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МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Photography — 110-size cartridges — Dimensions

Photographie — Chargeurs de format 110 — Dimensions

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Foreword

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International Standard ISO 7261 was prepared by Technical Committee ISO/TC 42, *Photography*.

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Photography — 110-size cartridges — Dimensions

1 Scope and field of application

This International Standard specifies the dimensions of 110-size cartridges.

This product was designed in SI units, which are therefore prime, unless specifically noted to the contrary in this International Standard.

This International Standard is intended to be used in conjunction with ISO 7330 and ISO 7374 to completely specify 110-size cartridges.

2 References

ISO 1, *Standard reference temperature for industrial length measurements.*

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications.*

ISO 7330, *Photography — 110-size cartridges — Location and dimensions of film exposure and film identification notches.*

ISO 7374, *Photography — 110-size cartridges — Dimensions and format of film and backing paper.*

3 Datum referencing

3.1 Principle

The principle of datum referencing is used to relate the cartridge to a set of three mutually perpendicular datum planes in contact with the cartridge surfaces which engage mating camera parts so as to ensure proper alignment of the cartridge in the camera. All related cartridge measurements originate from these planes.

3.2 Primary datum, S

The S plane or seating datum plane is the plane of a simulated camera aperture frame and is contacted by the four "A" pads of the cartridge.

3.3 Secondary datum, R

The R plane or rail datum plane is perpendicular to the S plane

and is contacted by the two "B" pads located on the product identification rail. (See figures 1 and 2.)

3.4 Tertiary datum, T

The T plane or take-up datum plane is mutually perpendicular to the S and R planes and is contacted by the T-plane rib moulded into the cartridge take-up chamber near the gear cover. (See figures 1 and 2.)

4 Dimensions and characteristics of cartridge and spool

4.1 Dimensions and characteristics apply at the time of manufacture to an assembled cartridge at standard atmospheric conditions of 23 ± 2 °C and (50 ± 5) % relative humidity as specified in ISO 554¹⁾ and when the four "A" pads of the cartridge are seated with a force of 1,11 to 2,22 N (4 to 8 ozf) per camera contact area²⁾ against a fixture that simulates the S plane or camera aperture frame. (See note 8, figure 2.)

4.2 The dimensions shall be as given in the table and figure 2.

4.3 Film-loaded cartridges shall require no more than 35×10^{-3} N·m (5.0 ozf·in) of torque to sustain film advance, and no more than 53×10^{-3} N·m (7.5 ozf·in) of torque to overcome momentary torque peaks in the picture area. Torque peaks at leading and trailing ends of film shall require no more than 75×10^{-3} N·m (10.6 ozf·in) of torque. After the trailer has been wound off, paper shall remain in the cartridge aperture under an applied torque of 100×10^{-3} N·m (14.2 ozf·in). (Torques specified refer to torques measured as defined in annex B.)

4.4 Nominally the film emulsion surface plane is $0,10 \pm 0,05$ mm (0.004 ± 0.002 in) to the rear of datum plane S. This applies only to a film load which has acquired scroll set at least equivalent to that expected at the earliest time it is anticipated it would be exposed by users. This dimension, measured at five cartridge film-plane measuring points, applies throughout the useful life of the film. (See figure 3.) Since the design and adjustment of camera lenses, with respect to focal plane and depth of field, will be based on this value, control of this dimension within narrow limits is an important quality consideration.

1) All measuring instrument calibrations are referred to a temperature of 20 °C (as specified in ISO 1) and a relative humidity of 50 %.

2) In usage, adequate force should be applied per camera contact area to ensure a sufficient net seating force at each seating pad "A".

