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Date (day/month/yr): \_\_\_\_/\_\_\_\_/\_\_\_\_ **3.0x Barlow 1.25in (BLW-3125)**

**Tele Vue<sup>®</sup>**  
 32 Elkay Drive  
 Chester, NY 10918-3001  
 U.S.A.

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Cut out mailing address at left, tape to envelope, insert form & sales receipt in envelope and apply sufficient postage to envelope.

**3.0x Barlow 1.25in (BLW-3125)**

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What made you decide to buy this and your comments after using the product?

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# Choosing Your Eyepieces

by Al Nagler  
CEO, Tele Vue Optics, Inc

## MAGNIFICATION

Eyepieces determine your telescope's magnification.

$$\text{Magnification} = \text{telescope focal length} \div \text{eyepiece focal length}$$

## TRUE FIELD OF VIEW

Eyepieces also determine the true field you see in the sky. To calculate the true field of view that you will see (in degrees):

$$\text{True field of view} = (\text{eyepiece field stop diameter} \div \text{telescope focal length}) \times 57.3$$

## THE FIELD STOP AND APPARENT FIELD OF VIEW

The field stop is the metal ring inside the eyepiece barrel that limits the field size. It's projected by the eyepiece so that it appears as a circle out in space when you look through the eyepiece. The angular diameter of this circle is called the apparent field of view (AFOV) and is a fixed property for each eyepiece design. For example, Plössl and Nagler Zoom eyepieces have an AFOV of 50°, Panoptics have 68°, Delos have 72°, Naglers have 82°, Ethos have 100° and the Ethos-SX eyepiece has 110°.

## LOW-TO-MEDIUM POWER VIEWING

For low-power viewing of large objects, or to use your telescope as a low-power finder, use an eyepiece that delivers close to the maximum possible true field of view (note that for 1.25" eyepieces, the maximum field stop diameter is 27mm; for 2" eyepieces, it's 46mm). Then add eyepieces covering uniform increments in smaller field stops. For example, if your widest field eyepiece has a 40mm diameter field stop and you choose a decreasing increment diameter factor of 2 (which results in a 4x decrease in area size), you'll end up with eyepieces having field stop diameters of approximately 40mm, 20mm and 10mm. To further fill in with incremental steps, add eyepieces with approximate field stop diameters of 28mm and 14mm. Of course, avoid duplicating focal lengths. For example, if you use a 31mm Nagler (with a 42mm field stop diameter), you would not need a 32mm Plössl (with a 27mm field stop diameter).

In general, for each field stop size, choosing eyepieces with shorter focal lengths and larger apparent fields of view will allow you to see more detail and fainter stars. In addition, you'll have a smaller exit pupil to better match your eyesight.

## EYEGASSES AND EYE RELIEF

If you do not need eyeglasses to correct astigmatism, don't use them when observing. If you wear glasses to correct astigmatism, make sure they're multi-coated, and try to choose eyepieces that have at least 15mm to 20mm of eye relief, to minimize any field reduction (vignetting). However, you will find that with small exit pupils such as 1mm or less, you probably will not need eyeglasses, and can therefore use eyepieces with less eye relief. You can use DIOPTRX instead of eyeglasses for best performance, with Tele Vue eyepieces that accept this accessory.

## EXIT PUPIL

The exit pupil is the image of the objective that is formed by the eyepiece. It's where you place your eye to see the full field of view.

$$\text{Exit pupil} = \text{eyepiece focal length} \div \text{telescope } f\#\$$

For reflecting telescopes, it's best to avoid exit pupils larger than 7mm or smaller than 0.5mm. Refracting telescopes have no upper limits on exit pupil sizes.

## IMAGE AMPLIFIERS (Barlows and Powermates)

You can also choose a long focal length eyepiece with comfortable eye relief and use image amplifying lenses to increase power. Tele Vue makes Barlows and Powermates (an improvement to the Barlow-type design) in magnification factors of 2x, 2.5x, 3x, 4x and 5x.

## PARACORR Type-2 (Parabola Corrector)

If you have a Newtonian or Dobsonian reflector that's  $f/5.0$  or faster, you should seriously consider using the Paracorr to eliminate coma, so your full field eyepiece sharpness is not compromised. Paracorr also acts like a 1.15x image amplifier, so, for example, a 1000mm  $f/4.5$  scope becomes an 1150mm  $f/5.2$  scope. Adjust your eyepiece focal length choices accordingly. Paracorr Type-2 is for scopes as fast as  $f/3.0$ .

