

## Specifications for 8-mm Type S Motion-Picture Camera Cartridge, Cartridge-Camera Interface and Take-Up Core Drive (200-ft Capacity)

PH22.205

Page 1 of 6 pages

### 1. Scope

This standard specifies the dimensions of the 8-mm Type S 200-ft [60-m] capacity motion-picture camera cartridge and cartridge-camera interface. Also specified are the dimensions of the take-up core drive opening and critical dimensions of the take-up core as well as the driving force, direction of drive, and recommended drive ratio. An optional means of retaining the film supply until the cartridge is placed in the camera is described.

### 2. Dimensions

- 2.1** The dimensions shall be as given in the figures and table.
- 2.2** The dimensions apply to an assembled cartridge with a film load at the time of manufacture.
- 2.3** Datum Planes B, C, and A are referred to as first, second, and third, respectively. The planes, which are used for dimensioning, are mutually perpendicular and are jointly called a datum reference frame.
- 2.3.1** Datum Plane A is coincident with the center of a circle located by basic Dimension T. The circle is in contact with the edges of the locating slot defined by Dimensions A, O, P, and Q. The diameter of this circle is such that it applies regardless of feature size (RFS) of the locating slot. (See Fig. 2 and Appendix A3.)
- 2.4** Datum Features B, C, and A are primary, secondary, and tertiary, respectively.
- 2.4.1** Datum Feature B is the unnotched, unlabeled surface of the cartridge, extending 2.00 in (50.8 mm) basic below and 1.635 in (41.53 mm) basic above Datum Plane A (cartridge surface between Dimensions Av and Cs in Fig. 1). It is the primary datum feature and contacts Datum Plane B (of a gauging fixture [see Appendix A3]) at a minimum of three points.
- 2.4.2** Datum Feature C is the front seating surface of the cartridge, extending 2.00 in (50.8 mm) basic below and 1.635 in (41.53 mm) basic above Datum Plane A. It is the secondary datum feature and contacts Datum Plane C (of a gauging fixture [see Appendix A3]) at a minimum of two points.
- 2.5** Dimensions L, N, U, Am, V, M, W, and R3, measured from Datum Planes A and C to the depth of Dimension E, describe the extent of both triangular recessed areas. The inboard wall of the recessed area, defined by Dimensions L and N, shall be a smooth surface and may be tilted sufficiently from the perpendicular to Datum Plane B to allow proper release from a mold, when the cartridge is manufactured in a molding process.
- 2.6** The thickness of the wall of the cartridge used for notching, Dimension W, shall be sufficient to withstand a force of at least 2.2 lbf (10 N), while deflecting no more than 0.04 in (1.0 mm). (For purposes of measurement, the force is applied by a solid round pin of nominal 0.05-in (1.3-mm) diameter, centered 0.03 in (0.8 mm) nominally above or below the film speed or filter notch coincident with basic Dimension T on Datum Feature C.)
- 2.7** Dimension A specifies the normal overall thickness of the cartridge, extending from the bottom edge of the cartridge to the light lock rib (Dimension U) and within the light lock channel (Dimension Dg).

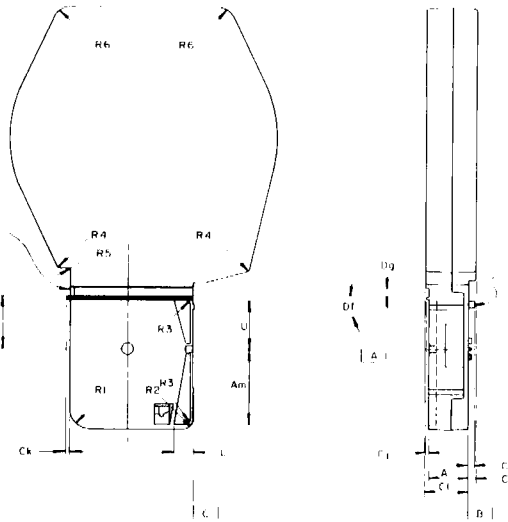
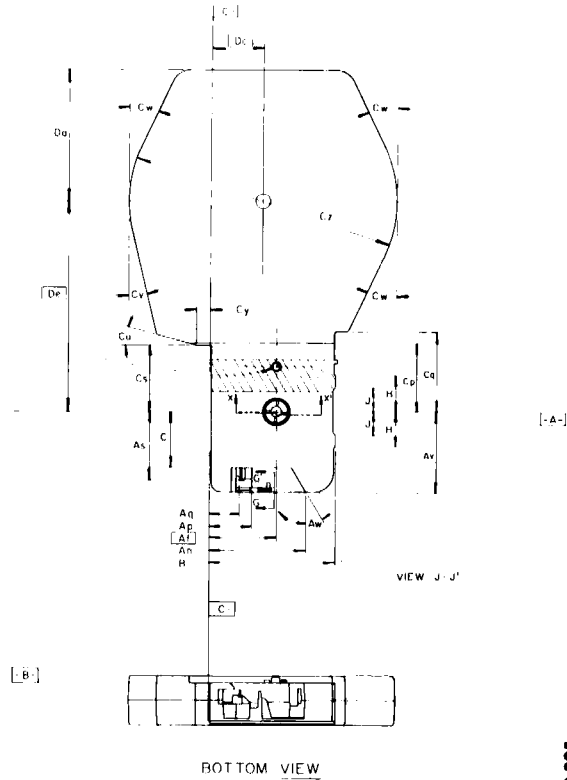


