



ROYCE
INSTRUMENTS

The gold
standard in
bond test
instruments

600 Series

Bond Test Instruments

Versatility • Precision • Performance

Royce 650

Royce 620



Royce 600 Series Bond Test Instruments

The Royce 600 Series offers proven technical performance, a unique centralized database that enables test data to be shared over your network, and the ability to grow with you as your needs evolve.

The Royce 600 Series of bond test instruments includes the Royce 650 Universal Bond Tester, the Royce 620 Multitest Bond Tester, and the Royce 610 Dedicated Wire Pull Bond Tester. With this comprehensive series, Royce Instruments can meet the full range of your bond test needs. In addition, the Royce 600 Series is scalable, which means it will continue to meet your testing needs as they evolve in the future.

The Royce 600 Series offers a number of substantial benefits that make these instruments the premier choice for bond testing.

- **Proven performance** – The Royce 600 Series is based on Royce's field-proven technology and user-focused design that have been refined and advanced over three decades for extremely high reliability and performance.
- **Outstanding accuracy and durability** – Even at high force levels there is virtually no deflection in the tool, due to the extreme rigidity of our robust frame design.
- **Unparalleled data management capabilities** – Because the Royce 600 Series instruments are linked to a centralized database, test data can be shared across your network and can be centrally managed. You can even access test data without leaving your desk or entering the cleanroom by using the desktop version of our Bond Test Manager software.

- **Configuration flexibility** – The Royce 600 Series instruments use interchangeable tooling, for cost savings and greater flexibility.
- **Scalability** – The networked system of Royce 600 Series instruments can easily be expanded to meet your growing needs.
- **Responsive local support** – Worldwide support is provided through our authorized, highly trained local distributors, who are able to respond quickly to your needs.

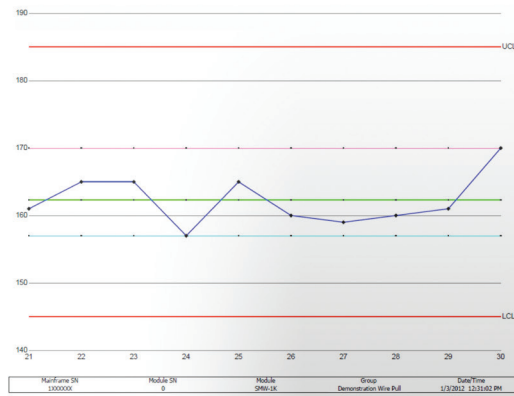
The Royce 600 Series incorporates a number of powerful features and capabilities that can improve your overall bond test performance and data management:

Intuitive Bond Test Manager Software

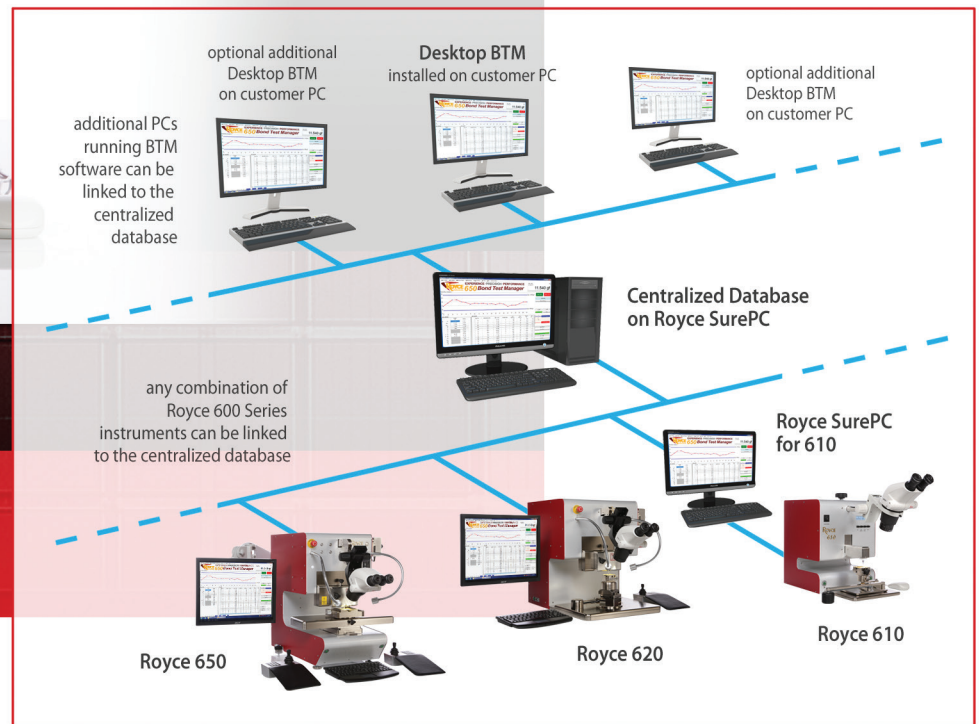
Royce's intuitive Bond Test Manager (BTM) software is uniform across the Royce 600 Series. This reduces training time from instrument to instrument, as well as giving users of all 600 Series bond testers access to Royce's latest software features. The Bond Test Manager software includes:

Easy language switching. The language preference can be changed with one mouse click. Language support includes Chinese, Japanese, Korean, German, French, Spanish, and English.

