shall be obtained from the appropriate standard.

6.5.1 Creep—Two of the I-joint specimens shall be loaded to 20% of their moment capacity and center-span deflection readings taken. For purposes of this test, 20% is assumed to be typical basic dead load (BDL). The specimen shall then be loaded to 1 1/2 times the moment capacity for 1 h and deflection readings taken. The specimen shall be unloaded to BDL and deflection readings shall be taken after 15 min. The specimens must recover an average of 90% of the total deflection from BDL to the end of the 1 h load period.

6.6 Details of End Use:

6.6.1 The intent of this section is to define common application details which, if not considered, may reduce structural capacity. In addition to the following minimum considerations, other details which may affect application performance should be investigated (for example, minimum nail spacing to avoid splitting).

6.6.2 Bearing Length Qualification Tests—Tests shall be conducted to determine recommended bearing lengths. The tests shall establish:

6.6.2.1 The minimum bearing lengths without web reinforcement that will develop ultimate shear capacity,

6.6.2.2 The minimum bearing lengths with specified web reinforcement that will develop ultimate shear capacity,

6.6.2.3 Any special requirements at interior supports of multi-span joists.

6.6.2.4 A minimum of five tests shall be conducted for each of the three conditions. Special details must be qualified with additional test specimens. Reinforcing materials shall be specified including size, fit, tolerance and connections.

6.6.3 Web Openings:

6.6.3.1 Holes which remove a significant portion of the web will reduce shear strength at that section of the I-joint. Tests are to define such reductions for varying size and shape openings so that in application openings can be located at sections subjected to appropriate shear levels. A minimum of five specimens of at least three depths encompassing the product range shall be tested for each depth/opening combination. Test specimens and setup may be the same as specified in 6.2 with an opening located between support and load points and centered on a web joint, when web joints exist in the product.

6.6.3.2 Maximum size hole which can be located anywhere in the web, shall be specified by the manufacturer and supported by data.

6.6.3.3 Spacing of allowed multiple holes must be verified by test.

6.6.4 Special Details—Concentrated loads may require stiffeners at special locations. Loads may also be supported by connection to the web or on bottom flanges. These and other special conditions require appropriate testing.

7. Design Values

7.1 Design Value Limited—Design values are determined from the analysis and capacities as specified in this standard. In no case may a design value exceed the capacity determined in Sections 6 or 11.

7.2 Design Value—It is the responsibility of the I-joint producer to determine design values. Judgement is required particularly when assessing design values from qualification tests. Design values should consider potential low-line lot capacities to avoid marginal application performance or uneconomical reject rates in the quality assurance program.

8. Independent Inspection

8.1 A qualified agency shall be employed by the manufacturer for the purpose of monitoring the quality assurance production process on a random unannounced basis. The qualified independent agency shall establish (or approve) and maintain procedures for quality assurance.

8.2 A qualified agency is defined as one that:

8.2.1 Has trained technical personnel to verify that the grading, measurement, species, construction, shaping, bonding, workmanship, and other characteristics of the products as determined by inspection, sampling and testing comply with all applicable requirements specified herein;

8.2.2 Has procedures to be followed by its personnel in performance of the inspection and testing; and

8.2.3 Has no financial interest in, or is not financially dependent upon, any single company manufacturing the product being inspected or tested; and is not owned, operated, or controlled by any such company.

9. In-House Quality Assurance

9.1 Manufacturing Standard:

9.1.1 A manufacturing standard shall be written and maintained for each product and each production facility and shall be the basis for the qualified agency's specific inspection at that location. As a minimum, it shall include the following:

9.1.1.1 Material specifications, including incoming inspection and acceptance requirements,

9.1.1.2 Process controls for each operation in production of the product,

9.1.1.3 Quality control, inspection and testing procedures and frequencies, and

9.1.1.4 Finished product identification, handling, protection and shipping requirements.

9.2 Inspection Personnel—All in-house persons responsible for quality control shall demonstrate to the satisfaction of the qualified agency that they have adequate knowledge of the manufacturing process, of the inspection and test procedures used to control the process, of the operation and calibration of the recording and test equipment used and of the maintenance and interpretation of quality control records.

9.3 Record Keeping—All pertinent records shall be maintained on a current basis and be available for review by both in-house and qualified agency inspection personnel. As a minimum, such records shall include:

9.3.1 All inspection reports and records of test equipment calibration whether accomplished by in-house or qualified agency personnel,

9.3.2 All test data, including retests and data associated with rejected production, and

9.3.3 Details of any corrective actions taken and the disposition of any rejected production, resulting from tests or inspections.

