

# North American ALIGNMENT

Division of North American Survey Supply

*Keeping the World Aligned*

**Adapters**

**Eyepieces**

**Optical Rentals**

**Micrometers**

**Targets & Scales**

**Mounts & Bases**

**Alignment Systems**

**Optical Instruments**



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catalog on your smartphone!

# Optical Tooling: Alignment Technology



OPTICAL INSTRUMENTS increase alignment accuracy and decrease measurement time-- all while providing stable, repeatable reference lines with no deviation.

The science of optical metrology and alignment, utilizing optical tools, makes it possible to achieve the highest degree of accuracy when aligning precision systems that are straight, flat, plumb or square.

Sighting methods date back to the stones of the David Altars at Stonehenge and the Pyramids of Egypt. The use of a mirror for setting squareness and alignment by in-line pinholes has been known for centuries.



The straight-edge, square and surface tables are the basic tools of the engineer and each has its counterpart in optical alignment.

In optical alignment, there are three methods of optical alignment-- collimation, auto-reflection and auto-collimation. Direct precision measurements are made rapidly and consistently. It is no longer necessary to extrapolate readings, or to make constant adjustments and calculations.

*“As technology becomes more precise and efficient, it is critical to align to tolerances never before possible -- and do it quickly and affordably”.*

This optical tooling catalog serves as a sample of what we have available to you for all of your optical needs. If you do not see an item that you need, be sure to call us for more information at (215) 969-5011.

## We can offer you the following:

- Original manufacturer's parts
- Custom parts
- Quick turn-around on repairs
- Discounted service contracts
- Extended warranties
- Calibration certificates
- Calibration reports
- Calibration stickers
- Calibration program reminder



Service and calibration can be offered with complete NIST traceable certifications.

We offer calibration estimates on instruments in addition to annual and multi-year service and certification contracts.

## The following certification options are available:

- Basic certification without readings
- Readings provided after calibration
- Readings provided before and after calibration

At North American, we offer a complete rental inventory of **over 600** optical and surveying instruments and supplies.

A complete inventory are available. These include, but are not limited to: precision levels, alignment telescopes, total stations, theodolites, clinometers, tooling scales, jig transits, rods, tripods and stands.

Rental weekly and monthly rates are available, as well as rental purchase plans!



## Alignment Telescopes



**WK-51-2200 Series**



**WK-51-2330 Series**

### **WK-51-2200 ALIGNMENT SCOPE:**

- Designed specifically to measure deviations from a reference line, and secondarily, to provide an extremely straight optical reference line for alignment applications.
- (2) built-in optical micrometers which measure at right angles to each other.
- Has built-in autoreflection target on its objective lens and an auto-collimation illumination unit.
- May be purchased without an autoreflection target.
- Also available in metric with .01mm accuracy.

### **WK-51-2330 BRIGHT LINE:**

- Essentially the same as the 2200 but has a right angle eyepiece and a two-reticle system consisting of a dark field, bright line reticle as well as a bright field, dark line reticle.
- Features specifically enhance the unit's accuracy and ease of use when autocollimating.
- Includes a built-in autoreflection target on the objective lens.
- Autocollimation illumination unit included.
- Black and red graduations indicate direction of displacement.

### **Specifications**

**Magnification:** Varies from 4x at zero focus to 46x at infinity

**Accuracy:**  $\pm 0.0002''$  over full range

**Barrel Diameter:** 2.2498" (+0" -0.0003") Meets A.I.A. specifications

**Barrel Length:** 9 7/8"

**Field of View:** 37 minutes at infinity, 42 mm at zero focus

**Displacement:**  $\pm 0.050''$

**Direct Reading:** to 0.001"

**2030 Eyepiece:** Erect, Diopter

**2022 Straightness of Line of Sight:**

$\pm 0.002''$  (0-50 ft.);  $\pm 0.004''$  (50-100 ft.); 0.5 arcseconds beyond 100 ft.

### May Be Used with:

- Coincidence Striding Level
- Right Angle Eyepiece
- Cross Level
- Light Source
- Angle Reading Attachment (WK-51-2200 only)
- Optical Square (WK-51-2200 only)
- Double Square Optical Square (WK-51-2200 only)
- Magnetic Back Mirrors, 2½" & 4" (WK-51-2330 only)
- Combination Auto-Collimation, Projection, Right Angle Eyepiece



**Call for Quote!**





## Alignment Telescopes



**WK-51-1000**



**WK-51-2000**

### WK-51-1000 Specifications

**Magnification:** Varies automatically from 23x at 2" to 35x at infinity

**Focusing Range:** 2" to infinity

**Barrel Diameter:** 2.2498" (+0" -0.0003") Meets A.I.A. specifications.

**Ground Barrel Length:** 9 3/16"

**Field of View:** 47 arcminutes at infinity; 7.4 mm at near distance

**Effective Aperture:** 38 mm

**Straightness of Line of Sight:** ±0.002" (0-50 ft.); ±0.004" (50-100 ft.); 0.5 arcseconds beyond 100 ft.

### WK-51-2000 Specifications

**Magnification:** 30x at infinity, ±10%

**Focusing Range:** Zero to infinity

**Barrel Diameter:** 2.2498" (+0" -0.0003") Meets A.I.A. specifications

**Barrel Length:** 10"

**Field of View:** 41 minutes, ±10%

**Effective Aperture:** 42 mm

**Straightness of Line of Sight:** ±0.002" (0-50 ft.); ±0.004" (50-100 ft.); 0.5 arcseconds beyond 100 ft.

### **WK-51-1000 ALIGNMENT SCOPE:**

- Designed to hold an optical reference line for other instruments, for use as a boresight telescope, or to evaluate equipment on its own using the principles of autocollimation.
- All standard spherical adapters and optical squares will fit it.
- Comes with a built-in autoreflection target on its objective lens as well as an WK-31-1112 LED Illuminator and WK-31-1122 Adapter.

