESCRIPTION IS IN ACCORDANCE WITH C.S.A A165.1 - 14
2. GROSS AREA MEANS THE AREA PARALLEL TO THE BEARING SURFACE OF THE UNIT INCLUDING VOIDS. (1).
3. NET AREA MEANS THE GROSS AREA CROSS SECTIONAL AREA MINUS THE AREA OF THE VOID. (1).
4. GROSS VOLUME OF THE UNIT IS EQUAL LxHxT USING ACTUAL DIMENSIONS. (2).
5. NET VOLUME OF THE UNIT IS THE GROSS VOLUME LESS THE VOLUME OF ALL CORE SPACES AND VOIDS CREATED BY SET BACKS AND INDENTATIONS IN THE OUTER SURFACE OF THE UNIT. (2).
6. LIGHT WEIGHT UNITS ("C") HAVE AN OVEN DRY DENSITY OF CONCRETE OF LESS THAN 1700 kg/m^3. (1). THE AGGREGATE CAN BE LIGHT WEIGHT MATERIAL OF EXPANDED SLAG, EXPANDED CLAY, EXPANDED SHALE OR PUMICE. LIGHT WEIGHT UNITS ARE ALSO PRODUCED WITH AGGREGATES BEING NATURAL SAND AND LIGHT WEIGHT MATERIAL. IN THESE TABLES A DENSITY OF 1700 kg/m^3 HAS BEEN USED.
7. MINIMUM COMPRESSIVE STRENGTH REQUIRMENTS ARE BASED ON NET AREA. (1).
8. FIRE RATINGS ARE ABSED ON TYPE OF CONCRETE AND UNIT EQUIVALENT THICKNESS (3).
9. S.T.C DATA ARE ESTIMATED FROM N.C.M.A TEK 69A
10. FOR MORE DETAILED INFORMATION ON RSI VALUES CONTACT YOUR SALES REPRESENTATIVE.
11. FOR MORE INFO ON "B" BLOCK FIRE RATING, PLEASE REACH OUT TO YOUR LOCAL SALES REP.



10cm PHYSICAL PROPERTIES

CINDERCRETE PRODUCTS LTD.
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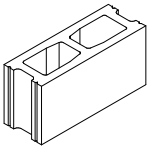
ACTUAL DIMENSIONS (mm) 90x190x390		SEE NOTE	STANDARD CONFIGURATIONS		
AVAILABLE TYPES	STANDARD METRIC CONFIGURATION		HOLLOW	HOLLOW	HOLLOW
CSA DESIGNATION	FACET DESIGNATION SYSTEM	1	H/20/A,B,C/O,M	H/25/A,B,C/O,M	H/30/A,B/O,M
DIMENSIONS (mm)	MINIMUM FACE SHELL THICKNESS		26	26	26
	MINIMUM WEB THICKNESS		26	26	26
	EQUIVALENT THICKNESS		66	66	66
AREA (mm^2)	GROSS AREA (mm^2)	2	3.51×10^4	3.51×10^4	3.51×10^4
	NET AREA (mm^2)	3	2.56×10^4	2.56×10^4	2.56×10^4
	CORE AREA (mm^2)		4.75×10^3	4.75×10^3	4.75×10^3
VOLUME (mm^3)	GROSS VOLUME (mm^3)	4	6.717×10^6	6.717×10^6	6.717×10^6
	NET VOLUME (mm^3)	5	5.153×10^6	5.153×10^6	5.153×10^6
PERCENT SOLID (%)	NET VOLUME/GROSS VOLUME		73 %	73 %	73 %
TYPICAL UNIT MASS (kg)	CSA "A" - TYPE "A" CONCRETE (2100 kg/m^3)		10.2		
	CSA "B" - TYPE "B" CONCRETE (1900 kg/m^3)		9.2		
	CSA "C" - TYPE "C" CONCRETE (1750 kg/m^3)	6	8.5		N/A
TYPICAL UNIT MASS (kg/m^2) (with mortar)	CSA "A" - TYPE "A" CONCRETE (2100 kg/m^3)		138		
	CSA "B" - TYPE "B" CONCRETE (1900 kg/m^3)		125		
	CSA "C" - TYPE "C" CONCRETE (1750 kg/m^3)	6	115		N/A
MINIMUM COMPRESSIVE STRENGTH (Mpa)	BASED ON NET AREA	7	20	25	30
FIRE PROTECTION RATING (hours)	S or N of NBCC ("A" BLOCK)	8	0.8		
	"B" BLOCK	11	-		
	$L_2$20S of NBCC ("C" BLOCK)	8	1.1		N/A
SOUND PROPERTIES Sound Transmission Class (STC)	CSA TYPE "A" CONCRETE	9	43		
	CSA TYPE "B" CONCRETE	9	43		
	CSA TYPE "C" CONCRETE	9	40		N/A
THERMAL PROPERTIES RSI Factors (m^2degC/W)	CSA TYPE "A" CONCRETE	10	0.17		
	CSA TYPE "B" CONCRETE	10	0.17		
	CSA TYPE "C" CONCRETE	10	0.24		N/A
MOMENT OF INTERTIA (mm^4)	PER BLOCK, I		22.69×10^6		
	PER METRE, Im		58.18×10^6		
SECTION MODULUS (mm^3)	PER BLOCK, S		0.504×10^6		
	PER METER, Sm		1.293×10^6		

