STAINLESS STRUCTURALS
SPECIAL PROFILES IN STEEL

Technical Guide: How to Specify Stainless Structural Shapes

Engineering Specification Document for Structural, Industrial & Architectural Applications

Stainless steel structural shapes play a critical role in structural systems that require long-term durability, high mechanical performance, and superior corrosion resistance. These shapes are integral in buildings, infrastructure, industrial process environments, coastal installations, and architectural exposed structural steel (AESS) applications.

This document provides complete, copy-ready CSI specification language written specifically for users of Stainless Structurals products. Engineers can incorporate this specification text directly into construction documents to ensure correct material selection and reduce the risk of inappropriate substitutions.

1. Importance of Correct Stainless Steel Specification

Selecting and specifying stainless steel correctly is essential for achieving:

- Long-term corrosion resistance
- Reduced lifecycle maintenance costs
- Higher structural reliability
- Consistent dimensional performance
- Architectural surface quality and durability

Improper specification may result in:

- Premature corrosion
- Unexpected failures
- Fabrication or welding issues
- Increased construction and maintenance costs
- Material substitution that compromises performance

Stainless Structurals produces both hot-rolled and laser-fused stainless steel profiles to stringent tolerances and international standards. This document aligns with the most commonly referenced ASTM, AWS, EN, and AISC requirements used in structural and mechanical design.

2. Technical Specification Language (CSI Format)

Section 05 12 00 – Structural Stainless Steel Framing

Engineers may copy/paste this text directly into their project specifications.

PART 1 — GENERAL

1.1 SUMMARY

A. This Section includes structural stainless steel shapes such as beams, channels, tees, angles, and custom profiles intended for structural, architectural, industrial, and corrosive environment applications.

B. Products include:

- Hot-rolled stainless structural profiles
- Laser-fused stainless structural shapes
- Custom/welded stainless shapes according to project requirements

C. **Basis of Design Manufacturer:**
Stainless Structurals (www.stainless-structurals.com)

1.2 REFERENCES

- **ASTM A276** – Stainless Steel Bars and Shapes
- **ASTM A479** – Stainless Steel Bars and Shapes for Pressure Vessels
- **ASTM A484** – General Requirements for Stainless Steel Bars, Billets, and Shapes
- **ASTM A1069** – Laser-Fused Stainless Steel Shapes
- **AWS D1.6** – Structural Welding Code: Stainless Steel
- **AISC Steel Construction Manual**

- **EN 10088-4** – Technical Delivery Conditions for Stainless Steel Structural Components

These standards define the chemical, mechanical, dimensional, and fabrication requirements governing the use of stainless steel structural shapes.

1.3 SUBMITTALS

A. Product Data:
Manufacturer data sheets including dimensional profiles, load/span tables, and weld certifications.

B. Shop Drawings:
Indicate:

- Member sizes
- Lengths
- Fabrication requirements
- Weld specifications
- Connection geometry

C. Mill Test Reports (MTRs):
Provide certified heat numbers, mechanical properties, and chemical composition.

1.4 QUALITY ASSURANCE

A. Manufacturer shall have a minimum of 10 years of experience producing stainless structural shapes.

B. Laser-fused shapes shall be produced using automated fusion systems capable of full penetration welds with consistent heat input. Welds shall meet AWS D1.6.

C. Hot-rolled profiles shall meet or exceed dimensional tolerances of ASTM A484 and EN 10088-4.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. **Basis of Design:**
Stainless Structurals

Alternate manufacturers must demonstrate full compliance with performance criteria listed in this Section.

2.2 MATERIALS

A. Stainless Steel Grades

- **304/304L:** General structural use and mildly corrosive environments
- **316/316L:** Marine, chemical, and highly corrosive environments
- **Duplex 2205/2304:** High strength and chloride-rich environments
- Additional grades as indicated in structural drawings

B. Structural Shapes

- Wide flange beams (W, S, HEA, HEB, IPE)
- Standard & parallel flange channels (C, MC, UPN, UPE)
- Equal and unequal leg angles
- Tees (hot-rolled or laser-fused)
- Flat bars or plate for built-up sections
- Custom stainless profiles per project requirements

2.3 MANUFACTURING METHODS

A. Hot-Rolled Stainless Profiles

1. Produced via hot forming per EN 10088-4.
2. Provide homogeneous microstructure with consistent mechanical properties.
3. Suitable for high-load or elevated-temperature conditions.

B. Laser-Fused Stainless Profiles

1. Conform to ASTM A1069.

2. Utilize continuous, full-penetration welds with controlled heat input.
3. Provide tight dimensional tolerances ideal for architectural and custom geometries.

Laser-fused profiles offer near-unlimited flexibility while maintaining structural integrity.

2.4 FINISHES

- Mill finish
- Pickled & passivated
- Blasted matte finish
- Polished finishes: No. 4, No. 6, No. 8 (architectural)

Passivation per ASTM A967 is recommended following fabrication for enhanced corrosion performance.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install stainless steel structural shapes per Engineer-of-Record requirements, manufacturer recommendations, and AWS D1.6.

B. Use compatible stainless hardware and consumables matching or exceeding the specified grade.

C. Prevent contamination from carbon steel during handling, storage, and fabrication.

3.2 PROTECTION

A. Protect stainless components from carbon steel dust, abrasive debris, and chloride exposure during construction.

B. Clean and passivate surfaces as required after installation.

4. Optional Performance-Based (VE-Resistant) Requirements

To maintain design intent, no substitutions shall be accepted unless the proposed alternative meets all of the following:

1. Equal or greater yield strength
2. Equivalent corrosion resistance verified through PREN values or ASTM pitting data
3. Comparable lifecycle cost over a 30-year minimum design life
4. Equal stiffness and weldability requiring no redesign
5. Availability of matching beam, channel, angle, and tee profiles

Basis of Design: Stainless Structurals hot-rolled and laser-fused stainless profiles.

Conclusion

Properly specified stainless steel shapes deliver superior structural performance, minimized maintenance, and excellent resistance to corrosive environments. Using the technical specification language provided in this document helps ensure:

- Correct grade and shape selection
- Compliance with ASTM, AWS, EN, and AISC standards
- Dimensional and mechanical reliability
- Reduced VE (value-engineering) risk
- Long-term asset durability

Stainless Structurals provides one of the most comprehensive stainless structural shape portfolios in the world, backed by advanced manufacturing technologies and rigorous mill certification.