### **WK-51-2000 ALIGNMENT SCOPE:**

- Similar to the WK-51-1000, and is used for establishing and/or holding optical reference lines.
- Barrel length, magnification, and field of view are different than other alignment telescopes.
- Barrel length is 10" long.
- Has no built-in micrometers.
- Has a built-in autoreflection target and comes with an autocollimation illumination unit.

### May Be Used with:

- Coincidence Striding Level
- Cross Level
- Combination Autocollimation, Projection Eyepiece (WK-51-1000 only)
- Right Angle Eyepiece
- Light Sources (WK-51-1000 only)
- Combination Auto-Collimation, Projection, Right Angle Eyepiece & Angle Reading Attachment (WK-51-2000 only)
- Optical Square & Double Optical Square (WK-51-2000 only)

## Eyepieces & Level Vials



Call for  
Quote!



522240 Combination  
Eyepiece



521241 Combination  
Eyepiece



621871 Stride Level

### 522240 & 521241 COMBINATION EYEPIECES:

- The 522240 consists of a right angle eyepiece plus an illumination unit which can be used either to project an image of the reticle onto a target or for autocollimation.
- The 521241 is interchangeable with the standard eyepiece of the K&E type telescope found on certain instruments.
- Both can be converted in the field as required, to form a straight-through vision system or a right-angle system.

### 621871 STRIDE LEVEL:

- Designed for quick, precise leveling of alignment telescopes and collimators to one arcsecond.
- Can also be used to level any cylindrical surface between 1 $\frac{3}{4}$ " and 3" in diameter.
- Both ends are viewed simultaneously via prisms and a magnification system.
- "Coincidence" or "split" bubble presentation provides the most accurate reading of the bubble position.
- Top-mounted turret assembly rotates 360°, allowing viewing from all sides.
- Elastic strap is included to secure the level to the instrument.

## Lighting

### 605090 UNIVERSAL LIGHT SOURCE:

- Battery powered light source-- by (3) Alkaline Button Cell 1.5V (included).
- Provides reticle or target illumination for alignment functions.
- Has LED lamp life of 100,000+ hours.
- Battery life of 100 hours.



605090 Universal  
Light Source Kit

### WK-31-1112 LED Illuminator

### WK-31-1112 LED ILLUMINATOR:

- Self-contained coin cell type battery power.
- Various LED colors available.
- Designed to be used to illuminate optical scales and reticles; may be custom ordered.



## Wild/Leica Theodolite Accessories

- **WK-31-1112** LED Illuminator for Wild T2 Circle and Auto Collimation Eyepiece (*replaces mirrors*)
- **WK-51-4700** Auto Collimation Eyepiece
- **WK-51-4700-RA** Right Angle Auto Collimation Eyepiece
- **WK-51-4800** Erecting Eyepiece for Old Style N3 Precision Level
- **WK-58-1900 Series** Short Focus Adapters
- **WK-58-1909** Short Focus Lens Adapter for T3000/TM5100A
- **WK-58-2100** Optical Micrometer
- **WK-58-2400** T2 Counterweight for Optical Micrometer
- Wild Replacement Level Vials for T2 Theodolite & N3 Precision Levels



**WK-58-1909**



**WK-31-1112**

## Additional Theodolites

- **WK-31-2702** Coincidence Telescope Level Vial
- **WK-51-4712** Auto Collimation Eyepiece w/ Illumination for Sokkia Theodolites
- **WK-58-1900 Series** Short Focus Adapters
- **WK-58-1906/8** Short Focus Adapter Range Set: includes 13" - 21" (WK-58-1906) and 21" - 62" (WK-58-1908)
- **WK-58-2410** Kern DKM2 Counterweight for use with K&E and Brunson Micrometers



**Call for Quote!**



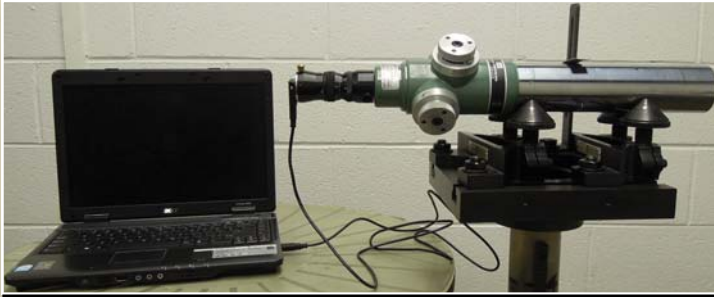
**WK-58-1906 & 1908**

## Video Eyepieces



### EYEPIECE AVAILABILITY:

*Video eyepieces are available for all theodolites, precision levels, alignment telescopes and total stations in analog or digital formats.*



**K&E/Brunson 71-2022 Digital Video Eyepiece**

### WK-96-1300 Series Eyepieces - Digital or Analog:

- K&E 71-2022 & 71-2062
- Brunson C47280 Alignment Scopes
- Rank-Taylor Hobson Alignment Telescopes
- Nikon Metrology
- Davidson Optronics



