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COMMISSION INTERNATIONALE DE L'ÉCLAIRAGE
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TECHNICAL REPORT

THE PHOTOMETRY AND GONIOPHOTOMETRY OF LUMINAIRES

CIE 121-1996

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Descriptor: Light distribution
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Goniophotometers

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2. D'élaborer des normes et des méthodes de base pour la métrologie dans les domaines de la lumière et de l'éclairage.
3. De donner des directives pour l'application des principes et des méthodes d'élaboration de normes internationales et nationales dans les domaines de la lumière et de l'éclairage.
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5. De maintenir une liaison et une collaboration technique avec les autres organisations internationales concernées par des sujets relatifs à la science, la technologie, la normalisation et l'art dans les domaines de la lumière et de l'éclairage.

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Tous les quatre ans, une Session plénière passe en revue le travail des Divisions et des Comités Techniques, en fait rapport et établit les projets de travaux pour l'avenir. La CIE est reconnue comme la plus haute autorité en ce qui concerne tous les aspects de la lumière et de l'éclairage. Elle occupe comme telle une position importante parmi les organisations internationales.

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3. Richtlinien für die Anwendung von Prinzipien und Vorgängen in der Entwicklung internationaler und nationaler Normen auf dem Gebiet der Lichttechnik zu erstellen.
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Tagungen werden alle vier Jahre abgehalten, in der die Arbeiten der Divisionen überprüft und berichtet und neue Pläne für die Zukunft ausgearbeitet werden. Die CIE wird als höchste Autorität für alle Aspekte des Lichtes und der Beleuchtung angesehen. Auf diese Weise unterhält sie eine bedeutende Stellung unter den internationalen Organisationen.

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This Technical Report has been prepared by CIE Technical Committee 2-10 of Division 2 "Physical measurement of light and radiation" and has been approved by the Board of Administration of the Commission Internationale de l'Eclairage for study and application. The document reports on current knowledge and experience within the specific field of light and lighting described, and is intended to be used by the CIE membership and other interested parties. It should be noted, however, that the status of this document is advisory and not mandatory. The latest CIE Proceedings or CIE NEWS should be consulted regarding possible subsequent amendments.

Ce rapport technique a été préparé par le Comité Technique CIE 2-10 de la Division 2 "Mesures physiques de la lumière et des radiations" et a été approuvé par le Bureau d'Administration de la Commission Internationale de l'Eclairage, pour étude et application. Le document traite des connaissances courantes et de l'expérience dans le domaine spécifique indiqué de la lumière et de l'éclairage, et il est établi pour l'usage des membres de la CIE et autres groupements intéressés. Il faut cependant noter que ce document est indicatif et non obligatoire. Pour connaître d'éventuels amendements, consulter les plus récents comptes rendus de la CIE ou le CIE NEWS.

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FOREWORD

The following members of TC 2-10 "Photometry and Goniophotometry of Luminaires" took part in the preparation of this Technical Report. The TC comes under Division 2 "Physical Measurement of Light and Radiation".

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THE PHOTOMETRY AND GONIOPHOTOMETRY OF LUMINAIRES

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THE PHOTOMETRY AND GONIOPHOTOMETRY OF LUMINAIRES

SUMMARY

This technical report provides general requirements for the photometry of luminaires of most types and includes the following information:

- standard test conditions under which the tests should be carried out, with acceptable practical tolerances;
- selection procedures for lamps and luminaires;
- procedures for measurement of the photometric characteristics of luminaires and assessment of the possible sources of error;
- correction factors and service conversion factors;
- presentation of test results.

The report is considered to be sufficiently comprehensive to form a practical guide for industrial laboratories and contains sufficient information to replace publication CIE 24-1973 "Photometry of indoor type luminaires" and CIE 27-1973 "Photometry of luminaires for street lighting". CIE will publish supplementary reports covering these types of luminaires more specifically.

PHOTOMETRIE ET GONIOPHOTOMETRIE DES LUMINAIRES

RESUME

Le présent rapport technique formule les exigences photométriques générales pour différents types de luminaires et comprend les informations ci-après:

- les conditions d'essai normalisées à adopter pour la réalisation des essais, avec les tolérances pratiques acceptables;
- les procédures de sélection de lampes et luminaires;
- les procédures de mesure des caractéristiques photométriques de luminaires et les sources d'erreur possibles;
- les facteurs de correction et les facteurs de conversion en service;
- la présentation des résultats d'essais.

