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Valid Until: **August 2027**

NEU Identification No. **NEU-0003**

An **ACI** Center of Excellence for Carbon Neutral Concrete

VERIFICATION STATEMENT

Prepared for the use of **MST REBAR Inc.**

1.0 SUMMARY

Verified by: NEU: An ACI Center of Excellence for Carbon Neutral Concrete
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Type of Assessment: Verification Statement

Verified for: **MST Rebar Inc.**
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2.0 INTRODUCTION

The verification statement presented herein is prepared by NEU – An ACI Center of Excellence for Carbon Neutral Concrete for **MST Rebar Inc.** for the claim given in Section 3.0 of this statement¹. The responsibility of NEU for this statement was limited to independent evaluation of the evidence submitted and providing an independent opinion on whether the claim is verified. The responsibility of **MST Rebar Inc.** was preparing and submitting any evidence supporting their claim, and making sure that the evidence submitted was free of errors and fraud. **MST Rebar Inc.** is fully responsible for the reliability and accuracy of the evidence submitted. Providing a statement with opinion does not warrant certification, endorsement, recommendation, or consultation through NEU Validation/Verification Program. MST-BAR® GFRP (glass fiber-reinforced polymer) Rebar, as mentioned in Section 3 of this statement, must be used and designed in accordance with the Building Code compliance report of ICC-ES ESR-4664.

3.0 SCOPE OF ENVIRONMENTAL CLAIMS

The scope of the environmental claims for this verification are the following:

CLAIM 1: MST-BAR® structural straight and bent GFRP rebar, and conventional steel reinforcement exhibit the following global warming potential (GWP) values for lifecycle stages A1-A3 (cradle-to-gate), as given in the table

below, for comparison purposes based on an equal nominal bar-size and equal-length basis (No. 6 / 20M reinforcement for one meter length):

Material Type	Average GWP (lifecycle stages A1-A3) (kg-CO ₂ eq. <u>per kg</u>)	Unit mass (kg/m)	Average GWP (lifecycle stages A1-A3) (kg-CO ₂ eq. for production of <u>one meter</u> of reinforcement)
MST-BAR® structural straight and bent rebars	1.410 ^{a1,a2}	0.720 ^b	1.02
Fabricated steel reinforcement bar in accordance with ASTM A615 or ASTM A706	0.854 ^c	2.235 ^{d,e}	1.91
Global steel rebar by World Steel Association (mild reinforcing steel)	1.770 ^f	2.235 ^{d,e}	3.96

CLAIM 2: In accordance with ACI CODE-440.11-22, commentary to Section 20.5, the use of corrosion-inhibiting admixtures are not necessary in GFRP-reinforced concrete structures because GFRP reinforcement is inherently resistant to corrosion. Consequently, when a reinforced concrete member requires a corrosion-inhibiting admixture to protect conventional steel reinforcement (treated concrete), additional global warming potential (GWP) impacts are introduced. The following GWP contributions for lifecycle stages A1-A3 associated with the use of corrosion-inhibiting admixtures are added to the concrete's GWP, compared with the use of MST-BAR® structural GFRP rebar as a direct replacement for conventional steel reinforcement, which eliminates the need for such admixtures (untreated concrete). To support this comparison, two commercially available corrosion-inhibiting admixtures—Euclid EUCON™ CIA and Mapeshield CI 300—were selected as representative products for assessment.

Material Type	Average GWP (lifecycle stages A1-A3) (kg-CO ₂ eq. per kg)	Recommended admixture dosage rate (min. – max.) (L/m ³)	Density (kg/L)	Treated concrete GWP contribution, kg CO ₂ eq. per m ³ (min. dosage)	Treated concrete GWP contribution, kg CO ₂ eq. per m ³ (max. dosage)	Untreated concrete GWP when MST-BAR® GFRP Rebar is used
Euclid EUCON™ CIA	0.95 ^g	10-30 ⁱ	1.27-1.33 ^j	+ 12.1 - 12.6	+ 36.2 - 37.9	0
Mapeshield CI 300	1.10 ^h	10-25 ^j	1.27 ^j	+ 14.0	+ 34.9	0

4.0 VERIFICATION PROCEDURE

The verification opinion issued in this NEU statement is based on the evidence listed below, using the NEU-P1 Assessment Scheme, dated September 2024, Rev 2.