### WK-96-8500 Series Eyepieces - Digital or Analog:

- Kern E2 & E20 Theodolites
- Zeiss ETH2 Theodolites

### WK-32-3000 Series Eyepieces - Digital or Analog:

- WK-49-4205 Precision Auto Levels, Brunson 545, K&E 71-3010

### WK-96-8540 Series Eyepieces - Digital or Analog:

- Wild T2000/T3000/TM5100A/TDM5005/TDA5005 Theodolites



## Video Eyepieces



Sokkia CX Series



Wild T2 Eyepiece



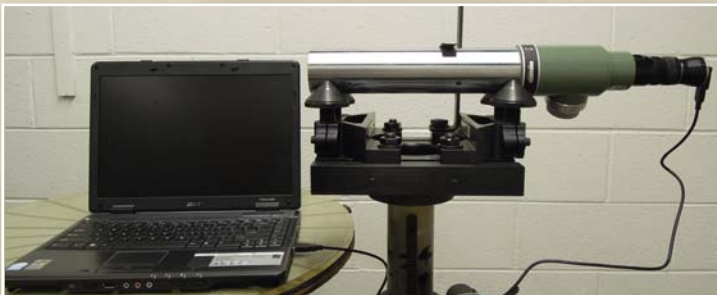
Sokkia DT5 Eyepiece

### WK-96-2000 Series Eyepieces - Digital or Analog:

- Wild T2
- Wild T3
- Kern DKM2
- Kern DKM3
- Rank-Taylor Hobson/Hilger-Watts ST-200
- Sokkia DT Series
- Sokkia CX Series
- Topcon ET Series
- Topcon DT Series
- Nikon Theodolites
- Geodimeter Instruments
- Trimble Instruments



Call for  
Quote!



K&E/Brunson C47280 Digital Video Eyepiece

Ask us about custom-fit modifications!  
*Speak with Bob Marron for more information*  
Email: [metrology@nasurvey.com](mailto:metrology@nasurvey.com)

## Mounts & Bases



**615170 Alignment Telescope Base**

### **615170 ALIGNMENT TELESCOPE BASE:**

- Provides a means for adjusting the position of alignment telescopes and collimators.
- Can be attached to any standard cup mount.
- Yoke is easily repositioned on the base so that setups may be made with the base secured in a vertical, inclined, or upside-down position.
- Not a standalone instrument mount. Must be used in conjunction with a spherical mounting system.

### **610886 TILT MOUNTING BASE:**

- Accommodates with all alignment telescopes and collimators.
- A steel plate provides support for two bronze "vees" that adjust from a spacing of 6¼" to 9½", center to center.
- Has a tilting range of approx. 1.25° both horizontally and vertically.
- Instrument carrier may be rotated with respect to the bottom plate through 360°.
- Base has standard internal thread.
- Also available as a rotating mounting base (610089).



**610886 Tilt Mounting Base**



**Call for Quote!**



**WK-51-9010 Wye Rotating Base**

### **WK-51-9010 WYE ROTATING BASE:**

- Accommodates all 2¼" diameter alignment telescopes and collimators.
- (4) leveling and slow motion tangent screws make positioning reliable and easy.
- Instrument is supported by (2) wyes on center that are mounted to a channel sectioned bar.
- Wyes provide stable support of the instrument barrel.
- Adjustable metal clips secure the telescope to the wyes.
- Special spacings available upon request.

## Mounts & Bases



WK-58-9001

WK-58-9000



### TELESCOPE MOUNT:

- Designed to hold and position alignment telescopes with 2.25 inch diameter barrels.
- Precise positioning of a telescope can be obtained and fixed in position.
- Includes the WK-58-9000 "T" Slotted Base, WK-58-9001 Cones and the WK-58-9002 V-Block.
- The entire unit weighs 13 lbs.

### WK-58-9000 "T" SLOTTED BASE:

- Plate has two parallel T-slots and a 3½" x 8 threaded section for attaching plate to the head assembly of an instrument stand or tripod.
- When used with two V-blocks, it becomes a baseline bracket that permits adjusting the optical axis of an alignment telescope horizontally or vertically.
- Size: 9 x 8 x 1¼"
- Weight 7 lbs. approx.

### WK-58-9001 CONES:

- Fine threads with conical shape for minute adjustments.
- Thread into WK-58-9002 V-block

### WK-58-9002 V-BLOCK:

- An adjustable cone-type V-block with the cones offset from the mounting assembly.
- When used in combination with another cone assembly, the optical axis can be adjusted horizontally or vertically.
- Weight 6 lbs. approx.

## Optical Instruments



**Telescopic  
Transit  
Square**



**Sight  
Level**

*Both optical instruments are available with a micrometer (in English or Metric) or without a micrometer.*

*Have a magnification of 20x at 2" from objective and 30x at infinity.*

*Available to purchase new or used and to rent!*

### TELESCOPIC TRANSIT SQUARES:

- Available with English, metric, or no micrometer.
- Main telescope length of 14" with 190 micrometer.
- Has a magnification of 20x at 2" from objective; 30x at infinity.
- Focusing range of 2 to infinity with an effective aperture of 1.34".
- Cross axis telescope has a length of 11".
- Has a magnification of 45x.
- Focusing range is fixed at infinity with an effective aperture of 1.25".

### SIGHT LEVELS:

- Available with English, metric, or no micrometer.
- Telescope length of 16" (40.6 cm) with 190 micrometer.
- Has a magnification of 20x at 2" from objective; 30x at infinity.
- Two-speed telescope tilting screw.
- Focusing range of 2 to infinity with an effective aperture of 1.34".
- The horizontal axis pivots directly over the vertical axis, making the change in plane height less than 0.0001" for tilts up to 5 arc minutes either above or below horizontal.

### May Be Used with:

- Coordinate Optical Micrometers
- Plastic or Glass Autoreflexion Target
- Optical Micrometers
- Right Angle Swivel Eyepiece & Illuminated Adapter
- Combination Projection, Auto-Collimation, Fixed Right Angle Eyepiece
- Combination Reticle Projection, Fixed Right Angle Eyepiece (Transit Square only)
- Auto-Collimation Unit (Transit Square only)
- Light Sources & Fiberoptic Light Sources (Transit Square only)



**Call for  
Quote!**



## Micrometers & Adapters



531900



531600



531526

### 531900 MICROMETER SERIES:

- Translates the line of sight literally with an accuracy of  $\pm 0.0005''$  using an optical flat.
- Cast aluminum housing has a 1.655" opening to fit the telescope barrel of all Brunson optical tooling transits and levels.
- Adapters allow this micrometer to be used with all variety of theodolites.

