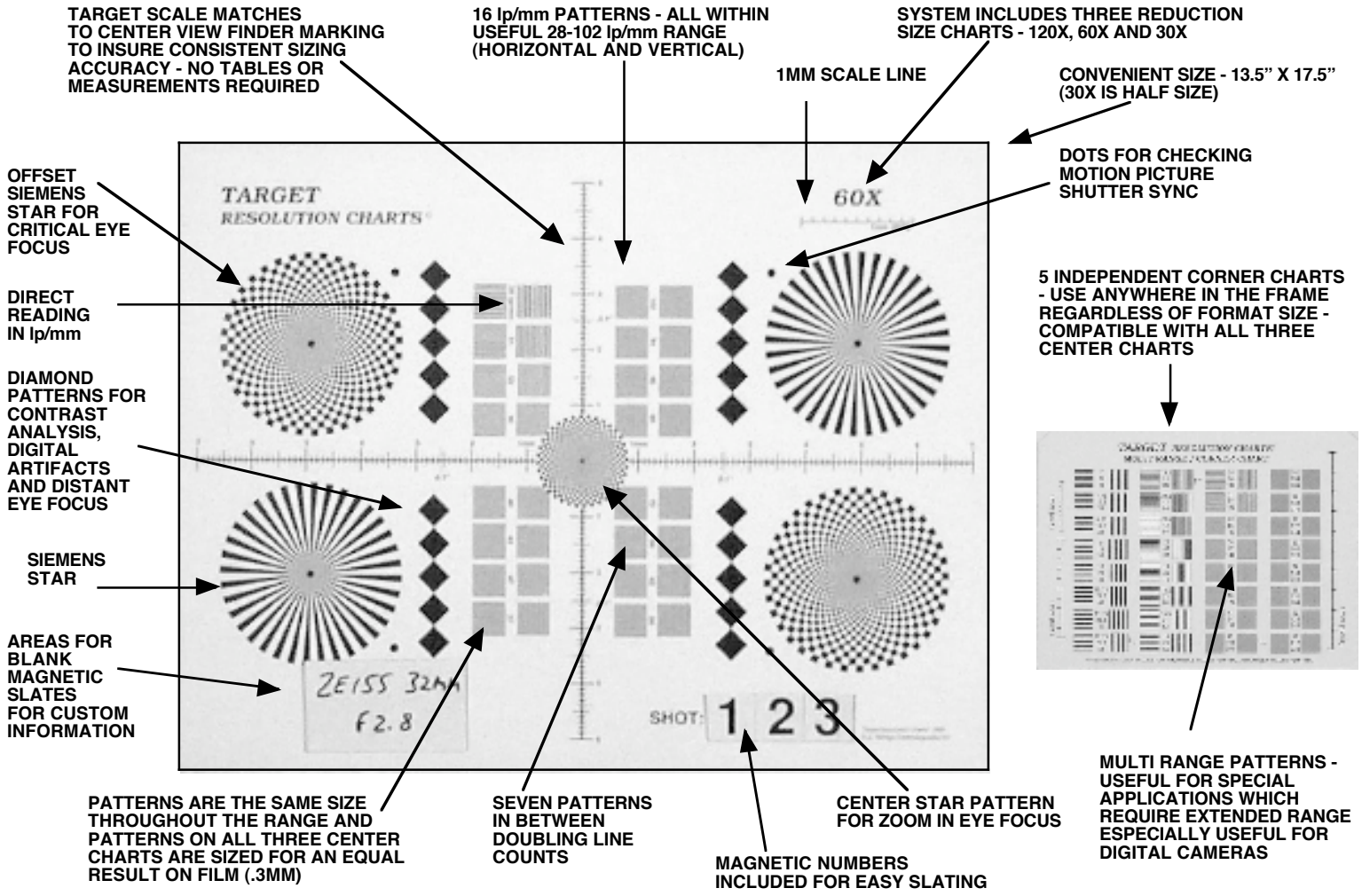
TARGET RESOLUTION CHARTS ©

A CONVENIENT AND ACCURATE SYSTEM FOR DETERMINING PHOTOGRAPHIC AND DIGITAL RESOLUTION

NO MEASURING, FORMULAS OR TABLES*



***Target Charts were designed for use with motion picture lens testing. They use an innovative direct measurement system which utilizes center markings in photographic film and still cameras with reflex viewfinders to maintain consistent pattern sizing. The center pages of this brochure explain how this works.**

BUT NOW TARGET CHARTS HAVE GONE DIGITAL!!