Fig. 1  
Cartridge



PH22.205

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Dimensions	Inches	Millimeters
A	0.954 ± 0.010	24.23 ± 0.25
B	2.99 ± 0.01	75.9 ± 0.3
C	1.390 ± 0.010	35.31 ± 0.25
E	0.780 max	19.81 max
F	0.090 ± 0.010	2.29 ± 0.25
G	0.06 ± 0.01	1.5 ± 0.3
H	0.88 ± 0.03	22.4 ± 0.8
J	0.61 ± 0.03	15.5 ± 0.8
K	0.015 ± 0.010	0.38 ± 0.25
L	0.470 min	11.94 min
M	0.007 ± 0.005	0.18 ± 0.13
N	0.177 min	4.50 min
O	0.154 ± 0.004	3.91 ± 0.10
P	0.142 ± 0.004	3.61 ± 0.10
Q	0.770 ± 0.010	19.56 ± 0.25
R1	0.50 ± 0.10	12.7 ± 2.5
R2	0.25 ± 0.05	6.4 ± 1.3
R3	0.160 max	4.06 max
R4	0.050 min	1.27 min
R5	0.040 max	1.02 max
R6	0.25 min	6.4 min
S	1.02 ± 0.01	25.9 ± 0.3
T	0.870 basic	22.10 basic
U	1.225 min	31.12 min
V	0.125 max	3.18 max
W	See 2.6	
Y	0.151 ± 0.012	3.84 ± 0.30
Af	1.608 basic	40.84 basic
Am	1.835 min	46.61 min
An	2.340 min	59.44 min
Ap	1.032 max	26.21 max
Aq	0.733 ± 0.008	18.62 ± 0.20
As	1.710 ± 0.012	43.43 ± 0.30
At	1.730 min	43.94 min
Au	1.890 min	48.01 min
Av	2.000 ± 0.010	50.80 ± 0.25
Aw	30° + 1° - 5°	30° + 1° - 5°
Ay	0.620 min	15.75 min
Az	0.502 min	12.75 min
Ba	0.040 ± 0.008	1.02 ± 0.20
Bb	0.319 ± 0.008	8.10 ± 0.20
Bc	1.152 min	29.26 min
Bd	0.660 max	16.76 max
Be	0.533 max	13.54 max
Bf	45° nom	45° nom

