



DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES

Section: 06 43 00—Wood Stairs and Railings

REPORT HOLDER:

MPI CONCEPTS, INC.

EVALUATION SUBJECT:

ISTAIR™ SYSTEM

1.0 EVALUATION SCOPE

Compliance with the following codes:

2021, 2018, and 2015 *International Residential Code*® (IRC)

Property evaluated:

Structural

2.0 USES

The ISTAIR™ System is intended for use as interior residential stairways in non-fire rated One and Two-Family Dwellings constructed in accordance with the IRC.

3.0 DESCRIPTION

3.1 General:

The ISTAIR™ System is a stair assembly kit consisting of steel stringer brackets, steel hinge-gussets, stair treads, stair tread riser gussets, and fastening screws.

3.2 Components and Materials:

3.2.1 Stringer: The stringers used in ISTAIR™ System are nominal 2x4 (38 mm by 89 mm), No. 2 or better Spruce Pine Fir (SPF) lumber, having a specific gravity and service moisture as specified in the 2018 National Design Specification® (NDS) for Wood Construction.

3.2.2 Stringer Brackets: The stringer brackets are triangular in shape and fabricated from 18 gage and/or 20 gage steel complying with ASTM A653 Grade 33 with a G60 galvanization coating. The base-metal thickness of the stringer brackets is 0.048 inch (1.22 mm) for 18 gage steel and 0.036 inch (0.91 mm) for 20 gage steel.

3.2.3 Hinge-gusset: The hinge-gussets are used for support underneath the tread to riser connections. The hinge-gusset is fabricated from 20 gage steel complying with ASTM A653 Grade 33 with a G60 galvanization coating. The base-metal thickness of the hinge-gusset is 0.036 inch (0.91 mm) for 20 gage steel.

3.2.4 Stair Treads and Risers: The treads and riser in the ISTAIR™ System are made from the 23/32 PERF CAT APA

Rated Underlayment Plywood or 3/4 PERF CAT APA Structural 1 Rated OSB, complying with the US DOC PS 1 and PS 2, respectively.

3.2.5 Fasteners: Screw fasteners used to install the components of the ISTAIR™ System are No. 10 x 1 1/2 (38 mm) long strong point screws and No. 6 x 3/4 (19 mm) long zinc plated pan head screws. Nails of 0.131-inch-diameter (3.3 mm) x 3-inch-long (76 mm) are used in the connections between the ISTAIR™ System top-end risers and the joist headers.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The ISTAIR™ System has been evaluated by testing under a 300-pound concentrated load in accordance with the loading requirement in IRC Table R301.5 and Footnote c to Table R301.5, and is limited to use in non-fire rated One and Two-Family Dwellings constructed in accordance with the IRC.

4.2 Installation:

Each stringer bracket is fastened to the nominal 2x4 (38 mm x 89 mm) SPF lumber stringer with four No. 10 x 1 1/2 inch (38 mm) long Strong Point Screws, to the treads with two No. 6 x 3/4 inch (19 mm) long zinc plated pan head screws, and to the risers with two No. 6 x 3/4 (19 mm) long zinc plated pan head screws. On the underside of each tread to riser connection, a steel hinge-gusset must be attached to riser and tread, as an additional support. See Figures 1 and 2 for ISTAIR™ System installation details.

5.0 CONDITIONS OF USE

The ISTAIR™ SYSTEM described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** The use of the ISTAIR™ System described in this evaluation report is limited in non-fire rated One and Two-Family Dwellings constructed in accordance with the IRC.
- 5.2** The ISTAIR™ System described in this evaluation report must be assembled and installed in accordance with the manufacturer's approved installation instructions, the applicable code provisions, and this report. A copy of the manufacturer approved ISTAIR™ installation instructions must be available at the jobsite.
- 5.3** All construction, wood framing including, header joists, beams, joists, and the associated connections between the stair stringers and wall studs needed to support the ISTAIR™ System are outside the scope of this evaluation report, and must be designed by a

registered design professional in accordance with the applicable provisions of the codes.