[REF #4]

Important Classification Note
All **Light Weight** is classified as **C**
All **Normal Weight** is classifies as **A,B**



15cm PHYSICAL PROPERTIES

CINDERCRETE PRODUCTS LTD.
A Heidelberg Materials Company

ACTUAL DIMENSIONS (mm) 140x190x390		SEE NOTE	STANDARD CONFIGURATIONS		
AVAILABLE TYPES	STANDARD METRIC CONFIGURATION		HOLLOW	HOLLOW	HOLLOW
CSA DESIGNATION	FACET DESIGNATION SYSTEM	1	H/20/A,B,C/O,M	H/25/A,B,C/O,M	H/30/A,B/O,M
DIMENSIONS (mm)	MINIMUM FACE SHELL THICKNESS		26	26	26
	MINIMUM WEB THICKNESS		26	26	26
	EQUIVALENT THICKNESS		81	82	82
AREA (mm^2)	GROSS AREA (mm^2)	2	5.46×10^4	5.46×10^4	5.46×10^4
	NET AREA (mm^2)	3	3.17×10^4	3.17×10^4	3.17×10^4
	CORE AREA (mm^2)		1.145×10^3	1.145×10^3	1.145×10^3
VOLUME (mm^3)	GROSS VOLUME (mm^3)	4	10.374×10^6	10.374×10^6	10.374×10^6
	NET VOLUME (mm^3)	5	6.017×10^6	6.017×10^6	6.017×10^6
PERCENT SOLID (%)	NET VOLUME/GROSS VOLUME		58 %	58 %	58 %
TYPICAL UNIT MASS (kg)	CSA "A" - TYPE "A" CONCRETE (2100 kg/m^3)		12.6		
	CSA "B" - TYPE "B" CONCRETE (1900 kg/m^3)		11.4		
	CSA "C" - TYPE "C" CONCRETE (1750 kg/m^3)	6	10.5		N/A
TYPICAL UNIT MASS (kg/m^2) (with mortar)	CSA "A" - TYPE "A" CONCRETE (2100 kg/m^3)		170		
	CSA "B" - TYPE "B" CONCRETE (1900 kg/m^3)		154		
	CSA "C" - TYPE "C" CONCRETE (1750 kg/m^3)	6	142		N/A
MINIMUM COMPRESSIVE STRENGTH (Mpa)	BASED ON NET AREA	7	20	25	30
FIRE PROTECTION RATING (hours)	S or N of NBCC ("A" BLOCK)	8	1.1		
	"B" BLOCK	11	-		
	$L_2$20S of NBCC ("C" BLOCK)	8	1.5		N/A
SOUND PROPERTIES Sound Transmission Class (STC)	CSA TYPE "A" CONCRETE	9	46		
	CSA TYPE "B" CONCRETE	9	46		
	CSA TYPE "C" CONCRETE	9	43		N/A
THERMAL PROPERTIES RSI Factors (m^2degC/W)	CSA TYPE "A" CONCRETE	10	0.19		
	CSA TYPE "B" CONCRETE	10	0.19		
	CSA TYPE "C" CONCRETE	10	0.03		N/A
MOMENT OF INTERTIA (mm^4)	PER BLOCK, I		74.07×10^6		
	PER METRE, Im		189.9×10^6		
SECTION MODULUS (mm^3)	PER BLOCK, S		1.058×10^6		
	PER METER, Sm		2.713×10^6		

