

European Committee for Electrotechnical Standardization (CENELEC)
Cenelec Electronic Components Committee

CECC



Système Harmonisé d'Assurance de la Qualité
des Composants Electroniques

SPECIFICATION PARTICULIERE CADRE:

● **TUBES AMPLIFICATEURS
A ONDE PROGRESSIVE
(PUISSANCE DE SORTIE
JUSQU'A 500 WATTS)**

Harmonized System of Quality Assessment for
Electronic Components

BLANK DETAIL SPECIFICATION:

● **C.W. POWER AMPLIFIER
TRAVELLING WAVE TUBES
UP TO 500 WATTS**

Harmonisiertes Gütebestätigungssystem für
Bauelemente der Elektronik

VORDRUCK FÜR
BAUARTSPEZIFIKATION:

**DAUERSTRICH-WANDER-
FELDRÖHREN FÜR
LEISTUNGSVERSTÄRKER
BIS 500 WATT**

CECC 35001

Cette page bleue doit être insérée après la page de garde de la CECC 35 001 Edition 1 (1977)

MODIFICATION 1 DE LA CECC 35 001 (Edition 1):
SPECIFICATION PARTICULIERE CADRE:
TUBES AMPLIFICATEURS A ONDE PROGRESSIVE
(PUISSANCE DE SORTIE JUSQU'A 500 WATTS)

Retirer les pages 7/8 et insérer les nouvelles pages 7/8 de la Modification 1.

Les modifications suivantes ont été effectuées
- à la page 7

"Examen ou Essai" Sous-groupe A 3:

"T.O.S. de sortie à chaud" a été changé en
"T.O.S. de sortie à chaud ou à froid
(comme spécifié)".

- à la page 8

"Examen ou Essai" Sous-groupe C 1:

"... ou stabilité en court-circuit ou stabilité en puissance (comme spécifié)" a été ajouté.

Le texte de cette modification a été soumis au vote du CECC dans les documents indiqués ci-dessous et a été ratifié par le Président du CECC pour être publié comme Modification 1.

Document: CECC(Secrétariat)1945

Date de Vote: 12 novembre 1986

Rapport de Vote: CECC(Secrétariat)2041

Enregistrer les modifications sur la feuille Jaune "Enregistrement de modifications".

CECC 35 001 Edition 1 Modification 1 (1987)

This blue page should be inserted after the title page of CECC 35 001 Issue 1 (1977)

AMENDMENT 1 TO CECC 35 001 (Issue 1):

BLANK DETAIL SPECIFICATION:

C.W. POWER AMPLIFIER TRAVELLING WAVE TUBES UP TO 500 WATTS

Remove pages 7/8 and insert new pages 7/8 of Amendment 1.

The following amendments were made

- on page 7

"Examination or Test" Sub-group A 3:

"Hot output v.s.w.r." was changed to read
"Hot or cold output v.s.w.r. (as specified)".

- on page 8

"Examination or Test" Sub-group C 1

"... or short circuit stability or power stability (as specified)" was added.

The text of this amendment was circulated to the CECC for voting in the documents listed below and was ratified by the President of the CECC for printing as Amendment 1.

Document: CECC(Secretariat)1945

Voting Date: 12 November 1986

Report on the Voting: CECC(Secretariat)2041

Enter these amendments on the yellow "Record of Amendments" sheet.

CECC 35 001 Issue 1 Amendment 1 (1987)

Dieses blaue Blatt ist nach dem Titelblatt CECC 35 001 Ausgabe 1 (1977) einzufügen

ÄNDERUNG 1 ZU CECC 35 001 (Ausgabe 1):

VORDRUCK FÜR BAUARTSPEZIFIKATION:

DAUERSTROM-WANDERFELDDRÖHREN FÜR LEISTUNGS-
VERSTÄRKER BIS 500 WATT

Die Seiten 7/8 sind herauszunehmen und durch die neuen Seiten 7/8 der Änderung 1 zu ersetzen.

