SYLVANIA

engineering data service 5641

MECHANICAL DATA

Bulb	T-3
Base	E8-10, Subminiature Button Flexible Leads
Outline	JETEC 3-3
Basing	6CJ
Cathode	Coated Unipotential
Mounting Position	Any

RATINGS[1] (Absolute Maximum)

Impact Acceleration	450 G
Uniform Acceleration	1000 G
Fatigue (Vibrational Acceleration for Extended Periods)	2.5 G
Bulb Temperature	220° C
Altitude[2]	60000 Ft.

ELECTRICAL DATA

HEATER CHARACTERISTICS

	Min.	Bogey	Max.
Heater Voltage[3]	6.0	6.3	6.6 V
Heater Current		450	mA

RATINGS[1 & 4] (Absolute Maximum)

Plate Supply Voltage	330 Vac
Peak Inverse Plate Voltage[5]	930 v
Steady State Peak Plate Current	300 ma
Transient Peak Plate Current	1.1 a
Output Current at 275 Volts Supply	
Choke Input	57 mAdc
Capacitor Input	50 mAdc
Heater-Cathode Voltage[5]	
Heater Positive with Respect to Cathode	465 v
Heater Negative with Respect to Cathode	465 v

CHARACTERISTICS

Tube Voltage Drop for Ib = 90 mAdc	23 Vdc

TYPICAL OPERATION

Half-Wave Rectifier—Capacitor Input to Filter

Plate Supply Voltage	120	235 Vac
Total Plate Supply Impedance	39	270 Ohms
Output Current	48	45 mAdc

Full-Wave Rectifier—Two Tubes

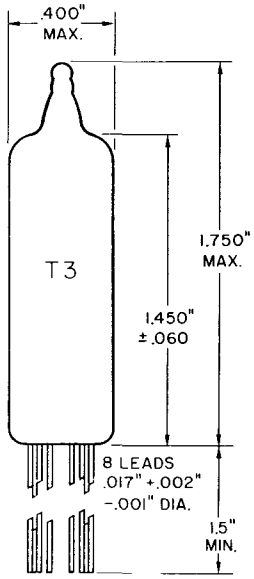
	Capacitor Input	Choke Input
Plate Supply Voltage (Each Plate)	250	300 Vac
Total Plate Supply Impedance (Each Plate)	300	— Ohms
Input Inductance	—	5.0 Henrys
Output Current	90	90 mAdc

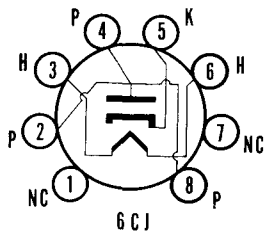
NOTES:

1. *Limitations beyond which normal tube performance and tube life may be impaired.*
2. *If altitude rating is exceeded, reduction of instantaneous voltages (Ef excluded) may be required.*
3. *Tube life and reliability of performance are directly related to the degree of regulation of the heater voltage to its center rated value of 6.3 volts.*
4. *Values shown are as registered with RETMA.*
5. *The maximum voltage appearing between any pair of leads shall be no greater than the maximum peak inverse plate voltage.*

QUICK REFERENCE DATA

The 5641 is a Premium Subminiature, high perveance, cathode type, half-wave rectifier designed primarily for use in power supplies.
The 5641 is designed to provide dependable service under conditions of severe shock, vibration, high temperature and high altitude, and is manufactured and inspected to meet the applicable MIL-E-1 specification for reliability.





SYLVANIA ELECTRIC PRODUCTS INC.

RADIO TUBE DIVISION
EMPORIUM, PA.

Prepared and Released By The
TECHNICAL PUBLICATIONS SECTION
EMPORIUM, PENNSYLVANIA
FEBRUARY 1957

ACCEPTANCE CRITERIA

Test Conditions

Heater Voltage	6.3 V	Load Resistance	5000 Ohms
Plate Supply Voltage	275 Vac	Load Capacitance	16 μf
Heater-Cathode Voltage	0 V		

For the purposes of inspection, use applicable reliable paragraphs of MIL-E-1 and Inspection Instructions for Electron Tubes.