### 531526 ADAPTER SERIES:

- Allows mounting a micrometer on any instrument with a barrel diameter of 2 1/4".
- (3) nylon setscrews secure the adapter to the barrel of the instrument without marring.
- Available in English and Metric units with or without Micrometer Adapter Assembly.

### 531600 MICROMETER SERIES:

- Allows monitoring of two dimensions simultaneously.
- Has two optical flats mounted in an aluminum housing so that their axis of rotation are at  $90^\circ \pm 15$  arcseconds, and converts any transit level into an alignment telescope.
- Each micrometer translates the line of sight with an accuracy of  $\pm 0.0005''$ .
- Available in English and Metric units. Cast aluminum housing fits the telescope barrel of all Brunson optical tooling transits and levels.



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**For more information, visit:**  
**[nasurvey.com/products/optical-tooling](http://nasurvey.com/products/optical-tooling)**



## Precision Automatic Level



### WK-49-4205 PRECISION AUTO LEVEL:

The WK-49-4205 Precision Auto Level with a built-in parallel plate micrometer is designed for the highest accuracy in geodesign, engineering and industry.

Optical alignment methods assure levelness to within a few thousandths of an inch, regardless of how large of an area is to be covered.



The WK-49-4205 Automatic Level is adoptable for the second and third-order geodetic leveling of national networks.

It can be used for engineering and deformation surveys in addition to general construction, engineering, and the installation of large machinery.

The use of the WK-49-4205's automatic compensator speeds up work and improves accuracy.

Operating temperature is -22°F (-30°C) to +122°F (+50°C).

### FEATURES:

- Includes a parallel plate that moves with a micrometer
- Pentaprism for easy viewing of circular level
- Equipped with a press button for compensator checking
- Magnification of 38x
- Working range of 15' minimum
- Setting accuracy of  $\pm 0.5$  mm
- Available in metric only
- Objective lens diameter of 45 mm
- Dismountable eyepiece; assorted accessories
- 0.1mm direct reading
- Sensitivity of circular level per 2 mm run is  $10' / 2$  mm

**Ask us about weekly and monthly rentals!**  
*We have over 600 instruments and supplies available*

*See pages 16-17 for more details.*

## Inclination Measuring System

### WK-34-7000 TELEMETRIC INCLINATION MEASURING SYSTEM:



The WK-34-7000 Inclination Measuring System is designed to facilitate combat system leveling and other alignment applications by providing a quick and simple method to measure differential angles between two or more planes. May be used for shipboard alignment, radar pad alignment, angle differential measurement.

The WK-34-7000 system shown features sensors—accurate to within  $\pm 10$  arc seconds. The sensors are encased in a sturdy aluminum housing each with a precision-ground base. The collection device features two ports for connecting sensor heads and additional port for connecting an external power supply or connecting directly to a personal computer for data storage. Systems are available with up to ten sensors.

#### **Features:**

- **Basic system:** (2)  $\pm 10$ -degree sensors capable of being mounted up to 1,000 meters from the central data collection device that are mounted to right-angle plates, and a hand-held collection device.
- **Sensor Range:**  $\pm 10$  Degrees
- **Limits Error:**  $\pm 10$  Seconds of Arc
- **Dimensions:** 6" x 4" x 4"
- **Connection Cable:** 15 meter standard length – longer lengths available.
- **Ext. Power Supply:** +12... +48 V DC
- **Batteries:** 250 mW
- **Output Data:** RS 485
- **Weight:** 15 lbs total system.

## Optical Rentals

### Instruments

- Wild T1/T2/T3 Theodolites
- Wild T2000/T3000 Theodolites
- Wild T16 Theodolite
- 271 Brunson Tilt Collimators
- Hilger Watts Autocollimators
- Davidson Autocollimators
- Hilger Watts TB Clinometers
- 71-6110 Brunson Bore Target Kits
- 521 Brunson Mount w/ Bullseye Targets
- Brunson 76RH Jig Transits
- K&E Jig Transits
- K&E Dual Axis Alignment Scopes
- Model 81 Brunson Alignment Scopes
- K&E Precision Tilting Levels
- Wild NA2 Automatic Levels
- Taylor Hobson Alignment Scopes
- Zeiss TH43 Theodolites
- Zeiss ITH2 Theodolites
- Hilger Watts ST-320A Theodolites
- Kern DKM2 Theodolites
- Kern DKM3 Theodolites
- Kern E20 Theodolites



### Stands

- WK-59-2330 Portable Tooling Stands
- Quickset Stands
- K&E 71-5025 Heavy Duty Stands

### Tripods

- NEDO Aluminum Tripods
- Aluminum Extension Leg Tripods
- Wood Extension Leg Tripods
- Wild GST20 Wood Extension Leg Tripods
- WK-19-6500 Extension Leg Tripods





## Optical Rentals



### Scales, Targets, Bases, Adapters, etc.

- 5", 10", 20", 40" Brunson Tooling Scales
- 10"/20" K&E Tooling Scales
- Brunson Magnetic Scale Holders
- Diagonal Eyepieces
- Right Angle Eyepieces
- Brunson Lateral Slides
- K&E Lateral Slides
- K&E Magnetic Spindle Targets
- K&E Cubic Quad Cells
- Brunson Optical Mirrors
- Mirror Mounts
- 71-6110 Brunson Bore Target Kits
- 521 Brunson Mount w/ Bullseye Targets
- K&E Optical Micrometers
- K&E Optical Wedges
- Zeiss Rotating Tribachs
- Brunson Rotating Bases
- Brunson 235-15 Theodolite Centering Plate
- Brunson V-Blocks
- K&E Slotted Bases
- K&E Sphere Adapters
- ¼" Tooling Target Sets
- K&E Coincidence Striding Levels
- Counterweights
- Tooling Bar Adapters
- Short Focus Adapters
- 30° Polygons
- Taylor Hobson Cup Mount Clamps
- 3", 5" 10", 20", 40" Stand Extensions
- Up to ¾" Precision Lift
- Tripod Floor Guides



*Contact us for a complete list of optical rentals!  
Available to rent or to purchase.*

## Optical Clinometers



### WK-23-1190 OPTICAL CLINOMETER:

Precision optical clinometers have a 360 degree operating range reading to either 10 seconds or to 1 second. They are used for accurate measurement or setting of angles, calibration, alignment, machine setting, boresighting, fire control alignment, and inspection.