The Target manual has been updated to include digital still camera testing which includes adding LW/PH evaluation to the existing lp/mm system. Now Target charts are a perfect way to test and compare film and digital imagery!

Target has some major advantages to add to digital testing:

- REASONABLE DISTANCES - NOT TOO CLOSE
- NO MINIMUM FOCUS PROBLEMS
- HIGH VALUE, EXTENDED RANGE
- FINEST PATTERN VERY DISTINCT
- 3 REDUCTION SIZES - LARGE AND SMALL CHARTS
- EASY TO ANALYZE PATTERNS - ALL THE SAME SIZE
- MORE INBETWEEN PATTERNS
- EXTRA CORNER CHARTS

The direct measurement system (as explained in the center pages of this brochure) does not apply to most digital cameras. The Target instruction manual explains proper sizing methods and how to convert photographic lp/mm to LW/PH results, more commonly used with digital and video resolution testing.

MORE ON THE TARGET WEBSITE - www.stringercam.com/target.html

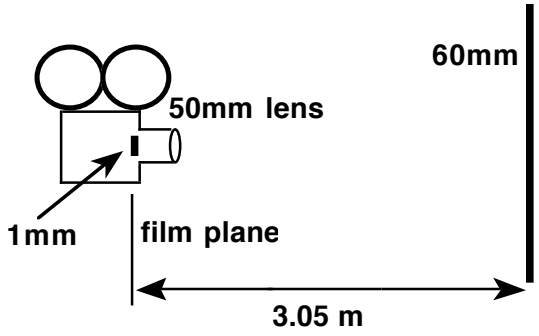
A LOOK AT RESOLUTION SYSTEMS BEFORE TARGET CHARTS:

With resolution testing, patterns consisting of equally spaced lines are photographed. This gives a reduced image of lines on the film. The number of finest lines you can clearly discern on the film is the resolving power value in lines pairs (lp) per mm.

CONSISTENT IMAGE SIZE IS CRITICAL IN COMPARATIVE RESOLUTION TESTING. IF YOU SHOOT A TEST PATTERN WITH DIFFERENT LENSES, IT SHOULD ALWAYS BE THE SAME SIZE ON FILM.

THE FORMULA:

The mainstream resolution charts use a mathematical formula to maintain consistent image size. The formula states that the distance required (film plane to subject) is equal to whatever reduction factor you require multiplied by the focal length plus 1. So, if you have a 60mm line and you want to reduce it to 1mm on film (60x) with a 50mm lens - you multiply 60 times 51 (50mm+1) to get the distance of 3050mm or 3.05 m.

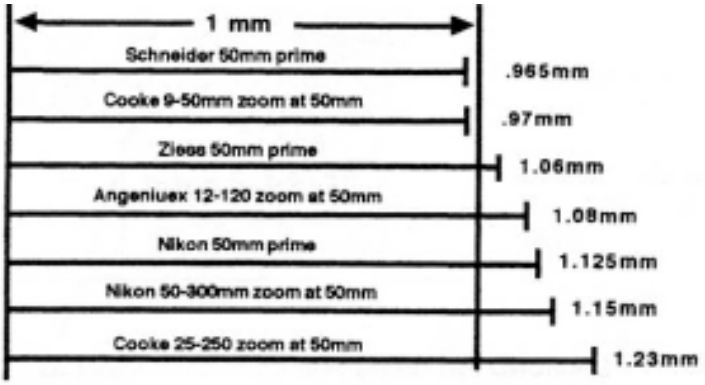


THE TEST:

So we tested this formula with seven different 50mm lens - some primes - some zooms set at 50mm. Using these seven lenses, we shot a 60mm line at a distance of 3.05 meters from the film plane. So all the seven images of the line should be 1mm on film.