Die folgenden Änderungen wurden vorgenommen

- auf Seite 7

"Prüfung" Untergruppe A 3:

"Ausgangswelligkeitsfaktor bei Betrieb" wurde geändert in "warmer oder kalter Ausgangswelligkeitsfaktor (wie festgelegt)".

- auf Seite 8

"Prüfung" Untergruppe C 1

"...oder Kurzschlussstabilität oder Leistungsstabilität (wie festgelegt)" wurde hinzugefügt.

Der Text dieser Änderung wurde dem CECC mit den unten aufgeführten Schriftstücken zur Abstimmung vorgelegt und vom Präsidenten des CECC zur Herausgabe als Änderung 1 freigegeben.

Schriftstück: CECC(Sekretariat)1945

Abstimmdatum: 12. November 1986

Abstimmbericht: CECC(Sekretariat)2041

Diese Änderung ist auf dem gelben Blatt "Verzeichnis der Änderung" einzutragen.

CECC 35 001 Ausgabe 1 Änderung 1 (1987)

FOREWORD

The CENELEC Electronic Components Committee (CECC) is composed of those member countries of the European Committee for Electrotechnical Standardization (CENELEC) who wish to take part in a harmonized System for electronic components of assessed quality.

The object of the System is to facilitate international trade by the harmonization of the specifications and quality assessment procedures for electronic components, and by the grant of an internationally recognized Mark, or Certificate, of Conformity. The components produced under the System are thereby accepted by all the member countries without further testing.

This document has been formally approved by the CECC, and has been prepared for those member countries taking part in the System who wish to issue national harmonized specifications for C.W. POWER AMPLIFIER TRAVELLING WAVE TUBES UP TO 500 WATTS. It should be read in conjunction with document CECC 00 100: Basic Rules (1974).

At the date of printing of this document, the member countries of the CECC are Belgium, Denmark, Germany, France, Ireland, Italy, the Netherlands, Norway, Sweden, Switzerland and the United Kingdom, and copies of it can be obtained from the National Committees of the CENELEC in these countries.

PREFACE

This blank detail specification was prepared by CECC Working Group 13 : "Microwave Tubes".

It is one of a series of blank detail specifications for travelling wave amplifier tubes, all relating to the generic specification printed as CECC 35 000.

In accordance with the requirements of document CECC 00 100, it is based, wherever possible, on the Recommendations of the International Electrotechnical Commission and in particular on IEC Publication 235: Measurement of the electrical properties of microwave tubes.

The text of this specification was circulated to the CECC for voting in the documents below and was ratified by the CECC for printing as a CECC Specification.

<u>Document</u>	<u>Voting date</u>
CECC(Secretariat)267	15 Nov 1974
CECC(Secretariat)267A	7 Nov 1975

1. General

This blank detail specification shows the layout and contents to be followed in the preparation of harmonized detail specifications for C.W. power amplifier travelling wave tubes up to 500 watts.

These requirement include the following:

- Identification of the harmonized detail specification
- Identification of the tube
- Supplementary information
- Test schedule and inspection requirements
- Information on application of the tube (if required)

The numbers between square brackets on the layout for a detail specification, as given on the next page, correspond to the indications which should be given.

2. Identification of the harmonized detail specification

- [1] The name of the National Standards Organisation under whose authority the detail specification is drafted
- [2] The CECC symbol and the number allotted to the national detail specification by the CECC General Secretariat
- [3] The number and issue number of the national generic specification
- [4] The national number of the detail specification, date of issue and any further information required by the national system, together with any amendment numbers, if issued.

3. Identification of the tube

- [5] A short description of the type of tube and type number.
- [6] Information on typical construction (where applicable).
- [7] An outline drawing with main dimensions which are of importance for interchangeability. Alternatively, this drawing may be given in an appendix to the detail specification.
- [8] The application or group of applications covered by the detail specification.
- [9] Brief information on the most important properties of the component (extracted from 6) to allow comparison between the various component types intended for the same, or for similar applications.

