

## **Ballasts for tubular fluorescent lamps - Performance requirements**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 60921:2002 sisaldab Euroopa standardi EN 60921:1991+A1:1992+A2:1995 ingliskeelset teksti.

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construction characteristic, fluorescent lamp, lighting equipment, marking, performance characteristic, reference ballasts, test, tubular lamp

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English version

## Ballasts for tubular fluorescent lamps Performance requirements

(IEC 921 : 1988 + corrigendum April 1989, modified)

Ballasts pour lampes tubulaires à fluorescence  
Prescriptions de performances  
(CEI 921 : 1988 + corrigendum avril 1989,  
modifiée)

Vorschaltgeräte für röhrenförmige  
Leuchtstofflampen  
Anforderungen an die Arbeitsweise  
(IEC 921 : 1988 + Corrigendum April 1989,  
modifiziert)

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

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## Foreword

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 921 : 1988, as corrected by corrigendum April 1989, could be accepted without textual changes, has shown that some CENELEC common modifications were necessary for the acceptance as European Standard.

The reference document, together with the common modifications prepared by the CENELEC Technical Committee TC 34Z, was submitted to the CENELEC members for formal vote.

The text of the draft was approved by CENELEC as EN 60921 on 15 March 1991.

The following dates were fixed:

- latest date of publication (dop) 1992-03-01 of an identical national standard
- latest date of withdrawal (dow) 1992-03-01 of conflicting national standards

For products which have complied with the relevant national standard before 1992-03-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1997-03-01.

Annexes designated 'normative' are part of the body of the standard. In this standard, annex ZA is normative.

## Endorsement notice

The text of the International Standard IEC 921 : 1988 with its corrigendum April 1989 was approved by CENELEC as a European Standard with agreed common modifications as given below.

## Common modifications

4.3 Delete.

11.1 Delete the second paragraph.

Replace Table I and the associated note with the following:

Table I Maximum value of the harmonics	
Harmonic	Maximum value expressed as a percentage of fundamental current for the ballast
2	5
3	$30 \times \lambda$
5	7
7	4
9	3
$\lambda$ is the circuit power-factor.	

13. Delete note 2.

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## BALLASTS FOR TUBULAR FLUORESCENT LAMPS

### Performance requirements

#### INTRODUCTION

This standard covers performance requirements for ballasts for tubular fluorescent lamps. It should be read in conjunction with IEC Publication 920, with which all ballasts covered by the present standard should comply.

Unless otherwise stated on the lamp data sheet mentioned in IEC Publications 81 and 901, it may be expected that ballasts which comply with this standard, when associated with lamps complying with IEC Publications 81 and 901, and, where appropriate, operated with a starter complying with IEC Publication 155 or starting devices complying with IEC Publication 927, will ensure satisfactory starting of the lamps at an air temperature immediately around the lamps between 10 °C and 35 °C and for voltages between 92% and 106% of rated supply voltage, and also proper operation between 10 °C and 50 °C at rated supply voltage.

The compatibility of lamps and ballasts is evaluated with the use of special inductive ballasts called "reference ballasts" having particular characteristics which are stable and reproducible. These ballasts are used when testing commercial ballasts and when selecting reference lamps. Moreover, the testing of ballasts presents particular difficulties which require a proper definition of testing methods. Such tests will generally be made with reference lamps and, in particular, by comparing the results obtained when such lamps are operated on a reference ballast with the results obtained when the same lamps are operated on the ballast being tested.

*Note.* — Requirements are also included for all those features of reference ballast construction and performance which are considered necessary to ensure accurate and reproducible results when testing ballasts, particularly with regard to the selection of reference lamps.

For checking the lamp power and current of lamps operated without starter, this standard specifies a measurement in a reference ballast circuit that makes no provision for separate power sources to heat the cathodes during lamp operation. Although the influence on the ballast specification is small, it has nevertheless been deemed useful for some pre-heated low-voltage cathode lamps, operated without a starter, to include provision for two alternative methods of measurement of lamp power and current:

- a) measurement of lamp power and current without additional cathode heating;
- b) measurement of lamp power and current with additional cathode heating.

The test method to be adopted for appraisal should be stated by the manufacturer.

Two alternative circuits are specified for the measurement of impedance at audio-frequencies. The less complex circuit could be used when there is no doubt about the inductive character of the impedance. If there is any doubt, the other circuit shall be used.

#### 1. Scope

This standard specifies performance requirements for ballasts excluding resistance types for use on a.c. supplies up to 1 000 V at 50 Hz or 60 Hz, associated with tubular fluorescent lamps with pre-heated cathodes operated with or without a starter or starting device and having rated wattages, dimensions and characteristics as specified in IEC Publications 81 and 901. It applies to complete ballasts and their component parts such as resistors, transformers and capacitors.

*Note.* — Full implications of references to IEC Publication 901 have not been carried out in this standard.

This standard should be read in conjunction with IEC Publication 920. A.C. supplied electronic ballasts for tubular fluorescent lamps for high frequency operation specified in IEC Publication 928 are excluded.

## 2. Definitions

The definitions of IEC Publication 920 apply.

## 3. General notes on tests

### 3.1 Tests according to this specification are type tests.

*Note.* — The requirements and tolerances permitted by this standard are based on testing of a type test sample submitted by the manufacturer for that purpose. In principle this type test sample should consist of units having characteristics typical of the manufacturer's production and be as close to the production centre point values as possible.

It may be expected with the tolerances given in the standard that products manufactured in accordance with the type test sample will comply with the standard for the majority of the production.

Due to the production spread, it is inevitable, however, that there may sometimes be ballasts outside the specified tolerances.

For guidance of sampling plans and procedures for inspection by attributes, see IEC Publication 410.

### 3.2 The tests shall be carried out in the order of the clauses, unless otherwise specified.

### 3.3 One specimen shall be submitted to all tests.

### 3.4 In general all tests are made on each type of ballast or, where a range of similar ballasts is involved, for each rated wattage in the range or on a representative selection from the range as agreed with the manufacturer.

### 3.5 The tests shall be made under the conditions specified in Appendix A.

### 3.6 All ballasts specified in this standard shall comply with the requirements of IEC Publication 920.

## 4. Marking

The following information shall be included either on the ballast or be made available in the manufacturer's catalogue or the like:

### 4.1 Circuit power-factor, for example $\lambda$ 0.85.

If the power-factor is less than 0.85 leading, it shall be followed by the letter C, for example  $\lambda$  0.80 C.

For ballasts intended for the additional application of operating lamps in series, the appropriate power-factors shall be included.

The following additional marking shall be included, if appropriate:

### 4.2 The symbol $\overline{Z}$ which indicates that the ballast is designed to comply with the conditions for audio-frequency impedance (see Clause 13).

## 5. Open-circuit voltage at terminations of lamp or starter (if any)

The test shall be carried out in accordance with the measuring conditions of Appendix A, Clause A4.