din 5480 w35x2x30x16x9g Document

din 5480 w35x2x30x16x9g is a designation that refers to a specific structural steel profile conforming to the DIN 5480 standard, which is widely used in engineering, construction, and manufacturing sectors across Europe. This particular designation encodes detailed information about the profile's dimensions, shape, and mechanical properties, making it essential for engineers and architects to select the correct profile for their projects. Understanding the meaning behind this designation, its specifications, and its applications is crucial for ensuring safety, efficiency, and compliance in structural design.

Understanding the DIN 5480 Standard

Overview of DIN 5480

The DIN 5480 standard, established by the Deutsches Institut für Normung (German Institute for Standardization), specifies the dimensions, tolerances, and mechanical properties of hot-rolled steel profiles. It covers a broad range of profile types, including channels, beams, angles, and other structural shapes.

This standard aims to:

- Ensure uniformity and interchangeability of steel profiles
- Provide detailed specifications for manufacturing and quality assurance
- Facilitate precise engineering calculations and structural analysis

Scope and Applications

Profiles conforming to DIN 5480 are used extensively in:

- Structural frameworks for buildings and bridges
- Mechanical engineering components
- Manufacturing of cranes, supports, and heavy machinery
- Any application requiring high-strength, reliable steel profiles

Decoding the Profile Designation: W35x2x30x16x9g

Breaking Down the Designation

The designation "W35x2x30x16x9g" encodes specific information about the profile:

- W: Indicates a wide flange beam or W-profile, designed for high load-bearing capacity
- 35: Nominal height of the profile in centimeters (here, 35 cm)
- x: Separator indicating the start of dimension details
- 2: Flange thickness in centimeters (2 cm)
- 30: Web thickness in millimeters (30 mm)
- 16: Flange width in centimeters (16 cm)
- 9: Radius or other specific geometric parameter, possibly fillet radius or weight per meter
- g: Indicates a specific grade or treatment, such as a galvanized or standard grade

This code helps engineers quickly understand the profile's dimensions and structural capabilities.

Detailed Profile Dimensions and Specifications

General Dimensions

Based on the designation:

- Height (h): 35 cm (from the "35" in the code)
- Flange Thickness (t_f): 2 cm
- Web Thickness (t_w): 30 mm
- Flange Width (b_f): 16 cm

The profile's overall geometry influences its load capacity and suitability for different structural applications.

Material Grade and Mechanical Properties

The suffix "g" often signifies a specific grade or treatment:

- Material Grade: Could be S235, S355, or other steel grades depending on regional standards and manufacturer specifications
- Mechanical Properties:
- Yield Strength (?_y): Typically ranges from 235 MPa (for S235) to higher values
- Tensile Strength (?_u): Varies with grade
- Ductility and Toughness: Influenced by the steel grade and heat treatment

Cross-Sectional Area and Weight

The profile's cross-sectional area affects its weight and load capacity:

- Approximate Cross-Sectional Area: Calculated based on flange and web dimensions
- Weight per Meter: Usually expressed in kg/m; for W35x2x30x16x9g, it might be around 60-80 kg/m, depending on steel density and precise manufacturing parameters

Structural and Mechanical Characteristics

Load-Bearing Capacity

Profiles like W35x2x30x16x9g are designed for high load-bearing applications:

- Flexural Strength: Determines resistance to bending
- Shear Strength: Critical for web stability
- Axial Load Capacity: For columns and supports

Design Considerations

Engineers must consider:

- Buckling Resistance: Especially for slender profiles
- Connection Points: Compatibility with bolts, welds, and other connections
- Corrosion Protection: Application of galvanization or coatings if exposed to elements

Standards and Compliance

Profiles must meet:

- European Standards: EN 10025, EN 1993 (Eurocode 3)
- Regional Codes: Local building codes and safety regulations

Manufacturing and Quality Control

Production Processes

The typical manufacturing involves:

- Hot rolling of steel billets
- Profiling through continuous or sectional rolling
- Cutting and finishing to specified dimensions
- Surface treatments such as painting or galvanization

Quality Assurance Measures

To ensure conformity:

- Dimensional inspections
- Mechanical property testing
- Surface quality checks
- Compliance with DIN 5480 tolerances

Common Testing Methods

- Tensile tests
- Ultrasonic testing for internal flaws
- Visual inspections for surface defects

Applications of W35x2x30x16x9g Profiles

Construction and Infrastructure

These profiles are ideal for:

- Structural frameworks of commercial and industrial buildings
- Bridges and overpasses
- Support beams and columns

Mechanical Engineering

Use cases include:

- Heavy machinery frames
- Crane supports
- Manufacturing equipment

Specialized Applications

In niche sectors, such profiles are used for:

- Railings and fencing
- Heavy-duty shelving
- Customized structural components

Advantages of Using DIN 5480 W-Profiles

Standardization and Compatibility

- Ensures interchangeability across manufacturers
- Simplifies procurement and logistics

High Strength-to-Weight Ratio

- Provides robust support with minimal material use
- Enhances efficiency in design and construction

Versatility

- Suitable for a wide range of structural applications
- Compatible with various connection methods

Cost-Effectiveness

- Bulk manufacturing reduces costs
- Durability and longevity lower maintenance expenses

Conclusion

The designation "din 5480 w35x2x30x16x9g" encapsulates a detailed profile specification that plays a critical role in modern structural engineering. Understanding its dimensions, material properties, and applications allows engineers to design safer, more efficient structures. The adherence to DIN 5480 ensures quality, consistency, and compatibility, making these profiles a reliable choice in diverse construction and manufacturing scenarios. Whether used in large-scale infrastructure projects or specialized mechanical components, these profiles exemplify the precision and robustness required in contemporary engineering.

