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SMARTJACK® SYSTEM

CSI Sections:
05 00 00 METALS
05 50 00 Metal Fabrications

1.0 RECOGNITION

Supportworks, Inc. (Supportworks) SmartJack® System recognized in this report has been evaluated for use as adjustable steel posts for use in axial load bearing conditions. The structural performance of the SmartJack System complies with the intent of the provisions of the following codes and regulations:

- 2021, 2018, 2015, 2012, and 2009 International Building Code® (IBC)
- 2021, 2018, 2015, 2012, and 2009 International Residential Code® (IRC)

2.0 LIMITATIONS

Use of the SmartJack System recognized in this report is subject to the following limitations:

2.1 The SmartJack System posts have been evaluated for concentric axial compression loads only. Other loading conditions are outside the scope of this report.

2.2 The SmartJack System shall be installed in accordance with the applicable code, the manufacturer's published installation instructions, the design documents, and this report. A copy of the installation instructions and design documents shall be available on the jobsite during installation. Where there is a conflict, the most restrictive requirements shall govern.

2.3 The SmartJack System design values in this report can only be used with AISC design specifications and shall not be interchanged with AISI specifications.

2.4 The supported structure's capacity to transfer design loads to the SmartJack System is outside the scope of this report. When required, calculations using recognized engineering principles as described in IBC Section 1604.4, shall be prepared by a registered design professional and provided to the building official for approval.

2.5 The adequacy of the soil or foundation to resist loads is outside the scope of this report.

2.6 When required by the building official, the SmartJack System and components shall be positively connected using additional fasteners at the interaction of each of the components and anchoring of baseplates to the foundation. This fastening is outside the scope of this report, when required, and shall be approved by the building official. The presence or absence of these fasteners does not affect the allowable capacities in this report.

2.7 The SmartJack System recognized in this report is manufactured at PowerBrace in Des Moines, Iowa.

3.0 PRODUCT USE

3.1 General: The SmartJack System described in this report is a prefabricated adjustable steel system that includes steel beams, posts, and top and bottom brackets used to provide supplemental vertical axial support for framing systems above crawl spaces. The system may be used where an engineering design is required in accordance with IRC Section R301.1.3.

3.2 Design: The SmartJack System component allowable stress design (ASD) capacities are indicated in Tables 1 and 2 of this report. Table 1 shows the post ASD axial compression capacities for various lengths, with the maximum allowed amount of threaded rod exposure above the threaded post cap [9 inches (229 mm)]. Table 2 shows the ASD compressive strengths capacities of the remaining components. The system design capacity shall be limited to the least design capacity of the specified post based on length from Table 1 and to the design capacities of the individual components used in the assembly from Table 2. The SmartJack System has been evaluated as concentrically loaded with no eccentricity from the supported structure framing.

3.3 Installation: The SmartJack System shall be installed in accordance with the Supportworks Technical Manual. The square tube steel post section is cut to the required length. The cut edge must be smooth and level to provide uniform bearing for the threaded post cap and bottom plate bracket. The top bracket and bottom plate bracket are selected based on final assembly configuration considering the structure above, soil conditions below, and loading. The base plates shall be supported by soil, an aggregate base, or a foundation capable of supporting the applicable design loads.

3.3.1 Adjustable Section: The posts have an adjustable all-thread rod which can be extended a maximum of 9 inches (229 mm) above the threaded post cap. The all-thread rod shall be fully engaged through the thickness of the threaded post cap and tube section in each of the top brackets. The all-thread rod can be positioned to align with the top bracket so that a 0.25-inch-diameter (6.35 mm) by 2.5-inch-long (63.5 mm) bolt and matching nut may be installed to inhibit adjustable vertical movement.

3.3.2 Top and Bottom Bracket Installation: The bottom brackets and threaded post cap are designed to slip fit, with optional fastener connection at the steel post ends. Top brackets are designed to slip fit, with optional bolted connection at the all-thread rod extended above the post cap.

