

## 1. Purpose

This document describes the process of thyssenkrupp rothe erde USA Inc. (the supplier) for evaluating and revising thyssenkrupp rothe erde USA slewing ring bearing designs against customer technical documentation.

## 2. Background

Slewing ring bearings are ready-to-install component assemblies which simultaneously transmit axial and radial forces and tilting moments. thyssenkrupp rothe erde USA slewing ring bearings are engineered products based on thyssenkrupp rothe erde standards. We have been engineering and selling slewing bearings in North America since 1962.

Slewing ring bearings are produced as various design types including:

- Four-point contact bearings
- Double four-point contact bearings
- Three-row roller bearings

These slewing ring bearings are used worldwide in various applications under different climate conditions. Examples include, handling equipment, excavators, cranes, wind energy turbines and many others.

Our slewing ring bearings are developed to satisfy unique customer requirements, including bearing external dimensions, loading requirements, and performance criteria. It is not always possible for us to satisfy every customer requirement. Therefore, we have established a process to identify exceptions to customer requests and to handle customer change requests. We will always quote and deliver a thyssenkrupp rothe erde USA part number, based on thyssenkrupp rothe erde USA drawings, design and manufacturing standards. The thyssenkrupp rothe erde USA drawing is always the primary design control document.

## 3. Customer Input

Customer input to thyssenkrupp rothe erde USA is communicated in both written and verbal format. Written formats may include technical specifications and drawings. Verbal input should be documented in written format to ensure confirmation of understanding.

As a prerequisite for us to accept any warranty beyond those listed in thyssenkrupp rothe erde USA terms and conditions, all customers are required to furnish complete details of the following information: application information, load data, and operating conditions.

Requests for design changes must be specific regarding each individual change to be made.

## 4. Supplier Response

A written technical response will be provided to a customer's request for a bearing selection or a design change. Technical responses are prepared by our Application Engineering department. These are referred to as Technical Proposals, and they are developed during the Sales Order Acquisition Process.

Technical Proposals may include a proposed bearing design, comments on the suitability of the bearing for given loads and application information, and may include exceptions to requirements on customer documents.

A Design Exception Document (DED) may be prepared by us. The DED identifies formal customer technical documents with their revision level, the proposed thyssenkrupp rothe erde USA drawing and its revision level, and highlights areas where the thyssenkrupp rothe erde USA proposal does not conform to the customer's technical requirements. DED exceptions are general in nature and are not meant to be exhaustive. They are exclusively a communication tool used during the Sales Order Acquisition Process to help the customer identify the differences between the final thyssenkrupp rothe erde USA design and the technical documentation as provided by the customer. It is the responsibility of the customer to update their technical information to the thyssenkrupp rothe erde USA primary design control document. We will only confirm orders against a thyssenkrupp rothe erde USA part number. It is the customer's responsibility to inform us in writing about any Engineering Changes that may impact form, fit or function of the bearing. thyssenkrupp rothe erde USA reserves the right to continuously improve its manufacturing process and internal standardization in a manner that drives costs and/or quality improvements as long as the result satisfies form, fit and function of the bearing.

## 5. Process Steps

- All customer technical input provided by the customer is reviewed by a thyssenkrupp rothe erde USA Application Engineer.
- The Application Engineer will select or create a bearing model that best satisfies the customer's technical requirements, loading conditions and application criteria.
- The Application Engineer will create design exceptions (in the form of a DED or otherwise) against the customer's technical documents.
- The Application Engineer will provide the customer with a Technical Proposal, including a proposed bearing design, exceptions (as applicable), and comments regarding load and application suitability. If a suitable bearing design cannot be provided by thyssenkrupp rothe erde USA, then the Application Engineer will advise accordingly.

- The customer is required to review the bearing design proposal, exceptions and comments regarding load and application suitability. It is the customer's responsibility to review thyssenkrupp rothe erde USA documents in full detail.
- If bearing design changes are required, the customer must notify thyssenkrupp rothe erde USA of the required changes. Customer drawing changes are best communicated with methods such as highlighting, mark-ups, and red-lining. If a formal customer drawing is revised, the customer must inform us of the specific changes made. Only changes clearly identified by the customer will be reviewed.
- After customer changes are received, the Application Engineer will review the change and advise if any changes cannot be met.
- A formal commercial quote will proceed after the thyssenkrupp rothe erde USA bearing design has been established and all technical issues are resolved. We will always quote a thyssenkrupp rothe erde USA part number based on thyssenkrupp rothe erde USA drawing and thyssenkrupp rothe erde USA technical specifications.
- Customer Purchase Orders received by us are subject to a Contract Review process. Our Contract Review process is closed with an Order Acknowledgement to the customer. We will acknowledge against a thyssenkrupp rothe erde USA part number (dictating primary design control) and refer to thyssenkrupp rothe erde USA's Terms & Conditions.
- Our manufacturing and inspection will proceed based on the thyssenkrupp rothe erde USA proposal drawing as the controlling document.

# thyssenkrupp rothe erde USA Inc.

Title: DEF-004

Revision Number: 1

Description: Customer-Supplier Technical Agreement Process



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| Rev # | Revision Description  | Edited By | Checked By | Date       |
|-------|---|-----------|------------|------------|
| 0     | Initial Release   | MDG       | DFK        | 09/28/2020 |
| 1     | Clarified supplier and simplified thyssenkrupp rothe erde USA and other references. | MDG       | DFK        | 10/12/2020 |
|       |   |           |            |            |