[REF #4]

Important Classification Note
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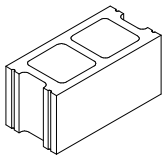

20cm PHYSICAL PROPERTIES

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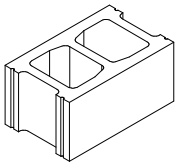
ACTUAL DIMENSIONS (mm) 190x190x390		SEE NOTE	STANDARD CONFIGURATIONS		
AVAILABLE TYPES	STANDARD METRIC CONFIGURATION		HOLLOW	HOLLOW	HOLLOW
CSA DESIGNATION	FACET DESIGNATION SYSTEM	1	H/20/A,B,C/O,M	H/25/A,B,C/O,M	H/30/A,B/O,M
DIMENSIONS (mm)	MINIMUM FACE SHELL THICKNESS		32	32	32
	MINIMUM WEB THICKNESS		26	26	26
	EQUIVALENT THICKNESS		106	106	106
AREA (mm^2)	GROSS AREA (mm^2)	2	7.41×10^4	7.41×10^4	7.41×10^4
	NET AREA (mm^2)	3	4.15×10^4	4.15×10^4	4.15×10^4
	CORE AREA (mm^2)		1.53×10^3	1.53×10^3	1.53×10^3
VOLUME (mm^3)	GROSS VOLUME (mm^3)	4	14.08×10^6	14.08×10^6	14.08×10^6
	NET VOLUME (mm^3)	5	7.88×10^6	7.88×10^6	7.88×10^6
PERCENT SOLID (%)	NET VOLUME/GROSS VOLUME		56 %	56 %	56 %
TYPICAL UNIT MASS (kg)	CSA "A" - TYPE "A" CONCRETE (2100 kg/m^3)		16.5		
	CSA "B" - TYPE "B" CONCRETE (1900 kg/m^3)		15		
	CSA "C" - TYPE "C" CONCRETE (1750 kg/m^3)	6	13.8		N/A
TYPICAL UNIT MASS (kg/m^2) (with mortar)	CSA "A" - TYPE "A" CONCRETE (2100 kg/m^3)		223		
	CSA "B" - TYPE "B" CONCRETE (1900 kg/m^3)		202		
	CSA "C" - TYPE "C" CONCRETE (1750 kg/m^3)	6	186		N/A
MINIMUM COMPRESSIVE STRENGTH (Mpa)	BASED ON NET AREA	7	20	25	30
FIRE PROTECTION RATING (hours)	S or N of NBCC ("A" BLOCK)	8	1.8		
	"B" BLOCK	11	-		
	$L_2$20S of NBCC ("C" BLOCK)	8	2.5		N/A
SOUND PROPERTIES Sound Transmission Class (STC)	CSA TYPE "A" CONCRETE	9	50		
	CSA TYPE "B" CONCRETE	9	50		
	CSA TYPE "C" CONCRETE	9	46		N/A
THERMAL PROPERTIES RSI Factors (m^2degC/W)	CSA TYPE "A" CONCRETE	10	0.21		
	CSA TYPE "B" CONCRETE	10	0.21		
	CSA TYPE "C" CONCRETE	10	0.32		N/A
MOMENT OF INTERTIA (mm^4)	PER BLOCK, I		194.2×10^6		
	PER METRE, Im		498.0×10^6		
SECTION MODULUS (mm^3)	PER BLOCK, S		2.045×10^6		
	PER METER, Sm		5.242×10^6		

[REF #4]

Important Classification Note
All **Light Weight** is classified as **C**
All **Normal Weight** is classifies as **A,B**