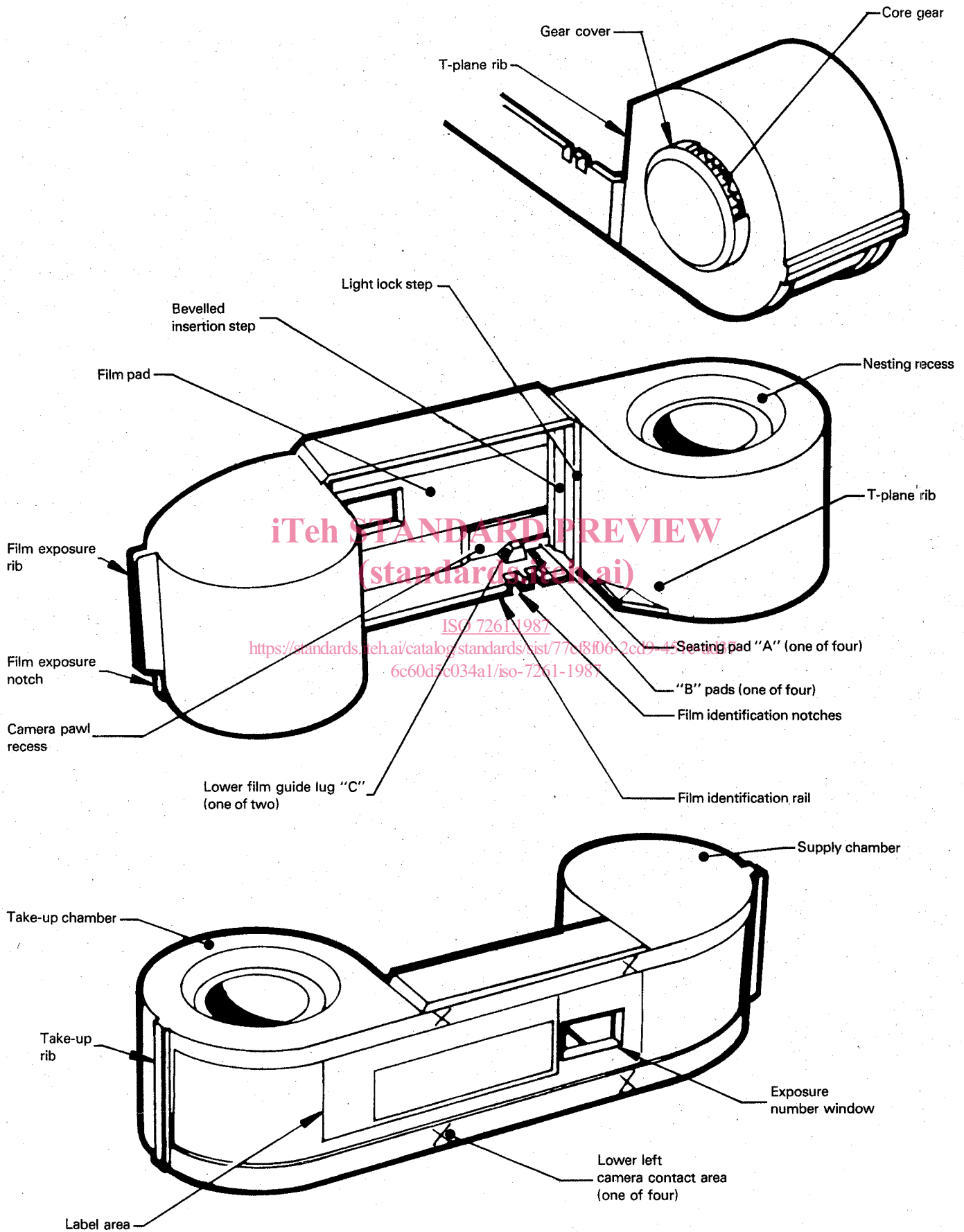


Figure 1 — 110-size cartridge nomenclature

Table — Cartridge dimensions

Dimension	Millimetres			Inches			Dimension	Millimetres			Inches		
	min.	aim	max.	min.	aim	max.		min.	aim	max.	min.	aim	max.
A ₁	28,70	28,90	29,10	1.130	1.138	1.146	C ₂₅	26,92	27,18	27,44	1.060	1.070	1.080
A ₂	5,74	5,92	6,10	0.226	0.233	0.240	C ₂₆	25,88	26,06	26,24	1.019	1.026	1.033
A ₃	3,28	3,38	3,48	0.129	0.133	0.137	C ₂₇		13,08	basic ¹⁾		0.515	basic ¹⁾
A ₄ (angle)	30°			30°			D ₁	35,56			1.400		
A ₅	1,55	1,65	1,75	0.061	0.065	0.069	D ₂	27,23	27,43	27,63	1.072	1.080	1.088
A ₆	0,66	0,76	0,86	0.026	0.030	0.034	D ₃	19,28	19,48	19,68	0.759	0.767	0.775
A ₇			0,12			0.005	D ₄		17,98	nom.		0.708	nom.
A ₈	28,73	28,83	28,93	1.131	1.135	1.139	D ₅	18,75	18,95	19,15	0.738	0.746	0.754
A ₉	29,62	29,72	29,82	1.166	1.170	1.174	D ₆	17,53	17,73	17,93	0.690	0.698	0.706
A ₁₀	30,35			1.195			D ₇	0,86	0,96	1,06	0.034	0.038	0.042
A ₁₁	30,38	30,48	30,58	1.196	1.200	1.204	D ₈	11,20	11,40	11,60	0.441	0.449	0.457
A ₁₂ (angle)		50°	nom.		50°	nom.	D ₉		9,40	nom.		0.370	nom.
A ₁₃ (angle)		20°	nom.		20°	nom.	D ₁₀	6,43	6,63	6,83	0.253	0.261	0.269
A ₁₄ (angle)		50°	nom.		50°	nom.	D ₁₁ (angle)		45°	nom.		45°	nom.
A ₁₅ (radius)			38,10		1.500		D ₁₂	1,25	1,65	2,05	0.049	0.065	0.081
A ₁₆		11,35	See note 6		0.447	See note 6	D ₁₃	5,11	5,51	5,91	0.201	0.217	0.233
A ₁₇		13,08	See note 6		0.515	See note 6	D ₁₄	24,57	24,97	25,37	0.967	0.983	0.999
A ₁₈	10,70	10,80	10,90	0.421	0.425	0.429	D ₁₅	28,43	28,83	29,23	1.119	1.135	1.151
B ₁	30,33	30,43	30,53	1.194	1.198	1.202	D ₁₆ (diameter)	14,12	14,22	14,32	0.556	0.560	0.564
B ₂	2,74	2,79	2,84	0.108	0.110	0.112	D ₁₇			3,00			0.118
B ₃	0,97	1,02	1,07	0.038	0.040	0.042	D ₁₈	2,03			0.080		
B ₄	5,36	5,46	5,56	0.211	0.215	0.219	D ₁₉			0,40			0.016
B ₅	30,74	30,94	31,14	1.210	1.218	1.226	D ₂₀			16,00			0.630
B ₆ (angle)		30°	ref.		30°	ref.	D ₂₁	18,01	18,24	18,47	0.709	0.718	0.727
