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APPROVAL REPORT

GRABBER CONSTRUCTION PRODUCT'S SCREWS FOR SECURING STEEL DECKING TO STRUCTURAL STEEL SUPPORTS

Prepared for:

**Grabber Construction Products div. of
John Wagner Associates, Inc.
205 Mason Circle
Concrd, CA 94520**

Project ID: 3012505

Class: 4451

Date of Approval: _____

Authorized by: _____

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**GRABBER CONSTRUCTION PRODUCT'S SCREWS
FOR SECURING STEEL DECKING
TO STRUCTURAL STEEL SUPPORTS**

From

**GRABBER CONSTRUCTION PRODUCTS DIV. OF
JOHN WAGNER ASSOCIATES, INC.
205 MASON CIRCLE
CONCORD, CA 94520**

I INTRODUCTION

- 1.1 Grabber Construction Products a division of John Wagner Associates, Inc, submitted samples of their CFP101875LYZ-10 x 3/4 Tec 3, CFP121878JBWZ-12 x 7/8 Tec 3, CSP12125JBWZ-12 x 1 1/4 Tec 4, CCFP12125LYZ-12 x 1 1/4 Tec 5 Lox 2, and CCFP12158LYZ-12 x 1 5/8 Tec 5 Lox 2 fasteners to determine if they meet the approval requirements of the **Standard** listed below for securing FM Approvals Approved steel roof deck to structural steel supports in Class 1 Insulated Steel Deck Roof Construction.
- 1.2 Examination included evaluations of the fasteners practicability, reliability and strength. Tests were conducted to determine the fasteners ability to penetrate and secure various metal thicknesses and their resistance to pullout.
- 1.3 This Report may be reproduced only in its entirety and without modification.
- 1.4 Standard:

Title	Class Number	Date
FM Approvals Inspection Procedure for 1 1/2 Inch (38.1 mm) Deep Steel Roof Deck for use in Insulated Steel Roof Deck Construction	4451	February, 1989

- 1.5 **Listings:** The Grabber Construction Products fasteners submitted for evaluation meet FM Approvals Approval requirements for use in securing steel roof deck in Class 1 Insulated Steel Deck Roof Construction when installed as specified in the **CONCLUSIONS** of this report and when Approval is effective will be listed in the FM Approval Guide.

II DESCRIPTIONS

- 2.1 A brief description of the John Wagner Associate's Grabber Construction Product's steel roof deck attachment fasteners are as follows:
- 2.2 The CFP101875LYZ-10 x 3/4 Tec 3, CFP121878JBWZ-12 x 7/8 Tec 3 fasteners are intended for use in securing the side laps of the individual sheets of 18, 20, and 22 gauge (MSG) [0.0478, 0.0359, and 0.0299 in. (1.21, 0.91, and 0.76 mm) thick] steel roof deck. The CFP101875LYZ-10 x 3/4 Tec 3 fastener is a self drilling steel screw, 3/4 in. (19 mm) long, containing 24 threads per inch (25 mm) of threaded shaft with a 7/16 in. (9.0 mm) flat pan head and a Tec 3 point. The fastener is plated with a yellow zinc coating. The CFP121878JBWZ-12 x 7/8 Tec 3 fastener is a self drilling steel screw, 7/8 in. (22 mm) long, containing 18 threads per inch (25 mm) of threaded shaft with a 5/16 in. (7.85 mm) flat pan head and a Tec 3 point. The fastener is plated with a zinc coating.