The level indicator is a precision level vial mounted to a precision graduated circle and an optical micrometer graduated at 10 seconds of arc. The standard level vial housing can be replaced with an auto collimating mirror or special worktable.

The clinometers can then be used vertically or horizontally as a precision circular measuring table for horizontal use. An accessory base is required. An optical illumination system is available for illumination of the internal scales.



### FEATURES:

- Angular range: 0 to 360°
- Graduation interval: 1 or 10 seconds of arc
- Can be estimated to: 2 seconds of arc
- Readings repeatable to: 5 Seconds of arc
- Maximum error between any two readings: 10 seconds of arc
- Reference faces of base flat to within: 0-.0005" (0-.013mm)
- Maximum symmetrical load when used horizontally: 5 lbs.
- Level vial sensitivity: 20 seconds per division
- Base dimensions: 6.5" x 3" (165 mm x 76 mm)
- Overall height: 8.5" (215 mm); Weight: 8.0 lbs. (3.6 kg)

### ACCESSORIES:

- WK-23-1125: Clinometer Worktable
- WK-23-1130: Auto-Collimating Mirror
- WK-23-1120: Optical Clinometer Support
- WK-31-1113: LED Clinometer Illuminator



## Drum Inclinerometers

### WK-23-2054 DRUM CLINOMETER:

The WK-23-2054 (*shown right*) has angles that are read directly to one minute and to 15 seconds by interpolation. This clinometer is graduated from 0° to 180° to 0° with negative numbers descending in red and positive numbers ascending in black.



The WK-23-2054 features two hardened and ground base plates. The lower 6" plate is suitable for use on shafts, propellers, wing surfaces, machine tools, test tables, production fixtures, and more. This adjustable base permits reading angles from zero, even when working from surfaces not perfectly horizontal. The lower base plate and the compensating screw may be removed permitting the fixed base to be used in contact with the working or reference surface.

When used in this manner, the Clinometer is adjusted to the fixed base. The graduations will read 0° and the level vial will center only when the base is truly horizontal. This permits the Clinometer to be clamped to a tiltable surface with all angles read directly from the horizontal. All working parts are effectively enclosed in a dust-tight case— assuring abrasion-free contact between the accurate ground arc and worm. The micrometer drum worm shaft is spring-loaded to eliminate backlash. Overall height of the clinometer is 5 15/16".

### WK-23-2052 DRUM CLINOMETER:

The WK-23-2052 Drum Clinometer is similar to WK-23-2054, but has a range of 10° to 0° to 90°. It fits easily into small storage and operational space. It is used worldwide by aircraft manufacturers, maintenance facilities, and aerospace services. Supplied with a durable plastic carrying case.

#### Model Variations:

- WK-23-2052 Drum Clinometer: 1 min. (res.), 1 min.(accuracy)
- WK-23-2152 Drum Clinometer: 30 sec. (res.), 30 sec. (accuracy)
- WK-23-2252 Drum Clinometer: 20 sec (res.), 20 sec. (accuracy)
- WK-23-2054 Drum Clinometer: 1 min. (res.), 1 min.(accuracy)
- WK-23-2154 Drum Clinometer: 30 sec. (res.), 30 sec. (accuracy)
- WK-23-2254 Drum Clinometer: 20 sec (res.), 20 sec. (accuracy)
- WK-23-2954 Drum Clinometer: 1 min. 30 sec. (res.), 1 min. 30 sec.

## Testing & Calibration Equipment



WK-51-3000



WK-51-3215

### Specifications

**Barrel:** Outside diameter of 2.4994" to 2.4997". Meets A.I.A specifications

**Length:** 14" (WK-51-3000)  
18" (WK-51-3215)

#### WK-51-3000 Targets:

Displacement and infinity targets; 0.092" radius circle target also included

#### WK-51-3215 Targets:

Filar/Bi-filar pattern with approx. distance settings of 2, 4, 6, 16, 25, 50, 75 ft. as well as infinity

### WK-51-3000 TILT COLLIMATOR:

- Provides (2) reticles -near and infinity- for optical instrument testing and evaluation.
- Specially mounted spirit level vial is fixed to the barrel to set the collimator's reticle pattern in a plumb orientation.
- Infinity target is graduated for angular measurement estimations, with a resolution of 30 arcseconds and a range of  $\pm 30$  arc seconds in two directions.
- Paired-line near target allows offset measurements when using instruments with micrometers.

### WK-51-3215 MULTIPLE TARGET COL.:

- Available with multiple targets (shown) or graduated targets.
- Multiple purpose test collimator, specifically designed for use in collimating test stands and instrument adjustment applications.
- Each adjustable target contains a label identifying its location along the optical path. Allows for testing and calculation of the deviation of any optical instrument's line of sight from a perfectly straight line.

### WK-29-3100 DIOPTRER TESTER:

- Used to check the range and establish the "zero" setting of focusing eyepieces for optical products.
- 3x magnification, 1 3/8" diameter, 8" minimum focus, range of 9 diopters from +4 to -5.
- Zero setting at infinity, 13 mm aperature, 3 1/2" length, 4 1/4 mm diameter of exit pupil.