Royce 610



Multiple Royce 600 Series instruments can be linked through a single centralized database and all test data can be managed over your network using our intuitive Bond Test Manager software.



Multiple Quick Report formats. Reports can be saved to an XLS file or as a PDF and can include any customer logo.

Rich data reporting. Reports can be generated in CSV, XLS or PDF format, with optional automatic data export and file naming. The built-in SQL database can be queried using the Royce Data Query and Export tool. Data can also be exported to a network location, any standard office printer or a USB drive.

Integrated SPC data. SPC data is displayed and can be saved for each test group, including the sample mean, standard deviation, Cpk, Cpl, and Cpu, as well as customizable force trend, Weibull probability and histogram charts.

Loop height measurement. Loop height measurement can be performed during wire pull tests.

Force profile data. The force profile is quickly captured and displayed, giving the operator an instant review of a test.

Configurable access permission. Separate access permission levels can be defined for each type of user—from full access to the details of machine operation and setup for process engineers to very limited access for production operators. The permission level is automatically applied when the user logs in.

Preinstalled software. To facilitate system setup, BTM software is preinstalled on the internal PC included in the Royce 650 and 620. The Royce 610 can also take advantage of the rich BTM capabilities by using the Royce SurePC option.

Bond Test Manager on the Desktop

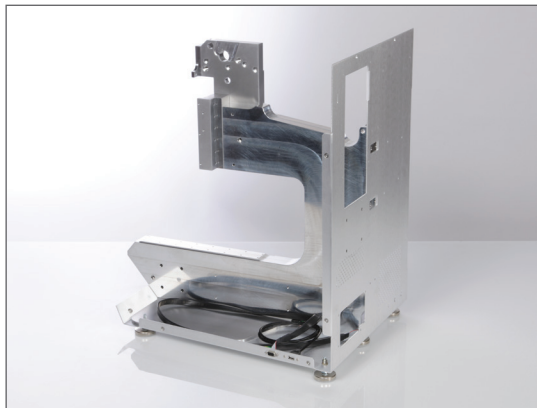
A desktop version of our Bond Test Manager (BTM) software program can be installed on any PC running Windows® 10. This program has the same user interface as the standard Bond Test Manager software, but it does not require a bond tester to run. This allows you to remotely access and download data from any of your Royce 600 Series bond testers without leaving your desk or entering the cleanroom.

Single Centralized Database

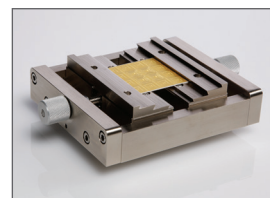
Multiple Royce 600 Series bond testers can all be linked through a single centralized database. This allows users to share test settings and data easily between instruments. In addition, it provides one single source for all bond test data, simplifying corporate networking and data backup.

Royce 650

Universal Bond Tester



The Royce 600 Series instruments incorporate an extremely rigid frame for great stability and accuracy.



Test modules are interchangeable between the Royce 650 and Royce 620 and are easy to change. A wide variety of test piece holders is available to accommodate any type of part, and they are interchangeable among all 600 Series instruments.

Royce 650 Universal Bond Tester

Based on field-proven technology, the Royce 650 Universal Bond Tester offers the most robust selection of capabilities in the Royce bond tester family, from the full range of standard test applications through custom testing. This high-end instrument is versatile and powerful enough to meet your complete bond testing needs. The Royce 650 features:

Wide range of applications. Applications performed by the Royce 650 include: wire pull, ball bond shear, die shear, solder ball (bump) shear, zone shear, tweezer pull, stud pull, die strength 3-point bend (push) test, heated testing, and custom testing to user specifications.

One-button microscope height adjustment.

Simply pressing a switch on the front panel adjusts the microscope to a comfortable height. The motor-driven microscope smoothly follows an arc path which keeps it in focus effortlessly.

Large stage travel. With an X-axis travel over 300 mm and a Y-axis travel over 150 mm of the servo driven XY stage, the Royce 650 easily accommodates up to 300-mm wafers and substrates, lead frames and large electronic modules.

Sophisticated digital image capture options. High magnification and wide-zoom-range image capture options are available for factory or field installation. These options are very useful for operator training and for communicating with customers and contractors. Both options include a high resolution USB camera. With Bond Test Manager, the user can measure displayed features of the bond site and save, print, or email the captured images.

