

The Burgess / TMB Planetary Eyepieces 4 and 9mm

Tom Trusock – 11/05



Production unit in back, Prototype in front

To say there's been a small amount of hype around these eyepieces would be like saying that an apochromatic telescope is a mildly popular design today. A collaboration between Bill Burgess and Thomas Back, these are designed to be 1) affordable, 2) have a wide apparent field of view, 3) comfortable eye relief and 4) serve as a planetary eyepiece.

Needless to say, that's something of a tall order. Like NASA, in the past we'd have said - pick any three. And usually it's affordable that gets tossed out the window. Although, in all fairness, sometimes that's not the *only* one that goes out the window... Despite the single (yet notable) review to the contrary I've long felt that the TMB Supermonos are

<i>Burgess / TMB Planetary Series</i>	
Focal Lengths	4,6* and 9
Eye Relief	16mm (as stated by manufacturer)
AFOV	60 Degrees
Reviewed Here	4 and 9
Price	\$99
Others Planned	Yes
<i>* not up to current specs and is reduced in price accordingly for sale</i>	

among the best (on-axis) planetary eyepieces currently available, and equaling those – let alone trying to top them, is a TALL order. Planetary observers are some of the most demanding individuals I know, and therefore planetary eyepieces are usually the most demanding eyepieces on the market.

With respect to their new Planetary series, Burgess Optical touts the following:

- Designed by Thomas Back
- Full internal baffling
- Full multi-broadband coatings on every air to glass surface
- Internal spacers with flat anodizing to reduce internal reflections
- Twist up eyecups (similar to the Pentax design, even though they physically resemble the Radians) with a rubber flexible eye guard on top

Currently there are three focal lengths in the Burgess / TMB line up – a 4, a 6 and a 9mm. Only the 4 and 9 are really what Bill calls his “final production” eyepieces. After they got the six back there were a few things he and Thomas felt could be easily changed to improve performance, and thus – made it so. The 6mm’s are currently being blown out at the bargain basement price of \$49 a piece, and despite not being quite as up to snuff as Bill and Thomas had hoped, they are still receiving rave reviews from many across the internet. Plans are (as of this writing) for a line of 2.5mm, 4mm, 6mm, 7.5mm, 9mm, 12mm, and a 17mm or 18mm eyepieces depending on how the field lenses fit in a 1.25” barrel.

Manufacturer specifications for the existing line are:

Focal Length	Barrel	FOV	Eye Relief	Field Stop	Weight
4mm	1-1/4"	60°	16	n/a	n/a
6mm	1-1/4"	60°	13-14	8.5	5.7 oz.
9mm	1-1/4"	60°	16	15.5	5.8 oz.

Specs from www.burgessoptical.com

A Sneak Peek

Personally, I’ve had a chance to see and use the 4 and 9mm. Bill and I got in touch back in late August, and he mentioned that he had a new eyepiece he’d like me to take a look at. At that time, he shipped me the prototype 4mm, and I was – to be blunt – extremely impressed. However, there was one small snag – CN does not typically review pre-production items. Therefore before a “real” write-up could be done I’d need to see a production sample to ensure that performance would be identical.

Sometime afterwards, I’d been shipped a 9mm by Astronomics – a door prize for some lucky individual at Michigan’s 2005 Great Lakes StarGaze - and me being me, I just couldn’t resist taking it out for a spin at least once or twice.

As in the 4mm, fit and finish were quite good – about a ½ step above the new Meade Series 5000's in my book, and on a par – but perhaps ever so slightly below – the Naglers, Panoptics and Pentaxes – recall that these are usually considered to be the crown jewels of the eyepiece world. The eyecup screws up and down, with a small snap into place. The cup is lubricated, but while I did see an extremely slight amount of oil on the barrel, it's nothing like what I found on the Meade 5000's (which sell for far more money).

But enough about it's physical characteristics - we look through an eyepiece in the dark. How did it measure up at night?

Again, I was extremely impressed. Although I only had a chance to get the 9mm out for a couple of nights (around new moon none the less) with no bright targets to really test its performance on, I could tell that this made an extremely good DSO eyepiece.

I was immensely pleased with it. In fact, I'd go so far as to say it's probably the all around best under \$100 wide field eyepiece I'd ever used.

The 4mm prototype has showed very similar fit and finish as well as performance characteristics but for the final evaluation: I'd have to wait for the finished product.

Around the middle of October, I received a phone call from Bill letting me know that the production 4mm's were in and he was sending me one. I received it a few days later, and it immediately sent the entire weather pattern for the eastern Americas into a tailspin, which has lasted for weeks – FAR longer than a \$99 eyepiece should cause. Clearly the weather gods feel these are something special.