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25cm PHYSICAL PROPERTIES

ACTUAL DIMENSIONS (mm) 240x190x390		SEE NOTE	STANDARD CONFIGURATIONS		
AVAILABLE TYPES	STANDARD METRIC CONFIGURATION		HOLLOW	HOLLOW	HOLLOW
CSA DESIGNATION	FACET DESIGNATION SYSTEM	1	H/20/A,B,C/O,M	H/25/A,B,C/O,M	H/30/A,B/O,M
DIMENSIONS (mm)	MINIMUM FACE SHELL THICKNESS		35	35	35
	MINIMUM WEB THICKNESS		28	28	28
	EQUIVALENT THICKNESS		127	127	127
AREA (mm^2)	GROSS AREA (mm^2)	2	9.36×10^4	9.36×10^4	9.36×10^4
	NET AREA (mm^2)	3	4.96×10^4	4.96×10^4	4.96×10^4
	CORE AREA (mm^2)		2.06×10^3	2.06×10^3	2.06×10^3
VOLUME (mm^3)	GROSS VOLUME (mm^3)	4	17.88×10^6	17.88×10^6	17.88×10^6
	NET VOLUME (mm^3)	5	9.257×10^6	9.257×10^6	9.257×10^6
PERCENT SOLID (%)	NET VOLUME/GROSS VOLUME		53 %	53 %	53 %
TYPICAL UNIT MASS (kg)	CSA "A" - TYPE "A" CONCRETE (2100 kg/m^3)		19.8		
	CSA "B" - TYPE "B" CONCRETE (1900 kg/m^3)		17.9		
	CSA "C" - TYPE "C" CONCRETE (1750 kg/m^3)	6	16.5		N/A
TYPICAL UNIT MASS (kg/m^2) (with mortar)	CSA "A" - TYPE "A" CONCRETE (2100 kg/m^3)		223		
	CSA "B" - TYPE "B" CONCRETE (1900 kg/m^3)		202		
	CSA "C" - TYPE "C" CONCRETE (1750 kg/m^3)	6	186		N/A
MINIMUM COMPRESSIVE STRENGTH (Mpa)	BASED ON NET AREA	7	20	25	30
FIRE PROTECTION RATING (hours)	S or N of NBCC ("A" BLOCK)	8	2.4		
	"B" BLOCK	11	-		
	$L_2$20S of NBCC ("C" BLOCK)	8	3.5		N/A
SOUND PROPERTIES Sound Transmission Class (STC)	CSA TYPE "A" CONCRETE	9	51		
	CSA TYPE "B" CONCRETE	9	51		
	CSA TYPE "C" CONCRETE	9	49		N/A
THERMAL PROPERTIES RSI Factors (m^2degC/W)	CSA TYPE "A" CONCRETE	10	0.24		
	CSA TYPE "B" CONCRETE	10	0.24		
	CSA TYPE "C" CONCRETE	10	0.33		N/A
MOMENT OF INTERTIA (mm^4)	PER BLOCK, I		334.9×10^6		
	PER METRE, Im		848.8×10^6		
SECTION MODULUS (mm^3)	PER BLOCK, S		2.791×10^6		
	PER METER, Sm		7.156×10^6		

[REF #4]

Important Classification Note
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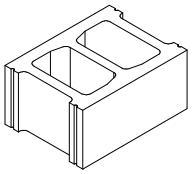

