ICC-ES Evaluation Report

ESR-3009

Reissued February 2024

This report also contains:

- FBC Supplement

Subject to renewal February 2026

DIVISION: 03 00 00—CONCRETE **Section: 03 16 00—Concrete Anchors** **DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES** **Section: 06 05 23—Wood, Plastic, and Composite Fastenings**	**REPORT HOLDER:** **JAACO CORPORATION**	**EVALUATION SUBJECT:** **JAACO NAILPRO NP100S AND NP145S HARDENED BALLISTIC PINS**	

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2021, 2018, 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Property evaluated:

- Structural

2.0 USES

The Jaaco NailPro NP100S and NP145S hardened ballistic pins are used to fasten building components, such as wood and steel, to normalweight concrete. The pins are alternatives to the cast-in-place anchors described in IBC Section 1901.3 (2012 IBC Section 1908; 2009 IBC Section 1911) for placement in normalweight concrete. For structures regulated under the IRC, the pins may also be used where an engineered design is submitted in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 Pins:

Jaaco NailPro NP100S and NP145S hardened ballistic pins are smooth-shank power-actuated fasteners (PAFs). The pins are manufactured from steel wire coils complying with ASTM A510 Grade 1060 (UNS 10600) and are heat treated to provide core hardness on the Rockwell C scale of 52 to 55 HRC. The pins are either electrically zinc plated with chromate finish or mechanically zinc plated complying, respectively, with ASTM B633, Type II, SC 1, or ASTM B695, Type 1, Class 12. The NP100S and NP145S pins have a ballistic point with nominally 0.100- and 0.145-inch (2.54 and 3.66 mm) smooth shank diameters, respectively, and nominally 0.244- and 0.299-inch (6.20 and 7.60 mm) head diameters, respectively. The NP100S pin has a minimum effective length of 0.115 inch (2.9 mm) less than the nominal length. The NP145S pin has a minimum effective length of 0.133 inch (3.4 mm) less than the nominal length. The pins are available in lengths ranging from $^{3}/_{4}$

inch to 3 1/2 inches (19.1 and 90 mm), and also in collated wire coils, plastic sheet coils, and strips. Figures 1 and 2 show the typical smooth-shank pins and pin head marking.

3.2 Concrete:

Normalweight concrete must comply with IBC Chapter 19 or IRC Section R402.2, as applicable. The concrete must have a minimum compressive strength, f_c', of 2,500 psi (17.2 MPa) at the time of pin installation.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Selection of PAFs must take into consideration the required length. The minimum effective shank length given in Section 3.1 must equal or exceed the sum of the thickness of the attached material and the minimum embedment depth shown in Table 2.

4.1.2 Allowable Loads: The most critical applied loads, excluding seismic load effects, resulting from the load combinations in Section 2.4 of ASCE 7-16/S1 (referenced in 2021 IBC Section 1605.1) or 2021 IBC Section 1605.2 (Section 1605.3.1 or 1605.3.2 of the 2018, 2015 and 2012 IBC), must not exceed the allowable loads described in this section. For pins which are subjected to seismic loads, see Section 4.1.4 for additional information.

Allowable tension and shear loads for the pins installed into normalweight concrete, the required minimum embedment depths, the minimum spacing, and the minimum concrete edge distance are provided in Table 1. The tabulated allowable loads are for allowable stress design (ASD).

The allowable loads apply to the interaction between the pins and the concrete only. Limit states such as pull-over and lateral bearing, which are governed by the properties of attached material, are outside the scope of this report. Design of the connection to the attached material must comply with the applicable requirements of the IBC.

When designing the connection of wood members to the base material, the bending yield strength of the pin can be assumed to be the same as that of a nail with the same shank diameter. The stress increases and load reductions described in 2021 IBC Section 1605.2 (2018, 2015, 2012 and 2009 IBC Section 1605.3) are not allowed.

4.1.3 Combined Loading: For pins subjected to both shear and tension loads, compliance with the following interaction equation must be verified:

$$\frac{p}{P_a} + \frac{v}{V_a} \leq 1.0$$

where:

p = Actual applied tension load on the fastener, lbf (N).

P_a = Allowable tension load for the fastener, lbf (N).

v = Actual applied shear load on the fastener, lbf (N).

V_a = Allowable shear load for the fastener, lbf (N).

4.1.4 Seismic Considerations: The pins have been evaluated for use when subjected to seismic loads as follows:

1. The pins may be used for attachment of nonstructural components listed in Section 13.1.4 of ASCE 7, which are exempt from the requirements of ASCE 7.
2. Concrete base materials: The Jaaco pins installed in concrete may be used to support acoustical tile or lay-in panel suspended ceiling systems, distributed systems and distribution systems where the service load on any individual fastener does not exceed the lesser of 90 lbf (400 N) or the published allowable load in Table 1.
3. For interior, nonstructural walls that are not subjected to sustained tension loads and are not a bracing application, the fasteners may be used to attach steel track to concrete in all Seismic Design Categories. In Seismic Design Categories D, E, and F, the allowable shear load due to transverse pressure must be no more than 90 pounds (400 N) when attaching to concrete. Substantiating calculations must be submitted addressing the fastener-to-base-material capacity and the fastener-to-attached-material capacity. Interior, nonstructural walls are limited to locations where bearing walls, shear walls or braced walls are not required by the approved plans. The design load on the fastener must not exceed the allowable load shown in Table 1.