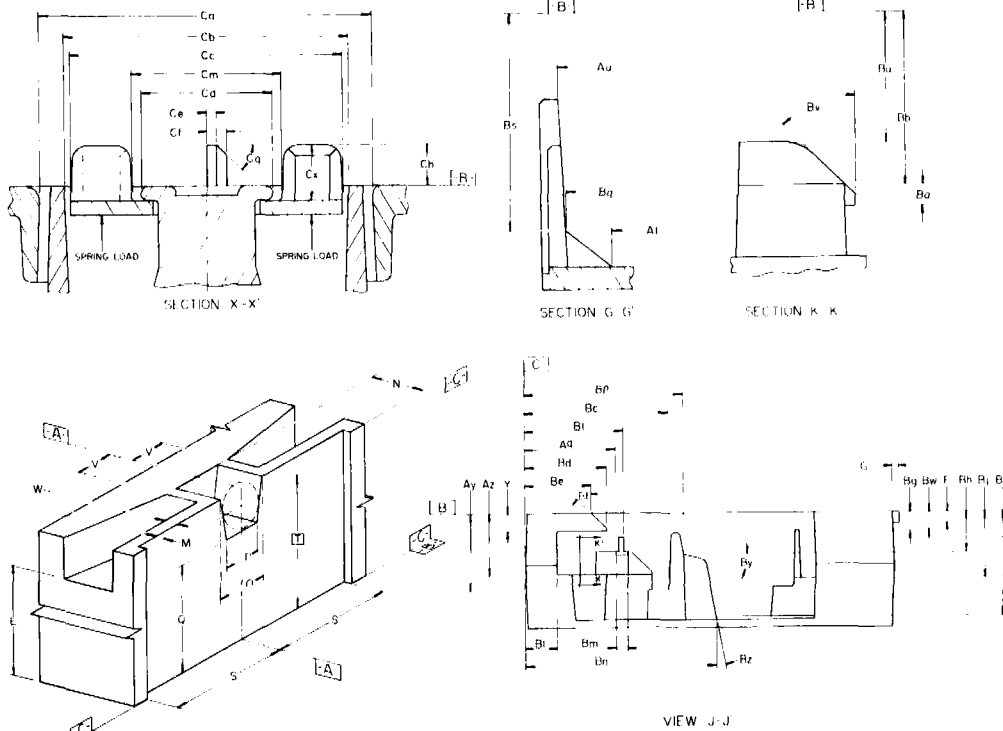


Fig. 2  
Camera Locating Slot

Dimensions	Inches		Millimeters	
	min	max	min	max
Bg	0.162	± 0.015	4.11	± 0.38
Bh	0.347	min	8.81	min
Bi	0.502	min	12.75	min
Bj	0.840	min	21.34	min
Bk	0.260	max	6.60	max
Bl	0.093	± 0.015	2.36	± 0.38
Bm	1.550	max	39.37	max
Bn	1.280	max	32.51	max
Bo	1.888	min	47.96	min
Bp	0.658	min	16.71	min
Bq	0.787	max	19.99	max
Br	0.200	min	5.08	min
Bs	45°	± 5°	45°	± 5°
Bt	0.151	± 0.012	3.84	± 0.30
Bu	15°	± 2°	15°	± 2°
Bv	15°	± 2°	15°	± 2°
Bw	0.690	max	17.53	max
Bx	0.555	min	14.10	min
By	0.500	min	12.70	min
Bz	0.264	max	6.71	max
Ca	0.020	max	0.51	max
Cb	0.040	± 0.015	1.02	± 0.38
Cc	45°	nom	45°	nom
Cd	0.090	± 0.050	2.29	± 1.27
Ce	0.080	± 0.010	2.03	± 0.25
Cf	0.065	± 0.015	1.65	± 0.38
Cg	1.074	max	27.28	max
Ch	0.310	max	7.87	max
Ch	45°	nom	45°	nom
Ci	1.692	± 0.015	42.98	± 0.38
Cj	1.985	± 0.030	50.42	± 0.76
Ck	0.185	max	4.70	max
Cl	1.655	± 0.020	42.04	± 0.51
Cm	0.165	± 0.020	4.19	± 0.51
Cn	15°	± 5°	15°	± 5°
Co	15°	± 5°	15°	± 5°
Cp	25°	± 5°	25°	± 5°
Cq	0.100	min	2.54	min
Cr	0.310	± 0.020	7.87	± 0.51
Cs	6.500	dia max	165.10	dia max
Ct	3.275	max	83.18	max
Cu	0.094	± 0.020	2.39	± 0.51
Cv	1.246	basic	31.65	basic
Cw	1.300	± 0.015	33.02	± 0.38
Cx	5.237	basic	133.02	basic
Cy	15°	± 2°	15°	± 2°
Cz	0.215	± 0.008	5.46	± 0.20

**3.1** The direction of rotation for the core shall be clockwise when viewed from the core side of the cartridge.

**3.2** After disengagement of any film locking device, the cartridge shall operate with a nominal torque of 1.3 oz·in (9.2 x 10<sup>-3</sup> N·m) with a permissible range of 1.0 to 1.5 oz·in (7.1 x 10<sup>-3</sup> to 10.6 x 10<sup>-3</sup> N·m). (See Appendix A2.)