3.3.3 SmartJack Beam: The SmartJack Beam (SJQ400) is either a 96-inch- (2438 mm), 120-inch- (3048 mm), or 144-inch-long (3656 mm) beam that can be field-cut and used to transfer load from the supported structure to the SmartJack posts when SJQ350TP-B or SJQ350TP-C top brackets are used. The SJQ350TP-C shall be used as interior supports and shall not be used as the last support of a cantilevered section.

4.0 PRODUCT DESCRIPTION

4.1 General: The SmartJack System (Figure 1) described in this report, when assembled, has a top bracket, all-thread rod, threaded post cap, post, and bottom bracket. Beams are optional to distribute load from supported structure to adjustable posts.

4.2 Top Brackets

4.2.1 General: The top brackets are manufactured using steel tube conforming to ASTM A519-17, CDS, Grade 1018, 1020, or 1026; or to ASTM A513-20a, Type 5, Grade 1026, with a minimum yield strength of 60 ksi (414 MPa) and a minimum tensile strength of 70 ksi (483 MPa). The finish of the top brackets is electrodeposited zinc per ASTM B633-19 with thickness class Fe/Zn 8 µm (315 µin).

4.2.2 SJQ350TP-A Flat Plate Bracket: The SJQ350TP-A bracket is constructed from 0.375-inch-thick (9.53 mm) steel plate, and 1.75-inch-outside-diameter (44.45 mm) steel tube with 0.25-inch (6.35 mm) wall thickness. The bracket plate has a bearing area of 4.5- inches (114 mm) square. The steel plates conform to ASTM A36 or other High-Strength Low-Alloy (HSLA) steel with equal or better mechanical properties.

4.2.3 SJQ350TP-B U-Bracket: The SJQ350TP-B U-bracket is used to support SJQ400B beams and is constructed from 0.75-inch-thick (19.05 mm) steel plate, 0.125-inch-thick (3.175 mm) steel plate, and 1.75-inch-outside-diameter (44.45 mm) steel tube with 0.25-inch (6.35 mm) wall thickness. The 0.75-inch-thick (19.05 mm) plate conforms to ASTM A572 Grade 50 or other HSLA steel with equal or better mechanical properties. The 0.125-inch-thick (3.175 mm) plate conforms to ASTM A36 or other HSLA steel with equal or better mechanical properties.

4.2.4 SJQ350TP-C Beam Splice Bracket: The SJQ350TP-C Beam Splice Bracket is used to support two adjacent SJQ400B beams and is constructed from 0.38-inch-thick (9.65 mm) steel plate, 0.125-inch-thick (3.175 mm) bent steel plate, and 1.75-inch-outside-diameter (44.45 mm) steel tube with 0.25-inch (6.35 mm) wall thickness. The 0.38-inch-thick (9.65 mm) plate conforms to ASTM A572 Grade 50, with a minimum yield strength of 50 ksi (345 MPa) and a minimum tensile strength of 65 ksi (427 MPa), or other HSLA steel with equal or better mechanical properties. The 0.125-inch-thick (3.175 mm) bent steel plate conforms to ASTM A36 or other HSLA steel with equal or better mechanical properties.

4.3 All-Thread Rod Assembly: The steel all-thread rod is 10-inches (254 mm) long by 1.25 inches (31.75 mm) in diameter. The all-thread rod conforms to ASTM F1554 Grade 55, with a minimum yield strength of 55 ksi (380 MPa) and a minimum tensile strength of 75 ksi (517 MPa). The all-thread rod has a 0.38-inch-diameter (9.65 mm) hole located 0.69 inch (17.53 mm) from the top of the rod. The adjustable hex nut conforms to ASTM A563-15 Grade B, ASTM A194-20a Grade 2, or SAE J995 201707 Grade 5. The finish is electrodeposited zinc per ASTM B633-19, with thickness class Fe/Zn 8 µm (315 µin).