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- 2.3 The CSP12125JBWZ–12 x 1 ¼ Tec 4, CCFP12125LYZ–12 x 1 ¼ Tec 5 Lox 2 fasteners are for use in securing 18, 20, and 22 gauge (MSG) [0.0478, 0.0359, and 0.0299 in. (1.21, 0.91, and 0.76 mm)] thick steel roof decking to 12 through 20 gauge [0.1046 through 0.0359 (2.65 through 0.91 mm)] thick steel substrates. The CSP12125JBWZ–12 x 1 ¼ Tec 4 fastener is a self drilling steel screw, 1 ¼ in. (31 mm) long, containing 18 threads per inch (25 mm) of threaded shaft with a 5/16 in. (7.85 mm) flat pan head and a Tec 4 point. The fastener is plated with a zinc coating. The CCFP12125LYZ–12 x 1 ¼ Tec 5 Lox 2 fastener is a self drilling steel screw 1 ¼ in. long, containing 24 threads per inch (25 mm) of threaded shaft with a 5/16 in. (7.85 mm) flat pan head and a Tec 5 point. The fastener is plated with a yellow zinc coating.
- 2.4 CCFP12158LYZ–12 x 1 5/8 Tec 5 Lox 2 fasteners are for use in securing 18, 20, and 22 gauge (MSG) [0.0478, 0.0359, and 0.0299 in. (1.21, 0.91, and 0.76 mm)] thick steel roof decking to ¼ in. through ½ in.[0.25 through 0.50 in. (6 through 13 mm)] thick steel substrates. The CCFP12158LYZ–12 x 1 5/8 Tec 5 Lox 2 fastener is a self drilling steel screw 1 5/8 in. (39 mm) long, containing 24 threads per inch (25 mm) of threaded shaft with a 5/16 in. (7.85 mm) flat pan head and a Tec 5 point. The fastener is plated with a yellow zinc coating.

III EXAMINATIONS AND TESTS

- 3.1 Testing is required to evaluate each fastener and its ability to resist various forces when installed for its intended design use.
- 3.1.1 Tests conducted were as required by the **Standard** listed in paragraph 1.4 above.
- 3.1.2 Fasteners incorporated into test samples were selected by FM Approvals personnel. Test samples were prepared by, or under the supervision of, FM Approvals personnel. The test samples were prepared using FM Approvals Approved commercial deck sections of thicknesses in accordance with the Manufacturer’s Standard Gauge (MSG) and structural steel members. Samples were submitted for examination and testing as follows:
- 3.2 Drivability - A series of drivability/penetration tests was completed with the combined thickness of deck to deck and deck to substrate with each fastener as follows:
- 3.2.1 A series of fastener drivability tests using two sections of 18 ga. steel decking are shown below:

<u>Fastener</u>	<u>Result</u>
CFP101875LYZ–10 x ¾ Tec 3	Satisfactory
CFP121878JBWZ–12 x 7/8 Tec 3	Satisfactory

- 3.2.2 A series of fastener drivability tests using four sections of 18 ga. (1.2 mm) steel decking and 12 ga. (2.6 mm) steel substrate, ¼ in. (6 mm) and 1/2 in. (13 mm) steel substrate are shown below:

<u>Fastener</u>	<u>Substrate</u>	<u>Result</u>
CSP12125JBWZ–12 x 1 ¼ Tec 4	12 ga. (2.6 mm) steel	Satisfactory
CCFP12125LYZ–12 x 1 ¼ Tec 5 Lox 2	12 ga. (2.6 mm) steel	Satisfactory
CCFP12158LYZ–12 x 1 5/8 Tec 5 Lox 2	¼ in. (6 mm) steel	Satisfactory
CCFP12158LYZ–12 x 1 5/8 Tec 5 Lox 2	½ in. (13 mm) steel	Satisfactory

- 3.3 Pull-Out/Pull-Over Resistance of Fasteners – Pullout/Pull-Over tests were conducted using the Tinius Olsen testing machine with force exerted on the test sample at the speed of 2 in. (51 mm) per minute. A series of tests was completed to determine the force which would pull the fastener out of the structural support and pull the steel decking over the head of the fasteners as follows:

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- 3.3.1 A deck/fastener pullout/pullover test with 22 ga. (.76 mm) steel decking and 20 ga. (.91 mm) steel substrate and 1/2 in (13 mm) steel substrate is shown below:

<u>Fastener/Substrate</u>	<u>Result</u> <u>lbf (N)</u>	<u>Mode of failure</u>
CCFP12158LYZ-12 x 1 5/8 Tec 5 Lox 2 / 1/2 in.(12 mm)	221 (983)	pullout of fastener from 20ga.
CCFP12158LYZ-12 x 1 5/8 Tec 5 Lox 2 / 1/2 in.(12 mm)	842 (3745)	22 ga. pullover fastener

