

# FIRE COUPLING AND NOZZLE HYDROSTATIC TESTER



# Fire Coupling and Nozzle Hydrostatic Tester - ToronFT™ FC-FN

ToronFT™ FC-FN Fire Coupling and Nozzle Hydrostatic Tester is a computer-controlled hydrostatic test machine that performs water pressure seal and water pressure strength tests on fire couplings, fire nozzles, indoor and outdoor fire hydrants, sprinkler heads, and fire hose assemblies. The system pressurizes up to five specimens simultaneously through a high-pressure pump capable of reaching 12 MPa, with a working test range of 0 to 10 MPa and a controllable pressure rise rate of 5 to 10 MPa/min. A multi-channel pressure stabilization system holds each test pressure steady while the computer records, displays, and archives the results.

The machine accommodates fire couplings in nominal diameters DN25 through DN100, fire nozzles for low-pressure, medium-pressure, and high-pressure service (bore sizes 40, 50, and 65 mm, plus M39×2 threaded inlets), indoor hydrants with KN-type internal-snap couplings (DN25, DN50, DN65), outdoor hydrants (DN100, DN150), sprinkler heads with R2 thread connections (1/2" and 3/4"), and fire hose assemblies with inner diameters of 19, 25, 32, and 38 mm. DN50 and DN65 adapters are included as standard; additional bore-size adapters are available separately.

The test chamber is finished with electrostatic baked paint and features quick-mount specimen fixtures for fast loading and unloading. A pressure accumulator rated to 10 MPa smooths pressure pulsations, and a pressure transmitter with 485 communication and  $\pm 0.01$  MPa accuracy feeds real-time data to the PLC and computer. The system operates on three-phase 380 V AC at 4.5 kW, with overall dimensions of 2,600 × 1,030 × 1,750 mm and a weight of approximately 650 kg.

## APPLICATIONS

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## Fire Coupling and Nozzle Hydrostatic Tester - ToronFT™ FC-FN Applications

The ToronFT™ FC-FN covers water pressure seal and hydrostatic strength testing for a broad range of fire protection components.

- Fire Coupling Seal and Strength Testing: pressurizes fire hose couplings (DN50 to DN100) to their rated pressure (up to 2.5 MPa nominal) to verify seal integrity and confirms that the coupling withstands the hydrostatic proof pressure without leakage or deformation.
- Fire Nozzle Seal and Pressure Resistance: tests low-pressure, medium-pressure, and high-pressure fire nozzles (up to 4.0 MPa working pressure) for seal tightness under static pressure and structural integrity under proof pressure
- Indoor Fire Hydrant Hydrostatic Testing: performs water pressure strength and seal tests on indoor fire hydrant valves with KN-type internal-snap couplings (DN25, DN50, DN65)
- Outdoor Fire Hydrant Hydrostatic Testing: tests DN100 and DN150 outdoor fire hydrant bodies and outlet valves for seal performance and hydrostatic strength
- Sprinkler Head Seal and Strength Testing: verifies the water pressure seal and hydrostatic strength of glass-bulb and fusible-link sprinkler heads with 1/2" and 3/4" R2 thread connections
- Fire Hose Assembly Hydrostatic Testing: pressurizes fire hose assemblies (19 to 38 mm bore) to their rated proof pressure to check for seal leakage and burst resistance
- Third-Party Certification Laboratories: provides a single-machine solution for fire equipment certification programs that require hydrostatic seal and strength data across multiple product categories.
- Manufacturing Quality Control: allows fire equipment manufacturers to perform incoming inspection, in-process checks, and final acceptance testing of couplings, nozzles, hydrants, sprinklers, and hose assemblies on one platform.