- 5.4 Subfloor shall be cut leaving a 1¹/₂ inches (38 mm) minimum overhang.
 - 5.5 The 2x4 (38 mm x 89 mm) lumber stringers do not support the full code prescribed design loading and must be attached to adjacent wall studs per Table 1 of this evaluation report.
 - 5.6 The ISTAIR™ System is limited to a maximum width of 48 inches (1219 mm) and must not be less than 36 inches (914 mm).
 - 5.7 The ISTAIR™ System must have an impervious moisture barrier attached to the stringer feet on any system that contacts a concrete or masonry slab. Where any wood-based component of the ISTAIR™ System (including structural framing) is in direct contact with concrete or masonry slab that is in direct contact with the ground, protection of wood-based component from decay shall be provided by the use of naturally durable wood or wood that is preservative-treated in accordance with AWPA U1.
 - 5.8 Use of ISTAIR™ stringer brackets, hinge-gussets, and screws in contact with pressure treated lumber has not been evaluated and is outside the scope of this report.
 - 5.9 The underside of the ISTAIR™ System must be separated from the interior of the residential One and Two-Family Dwellings by using a code prescribed minimum of ½ inch (12.7 mm) thick gypsum board in all uses and locations.
 - 5.10 The ISTAIR™ System is fabricated under an approved quality control program with inspections by ICC-ES.
- ## 6.0 EVIDENCE SUBMITTED
- 6.1 Report, dated March 11, 2011, for the concentrated load tests in accordance with ASTM D7032 Section 5.1.2 on i18gs, i20gs and trg45 i-Stair brackets of ISTAIR™ System.

- 6.2 Report, dated June 28, 2019, for the concentrated load tests in accordance with ASTM D7032 Section 5.1.2 on i18gs, i20gs and trg45 i-Stair brackets of ISTAIR™ System.
- 6.3 Engineering calculations for the connections of 2x4 (38 mm x 89 mm) SPF lumber stringers of ISTAIR™ System to the wall studs.
- 6.4 ISTAIR™ System installation instructions.
- 6.5 An approved Quality Control Manual for the ISTAIR™ System.

7.0 IDENTIFICATION

- 7.1 Product labeling shall include, the name of the report holder or listee, and the ICC-ES mark of conformity. The listing or evaluation report number (ICC-ES ESR-4939) may be used in lieu of the mark of conformity. Each ISTAIR™ System assembly kit must be identified by a stamp, on each individual component or on the packaging, bearing the report holder's name (MPI Concepts, Inc.) and address, product name, manufacturing plant, fabrication date, and the ICC-ES evaluation report number (ESR-4939) or the ICC-ES mark of conformity.
- 7.2 The report holder's contact information is the following:

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TABLE 1—NUMBER OF FASTENERS REQUIRED PER STUD FOR CONNECTION BETWEEN ISTAIR™ STRINGER AND SUPPORT WALL^{1,2}

FASTENER (inch)	STUD SPACING (inch)	STAIR WIDTH ⁴ (inch)			
		36	42	45	48
Screws ³ (⁵ / ₁₆ x 4)	12	1	1	1	1
	16	1	1	1	1
	19.2	1	1	1	1
	24	1	1	1	1
Nails (0.131 x 3)	12	2	2	2	2
	16	2	2	2	2
	19.2	2	2	2	2
	24	2	2	2	2

For SI: 1 inch = 25.4 mm

¹ Number of fasteners determined by the engineering analysis assuming a 300 lb. concentrated load distributed between two studs.

² Fasteners analyzed in accordance with the 2018 National Design Specification® (NDS) for Wood Construction design provisions.

³ The screws are GRK RSS Screws in ICC-ES ESR-2442.

⁴ Refer to Figure 2 for the stair width, tread and riser dimensions.

