Talyrond 595

A revolutionary concept in automated roundness inspection
The Talyrond 595 series
A new concept in roundness measurement

Measure three critical performance elements...

Roundness, Surface finish, and now Contour

...exactly as they were produced

High precision emulation of your manufacturing process
The all-new Talyrond 595 roundness instruments use rotary, vertical and horizontal measuring datums to duplicate your machine tool’s movement and exactly reproduce the workpiece shape. This ultra high precision simulation of the cutting tool path enables precise control of your manufacturing process.

Reproducible measurement results
Decades of experience, ultra precision machining expertise and FEA optimized design combine to provide low noise and near flawless mechanical execution of the measuring axes. Further enhancement via the use of traceable standards and exclusive algorithms effectively eliminates instrument influence from the measurement results.

Monitoring manufacturing

Precision balls  Fuel injectors  Hard disk drives  Aerospace bearings
Multi-disciplined measurement
Understanding the manufacturing process means understanding the measurement process

"We measure it the same way you make it.

**On-axis profile measurement**
Profile measurement with respect to the component axis allows adjustment for taper as well as shape and dimension.

**Made on axis, measured on axis**
Machine tool spindles constrain the work piece or tool movement to rotate about a fixed axis, while the tool path is controlled by slide ways set parallel or square to this axis. This allows the manufacture of profiled parts that are cylindrical or round in nature and have a functional axis. By the same philosophy, the Talyrond 595 range of instruments can measure profiled parts that are cylindrical or round by tracing a stylus along the same rotational axis, allowing reproduction and subsequent adjustment to the machine tool path, thereby controlling the process and improving product quality.
Unparalleled measurement capability

Three measurements in one

Emulating the manufacturing process with a higher degree of precision allows all features to be measured on one instrument.

1 Roughness
High resolution gauge and low axis noise enables linear or circumferential surface roughness measurement.

2 Roundness
Frictionless air bearing spindle and precision column for roundness, cylindricity and straightness measurements.

3 Contour
Our patented calibration technique enables measurement of radius, angle, height, length, distance and more.

Sophisticated data analysis – automatically
Whether in research or production there are many advantages to having a multi-disciplined instrument. The 595 series of instruments have a wide range of measurement and analysis capability, some of which are listed below.

Example measurement and analysis capabilities:

<table>
<thead>
<tr>
<th>Roundness</th>
<th>Contour</th>
<th>Surface Texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roundness</td>
<td>Length</td>
<td>Roughness</td>
</tr>
<tr>
<td>Cylindricity</td>
<td>Radius</td>
<td>Waviness</td>
</tr>
<tr>
<td>Straightness</td>
<td>Distance</td>
<td>Primary profile</td>
</tr>
<tr>
<td>Parallelism</td>
<td>Angle</td>
<td></td>
</tr>
<tr>
<td>Co-axiality</td>
<td>Diameter</td>
<td></td>
</tr>
<tr>
<td>Concentricity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Run-out</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cylinder calibration
Precise column to spindle alignment allow measurement of precision cylinders such as fuel injectors or calibration standards.
Harmonics – identify the cause of bad parts

Ordinary inspection might detect bad components but Talyrond 595 can help you fix the production issues that are causing them. Deviation in form on a workpiece can be broken down into irregularities that have both frequency and amplitude. Harmonic analysis identifies these imperfections allowing you to pinpoint and correct their cause, reducing the need for ever tighter tolerances on size.

Eliminate production line bottlenecks

Assembly of mating parts is complicated when one or both of them are tri-lobed or oval instead of round. These low frequency harmonics are commonly caused by excessive part clamping pressure or unstable machining forces. A simple roundness measurement followed by harmonic analysis quickly identifies the problem and gives you the information necessary to resolve it.

Full CNC operation for automated measurement routines

With automatic calibration, automatic centre and level and automatic measuring runs, Talyrond 595 is your automatic choice for high productivity and error free performance regardless of operator skill. Simplified “Teach/Learn” programming techniques along with comprehensive user prompts and on-screen instructions combine for unparalleled ease of operation.

