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**NATIONAL STANDARD OF THE
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GB/T 37400.18-2023

**Heavy mechanical general technical specification - Part 18:
Opening gear drives system**

重型机械通用技术条件 第18部分：开式齿轮传动系统

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Foreword

SAC/TC 409 is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This document is drafted in accordance with the provisions of GB/T 1.1-2020 Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents.

This document is the 18th part of GB/T 37400 Heavy Mechanical General Technical Specification. The following parts of GB/T 37400 have been issued: Part 1: Products inspection and test; Part 2: Flame cutting parts; Part 3: Welding parts; Part 4: Iron castings; Part 5: Nonferrous metal casting; Part 6: Steel castings; Part 7: Repair welding for steel castings; Part 8: Forgings; Part 9: Machining parts; Part 10: Assembling; Part 11: Piping;

Part 12: Painting; Part 13: Packaging; Part 14: Nondestructive test of steel castings; Part 15: Nondestructive test of steel forgings; Part 16: Hydraulic system; Part 17: Repair welding for steel forging; Part 18: Opening gear drives system.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The issuing body of this document shall not be held responsible for identifying any or all such patent rights.

This document was proposed and prepared by SAC/TC 409 (National Technical Committee of Metallurgical Machinery of Standardization Administration of China).

Introduction

GB/T 37400 is not only widely used in metallurgy, mining, lifting, material handling, industrial vehicles and other industries, but also used in the equipment manufacturing process of engineering machinery, petrochemical, nuclear power, wind power, large aircraft, rail transit and other industries. It is an important basic process document for large and medium-sized equipment manufacturing in various industries of China.

GB/T 37400 classifies the main stages in the manufacturing process of heavy machinery products, including material preparation, matching inspection, cutting processing, assembly, painting, packaging, etc., thus constructing a relatively complete standard system. It is designed to provide a basis for design, manufacturing, inspection, and acceptance for relevant production enterprises, business units, industry counterparts, and departments. It is intended to consist of 18 parts.

Part 18: Opening gear drives system. The purpose is to provide technical guidance for the manufacture, installation, commissioning, and operation and maintenance of open gears, so that they can operate stably and reliably.

1 Scope

China's national specification for the open gear drive, the eighteenth part of the GB/T 37400 series on heavy machinery. An open gear drive is what turns a ball mill, a rod mill, an AG or SAG mill, a rotary kiln, a cooling machine, a dryer or a cylindrical mixer: a girth gear wrapped round the shell, driven by a much smaller pinion on its own bearings, with no enclosed casing over the mesh. The arrangement exists because nothing else will transmit thousands of kilowatts to a vessel several metres in diameter that is itself rotating, and it is punishing - low speed, heavy load, a large reduction ratio, an adjustable centre distance, dust, and lubrication that has to be sprayed onto an exposed mesh rather than run in an oil bath. A girth gear is also too big to cast in one piece, so it arrives in two, four or six segments to be bolted together on site, and whether it then runs true is decided by the installation. This document specifies the type classification, the technical requirements, the test methods, the inspection rules and the marking, packaging and transport of open gear

drive systems, so that they can be manufactured, installed, commissioned, operated and maintained to run stably and reliably. Others may implement this document by reference.

This document specifies the type classification, technical requirements, test methods, inspection rules, marking, packaging, and transport of opening gear drives system.

This document is applicable to low-speed and heavy-duty involute opening gear drives system used for cylindrical rotary equipment, such as ball mill, rod mill, AG mill, SAG mill, rotary kiln, cooling machine, dryer, and cylindrical mixer. Others may implement this document by reference.

2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 1348-2019, Spheroidal graphite iron castings.

GB/T 3374.1, Vocabulary of gear terms - Part 1: Definitions related to geometry.

GB/T 3480.5-2021, Calculation of load capacity of spur and helical gears - Part 5: Strength and quality of materials.

GB/T 3505, Geometrical product specifications (GPS) - Surface texture: Profile method - Terms, definitions and surface texture parameters.

GB/T 6388, Transport package shipping mark.

GB/T 10095.1-2022, Cylindrical gears - ISO system of flank tolerance classification - Part 1: Definitions and allowable values of deviations relevant to flanks of gear teeth.

GB/T 10095.2-2008, Cylindrical gears - System of accuracy - Part 2: Definitions and allowable values of deviations relevant to radial composite deviations and runout information.

GB/T 13306, Plates.

GB/Z 18620.1, Cylindrical gears - Code of inspection practice - Part 1: Inspection of corresponding flanks of gear teeth.

GB/Z 18620.2, Cylindrical gears - Code of inspection practice - Part 2: Inspection related to radial composite deviations, runout, tooth thickness and backlash.

GB/T 37400.1-2019, Heavy mechanical general technical specification - Part 1: Products inspection and test.

GB/T 37400.10-2019, Heavy mechanical general technical specification - Part 10:

Assembling.

GB/T 37400.13-2019, Heavy mechanical general technical specification - Part 13: Packaging.

GB/T 37682-2019, Large exposed gear steel castings - Technical specification.

GB/T 37683-2019, Large gear and girth gear forgings - Technical specification.

ISO 3448, Industrial liquid lubricants - ISO viscosity classification.

3 Terms and definitions

For the purposes of this document, the following terms and definitions given in GB/T 3374.1 apply.

3.1 pinion: gear with fewer teeth in the gear pair.

3.2 girth gear: gear with more teeth in the gear pair.

3.3 opening gear drives system: type of gearbox that is different from an closed gearbox, and consists of girth gear and pinion supported by independent bearing, lubrication system, etc., in which, the girth gear rim is enclosed, while the hub is an exposed drive system.

NOTE: The opening gear drives system has the characteristics of low speed, heavy load, big reduction ratio and adjustable center distance, and its operating conditions, working environment, and lubrication conditions are all not so good.

3.4 contact pattern: contact polishing marks distributed on the teeth surfaces of gear pair under the slight braking or load action. EXAMPLE: See Figure 1.

4 Type classification

The opening gear drives system can be classified as follows.

According to the shape of opening gear tooth traces, it can be classified into opening spur gear drives system and opening helical gear drives system.

According to the structural designs of the girth gear, it can be manufactured in two segments, four segments, and six segments.

According to the assembling method of the girth gear, it fall into two categories: flange mounted and spring plate mounted.

5.1 Basic requirements

5.1.1 The opening gear drives system shall work normally under the following conditions: a) a stated ambient temperature range; b) a stated range of circumferential speed at the pitch circle, or a stated range of pinion rotational speed.