- 3.3.2 A series of deck/fastener pullout tests with 22 ga. (.76 mm) steel decking and 12 ga. (2.6 mm) steel substrate and 20 ga. (.91 mm) steel substrate is shown below:

<u>Fastener/Substrate</u>	<u>Result</u> <u>lbf (N)</u>	<u>Mode of failure</u>
CSP12125JBWZ-12 x 1 ¼ Tec 4 / 12 ga. (2.6 mm)	969 (4310)	Fastener pullover
CSP12125JBWZ-12 x 1 ¼ Tec 4 / 20 ga. (2.6 mm)	358 (1592)	Fastener pullout
CCFP12125LYZ-12 x 1 ¼ Tec 5 Lox 2 / 12 ga. (2.6 mm)	882 (3923)	Fastener pullover
CCFP12125LYZ-12 x 1 ¼ Tec 5 Lox 2 / 20 ga. (2.6 mm)	281 (1249)	Fastener pullout

- 3.4 Shear Tests - Shear tests were conducted using the Tinius Olsen testing machine with force exerted on the test sample at the speed of 2 in. (51 mm) per minute. A series of deck/fastener shear tests with 18 ga. (1.2 mm) steel decking and 12 ga. (2.6 mm) steel substrate and ¼ in. (6 mm) steel substrate is shown below:

<u>Fastener/Substrate</u>	<u>Result</u> <u>lbf (N)</u>	<u>Mode of failure</u>
CSP12125JBWZ-12 x 1 ¼ Tec 4 / 12 ga. (2.6 mm)	1909 (8491)	Decking Failed
CCFP12125LYZ-12 x 1 ¼ Tec 5 Lox 2 / 12 ga. (2.6 mm)	1451 (6454)	Decking Failed
CCFP12158LYZ-12 x 1 5/8 Tec 5 Lox 2 / ¼ in. (13 mm)	1483 (6596)	Decking Failed

IV MARKING

- 4.1 The manufacturer shall mark each packing container with the manufacturer's name and product trade name. In addition, the container must be marked with the FM Approvals Approval Mark and the words "Subject to the conditions of Approval as a roof deck fastener when installed as described in the current edition of the FM Approvals Approval Guide".
- 4.2 Markings denoting FM Approvals Approval shall be applied by the manufacturer only within and on the premises of manufacturing locations that are under the FM Approvals Facilities and Procedures Audit program.
- 4.3 The manufacturer agrees that use of the FM Approvals name or Approval Mark is subject to the conditions and limitations of the FM Approvals Approval. Such conditions and limitations must be included in all references to FM Approvals Approval.

V REMARKS

- 5.1 The manufacturer shall make every reasonable effort to supply all necessary instructions and other assistance to the installer to insure proper installation.
- 5.2 The securement of the roof system must be enhanced at the building corners and perimeter as outlined in

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FM Global Property Loss Prevention Data Sheet 1-29.

VI FACILITIES AND PROCEDURES AUDITS

The Fong Prean Industrial Co., Ltd. and Your Choice Fasteners & Tools Co., Ltd manufacturing locations are subject to periodic audit inspections to determine that the quality and uniformity of the materials have been maintained and will provide the same level of performance as originally Approved. The facilities and control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this report.

VII MANUFACTURER'S RESPONSIBILITIES

- 7.1 To assure compliance with his procedures in the field, the manufacturer shall supply to the deck installer such necessary instruction or assistance required to produce the desired performance achieved in the tests.
- 7.2 The manufacturer shall notify FM Approvals of any planned change in the Approved products, prior to general sale or distribution, using Form 797, Approved Product Revision Report.

VIII DOCUMENTATION

The following documents describe the Grabber Construction Products fasteners and are on file at FM Approvals.