4.4 SJQ350TI Threaded Post Cap: The SJQ350TI threaded post cap is placed at the top of the tube post and is used to thread the all-thread rod assembly into the post. The threaded post cap is constructed from 0.75-inch-thick (19 mm) flat steel plate and 0.125-inch-thick (3.18 mm) bent steel plates. The bent steel plates may be substituted with 4.0-inch square metal HSS members with 0.120-inch (3.05 mm) wall thickness. The 0.75-inch-thick (19 mm) steel plate conforms to ASTM A572 Grade 50, with a minimum yield strength of 50 ksi (345 MPa) and a minimum tensile strength of 65 ksi (448 MPa), or other HSLA steel with equal or better mechanical properties. The 0.125-inch-thick (3.18 mm) bent steel plates conform to ASTM A36 or other HSLA with equal or better mechanical properties. The 4.0-inch square HSS members conform to ASTM A500-21 Grade C, with a minimum yield strength of 50 ksi (345 MPa) and a minimum tensile strength of 62 ksi (427 MPa). The finish is electrodeposited zinc per ASTM B633-19, with thickness class Fe/Zn 8 µm (315 µin).

4.5 SJQ350T 84 and 120 Posts: The posts are manufactured in two lengths, 84 inches (2134 mm) and 120 inches (3048 mm). The posts can be cut to the needed length on site. All posts are manufactured using 3.5-inch (89 mm) square metal HSS members with 0.095-inch (2.4 mm) wall thickness. The HSS sections conform to ASTM A500-21 Grade C, with a minimum yield strength of 50 ksi (345 MPa) and a minimum tensile strength of 62 ksi (427 MPa). The post finish is either hot-dip galvanized in accordance with ASTM A123-17, or electrodeposited zinc per ASTM B633-19 with thickness class Fe/Zn 8 µm (315 µin) or in-line triple coated galvanized (exterior) and zinc-rich painted (interior).

4.6 Bottom Brackets

4.6.1 SJQ350BP-A Bottom Plate Bracket: The SJQ350BP-A is primarily used where an aggregate base, e.g., recycled concrete or crushed stone is the foundation material. The SJQ350BP-A bracket bearing plate is constructed from 0.31-inch-thick (7.87 mm) by 12.0-inch-square (305 mm) steel plate. The post connection is constructed from

0.125-inch (3.18 mm) bent steel plates. The bent steel plates may be substituted with 4.0-inch square metal HSS members with 0.120-inch (3.05 mm) wall thickness. The steel plates conform to ASTM A36 or other HSLA material with equal or better mechanical properties and the steel HSS conforms to ASTM A500-21 Grade C, with a minimum yield strength of 50 ksi (345 MPa) and a minimum tensile strength of 62 ksi (427 MPa). The finish is electrodeposited zinc per ASTM B633-19, with thickness class Fe/Zn 8 µm (315 µin).

4.6.2 SJQ350BP-B Bottom Plate Bracket: The SJQ350BP-B is primarily used where finished concrete is the foundation material. The SJQ350BP-B bracket bearing plate is constructed from 0.31-inch-thick (7.87 mm) by 6.0-inch-square (305 mm) steel plate and conforms to ASTM A572 Grade 50, with a minimum yield strength of 50 ksi (345 MPa) and a minimum tensile strength of 65 ksi (427 MPa), or other HSLA steel with equal or better mechanical properties. The post connection is constructed from 0.125-inch-thick (3.18 mm) bent steel plates conforming to ASTM A36 or other HSLA material with equal or better mechanical properties. The bent steel plates may be substituted with 4.0-inch square metal HSS members with 0.120-inch (3.05 mm) wall thickness and conforms to ASTM A500-21 Grade C, with a minimum yield strength of 50 ksi (345 MPa) and a minimum tensile strength of 62 ksi (427 MPa). The finish is electrodeposited plated per ASTM B633-19, with thickness class Fe/Zn 8 µm (315 µin).