MIL-E-1 Ref.	Test	AQL (%)	Limits Min.	LAL	Bogey	UAL	Max.	Units
Measurements Acceptance Tests, Part 1, Note 1								
4.1.1.7	(Method A)							
4.10.8	Heater Current: ALD = 36	—	—	432	450	468	—	mA
4.10.8	Heater Current:	0.65	420	—	—	—	480	mA
4.10.15	Heater-Cathode Leakage:	0.65	—	—	—	—	—	
	Ehk = +465 Vdc	—	—	—	—	—	50	μAdc
	Ehk = —465 Vdc	—	—	—	—	—	50	μAdc
4.10.13	Operation: Note 4 Io	0.65	47	—	—	—	—	mAdc
4.7.5	Continuity and Shorts (Inoperatives):	0.4	—	—	—	—	—	
4.9.1	Mechanical: Envelope (8-4)	—	—	—	—	—	—	
Measurements Acceptance Tests, Part 2								
4.8.2	Insulation of Electrodes: p-all	2.5	10	—	—	—	—	Meg.
4.10.1.1	Emission: Is Eb = 30 Vdc	2.5	100	—	—	—	—	mAdc
4.9.12.1	Low Pressure Voltage Breakdown: Pressure = 55 ±5 mm Hg.; Voltage = 550 Vac	6.5	—	—	—	—	—	
4.9.20.3	Vibration (1): No Voltages; Post Shock and Fatigue Test End Points Apply	10.0	—	—	—	—	—	
Degradation Rate Acceptance Tests, Note 2								
4.9.5.3	Subminiature Lead Fatigue:	2.5	4	—	—	—	—	arcs
4.9.20.5	Shock: Hammer Angle = 30°; Ehk = +100 Vdc; Epp = O V	20	—	—	—	—	—	
4.9.20.6	Fatigue: G = 2.5; Fixed Frequency; F = 25 min., 60 max.	6.5	—	—	—	—	—	
	Post Shock and Fatigue Test End Points: Heater-Cathode Leakage							
	Ehk = +465 Vdc	—	—	—	—	—	100	μAdc
	Ehk = —465 Vdc	—	—	—	—	—	100	μAdc
	Operation Io	—	45	—	—	—	—	mAdc
4.9.6.3	Glass Strain:	6.5	—	—	—	—	—	

ACCEPTANCE CRITERIA (Continued)

MIL-E-1 Ref.	Test	AQL (%)	Allowable Defectives per Characteristic: 1st Sample	Allowable Defectives per Characteristic: Combined Samples	Limits: Min.	Limits: Max.	Units
Acceptance Life Tests, Note 2							
4.11.3.1	Survival Rate Life Test: (100 Hours) Note 4 TA = Room	0.65	—	—	—	—	
4.11.4	Survival Rate Life Test End Points: Continuity and Shorts (Inoperatives)	—	—	—	—	—	
4.11.7	Heater Cycling Life Test: Ef = 7.0 V; 1 min. on, 4 min. off; Ehk = 140 Vac; Eb = O V	2.5	—	—	—	—	
4.11.5 4.11.3.1	Intermittent Life Test: Notes 3 and 5 Survival Rate Life Test Conditions; T Envelope = +220°C min.; 1000 Hour Requirements Do Not Apply	—	—	—	—	—	
4.11.3.1 4.11.4	Intermittent Life Test End Points: (500 Hours)						
	Inoperatives	—	1	3	—	—	
	Operation Io	—	1	3	43	—	mAdc
	Heater Current	—	2	5	414	492	mA
	Heater-Cathode Leakage	—	2	5	—	—	
	Ehk = +465 Vdc	—	—	—	—	100	μAdc
	Ehk = —465 Vdc	—	—	—	—	100	μAdc
	Total Defectives	—	4	8	—	—	

ACCEPTANCE CRITERIA NOTES:

1: The AQL for the combined defectives for attributes in Measurements Acceptance Tests, Part 1, excluding inoperatives and mechanical shall be one (1) percent. A tube having one (1) or more defects shall be counted as one (1) defective.

2: Tubes subjected to the following destructive tests are not to be accepted under this specification.