Document	Issue or Revision	Description
Drawing Fong Prean Industrial Co., Ltd. Part No. CFP101875LYZ-10 x ¾ Tec 3	Oct. 16, 2000	Self Drilling Flat Pan Head Screw 10 x ¾ in. Tec 3
Drawing Fong Prean Industrial Co., Ltd. Part No. CFP121878JBWZ-12 x 7/8 Tec 3	Sept. 28, 2000	Self Drilling Flat Pan Head Screw 12 x 7/8 in. Tec 3
Drawing Fong Prean Industrial Co., Ltd. Part No. CSP12125JBWZ-12 x 1 ¼ Tec 4	Sept. 28, 2000	Self Drilling Flat Pan Head Screw 12 x 1 ¼ in. Tec 4
Drawing Your Choice Fasteners & Tools Co., Ltd. Part No. CCFP12158LYZ-12 x 1 5/8 Tec 5 Lox 2	March 18, 2003	Self Drilling Flat Pan Head Screw 12 x 1 5/8 Tec 5 Lox 2
Drawing Your Choice Fasteners & Tools Co., Ltd. Part No. CCFP12125LYZ-12 x 1 ¼ Tec 5 Lox 2	March 18, 2003	Self Drilling Flat Pan Head screw Deck Fastener CCFP12125LYZ - 12 x 1 ¼ Tec 5 Lox 2

IX CONCLUSIONS

- 9.1 The CFP101875LYZ-10 x ¾ Tec 3, and CFP1211878JBWZ-12 x 7/8 Tec 3 fasteners submitted by Grabber Construction Products meet FM Approvals requirements for securing the side laps of Approved 18, 20, and 22 gauge (MSG) [0.0474, 0.0358, and 0.0299 in. (1.2, 0.91, and 0.76 mm)] thick steel roof deck in Class 1-60, Class 1-75 or Class 1-90 Insulated Steel Deck Roof Constructions as follows: The longitudinal edge of the deck must possess an overlap type joint. Spacing between side lap fasteners

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and/or supporting members shall not exceed 3 ft (0.9 m).

- 9.2 The CSP12125JBWZ-12 x 1 ¼ Tec 4, CCFP12125LYZ-12 x 1 ¼ Tec 5 Lox 2 and the CCFP12158LYZ-12 x 1 5/8 Tec 5 Lox 2 fasteners submitted by Grabber Construction Products meet FM Approvals requirements for securing FM Approved 18, 20, and 22 ga. [0.0474, 0.0358 and 0.0295 in. (1.2, 0.91 or 0.75 mm) thick], steel roof deck in Class 1-60, Class 1-75 or Class 1-90 Insulated Steel Deck Roof Constructions when the fasteners are spaced maximum 12 in. (305 mm) o.c. at the supports.

<u>Deck Ga.</u>	<u>Thickness</u>	<u>Maximun Span</u>
22 ga.	0.029 in. (0.75 mm)	6 ft - 3 in. (1.9 m)
20 ga.	0.035 in. (0.91 mm)	6 ft - 7 in. (2.0 m)
18 ga.	0.047 in. (1.20 mm)	7 ft - 9 in. (2.4 m)

The fasteners are designed for securing steel deck to steel supporting members when the total thickness of the decking and substrate is not greater than shown below and the minimum thickness of the substrate is not less than shown below.

<u>Fastener</u>	<u>Max Thickness Deck + Substrate</u>	<u>Supporting Steel Thickness</u>
CSP12125JBWZ-12 x 1 ¼ Tec 4	0.143 in. (3.34 mm)	12 ga. (2.65 mm)
CCFP12125LYZ-12 x 1 ¼ Tec 5 Lox 2	0.143 in. (3.34 mm)	12 ga. (2.65 mm)
CCFP12158LYZ-12 x 1 5/8 Tec 5 Lox 2	0.691 in. (17.5 mm)	½ in. (13 mm)

- 9.2.1 Care must be exercised when securing steel deck end laps and steel deck side laps at the supports to insure that the proper fastener is used to join all sheets of the decking securely to the supports.
- 9.2.2 Continued Approval will depend upon satisfactory field experience and periodic Facilities and Procedures Audits.

TESTING SUPERVISED BY:

D. L. Alves

PROJECT DATA RECORD:

3012505

ORIGINAL TEST DATA:

None

REPORT BY:

REPORT REVIEWED BY:

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