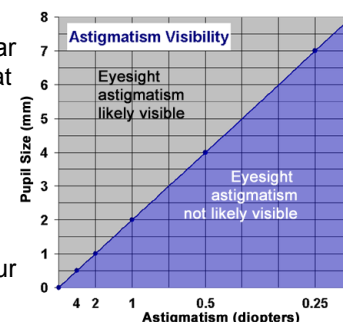
## HIGH-POWER VIEWING

Once you've selected an eyepiece set based on field stop sizes, calculate the magnifications produced with your scope. For planetary or double star observing, you'll want an eyepiece in at least the 150x range. For determining maximum power, a good rule of thumb is to use no more than 60x per inch of aperture for scopes with apertures up to 6". Higher magnifications may still be pleasing but will not likely reveal any additional detail. Realistically, the atmosphere will usually limit your planetary observing to a maximum magnification of about 300x, no matter how large your telescope aperture.

Basically, you'll be choosing low and medium power eyepieces by field stop increments to "frame" the subject, and high power eyepieces by magnification increments (based on your scope's aperture), to reach the optimum contrast and resolution for viewing planets and double stars.

Check out [www.televue.com](http://www.televue.com) for the following related articles: "Choosing Your Telescope's Magnification", "Eyepieces for Small Dobs" and "Determining When To Use Eyeglasses".

For more individual advice on specific applications, you can always call Tele Vue at 845-469-4551



# TELE VUE EYEPIECE SPECIFICATIONS

Tele Vue recommends choosing low and medium power eyepieces in ratios of field stop diameters. For example, factors of 1.4 or 2.0. When choosing higher power eyepieces, use ratios of magnification.