WK-29-3100

### 510290 VARIABLE WEDGE:

- Used to measure angular deviation from optimal during optical instrument calibration.
- Range of  $\pm 30$  arcseconds, 1/2 arcsecond accuracy, 10 arcsecond graduations, 1.8" aperature diameter, 30" control cable.



510290

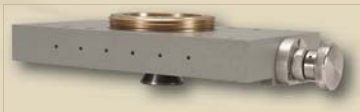
## Lateral & Vertical Adjustment



**588023 Compound Lateral Slide**

### 588020 & 588023 LATERAL SLIDES:

- The 588020 has 2" travel for horizontal alignment to known points.
- The 588023 is a compound lateral slide using (2) of the 588020's. Allows for a full 2" of travel in X and Y directions.
- Both have a standard external 3½" x 8 instrument thread mount on top. A dovetail on the bottom seats into the 580800 lift or the 582356 adapter, rotating 360°.



**588020 Precision Lateral Slide**

### WK-59-1360 SERIES LATERAL SLIDES:

- 3½x 8" thread or 5/8"x11 thread.
- Available in WK-59-1350 Precision Lateral Slide, WK-59-1361 Lateral Slide w/ Micrometer (5/8 x 11" threads), WK-59-1362 Dual Axis Slide w/ Micrometer (5/8 x 11" threads), WK-59-1363 Lateral Slide w/ Micrometer, (3½ x 8" threads), and WK-59-1364 Dual Axis Slide w/ Micrometer (3½ x 8" threads).



**WK-59-1360 Lateral Slide**



**580800  
Precision Lift**

### 580800 PRECISION LIFT:

- Provides precise control of vertical motion throughout approximately ½" range.
- Generally used for fine vertical positioning after the instrument height has been roughly established with a stand column.
- Large diameter, fine-motion screw allows minute height adjustments of previously leveled instruments
- 2.825 x 20 external thread.
- Recessed dovetail socket allows mounting of slides or other configured products on top, with socket head set screws to hold them in place.



**Call for  
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**580801  
Precision Lift  
& Adapter**



### 580801 PRECISION LIFT & ADAPTER:

- This assembly consists of an 580800 precision lift, a 582352 adapter (dovetail bottom, 3½" x 8 thread top), and a 581584 precision lift adapter.
- Replaces the 585060 precision lift.

## Mounting Adapters



583512



WK-19-1067



WK-19-1060



WK-19-1000

### 583512 PRECISION LIFT ADAPTER:

- Seats into the dovetail receptacle mount and has a standard 3½" x 8 external thread on top.

### WK-19-1067 SURFACE MOUNT ADAPTER:

- Provides 3½" x 8 external thread as a mount for many instruments and other adapters. A flange with six (6) countersunk bolt holes is provided for secure mounting on any flat surface.
- Also available as black anodized aluminum (WK-29-3000)

### WK-19-1060 SURFACE MOUNT ADAPTER:

- Provides 3½" x 8 external thread for mounting various bases or other adapters, including standard surveying or optical alignment instruments. Has three (3) mounting holes for fastening the ring to virtually any flat surface.

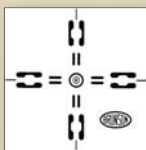
### WK-19-1000 THEODOLITE ADAPTER:

- Converts a 3½" x 8 standard external instrument thread on any stand or adapter into a 5/8" x 11 external thread to accommodate most theodolites
- Available as reverse conversion (WK-19-1010)

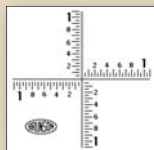
## Adhesive Targets



556165



557211



557202

Item	Description	MSLP
556165	1.75" Bi-Filar Adhesive Alignment Target	\$ 136.00
556166	1.75" Bullseye Adhesive Alignment Target	\$ 136.00
557200	2.5" Bi-Filar Target Decal	\$ 15.00
557202	2.5" Graduated Target Decal	\$ 16.80
557210	1.5" Bi-Filar Target Decal	\$ 15.00
557211	1.5" Bullseye Target Decal	\$ 15.00



**Call for Quote!**

## Targets



### 553005 SERIES OPEN TARGET:

- See-through target is great for alignment jobs where it is necessary to focus on various collinear targets that are positioned down a single line of sight; mounted 2¼" diameter; various spacings available.

### 557950 OPEN TARGET:

- Unique type of field-adjustable, see-through target which provides a multiple paired line pattern without using glass; have spacings of 0.010", 0.020", 0.040" and 0.080".

### 557110 MULTIPLE PAIRED-LINE TARGET:

- Target has line pairs at four (4) different spacings, which are useful at various distances; 1½" diameter.
- Also available with 2¼" diameter (557140)

### 557062 SIDE VIEWING TARGET:

- Plug target with a dual width, bi-filar line pattern; target spacings of 0.010" and 0.020"; shank diameter is 0.250".

### 557170 SERIES END VIEWING TARGET:

- Paired line target has a plug diameter of 0.250"; 0.375" and 0.500" are available by special order.
- Also available as Bull's Eye End Viewing Target (557171)

## Mirrors



### WK-58-1890 MAGNETIC MIRROR:

- Checks the perpendicularity of any flat surface to a line of sight by means of auto reflection or auto-collimation. The mirror has a circular front surface with a 2½" diameter. Its reflecting surface is flat to within a ¼ wave length in 50 mm diameter. Single magnet parallel to ± 3 seconds of arc.
- Also available in 4" diameter (WK-58-1894) and 6" diameter (WK-58-1846). Three magnetic feet are cemented to the back of the 4" and 6" mirrors.

## SMR Target Holders



**541525 Compression Floor Mount Adapter**



**Call for Quote!**

### **541525 COMPRESSION FLOOR MOUNT ADAPTER:**

- The 541525 Compression Floor Mount Adapter gives you an easy way to put a permanent target location in the floor or wall without using epoxies or other adhesives.
- Install the 541525 into a 1.38" x 1.9" hole that is drilled in a concrete floor or wall. The top will be flush with the surface of the floor or wall.
- May be used with any 1.5" diameter SMR.