Features Common to the Royce 650 and 620

In addition, the Royce 650 includes a number of important features that are also standard on the Royce 620:

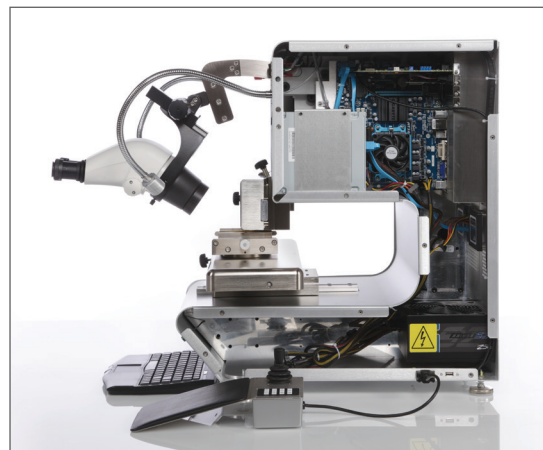
Interchangeable test modules and tooling. Most test modules and tooling are quickly interchangeable between the Royce 650 and Royce 620. All test modules have four software-selectable subranges down to 1/10 of full scale, to maximize the versatility of the instrument.

Robust test module design. Royce's robust design minimizes down time and the need for module repairs, while improving the user experience.

Ergonomic design. The Royce 650 and 620 have been designed to support operator comfort over long shifts.

Royce 620

Multitest Bond Tester



The Royce 650 and the Royce 620 incorporate an internal PC, creating a smaller system footprint.



The Royce 620 uses a range of manipulators, both current and from legacy systems, that permit rapid and precise positioning of the test piece.

Space-saving, easy-to-access integrated PC. Both the Royce 650 and Royce 620 integrate a high-performance standard Windows® 10 PC into one compact, easy-to-use package. The internal PC allows a small desktop footprint, saving valuable cleanroom space and eliminating desktop clutter. Ease of service is provided by removable side panels.

Flexible monitor mount arm. This feature allows the monitor to be positioned to the left, to the right, or above the bond tester in any position without taking up valuable desktop space.

Ultrafine Pitch. The high-accuracy shear height and sub-micron resolution of the XY stage deliver solid positioning repeatability for ultrafine pitch testing. Optional microscope magnifications up to 128x permit easy test site inspection.

Easy-to-use integrated calibration wizard. Used with the appropriate calibration equipment, the wizard allows you to calibrate the instrument on site, maximizing uptime. After completion, a calibration report is generated, and all calibration activity is logged in the internal PC for future reference.

Rigid chassis. The exceptionally robust chassis on the Royce 650 and Royce 620 permits smooth die-shear and stud-pull testing.

Royce 620 Multitest Bond Tester

The Royce 620 Multitest Bond Tester offers an attractive bond test solution that is midway between the Royce 650 and the Royce 610. It performs all the most frequently used applications, and it employs manual sample positioning, which in some applications allows for higher productivity over a motorized XY stage.

In addition to the features that are common to the Royce 650 and 620, the Royce 620 also offers:

Responsive joystick and manipulator. The operator controls the Royce 620 using a joystick and manipulator. The joystick allows the operator to control the Z height positioning of the module (and tool rotation for wire pull testing), while the manual manipulator allows the operator to control the XY and theta movements of the part.

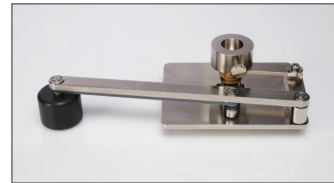
Compatibility with legacy systems. The Royce 620 is fully compatible with the Royce 550 and Royce 552 manipulators, test piece holders, and tools.

Royce 610

Dedicated Wire Pull Bond Tester



The Royce 610 has an optional strip printer unit that allows you to print out a hard copy of test data. The 610 can also be linked to the centralized database by using the Royce SurePC option.



To position the part for testing, a number of manipulators are available for the Royce 610.

Royce 610 Dedicated Wire Pull Bond Tester

The Royce 610 Dedicated Wire Pull Bond Tester is designed for maximum throughput at an affordable cost, in a reliable system. It features:

- Data output to any PC using RS232
- Ergonomic design to support operator comfort over long shifts
- Simple calibration interface to allow user to quickly and easily check and recalibrate the instrument with on-screen instructions (NIST traceable calibration weights available)
- Optional strip printer
- Optional keypad for enhanced failure code input
- Optional external Royce PC with Bond Test Manager software for data storage and networking

