

# CCMC 13421-R

## CCMC Canadian code compliance evaluation

<b>CCMC number:</b>	13421-R
<b>Status:</b>	Active
<b>Issue date:</b>	2009-02-06
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<b>Evaluation holder:</b>	<b>BASF Canada Inc. o/a BASF Canada</b> 100 Milverton, 5th Floor Mississauga ON L5R 4H1 Canada Telephone: 289-360-1300
<b>Product names:</b>	<ul style="list-style-type: none"> <li>• Lupranate M20</li> <li>• Lupranate M20FB</li> </ul>
<b>Compliance:</b>	NBC 2015
<b>Criteria:</b>	CCMC-TG-060523.08-15 "CCMC Technical Guide for Binders for Oriented Strandboard (OSB) and Waferboard"

**In most jurisdictions this document is sufficient evidence for approval by Canadian authorities.**

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## Compliance opinion

It is the opinion of the Canadian Construction Materials Centre that the evaluated products, when used as binders for oriented strandboard (OSB) and waferboard in accordance with the conditions and limitations stated in this evaluation, comply with the following code:

### National Building Code of Canada 2015

Code provision	Solution type
9.23.15.2. Material Standards	<u>Alternative</u>
9.23.16.2. Material Standards	<u>Alternative</u>
9.23.17.2. Thickness, Rating and Material Standards	<u>Alternative</u>
9.27.10.1. Material Standard	<u>Alternative</u>
9.29.9.1. Material Standard	<u>Alternative</u>
9.30.2.2. Materials and Thickness	<u>Alternative</u>

The above opinion(s) is/are based on the evaluation by the CCMC of technical evidence provided by the evaluation holder, and is bound by the stated conditions and limitations. For the benefit of the user, a summary of the technical information that forms the basis of this evaluation has been included.

# Product information

## Product names

- Lupranate M20
- Lupranate M20FB

## Product description

The products are polymeric methylene diphenyl diisocyanate (MDI) binders used for the manufacturing of OSB and waferboard.

## Manufacturing plant

This evaluation is valid only for products produced at the following plant:

Product names	Manufacturing plant
	Geismar, LA, US
Lupranate M20	☑
Lupranate M20FB	☑

☑ Indicates that the product from this manufacturing facility has been evaluated by the CCMC

## Conditions and limitations

The CCMC's compliance opinion is bound by this product being used in accordance with the conditions and limitations set out below.

- The products may be used for the bonding of strands in the manufacturing of OSB products that are intended to conform to the requirements of CSA O437.2-93 as referenced in CSA O325-07, Article 5.2.3A. Each finished product (i.e., OSB panel) using Lupranate M20 and Lupranate M20FB must conform to CSA O325-07.

## Technical information

This evaluation is based on demonstrated conformance with the following criteria:

Criteria number	Criteria name
CCMC-TG-060523.08-15	CCMC Technical Guide for Binders for Oriented Strandboard (OSB) and Waferboard

The evaluation holder has submitted technical documentation for the CCMC evaluation. Testing was conducted at laboratories recognized by the CCMC. The corresponding technical evidence for this product is summarized below.

## Material requirements

**Table 1. Results of testing the physical properties of the test board**

Property	Unit	Requirement	Result
<b>Modulus of rupture (MOR) after preconditioning</b>	MPa	≥ 17.2 average	42.6 average
	MPa	≥ 13.8 individual	34.2 individual
<b>Modulus of elasticity (MOE) after preconditioning</b>	MPa	≥ 3 100 average	5 226 average
	MPa	≥ 2 480 individual	4 027 individual
<b>Internal bond after preconditioning</b>	MPa	≥ 0.345 average	0.935 average
	MPa	≥ 0.276 individual	0.838 individual
<b>Bond durability: MOR after 2-h boil (tested when wet)</b>	MPa	≥ 8.6 average	22.4 average
	MPa	≥ 6.9 individual	18.0 individual
<b>Bond durability: MOR after six cycles</b>	MPa	≥ 8.6 average	32.0 average
	MPa	≥ 6.9 individual	23.9 individual
<b>Thickness swell: 24-h soak</b>	%	≤ 25 average	3.8 average
	%	≤ 30 individual	4.4 individual
<b>Linear expansion: oven-dry to saturated</b>	%	≤ 0.40 average	0.26 average
	%	≤ 0.48 individual	0.30 individual
<b>Linear expansion: 50% to 90% relative humidity (RH)</b>	%	≤ 0.20 average	0.10 average
	%	≤ 0.24 individual	0.11 individual

## Prescriptive requirements

**Table 2. Results of testing the creep properties at 20°C**

Property	Unit	Requirement	Result
<b>Cumulative creep</b>	mm	≤ 1.7 average	1.0 average