### **541534 POLE ADAPTER:**

- The 541534 has a connector which fits either of our lanyard kits.
- Drilled and tapped with an internal  $\frac{3}{4}$ "-5 acme thread, the 541534 attaches easily to most standard paint roller poles or detachable broom sticks.
- The 541534 has a connector which fits either of our lanyard kits.
- Adapter size: 1.00" (25.4mm) x 3.00" (76.2mm)
- Has a connector which fits a lanyard kit.



**541534 Pole Adapter**



**541505 Target Holder w/ Interchangeable Pins**

### **541505 TARGET HOLDER W/ PINS:**

- Handy for people who want to put 0.5" and 1.5" SMRs in the same locations.
- Contains four "base" pin nests that can hold a 0.5" SMR. Additionally there is a uniquely crafted 1.5" SMR adapter that fits with fine-tuned precision over the base pin nests, transforming them into a 1.5" SMR target holder.
- This larger adapter has three bottom-mounted magnets as well as an air release to make removal from the base adapters easy.
- Kits are available in English (541505) or Metric units (541506).



## Target Centering Kit



### WK-58-8400 TARGET CENTERING KIT:

- **WK-58-8410 Adjustable Target Holder (Large Bores):** Device holds a target in any bore from 18 in. to 68½ in. in diameter. The target holder is supported by three telescoping legs. Used with the WK-58-8420 Indicator Holder.
- **WK-58-8415 Legs:** Three sets of legs are supplied for use in bores of diameters from 16 in. to 23½ in., 23½ in. to 38½ in. and 38½ in. to 68½ in., respectively. Legs for use in bores 65" to 121" in diameter are also available.
- **WK-58-8420 Indicator Holder:** Sits on WK-58-8410 Target Holder; Locates center of bore by rotating.
- **WK-58-8425 Extension Rod:** For WK-58-8420 for use on bores of diameters from 67 in. to 121 in.
- **WK-58-8428 Dial Indicator:** For use with WK-58-8420 Indicator Holder, reading to .001 in., graduated 0-100, range .250 in.
- **553005 Series Open Target:** See-through target is great for alignment jobs where it is necessary to focus on various collinear targets that are positioned down a single line of sight; mounted 2¼" diameter; various spacings available.



## Scales



### OPTICAL TOOLING SCALES:

- These scales are used with optical instruments to measure the precise distance of any object from the line of sight. All scales graduated throughout their state length except the 40" size, which is blank over the lower 19½" and graduated over the upper 20½".
- Available in English and Metric units

Item	Description	MSLP
575646	500 mm Optical Tooling Scale, Metric	\$ 395.00
576003	3" Optical Tooling Scale	\$ 333.00
575645	5" Optical Tooling Scale	\$ 337.00
576010	10" Optical Tooling Scale	\$ 341.00
576020	20" Optical Tooling Scale	\$ 375.00
576040	40" Optical Tooling Scale	\$ 626.00
576061	Box of Optical Tooling Scales: 3", 10", 20", 40"	\$ 1,664.00

## Scale Holders & Levels



575620



575603



WK-58-1100

### SCALE HOLDERS:

- Use holders to secure 3" - 20" (80mm - 500mm) scales in any orientation on a ferrous surface. The edges of the scale holder are precisely ground to 90° in order to assure that the scale is held perpendicular to the surface.

Item	Description	MSLP
575603	3-20" or 80-500mm Scale Level	\$ 290.00
575620	3-20" or 80-500mm Magnetic Scale Holder	\$ 173.00
WK-58-1100	3-20" Mag. Scale Holder w/ ON/OFF switch	\$ 230.00
575624	40" or 1000mm Magnetic Scale Holder	\$ 1,141.00

## Scale Holders

### FIXED & ROTATING SCALE HOLDERS:

- For axial orientation of a scale in Invar System
- Knurled lock knob on the base
- Loosen the knob, and you can rotate the upper portion of the scale holder to the axial angle needed to match the orientation of the fixed scale holder on the other end.
- Threads: 3/8" x 24, fits Invar System
- Works with new and old style scales as well as older Cubic Precision (K+E) scales.
- Both available in English and Metric units
- Base insert made of stainless steel; Scale holder body, black-anodized aluminum



578665



578667

Item	Description	MSLP
578665	Fixed Scale Holder, English	\$ 287.00
578666	Fixed Scale Holder, Metric	\$ 287.00
578667	Rotating Scale Holder, English	\$ 475.00
578668	Rotating Scale Holder, Metric	\$ 475.00

### 576210 V-BLOCK SCALE HOLDER SET :

- Helps you place a scale against many cylindrical drums or rolls, and hold the scale nominally on a diameter of the roll.
- The 576210 set includes two scale holders: one 576212 V-block (120°), & one 5576216 V-block (160°). May purchase separately.
- One side of the V-block holds 40" or 1000mm scales, and the other side holds smaller scales.



## Invar

### INVAR SYSTEM KITS:

- The 590803 and 590804 Invar Kits are designed as multipurpose kits; often used as scale extension. Invar has a very low coefficient of thermal expansion which effectively eliminates changes in length due to handling or environmental changes.
- The 590803 is manufactured to its stated length within  $\pm 0.0003"$ , and 590804 to  $\pm 0.0001"$ .



