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NAVFAC IGS-05400 (MAY 2002)  
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Preparing Activity: LANTNAVFACENGCOM Based on UFGS-05400N

ITALIAN GUIDE SPECIFICATIONS

Use for ITALIAN projects only

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SECTION 05400

COLD-FORMED METAL FRAMING

05/02

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NOTE: This guide specification is issued by the  
Atlantic Division, Naval Facilities Engineering  
Command for regional use in Italy.

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NOTE: This guide specification covers framing  
components and erection of load-bearing light gage  
steel.

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NOTE: The following information shall be shown on  
the project drawings:

1. The extent and location of all framing  
indicating gage, size, section modulus, and other  
structural properties required.
2. Connections and other installation details.
3. Indicate concentrated loads, e.g., pipe  
supports, that may overstress a flange or connection.

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Comments and suggestion on this specification are  
welcome and should be directed to the technical  
proponent of the specification. A listing of  
technical proponents, including their organization  
designation and telephone number, is on the Internet.

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer  
choices or locations where text must be supplied by  
the designer.

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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

ITALIAN NATIONAL ASSOCIATION FOR UNIFICATION OF STANDARDS (UNI)

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**NOTE: A UNI Norm is a technical normative recognized as Italian Law, submitted by a private organization "Ente Nazionale Italiano di Unificazione" for Italy and is available only in the Italian language. It is the National Standard.**

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UNI 7344 (1985) Cold formed steel sections - Requirements and tolerances

ITALIAN/EUROPEAN HARMONIZATION STANDARDS (UNI EN)(UNI ENV)(CEI EN)  
(UNI EN ISO)(UNI ISO)

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**NOTE: A UNI EN, UNI ENV, CEI EN, UNI EN ISO or UNI ISO is a European Standard with a coincident Italian National Standard or International Standard. The two standards are identical, with most (but not all) EN's available in the English language and the UNI available only in the Italian language.**

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UNI EN 287-1/A1 (1993/99) Approval testing welders - Fusion welding - Steels

UNI EN 288-1/A1 (1993/99) Specification and qualification of welding procedures for metallic materials - Part 1: General rules for fusion welding

UNI EN 288-2/A1 (1993/99) Specification and qualification of welding procedures for metallic materials - Part 2: Welding procedure specification for arc welding

UNI EN 288-3/A1 (1993/99) Specification and qualification of welding procedures for metallic materials - Part 3: Welding procedure tests for the arc welding of steels

UNI EN 288-5 (1996) Specification and qualification of

	welding procedures for metallic materials - Part 5: Approval by using approved welding consumables for arc welding
UNI EN 288-6	(1996) Specification and qualification of welding procedures for metallic materials - Part 6: Approval related to previous experience
UNI EN 440	(1996) Welding consumables - Wire electrodes and deposits for gas shielded metal arc welding of non alloy and fine grain steels - Classification
UNI ENV 1993-1-3	(2000) Eurocode 3: Design of steel structures - Part 1-3: General rules - Supplementary rules for cold formed thin gauge members and sheeting
UNI EN 10130	(2000) Cold rolled low carbon steel flat products for cold forming - Technical delivery conditions
UNI EN 10143	(1994) Continuously hot-dip metal coated steel sheet and strip - Tolerances on dimensions and shape

1.2 SUBMITTALS

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**NOTE:** Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item is required.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Recommended codes for Army projects are "RE" for Resident Engineer approval, "ED" for Engineering approval, and "AE" for Architect-Engineer approval. Codes following the "G" typically are not used for Navy projects.

Submittal items not designated with a "G" are considered as being for information only for Army projects and for Contractor Quality Control approval for Navy projects.

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Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-02 Shop Drawings

Framing drawings G

SD-03 Product Data

Materials

[SD-05 Design Data

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**NOTE: Require calculations for items considered critical by the designer. Delete paragraph if calculations are not necessary.**

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Metal framing calculations G]

### 1.3 DELIVERY, STORAGE, AND HANDLING

Deliver materials to job site and store in adequately ventilated, dry locations. Storage area shall permit easy access for inspection and handling. If necessary to store materials outside, stack off the ground, support on a level platform, and protect from the weather as approved. Handle materials to prevent damage. Replace damaged items with new, as directed by the Contracting Officer.

### 1.4 PRE-INSTALLATION CONFERENCE

Prior to start of installation of metal framing systems, meet at project site with installers of other work including mechanical and electrical work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work. Record discussions of meetings and decisions and agreements (or disagreements) reached; furnish copy of record minutes to Contracting Officer and each party attending.