To enable cameras to distinguish automatically between the 8-mm Type S 200-ft (60-m) capacity cartridge and the 50-ft (15-m) capacity sound and silent cartridge, a spring-loaded drive plate is incorporated in the core drive of the 8-mm Type S 200-ft (60-m) capacity cartridge. The spring-loaded drive plate will react axially against the core drive mechanism of the camera with a nominal force of 14 oz (3.9 N) with a permissible range of 10 to 18 oz (2.8 to 5.0 N) when the spring-loaded drive plate is depressed to within 0.020 in (0.51 mm) from Datum Plane B. (Four driving lugs are shown in the core, and it is recommended that the camera core driver be redesigned in such a way as to present a plane surface for the four lugs to bear against.)

**3.3** When operating the 200-ft (60-m) capacity cartridge loaded with film without a magnetic sound stripe, proper film transport requires that all camera film transport mechanisms, including those for recording sound, be activated. (This may not be required when using the 8-mm Type S 50-ft (15-m) capacity silent cartridge.)

**Appendix**

(The Appendix is not a part of this American National Standard, but is included for information purposes only.)

**A3.** To provide a consistent method of measurement, it is recommended that a cartridge gauging fixture be used which incorporates datum surfaces, a locating pin, and means of exerting locating forces on appropriate surfaces of the cartridge.

**2.8** Some cartridge manufacturers may desire to provide a means of retaining the film supply and take-up spools until the cartridge is placed in the camera. One method employs a spool locking device which is activated by a lock pin extending through Datum Feature B. The device should be designed to unlock the spools when the lock pin is depressed by sealing the cartridge on Datum Plane B (camera mechanism plate). The lock pin should be located within a zone from 0.50 in (12.7 mm) basic from Datum Plane A within Dimension B. The force required to hold the lock pin coincident with Datum Plane B shall not exceed 20 oz (5.4 N). The initial force to depress the lock pin may be significantly higher than the force required to hold the lock pin coincident with Datum Plane B.

**2.9** Dimension M is measured from Datum Plane C.

**2.10** The sprocket axis shall be located within 0.010 in (0.25 mm) of the true center formed by Datum Plane A and basic Dimension Af.

**2.11** Dimensions Ca, Cb, Cc, Cd, and Cm are diameters.

**2.12** Dimensions Bt, Bu, and Bv define an optional guide provided to facilitate film loading at the time of cartridge manufacture.

**A1.** In designing the core driver, consideration should be given to the fact that tooth-on-tooth engagement of the core lug on the driver pin is a possibility.

**A2.** It is recommended that the core be tendency driven (by some form of slip-drive mechanism) with a drive ratio of at least one turn of the core driver for every fourteen strokes of the pulldown claw when no slippage occurs.

# Specifications for 8-mm Type S Model I Sound Motion-Picture Camera Cartridge Aperture and Profile, Film Position, Pressure Pad and Flatness (200-ft Capacity)

PH22.206

**1. Scope**  
This standard specifies the dimensions and location of the cartridge aperture, pressure pad, and characteristics necessary for its appropriate flatness, clearance, and location of film in the camera aperture of 200-ft (60-m) capacity 8-mm Type S Model I sound motion-picture film camera cartridges.