B ₇	1,12	1,32	1,52	0.044	0.052	0.060	D ₂₂		9,02	nom.		0.355	nom.
B ₈	0,10	0,30	0,50	0.004	0.012	0.020	D ₂₃	6,35			0.250		
C ₁	53,72	53,98	54,24	2.115	2.125	2.135	D ₂₄			19,30			0.760
C ₂	51,87	52,07	52,27	2.042	2.050	2.058	D ₂₅ (angle)	34°	37°	40°	34°	37°	40°
C ₃	51,38	51,61	51,84	2.023	2.032	2.041	D ₂₆			2,25			0.089
C ₄		41,02	basic ¹⁾		1.615	basic ¹⁾	E ₁	1,04	1,09	1,14	0.041	0.043	0.045
C ₅		39,12	basic ¹⁾		1.540	basic ¹⁾	E ₂	17,17	17,22	17,27	0.676	0.678	0.680
C ₆		35,56	basic ¹⁾		1.400	basic ¹⁾	E ₃	0,78	0,81	0,84	0.031	0.032	0.033
C ₇ (radius)	10,34	10,54	10,74	0.407	0.415	0.423	E ₄ (angle)			45°			45°
C ₈	23,30	23,50	23,70	0.917	0.925	0.933	E ₅	3,20	3,30	3,40	0.126	0.130	0.134
C ₉		16,64	basic ¹⁾		0.655	basic ¹⁾	F ₁	0,66	0,76	0,86	0.026	0.030	0.034
C ₁₀		12,95	basic ¹⁾		0.510	basic ¹⁾	F ₂	0,66	0,76	0,86	0.026	0.030	0.034
C ₁₁	10,27	10,52	10,77	0.404	0.414	0.424	F ₃	0,88	0,91	0,94	0.035	0.036	0.037
C ₁₂	8,82	9,02	9,22	0.347	0.355	0.363	F ₄	0,88	0,91	0,94	0.035	0.036	0.037
C ₁₃	7,62			0.300			F ₅ (angle)			45°			45°
C ₁₄ (radius)	13,01	13,21	13,41	0.512	0.520	0.528	F ₆			0,18			0.007
C ₁₅ (radius)	18,14	18,34	18,54	0.714	0.722	0.730	F ₇ (angle)		0,75°	nom.		0,75°	nom.
C ₁₆	5,03	5,23	5,43	0.198	0.206	0.214	F ₈	17,91	18,03	18,15	0.705	0.710	0.715
C ₁₇ (radius)	13,57	13,77	13,97	0.534	0.542	0.550	F ₉	0,59	0,69	0,79	0.023	0.027	0.031
C ₁₈	2,21	2,41	2,61	0.087	0.095	0.103	F ₁₀ (angle)		0,75°	nom.		0,75°	nom.
C ₁₉	7,62			0.300			F ₁₁			0,18			0.007
C ₂₀	10,14	10,47	10,80	0.399	0.412	0.425	F ₁₂			4,83			0.190
C ₂₁		11,35	basic ¹⁾		0.447	basic ¹⁾	F ₁₃	13,20			0.520		
C ₂₂	24,16	24,36	24,56	0.951	0.959	0.967	F ₁₄ (angle)			45°			45°
C ₂₃ (radius)	12,80	13,00	13,20	0.504	0.512	0.520	G ₁	24,65	24,85	25,05	0.970	0.978	0.986
C ₂₄ (angle)	10°			10°			G ₂ (radius)	1,37	1,57	1,77	0.054	0.062	0.070
							H ₁			0,40			0.016
							H ₂	2,16			0.085		