4.6.3 SJQ350BP-C Bottom Plate Footing Bracket: The SJQ350BP-C is primarily used where suitable soil is the foundation material. The SJQ350BP-C bracket bearing plate is constructed from 0.188-inch-thick (4.78mm) by 16.0-inch (406.4 mm) by 36.0-inch (914.4) steel plate. The post connection is constructed from 0.188-inch (4.78 mm) steel plate. All steel plates conform to ASTM A572 Grade 50, with a minimum yield strength of 50 ksi (345 MPa) and a minimum tensile strength of 65 ksi (427 MPa), or other HSLA steel with equal or better mechanical properties. The finish is electrodeposited zinc per ASTM B633-19, with thickness class Fe/Zn 8 µm (315 µin).

4.6.4 SJQ400B 96, 120, and 144 Beams: The beams are manufactured in three lengths, 96 inches (2438 mm), 120 inches (3048 mm), and 144 inches (1118 mm). The beams can be cut to the needed length on-site. All beams are manufactured using 4-inch (102 mm) square metal HSS members with a 0.120-inch (3.048 mm) wall thickness. The HSS sections conform to ASTM A500-21 Grade C, with a minimum yield strength of 50 ksi (345 MPa) and a minimum tensile strength of 62 ksi (427 MPa). The beam finish is either hot-dip galvanized in accordance with ASTM A123-17, or electrodeposited zinc per ASTM B633-19, with thickness class Fe/Zn 8 µm (315 µin) or in-line triple coated galvanized (exterior) and zinc-rich painted (interior). Beams are optional in the system.

5.0 IDENTIFICATION

The SmartJack System is identified by the report holders name, Supportworks, Inc., product name, model number, part number, and evaluation report number (ER-713). Either IAPMO UES Mark of Conformity may also be used as shown below:

or

IAPMO UES ER-713

6.0 SUBSTANTIATING DATA

6.1 Data submitted in accordance with the ICC-ES Acceptance Criteria for Adjustable Steel Columns (AC335), Approved February 2008, editorially revised January 2021.

6.2 Test reports are from laboratories in compliance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on Supportworks, Inc., SmartJack System to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification.

Products are manufactured at locations noted in Section 2.7 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org

TABLE 1-POST AXIAL COMPRESSION CAPACITY

SJQ350 Post Axial Compression Capacity[1]		
Post Length (ft)	**Total System Height (ft)[2]**	**Allowable Capacity (kips)**
1	1.75	20.5[3]
2	2.75	20.5[3]
3	3.75	20.5[3]
4	4.75	20.5[3]
5	5.75	20.5[3]
6	6.75	20.5[3]
7	7.75	20.5[3]
8	8.75	20.5[3]
9	9.75	20.5[3]
10	10.75	18.8
11	11.75	16.6
12	12.75	14.5
13	13.75	12.5
14	14.75	10.9
15	15.75	9.6
16	16.75	8.5
17	17.75	7.5
18	18.75	6.7
19	19.75	6.1
20	20.75	5.5

[1] - Each system requires the use of a threaded post cap and a threaded rod. Items are combined with a top bracket, a bottom bracket, and a post of various length. Allowable system capacity shall be limited to the lowest compression capacity of the assembled components using the values given in Tables 1 and 2. Allowable capacities are based on an effective length factor, K, equal to 1.0 for determining the effective length.

[2] – Total System Height includes maximum extension of the threaded rod of 9 inches. System lengths that have a post length greater than 10 feet require a custom order.

[3] – Post axial compression is limited by the threaded post cap component used in the system. Actual capacities of HSS members are greater.