- 4.9.5.3 Subminiature lead fatigue
- 4.9.20.5 Shock
- 4.9.20.6 Fatigue
- 4.11.7 Heater cycling life test
- 4.11.5 Intermittent life test

3: Envelope temperature is defined as the highest temperature indicated when using a thermocouple of #40 BS or smaller diameter elements welded to a ring of 0.025 inch diameter phosphor bronze placed in contact with the bulb. Envelope temperature requirement will be satisfied if a tube, having bogey Ib (±5%) under normal test conditions, is determined to operate at maximum specified temperature at any position on the life test rack.

4: In a half-wave circuit, adjust Zp so that a bogey tube gives Io = 50 mAdc. A bogey tube has a tube drop of Etd = 25.0 Vdc at Is = 100 mAdc. Ehk = Eo +117 Vac.

5: In a half-wave life test circuit, the values specified for LR and CL may be considered as approximate and shall be adjusted initially to give not less than Io = 50 mAdc and ib = 250 ma with a bogey tube. Ehk = Eo +117 Vac.

APPLICATION DATA

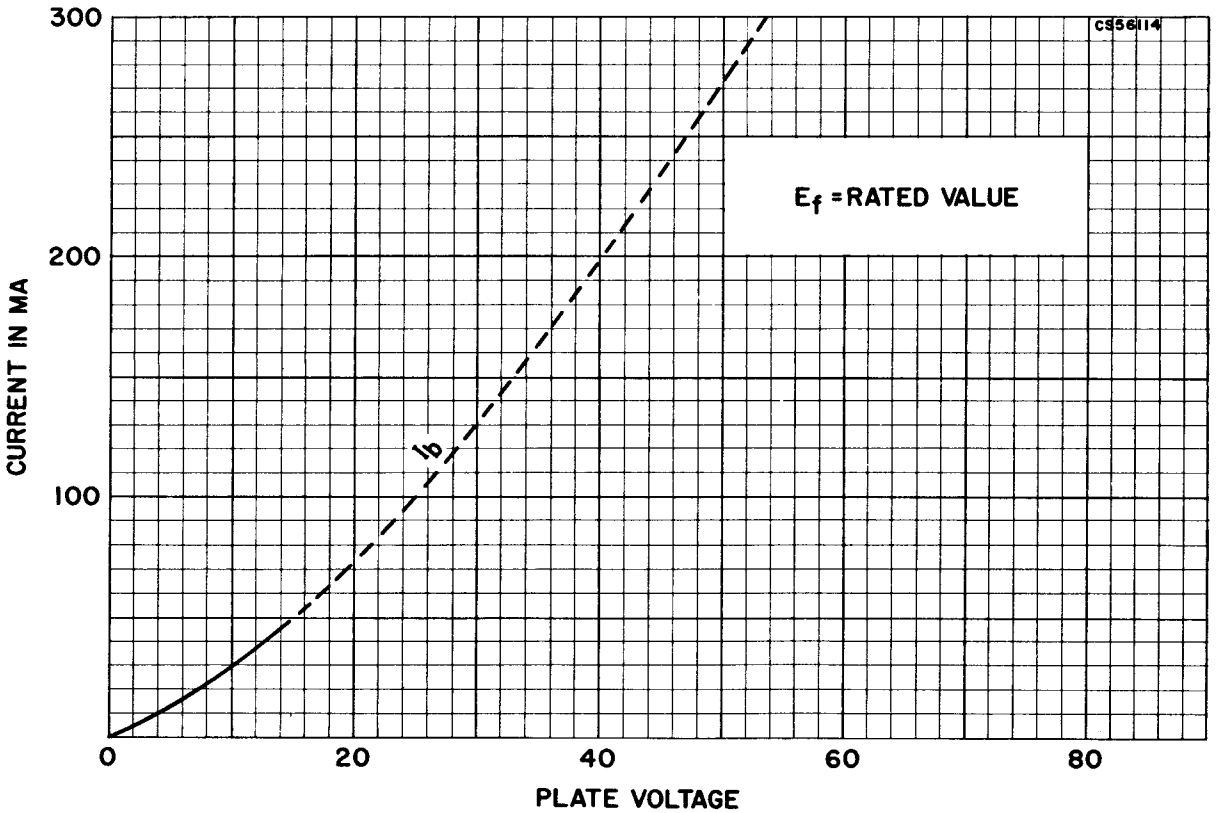
The Sylvania Premium Subminiature Type 5641 is a heater-cathode type diode intended primarily for use as a power supply rectifier where the dc current requirements are not in excess of 45 ma. Where fullwave rectification is desired two 5641's may be used, thus permitting an output current of 90 ma. The 5641 may also be used efficiently in moderate power damping circuits.

