

**CECS 102: 2002**

---

Standard by China Association for Engineering Construction Standardization

**Technical specification for steel structure of  
light-weight buildings with gabled frames**

**门式刚架轻型房屋钢结构  
技术规程**

**CECS 102: 2002**

**Beijing 2003**

**Technical specification for steel structure of light-weight  
buildings with gabled frames**

**门式刚架轻型房屋钢结构**

**技术规程**

**CECS 102: 2002**

Chief editing unit: Construction Steel Structure Committee of China Construction Metal  
Structure Association

China Academy of Building Research

Approved by: China Association for Engineering Construction Standardization

Effective date: March 1, 2003

China Planning Press

2003 Beijing

## Foreword

The original Regulations is revised in accordance with the requirements of *Circular on printing and distributing the items and plan for development and revision of second batch of standards issued by China Association for Engineering Construction Standardization in 2001* No. (2001) JBXZ 45 by China Association for Engineering Construction Standardization

Since *Technical specification for steel structure of light-weight buildings with gabled frames* (CECS 102: 98), a standard by China Association for Engineering Construction Standardization, was issued in 1998, it has remarkably pushed forward the development of steel structure of light-weight buildings with gabled frames in our country. Presently, this kind of structure, as one of the most extensive applications among the building structures in our country, has accumulated more engineering experiences; at the same time, engineering practices have also discovered some subjects in the original Specification necessary to revise or supplement. Additionally, during this period of time, the related state standards for building structures have been widely revised, so, it is also necessary to revise the this Specification as to the contents connected thereof.

The main contents revised this time include: 1. It has adjusted the applicable range of this Specification (crane tonnage); 2. It has adjusted the importance coefficient of structures; 3. It has supplemented the rules for checking calculation to seismic resistance of structure; 4. It has supplemented the indicators for steel design; 5. It has adjusted the standard value for live load on roofs; 6. It has supplemented the provisions on the wind load's profile coefficient of purlin; 7. It has adjusted the indicators for structural rigidity; 8. It has supplemented the requirements for support layout; 9. It has perfected the provisions on the calculations of steel-framed structures; 10. It has supplemented the provisions on purlin design; 11. It has supplemented the provisions on knee-bracing design; 12. It has modified the provisions on calculations of purlin under negative wind pressure; 13. It has supplemented the provisions on anti-draw checking calculations of anchor bolts in columns; 14. It has added the provisions on one side welding for tee connection of steel plate; 15. It has perfected the provisions on the design of high-strength bolt connection; 16. It has deleted the concrete provisions on fabrication of structural members; 17. It has added the provisions on the permissible deviations for structural engineering installations, etc.

In accordance with the requirements of Circular about to engage China Committee for Engineering Construction Standardization to carry out the pilot work for compilation of suggestive engineering construction standards No. [1986]1649 issued by the State Planning Commission, we hereby approve the association standard *Technical specification for steel structure of light-weight buildings with gabled frames*, revised edition, 2002, with serial number to be CECS102:2002, recommended to engineering design units, construction units and project owners for implementation. From the effective date of this Specification, the original Specification CECS 102 : 98 shall be abolished.

Article 3.1.3, Articles 3.2.1, 3.2.2, 3.2.3 and 3.2.4, Article 3.3.2 (boldfaced portion), Article

7.2.9 (boldfaced portion), Article 7.2.19, Article 8.1.4 and Article 8.2.5 (boldfaced portion) are suggested to list into the Compulsory Provisions of the Engineering Construction Standards, the rest shall be suggestive provisions.

This Specification shall be governed by Construction Steel Structure Committee of China Construction Metal Structure Association and construed by China Academy of Building Research (address: No. 19, Chegongzhuang Street, Beijing, 100044). If anything is discovered necessary to modify or supplement in the process of implementation, please send your opinions and data directly to the construction unit.

Chief editing unit: Construction Steel Structure Committee of China Construction Metal Structure Association

China Academy of Building Research

Assistant editing unit: Shanghai Meijian Steel Structure Co., Ltd.

Xi'an University of Architecture & Technology

Tongji University

Tsinghua University

Zhejiang Hangxiao Steel Structure Co., Ltd.