**2. Dimensions**

- 2.1** The dimensions shall be as given in the figures and tables.
- 2.2** The dimensions shown in Figs. 1 and 3 and Tables 1 and 3 apply to a cartridge that is fully assembled but does not contain film. The dimensions shown in Fig. 2 and Table 2 apply to an assembled cartridge with a film load at the time of manufacture.
- 2.3** The datum planes and datum features used for dimensioning are as defined in Secs. 2.3, 2.3.1, 2.4, 2.4.1, and 2.4.2 of Proposed American National Standard Specifications for 8-mm Type S Motion-Picture Camera Cartridge, Cartridge-Camera Interface and Take-Up Core Drive (200-ft Capacity), PH22.205.
- 2.4** Dimensions T and U denote the lateral location of the film in the cartridge before insertion in the camera. After insertion, Dimension T becomes 0.060 in (1.52 mm) minimum and Dimension U becomes 0.050 in (1.27 mm) minimum.
- 2.5** All dimensions in Table 1, except Dimensions A and C, apply at the front surface of the pressure pad. A draft of 5 degrees to the recess area is permitted as well as an inside or outside radius of 0.005 in (0.13 mm) at all corners to provide satisfactory mold release when the pressure pad is manufactured in a molding process.
- 2.6** Dimension A denotes the space available from Datum Plane C for penetration of the camera film alignment guide wings or the camera claw into the recessed area of the cartridge pressure pad.
- 2.7** Dimension B is measured from Datum Plane C and determines the operating position of the cartridge pressure pad.
- 2.8** Dimensions relative to the surface of the pressure pad are measured from a plane established through Surfaces 1, 2, and 3, as defined by 0.060-in (1.52-mm) diameter circles dimensionally centered. (See Fig. 3.) The actual camera aperture bosses may deviate from this shape.
- 2.9** Dimension G<sub>2</sub> specifies the clearance for film in the camera aperture area, based on Dimension T<sub>1</sub>, the thickness of the film in the center of the picture area. (See Note 1.)
- 2.10** Dimension G<sub>1</sub> specifies the extension of the camera aperture plate boss points (corresponding to 1, 2, and 3) beyond the aperture plate plane at the aperture opening.
- 2.11** The upper and lower pad areas extend from Dimension C<sub>1</sub> to the top and bottom of the cartridge pressure pad within Dimension K.
- 2.12** Dimension H<sub>1</sub> is intended to apply from a plane as described in Sec. 2.8.

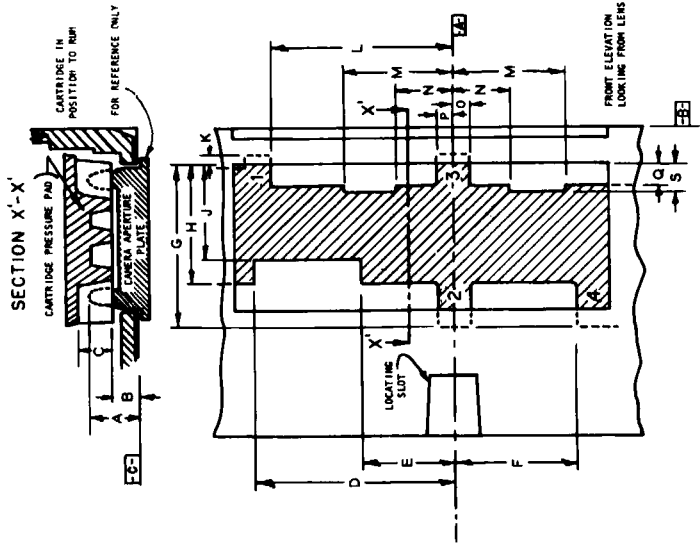


Fig. 1  
Cartridge Pressure Pad

Table 1

Dimensions	Inches		Millimeters	
	min	max	min	max
A	0.150	max	3.81	max
B	0.077	± 0.005	1.96	± 0.13
C	0.090	min	2.29	min
D	0.540	min	13.72	min
E	0.260	max	6.60	max
F	0.360	± 0.020	9.14	± 0.51
G	0.455	min	11.56	min
H	0.365	max	9.27	max
J	0.300	max	7.62	max
K	0.000	min	0.00	min
L	0.540	± 0.020	13.72	± 0.51
M	0.300	min	7.62	min
N	0.140	max	3.56	max
O	0.058	± 0.022	1.47	± 0.56
P	0.038	± 0.022	0.97	± 0.56
Q	0.055	min	1.40	min
S	0.090	min	2.29	min