Detect small problems, prevent big errors

Noise and vibration typify components produced on machines with alignment, balance or chatter problems. As the level of precision in your manufacturing increases so does the difficulty of minimizing these often subtle machine tool effects. Talyrond 595 with frictionless spindle and high precision encoder is ideally suited to isolate and identify high frequency harmonics.

3D cylindrical mapping

For production issues beyond the scope of traditional 2D inspection techniques

With high accuracy and high resolution in all axes, Talyrond 595 allows you to measure in 3 dimensions for more thorough examination of flaws, defects and cutting tool geometry effects that influence performance or lead to component malfunction.

- Twist or lead detection
- Machining defects
- Wear scar analysis
- Leak detection and more
Applications

Inner bearing races
- Harmonic analysis
- Form & radius analysis
- Roundness

Roller bearings
- Roundness
- Tilt and form error to axis of rotation

Fuel injectors
- Angle and distance
- Roundness
- Parallelism
- Surface finish

Cylinders
- Parallelism
- Cylindricity

Turbo chargers
- Surface finish
- Parallelism
- Cylindricity
Barden
A world leader in the design and manufacture of super precision ball bearings, Barden bearings are produced to the highest standards available.

Used in industries with a necessity for critical tolerances, high speeds and reliable performance under demanding operating conditions, Barden bearings are also used in safety-critical and harsh environment applications.

Having the responsibility to ensure 1.5 million bearings each year are to the highest quality, means controlling our components at all stages of manufacturing. We have 15 Taylor Hobson roundness measuring instruments that help us maintain high throughput and the accuracies we require to ensure every one of our bearings is of the highest quality.

Derek Pitcher – Q/A Co-Ordinator – Measurement
The Barden Corporation (UK) Ltd, a member of the Schaeffler Group

Industries and applications:
- Automotive
- Aerospace
- Bearings
- Hydraulics
- Optics
- Dental and medical
- Industrial plants
Reproducing the part
Taylor Hobson’s core competencies are in cylindrical grinding, surface grinding and diamond turning. All of these disciplines coupled with knowledge in drive mechanisms go towards constructing an instrument with low noise and high geometric accuracy, ensuring reproducibility of the component.

Frictionless air bearing spindle
The instrument’s spindle axis, like any spindle based machine tool, is paramount in ensuring integrity of measurement. Utilising Taylor Hobson’s own diamond turning lathe we are able to create a reference datum unsurpassed in accuracy and reliability.

Instrument base
Using finite element analysis software, the cast iron base provides a solid foundation for both the high precision air bearing spindle and vertical straightness datum, ensuring movement and weight do not effect results. A choice of passive or active isolation mounts are available, which have been designed for either inspection laboratories or production environments.

Straightness datums
The vertical column is machined for straightness, waviness and roughness to an exacting standard, using traceable standards and techniques developed by Taylor Hobson. The straightness datums are further enhanced to ensure reproducibility of the part with little or no instrument influence.

“World-beating noise floor”

Important features of a roundness system

1. Parallelism of column to spindle axis
2. Column and arm straightness
3. Low vertical and radial arm noise
4. Squareness of arm to spindle axis
5. Radial run-out of spindle
6. Low spindle noise
7. Minimised coning error of spindle
8. Accurate glass scales in all axes

Designed for metrology without compromise
The construction of the 595 series range is key to measurement integrity
Traceability

Full traceability to international standards

Traceability
All calibration standards can be provided with traceability to international standards using Taylor Hobson’s own UKAS laboratory.

Roundness
Using a precision polished glass hemisphere calibrated to an uncertainty of less than 5 nm Taylor Hobson can guarantee your spindle is within specification and maintain quality of results.

Straightness, squareness and parallelism
To ensure the column and radial straightness unit conform to specification we can provide standards that are either cylindrical or flat. These standards provide certainty of the measurement axes. These artefacts are combined with special software routines to enhance all axes for correct geometrical form.

Arcuate correction (contour option)
Taylor Hobson’s patented calibration routine and calibration ball corrects for the arcuate motion of the stylus allowing dimensional measurement. This routine is critical to measurement of radius and angled parts when normal calibration routines will not suffice.