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30cm PHYSICAL PROPERTIES

ACTUAL DIMENSIONS (mm) 290x190x390		SEE NOTE	STANDARD CONFIGURATIONS		
AVAILABLE TYPES	STANDARD METRIC CONFIGURATION		HOLLOW	HOLLOW	HOLLOW
CSA DESIGNATION	FACET DESIGNATION SYSTEM	1	H/20/A,B,C/O,M	H/25/A,B,C/O,M	H/30/A,B/O,M
DIMENSIONS (mm)	MINIMUM FACE SHELL THICKNESS		38	35	35
	MINIMUM WEB THICKNESS		32	28	28
	EQUIVALENT THICKNESS		148	145	145
AREA (mm^2)	GROSS AREA (mm^2)	2	11.31×10^4	11.31×10^4	11.31×10^4
	NET AREA (mm^2)	3	5.77×10^4	5.77×10^4	5.77×10^4
	CORE AREA (mm^2)		2.50×10^3	2.50×10^3	2.50×10^3
VOLUME (mm^3)	GROSS VOLUME (mm^3)	4	21.489×10^6	21.4889×10^6	21.4889×10^6
	NET VOLUME (mm^3)	5	10.96×10^6	10.96×10^6	10.96×10^6
PERCENT SOLID (%)	NET VOLUME/GROSS VOLUME		51 %	51 %	51 %
TYPICAL UNIT MASS (kg)	CSA "A" - TYPE "A" CONCRETE (2100 kg/m^3)		23.0		
	CSA "B" - TYPE "B" CONCRETE (1900 kg/m^3)		20.8		
	CSA "C" - TYPE "C" CONCRETE (1750 kg/m^3)	6	19.2		N/A
TYPICAL UNIT MASS (kg/m^2) (with mortar)	CSA "A" - TYPE "A" CONCRETE (2100 kg/m^3)		311		
	CSA "B" - TYPE "B" CONCRETE (1900 kg/m^3)		281		
	CSA "C" - TYPE "C" CONCRETE (1750 kg/m^3)	6	259		N/A
MINIMUM COMPRESSIVE STRENGTH (Mpa)	BASED ON NET AREA	7	20	25	30
FIRE PROTECTION RATING (hours)	S or N of NBCC ("A" BLOCK)	8	3.2		
	"B" BLOCK	11	-		
	$L_2$20S of NBCC ("C" BLOCK)	8	4+		N/A
SOUND PROPERTIES Sound Transmission Class (STC)	CSA TYPE "A" CONCRETE	9	53		
	CSA TYPE "B" CONCRETE	9	53		
	CSA TYPE "C" CONCRETE	9	50		N/A
THERMAL PROPERTIES RSI Factors (m^2degC/W)	CSA TYPE "A" CONCRETE	10	0.26		
	CSA TYPE "B" CONCRETE	10	0.26		
	CSA TYPE "C" CONCRETE	10	0.41		N/A
MOMENT OF INTERTIA (mm^4)	PER BLOCK, I		570.4×10^6		
	PER METRE, Im		1463×10^6		
SECTION MODULUS (mm^3)	PER BLOCK, S		3.934×10^6		
	PER METER, Sm		10.09×10^6		

[REF #4]

Important Classification Note
All **Light Weight** is classified as **C**
All **Normal Weight** is classifies as **A,B**

LEED PROGRAM

Cindercrete can help maximize the number of LEED credits you wish to achieve by producing a product specific to your design needs. Our concrete products can be modified to achieve maximum LEED credits. Talk with your local Cindercrete sales representative to learn how.

AVAILABLE INTEGRAL WATER REPELLENT SYSTEM

Concrete masonry manufactured with Water Rain Repellant Integral Water Repellant System resists rainwater penetration because:

- Individual masonry units incorporate the RainBlock water repellent additive during their manufacture
- Concrete masonry units are tested and certified for water repellency performance compliance
- Masonry mortar is produced with RainBloc for mortar water repellent additive at the construction site

Concrete masonry produced with RainBlok Integral Water Repellent System resists wind-driven rain while still maintaining vapor transmission, reducing the change of mold, mildew, and musty smells from developing inside a building.

RainBlok for mortar is a liquid admixture used at the masonry construction site to make mortar. RainBlok for mortar should only be used with concrete or clay masonry units manufactured with RainBlok water repellent additive in exterior masonry wall construction. To ensure your masonry wall system is completely water repellent, you must remember to include the Rainblok additive to the masonry mortar on site. Specify RainBlok Water Repellent System when designing with Finesse, Profile Series or Standard and Architectural Block.

RainBlok for Mortar Performance in ASTM Standards and Tests RainBloc for Mortar meets or exceeds the Performance requirements for high quality masonry mortar water repellents when tested and evaluated according to ASTM C 1384, ‘Standard Specification for Admixtures for Masonry Mortars’. When measured by ASTM C 1072, ‘Standard Test Method for Measurement of Masonry Flexural Bond Strength’, the RainBloc Integral Water Repellent System does not adversely affect mortar bond. *[Ref #1]*

CODES & STANDARDS

Canadian Codes & Standards Guide

Canadian Standards Associated (CSA) Masonry

Construction for Buildings: CSA A371

Fired Masonry Brick made from Clay or Shale: SCA A82

Connectors for Masonry: CSA A370

Mortar and Grout for Unit Masonry: CSA A179

For most current information on Canadian Codes and Standards, please visit: www.csa.ca

American Codes & Standards Guide

American Society for Testing and Materials (AMTM)

Terminology for Clay Products: C43

Test Methods for Sampling and Testing Brick and Structural Clay Tile: C67

Standard Specification for Facing Brick (Solid Masonry Units made from Clay or Shale):C216