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Property	Unit	Requirement	Result
Secondary creep	mm	≤ 2.04 individual	1.14 individual
		≤ 0.4 average	0.2 average
		≤ 0.48 individual	0.28 individual
Irrecoverable creep	mm	≤ 1.1 average	0.6 average
		≤ 1.32 individual	0.66 individual

**Table 3. Results of testing the creep properties at 30°C**

Property	Unit	Requirement	Result
Cumulative creep	mm	≤ 2.2 average	0.9 average
		≤ 2.64 individual	1.09 individual
Secondary creep	mm	≤ 0.4 average	0.1 average
		≤ 0.48 individual	0.15 individual
Irrecoverable creep	mm	≤ 1.5 average	0.5 average
		≤ 1.8 individual	0.66 individual

**Table 4. Results of testing the creep properties at higher ambient temperature (30°C)**

Property	Unit	Requirement	Result
Cumulative creep	%	≤ 35 average	-9 average
		≤ 42 individual	-5 individual
Secondary creep	%	≤ 0 average	-46 average
		≤ 0 individual	-41 individual
Irrecoverable creep	%	≤ 50 average	-9 average
		≤ 60 individual	0 individual

## Performance requirements

**Table 5. Results of testing the MOR retention properties of the products**

Property	Unit	Requirement	Result
Exposure after 2-h boil (modified)	MPa	≥ 8.6 average	40.1 average
		≥ 6.9 individual	30.2 individual
Exposure after six-cycle test	MPa	≥ 8.6 average	32.0 average

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Property	Unit	Requirement	Result
At -20°C	MPa	≥ 6.9 individual	23.9 individual
		≥ 17.2 average	49.8 average
		≥ 13.8 individual	36.9 individual
After fungal exposure: <i>Aspergillus niger</i> vs. Teigh	MPa	≥ 13.8 average	46.2 average
		≥ 11.0 individual	36.1 individual
After fungal exposure: <i>Penicillium luteum</i>	MPa	≥ 13.8 average	42.7 average
		≥ 11.0 individual	30.0 individual
After soaking in 1% hydrochloric acid	MPa	≥ 7.7 average	26.2 average
		≥ 6.2 individual	17.8 individual
After soaking in 1% sodium hydroxide	MPa	≥ 12.0 average	29.9 average
		≥ 9.6 individual	25.8 individual
After soaking in water	MPa	≥ 14.6 average	34.9 average
		≥ 11.7 individual	24.6 individual

**Table 6. Results of testing the MOE retention properties of the products**

Property	Unit	Requirement	Result
Exposure after 2-h boil (modified)	MPa	≥ 1 550 average	5 123 average
		≥ 1 240 individual	4 275 individual
Exposure after six-cycle test	MPa	≥ 2 015 average	4 523 average
		≥ 1 612 individual	4 027 individual
At -20°C	MPa	≥ 3 100 average	5 771 average
		≥ 2 480 individual	4 950 individual
After fungal exposure: <i>Aspergillus niger</i> vs. Teigh	MPa	≥ 2 480 average	5 295 average
		≥ 1 984 individual	4 447 individual
After fungal exposure: <i>Penicillium luteum</i>	MPa	≥ 2 480 average	5 109 average
		≥ 1 984 individual	4 585 individual
After soaking in 1% hydrochloric acid	MPa	≥ 2 480 average	4 606 average
		≥ 1 984 individual	3 923 individual
After soaking in 1% sodium hydroxide	MPa	≥ 2 325 average	4 171 average
		≥ 1 860 individual	3 723 individual

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Property	Unit	Requirement	Result
After soaking in water	MPa	≥ 2 790 average	4 771 average
		≥ 2 232 individual	4 268 individual

## Retention properties - internal bond

There is no individual result for the internal bond property given that the residual property requirements apply to the average of three test specimens for each test board.

**Table 7. Results of testing the internal bond properties of the products**

Property	Unit	Requirement	Result
Exposure after 2-h boil (modified)	MPa	≥ 0.104	0.575
Exposure after six-cycle test	MPa	≥ 0.035	0.389
At -20°C	MPa	≥ 0.345	1.038
After fungal exposure: <i>Aspergillus niger</i> vs. Teigh	MPa	≥ 0.207	0.760
After fungal exposure: <i>Penicillium luteum</i>	MPa	≥ 0.207	0.745
After soaking in 1% hydrochloric acid	MPa	≥ 0.069	0.527
After soaking in 1% sodium hydroxide	MPa	≥ 0.155	0.591
After soaking in water	MPa	≥ 0.224	0.674

# Administrative information

## Use of Canadian Construction Materials Centre (CCMC) assessments

This assessment must be read in the context of the entire [CCMC Registry of Product Assessments](#), any applicable building code or by-law requirements, and/or any other regulatory requirements (for example, the [Canada Consumer Product Safety Act](#), the [Canadian Environmental Protection Act](#), etc.).

