TECHNICAL SPECIFICATION

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Petroleum and related products — Guidance for the maintenance and use of triaryl phosphate ester turbine-control fluids

Pétrole et produits connexes — Lignes directrices pour la maintenance et l'utilisation des fluides de régulation de turbines à base d'esters de triaryl phosphate

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

— an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;

— an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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

ISO/TS 11365 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, Subcommittee SC 4, *Classifications and specifications*.

This first edition of ISO/TS 11365 is a revision of IEC 60978:1989, which was previously maintained by IEC/TC 10, *Fluids for electrotechnical applications*.

Introduction

Many turbine manufacturers and electrical power utilities specify limits on the properties of triaryl phosphate ester hydraulic control fluids in service. Some companies also provide recommendations on the action necessary if these limits are approached or exceeded, but few provide detailed guidance on fluid maintenance and use.

This Technical Specification identifies typical performance limits for used fluids and also contains detailed recommendations on their use and maintenance. While the requirements of the equipment builder and/or operator take precedence, particularly during any warranty period, the content of this Technical Specification can be read in conjunction with manufacturer/operator requirements, or provide guidance in their absence.

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WARNING — The use of this Technical Specification may involve hazardous materials, operations and equipment. This Technical Specification does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this Technical Specification to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

1 Scope

This Technical Specification applies to the use of triaryl phosphate esters as fire-resistant fluids for turbine control and other hydraulic systems in power generation.

This Technical Specification is intended to

— help power equipment operators appreciate the important properties of triaryl phosphate esters;

— provide information on their safe handling, storage and use.

This Technical Specification addresses the causes of fluid deterioration and sets out procedures for examining consignments of new fluid, for monitoring the fluid in use and for maintaining an adequate fluid condition.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 3170:2004, *Petroleum liquids — Manual sampling*

ISO 3722:1976, *Hydraulic fluid power — Fluid sample containers — Qualifying and controlling cleaning methods*

ISO 4021:1992, *Hydraulic fluid power — Particulate contamination analysis — Extraction of fluid samples from lines of an operating system*

3 Description of triaryl phosphate ester fluids

Triaryl phosphates are complex mixtures of products produced from the reaction of phosphorus oxychloride with either xylenols or substituted phenols and they have been used as fire-resistant fluids in power generation applications for over 50 years. While the early fluids were neurotoxic as a result of the presence of tricresyl phosphate, the products in commercial use for about the last 30 years do not contain this component and have very low levels of neurotoxicity. Modern phosphate esters are manufactured to meet the stringent health and safety requirements of the 7th Luxembourg Report[24] and its more recent replacement, CEN/TR 14489. However, as with all chemicals, they should be handled responsibly. The health and safety recommendations given in this Technical Specification are therefore intended to minimize exposure and to provide a margin of safety for workers handling these fluids.