DIN 5480 W35x2x30x16x9G: An In-Depth Analysis of a Structural Steel Profile

The world of structural engineering and steel construction relies heavily on standardized profiles that ensure safety, consistency, and efficiency. Among these, the designation DIN 5480 W35x2x30x16x9G stands out as a complex, detailed identifier for a specific structural steel profile conforming to German standards. This article aims to demystify this designation, providing a comprehensive overview of its components, properties, applications, and significance within the steel construction industry.

Understanding the DIN 5480 Standard and Its Context

What is DIN 5480?

DIN 5480 is a German industrial standard that specifies the dimensions, tolerances, and technical requirements for welded I-beams and similar steel profiles. Established to promote uniformity and quality in steel construction, DIN 5480 covers various types of steel sections, emphasizing their mechanical properties and geometric precision.

This standard is particularly relevant in European countries where German engineering standards are influential, and it aligns with or complements other international standards such as EN (European Norm) and ASTM (American Society for Testing and Materials).

Significance of the Standard in Structural Engineering

The DIN 5480 standard facilitates:

- Design consistency: Engineers can select profiles with predictable characteristics.
- Manufacturing precision: Steel producers adhere to strict tolerances.
- Interchangeability: Components produced under DIN 5480 can be used across projects without compatibility issues.
- Quality assurance: Ensures profiles meet safety and strength criteria essential for load-bearing structures.

Deciphering the Profile Designation: W35x2x30x16x9G

The designation W35x2x30x16x9G encodes detailed information about the steel profile's dimensions, material properties, and manufacturing standards. Breaking down this complex code is essential for understanding its implications.

Standard Profile Type: 'W' Series

The initial 'W' indicates a Welded I-beam profile, also known as a wide-flanged beam. These profiles are predominantly used in construction for their high load-carrying capacity and ease of welding.

Size Class: '35'

The number '35' generally denotes the nominal height of the profile in centimeters. Therefore, this profile is approximately 350 mm tall, categorizing it as a medium-large structural element suitable for significant load-bearing applications.

Thickness and Flange Details: 'x2x30x16x9'

The sequence following the size class encodes specific geometric and material characteristics:

- 'x2': Likely refers to the web thickness (in millimeters). A web thickness of 2 mm suggests a profile designed for moderate to high loads, balancing weight and strength.
- 'x30': Possibly indicates the flange width or thickness, or a specific parameter related to the flange's cross-sectional dimension.
- 'x16': Could be the flange thickness or another geometric detail.
- 'x9': May specify additional features such as fillet radii, reinforcement details, or other structural parameters.

Note: The precise interpretation of these segments often depends on manufacturer-specific or regional standards, but generally, they encode critical dimensions that influence the profile's mechanical behavior.

Material and Grade: 'G'

The trailing 'G' signifies the material grade or steel quality. In the context of DIN standards, 'G' often indicates general structural steel conforming to specific mechanical properties. It may denote a particular grade such as S235, S355, or similar, depending on regional or project-specific classifications.

Mechanical Properties and Structural Capabilities

Understanding the mechanical properties of W35x2x30x16x9G is crucial for assessing its suitability in construction projects.

Strength Characteristics

- Yield Strength (?y): For typical structural steels under DIN standards, this profile is likely designed for steels with a yield strength around 235 MPa (S235) or higher, depending on the grade.
- Ultimate Tensile Strength (UTS): Usually exceeds 370 MPa, providing ample capacity for load-bearing applications.
- Ductility: Adequate elongation and toughness to absorb stresses without sudden failure, essential in dynamic or seismic zones.

Load-Bearing Capacity

The profile's dimensions suggest it can support significant axial, bending, and shear loads. Its web and flange thicknesses are optimized for stability, resisting buckling and deformation under heavy loads.

Weight Considerations

The combination of profile dimensions and material grade results in a weight that balances structural strength with transportation and assembly efficiency. Precise weight calculations depend on the exact geometry derived from the detailed dimensions encoded in the designation.

Manufacturing Aspects and Tolerances

Production Process

Profiles like W35x2x30x16x9G are typically manufactured through hot-rolled or welded methods, with strict adherence to DIN 5480 specifications.

- Hot Rolling: Involves heating steel billets and passing them through rollers to achieve the desired cross-section.
- Welding and Fabrication: For certain complex profiles, welding ensures precise dimensions and tailored features.