9.4 Testing Equipment—Testing equipment is to be properly maintained, calibrated and evaluated for accuracy and adequacy in accordance with Practices E 4 and other appropriate procedures, at a frequency satisfactory to the qualified agency.
9.5 I-Joist Quality Control Testing:
9.5.1 Objectives—The following objectives are to be met simultaneously with the quality control testing program:
9.5.1.1 Provide test data for use in maintaining and updating design values, and
9.5.1.2 Verify production process and material quality on a daily basis.
9.5.2 Initial Quality Control—When qualification is based on no more than the minimum testing required in this standard, the producer shall initiate higher test frequencies and retset levels. All new producers are advised to intensify quality control in early production. Adjustments to these requirements can be made as the stability of the process and material characteristics is defined over a period of time in production.
9.5.3 Required Tests—The following shall be the scope of a minimum testing program:
9.5.3.1 Test methods shall be identical to those of Section 6.
9.5.3.2 The shear strength test described in 6.2 shall be used for quality control of shear strength. This test is required even if qualification is by calculation.
9.5.3.3 If flanges contain end joints qualified in accordance with 6.4, daily tension tests of full-section joints shall be conducted. Durability tests of such joints are required only at such frequency as required to verify adhesive performance in accordance with 5.3.
9.5.3.4 When flange material is qualified by test in accordance with 6.3.1, the testing of that section shall be included in daily quality control tests.
9.5.3.5 When moment capacity is determined empirically, the test detail in 6.3.2 shall be conducted as part of the daily quality control program. All depths produced shall be tested in this program and the tests shall include deflection measurement.
9.5.3.6 When the flange material does not have a modulus of elasticity assigned by the code, stiffness measurement of the material shall be part of the quality control program.
9.5.4 Data Collection and Analysis—Test frequency, minimum test values and rejection criteria for all tests of 9.5.3 shall be chosen to yield quality control performance which is consistent with design values assigned to the product and its intended use.

10. Qualification and Quality Assurance of I-Joist Components Manufactured by Others
10.1 Producer's Responsibility—When the I-joist producer purchases material which would require qualification and quality control under the provision of this standard, the I-joist producer shall be responsible for assuring that, as a minimum, such material conforms to the requirements of Section 6, 8, 9, and 11 of this standard.
10.2 Record Keeping—The I-joist producer shall obtain and maintain records of certification from the outside producer’s qualified agency that the components supplied conform to the requirements of this standard.
10.3 Identification—All such components shall be appropriately marked as agreed upon between the component and I-joist producers. In general, such identification shall include the information specified in Section 13.

11. Periodic Reevaluation of Structural Capacities
11.1 Reevaluation Required—Each capacity monitored by the required tests of 9.5.3 shall be reevaluated on a periodic basis. Reevaluation shall be accomplished at the end of the first six months of production by any new manufacturer and for any new product line, and thereafter each such capacity shall be reevaluated at the end of each successive year of production. Reevaluation may be done at greater frequency at the option of the producer.
11.1.1 Bearing Capacity Reevaluation—A one-time reevaluation of bearing capacity shall be accomplished at the end of the first six months of production by any new manufacturer and for any new product line. The reevaluation is to be based on data from specimens selected randomly throughout the six-month period and tested when convenient. Tests are to be conducted in accordance with 6.6.1 on the details (minimum bearing length and reinforcement as required) developed in that section.
11.2 Minimum Data Base in Periodic Evaluation:
11.2.1 Shear and Flange Material Tests—The minimum number of tests to be included in the analysis is that required for qualification in accordance with Section 6. When it appears that this requirement may not be met by the initial test frequency established, the frequency of testing shall be increased. Evaluation of test frequency shall be accomplished early in the evaluation period to ensure that test data is representative of production in the period and will be randomly accumulated at time intervals spaced throughout the period.
11.2.2 Empirical Moment Capacity Tests—The minimum number of tests required is that used for qualifying in 6.3.2, except that no more than half of the number of depths tested in qualification need to be included in the analysis when insufficient data has accumulated in other depths. Test frequency in the period must be adjusted as necessary to ensure this criteria. When the reevaluation requires change in accordance with 11.4 and data on the full range of depths is not available, additional depths shall be selected and tested so that the data available is at least equal to that required in 6.3.2, and the analysis of all the data shall then be used to assess new design values.
11.3 Data Analysis—Data to be included in the analysis is all that developed in the latest evaluation period from the testing specified in 9.5.3, except that tests associated with rejected production may be excluded. Also, with the agreement of the qualified agency, low test values related to any assignable and correctable cause which has been corrected, may be excluded from consideration. Analysis of the data shall be identical to that of the applicable qualification section of this standard.
11.4 Adjustment of Design Value—No capacity determined in the analysis of 11.3 may be less than the current design value or the design value must be reduced. When stiffness capacity is determined from flange material stiffness tests or joist bending tests, the comparison shall be between the mean of the tests in the period and the design value; the flange modulus of elasticity in the design equation shall be reduced proportionately when the current test mean is less than the design value.