It is the responsibility of the user to confirm that the assessment they are using is current and has not been withdrawn or superseded by a later version on the [CCMC Registry of Product Assessments](#).

## Disclaimer

The National Research Council of Canada (NRC) has evaluated only the characteristics of the specific product described herein. The information and opinions in this evaluation are directed to those who have the appropriate degree of experience to use and apply its contents (such as authorities having jurisdiction, design professionals and specifiers). This evaluation is valid when the product is used as part of permitted construction, respecting all conditions and limitations stated in the evaluation, and in accordance with applicable building codes and by-laws.

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## Language

Une version française de ce document est disponible.

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## CCMC recognition

The Canadian Construction Materials Centre (CCMC) assesses compliance with Canadian building, energy and safety codes. We are the only construction code compliance service supported and operated by the Government of Canada. Trusted by over 6,000 regulators across Canada.

Most Canadian authorities having jurisdiction (AHJs) consider CCMC product assessments acceptable as evidence for product approval.

### CCMC assessments are recognized by construction authorities across Canada:

Alliance of Canadian Building Official Associations (ACBOA)



[\(Alliance of Canadian Building Official Associations \(ACBOA\)\)](#)

First Nations National Building Officers Association (FNNBOA)



[\(First Nations National Building Officers Association \(FNNBOA\)\)](#)

Canadian Home Builders' Association (CHBA)



[\(Canadian Home Builders' Association \(CHBA\)\)](#)

Alberta Building Officials Association (ABOA)



[\(Alberta Building Officials Associations \(ABOA\)\)](#)

Saskatchewan Building Officials Association (SBOA)



[\(Saskatchewan Building Officials Association \(SBOA\)\)](#)

Manitoba Building Officials Association (MBOA)



[\(Manitoba Building Officials Association \(MBOA\)\)](#)

Ontario Building Officials Association (OBOA)



[\(Ontario Building Officials Association \(OBOA\)\)](#)

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Nova Scotia Building Officials Association (NSBOA)



[\(Nova Scotia Building Officials Association \(NSBOA\)\)](#)

The CCMC provides code compliance assessments to Canadian code requirements, consulting nationwide with construction regulators to elicit regional variations in code requirements as well as provincial and local interpretations. Users are advised to review the technical information presented in CCMC assessments when making approval decisions. [Learn more about how the CCMC provides a unique service for Canada.](#)

For more information, contact the CCMC by phone at (613) 993-6189 or by email at [ccmc@nrc-cnrc.gc.ca](mailto:ccmc@nrc-cnrc.gc.ca)

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# Code compliance as an acceptable solution

## Code Compliance via Acceptable Solutions

If a building design (e.g. material, component, assembly or system) can be shown to meet all provisions of the applicable **acceptable solutions** in Division B (e.g. it complies with the applicable provisions of a referenced standard), it is deemed to have satisfied the objectives and functional statements linked to those provisions and thus to have complied with that part of the Code.

— National Building Code of Canada, Sentence A-1.2.1.1.(1)(a)

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Acceptable Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

### CCMC's code compliance opinions

All CCMC evaluation reports are opinions of code compliance established in accordance with the National Building Code of Canada, Subsection 1.2.1. "Compliance with this Code," which requires compliance to be achieved by:

- complying with the applicable acceptable solutions in Division B, or
- using an alternative solution that will achieve at least the minimum level of performance required by Division B in the areas defined by the objective and functional statements attributed to the applicable acceptable solutions.

The CCMC assesses compliance with Canadian building, energy and safety codes, and is trusted by over 6,000 regulators across Canada.

# Code compliance as an alternative solution

## Code Compliance via Alternative Solutions

Where a design differs from the acceptable solutions in Division B, then it should be treated as an **"alternative solution."** A proponent of an alternative solution must demonstrate that the alternative solution addresses the same issues as the applicable acceptable solutions in Division B and their attributed objectives and functional statements. However, because the objectives and functional statements are entirely qualitative, demonstrating compliance with them in isolation is not possible. Therefore, Clause 1.2.1.1.(1)(b) identifies the principle that Division B establishes the quantitative performance targets that alternative solutions must meet. In many cases, these targets are not defined very precisely by the acceptable solutions [...] Nevertheless, Clause 1.2.1.1.(1)(b) makes it clear that an effort must be made to demonstrate that an alternative solution will perform as well as a design that would satisfy the applicable acceptable solutions in Division B—not “well enough” but “as well as.”

— National Building Code of Canada, Sentence A-1.2.1.1.(1)(b)

The CCMC has determined that compliance with this provision of the Code has been demonstrated as an **Alternative Solution**. The evaluation report provides a summary of the basis of CCMC's compliance opinion.

### CCMC's code compliance opinions

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