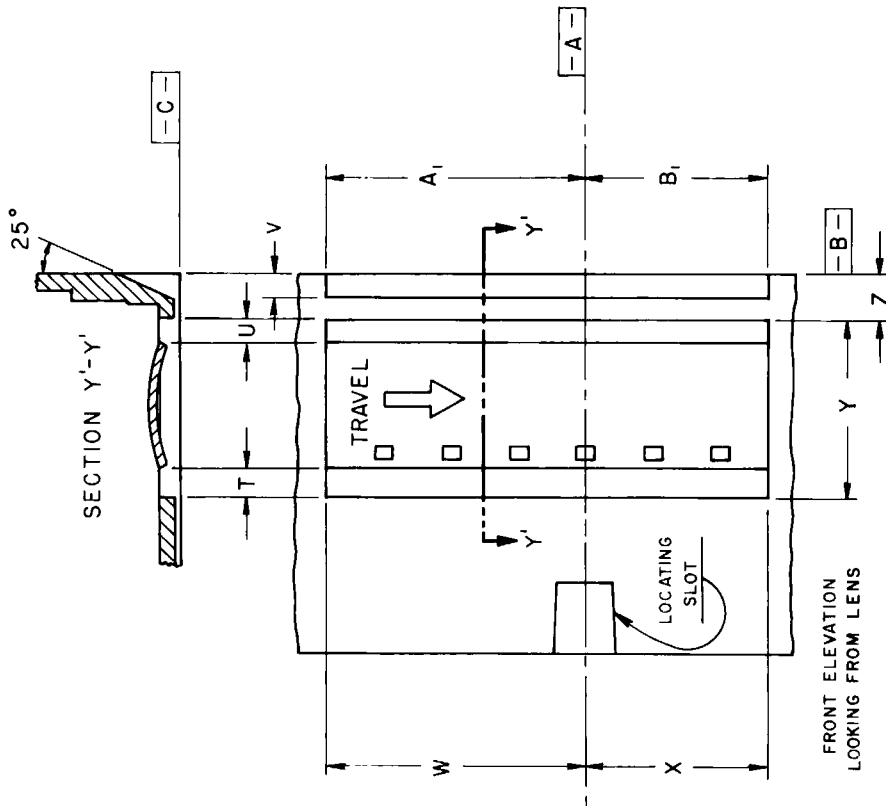
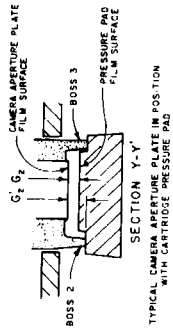


Fig. 2  
Cartridge Aperture Opening and Film Position

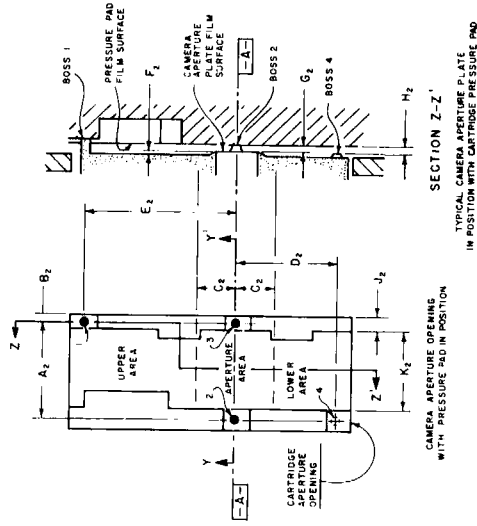
Table 2

Dimensions	Inches	Millimeters
T	0.050 min	1.27 min
U	0.040 min	1.02 min
V	0.061 ± 0.006	1.55 ± 0.15
W	0.648 ± 0.006	16.46 ± 0.15
X	0.451 ± 0.006	11.46 ± 0.15
Y	0.451 ± 0.004	11.46 ± 0.10
Z	0.111 ± 0.003	2.82 ± 0.08
A <sub>1</sub>	0.642 min	16.31 min
B <sub>1</sub>	0.445 min	11.30 min

PH22.206



SECTION Y'-Y  
TYPICAL CAMERA APERTURE PLATE IN POSITION WITH CARTRIDGE PRESSURE PAD



SECTION Z'-Z  
TYPICAL CAMERA APERTURE PLATE IN POSITION WITH CARTRIDGE PRESSURE PAD

Fig. 3  
Pressure Pad Flatness Reference Surfaces

Table 3  
Pressure Pad Dimensions

Dimensions	Inches	Millimeters
A <sub>2</sub>	± 0.001	± 0.03
B <sub>2</sub>	0.030 ± 0.002	0.76 ± 0.05
C <sub>2</sub>	0.153 nom	3.89 nom
D <sub>2</sub>	0.393 ± 0.001	9.98 ± 0.03
E <sub>2</sub>	0.590 ± 0.001	14.99 ± 0.03
F <sub>2</sub>	0.005 min	0.13 min
G <sub>2</sub>	T <sub>2</sub> + 0.0007 min	T <sub>2</sub> + 0.018 min
	T <sub>2</sub> + 0.0012 max	T <sub>2</sub> + 0.030 max
G' <sub>2</sub>	0.0065 min	0.165 min
	0.0070 max	0.178 max
H <sub>2</sub>	0.004 min	0.10 min
J <sub>2</sub>	0.055 min	1.40 min
K <sub>2</sub>	0.310 max	7.87 max

PH22.206