Gain correction
The TR595 series has a unique automated gain calibration for the instrument’s gauge; the routine is automated and takes a matter of seconds to set. Alternatively a set of calibrated slip blocks traceable to primary standards are also supplied.

Axis calibration
Automated or manual routines can be supplied allowing the user to set coordinates to the part or instrument axes, the optional fully automated routine calibrates the arm, column and spindle.

Industry specific software
Velocity analysis allows bearing manufacturers to evaluate harmonics with respect to amplitude and predict function with respect to speed.
All the accessories you need to begin using Taylor Hobson roundness measuring systems are supplied as standard. However, for more demanding requirements or improved measurement throughput, we have a range of accessories which may be ordered separately.

1. **Environmental cabinet and active AV mounts**
   Recommended for use in production or non controlled environments.

   **Environmental cabinet**
   The environmental cabinet forms part of the instrument structure and protects against airflow, dust and external influence.
   code 112/4276

   **Active anti-vibration mounts**
   The active AV mounts protect the system from external vibration by use of piezo actuated mounts.
   code 112/4277

2. **Talyrond ball calibration standard**
   Required for use with contour or form software, this calibration standard corrects for gain, tip and arcuate motion of the stylus.

   - 7.5 mm Radius Ball Standard
     code 112/4205
   - 12.5 mm Radius Ball Standard
     code 112/4051
   - 22.5 mm Radius Ball Standard
     code 112/4092

3. **Six jaw component chuck**
   A 6 jaw precision scroll chuck.
   Capacity - Inside diameter 20 mm - 95 mm (0.78 in - 3.74 in).
   Capacity - Outside diameter 2 mm - 32 mm (0.08 in - 1.26 in).
   code 112/1859 optional

4. **Standard stylus arms**
   Ruby ball x 100 mm [3.9 in]
   1 mm [0.039 in], code 112/3245
   2 mm [0.078 in], code 112/3244
   4 mm [0.157 in], code 112/3243

5. **Precision collet chuck - removable three ball type location**
   (for use with manual or automated tables)
   Note: Collet required – see list below.
   code 112/3662

   - code 112/3554-1.0 1 mm Collet
   - code 112/3554-1.5 1.5 mm Collet
   - code 112/3554-2.0 2 mm Collet
   - code 112/3554-2.5 2.5 mm Collet
   - code 112/3554-3.0 3.0 mm Collet
   - code 112/3554-3.5 3.5 mm Collet
   - code 112/3554-4.0 4.0 mm Collet
   - code 112/3554-4.5 4.5 mm Collet
   - code 112/3554-5.0 5.0 mm Collet
   - code 112/3554-5.5 5.5 mm Collet
   - code 112/3554-6.0 6.0 mm Collet
   - code 112/3554-6.5 6.5 mm Collet
   - code 112/3554-7.0 7.0 mm Collet
   - code 112/3554-7.5 7.5 mm Collet
   - code 112/3554-8.0 8.0 mm Collet
   - code 112/3555 Adjustable End Stop
   Recommended for use with 112/3549 or 112/3662; may require modification to suit the component under test.

6. **Bar stylus**
   A 100mm [3.9 in] stylus for measuring small diameter components.
   code 112/3489 optional

7. **Diamond stylus**
   Conisphere stylus with 90° included angle; required for cylindrical mapping or surface finish applications.
   code 112/3806 optional 5 µm Rad
   code 112/3807 optional 10 µm Rad

8. **Kinematic dowel support set**
   For stable workpiece mounting.
   code 112/1861 standard

9. **Reservoir assembly kit**
   If the air supply is unreliable or of poor quality then the reservoir assembly is recommended to provide an even flow of air to the spindle.
   code 112/2869 optional
Force setting gauge
Recommended with diamond styli and where specific stylus forces are required.
code 112/3808 optional

6 High precision glass hemisphere
For checking total system performance; UKAS calibration certificate is optional.
Roundness < 0.01 µm (0.4 µ")
code 112/2324 optional

Glass hemisphere
For checking total system performance; UKAS calibration certificate is optional.
Roundness < 0.05 µm (2 µ")
code 112/436 optional

7 High precision test cylinder
For verification of the instrument’s vertical straightness accuracy and parallelism of the vertical axis to the spindle axis. UKAS calibration certificate is optional.
code 112/3670-01 optional