1) basic: a theoretically exact dimension used to describe location of a feature from which permissible variations are established by tolerance on other dimensions or notes.

- R** Rail datum plane (perpendicular to -S- and contacted by two "B" pads on film identification rail)
- S** Seating datum plane (contacted by four "A" pads)
- T** Take-up datum plane (perpendicular to -S- and -R- and contacted by -T- plane rib)

NOTES

- 1 Seating datum plane S contacted by areas A_1 , A_2 , A_3 and A_4 .
- 2 Rail datum plane R contacted by areas B_3 and B_4 .
- 3 Guides C_1 and C_2 determine film channel width. $[F_8 - (F_3 + F_4)]$.
- 4 Take-up core gear data (designed in inches)
 - Spur gear: 20 teeth
 - Tooth form per ANSI/AGMA 207.06
 - Diametral pitch: 48
 - Pitch diameter: 0.417 in (10,59 mm)
 - Pressure angle: 20°
 - Test radius with basic rack
 - 0.207 $\begin{smallmatrix} 0 \\ -0,006 \end{smallmatrix}$ in (5,26 $\begin{smallmatrix} 0 \\ -0,15 \end{smallmatrix}$ mm)

- 5 Take-up core O.D. 0.696 in (17,68 mm) min.
- 6 Core gear axis located on the true position shown within 0,30 mm (0.012 in) diameter.
- 7 Force per camera contact area equals 1,11 to 2,22 N (4 to 8 ozf). (See 4.1.)
- 8 Dimensions shown apply when cartridge is seated against camera aperture frame with force as stated in note 7.
- 9 The radii shown shall be a maximum of 0,12 mm (0.005 in).
- 10 The radii shown shall be a maximum of 0,20 mm (0.008 in).
- 11 The radii shown shall be a maximum of 0,30 mm (0.012 in).
- 12 Corners not otherwise specified have a maximum radius of 0,50 mm (0.020 in).
- 13 Maximum diameter of allowable projection to be 3,0 mm (0.12 in).
- 14 The throat gap should be such that light tightness is assured.
- 15 A relief is suggested.
- 16 For notching information, see clause 4 of ISO 7330.