### 1.5 LOAD-BEARING COLD-FORMED METAL FRAMING

Include [top and bottom tracks,] bracing, fastenings, and other accessories necessary for complete installation. Framing members shall have the structural properties indicated. Where physical structural properties are not indicated, they shall be as necessary to withstand all imposed loads. [Non-load-bearing metal framing, furring, and ceiling suspension systems are specified in Section 09100, "Metal Support Assemblies."] [Metal

suspension systems for acoustical ceilings are specified in Section 09510, "Acoustical Ceilings."]

1.6 MAXIMUM DEFLECTION

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**NOTE: Modify to suit project requirements. Use maximum deflection of L/360 unless special considerations require modification.**  
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a. Exterior Studs:

<u>Deflection Criteria</u>	<u>Exterior Finish</u>
L/240 or L/360	Synthetic Plaster, Metal Panels
L/360	Cement Plaster, Wood Veneer
L/600	Brick Veneer, Stone Panels

Wall deflections shall be computed on the basis that studs withstand all lateral forces independent of any composite action from sheathing materials. Studs abutting windows or louvers shall also be designed not to exceed 6 mm maximum deflection.

b. Floor Joists:

L/360 - Live load only  
L/240 - Total load

c. Roof Rafters:

L/240 - Live load only

1.7 QUALITY ASSURANCE

1.7.1 Drawing Requirements

Submit framing drawings to show sizes, thicknesses, layout, material designations, methods of installation, and accessories. Drawings shall indicate materials, sizes, thicknesses, and fastening procedures, including welding method, electrodes, and type of screws and spacing. Provide framing and connection design and details prepared by a professional structural engineer, listed on the roles of Italy. Provide drawings bearing the impressed seal and signature of the Specialty Engineer responsible for the design, in accordance with UNI ENV 1993-1-3 (Eurocode 3).

[1.7.2 Design Data Required

Submit metal framing calculations to verify sizes, gages, and spacing of members and connections. Show methods and practices used in installation. Provide calculations bearing the impressed seal and signature of the Specialty Engineer responsible for the design.

]PART 2 PRODUCTS

2.1 SOURCE MANUFACTURERS

2.1.1 Cold-Formed Metal Framing

The following manufacturers provide cold-formed metal framing components that generally comply with these specifications:

MARCEGAGLIA S.p.a.  
Via Bresciani, 16-46040 Mantova  
Gazoldo Ippoliti  
Tel: 39-03766851  
Fax: 39-0376685600

Profilumbra  
Zona Industriale  
06029 VALFABBRICA (PG)  
ITALY  
Tel: 075/901321  
Fax: 075/901776

2.2 MATERIALS

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NOTE: It is assumed that members will be protected from the weather. If members will be exposed or subject to moisture directly, by water infiltration, or via vapor transmission and condensation or indirectly in a corrosive atmosphere, delete carbon steels (painted) and specify galvanized coating for such members. See special option below for deflection limit on exterior wall brick construction. See manufacturer's current literature for other grades and section properties available.  
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Form studs and runners of carbon steel conforming to UNI EN 10130, UNI EN 10143, and UNI 7344. Include top and bottom tracks, runners, bracing, fastenings and other accessories necessary for a complete installation. All materials shall be galvanized as per UNI EN 10143. Metal framing for interior partitions as specified in Section 09100, "Metal Support Assemblies".

2.2.1 Structural Properties

Minimum structural properties shall be determined in accordance with UNI 7344 and shall be as follows:

a. 60 mm Studs

Moment of Inertia about Major Axis . . . . .	26.37 cm <sup>4</sup>
Section Modulus . . . . .	8.79 cm <sup>3</sup>
Weight . . . . .	4.12 Kg/lm

Thickness . . . . . 2.5 mm

b. 80 mm Studs

Moment of Inertia about Major Axis . . . . . 52.04 cm<sup>4</sup>

Section Modulus . . . . . 13.01 cm<sup>3</sup>

Weight . . . . . 4.31 Kg/lm

Thickness . . . . . 2.5 mm

c. 100 mm Studs

Moment of Inertia about Major Axis . . . . . 93.80 cm<sup>4</sup>

Section Modulus . . . . . 18.76 cm<sup>3</sup>

Weight . . . . . 4.9 Kg/lm

Thickness . . . . . 2.5 mm

2.2.2 Sizes, Gages, Section Modulus, and Other Structural Properties

Studs shall be stamped with manufacturer's name, initials, or logo, material thickness [and yield strength]. Size and thickness as indicated. [Steel stud deflection shall be limited to L/600 for exterior wall brick veneer construction.]

[2.3 PAINT

Ungalvanized steel, if used, shall be thoroughly cleaned, phosphate treated, and coated with corrosion-inhibiting primer.

