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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 17186.2-2018

Replacing GB/T 17186-1997

**Calculation methods for the pipe flange joints - Part 2:
Calculation method satisfies leakage rate**

管法兰连接计算方法 第2部分：基于泄漏率的计算方法

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Foreword

GB/T 17186 Calculation Methods for the Pipe Flange Joints consists of the following 2 parts.

1. Calculation Method Satisfies both Strength and Rigidity Requirements;

2. Calculation Method Satisfies Leakage Rate. This Part is Part 2 of GB/T 17186. This Part was drafted as per the rules specified in GB/T 1.1-2009. This Part replaced partial contents (Clauses 1~3, and Clause 5) of GB/T 17186-1997 Calculating Method for Strength Steel Pipe Flanged Joint. Compared with GB/T 17186-1997, the major technical changes of this Document are as follows besides the editorial modifications.

--- Modify the standard structure. There are two different flange calculation methods in the original standard (Method A and Method B);

--- This Part modifies and improves Method B;

--- Modify the gasket coefficient;

--- Modify the flange calculation parameters and calculation procedures;

--- Add the calculation of joint internal force;

--- Add inspection by allowance load ratio.

--- Add Appendix A Assembly using a torque wrench; Appendix B Use of the original creep factor g_c ; Appendix C Flange deflection; Appendix D Discreteness of bolt tightening methods; Appendix E Calculation sequence; Appendix F Limitations on gasket stress unevenness; Appendix G Metric bolt dimensions. This Standard also made the following

editorial modifications.

--- Change the Chinese and English names of the standard. This Part was proposed by China Machinery Industry Federation. This Part shall be under the jurisdiction of National Technical Committee on Pipe Fittings of Standardization Administration of China (SAC/TC 237). Drafting organizations of this Part. Mechanical Productivity Center; East China University of Science and Technology; CNPC East China Design Institute Co., Ltd.; China Tianchen Engineering Corporation; China Energy Engineering Group Guangdong Electric Power Design Institute Co., Ltd.; Chaoda Valves Group Co., Ltd.; and Zhejiang CPS Cathay Packing & Calculation Methods for the Pipe Flange Joints - Part 2. Calculation Method Satisfies Leakage Rate

1 Scope

GB/T 17186.2-2018 is the Chinese national standard on calculation methods for the pipe flange joints - part 2: calculation method satisfies leakage rate, in the field of fluid systems and general-purpose components. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 14 May 2018 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 December 2018. Classification: ICS 23.040.60, CCS J15. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This Part of GB/T 17186 specifies the calculation method for bolted circular pipe flange joints with gaskets. This Part mainly applies to PN series pipe flanges; Class series flanges and non-standard flanges can also be referenced for selection.

2 Normative References

The following documents are essential to the application of this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 9112 Types and Parameters for Steel Pipe Flanges EN 13555.2004 Flanges and Their Joints - Gasket parameters and test procedures relevant the design rules for gasket circular flange connections

3 Terms and Definitions

For the purposes of this Document, the following terms and definitions apply.

3.1 Integral flange The flange can be connected to the shell by welding (e.g., welding neck flange, see Figures 4~7; or slip-on flange, see Figures 8 and 11) or by casting (integral cast flange, type 21).

3.2 Blank flange For protective cover, see Figure 9.

3.3 Loose flange A back-up ring that is connected to the collar.

3.4 Hub The axial extension of the flange ring is typically used to connect the flange ring to the shell, as shown in Figures 4 and 5.

3.5 Collar The portion adjacent to the loose flange, as shown in Figure 10.

3.6 External load Forces and/or moments that other external loads acting on the joint, such as the weight of the pipe and thermal expansion.

3.7 Load condition A set of conditions in which loads are applied simultaneously, as denoted by I .

3.8 Assembly condition The initial load condition for tightening the bolts, as denoted by $I = 0$.

3.9 Subsequent condition Load condition after assembly condition, such as test conditions operating condition, and various conditions during start-up or shutdown, as denoted by $I = 1, 2, 3, \dots$

3.10 Compliances; Y The reciprocal of stiffness (axial). NOTE. Unit is in mm/N.

3.11 Flexibility modulus The reciprocal of the stiffness modulus, excluding the material's elastic constant. The axial flexibility modulus is denoted by X , in 1/mm; the gyratory flexibility modulus is denoted by Z , in 1/mm³.