| Focal Length (mm)   | Type        | Product Code | Apparent Field (deg) | Field Stop Dia. (mm) | Eye Relief (mm) | Dioptr Ready | Pupil size in mm for various f/ratio telescopes |         |         |         |         |
|---|-------------|--------------|----------------------|----------------------|-----------------|--------------|---|---------|---------|---------|---------|
|   |             |              |                      |                      |                 |              | f/4.5   | f/5.2   | f/7     | f/10    | f/14    |
| <b>2" Eyepieces for Wide True Fields</b>                  |             |              |                      |                      |                 |              |   |         |         |         |         |
| 55  | Plössl      | EPL-55.0     | 50                   | 46.0                 | 38              | Y            | 12.2  | 10.6    | 7.9     | 5.5     | 3.9     |
| 41  | Panoptic    | EPN-41.0     | 68                   | 46.0                 | 27              | Y            | 9.1   | 7.9     | 5.9     | 4.1     | 2.9     |
| 31  | Nagler 5    | EN5-31.0     | 82                   | 42.0                 | 19              | Y            | 6.9   | 6.0     | 4.4     | 3.1     | 2.2     |
| 35  | Panoptic    | EPN-35.0     | 68                   | 38.7                 | 24              | Y            | 7.8   | 6.7     | 5.0     | 3.5     | 2.5     |
| 21  | Ethos       | ETH-21.0     | 100                  | 36.2                 | 15              | Y            | 4.7   | 4.0     | 3.0     | 2.1     | 1.5     |
| 22  | Nagler 4    | EN4-22.0     | 82                   | 31.1                 | 19              | Y            | 4.9   | 4.2     | 3.1     | 2.2     | 1.6     |
| 27  | Panoptic    | EPN-27.0     | 68                   | 30.5                 | 19              | Y            | 6.0   | 5.2     | 3.9     | 2.7     | 1.9     |
| 17  | Ethos       | ETH-17.0     | 100                  | 29.6                 | 15              | Y            | 3.8   | 3.3     | 2.4     | 1.7     | 1.2     |
| 24  | Delos       | EDL-24.0     | 72                   | 29.6                 | 22              | Y            | 5.3   | 4.6     | 3.4     | 2.4     | 1.7     |
| 19  | Nagler 7    | EN7-19.0     | 82                   | 27.1                 | 19              | Y            | 4.2   | 3.7     | 2.7     | 1.9     | 1.4     |
| 14  | Nagler 7    | EN7-14.0     | 82                   | 20.5                 | 19              | Y            | 3.1   | 2.7     | 2.0     | 1.4     | 1.0     |
| <b>1 1/4" Eyepieces for Wide True Fields</b>              |             |              |                      |                      |                 |              |   |         |         |         |         |
| 40  | Plössl      | EPL-40.0     | 43                   | 27.0                 | 28              | Y            | 8.9   | 7.7     | 5.7     | 4.0     | 2.9     |
| 32  | Plössl      | EPL-32.0     | 50                   | 27.0                 | 22              | Y            | 7.1   | 6.2     | 4.6     | 3.2     | 2.3     |
| 24  | Panoptic    | EPN-24.0     | 68                   | 27.0                 | 15              | Y*           | 5.3   | 4.6     | 3.4     | 2.4     | 1.7     |
| 13  | Ethos       | ETH-13.0     | 100                  | 22.3                 | 15              | Y            | 2.9   | 2.5     | 1.9     | 1.3     | 0.9     |
| 16  | Nagler 5    | EN5-16.0     | 82                   | 22.1                 | 10              | N            | 3.6   | 3.1     | 2.3     | 1.6     | 1.1     |
| 19  | Panoptic    | EPO-19.0     | 68                   | 21.3                 | 13              | Y*           | 4.2   | 3.7     | 2.7     | 1.9     | 1.4     |
| 25  | Plössl      | EAP-25.0     | 50                   | 21.2                 | 17              | N            | 5.6   | 4.8     | 3.6     | 2.5     | 1.8     |
| 17.3  | Delos       | EDL-17.3     | 72                   | 21.2                 | 20              | Y            | 3.8   | 3.3     | 2.5     | 1.7     | 1.2     |
| 18.2  | DeLite      | EDE-18.2     | 62                   | 19.1                 | 20              | Y            | 4.0   | 3.5     | 2.6     | 1.8     | 1.3     |
| 10  | Ethos       | ETH-10.0     | 100                  | 17.7                 | 15              | Y            | 2.2   | 1.9     | 1.4     | 1.0     | 0.7     |
| 13  | Nagler 6    | EN6-13.0     | 82                   | 17.6                 | 12              | Y*           | 2.9   | 2.5     | 1.9     | 1.3     | 0.9     |
| 14  | Delos       | EDL-14.0     | 72                   | 17.3                 | 20              | Y            | 3.1   | 2.7     | 2.0     | 1.4     | 1.0     |
| 20  | Plössl      | EAP-20.0     | 50                   | 17.1                 | 14              | N            | 4.4   | 3.8     | 2.9     | 2.0     | 1.4     |
| 15  | DeLite      | EDE-15.0     | 62                   | 16.0                 | 20              | Y            | 3.3   | 2.9     | 2.1     | 1.5     | 1.1     |
| <b>1 1/4" Eyepieces for Medium Powers</b>                 |             |              |                      |                      |                 |              |   |         |         |         |         |