TABLE 2 - SmartJack Component Capacities[1]

Component	Item	Item Description	Allowable Compression Capacity (kips)
Top Brackets	SJQ350TP-A	Top Plate-A-Style	10.0[2]
	SJQ350TP-B	Top Plate-B-Style	14.6
	SJQ350TP-C	Top Plate-C-Style	18.4
Bottom Brackets[4]	SJQ350BP-A	Bottom Plate-A Style	8.1
	SJQ350BP-B	Bottom Plate-B Style	23.8
	SJQ350BP-C	Bottom Plate-C Style	6.0
Post Cap	SJQ350TI	Threaded Post Cap	20.5
	SJQ125ATR	Threaded Rod	27.3
			Allowable Distributed Load[3] (plf)
Optional Beams	SJQ400 Beam	Beam-4 ft Span	2720
	SJQ400 Beam	Beam-5 ft Span	1740
	SJQ400 Beam	Beam-6 ft Span	1160
	SJQ400 Beam	Beam-7 ft Span	730
	SJQ400 Beam	Beam-8 ft Span	490

[1] - Each system requires the use of a threaded post cap and a threaded rod. Items are combined with a top bracket, a bottom bracket, and a post. Allowable system capacity shall be limited to the lowest compression capacity of the assembled components using the values given in Tables 1 and 2. Optional steel beams may also be used and limited to the allowable beam loads given in Table 2. See Figure 1 for assembly details.

[2] - The listed capacity for SJQ350TP-A includes the bending effects from uniform bearing distribution when used to support a material such as wood. When supporting a steel beam, the allowable capacity will not be limited by this effect and system capacity will be governed by another system component.

[3] - The given allowable beam loads assume serviceability deflection limits of l/360 and l/240 for Live Load and Total Load, respectively. Beam loading assumes a LL/TL ratio equal to 40/55. Design professionals may require other serviceability limits; justification shall be provided to the building official for approval. Supporting a cantilever requires the beam to be continuous over the SmartJack support. The length of the cantilever may be up to 50% of the length of the adjacent beam span or 30 inches, whichever is less. Each beam segment must be supported by at least two SmartJack supports.

[4] - The bottom brackets have been designed for the following maximum uniform bearing stress; Bracket A: 56 psi, Bracket B: 661 psi , Bracket C: 10.42 psi (1500 psf).