## Stands

### WK-59-2000 SERIES STATIONARY ADJUSTABLE STAND:

- Rack and pinion raising mechanism with collar lock and safety ratchet pawl; adjustable tension assembly; elevation tube has a 2.687-20 thread which allows for various adapters and assessors as well as custom attachments to be easily interchanged; 3 swivel casters with rubber tires
- Heavy duty lift locking mechanism raises and lowers stand on casters for mobility.
- A U.S. standard 3½" x 8" thread is machined in the head for instrument attachment. the column is hollow to permit downward sighting, with a clear 2.0" diameter aperture.
- Provided with rubber shock bumpers and a shock-resistant plastic thread cap. The floor space required for both stands is 32½" x 37½".
- Available in a low movable stand-- 24" to 41" (WK-59-2310) and a high moveable stand-- 40" to 73" (WK-59-2320).



## Stand Extensions



### WK-59-3500 STAND EXTENSIONS:

- Each WK-59-3500 series stand extension piece increases the maximum height of WK tripods and stands.
- Fitted with a 3½" x 8" male and female thread.
- Hollow for vertical center line plumbing.

#### Model Variations:

WK-59-3503: 3 inch

WK-59-3520: 20 inch

WK-59-3505: 5 inch

WK-59-3540: 40 inch

WK-59-3510: 10 inch

## Trivets



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### WK-59-3000 TRIVET:

- For supporting jig transits, precision levels, or theodolites.
- Extremely rigid and is supported by removable, hardened steel points; has 3½" x 8 mounting threads.
- Provides a convenient means of setting up instruments on surface plates, machine tables, the floor, or any place where the line of sight is close to the supporting surface.



## Tripods



### WK-59-2350 ELEVATION TRIPOD:

- The superb torsional rigidity of the WK-59-2350 elevation tripod series is matched by its support strength (150 lbs., 68 kg).
- The WK-59-2350 has a load capacity of 150 lbs. (68 kg) with a maximum height of 72" and a minimum height of 33.5".
- The tripod weighs 23 lbs. with a maximum spread of 73" (185 cm).
- It has a foot plate diameter of 4" (10 cm) for self-leveling and a 5/8" hole for spiking.
- Also available in a shorter height (WK-59-2330) with a maximum height of 57" and a minimum height of 26".



### 580810 HEAVY-DUTY PORTABLE STAND:

- Various combinations of the 580810's components allow instrument mounting heights of 2" to 55½" (5 - 141 cm) from the floor.
- The stand allows you to make precision vertical and horizontal adjustments to solve a multitude of instrument location problems.
- Comes with a set of short legs, a set of long legs, and a set of trivet points that may be mounted directly in the three sockets on the tribrach plate, for setting the stand almost directly on the floor or other work surface. It is also supplied with a short and long intermediate tube.
- Equipped not only with the 3½" x 8 standard external instrument mount threads, but also a dovetail receptacle and the 2.825" x 20 internal thread.



## Swivel Heads

### 586632 SWIVEL HEAD:

- Allows you to turn your instrument to any azimuth position. May be continuously rotated in either direction, and locked into the desired position with a large knob.
- Attaches to any stand or other accessory having a 3½" x 8 external thread. Provides the means to mount any standard instrument or other accessory.



## Optical Camera Adapter Kit



### 638420 CAMERA ADAPTER KIT:

The 638420 Camera Kit adds flexible functionality to alignment telescopes. This configurable system is ideal for many applications such as:

- Repetitive measurement tasks
- Easy viewing of difficult set-ups in the field or the lab
- Easier real-time feedback during machine adjustment
- Remote monitoring to view targets from across the room, from multiple locations, or on the other side of the world.
- Live viewing for multiple people
- Training and classroom settings

The 638420 comes with a specially designed adapter (left) that can be installed in a field setting. Simply remove the standard eyepiece from the alignment telescope and replace it with the camera system adapter.

Simple to use and portable, the 638420 Camera Kit includes TeleView™ software. This software displays images from the digital camera on computers running Microsoft Windows®.

The 638420 requires no factory adjustments and installation is practically fool-proof. Just connect the camera assembly to the instrument, and plug the USB cable into the camera and the computer. Power is supplied to the camera via the USB cable. No external camera power is required!

## Optical Camera Adapter Kit



Order model 634821 for the Camera Kit, which includes:

- Instrument adapter
- TeleView software
- 1.2 Megapixel monochrome CCD camera w/ 1280 x 960 resolution
- 5 meter USB cable.

### SPECIFICATIONS:

#### Camera

- Size: 1.30" x 1.34" x 1.35" (32mm x 34mm x 34.4mm)
- Weight: 0.17 lbs (80g)
- Sensor: Monochrome CCD, 1/3 inch
- Resolution: 1280 x 960 (1.2MP)
- Frames/second: Bus dependent, 25 max

#### Adapter

- Size: 3.0" length x 1.5" dia. (76.2mm x 38.1mm)
- Weight: 0.40 lb (0.18kg)

#### Computer Requirements

- Windows XP (minimum), 32 or 64 bit
- Processor: 2.6 GHz
- RAM Memory: 4GB
- USB Ports: Minimum USB2.0 (1 required)

#### Cable

- Type: USB2.0, Mini B to A connectors
- Length: 5 meters



**Call for  
Quote!**

**638420 Camera  
Kit**



May Be Used with (shown on pages 4-5):

- WK-51-2200 Alignment Telescope
- WK-51-2400 Alignment Telescope
- WK-51-2000 Alignment Telescope





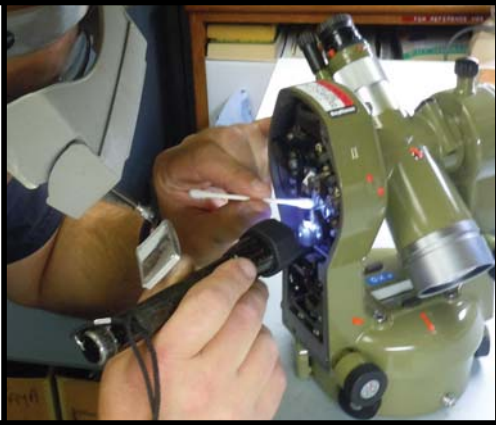
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