Specification for Mortar for Unit Masonry: C270

Specification for Grout for Masonry: C467

Standard Specification for Hollow Brick (Hollow Masonry Units made from Clay or Shale: C652) For most current information on American Codes or Standards, please visit: www.atsm.org

MANUFACTURING TOLERNACE (CSA 165.1)

CSA A165.1 limits the dimensional tolerances on standard concrete block masonry units to:

1. Width: +/- 2mm
2. Height: +/-2mm
3. Length: +/- 3mm

These provide a tolerance envelope in unit size, within which deviations in 'out-of-square and warpage" and 'within job lots" are permitted:

1. In warpage and out-of-square, dimensional variations must not exceed 2mm; and,
2. Within a job lot, the maximum variation between units of a specified dimension must not exceed 2mm.

Although the term 'job lot' is not defined in CSA A165.1, it is understood to be a lot intended for use on a specific job (or project) consisting of units having the same configuration, sold content, and nominal dimensions, including intended colour and finish. Further to the stated limits on standard units within a job lot:

1. For masonry elements where the units from one job lot are necessarily combined with units from a different job lot, their suitability for use must be assessed. For example, where special units are to be included within a masonry element constructed of standard units, before laying the units. the dimensions of the special units should be gauged for suitab1hty or use with the standard units.

2. There are practical limits on the number or units within a Job lot. Sourcing from a single lot or Job lot may not be feasible over a prolonged time period. Where considerable time has passed before work recommences on a partially constructed masonry element, or before work commences on a masonry element that junctions with masonry elements constructed earlier, before laying the units, the dimensions or the units should be gauged for suitability or use with the existing.

Note that these dimensional tolerances pertain to standard concrete block masonry units. For standard units intended for architectural applications, tighter unit dimensional tolerances may be needed, and tolerances that must necessarily differ from those stated In CSA A16S.1 should be stated In project specifications. Dimensional tolerances achievable for architectural units are not stated In CSA A 165.1, these may vary with the unit type and between manufacturers.

WATER ABSORPTION

The 24-hr. absorption differs from rate of absorption (or initial rate of absorption, IRA), which is a property measured by standardized text for clay masonry products. No such standardized test exists for concrete masonry products.

Under CSA A165.1, the following maximum absorption limits are assigned to each concrete density.

Concrete Type	Concrete Density	Maximum Absorption Limit
A	Over 2000 kg/m3	175 kg/m3
B	1800 to 2000 kg/m3	200 kg/m3
C	1700 to 1800 kg/m3	225 kg/m3
D	Less than 1700 kg/m3	300 kg/m3
N	No limits	No limits

These limits are related to a measure of compaction of the unit during manufacture and its void space. The absorption test measures voids within the aggregates themselves as well as the surrounding cement paste. Because light-weight aggregates contain greater void space than normal-weight aggregates, a lower-density classification is permitted a higher absorption value than a higher density classification for the same level of compaction. The absorption of a unit, like its compressive strength, is used as an indicator of its resistance to freeze/thaw deterioration. In lieu of conducting direct freeze/thaw test on units, these properties serve as surrogate predictors of resistance. Segmental Retaining Wall (SRW) units, which are dry-cast cementitious units similar to concrete block masonry units and oftentimes manufactured by the same producers, are readily exposed to water, snow, ice, soil and salt and serve in markedly more severe exposure environments than concrete block masonry units included in building structures. Field and laboratory research on SRW units shows that units offering high compressive strengths and high density with low absorptions generally show better resistance under severe exposure conditions. The limits on 24-hr. absorption stated In A 165.1 for concrete block masonry units have been used for decades. Compliant units have a proven record of good performance in Canadian building construction. This suggests that these limits indeed are below the threshold values needed for the exposure environments to which concrete block masonry is typically subjected. The stated absorption limits are sometimes misunderstood by users to be a measure of in-service water penetration resistance for masonry units. The higher absorption limits permitted for lower density concrete block masonry units are in no manner intended to imply that masonry constructed with lower density units offers comparatively less resistance to water penetration. *[Ref #4]*