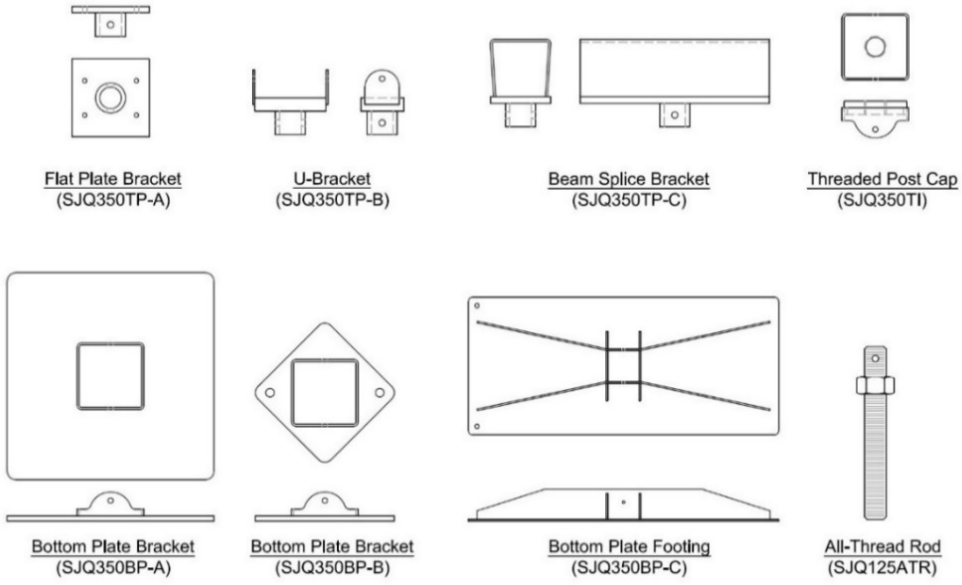

FIGURE 1 – SmartJack System Assemblies and Components

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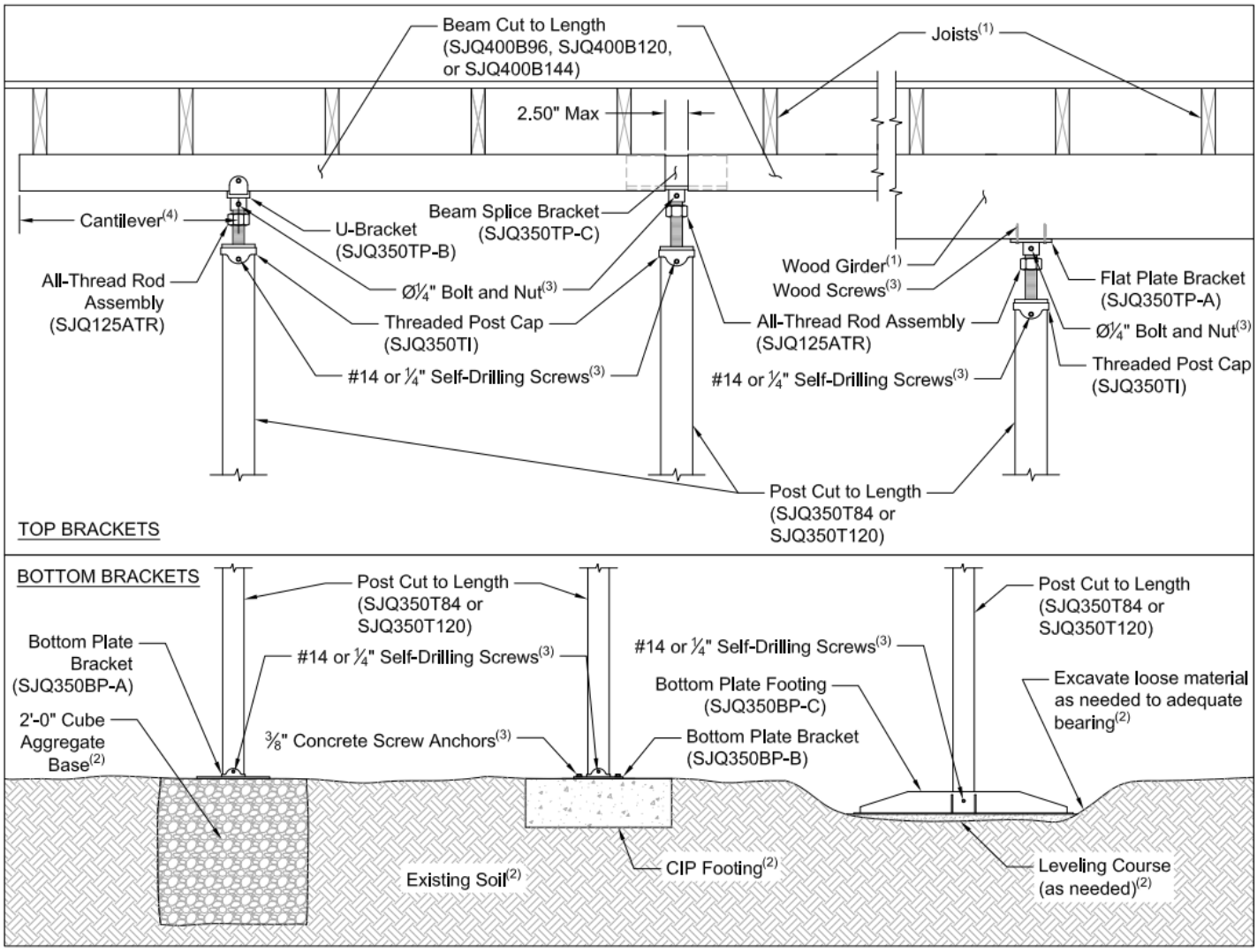

(1) - Supported structure - See Section 2.4
(2) - Supporting materials - See Section 2.5
(3) - Optional fasteners - See Section 2.6
(4) - Supporting a cantilever requires the beam to be continuous over the SmartJack support. The length of the cantilever may be up to 50% of the length of the adjacent beam span or 30 inches, whichever is less. Each beam segment must be supported by at least two SmartJack supports.

FIGURE 1 (continued) – SmartJack System Assemblies and Components