Precision test cylinder
For checking the instrument’s vertical straightness accuracy and parallelism of the vertical axis to the spindle axis. UKAS calibration certificate is optional.
300 mm (11.8") cylinder
Roundness < 0.25 µm (10 µ")
Straightness < 0.5 µm (20 µ")*
code 112/1888 optional

500 mm (19.7") cylinder
Roundness < 0.25 µm (10 µ")
Straightness < 0.5 µm (20 µ")*
code 112/1997 optional

1000 mm (39.4") cylinder
Roundness < 0.75 µm (30 µ")
Straightness < 3 µm (120 µ")*
code 112/2333 optional

* Straightness over central 90% of test cylinder length

9 Flick standard
For rapid calibration of the gauge head; alternative to the standard gauge calibration set.
20 µm (788 µ") range
code 112/2308 Optional
300 µm (0.012") range
code 112/2233 optional

10 Calibration set
For calibrating the gauge head. The set comprises a circular glass flat and four gauge blocks. UKAS calibration certificate is optional.
code 112/2889 standard

Glass flat 250 mm (10") diameter
For checking the straightness and alignment of the horizontal arm with respect to the spindle axis.
code 112/1998 optional

Instrument cover
To protect the instrument when not in use.
code 112/1393 optional

Flick and bulb kit
code 112/2131 optional

Pre-filter element
code 112/3351 optional

Accessory case
A useful case for carrying standard and optional accessories.
code 48/453 optional

Set of hexagonal wrench keys
To assist with minor adjustments on the instrument.
code 630/412 optional

Coalescing filter element
Secondary filter to be changed every 3 months to maintain a clear air supply, (1 included with the instrument).
code 112/3378 optional

Customized solutions for special applications
Our strategy for success is simple, instead of just selling products, we provide solutions. If our standard instruments and accessories do not satisfy your needs, we can customize a solution to exactly match your application. This may include such things as work holding devices or special stylus for applications such as small bores, shoulders or undercuts.

Specifications are subject to change without notice.
# Talyrond 595 Specification

## Analysis capability

<table>
<thead>
<tr>
<th>Standard software</th>
<th>Optional software</th>
<th>Filters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roundness</td>
<td>Parallelism</td>
<td>Piston measurement</td>
</tr>
<tr>
<td>Squaresness</td>
<td>Vertical straightness</td>
<td>Commutator analysis</td>
</tr>
<tr>
<td>Concentricity</td>
<td>Partial arc flatness</td>
<td>Disk thickness</td>
</tr>
<tr>
<td>Coaxiality</td>
<td>Partial arc roundness</td>
<td>Velocity analysis</td>
</tr>
<tr>
<td>Slope</td>
<td>Cylindrical mapping</td>
<td>Wall thickness</td>
</tr>
<tr>
<td>Cylindricity</td>
<td>Departure from True Plane (DFTP)</td>
<td>RTA analysis</td>
</tr>
<tr>
<td>Total run-out</td>
<td>Departure from True Circle (DFTC)</td>
<td>Groove analysis</td>
</tr>
<tr>
<td>Flatness</td>
<td>Radial straightness (RSU)</td>
<td>Harmonics</td>
</tr>
<tr>
<td>Eccentricity</td>
<td>Multiplane flatness (RSU)</td>
<td>TalyMap Contour Software</td>
</tr>
<tr>
<td>Run-out</td>
<td></td>
<td>TalyMap 3D analysis Software</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Circumferential Surface finish analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surface finish analysis</td>
</tr>
</tbody>
</table>