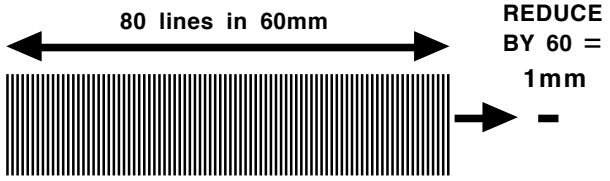
BUT THESE WERE OUR RESULTS:

The formula is fine in theory, but is inaccurate and inconsistent in the real world. The seven 50mm lenses have slightly different angles of view with different field coverages, so our images of the line were not exactly 1mm on the film! Depending on the lens, the image varied from .965mm to 1.23mm. That's as much as 25% difference!



SO WHAT'S THE BIG DEAL??!!

On a 60x chart, if we have 80 black and white lines printed over 60mm - they should reduce to 80 lines in 1mm on film and become a 80 lp/mm pattern (chart patterns are usually a square section of this example).



In our test, the Cooke 25-250mm shows 1mm as 1.23mm, so instead of the proper 80 lines, that lens will show extra lines - actually 98 lines (80x1.23). Now the Cooke will have an unfair advantage (no matter what its sharpness). The Schneider with a shorter .965mm result will show only 77 lines (80x.965). <u>That's a total error of 21 lp/mm in what is supposed to be an equal comparison!</u> The obvious problem is that the camera is too close to the chart for the Cooke zoom - it should be further back to get the proper 1mm result. The closer the camera to the chart, the bigger the image, and a better but false lp/mm result. And with the Schneider lens, the formula method has put the camera slightly further away than it should be for a 1mm image.

WHAT'S THE ANSWER?

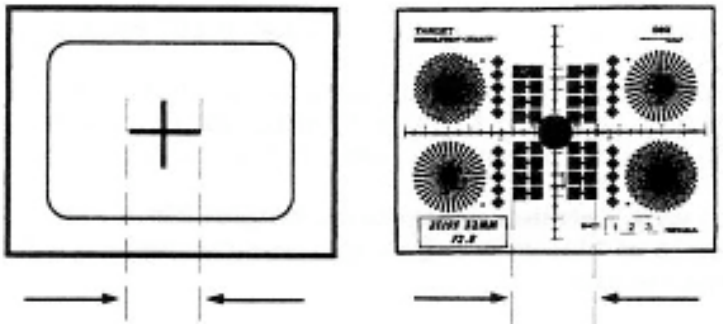
TARGET RESOLUTION CHARTS ©

We have proven that the formula method is not accurate. The answer to this problem is Target Resolution Chart's DIRECT MEASUREMENT system. To give a simple example of direct measurement, we will go back to our 60mm line test. If there was a 1mm cross hair in the camera's reflex viewfinder we could use that to line up with our 60mm line because the viewfinder is exactly the same size as the film image. If we adjust the camera position so that the line matches the cross hair with the seven 50mm lenses, we are adjusting the distance for each lens and the line will be rendered as 1mm each time.

THE IDEAL DISTANCE FROM FILM PLANE:

Schneider 50mm prime	2.94 m
Cooke 9-50mm zoom at 50mm	2.96 m
Zeiss 50mm prime	3.23 m
Angeniuex 12-120 zoom at 50mm	3.30 m
Nikon 50mm prime	3.44 m
Nikon 50-300mm zoom at 50mm	3.42 m
Cooke 25-250 zoom at 50mm	3.64 m

ALL RESULTS ARE 1MM !!



With Target, you line up a center marking of a known dimension in the viewfinder (cross hair in motion pictures or microprism circle in 35mm SLRs) to a measured reference scale (which matches the chart's reduction factor). So for any size focal length or angle of view, the patterns are a consistent size and the chart values are correct. The Target instructions includes specs on viewfinder markings and explains how to make it work even if you don't have any markings.

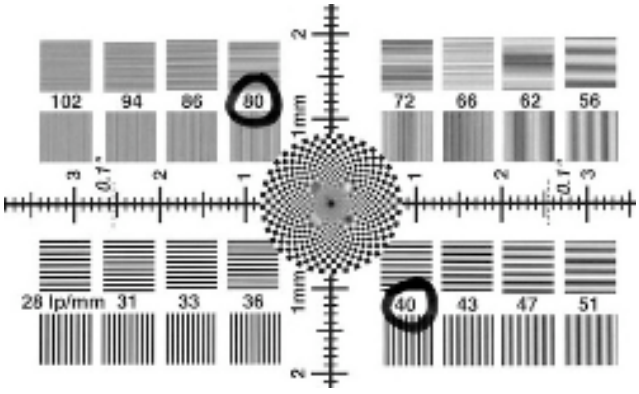
AND THERE'S MORE TO TARGET CHARTS THAN ACCURATE SIZING!!