RECOMMENDED LAYOUT FOR DETAIL SPECIFICATIONS

[1]	page of	[2] 
ELECTRONIC COMPONENT OF ASSESSED QUALITY IN ACCORDANCE WITH [3]	[4]	
DETAIL SPECIFICATION for [5] Typical Construction: [6]		
[7]	[8]	
[9]		
See the relevant Qualified Products List for the availability of components made to this specification		

4. Supplementary information (not for inspection purposes)

Following the information given in accordance with 2. and 3., space shall be allocated for the following information:

- structurally similar features of the tube which may be relevant for inspection purposes
- requirements for certified test records
- marking requirements (in accordance with 2.5 of CECC 35 000)
- ordering information.

5. Additional information (not for inspection purposes)

Following the information given in accordance with 4., space may then be allocated for any additional information which may be of help to the user of the tube.

This information may include:

- any requirements of a precautionary nature
- mounting requirements
- cooling requirements
- any special setting up or switching requirements.

6. Data (not for inspection purposes)

Detail specifications shall include data on the following properties, but not necessarily in the order given.

6.1 Mechanical and environmental data:

- dimensioned engineering drawing
- mass of the tube and mass of the tube mount (if separate)
- mounting position and accessories
- precautions to be taken with respect to external magnetic influences; ambient magnetic fields and distance from ferromagnetic materials.
- cooling requirements
- maximum temperatures of specified reference points
- limiting values for shock and vibration (if required by the application)
- minimum ambient air pressure (if required by the application)
- ambient temperature range, storage and operating.

6.2 Electrical Characteristics

- frequency range (given as x GHz to y GHz)
 - instantaneous bandwidth - minimum value
 - power output at stated conditions - minimum value
 - gain at stated conditions - minimum value (and where appropriate maximum value)
 - gain flatness
 - gain ripple
 - gain slope
 - AM/PM conversion coefficient
 - AM/PM transfer coefficient
 - intermodulation products (3 tone)
 - noise factor
 - characteristic curve
- } if required by
the application

6.3 Electrical Limiting values

Absolute maximum rating system in accordance with IEC 134.

- cathode preheating time at minimum heater voltage or current - minimum value
- heater voltage or current - minimum and maximum values
- heater surge current - maximum value
- heater to cathode voltage, where appropriate - maximum value
- grid(s) voltage(s) (with respect to cathode) - minimum and maximum values
- slow wave structure voltage (with respect to cathode) minimum and maximum values
- collector(s) voltage(s) (with respect to cathode) - minimum and maximum values
- collector(s) current(s) - maximum value(s)
- grid(s) current(s) - maximum value
- slow wave structure current - maximum value
- r.f. power input - maximum value
- v.s.w.r. (caused by load) - maximum value
- focus coil current (if applicable) - maximum value

Inspection Requirements for Quality Conformance
Lot by Lot Inspection
Group A

Examination or Test	D ND see Note 1	Ref. in CECC 35 000	Conditions of Test	Limits		Units	IL	AQL %
				Min	Max			
<u>Sub-group A 1</u>	ND						100 %	
Holding period 24 h Post holding tests:								
Available power gain		4.5.5	Heater voltage V Grid(s)...voltage(s) adjust to obtain required collector current and minimize structure current Grid(s)...voltage(s).....V Slow wave structure voltage V Collector(s) voltage(s)..V Collector current.....mA Power output W Frequency GHz Mount (if separate)	✓		dB		
Slow wave structure current		4.5.4	As for available power gain	✓	✓	mA		
Visual inspection		4.4.1	No voltages					
<u>Sub-group A 2</u>	ND						II	1,5
Major dimensions		4.4.2	See drawing on page.....					
Heater current		4.5.3	No other voltages	✓	✓	A		
Grid(s) current(s)		4.5.4	As for available power gain	✓	✓	mA		
Grid...voltage(s)		4.5.4	As for available power gain	✓	✓	V		
Insulation of electro- des (leakage current)		4.5.15	Heater voltage V Test voltage V		✓	μA		