## Measuring capacity

<table>
<thead>
<tr>
<th></th>
<th>300 mm column</th>
<th>500 mm column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum component diameter</td>
<td>Ø 400 mm (15.7&quot;)</td>
<td>500 mm (19.7&quot;)</td>
</tr>
<tr>
<td>Maximum component height</td>
<td>300 mm (11.82&quot;)</td>
<td>500 mm (19.7&quot;)</td>
</tr>
<tr>
<td>Maximum measuring depth</td>
<td>160 mm (6.3&quot;)</td>
<td>160 mm (6.3&quot;)</td>
</tr>
<tr>
<td>Maximum measuring diameter</td>
<td>Ø 350 mm (13.8&quot;)</td>
<td></td>
</tr>
<tr>
<td>Maximum component weight</td>
<td>Auto Center and Level: 40 kg (88lb)</td>
<td></td>
</tr>
<tr>
<td>Maximum worktable moment loading</td>
<td>Auto C&amp;L: 1250 kg/mm (108 lb/in) within a central 80 mm (3.15&quot;) equilateral triangle</td>
<td></td>
</tr>
</tbody>
</table>

## Column axis

<table>
<thead>
<tr>
<th></th>
<th>300 mm column</th>
<th>500 mm column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column construction</td>
<td>Precision machined cast iron datum</td>
<td></td>
</tr>
<tr>
<td>Column length</td>
<td>300 mm (11.8&quot;)</td>
<td>500 mm (19.7&quot;)</td>
</tr>
<tr>
<td>Straightness over column length</td>
<td>0.2 µm / 300 mm</td>
<td>0.2 µm / 500 mm</td>
</tr>
<tr>
<td>Vertical axis to spindle axis parallelism</td>
<td>(8 µin / 11.8&quot;)</td>
<td>(8 µin / 19.7&quot;)</td>
</tr>
<tr>
<td>Straightness over any 100mm (3.94&quot;)</td>
<td>0.12 µm / 100 mm</td>
<td>0.15 µm / 100 mm</td>
</tr>
<tr>
<td>Speed of traverse</td>
<td>- Moving: 0.25 - 20 mm/s (0.01 - 0.8 in/s) stepped</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Measuring: 0.25 - 20 mm/s (0.01 - 0.8 in/s) stepped</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Contacting: 0.5 - 5 mm/s (0.02 - 0.2 in/s) stepped</td>
<td></td>
</tr>
<tr>
<td>Positional control</td>
<td>+/- 5 µm (200µin)</td>
<td>+/- 5 µm (200µin)</td>
</tr>
<tr>
<td>Length measurement</td>
<td>(0.03 µm/mm + 1.5 µm)</td>
<td></td>
</tr>
<tr>
<td>Positional resolution</td>
<td>0.25 µm (0.98 µin)</td>
<td></td>
</tr>
<tr>
<td>Number of data points</td>
<td>200,000 maximum</td>
<td></td>
</tr>
<tr>
<td>Column noise †</td>
<td>&lt;20 nm Rq</td>
<td></td>
</tr>
</tbody>
</table>

## Spindle axis

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Spindle construction</td>
<td>Ultra precision air bearing</td>
<td></td>
</tr>
<tr>
<td>Speed of rotation</td>
<td>0.6, 1, 2, 6, 10 rpm, bi-directional</td>
<td></td>
</tr>
<tr>
<td>Radial limit of error (height above table)</td>
<td>+/- (0.01 µm + 0.0003 µm/mm) +/- (0.4 µin + 0.3 µin/in)</td>
<td></td>
</tr>
<tr>
<td>Axial limit of error (radius from center)</td>
<td>+/- (0.02µm + 0.0003 µm/mm) +/- (0.8 µin + 0.3 µin/in)</td>
<td></td>
</tr>
<tr>
<td>Positional control</td>
<td>+/- 0.2°</td>
<td></td>
</tr>
<tr>
<td>Positional resolution</td>
<td>0.02 °</td>
<td></td>
</tr>
<tr>
<td>Minimum movement</td>
<td>0.1 °</td>
<td></td>
</tr>
<tr>
<td>Number of data points</td>
<td>18,000 maximum</td>
<td></td>
</tr>
</tbody>
</table>
### Horizontal arm axis