Le rapport est considéré comme une synthèse pouvant constituer un guide pratique pour les laboratoires industriels et contient suffisamment d'informations pour remplacer les publications CIE 24-1973 "Photometry of indoor type luminaires" et CIE 27-1973 "Photometry of luminaires for street lighting". Il est toutefois de l'intention de la CIE de publier des rapports complémentaires couvrant plus spécifiquement ces types de luminaires.

PHOTOMETRIE UND GONIOPHOTOMETRIE VON LEUCHTEN

ZUSAMMENFASSUNG

Die allgemeinen Anforderungen in diesem technischen Bericht beziehen sich auf Photometrie vieler Typen von Leuchten. Die folgende Information ist also eingeschlossen:

- die für die Prüfung erforderlichen normierten Bedingungen, zugleich mit den im Betrieb anzunehmenden Begrenzungen;
- Auswahlverfahren für Lampen und Leuchten;
- Prozeduren für Messungen der photometrischen Eigenschaften und zugleich mögliche Fehlerursachen;
- Korrekturfaktoren und Umsetzungsfaktoren im Betrieb;
- Darstellung der Prüfergebnisse.

Der Bericht bildet eine Synthese und ist deshalb als praktische Anleitung für industrielle Laboratorien geeignet. Er enthält genügend Informationen, um die Publikationen CIE 24-1973 "Photometry of indoor type luminaires" und CIE 27-1973 "Photometry of luminaires for street lighting" zu ersetzen. Die CIE wird jedoch noch ergänzende Berichte veröffentlichen, die diese Leuchtentypen genauer behandeln.

1. INTRODUCTION

1.1 Scope

This report covers general requirements for the photometry of luminaires which are considered to be applicable to most types of luminaire.

The report sets out to provide specifications for the standard conditions under which photometric tests should be carried out and to recommend testing procedures which will give sufficiently accurate and reproducible results when determining and reporting the photometric characteristics of luminaires. These specifications are intended to provide a basis for uniform national standards and to give guidance to photometric laboratories in the conduct of tests and in the presentation of luminaire performance data. The report also gives specifications for the measurement of correction factors applicable to luminaires operated under practical test conditions different from the standard test conditions.

Detailed descriptions of photometric methods are primarily of value to laboratory personnel and engineers, but are also important to users of the data. Proper interpretation of data often depends on a full knowledge of the testing procedures involved and this report also sets out to provide the user with the information needed to understand photometric testing procedures and data presentation. Where there is felt to be a need for specific recommendations relating to the measurement and data presentation requirements of particular types of luminaire designed for specialist applications, which could not be covered in a general report of this kind, it is intended that the need shall be met by the publication of a number of supplementary technical reports. These supplementary reports will refer back to the appropriate sections in the present report, and will define, where necessary, special requirements and measurement conditions.

For types of luminaire not covered by a specific report, the requirements of the most appropriate report, together with this general report may be used as a guide to the test procedures to be employed.

1.2 Photometric characteristics

Photometric characteristics can be divided into measured characteristics, i.e. those directly measured with laboratory instruments, and derived characteristics, i.e. characteristics which can be calculated from the measured ones. The derived characteristics are more closely related to lighting applications. This report deals mainly with measured photometric characteristics.

2. TERMINOLOGY

Only definitions of immediate interest are included. The terminology used in this report is preferred, but some of the terms may be found in other publications under different names. These other names are given in square brackets.

For other relevant definitions see Publication CIE/IEC 17.4-1987 [1].

2.1 Terms related to the luminaire

2.1.1 Luminaire

Apparatus which distributes, filters or transforms the light transmitted from one or more lamps and which includes, except the lamps themselves, all the parts necessary for supporting, fixing and protecting the lamps and, where necessary, circuit auxiliaries together with the means for connecting them to the electricity supply.

2.1.2 Design attitude (of a luminaire) [also tilt normal in application]

The attitude in which a luminaire is designed to operate (as determined by reference to the manufacturer's instructions or to common practice).