- a) Product-specific Environmental Product Declaration (EPD) prepared by the EPD International AB in accordance with ISO 14025:2006 and EN 15804+A2:2019/AC:2021 for:
 1. MST Rebar Inc., fiberglass rebar-structural rebar, publication date: 2025-06-17, Valid until: 2030-06-16, EPD registration number: EPD-IES-0024238:001.
 2. MST Rebar Inc., fiberglass rebar-bent rebar, publication date: 2025-06-17, Valid until: 2030-06-16, EPD registration number: EPD-IES-0024239:001.
- b) See table on pages 6 and 7 (No.6-20M rebar) of MST Rebar Inc. EPD, fiberglass rebar-structural rebar, publication date: 2025-06-17, Valid until: 2030-06-16, EPD registration number: EPD-IES-0024238:001
- c) An industry-wide average Environmental Product Declaration (EPD) for steel reinforcement bar according to ISO 14025 and ISO 21930:2017, prepared for Concrete Reinforcing Steel Institute (CRSI). Program operator: ASTM International. Issue date is September 2022. Valid Until: September 2027. Declaration number: EPD 362.
- d) ASTM A615/A615M-26; Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; ASTM International.

- e) ASTM A706/A706M-26; Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; ASTM International.
- f) An industry-wide global-average Environmental Product Declaration (EPD) for global steel rebar according to EN 15804+A2:2019, prepared by World Steel Association, supported by Daxner & Merl GmbH, publication date June 2023.
- g) Product-specific Environmental Product Declaration (EPD) in accordance with ISO 14025:2006 and ISO 21930:2017 for Euclid Canada Inc. Chemical Admixtures for Concrete, prepared by ASTM International. Certification validity period for 5 years starting by 28/06/2024. EPD number: EPD-729.
- h) Product-specific Environmental Product Declaration (EPD) in accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for Mapeshield CI 300, prepared by EPD International AB. Publication date: 2023-05-10, valid until: 2028-05-09. EPD registration number: S-P-08245.
- i) Datasheet by Euclid Chemical, obtained from Euclid Chemical website, Rev. 03.26
- j) Datasheet by Mapei for Mapeshield CI 300, obtained from Mapei website, datasheet dated 2024-07-02.

5.0 VERIFICATION (VALIDATION) OPINION

Verification type: Historical in nature

Verification level: Verified at the **reasonable** level of assurance.

Verification time period: Verification statement assessment for the claim covers the evidence periods given in Section 4 of this statement.

Verification boundaries: The boundaries of the verification include lifecycle stages A1 to A3 for the MST Rebar structural rebar and bent rebar that are recognized in the Building Code compliance report ICC-ES ESR-4664.

Verification opinion: Based on the evidence submitted and verification procedures applied, in its opinion dated **September 2026**, NEU – An ACI Center of Excellence for Carbon Neutral Concrete concluded with **reasonable** assurance that the information in the statement was fairly stated, and there are no issues observed regarding misstatements or nonconformance to the specification/s for which data was generated.

6.0 MISCELLANEOUS

¹NEU is providing this third-party verification statement in accordance with the NEU Procedures. As an independent third-party verifier, NEU maintains a Quality Management System which address competence, impartiality, and objectivity for all verification activities; and the NEU verification team that conducted this verification activity has demonstrated and documented competency, independence, and impartiality. NEU continues to monitor impartiality throughout the engagement in accordance with the NEU Quality Management System. In this verification activity, NEU applied the general requirements of ISO/IEC 17029. This statement is issued to the company given in Section 1.0 of this statement, as posted on NEU web site.