Beijing Huate Architectural Design Consultant Co., Ltd

Main drafters: Cai Yiyang, Chen Shaofan, Sheng Zuyan, Li Shaofu, Ding Yunsun, Xu Zhouliang, Wei Chaowen, Sun Xiaoyan, Zhang Yuefeng and Shen Lin

**China Association for Engineering Construction Standardization**

September 20, 2002

## Contents

<b>1. General</b> .....	2
<b>2. Technical terms and symbols</b> .....	2
2.1 Technical terms .....	2
2.2 Symbols.....	3
<b>3. Stipulations for basic design</b> .....	4
3.1 Design principles.....	4
3.2 Actions .....	6
3.3 Materials.....	6
3.4 Stipulations for deformation .....	9
3.5 Requirements for construction .....	10
<b>4. Structural Form and Layout</b> .....	11
4.1 Structural form .....	11
4.2 Architectural dimensions .....	12
4.3 Structural plane arrangement .....	13
4.4 Wall beam arrangement .....	13
4.5 Bracing arrangement .....	14
<b>5. Action effect calculations</b> .....	15
5.1 Calculations for the internal force of variable section rigid frame.....	15
5.2 Calculations for the lateral displacement of variable cross-section rigid frame.....	15
<b>6. Structural Member Design</b> .....	18
6.1 Calculations for the members of variable cross-section rigid frame.....	18
6.2 Calculations for the members of constant cross-section rigid frame.....	28
6.3 Design of purlin .....	28
6.4 Design of wall frame member.....	30
6.5 Design of bracing member .....	31
6.6 Design of roof board and wall slab .....	31
<b>7 Design of connection and node</b> .....	33
7.1 Welding .....	33
7.2 Design of node .....	35
<b>8 Fabrication and Installation</b> .....	42
8.1 Fabrication .....	42
8.2 Installation.....	42
<b>9 Thermal Insulation and Coating</b> .....	47
9.1 Thermal insulation .....	47
9.2 Coating.....	48
<b>Appendix A Calculation for Wind Load</b> .....	49
<b>Appendix B The section feature of cold-formed Z-steel with inclined simple edge</b> .....	56
<b>Appendix C The section feature of cold-formed lipped channel</b> .....	59
<b>Appendix D The in-plane equated length factor of tapered beam</b> .....	62
<b>Appendix E The stability calculation of purlin subjected to wind suction</b> .....	69
<b>Appendix F Technical requirements for one side fillet weld</b> .....	74
<b>Appendix Elucidation on Some Wording used in the Regulations</b> .....	75
<b>Clause Explanation</b> .....	76

## **1. General**

This Specification is formulated to adapt the development of steel structure of light-weight buildings with gabled frames and promote the rational design, fabrication and installation to achieve the targets of advanced technology, reasonable and economical manner, safety and appliance and guaranteed quality.

This Specification is applicable to the design, fabrication and installation of single-storey building's steel structures with light-weight roofing and light weight external walls for cranes without bridge, A1 ~ A5 work level Lingxi type crane with hoisting capacity to be no more than 20t or 3t suspension crane, where single-span or multi-span solid-web rigid frame is used as main load bearing structure.

The external walls for light-weight buildings with gabled frames can be of brickwork, in this case, it shall conform to the stipulations of Article 4.4.3 of this Specification.

This Specification is not applicable to the buildings in deep erosion environment.

This Specification is compiled by following the principles specified in the active national standard Unified standard for reliability design of building structures (GB 50068) and by the general rules specified in the active national standards: Standard for terminology and symbols used in design of building structures (GB / T 50083), Load code for the design of building structures (GB 50009), Code for seismic design of buildings (GB 50011), Code for design of steel structures (GB 50017), Technical code for design of cold-formed thin-wall steel structures (GB 50018) and Code for acceptance of construction quality of steel structures, etc, and based on the concrete conditions for the design and construction of light weight building steel structures in our country.

The design, limited installation and protection requirements for steel structure of light-weight buildings with gabled frames shall be subject to the related active standards, if not specified in this Specification.

## **2. Technical terms and symbols**

### **2.1 Technical terms**

#### **2.1.1 Opening**

The portion set in a building's enclosure surface (metope or roofing) without permanent and effective locking device.

#### **2.1.2 Opening building**

A building with at least 80% of external wall opened.

#### **2.1.3 Partially enclosed building**

A building where total area of opening on wall surface subject to external positive wind pressure exceeds the summation of opening areas in the remaining enclosure surface (metope and roofing) of such building, exceeds the gross area of the wall by 5% and the opening rate of the remaining enclosure surface for the building does not exceed 20%.

#### **2.1.4 Enclosed building**

A building where there is no opening in the space so enclosed of the kind as defined for partially enclosed building or opening building.

---

---

## 完整版本请在线下单

或咨询：

TEL: 400-678-1309

QQ: 19315219

Email: [info@lancarver.com](mailto:info@lancarver.com)

<http://www.lancarver.com>

---

---

## 线下付款方式：

### 1. 对公账户：

单位名称：北京文心雕语翻译有限公司

开户行：中国工商银行北京清河镇支行

账 号：0200 1486 0900 0006 131

---

---

### 2. 支付宝账户：[info@lancarver.com](mailto:info@lancarver.com)

---

---

注：付款成功后，请预留电邮，完整版本将在一个工作日内通过电子 PDF 或 Word 形式发送至您的预留邮箱，如需索取发票，下单成功后的三个工作日内安排开具并寄出，预祝合作愉快！

---



银联特约商户