Dimensional Tolerances

DIN 5480 specifies permissible deviations in dimensions to ensure compatibility and safety. Tolerances cover:

- Web and flange thicknesses
- Overall length
- Flange width
- Web height
- Radius and fillet dimensions

These tolerances are critical for ensuring proper fit during assembly and maintaining structural integrity.

Surface Finish and Coatings

Surface quality influences corrosion resistance and aesthetic appeal. Common treatments include:

- Hot-dip galvanizing
- Powder coating
- Painting for corrosion protection

Applications in Construction and Industry

The W35x2x30x16x9G profile finds diverse applications across multiple sectors:

Building Frameworks and Structural Supports

Its dimensions make it suitable for:

- Beams and girders in commercial and residential buildings
- Supports in bridges and industrial facilities
- Frames for large equipment or heavy machinery

Industrial Manufacturing

Used in manufacturing plant structures, conveyor supports, and rack systems where strength and stability are paramount.

Infrastructure Projects

Applicable in bridge construction, tunnel supports, and other civil engineering structures requiring reliable steel profiles.

Specialized Engineering Applications

The detailed profile dimensions allow for custom applications such as crane beams, heavy-duty shelving, or prefabricated modules.

Advantages and Limitations

Advantages

- High Load Capacity: The profile's dimensions and material grades enable it to bear substantial loads.
- Standardization: Compliance with DIN 5480 ensures quality and interchangeability.
- Design Flexibility: The detailed specifications allow engineers to tailor structures to precise requirements.
- Ease of Fabrication: Well-defined dimensions facilitate manufacturing and assembly.

Limitations

- Weight Considerations: Larger profiles can be heavy, impacting transportation and installation.
- Cost Implications: High-grade materials and precise manufacturing incur higher costs.
- Regional Constraints: While standardized in Germany and Europe, adoption elsewhere may require compatibility checks with local standards.

Conclusion: The Significance of DIN 5480 W35x2x30x16x9G in Modern Construction

The designation DIN 5480 W35x2x30x16x9G exemplifies the complexity and precision inherent in modern structural steel profiles. It embodies a meticulous balance between geometric dimensions, material properties, and manufacturing standards, all aimed at ensuring safety, durability, and efficiency in construction.

As infrastructure projects grow in scale and complexity, the importance of standardized, high-quality profiles like this becomes ever more evident. They enable engineers to design resilient structures, manufacturers to produce consistent components, and builders to execute projects with confidence.

Understanding such detailed designations enhances appreciation for the engineering rigor behind

everyday structures and underscores the continuous evolution of standards that underpin safe and sustainable construction practices worldwide.

QuestionAnswer What does the designation 'DIN 5480 W35x2x30x16x9g' specify about this steel section? It indicates a structural steel profile conforming to DIN 5480 standards, with the 'W35x2x30x16x9g' specifying its dimensions, weight, and characteristics such as width, thickness, and grade for engineering applications. What are the typical applications of a steel section like 'W35x2x30x16x9g'? Such steel sections are commonly used in construction, structural frameworks, bridges, and industrial machinery due to their strength and specific dimensions. How does the 'W35' designation influence the load-bearing capacity of this steel profile? The 'W35' indicates a wide-flange section with a nominal depth of 35 cm, which directly affects its moment of inertia and load-bearing capacity, making it suitable for supporting significant structural loads. What does the 'x2x30x16x9g' part of the designation signify in terms of steel properties? This sequence details specific dimensions and properties such as flange thickness, web thickness, weight per meter, and possibly material grade or mechanical properties relevant to structural design. Is the 'g' at the end of 'W35x2x30x16x9g' indicative of a specific steel grade? Yes, in DIN standards, the 'g' often denotes a particular grade or quality class of the steel, indicating its mechanical properties and suitability for specific structural requirements. How does 'DIN 5480' influence manufacturing standards for this steel profile? DIN 5480 sets the dimensional and manufacturing standards for steel sections like W35x2x30x16x9g, ensuring consistency, quality, and compatibility across different producers and applications. What are the typical mechanical properties expected from steel profiles conforming to 'DIN 5480 W35x2x30x16x9g'? These profiles generally exhibit high tensile strength, good ductility, and weldability, compliant with DIN standards, making them suitable for load-bearing structural applications. Can 'W35x2x30x16x9g' be customized for specific project needs? While standard profiles follow DIN 5480 specifications, custom modifications are possible through specialized manufacturing, but they must still adhere to relevant safety and quality standards. How does the weight per meter of 'W35x2x30x16x9g' compare to other similar steel profiles? The weight per meter, indicated by the '30' in the designation, helps compare it to other profiles; W35 sections are relatively heavy and robust, suitable for heavy-duty structural applications. Where can I find detailed technical drawings or specifications for 'DIN 5480 W35x2x30x16x9g'? Detailed specifications can be obtained from steel manufacturers' catalogs, DIN standards documentation, or specialized structural engineering resources that provide dimensional and mechanical property data.

Related keywords: DIN 5480, W35x2x30x16x9g, steel beam, structural steel, steel section, welded I-beam, load-bearing steel, steel profile, construction steel, steel structural component