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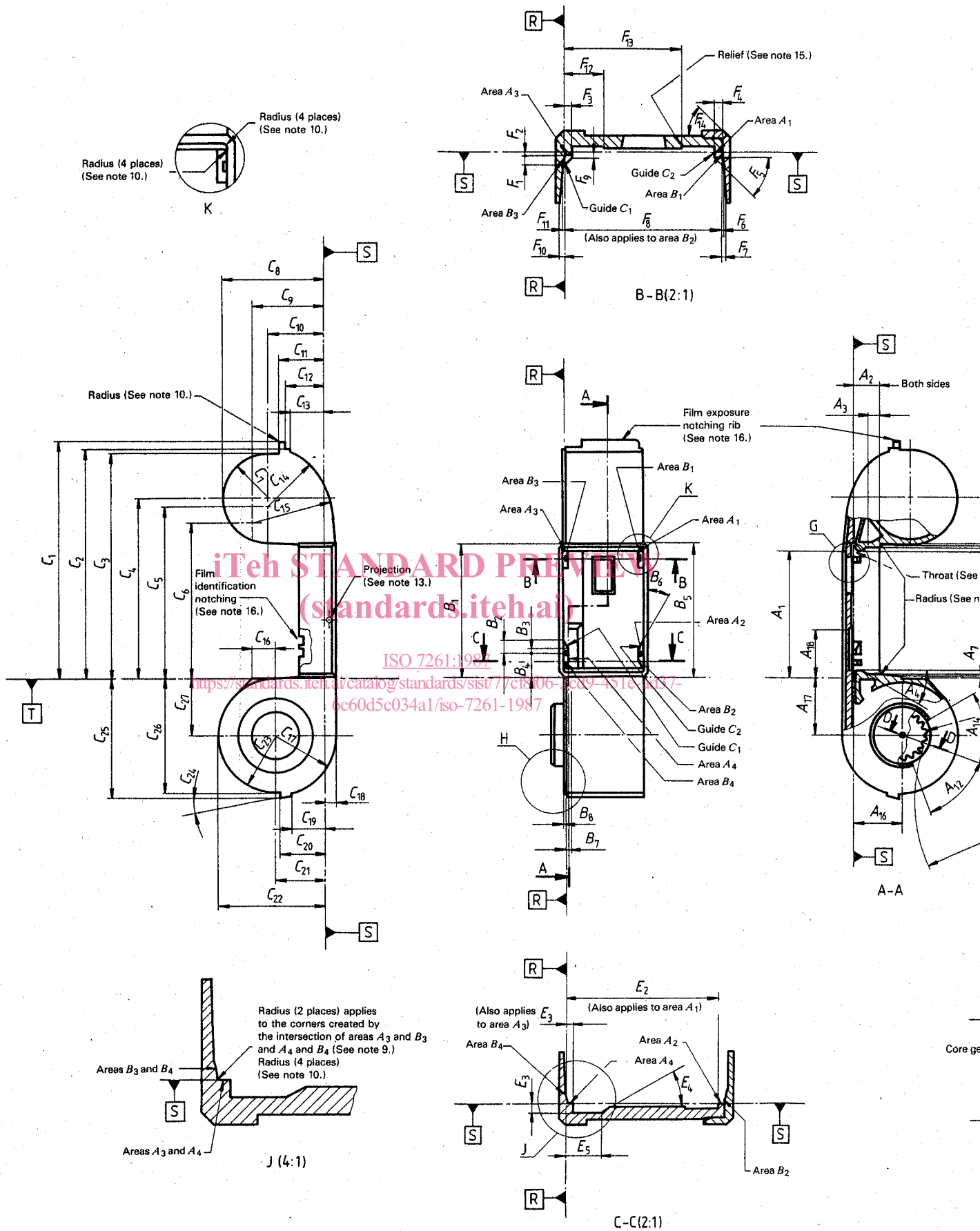
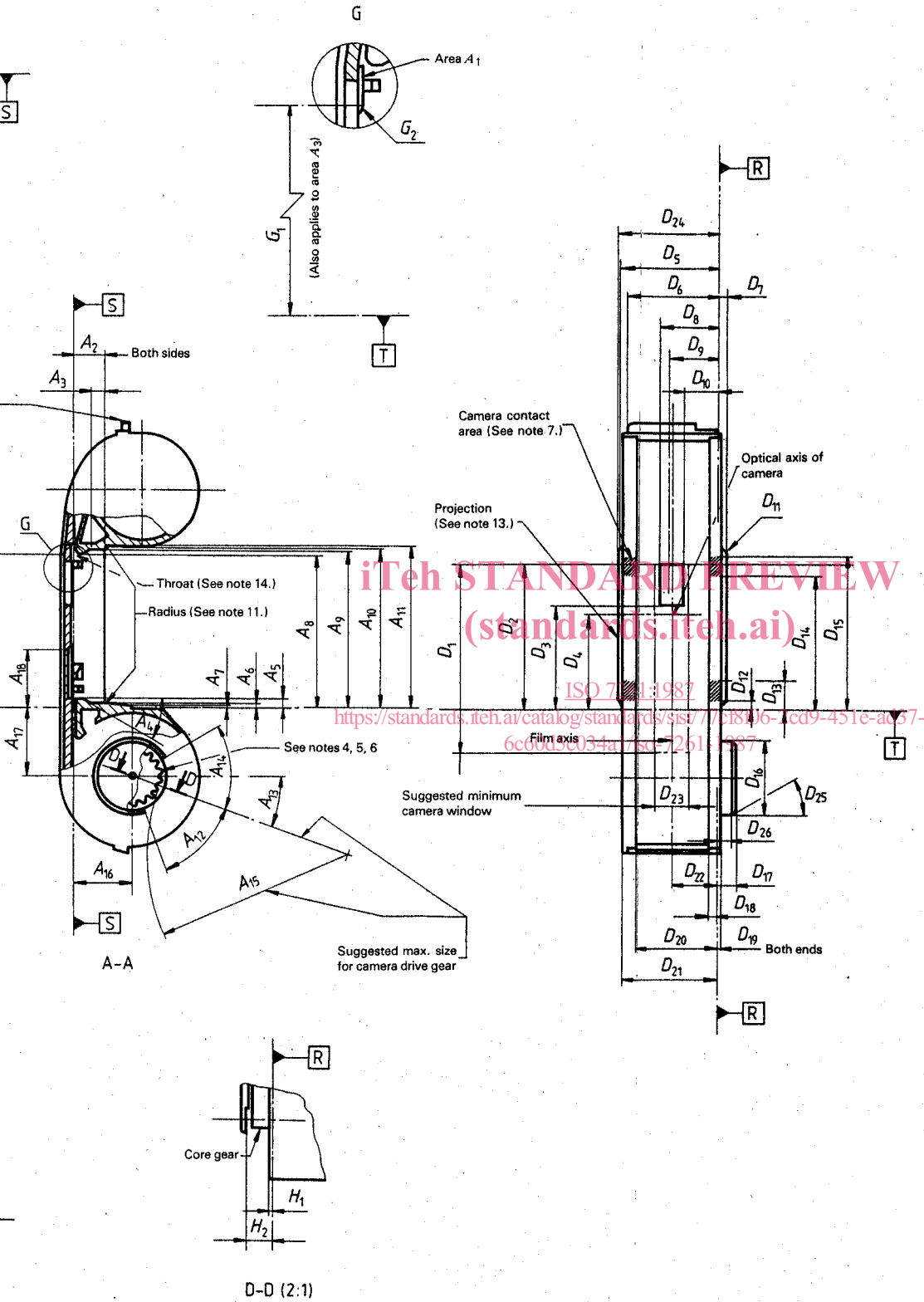