Finally I've had a few clear nights here and there, and had a chance to use the production model in a few different telescopes. The 4mm is usually too much power for a serious evaluation on my 18", so I concentrated on my small refractors (of which I seem to have a plethora) – and a few other scopes which are on loan for review. At this point, it's seen duty in a 66mm aperture 388mm focal length F5.9 fluorite doublet, a 66mm aperture 400mm focal length f6.1 ED Petzval, a 66mm aperture 460mm focal length f7 ED triplet, a 102mm aperture 820mm FL f8 fluorite doublet, and a 102mm aperture 880mm FL f8.6 ED doublet.

It performed like a champ in all of them.

About the only regret I have is given the seeing I've had lately, the 4mm yielded simply too much power for me to give a critical evaluation in my 18". These eyepieces deserve a bit more time in evaluation at a shorter focal

Production 4mm Measured Specifications (CN)

Eye Lens	22mm
Field Lens	8mm
Weight	6.5 oz
Height (Eyecup collapsed – rubber eyeguard collapsed)	89mm
Height (Eyecup Extended – rubber eyeguard collapsed)	103mm
Width (Widest Point)	44mm

ratio, and rest assured I'll be looking into that.

Ultimate Performance

I used it on both tracking and nontracking mounts and the 60 deg fov was a godsend – especially on an alt/az mount and when compared to the extremely limited FOV of the TMB supermonos, but there was even a noticeable difference when compared to a standard ortho or the nagler zoom.

The eyepiece performed very well. Very well. Specifically, I noted the following.

There was a notable lack of aberrations:

- Lateral color was – for all intents and purposes – nonexistent
- The field was flat and remained sharp pretty much all the way to the edge at f6
- Field curvature was undetectable – any present was more than made up for by my personal accommodation
- I noted no internal ghosting and minimal scatter
- There was a slight out of field reflection when extremely bright objects were placed in particular positions – this was not typically an issue on the 4mm prototype**, and I never thought to extensively test for it on the 9 – mainly due to the limited amount of time I had the 9mm for.
- There was an insignificant amount of spherical aberration of the exit pupil (I pretty much had to go looking for it, and even then it wasn't intrusive).



Left to right and top to bottom: Nagler t6, GSO Wide View, Generic Plossl, Burgess / TMB Planetary, Apogee Widescan 70, Speers Variable Focal Length

Additionally, I noted

- On axis, these eyepieces were *very* sharp - rivaling a good plossl, but with a significantly wider AFOV, and better (vastly better) eye relief.
- The coatings – Bill and Tom’s “Black Coating” process ATE light. The coatings are wonderful. At this point I think I’ve seen them pop up in a couple other places, and had opportunity to compare them against standard coatings. I have yet to see a picture that really does them justice. The one above certainly does not.
- Contrast was quite high – especially when one considers that this is a 6 element eyepiece.
- Eye relief seemed about on order with the current stated measurements – perhaps just a mm or two shy, but certainly in that ballpark. It was comfortable for me without glasses, but I suspect might be a touch tight for some eyeglass wearers – but not all.
- 60 deg afov seems to be something of a magic number for me. While it’s not really that much larger than a 50 deg afov, I find it large enough to yield a more immersive view.

I had a chance to compare these to various other eyepieces in my kit, and overall, I found that I slightly preferred the Nagler zoom for it’s ability to change focal lengths on the fly, and that the Supermonos delivered more pop, along with a slightly more contrasty on-axis view. However, these are minor issues, and considering the price point, the Burgess / TMB planetaries are a fantastic value. For an undriven scope, these are excellent planetary or DSO eyepieces.

About the only difference I’ve seen between the 4mm prototype and the 4mm production unit involved some minor fit and finish issues. The overall look of the eyepiece improved a bit – they went to a reflective / chrome paint in the production unit where the prototype had a simple white. The prototype did have a more positive “click” and rotation when adjusting the eye cup, but in my opinion that’s not significant. Overall, the production unit bears a great resemblance to its prototype.



***Update: 11 November 2005*

I've had a couple more chances to use



the production 4mm on Luna in several different telescopes, and I've discovered what appears to be – visually anyway – a significant difference between the prototype and the production model.

Unfortunately, there seems to be a glare / reflection problem in the eyepiece itself resulting in some rather noticeable flare when viewing bright extended objects. This is similar to what I saw in the Meade 5000's, but recall those are twice the price, so it's

more forgivable here. The glare is only seriously evident when lunar viewing. Further, it's not at all apparent in the prototype, which is an indication to me that it's a production run problem, and not a design problem.