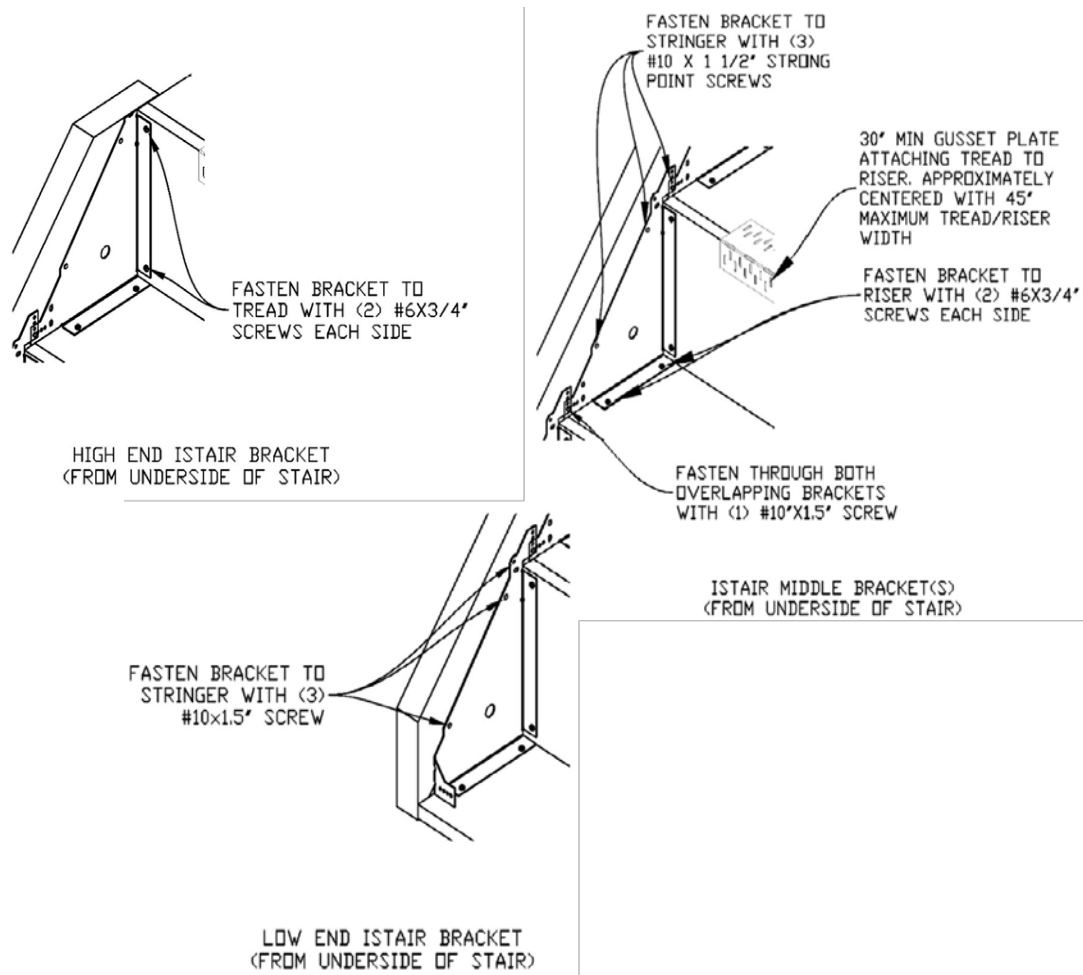


FIGURE 1—IStair™ SYSTEM BRACKET TO RISER, STRINGER, AND TREAD INSTALLATION DETAILS