Royce 600 Series Dimensions and Facility Requirements

	650	620	610
Dimensions			
Height	635 mm (25 in)	560 mm (22 in)	460 mm (18 in)
Width	432 mm (17 in)	432 mm (17 in)	320 mm (12.5 in)
Depth	585 mm (23 in)	585 mm (23 in)	560 mm (22 in)
Weight	55 kg (120 lbs)	50 kg (110.5 lbs)	27 kg (59.5 lbs)
Power Supply	90 – 264 VAC 47 – 63 Hz	90 – 264VAC 47 – 63 Hz	90 – 264 VAC 47 – 63 Hz
Pneumatic Supply	420 – 550 kPa (60 – 80 psi)	420 – 550 kPa (60 – 80 psi)	N/A
Vacuum Supply	500 mm Hg 67.7 kPa, (20 in Hg)	500 mm Hg 67.7 kPa, (20 in Hg)	N/A

Royce 600 Series Product Comparison

	650	620	610
Maximum Wire Pull Test Force	10 kgf	10 kgf	100 gf
Maximum Shear Test Force	200 kgf	5 kgf	N/A
Maximum Tweezer Test Force	10 kgf	10 kgf	N/A
Maximum Push Test Force (3 point die strength test)	10 kgf	10 kgf	N/A
Maximum Stud Pull Test Force	200 kgf	5 kgf	N/A
Total System Accuracy	±0.1%	±0.1%	±0.25%
Z Resolution	±0.1 μm	±0.1 μm	±2.5 μm
X,Y Resolution	<1 μm	N/A	N/A
Step Back Accuracy	± 1 μm over 2 mil travel	± 1 μm over 2 mil travel	N/A
Computer*	Internal Windows® 10 PC with Bond Test Manager	Internal Windows® 10 PC with Bond Test Manager	Optional external Windows® 10 PC with Bond Test Manager
Part Manipulation	Joystick-controlled motorized XY table (305 mm x 155 mm)	Manual manipulators (MPS-2 and MPS-3)	Manual manipulators (MPS-12 and MPS-14)
Module Height and Tool Theta Control	Joystick with Z and theta control	Joystick with Z and theta control	3-button mouse with Z and theta control
Microscope	Olympus SZ61-60	Olympus SZ61-60	Olympus SZ61-60
Centralized Database Compatibility	YES	YES	YES with optional PC
Ethernet Port for Network Capability	YES	YES	YES with optional PC
International Standard Compliance	MIL-STD-883 MIL-STD-750 ASTM F1269 JESD22-B117 JESD22-B116 CE	MIL-STD-883 MIL-STD-750 ASTM F1269 JESD22-B117 JESD22-B116 CE	MIL-STD-883 CE

* All PCs include a 250 GB solid state hard drive with 1,000,000 hours MTBF, Windows® 10, 17-inch color monitor, USB, network ports, Bond Test Manager, Excel® compatible IBM Lotus Symphony office suite, Adobe® Acrobat® Reader, and PDF creation software. All specifications subject to change from what is shown in the table and photos. Please contact sales for latest updates.

Royce Instruments



Royce Instruments was acquired by V-TEK in 2013. V-TEK Inc. through its V-TEK and Royce Instruments product line is a leading manufacturer of precision, packaging, inspection and bond test equipment for the electronics, automotive, aerospace, medical and defense industries.

We take pride in our support of our customers' requirements. We have worldwide sales and technical presence in over 30 countries, providing the level of service and support our customers have come to expect.

As our customers' technology and product offerings evolve, we continue to expand and develop equipment to meet their needs.

With our leadership and knowledge of ever expanding markets, our mission is to supply high-precision mechanical test and assembly product solutions that exceed our customers' performance, quality, and service expectations.

We invite you to give us the opportunity to show you why we are the supplier of choice.

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ROYCE
INSTRUMENTS



V-TEK INC

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Versatility.

Since 1983, Royce Instruments has been providing reliable, accurate equipment to the microelectronics industry. Royce has over 2000 systems installed worldwide. We offer two product lines: the 600 Series of bond test instruments and a line of semiautomatic and automatic die sort systems. For three decades, we have continued to evolve our products to meet and exceed our customers' needs. Our broad range of solutions allows our customers to grow, knowing that we will be able to meet their ongoing needs.

Precision.

Our instruments provide outstanding accuracy to meet the full range of bond test and die sorting requirements. Royce engineers have a deep understanding of the real-world needs and technical challenges our customers face. Because bond testing and die sorting are our sole focus, we are able to dedicate ourselves to developing and supplying advanced, high-precision solutions for these areas.

Performance.

Royce is equally well known for providing robust, accurate equipment and for providing a high level of customer support that starts with initial installation and continues for the life of the instrument. Royce equipment that was installed over 15 years ago is still performing well in production today at some customer facilities. Responsive local service and support is provided worldwide by our network of authorized and highly trained distributors.

Made in the USA.

All systems are manufactured at our Corporate Headquarters in Mankato, Minnesota. Our Napa, California facility houses a customer center that is available for system demonstrations and training.