Life expectancy is described by the life tests, specified on the attached pages and/or individual MIL-E-1 specifications. The actual life expectancy of the tubes in an operating circuit is affected by both the operating and environmental conditions involved. Likewise, the life tests specified indicates performance under certain operating criteria to a set of specified end points. Performance at conditions other than those specified can usually be estimated only roughly as giving better or poorer life expectancy, reference should be made to the frontal section of this manual.

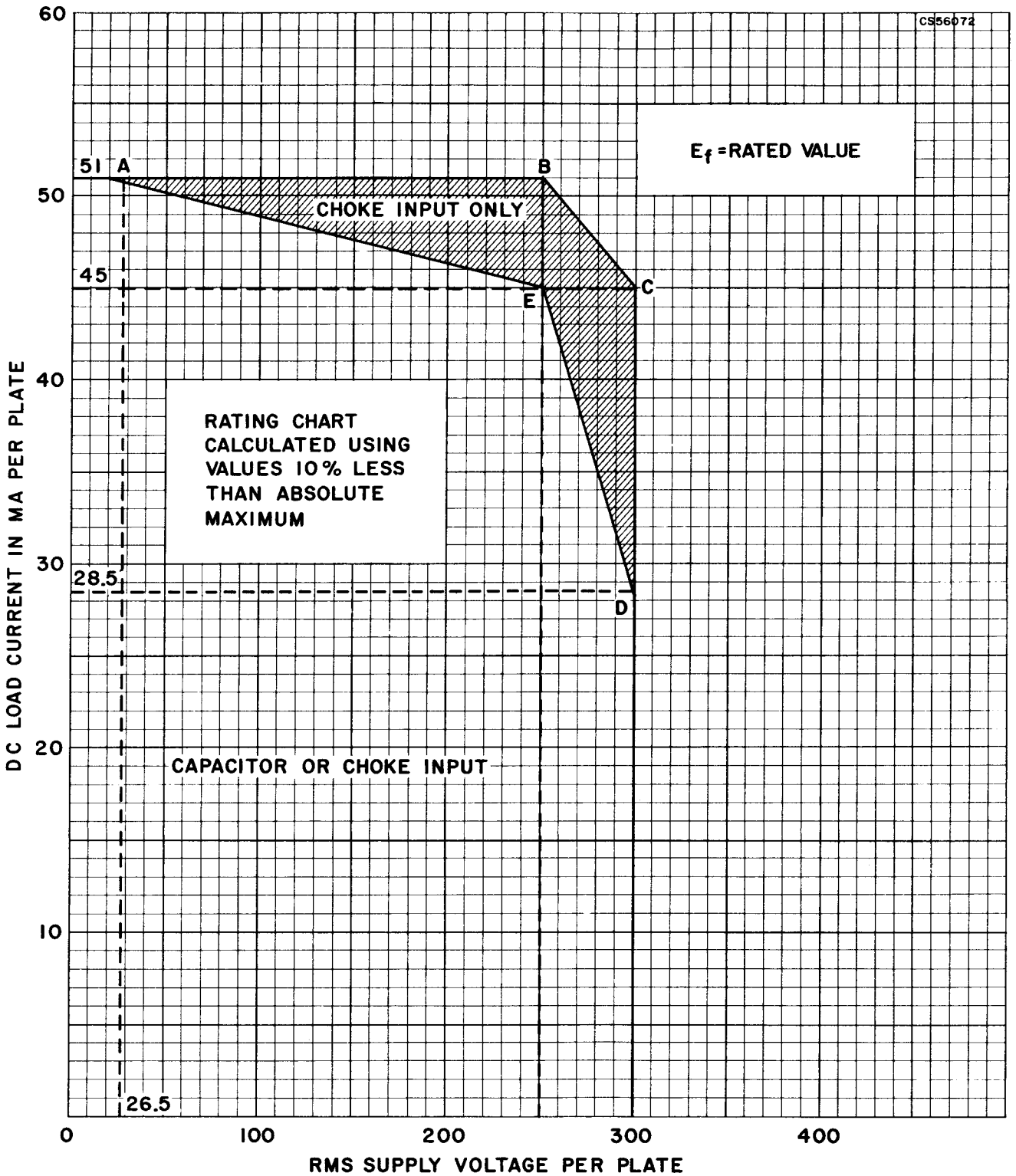
The 5641 is intended for operation under conditions of severe shock, vibration, high temperature, and high altitude and is manufactured and inspected to meet the applicable MIL-E-1 specification for reliability. The heater-cathode construction is designed to withstand intermittent operation.