CLEANING OF NEW MASONRY

Periodic cleaning of buildings may be needed to remove dirt, stains, efflorescence, graffiti and mold. NCMA TEK 2A provides information on removing a wide range of stains and NCMA TEK 8 3A discusses control and removal of efflorescence. As a general recommendation for all cleaning efforts, care should be taken to use a cleaning method that is as nonaggressive as possible so as not to damage the masonry or surrounding materials. The cleaning agent manufacturer's recommendations should be closely followed since some products can not only damage the building but can also cause serious injuries to personnel. Prior to starting cleaning efforts on routine stains such as rusting from nearby metals or efflorescence, the cause of the stain should be identified and remedied if possible so that further cleaning efforts are avoided. **Cleaning procedures should be started in small inconspicuous areas to ensure the cleaning method is effective, non-damaging, and providing the desired results. Once the effectiveness or the cleaning method is determined it can then be applied to the entire building.** *[Ref #5]*

CLEANING METHODS

The methods of cleaning concrete masonry can generally be divided into four categories: hand cleaning, water cleaning, abrasive cleaning and chemical cleaning. **Cleaning by any method should be performed on an inconspicuous section of the building of a sample panel to ascertain its effect.**

Hand Cleaning

Simple hand tools such as a trowel, chisel, stiff bristle fibre brush, abrasive block or broken piece of masonry are first used for cleaning during construction. Steel-wire brushes should not be used because they can leave behind metal particle that may rust and stain the masonry.

Water Cleaning

Water cleaning involves scrubbing with water and detergent, water soaking, steam cleaning or pressure washing.

When using water cleaning methods, the amount of water used should be limited to the least amount that will effectively clean the wall, as any water that enters the wall may promote efflorescence. See control and removal of efflorescence, NCMA TEK 8-3A for more detail. Unpainted walls can usually be cleaned by scrubbing with water and a small amount of detergent. This is a nonaggressive cleaning method that generally does not alter the masonry appearance. It may not be cost effective for large areas, however, due to the labour involved. Clay or dirt should first be removed with a dry brush. Steel wire brushed should not be used because any dirt deposits to swell, loosening their grip on the underlying masonry and allowing them to be flushed away with water. Again, this method may not be appropriate if efflorescence is the primary concern. Heated water is useful on greasy surfaces or during cold weather. However, when used with alkaline chemicals, warm water should not exceed 160 degrees F (71 degrees C). There is no significant advantage to using hot water with acid cleaners. Pressure washing equipment can be effective for surface cleaning and is often specified for masonry restoration work to avoid the use of harsh chemicals. Water pressure should be kept to a minimum to avoid driving water into the wall which can cause efflorescence.

Note that high pressure can damage masonry of alter the final appearance. Using a consistent pressure and maintaining a set distance from the wall will produce the most uniform results. If high pressure cleaning is used, it is recommended that:

a) the pressure be limited to 400 to 600 psi (2.76 – 4.14 MPa)
b) a wide flange tip be used, never a pointed tip
c) the tip be kept at least 12 in. (305mm) from the masonry surface, and
d) the spray be directed at a 45-degree angle to the wall (never perpendicular to the wall)

Pressure washing can also be used as an adjunct to scrubbing. The mild agitation created by brush application improves the overall cleaning results and enables the rinsing pressure to be kept to a minimum. Steam cleaning has been virtually supplanted by pressure washing. However, by supplementing heat to the water, the action of loosening and softening dirt particles and grease is improved, allowing them to be more easily rinsed away. Steam is normally generated in a flash boiler and directed toward the wall using a want at a pressure of 10 to 80 psi 69 to 552 kPa), depending on the equipment used. Although steam cleaning is less aggressive that pressure washing, it is also slower.

Chemical Cleaning

Many proprietary cleansing agents are available for concrete masonry; the concrete masonry manufacturer can be consulted for recommended compatible products. Premixed chemicals eliminate many potential problems, such as those associated with mixing reactive chemicals. They are also mixed in the proper proportions to be safely used on masonry. Strict adherence to the manufacturer's direction is required, to protect both the user and the masonry, and to avoid any potentially harmful runoff. When used in conjunction with water washing techniques, chemical surfactants help dissolve contaminants and allow them to be washed away during the final rinsing process. If chemical cleaning agents are used, the surfaces to be cleaned must be thoroughly prewetted with low water pressure (maximum 30 to 50 psi), the cleansing agent, the wall should be thoroughly rinsed with fresh water (preferably at low pressure), or if necessary, at high pressure using the precautions discussed in the water cleaning section.