]2.4 PLASTIC GROMMETS

Supply plastic grommets, recommended by stud manufacturer, to protect electrical wires. Prevent metal to metal contact for plumbing pipes.

2.5 CUTOUTS

So as to allow for horizontal runs of conduit and/or piping, the studs shall have holes either pre-punched by the manufacturer or field punched with a power tool specifically designed for punching holes in sheet metal. Holes shall be on the center line of the web. The hole's diameter shall be one-third of the web's depth and shall be spaced a minimum of two times the web's depth on centers.

PART 3 EXECUTION

3.1 FASTENING

Fasten framing members together by welding or by using self-drilling or self-tapping screws. Welding shall conform to UNI EN 288-1/A1, UNI EN 288-2/A1, UNI EN 288-3/A1, UNI EN 288-5, UNI EN 288-6, and UNI EN 440. Provide UNI EN 287-1/A1 qualified welders, welding operators, and tackers; submit welding procedures and qualifications. Electrodes and screw connections shall be as required and indicated in the design calculations. Do not field weld materials lighter than 1.2 mm.

### 3.2 TRACKS

Provide accurately aligned runners at top and bottom of partitions. Anchor tracks as indicated in design calculations. Butt weld joints in tracks or splice with stud inserts. Fasteners shall be at least 75 mm from the edge of concrete slabs.

### 3.3 STUDS

Cut studs square and set with firm bearing against webs of top and bottom tracks. Position studs vertically in tracks and space as indicated in design. Do not splice studs. Provide at least two studs at jambs of doors and other openings 600 mm wide or larger. Provide jack studs over openings, as necessary, to maintain indicated stud spacing. Provide tripled studs at corners, positioned to receive interior and exterior finishes. Fasten studs to top and bottom tracks by welding or screwing both flanges to the tracks. In curtain wall construction, provide for vertical movement where studs connect to the structural frame. Provide horizontal bracing in accordance with the design calculations, consisting of, as a minimum, runner channel cut to fit between and welded to the studs or hot- or cold-rolled steel channels inserted through cutouts in web of each stud and secured to studs with welded clip angles. Bracing shall be not less than the following:

<u>LOAD</u>	<u>HEIGHT</u>	<u>BRACING</u>
Wind load only	Up to 3000 mm Over 3000 mm	One row at mid-height Rows 1500 mm o.c. maximum
Axial load	Up to 3000 mm Over 3000 mm	Two rows at 1/3 points Rows 900 mm o.c. maximum

### 3.4 JOISTS

Locate each joist directly above a stud. Provide doubled joists under parallel partitions wherever partition length exceeds 1/2 of joist span. Joists shall have at least 60 mm of bearing on steel, 100 mm on masonry, and shall be reinforced over bearings where required to prevent web crippling. Splice joists over bearings only. Lap and weld splices as indicated. Provide manufacturer's standard bridging which shall not be less than the following:

<u>CLEAR SPAN</u>	<u>BRIDGING</u>
Up to 4200 mm	One row near center
4200 mm to 6000 mm	Two rows at 1/3 points
6000 mm to 7800 mm	Three rows at 1/4 points
7800 mm to 10600 mm	Four rows at 1/5 points

### 3.5 BRIDGING

Use bridging sections of runner channel to brace and cut to fit between studs or use hot or cold rolled steel channels inserted through cutouts in web of each stud and secured to studs with welded clip angles. Provide the

following minimum bridging:

Partition Height	Bridging
Up to 3 m	One row at mid span
From 3 m to 4.5 m	Two rows at approximately 1/3 span
From 4.5 m to 6 m	Three rows at approximately 1/4 span

### 3.6 ERECTION TOLERANCES

a. Framing members which will be covered by finishes such as wallboard, plaster, or ceramic tile set in a mortar setting bed, shall be within the following limits:

- (1) Layout of walls and partitions: 6 mm from intended position;
- (2) Plates and runners: 6 mm in 2400 mm from a straight line;
- (3) Studs: 6 mm in 2400 mm out of plumb, not cumulative; and
- (4) Face of framing members: 6 mm in 2400 mm from a true plane.

b. Framing members which will be covered by ceramic tile set in dry-set mortar, latex-portland cement mortar, or organic adhesive shall be within the following limits:

- (1) Layout of walls and partitions: 6 mm from intended position;
- (2) Plates and runners: 3 mm in 2400 mm from a straight line;
- (3) Studs: 3 mm in 2400 mm out of plumb, not cumulative; and
- (4) Face of framing members: 3 mm in 2400 mm from a true plane.

-- End of Section --