4.2 Installation:

The Jaaco NailPro NP100S and NP145S hardened ballistic pins must be installed using pneumatic tools or gas-powered tools recommended by Jaaco Corporation, in accordance with the pin manufacturer's published installation instructions. Pin shank diameters, pin minimum embedment depth, spacing and edge distance, and normalweight concrete requirements are shown in Table 1. The pins must not be driven until the concrete has reached the designated compressive strength.

5.0 CONDITIONS OF USE:

The Jaaco NailPro hardened ballistic pins described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The pins are manufactured and identified in accordance with this report.

5.2 The pins must be installed in accordance with this report and the Jaaco published installation instructions. In the event of a conflict between this report and the published installation instructions, the more restrictive requirements govern.

5.3 Calculations demonstrating that the applied loads are less than the allowable loads described in this report must be submitted to the code official for approval. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.4 The use of the pins is limited to installation in uncracked concrete. Cracking occurs when the extreme fiber tension stress in concrete, f_t, is greater than the modulus of rupture of concrete, f_r, due to service loads or deformations.

5.5 The minimum normalweight concrete thickness must be a minimum of three times the pin embedment depth.

5.6 The use of the pins is limited to dry, interior environments, which include exterior walls which are protected by an exterior wall envelope.

5.7 Use of the pins in treated lumber is outside the scope of this report.

5.8 Refer to Section 4.1.4 for seismic considerations.

5.9 The Jaaco hardened ballistic pins are manufactured under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Power-actuated Fasteners Driven into Concrete, Steel, and Masonry Elements (AC70), dated December 2019 (editorially revised January 2021).

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-3009) along with the name, registered trademark, or registered logo of the report holder (Jaaco Corporation) must be included in the product label. [Electronic labeling is the ICC-ES web address (www.icc-es.org); specific URL related to the report; or the ICC-ES machine-readable code placed on the aforementioned items.]

7.2 In addition, the Jaaco NailPro hardened ballistic-point pins are identified by a head marking as shown in Figure 2. Each carton and packaging unit of pins described in this report must be identified by a label bearing the product trade name as indicated in Table 2 of this report; the model number (NP100S or NP145S); and the nominal pin diameter and length.

7.3 The report holder's contact information is the following:

JAACO CORPORATION
18080 NORTH EAST 68TH STREET, SUITE C-130
REDMOND, WASHINGTON 98052
(425) 952-4205
www.jaaco.com
jaaco@qwestoffice.net

TABLE 1—ALLOWABLE TENSION AND SHEAR LOAD VALUES FOR PINS INSTALLED IN NORMALWEIGHT CONCRETE[1,2,3]

FASTENER	SHANK DIAMETER (in.)	MINIMUM EMBEDMENT DEPTH (in.)	MINIMUM SPACING (in.)	MINIMUM EDGE DISTANCE (in.)	ALLOWABLE LOADS (lbf)	
Concrete Compressive Strength:					2,500 psi	
Load Direction:					Tension	Shear
NP100S	0.100	3/4	4	3.2	125	60
NP145S	0.145	1	4	3.2	145	125

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.48 N, 1 psi = 6,895 Pa.

[1]Pins must not be driven until the normalweight concrete has reached the minimum compressive strength of 2,500 psi.
[2]Normalweight concrete thickness must be a minimum of three times the pin embedment depth.
[3]The tabulated allowable load values are for the fastener in the concrete only. Materials connected to the normalweight concrete must be investigated for compliance with applicable code in accordance with referenced design criteria, for both lateral resistance and fastener pull-through.

TABLE 2—COMPANY NAME/PRODUCT TRADE NAME CROSS-REFERENCE

COMPANY NAME	PRODUCT TRADE NAME	DESIGNATION[1]
Jaaco Corporation	NailPro	NP100S### and NP145S###

[1]### signifies that there are additional digits in the product designation for length, etc.

FIGURE 1—JAACO NAILPRO HARDENED BALLISTIC PINS: NP100S (LEFT) and NP145S (RIGHT)

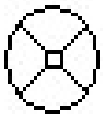

FIGURE 2—JAACO NAILPRO HARDENED BALLISTIC PIN HEAD MARK

DIVISION: 03 00 00—CONCRETE
Section: 03 16 00—Concrete Anchors

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 05 23—Wood, Plastic, and Composite Fastenings

REPORT HOLDER:

JAACO CORPORATION

EVALUATION SUBJECT:

JAACO NAILPRO NP100S AND NP145S HARDENED BALLISTIC PINS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that Jaaco NailPro NP100S and NP145S hardened ballistic pins, described in ICC-ES evaluation report ESR-3009, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2020 *Florida Building Code—Building*
- 2020 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The Jaaco NailPro NP100S and NP145S hardened ballistic pins, described in Sections 2.0 through 7.0 of the evaluation report ESR-3009, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*. The design requirements must be determined in accordance with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-3009 for the 2018 *International Building Code®* meet the requirements of the *Florida Building Code—Building* and the *Florida Building Code—Residential*.

Use of the Jaaco NailPro NP100S and NP145S hardened ballistic pins in accordance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* or the *Florida Building Code—Residential* has not been evaluated, and is outside the scope of this supplemental report.

For products falling under Florida Rule61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued February 2024.