

CDT collimators

Off axis reflective collimators



Fig. 1. Photo of several CDT series collimators

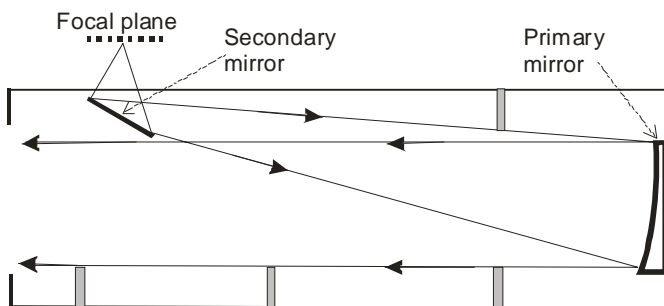


Fig. 2. Block diagram of the CDT collimator

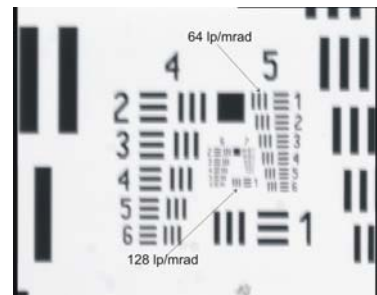


Fig. 3. Photo of an USAF 1951 target projected by a CDT 2000HR collimator (diffraction limits can be achieved)

BASIC INFORMATION:

Collimators are optical systems used to imitate standard targets placed in "optical infinity" (very long distance). The collimators are used for projection of image of the standard targets into direction of tested imagers. The collimators according to type of optical elements used in design are divided into two groups: reflective collimators and refractive collimators. Reflective collimators due to their wide spectral range are almost exclusively used in systems for testing thermal imagers and often also in systems for testing TV cameras. Refractive collimators are used in systems for testing TV cameras.

Inframet manufactures both types of collimators as components of its test systems. However, our company specializes in reflective off-axis collimators. The latter ones are collimators built using two mirror configuration: primary off axis collimating mirror and secondary

flat mirror. In spite of this simple optical structure manufacturing high quality off axis reflective collimators is a technical challenge, particularly in case of collimators of big optical apertures. Resolution of the collimator should be at least five times better than resolution of tested imager (approximately Nyquist frequency) for proper work of the test system.

Inframet offers a series of off-axis reflective collimator of different optical aperture (range from 75 mm to 500mm) and different focal length (range from 750mm to 5000mm). To assure proper choice we should remember that optical aperture of the collimator should be at least 10% bigger than aperture of the optics of the tested imager. Next, collimators of F-number (ratio of the focal length to the aperture) over 6 are preferable as such collimator project high quality images in entire field of view; not only in the center.

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FEATURES:

- Wide range of optical aperture of available collimators from 100mm to 500mm
- Resolution data refer to center part (25%) of collimator field of view instead of typical data that refer only to an on-axis point
- Real measurement data of collimator resolution are presented. Not misleading claims that collimator is diffraction limited for on-axis point without information about image quality outside this point
- Optional collimators of ultra high resolution over 500 lp/mrad are available
- Athermal design resistible to ambient temperature changes
- High accuracy alignment of collimator mirrors
- Internal baffles in the collimator eliminate unwanted reflected radiation
- Gold coating for secondary mirror (the highest reflectivity in infrared range) in collimators for testing thermal imagers; silver coating for secondary mirror (the highest reflectivity in visible range) in collimators for testing both thermal imagers and TV cameras
- Long life time of collimators (depends on environmental conditions but generally over ten years)
- Inframet specializes in off axis collimators of big optical aperture for highly demanding applications

SPECIFICATIONS

Collimators

Models	CDT 1000, CDT 1500, CDT2000, CDT 2500, CDT 3000, CDT 4000	Transmittance	Option: aluminum – collimating mirror, protected silver-flat mirror 0.92@3-5 μm , 0.94@8-14 μm
Collimator type	reflective, off-axis	Field of view	CDT 1000 : 3.4° CDT 1500 : 2.3° CDT 2000 : 1.7° CDT 2500SR : 1.4° CDT 2500HR : 1.7° CDT 3000SR – 1.1° CDT 3000HR : 1.7° CDT 4000SR: 0.8° CDT 4000HR: 1.1°
Aperture	from 75mm to 300 mm (collimator code/10)	Operating temperature	10°C to 35°C
Focal length	CDT1000-1000mm/ CDT 1500 – 1500mm CDT 2000–2000mm CDT 2500SR – 2500 mm CDT 2500HR – 2000 mm CDT 3000SR – 3000 mm CDT 3000HR – 2000 mm CDT 4000SR – 4000 mm CDT 4000HR – 3000 mm	Dimensions	From 310x 320x 1120 mm to 510x 520x 4130 mm
Spectral range	0.6-15 μm (0.4-15 μm – optional)	Mass	From 15 kg to 85 kg
Spatial resolution	not less than 50 mrad^{-1} – SR version not less than 160 mrad^{-1} – HR version	<i>*specifications are subject to change without prior notice</i>	
Mirror manufacturing accuracy	not less than $\lambda/8$ – HR version not less than $\lambda/2$ – SR version		
Coating	Standard: aluminum – collimating mirror, gold-flat mirror		

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