Other observers have noted this as well – in fact, Mike Hosea first suggested the cause of this difficulty (in the CN Forums) as being the interior retaining ring on the field element – a little experimentation quickly verified this. In the image above, note the prototype is the lens on the left, while the production element is the lens on the right. In the prototype element, the lens is recessed deeper into the retaining ring, and thus is a bit better sheltered from stray light. A quick makeshift baffle (shown on far right) placed atop the field lens (made from plastic or cardboard and secured with a very small amount of double sided tape) noticeably reduced the problem on the production lens. Alternately, if you don't mind removing a retaining ring, Mike Hosea has what certainly seems to be a better looking solution – flock the interior of the retaining ring. He describes it in detail in the thread that accompanies this article, and today, I took the time to do just that.



Lacking Protostar flocking paper (which Mike suggests), but having some black fine grain self-adhesive sandpaper in the garage, I decided to give that a try. It's not quite as black, but a little attention with a black marker and traditional soft lead pencil took

care of that. (Be certain to wipe the surface several times before you install – to take off the “extra graphite / ink / and knock off any loose grains.) First, I removed the retaining ring (very carefully) using a flathead screwdriver. (Mike describes how to make a “high tech” spanner in the thread.) Then I simply cut the prepared sandpaper to size with a utility knife and installed it using a pencil and trimming to size. Be very careful the sandpaper does not extend below the retaining ring. The last thing you want is an abrasive in contact with your optics as you tighten the ring. I went over it a few more times with the edge of my pencil to ensure that bending the paper didn't generate any loose sand, and carefully reinstalled the retaining ring in the eyepiece. The picture above shows the final result – the original prototype lens is on the left, the new production lens on the right – after the flocking has been installed.

A preliminary test on the moon (without the makeshift baffle in place: i.e. using only the flocked retaining ring) shows that this seems to have fixed the problem and put the performance level of the production eyepiece on the same par as the prototype.

So, what caused this issue in the first place?

Having access to both the prototype and a production unit puts me in something of a unique position, and after examining both, here's my guess. If you look carefully at the retaining rings holding the field lens, you can see that the lens is recessed slightly more in the prototype than in the production model. Examining the barrels in the picture to the right (prototype on left, production on right) you can see that they are not exactly the same size – the



production model is slightly taller than that which was used in the prototype. I'd take a guess here and say that the initial barrels were (for one reason or another) not on hand when the production run was made, and the factory made the decision to substitute these barrels. To maintain the spacing, the field lens was then moved up in the retaining ring. Without the deeper recess to act as a baffle, we get the glare issue that we've discovered in the production model.

This can potentially be cured in a number of very simple ways – the addition of a baffle in (it appears) one of several locations, the flocking of the existing retaining ring, or quite possibly the simple substitution of a thinner retaining ring. With a minimum of cost, time and effort, you can easily turn this eyepiece into the same superb performer I found the prototype unit to be.

If Burgess / TMB address this issue (and there's been talk about it in the various online groups that seems evident he's planning on it), this eyepiece is a clear winner in this price / performance range. If not, I'd have to give it a bit more cautious recommendation than previously - if you're not up for a little tinkering. However, if you're not observing Luna, the problem is minimal – nothing else is really big enough or bright enough (in most scopes anyway) for this to be a serious issue.

Update: Monday, November 14, 2005

I've had an e-mail with TMB concerning the glare issue, what follows are the relevant parts, quoted with permission:

>> mark my statements, the others are TMBs.

<snip>

>> *(I had some time today so I flocked the retaining ring for the field lens
>> (see picture 1 - production model on right) It was a very simple process
>> that only took 5-10 minutes max. (Actually quicker than making the
>> baffle.) A quick peek at luna (just before the clouds rolled in) showed
>> that seemed to put the performance of the production unit back on the
>> same order as the prototype in regards to the glare issue.*

That's great to hear. But I don't expect our customers to do this, so I am going to show Bill your results, and tell him that all customers will either get a brand new eyepiece that is baffled properly, or he will supply a new field lens group, with the lower barrel, so the customer just has to screw the new one on. I will make sure to talk to Bill tomorrow, when he comes back from his trip to China, and tell him all that you did, and told me.

>> *I realize that I'm talking to the designer here, and you probably
>> already know this, but ... I suspect there are several ways this issue
>> could be addressed:
>>
>> 1) use a thinner retaining ring so the deeper "well" acts as a baffle
>> 2) flock the existing retaining ring
>> 3) a properly placed baffle*

I sent a perfectly ray traced baffled system for all the Planetary eyepieces, but the company obviously took an off the shelf retaining ring, that does not cut the stray light. They went the cheap route, and we are going to do number 3, on your list of how to fix this problem. Bill has already contacted them about this, so it must be done right in the very next run of all focal lengths, as they told Bill already.