Examination or Test	D ND	Ref. in CECC 35 000	Conditions of Test	Limits		Units	IL	AQL %
				Min.	Max.			
<u>Sub-group A 3</u>	ND							
Gain flatness (if required by the application)		4.5.6	Heater voltage V Grid voltage(s) adjust to obtain required collector current and minimize structure current Grid(s)...voltage(s).....V		✓	dB	S4	6,5
Gain ripple (if required by the application)		4.5.7	Slow wave structure voltage adjust between.....V and V for optimum performance in each band		✓	dB	S4	6,5
Gain slope (if required by the application)		4.5.8	Collector(s) voltage(s)...V Power output W Frequency range to be covered GHz to.....GHz Frequency band for each measurement MHz Mount (if separate)		✓	dB	S4	6,5
Hot input v.s.w.r.		4.5.16	As for available power gain but with an r.f. drive level at least 10 dB below that required for saturation		✓		S4	6,5
Hot or cold output v.s.w.r. (as specified)		4.5.16	As for available power gain but with no r.f. drive. The power level used for making this measurement must be at least 10 dB below saturated power level		✓		S4	6,5

Group B (lot by lot) - Not applicable



Group C

(periodical inspection)

Examination or Test	D ND	Ref. in CECC 35 000	Conditions of Test	Limits		Units	sampling requirements	
				Min.	Max.		n	c
<u>Sub-group C 1</u>								
6 monthly								
Mismatch stability	ND	4.5.10	Heater voltage V				5	1
or			Grid voltage(s)					
Short circuit stability			adjust to obtain required					
or			collector current and mini-					
Power stability			mize structure current					
(as specified)			Grid(s)...voltage(s).....V					
			Collector(s) voltage(s)....V					
			Collector current mA					
			Mismatch condition					
Power at the input					✓	W		
Power at the output					✓	W		
			Slow wave structure voltage					
			range.....V to V					
			Mount (if separate)					
Noise	ND	4.5.11	In accordance with required				5	1
(if applicable)			application					
<u>Sub-group C 2</u>								
12 monthly								
Instantaneous	ND	4.5.12	As for available power gain				5	1
bandwidth			Proportion of max gain....	✓		MHz		
Operating loss	ND	4.5.13	As for available power gain	✓		dB	5	1
			but no r.f. drive					
Detail dimensions	ND	4.4.2	See drawing on page.....				5	1
Robustness of termina-	See	4.6.1	Test U of IEC 68-2-21				5	1
tions	Note		(tensile, bending, torsion,					
(as applicable)	2		torque as applicable)					

Group D

Qualification approval only

Examination or Test	D ND	Ref. in CECC 35 000	Conditions of Test	Limits		Units	Sampling requirements	
				Min	Max		n	c
Sub-group D 1							5	1
Phase sensitivity (if required by the application)	ND	4.5.14	As for available power gain Dynamic variation of slow wave structure voltage.....V		✓	deg/V		
Sub-group D 2							5	1
External magnetic influence (if required by the application)	ND	4.6.5	Magnetic field.....Tesla Direction of field..... Duration of immersion.....					
Post magnetic influence tests:								
Available power gain Slow wave structure current			As in sub-group A 1	✓ ✓	✓	dB mA		
Magnetic shielding (if required by the application)	ND	4.6.6	Mild steel plates placed at positions shown in drawing on page.....					
Magnetic shielding tests:								
Change in available power gain			Conditions as in sub-group A 1		✓	dB		
Change in noise per- formance (as appli- cable)			As in sub-group C 1		✓			
Change in gain flat- ness, gain ripple or gain slope (as applicable)			As in sub-group A 3		✓			