Figure 2 — 110-size cartridge dimensions

15.)



tridge dimensions

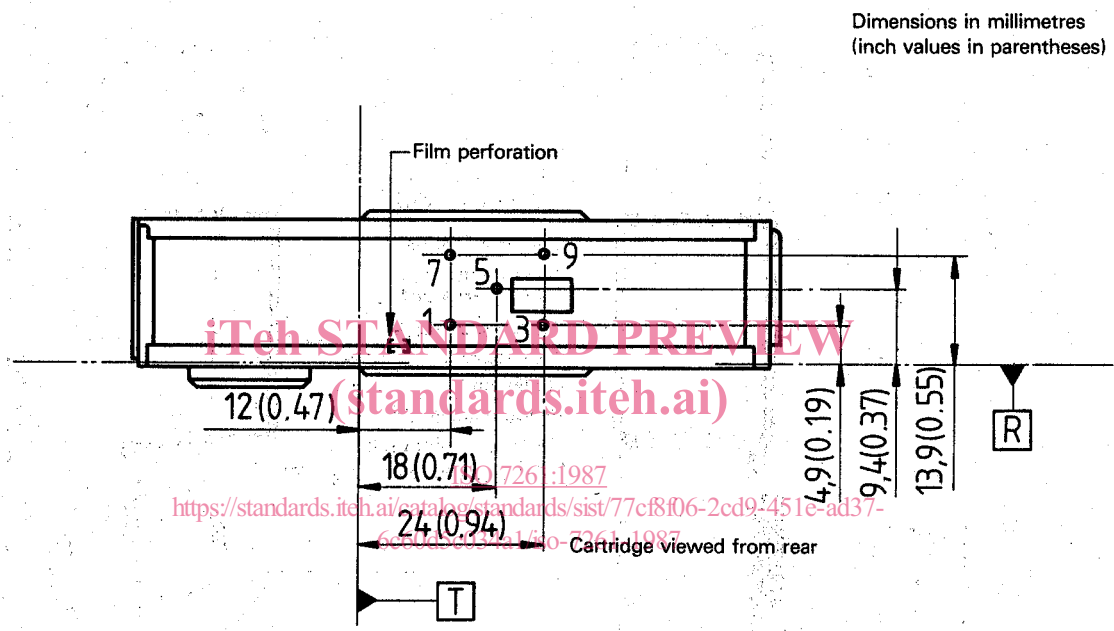


Figure 3 — 110-size cartridge film plane measuring points