Chemical cleaning can be a more aggressive method than pressure washing and is often more efficient and cost effective. With proper technique, the results are uniform across the wall, although the wall's final appearance can be changed by using this method. Apply chemical cleaning solutions with low pressure spray (less than 50psi, 345 kPa) or soft-fibred brushes. Chemical cleaning solutions can be used to clean concrete masonry without damaging the surface; avoid using raw or undiluted acids. Even diluted acids should be used with caution, and only after thoroughly prewetting the wall, as acids dissolve the cement matrix at the masonry surface and can also damage any integral water repellant at the surface. This leaves the face more porous and exposes more aggregate, thereby changing the colour and texture of the masonry. In the case of masonry with an integral water repellent, acids can also reduce the water repellency at the surface. Acids should never be applied under pressure. As a guideline, any cleaning with a pH below 4 should be considered acidic in nature. In addition, highly alkaline products require an acidic neutralizing after wash as well as through rinsing; efflorescence can be an unwanted result if there is residual alkali.

Abrasive Cleaning

Abrasive cleaning is the most aggressive cleaning method, as the objective is not to wash away surface contaminants, but to remove the outer portion of the masonry in which the stain is deposited. For this reason, it should not be used on ground faced units where the surface is smooth and polished. Although abrasive cleaning included methods such as grinding wheels, sanding discs and sanding belts, it typically refers to grit blasting, also called sandblasting. Note that the use of silica sand is restricted in some areas due to its classification as an irritant, but many other blasting media are available.

Because it is a dry process, sandblasting will not promote efflorescence and can be performed in cold weather. As with pressure chemical cleaning, the cleaning method produces a consistent result across the wall with proper technique. Care must be exercised when using abrasive cleaning techniques since overzealous applications can cause drastic changes to the appearance, durability and water tightness of the masonry. Sandblasting can alter the appearance of the masonry by roughening the surface or exposing the aggregate. This is less of a concern with split faced units. In some cases, sandblasting can accelerate deterioration by increasing surface porosity. Pretesting using a sample panel is critical when sandblasting is considered.

To minimize potential damage, softer abrasives such as crushed corn husks, walnut shells, or glass or plastic beads can be used. This process, sometimes called micro-peening, is slower and most costly and generally is not applicable to large scale cleaning operations. Protective equipment and clothing must be used, including an approved respirator under a hood. Most of the dust that companies a dry sandblasting process can be eliminated by introducing water into the air-grit stream at the nozzle. However, the smaller particles remain a health hazard, so the same protective equipment and clothing are needed as for the dry process. The wet process requires the extra step of rinsing down the cleaned surface after blasting. Sandblasting removes any previously applied water-resistant surface coatings, so there will need to be reapplied after abrasive cleaning. *[Ref #6]*

MANUFACTURING LOCATION

Saskatoon
605 Avenue P South
Saskatoon, SK S7M 2W7

DISTRIBUTION CENTERS

Saskatoon
605 Avenue P South
Saskatoon, SK S7M 2W7
(306) 653-3933

Regina
Highway #1 East
Regina, SK S4N 7L2
(306) 798-2636

References:

[1] RainBloc Brochure, Rain Water Penetration Resistance for Masonry Construction, pg 2. ACM Chemistries Inc, Norcross GA

[2] Physical Properties, Metric Technical Manual, Canadian Concrete Masonry Producers Association (CCMPA) P.O. Box 1345, 1500 Avenue Road, Toronto, ON.

[3] Physical Properties, Metric Technical Manual, Canadian Concrete Masonry Producers Association (CCMPA) P.O. Box 1345, 1500 Avenue Road, Toronto, ON.

[4] Initial Rate of Absorption (IRA), Technical Notes, Pg 27. Clay Brick Association of Canada, PO Box 248 Burlington ON

[5] Cleaning of New Masonry, Technical Notes, Pg. 21, Clay Brick Association of Canada, PO Box 248 Burlington ON

[6] Cleaning Concrete Masonry, NCMA TEK 8-4A, Pg.3. National Concrete Masonry Association, 13750 Sunrise Valley Drive, Herndon, VA

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