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# 中华人民共和国石油化工行业标准

SH/T 3160-2009

# Specification for design of blast resistant control building in petrochemical industry

# 石油化工控制室抗爆设计规范

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# Contents

## Foreword

This specification is compiled by Luoyang Petrochemical Engineering Corporation (LPEC)/Sinopec Group based on "Notice about Issuing Industry Standard Project Plan for 2003" (GJMTHY [2003] No. 22) of former State Economic and Trade Commission.

This specification is divided into seven chapters (scope, normative reference, terms and main symbols, general layout, architectural design, structural design, ventilation and air conditioning) and five annexes, including annex D, E as normative annexes, and annex A, B, C as informative annexes.

The articles written in bold-face in this specification are the mandatory provisions, which must be strictly implemented.

This specification is administrated by Architectural Design Technology Center Station of Sinopec Group, and is interpreted by Luoyang Petrochemical Engineering Corporation (LPEC)/SINOPEC Group.

During the process of implementation of the specification, if any modification and replenishment are found, please provide comments and relevant information to administrative unit and chief editorial unit for reference during future revisions.

Supervision unit: The Architectural Design Technology Center Station of Sinopec Group

Communication address: No. 27 West Zhongzhou Road, Luoyang, Henan

Post code: 471003

Tel: 0379—64887187

Fax: 0379—64887187

Chief editorial unit: Luoyang Petrochemical Engineering Corporation (LPEC)/SINOPEC

Communication address: No. 27 West Zhongzhou Road, Luoyang, Henan

Post code: 471003

Participated units: Shanghai Senlin Special Type Steel Door Co., Ltd.
Shanghai Dragon Electric Engineering Co., Ltd.

| | | | | | |
|---|---|---|---|---|---|
| Main drafters: | Liu Wu | Lu Yining | Zhang Jun | Wan Chaomei | Wang Songsheng |
| | Fan Yousheng | Wei Jianshu | | | |
| Main examiners: | Huang Zuojian | Wu Shaoping | Xu Lansheng | Zhang Kefeng | Nie Xiangdong |
| | Zhang Fengshan | Liu Kunming | He Guofu | Zhang Jian | Ren Yi |
| | Wang Chao | Li Yunzhong | Ji Zhuanping | Zhu Xiaoming | Huang Guoliang |
| | Jiang Jinti | Wang Yaodong | Huang Wenqi | Zhu Ye | Bao Changwei |
| | Zhang Liwen | Huang Yuenian | Dong Yifu | Zhang Xin | Gao Guangsheng |
| | Quan Min | | | | |


This specification is first released.

# Specification for design of blast resistant control building in petrochemical industry

## 1 Scope

This Specification specifies the requirements of blast resistant design of the control building in petrochemical industry.

This Specification applies to the blast resistant design of newly built control building in petrochemical industry. The blast resistant design of the reconstruction or extension of the control building in petrochemical industry can use it as reference.

## 2 Normative References

The articles contained in the following documents have become this standard when they are quoted herein. For the dated documents so quoted, all the modifications (excluding corrections) or revisions made thereafter shall not be applicable to this Standard. For the undated documents so quoted, the latest editions shall be applicable to this Standard.

GB 50007 Code for design of building foundation

GB 50009 Load code for the design of building structures

GB 50010 Code for design of concrete structures

GB 50011 Code for seismic design of buildings

GB 50019 Code for design of heating ventilation and air conditioning

## 3 Terms and main symbols

For the purpose of this standard, the following terms and definitions shall apply.

### 3.1 Terms

**3.1.1**

**Blast-resistant control building**

The blast-resistant control building can meet the requirements of production and personal safety, and resist the explosive shockwave from outside the building, with reasonable technology and economy.

**3.1.2**

**Blast-resistant door**

Blast-resistant door can resist the explosive shockwave from outside the building.

**3.1.3**

**Blast-resistant access door**

Blast-resistant access door can meet the requirements for the staff to get into and out of the building normally.

**3.1.4**

**Blast-resistant equipment door**

Blast-resistant equipment door can meet the requirements for the large-scale equipment to get into and out of the building.

**3.1.5**

**Blast-resistant window**

Blast-resistant window can resist the explosive shockwave from outside the building.

**3.1.6**

**Safety glass**

Laminated glass or tempered glass that meets the strength requirement.

**3.1.7**

**Airlock**

The airlock located in the staff access is building construction measure used to prevent exterior harmful gases from entering the interior and to maintain interior positive pressure.

**3.1.8**

**Blast-resistant valve**

Blast-resistant valve installed on the air inlet and air outlet of the blast resistant structure can resist the explosive shockwave from outside the building.

### 3.2 The main symbol

$\alpha$——Particle motion acceleration;

$A_s$——Member reinforcement area;

$b$——Member section width;

$C$——The structure or structure member shall reach the specified limitation of the normal use;

$C_e$——The load equivalent coefficient of side walls, back walls and roof;

$C_d$——Resistance coefficient;

$d$——Member section height;

$D$——Width of the building in the shock wave forward direction.

$DIF$——The increase coefficient of dynamic load;

$E_c$——Modulus of elasticity of concrete;

$E_s$——Elastic modulus of reinforcement;

$f_{dc}$——Dynamic design strength of the concrete;

$f_{du}$——Dynamic strength limit value of the reinforced steel bar;

$f_{dy}$——Dynamic design strength of reinforcement steel bar;

$F_t$——The force acting on the members (function of time);

$f_u$——Limit value of strength of steel bar;

$f_{yk}$——Standard value of strength of steel bar;

$f_{ck}$——Standard value of the compressive strength of the concrete;

*fy*——Yield strength of steel bar;

*I*——Inertia moment of member section;

$I_{cr}$——Inertia moment of concrete section when forms cracks;

$I_g$——The gross inertia moment of concrete members on the centroid axis, excluding the impact of reinforced steel bar.

$I_w$——Impulse of positive pressure;

$K_L$——Load or stiffness transfer coefficient;

$K_{Lm}$——Considering the transfer coefficient of load, stiffness and mass;

*Km*——Mass transfer coefficient;

*k*——Stiffness of structural member;

*L*——Length of the structural member in the shockwave forward direction;

$L_w$——The wavelength of shockwave;

$L_o$——Member span;

$M_e$——equivalent mass;

*M*——Quality of members;

*P*——The shock load of members, the peak blast load corresponding to the considered members;

$P_a$——The effective positive pressure of shock wave acting on the side walls and roof;

$P_{atm}$——Environmental standard atmospheric pressure;

$P_b$——The effective positive pressure of shock wave acting on the backwall;

$P_r$——Peak reflected pressure;

$P_S$——Stagnation pressure;

$P_{SO}$——Peak explosive shockwave incident overpressure;