NO MEASURING

With Target you get a big bonus - NO MEASURING - you just line up the sizing in the viewfinder. There are no formulas, calculations or tables to refer to. You can test any focal length, even in-between settings on zoom lenses.

MORE IN–BETWEEN PATTERNS

This section of a Target chart shows there are 7 in-between patterns within a doubling progression from 40 to 80. This gives many more choices to work with and therefore you can pinpoint a higher, more specific value than existing systems.



FINER PATTERNS – SAME SIZE

By going up to a very fine 102 lp/mm pattern, Target Charts cater to modern high resolution lenses and films. Unlike other systems where the patterns get smaller as the lp/mm get higher, Target patterns are rendered the same size on film for easy comparison and have the actual values printed beside them. The corner charts have even finer patterns (to 408!).

RANGE OF PATTERN SIZES

Some existing systems try to cater to more than one reduction factor by using the same chart over different distances with tables to interpolate the results. Therefore the chart displays a wide range of patterns which might includes some patterns which are too course or too fine. Target offer three choices of sizing - 120x, 60x, and 30x. This covers a wide variety of focal lengths and formats, and still keeps within practical distances. The 60x is for mid-range, the 120x for wide lenses, and the 30x for telephoto lenses.

OTHER ADVANTAGES AND SUPERIOR FEATURES OF THE TARGET SYSTEM

- With Target you can now test many formats - motion pictures, photographic stills and digital. Target offers flexibility with easy conversion to LW/PH results. Target charts include a more extended range and easier visibility than existing digital or video style LW/PH charts. The choice of reduction sizing allows for more practical testing distances with small digital chip formats. Now get realistic results from digital testing regardless of confusing digital CCD specifications and pixel count.

- Five corner charts are included with each kit. The corner charts are designed to be independent from the center chart, so can be used anywhere in the frame. They display an extended multi-range of lp/mm patterns, so not only do they work with all three chart reduction factors (120x, 60x, 30x), but they can be used for special applications where a wide range of patterns is required. These small charts are useful for digital stills because of the smaller image sizes required and the need for extended scale evaluation (resolution fall-off is more difficult to visualize in digital).

- Built-in flexibility - Sometimes you have to shoot charts at non-standard distances - for instance, shooting at specific distance settings or to test for depth of field. With Target charts (with film only), you can measure the film image of the 1mm scales (which are printed on all charts) and apply the difference to the resolved off-size pattern to get a corrected value. The kit includes a 10mm scale for measuring the film image. For digital stills, the Target manual describes how to obtain the proper sizing (and correction procedures) using methods other than direct measurement.

- Slating aids - There are built in slating areas which use magnetic squares and paper-thin strips of metal (on the back of the charts). Numbers are included to post slates from 1 to 199. Two blank custom slates are included to post additional information with an erasable marker. This system is quick, easy to use and the chart surface is kept clean and free from damage.

- Optimum printing standards and convenient size - The line pairs are printed black on white with excellent fine line detail quality. The dull matte surface reduces flare and is also resistant to tape damage. The largest charts are 13.5" x 17.5" and can be shipped and stored in a 14" x 18" envelope.

- Each center chart has four Siemens star targets (two regular, two offset) to help eye focus and offer immediate lens evaluation. There is also a small star target at the chart center for eye focus when zooming in. Diamond patterns offer contrast assessment as well as distant eye focus points.

- Includes comprehensive 20 page instruction manual with detailed procedures, helpful hints and background information on resolution evaluation. Digital camera testing is now included. A strip of film with a 10mm measurement scale is included for measuring viewfinder markings and image results.

David W. Samuelson, a veteran British cinematographer and author of technical manuals, stated that Target Resolution Charts *"are very worthwhile and fill a long felt need.... a very big advance."*

The Target Resolution Chart kit includes:
- Three large charts (120x, 60x, and 30x)
- Five corner charts
- 22 magnetic numbers and two blank slates with water soluble marker
- 10mm Measurement scale
- 20 page instruction manual.