>> *I'm guessing here's what's caused the problem:
>>
>> If you look carefully at the retaining rings holding the field lens, you
>> can see that the lens is recessed slightly more in the prototype than in
>> the production model. Examining the barrels in the picture 2 (prototype
>> on left, production on right) you can see that they are not exactly the
>> same size – the production model is slightly taller than that which was
>> used in the prototype. I'd take a guess here and say that the initial
>> barrels were (for one reason or another) not on hand when the production
>> run was made, and the factory made the decision to substitute these
>> barrels. To maintain the spacing, the field lens was then moved up in
>> the retaining ring. Without the deeper recess to act as a baffle, we get
>> the glare issue that we've discovered in the production model.*

Yes, you hit it right on the head.

>> *I'm also guessing that this was a substitution that was made at the
>> factory without you being consulted.*

That is for sure. I would have never approved this faulty design.

>> *I (and several readers over on CN) are curious about how/if you / Bill
>> are going to address the issue.*

*Like I said, Bill told me that the very next run will all be baffled, so there will be no
stray light issues. I am very serious about this, as I won't sell them, if this problem is not
taken care of. That is why I would not sell the 6mm's, and we can't have that happen ever
again.*

<snip>

You can quote anything from this e-mail, if you would like.

<snip>

Thanks for all your help.

Best Regards,

*Thomas M. Back
Owner and Designer
TMB Optical*

*As you can see, they are aware of the situation and do intend to address it. I'll update
this review again as I receive new information.*

Summary

In spite that one (easily addressed) issue in the production 4mm, I still think Burgess and TMB have a winner on their hands in this design.

Consider - A few years ago this whole thing would have been unheard of. The only eyepiece really resembling the performance characteristics of the Burgess / TMB Planetaries are the Tele Vue Radians. While the Radians are still probably a slightly better choice for eyeglass wearers (for their added eye relief), Bill and Tom have done something absolutely amazing here. They've hit a home run. Performance wise (outside of this glare issue) these eyepieces are in the same ballpark, but at a fraction of the cost. Assuming they can keep quality control up and cost down (and fix the glare issue), Bill Burgess and Thomas Back have a real winner on their hands. They are off to a good start with their new line of planetary eyepieces, and I for one, look forward to seeing more from them in the future.

While they term it a planetary eyepiece, the truth is that it's an excellent all around piece of glass. I'll even go one further by stating that it compares very well to eyepieces costing several times that amount. Bill Burgess has told me many times that he wants to make good equipment affordable, and he's done that here.

Update: January 12, 2006 –



The replacement retaining rings have arrived! Good on his word, Bill has now shipped out replacement retaining rings (free of charge) for the Burgess TMB planetary eyepieces – all individuals who purchased one new should receive one in the mail, if you picked one up used, or do not receive one within the next month or so (Jan 12, 2006) you may wish to contact Burgess Optical directly.

I received both 9 and 4mm rings with a set of detailed instructions. The procedure is extremely simple and requires very little time. (I replaced both in under 3 minutes tops.) The only tool needed is a small jewelers screwdriver or micro spanner to loosen and tighten the retaining rings. The new ring is micro baffled (what the impromptu fix accomplished), and does an adequate job of fighting the glare the other ring introduced. If you do not wish to replace the ring your self, Bill has informed me that Burgess will do it for you – contact him to make arrangements to ship the eyepiece back.

Some quick tests on a nearly full moon, showed there to be no more significant out of field glare than in most other eyepieces – although the 4mm did show that rather odd

rainbow effect once again. That and the residual glare were, in essence, non-issues as in my opinion they would only really show up under very specific circumstances - ones that the average astronomer would probably not normally encounter.

While these don't have the sheer contrast and resolution of the TMB supermonos, nor the extreme wide field of the Tele Vue Naglers, they do provide excellent planetary and deep sky views at a fraction of the cost of the more premium eyepieces on the market, and are a good all around eyepiece at an excellent price.

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Available from:

Burgess Optical – <http://www.burgessoptical.com/>
7756 Oak Ridge Hwy
Knoxville, Tennessee, 37931, USA
(865) 769-8777

TMB Optical - <http://www.tmboptical.com/>
c/o Thomas M. Back
PO Box 44331
Cleveland, OH 44144 USA
Phone: 216-524-1107

Astronomics – <http://www.astronomics.com/>
680 S.W. 24th Ave.
Norman, OK, 73069
800-422-7876

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