



Telescope Eyepieces, 7mm, 32mm, 45mm, 52mm, 1.25" dia



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Summary

Eyepieces for astronomical telescope, 1-1/4" barrels

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This project was inspired by Jerry Oltion's article in the September 2020 issue of Sky & Telescope, p. 74.

These are four eyepieces for an astronomical telescope made from lens sets available from Surplus Shed (surplussed.com). These are based on the following items:

L3721 Reverse Kellner, 52mm fl

L3715 Erfle, 32mm fl

L3713 Reverse Kellner, 45mm fl

L1646 Reverse Kellner, 7mm fl

Each set consists of two or three lenses (eye, middle, field) ranging from 8mm to 36mm in diameter.

Each eyepiece consists of the following parts:

1.25" barrel with a 1.5mm pitch external thread,

Housing with a matching internal thread,

Two or three lens spacers, one each for the eye lens, middle lens (if used), and field lens.

Flexible eye guard.

I made these from ABS except for the flexible eye guards. ABS is more durable, lighter, and has a less glossy finish than PLA. The eye guards are printed from black TPU

The vertical resolution of the print is important to get acceptable quality on the threads. I printed mine at 0.12mm vertical resolution and a speed of 20mm/s. You can print all the parts without supports, but some files need to be flipped 180° when slicing.

I have compared these eyepieces with commercial eyepieces from Meade. The 3D printed eyepieces compare very favorably. There's a little distortion at the edges, and some chromatic aberration. A view of the moon shows color fringes on some of these designs, whereas the Meade eyepieces are color-free. The FOV of the 7mm eyepiece is very narrow. Contrast is as good or better than the Meade lenses, and I notice no internal reflections.

Print Settings

Printer Brand:

Anet

Printer:

A8

Rafts:

No

Supports:

No

Resolution:

0.12mm

Infill:

20%

Filament: Inland ABS & TPU Black

Notes:

Make all parts from ABS except for the flexible eye guards, which are TPU. Take care in assembling the lenses; they must be properly oriented and in the correct order. Surplus Shed provides an info sheet with the lenses, but doesn't give a lot of specifics about possible designs. They specify that the lenses "should be as close as possible without actually touching." My design has a nominal spacing of 0.48mm, which seems to work well. The clearance between the lenses and the spacers is 0.3mm. This seems to work well to keep the lenses in place but allows them to slip easily into the spacers. The vertical resolution of the print is important to get acceptable quality on the threads. I printed mine at 0.12mm vertical resolution and a speed of 20mm/s. You can print all the parts without supports, but both housings (internal & external threads) need to be flipped 180o when slicing.

Category: Physics & Astronomy

Model files

eyepiece_barrel_internal_thread_l3713.stl

eyepiece_lens_spacer_l3715_eye.stl

eyepiece_lens_spacer_l3715_field.stl

eyepiece_barrel_internal_thread_l3721.stl

eyepiece_eye_guard_l3715.stl

eyepiece_barrel_internal_thread_l3715.stl

eyepiece_lens_spacer_l1646_field.stl

eyepiece_barrel_external_thread_l1646.stl

eyepiece_lens_spacer_l1646_eye.stl

eyepiece_barrel_external_thread_l3713.stl

eyepiece_lens_spacer_l3713_field.stl

eyepiece_lens_spacer_l3713_eye.stl

eyepiece_lens_spacer_l3715_middle.stl

eyepiece_barrel_external_thread_l3721.stl

eyepiece_eye_guard_l3713.stl

eyepiece_lens_spacer_l3721_eye.stl

eyepiece_eye_guard_l3721.stl

eyepiece_barrel_internal_thread_l1646.stl

eyepiece_lens_spacer_l3721_field.stl

eyepiece_eye_guard_l1646.stl

eyepiece_barrel_external_thread_l3715.stl

[Find source .stl files on Thingiverse.com](#)

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