The information presented on this data sheet is furnished without assuming any obligation.

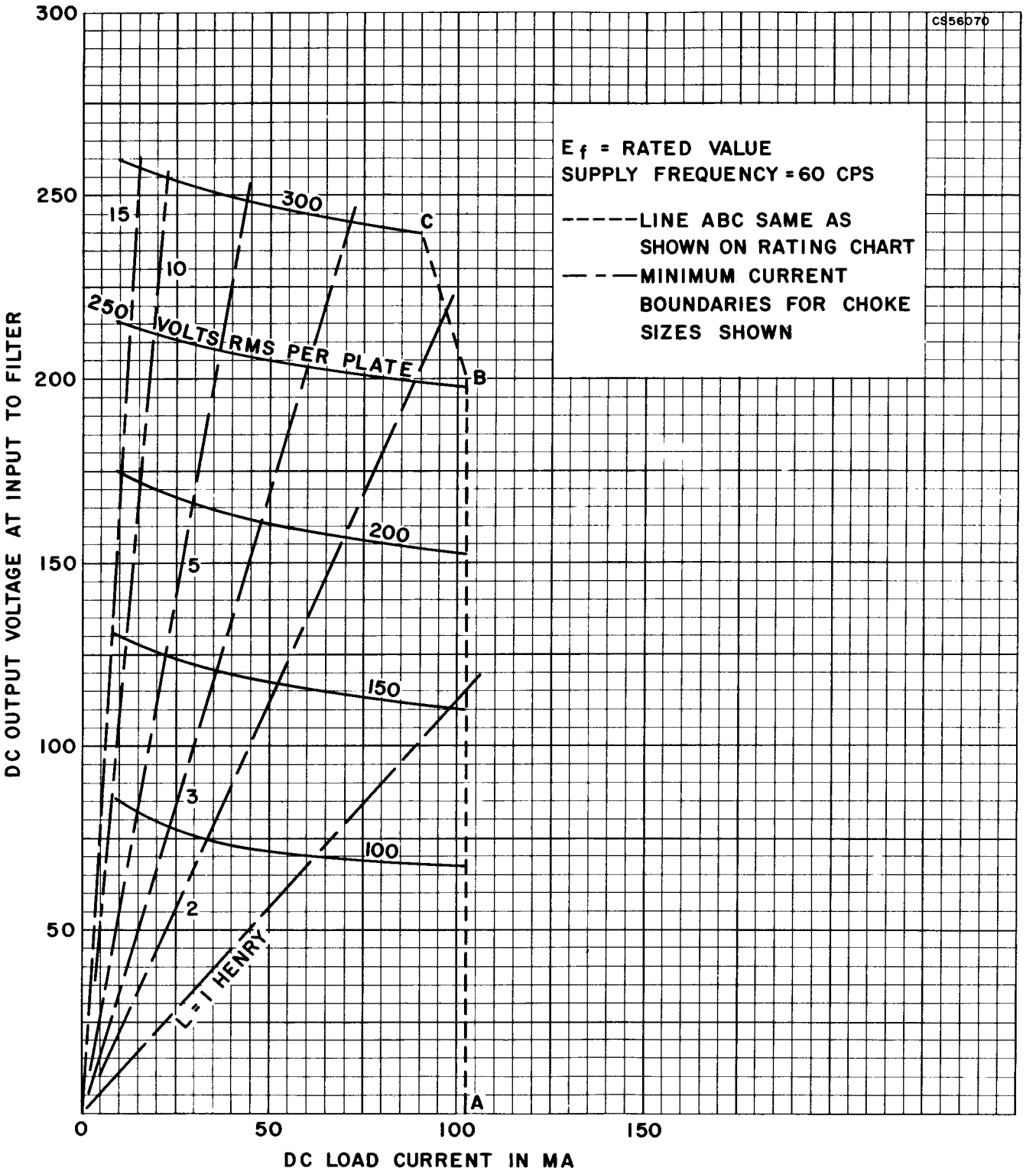