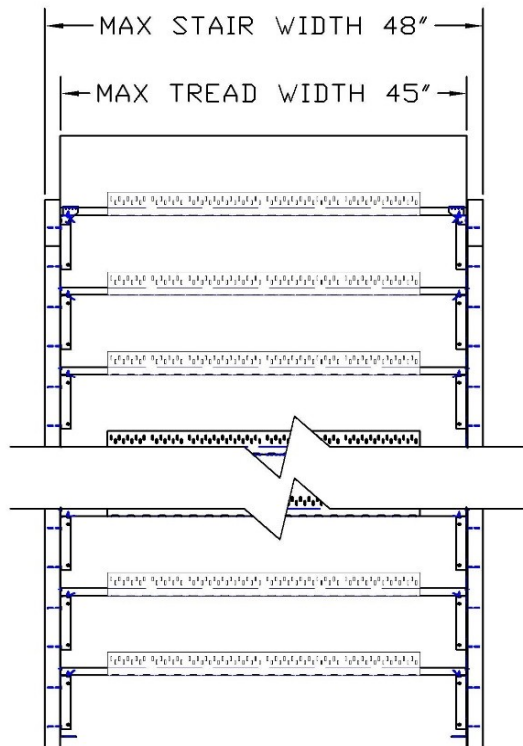
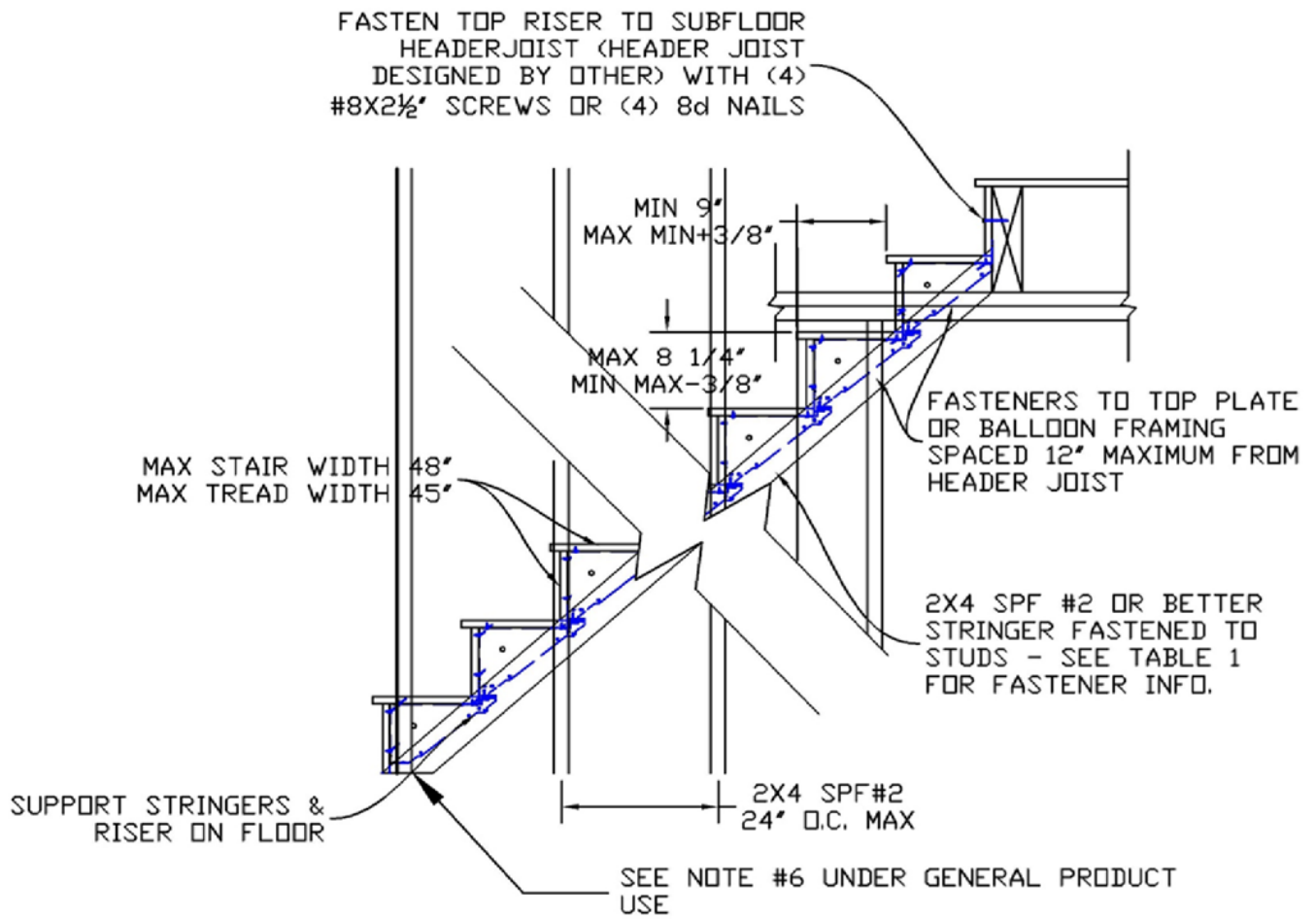


FIGURE 2—IStair™ SYSTEM BRACKET AND HINGE-GUSSET INSTALLATION DETAILS