| 12  | Delos       | EDL-12.0     | 72                   | 15.0                 | 20              | Y            | 2.7   | 2.3     | 1.7     | 1.2     | 0.9     |
| 13  | DeLite      | EDE-13.0     | 62                   | 13.8                 | 20              | Y            | 2.9   | 2.5     | 1.9     | 1.3     | 0.9     |
| 9   | Nagler 7    | EN7-09.0     | 82                   | 13.0                 | 19              | Y            | 2.0   | 1.7     | 1.3     | 0.9     | 0.6     |
| 10  | Delos       | EDL-10.0     | 72                   | 12.7                 | 20              | Y            | 2.2   | 1.9     | 1.4     | 1.0     | 0.7     |
| 15  | Plössl      | EAP-15.0     | 50                   | 12.6                 | 10              | N            | 3.3   | 2.9     | 2.1     | 1.5     | 1.1     |
| 9   | Nagler 6    | EN6-09.0     | 82                   | 12.4                 | 12              | Y*           | 2.0   | 1.7     | 1.3     | 0.9     | 0.6     |
| 11  | DeLite      | EDE-11.0     | 62                   | 11.7                 | 20              | Y            | 2.4   | 2.1     | 1.6     | 1.1     | 0.8     |
| 9   | DeLite      | EDE-09.0     | 62                   | 9.6                  | 20              | Y            | 2.0   | 1.7     | 1.3     | 0.9     | 0.6     |
| 11  | Plössl      | EAP-11.0     | 50                   | 9.1                  | 8               | N            | 2.4   | 2.1     | 1.6     | 1.1     | 0.8     |
| <b>1 1/4" Eyepieces for Higher Powers</b>                 |             |              |                      |                      |                 |              |   |         |         |         |         |
| 8   | Ethos       | ETH-08.0     | 100                  | 13.9                 | 15              | Y            | 1.8   | 1.5     | 1.1     | 0.8     | 0.6     |
| 6   | Ethos       | ETH-06.0     | 100                  | 10.4                 | 15              | Y            | 1.3   | 1.2     | 0.9     | 0.6     | 0.4     |
| 8   | Delos       | EDL-08.0     | 72                   | 9.9                  | 20              | Y            | 1.8   | 1.5     | 1.1     | 0.8     | 0.6     |
| 7   | Nagler 6    | EN6-07.0     | 82                   | 9.7                  | 12              | Y*           | 1.6   | 1.3     | 1.0     | 0.7     | 0.5     |
| 4.7   | Ethos SX    | ETH-04.7     | 110                  | 8.9                  | 15              | Y            | 1.0   | 0.9     | 0.7     | 0.5     | 0.3     |
| 5.5   | Nagler 7    | EN7-05.5     | 82                   | 8.1                  | 19              | Y            | 1.2   | 1.1     | 0.8     | 0.6     | 0.4     |
| 6   | Delos       | EDL-06.0     | 72                   | 7.6                  | 20              | Y            | 1.3   | 1.2     | 0.9     | 0.6     | 0.4     |
| 7   | DeLite      | EDE-07.0     | 62                   | 7.5                  | 20              | Y            | 1.6   | 1.3     | 1.0     | 0.7     | 0.5     |
| 3.7   | Ethos SX    | ETH-03.7     | 110                  | 7.0                  | 15              | Y            | 0.8   | 0.7     | 0.5     | 0.4     | 0.3     |
| 5   | Nagler 6    | EN6-05.0     | 82                   | 7.0                  | 12              | Y*           | 1.1   | 1.0     | 0.7     | 0.5     | 0.4     |
| 8   | Plössl      | EAP-08.0     | 50                   | 6.5                  | 6               | N            | 1.8   | 1.5     | 1.1     | 0.8     | 0.6     |
| 4.5   | Delos       | EDL-04.5     | 72                   | 5.6                  | 20              | Y            | 1.0   | 0.9     | 0.6     | 0.5     | 0.3     |
| 5   | DeLite      | EDE-05.0     | 62                   | 5.3                  | 20              | Y            | 1.1   | 1.0     | 0.7     | 0.5     | 0.4     |
| 3.5   | Nagler 6    | EN6-03.5     | 82                   | 4.8                  | 12              | Y*           | 0.8   | 0.7     | 0.5     | 0.4     | 0.3     |
| 3.5   | Delos       | EDL-03.5     | 72                   | 4.4                  | 20              | Y            | 0.8   | 0.7     | 0.5     | 0.4     | 0.3     |
| 4   | DeLite      | EDE-04.0     | 62                   | 4.3                  | 20              | Y            | 0.9   | 0.8     | 0.6     | 0.4     | 0.3     |
| 3   | DeLite      | EDE-03.0     | 62                   | 3.2                  | 20              | Y            | 0.7   | 0.6     | 0.4     | 0.3     | 0.2     |
| <b>1 1/4" Zoom Eyepieces for Medium and Higher Powers</b> |             |              |                      |                      |                 |              |   |         |         |         |         |
| 6-3   | Nagler Zoom | ENZ-0306     | 50                   | 5.1-2.6              | 10              | N            | 1.3-0.7   | 1.2-0.6 | 0.9-0.4 | 0.6-0.3 | 0.4-0.2 |

NOTE: True Field in degrees = (Field Stop dia./Telescope Focal Length) X 57.3° \*Indicates additional Dioptr Adapter required  
As of January 2012, all Tele Vue eyepieces have a limited lifetime warranty.



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