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PROFESSIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

中华人民共和国石油化工行业标准

SH/T 3077-2012

Replace SH 3077-1996

Design specification for steel frames supporting coolers and exchangers in petrochemical industry

石油化工钢结构冷换框架设计规范

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Contents

Foreword

According to the requirements of the *2008 Industry Standard Project Plan* (FGBGY [2008] No.1242) issued by the National Development and Reform Commission General Office, through extensive investigation and study, serious summary of practical experience, by referring to relevant international standards and advanced foreign standards and on the basis of soliciting opinions from all sides, the Specification Preparation Group revised this Specification.

This Specification is divided into 8 chapters and 1 appendix.

The main technical contents of the Specification include: The basic provisions, load and seismic action, structural design and foundation of steel frames supporting coolers and exchangers design.

This Specification is a revision on the basis of the SH 3077—96 Design specifications for steel frames supporting coolers and exchangers in petrochemical industry, including the following main revised technical contents:

——Improved the structure requirements of steel frames supporting coolers and exchangers, especially the seismic structure requirements, and clarified the setup requirements of horizontal support;

——Added the requirements of beams, columns eiking; added the grade requirements of welding quality;

——Improved the wind load calculation;

——Canceled the calculation requirements and structure requirements of beam - beam, beam - column joint, and improved the calculation and structure of the foundation bolt;

——A comprehensive revision and supplement for the former specification is made according to the feedback of the relevant units in the process of the execution of the current national specification and the former specification,

The China Petrochemical Corporation (Sinopec Group) is responsible for the management of this Specification, the Architectural Design Technology Center Station of Sinopec Group is responsible for the daily management and the Sinopec Engineering

Incorporation is responsible for the interpretation of the specific technical contents. If there are any comments and suggestions during the execution process, please send them to the daily management unit and the chief preparation unit.

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This Specification was first issued in 1996 and this is the first revision.

Design specification for steel frames supporting coolers and exchangers in petrochemical industry

1 Scope

The basic provisions, load and seismic action, structural design and foundation of the design for steel frames supporting coolers and exchangers in petrochemical industry is stipulated by the Specification.

This specification is applicable to the design of the supporting cooler, heat exchanger (hereinafter referred to as coolers and exchangers), horizontal vessel and the steel frame with an air cooler (hereinafter referred to as the air cooler) on the top. This Specification is not applicable to the design of the steel frame with an air cooler on the top of pipe rack.

2 Normative references

The articles contained in the following documents have become this Code when they are quoted herein. For the dated documents so quoted, all the modifications (Including all corrections) or revisions made thereafter shall be applicable to this Code.

GB/T 5117 Covered electrodes for manual metal arc welding of non-alloy and fine grain steels

GB/T 5118 Covered electrodes for manual metal arc welding of creep-resisting steels

GB/T 5313 Steel plates with through-thickness characteristics

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 50016 Code of Design on Building Fire Protection and Prevention

GB 50017 Code for design of steel structures

GB 50160 Fire prevention code of petrochemical enterprise design

SH 3137 Technical specification of fire protection for steel structures in petrochemical industry

SH/T 3147 Code for seismic design of special structures for petrochemical

3 Terms and definitions

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

3.1

Coolers and exchangers frames

For the supporting cooler, heat exchanger, horizontal vessel and the steel frame with an air cooler on the top

3.2

Beams supporting equipment

Steel beam of direct or indirect supporting equipment

4 Major symbols

The following major symbols are applicable to this Specification.

4.1 Loads and load effects

F_{dk}——Characteristic value of horizontal equivalent load of air cooler fan and motor;

F_{vk}——Characteristic value of vertical equivalent load of each fan and motor;

N——Design value of axial force;

Q——Design value of horizontal force at the soleplate of column base;

R——Design value of resistance of structural component;

S——Design value of load effect combination of structural component (including design values of combined bending moment, axial force and shear force);

S_{GK}——Effect of characteristic value of permanent load;

S_{WK}——Effect of characteristic value of wind load;

S_{EhK}——Effect of characteristic value of horizontal seismic action;

S_{GE}——Effect of representative value of gravity load;

W_K——Characteristic value of wind load on the frame;

σ_c——Design value of axial compressive stress withstood by the top surface of column foundation

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