

CCMC 13486-R

CCMC Canadian code compliance evaluation

CCMC number:	13486-R
Status:	Active
Issue date:	2011-11-16
Modified date:	2022-11-18
Evaluation holder:	<p>Huntsman International LLC 10003 Woodloch Forest Drive The Woodlands TX 77380 United States Website: www.huntsman.com Telephone: 1-281-719-6000</p>
Product name:	Rubinate® FC 3390
Compliance:	NBC 2015
Criteria:	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.

[Learn more about CCMC recognition](#) [Look for the trusted CCMC mark on products to verify compliance.](#)

Compliance opinion

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

National Building Code of Canada 2015

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

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 name

Rubinate® FC 3390

Product description

The product is a fast-curing binder made from polymeric diphenylmethane diisocyanate (pMDI) that is used for the manufacturing of OSB and waferboard. Due to its fast-curing properties, the product is typically used in the core layer of a wood composite panel.

Manufacturing plant

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

Product name	Manufacturing plant
	Geismar, LA, US
Rubinate® FC 3390	☑

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

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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 product 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, "Evaluation of Binder Systems for OSB and Waferboard," as referenced in Article 5.2.3A of CSA O325-07, "Construction Sheathing."
- Each finished wood product (e.g., OSB panel) that uses "Rubinate® FC 3390" 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 Report 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

Physical properties

Results of testing the physical properties of OSB with Rubinate® FC 3390 as the binder

Property	Unit	Requirement	Result
Modulus of rupture (MOR) – (after preconditioning)	MPa	≥ 17.2 average	46.4 average
		≥ 13.8 individual	35.0 individual
Modulus of elasticity (MOE) – (after preconditioning)	MPa	≥ 3 100 average	7 142 average
		≥ 2 480 individual	5 775 individual
Internal bond – (after preconditioning)	MPa	≥ 0.345 average	0.557 average
		≥ 0.276 individual	0.488 individual
Bond durability – MOR after 2-h boil (tested when wet)	MPa	≥ 8.6 average	22.9 average
		≥ 6.9 individual	9.9 individual
Bond durability – MOR after 6 cycles	MPa	≥ 8.6 average	39.3 average
		≥ 6.9 individual	33.4 individual
Thickness swell: 24-h soak	%	≤ 25 average	6.8 average
		≤ 30 individual	7.6 individual
Linear expansion: oven-dry to saturated	%	≤ 0.40 average	0.17 average
		≤ 0.48 individual	0.21 individual
Linear expansion: 50% to 90% relative humidity (RH)	%	≤ 0.20 average	0.05 average
		≤ 0.24 individual	0.06 individual

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Prescriptive requirements

Creep properties at 20°C

Results of testing the creep properties of OSB with Rubinate® FC 3390 as the binder at 20°C

Property	Unit	Requirement	Result
Cumulative creep	mm	≤ 1.7 average	0.95 average
		≤ 2.04 individual	1.08 individual
Secondary creep	mm	≤ 0.4 average	0.14 average
		≤ 0.48 individual	0.18 individual
Irrecoverable creep	mm	≤ 1.1 average	0.65 average
		≤ 1.32 individual	0.81 individual

Creep properties at 30°C

Results of testing the creep properties of OSB with Rubinate® FC 3390 as the binder at 30°C

Property	Unit	Requirement	Result
Cumulative creep	mm	≤ 2.2 average	0.86 average
		≤ 2.64 individual	0.94 individual
Secondary creep	mm	≤ 0.4 average	0.13 average
		≤ 0.48 individual	0.15 individual
Irrecoverable creep	mm	≤ 1.5 average	0.58 average
		≤ 1.8 individual	0.67 individual

Creep properties increased at higher ambient temperature (30°C)

Results of testing the creep properties of OSB with Rubinate® FC 3390 as the binder at 30°C+

Property	Unit	Requirement	Result
Cumulative creep	%	≤ 35 average	-10 average
		≤ 42 individual	-13 individual
Secondary creep	%	≤ 0 average	-7 average
		≤ 0 individual	-17 individual
Irrecoverable creep	%	≤ 50 average	-11 average
		≤ 60 individual	-17 individual

Performance requirements

Retention of properties - modulus of rupture

Results of testing the MOR of OSB with Rubinate® FC 3390 as the binder

Property	Unit	Requirement	Result
Exposure after 2 h boil (modified)	MPa	≥ 8.6 average	43.4 average
		≥ 6.9 individual	36.7 individual
Exposure after 6 cycles	MPa	≥ 8.6 average	39.3 average
		≥ 6.9 individual	33.4 individual
At -20°C	MPa	≥ 17.2 average	54.4 average
		≥ 13.8 individual	44.2 individual
After fungal exposure – Aspergillus niger vs. Teigh	MPa	≥ 13.8 average	45.5 average
		≥ 11.0 individual	36.1 individual
After fungal exposure – Penicillium luteum	MPa	≥ 13.8 average	44.9 average
		≥ 11.0 individual	36.1 individual
After soaking in 1% hydrochloric acid	MPa	≥ 7.7 average	29.8 average
		≥ 6.2 individual	21.0 individual
After soaking in 1% sodium hydroxide	MPa	≥ 12.0 average	33.5 average
		≥ 9.6 individual	30.2 individual
After soaking in water	MPa	≥ 14.6 average	38.9 average
		≥ 11.7 individual	33.2 individual

Retention of properties - modulus of elasticity

Results of testing the MOE of OSB with Rubinate® FC 3390 as the binder

Property	Unit	Requirement	Result
Exposure after 2-h boil (modified)	MPa	≥ 1 550 average	6 971 average
		≥ 1 240 individual	5 597 individual
Exposure after 6 cycles	MPa	≥ 2 015 average	6 568 average
		≥ 1 612 individual	5 458 individual
At -20°C	MPa	≥ 3 100 average	7 880 average
		≥ 2 480 individual	6 688 individual

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Property	Unit	Requirement	Result
After fungal exposure – <i>Aspergillus niger</i> vs. Teigh	MPa	≥ 2 480 average	7 128 average
		≥ 1 984 individual	5 785 individual
After fungal exposure – <i>Penicillium luteum</i>	MPa	≥ 2 480 average	7 336 average
		≥ 1 984 individual	6 433 individual
After soaking in 1% hydrochloric acid	MPa	≥ 2 480 average	7 171 average
		≥ 1 984 individual	5 914 individual
After soaking in 1% sodium hydroxide	MPa	≥ 2 325 average	5 912 average
		≥ 1 860 individual	5 045 individual
After soaking in water	MPa	≥ 2 790 average	6 909 average
		≥ 2 232 individual	5 972 individual

Retention of 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.

Results of testing the internal bond of OSB with Rubinate® FC 3390 as the binder

Property	Unit	Requirement	Result
Exposure after 2-h boil (modified)	MPa	≥ 0.104	0.180
Exposure after 6 cycles	MPa	≥ 0.035	0.097
At –20°C	MPa	≥ 0.345	0.618
After fungal exposure – <i>Aspergillus niger</i> vs. Teigh	MPa	≥ 0.207	0.394
After fungal exposure – <i>Penicillium luteum</i>	MPa	≥ 0.207	0.311
After soaking in 1% hydrochloric acid	MPa	≥ 0.069	0.122
After soaking in 1% sodium hydroxide	MPa	≥ 0.155	0.192
After soaking in water	MPa	≥ 0.224	0.251

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.

In the case of any discrepancy between the English and French version of this document, the English version shall prevail.

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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))

New Brunswick Building Officials Association (NBBOA)



(New Brunswick Building Officials Association (NBBOA))

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

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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.

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