AVERAGE PLATE CHARACTERISTICS



RATING CHART



AVERAGE OPERATION CHARACTERISTICS



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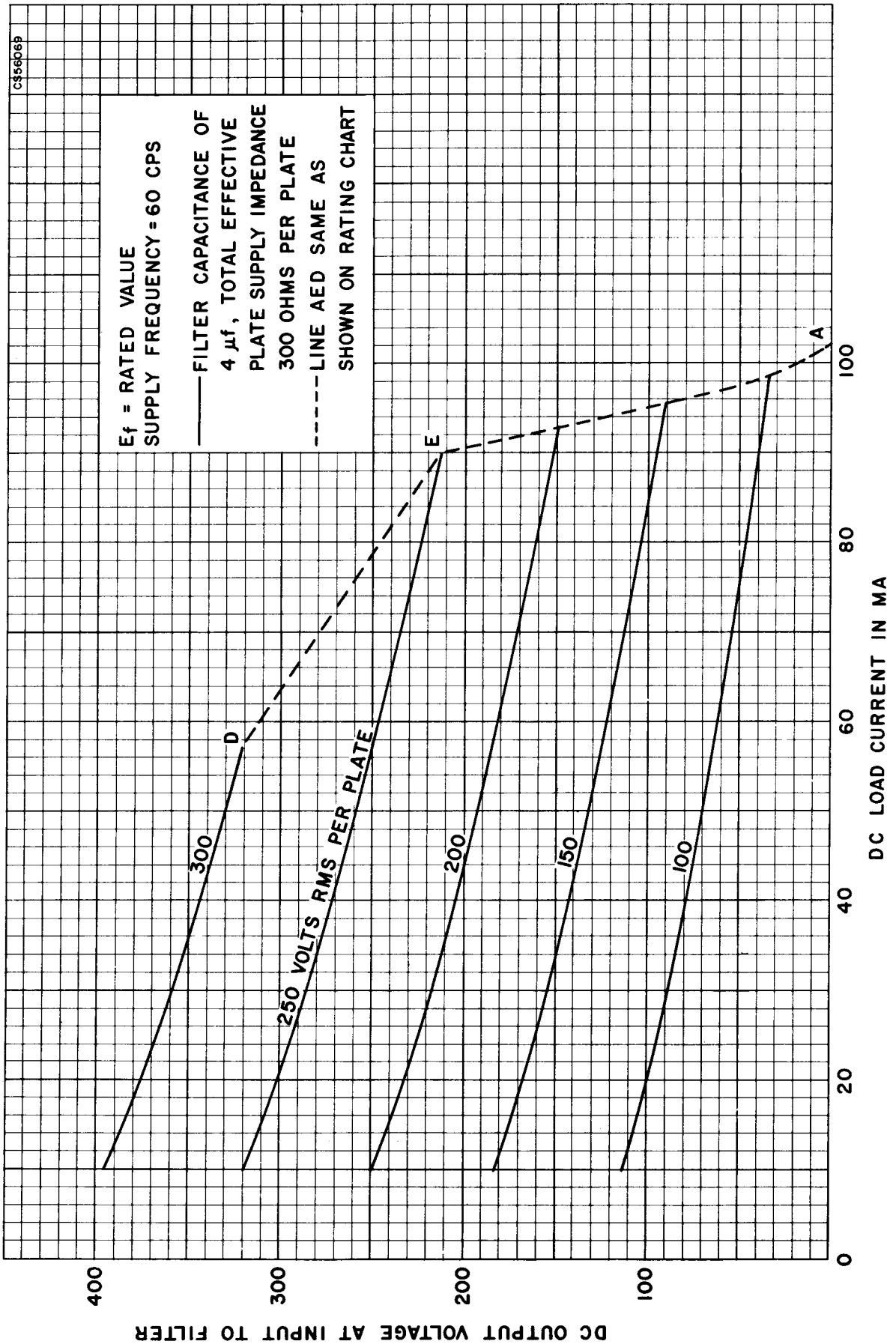
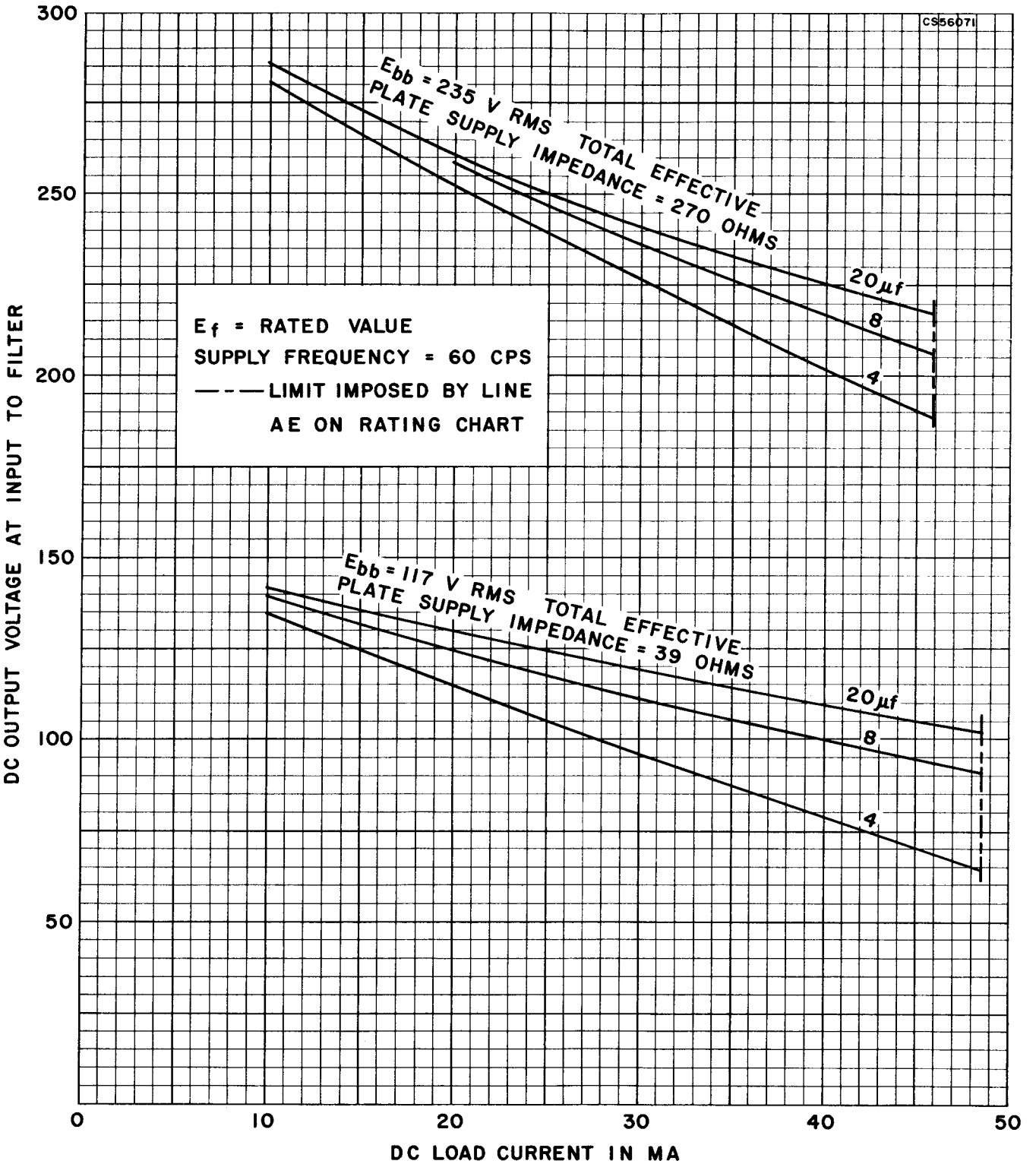
AVERAGE OPERATION CHARACTERISTICS