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm construction</td>
<td>Lapped ceramic datum</td>
</tr>
<tr>
<td>Movement range</td>
<td>200 mm (7.9 in)</td>
</tr>
<tr>
<td>Straightness over full length of travel</td>
<td>0.25 μm/200 mm (10 μin / 7.9 in)</td>
</tr>
<tr>
<td>Straightness over any length of travel</td>
<td>0.125 μm +0.000625 μm/ mm (5 μin+0.025 μin/in)</td>
</tr>
<tr>
<td>Squareness to spindle axis</td>
<td>1 μm/200 mm (39.4 μin / 7.9 in)</td>
</tr>
<tr>
<td>Speed of traverse</td>
<td>0.25 - 15 mm/s (0.01 - 0.6 in/s) stepped</td>
</tr>
<tr>
<td>- measuring</td>
<td>0.25 - 15 mm/s (0.01 - 0.6 in/s) stepped</td>
</tr>
<tr>
<td>- contacting</td>
<td>0.5 - 5 mm/s (0.02 - 0.2 in/s) stepped</td>
</tr>
<tr>
<td>Over-center travel</td>
<td>25 mm (0.98 in)</td>
</tr>
<tr>
<td>Positional control</td>
<td>+/- 5 μm (200 μin)</td>
</tr>
<tr>
<td>Radial measurement *</td>
<td>(0.1 μm/mm + 1.5 μm)</td>
</tr>
<tr>
<td>Positional resolution</td>
<td>0.25 μm (0.98 μin)</td>
</tr>
<tr>
<td>Minimum movement</td>
<td>0.05 mm (0.002 in)</td>
</tr>
<tr>
<td>Number of data points (selectable)</td>
<td>200,000 (maximum)</td>
</tr>
<tr>
<td>Arm noise †</td>
<td>&lt;20 nm Rq</td>
</tr>
</tbody>
</table>

### Center and leveling axis

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>Patented 3 point kinematic support</td>
</tr>
<tr>
<td>Center and leveling table control</td>
<td>Automatic with continuous spindle rotation</td>
</tr>
<tr>
<td>Follow mode center and leveling</td>
<td>Yes</td>
</tr>
<tr>
<td>Centering range</td>
<td>2.5 mm (0.2 in)</td>
</tr>
<tr>
<td>Leveling range</td>
<td>+/- 0.5°</td>
</tr>
<tr>
<td>Height of neutral plane above worktable</td>
<td>N/A</td>
</tr>
<tr>
<td>Achievable accuracy of auto centering</td>
<td>&lt;0.3 μm (32 μin)</td>
</tr>
<tr>
<td>Achievable accuracy of auto leveling</td>
<td>&lt;0.8 arc secs</td>
</tr>
<tr>
<td>Worktable diameter</td>
<td>300 mm (11.8 in)</td>
</tr>
</tbody>
</table>

### Gauge

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauge type</td>
<td>Talymin 5 single bias inductive transducer</td>
</tr>
<tr>
<td>Normal range / normal resolution</td>
<td>+/- 1 mm range, 0.008 μm resolution</td>
</tr>
<tr>
<td>Mid range / medium resolution</td>
<td>+/- 0.2 mm range, 0.002 μm resolution</td>
</tr>
<tr>
<td>Low range / high resolution</td>
<td>+/- 0.08 mm range, 0.0003 μm resolution</td>
</tr>
<tr>
<td>Stylus tip force</td>
<td>0 to 15 g adjustable (roundness mode)</td>
</tr>
<tr>
<td>Crutch angle</td>
<td>Adjustible</td>
</tr>
<tr>
<td>Cresting (TRS95)</td>
<td>Dual cresting facility (horizontal and vertical)</td>
</tr>
</tbody>
</table>

### Air supply

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pressure</td>
<td>550 to 1030 kPa (5.5 to 8 bar)</td>
</tr>
<tr>
<td>Regulator (pre-set)</td>
<td>350 kPa (3.5 bar)</td>
</tr>
<tr>
<td>Max. particle size</td>
<td>5 micron (0.0002 in)</td>
</tr>
<tr>
<td>Moisture content – dew point</td>
<td>-20 °C (-4 °F)</td>
</tr>
<tr>
<td>Flow rate at operating pressure</td>
<td>150 litres/minute (minimum) 5.3 ft³/minute</td>
</tr>
<tr>
<td>Max oil content</td>
<td>25 mg/m³ (0.01 grains/ft³)</td>
</tr>
<tr>
<td>Solid Particle Content</td>
<td>5 mg/m³ (0.002 grains/ft³)</td>
</tr>
</tbody>
</table>

### Electrical (alternating supply, single phase with earth, 3-wire)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument &amp; computer voltage</td>
<td>90V-130V or 200V-260V (switch selectable)</td>
</tr>
<tr>
<td>Frequency</td>
<td>47Hz to 63Hz</td>
</tr>
<tr>
<td>Supply voltage transients – amplitude</td>
<td>Maximum five times RMS operating voltage</td>
</tr>
<tr>
<td>Supply voltage transients – width</td>
<td>Not less than 2μs and not greater than 20μs</td>
</tr>
<tr>
<td>Power consumption</td>
<td>500VA maximum</td>
</tr>
<tr>
<td>Safety</td>
<td>EN 61010-1:2001</td>
</tr>
<tr>
<td>EMC</td>
<td>EN 61000-6-1:2001, EN 61000-6-4:2001</td>
</tr>
</tbody>
</table>

### Environment

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>10 °C to 35 °C (50 °F to 95 °F)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-10 °C to 50 °C (14 °F to 122 °F)</td>
</tr>
<tr>
<td>Temperature gradient</td>
<td>&lt; 2 °C / hour (&lt; 3.6 °F / hour)</td>
</tr>
<tr>
<td>Operating humidity</td>
<td>30% to 80% relative humidity non condensing</td>
</tr>
<tr>
<td>Storage humidity</td>
<td>10% to 90% relative humidity non condensing</td>
</tr>
<tr>
<td>Maximum RMS vertical</td>
<td>0.05 mm/s (0.0002 in/s) at &lt; 50 Hz</td>
</tr>
<tr>
<td>Isolation from Floor vibration</td>
<td>Dynamic anti-vibration mounts giving low frequency isolation beginning at 2Hz.</td>
</tr>
</tbody>
</table>

### Notes

- All accuracies are quoted at 20° C ± 1° C (68° F ± 1.8° F).
- All roundness and flatness results are quoted as the departure from the Least Squares Circle (LSC) at 1 - 15 UPR, Gaussian filter; 6 RPM, clockwise rotation (unless otherwise specified).
- All errors are quoted as maximum permissible errors (MPE).
- All straightness / parallelism results are quoted with an 8 mm cut-off, low pass filter, 5mm/s measuring speed, Minimum Zone (MZ2) reference.
- All measurements are taken using a standard 100 mm-length stylus with a 2 mm-diameter ball tip.
- All measurements based on a nominally leveled glass flat using the specified stylus; analyzed using a Gaussian filter; 0.8mm cut off, 300:1 bandwidth and parameter Rq.
Talyrond 595 floor plan

Talyrond 595 with desk

Talyrond 595 with cabinet

Talyrond 595 with desk

Optional cabinet
<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Measurement mode</th>
<th>Evaluation diagram</th>
<th>Talyround 595</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roundness</td>
<td></td>
<td><img src="image1" alt="Roundness Diagram" /></td>
<td>✓</td>
</tr>
<tr>
<td>Parallelism</td>
<td></td>
<td><img src="image2" alt="Parallelism Diagram" /></td>
<td>✓</td>
</tr>
<tr>
<td>Cylindricity</td>
<td></td>
<td><img src="image3" alt="Cylindricity Diagram" /></td>
<td>✓</td>
</tr>
<tr>
<td>Straightness</td>
<td></td>
<td><img src="image4" alt="Straightness Diagram" /></td>
<td>✓</td>
</tr>
<tr>
<td>Flattness</td>
<td></td>
<td><img src="image5" alt="Flattness Diagram" /></td>
<td>✓</td>
</tr>
<tr>
<td>Coaxality</td>
<td></td>
<td><img src="image6" alt="Coaxality Diagram" /></td>
<td>✓</td>
</tr>
<tr>
<td>Concentricity</td>
<td></td>
<td><img src="image7" alt="Concentricity Diagram" /></td>
<td>✓</td>
</tr>
<tr>
<td>Eccentricity</td>
<td></td>
<td><img src="image8" alt="Eccentricity Diagram" /></td>
<td>✓</td>
</tr>
</tbody>
</table>

✓ = Included – ● = Optional – × = Not available
(Customer specific analysis available on request)
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