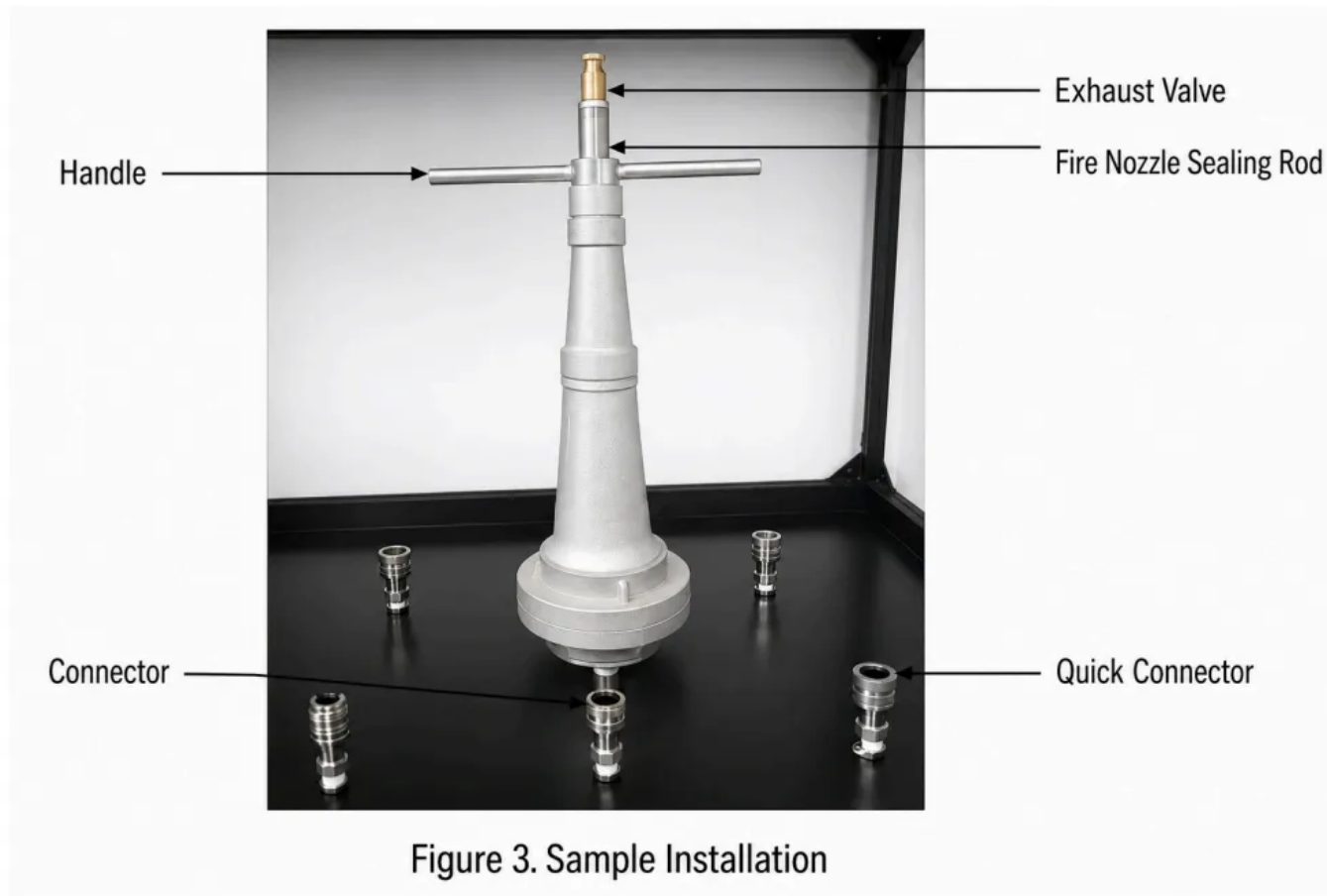
## FEATURES

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# Fire Coupling and Nozzle Hydrostatic Tester - ToronFT™ FC-FN Key Features

The ToronFT™ FC-FN combines high-pressure capability with multi-product versatility in a single hydrostatic test platform.

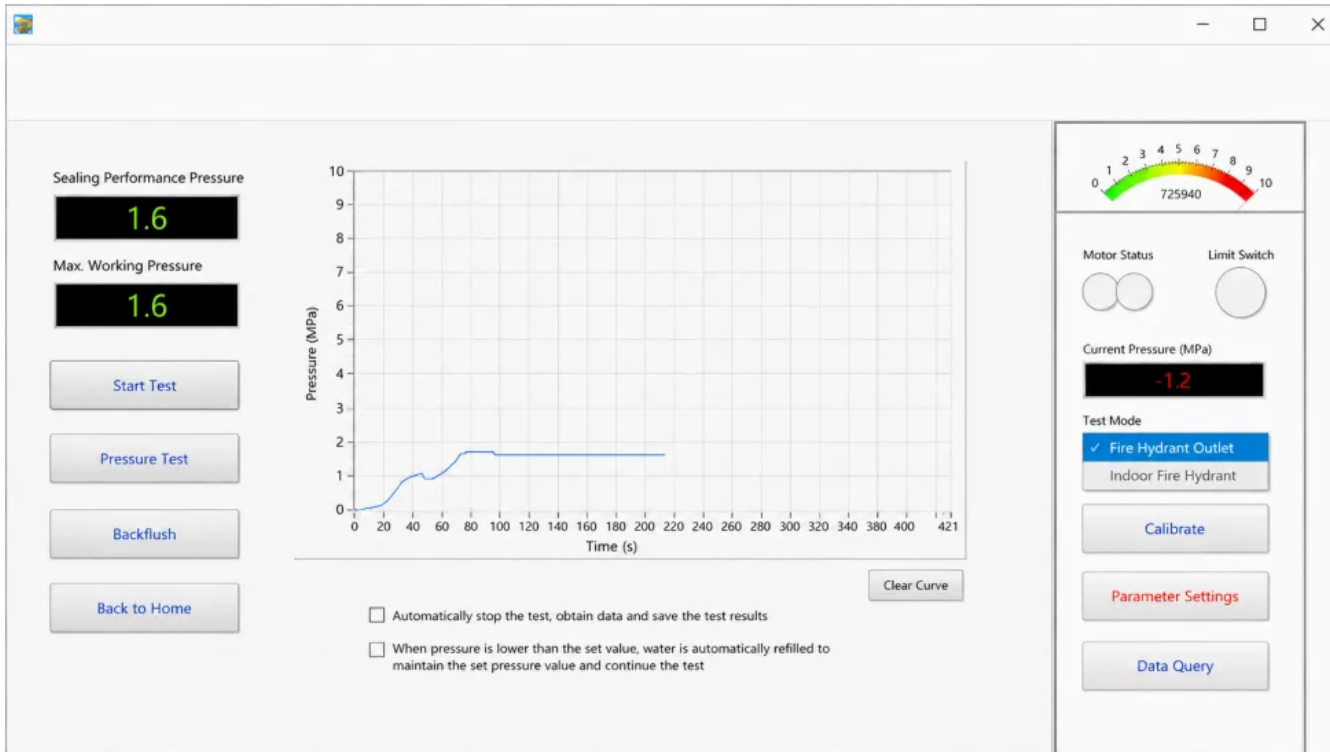
- Wide Pressure Range (0 to 10 MPa): covers seal and strength tests for low-pressure fire couplings (2.5 MPa), high-pressure fire nozzles (4.0 MPa), and proof-pressure tests at multiples of the working pressure, all from one machine.
- Five-Specimen Capacity: tests up to five specimens per run, increasing throughput for batch production and reducing the number of pressurization cycles needed per shift.
- Programmable Pressure Rise Rate: adjustable from 5 to 10 MPa/min under variable-frequency drive control, meeting the ramp-rate requirements of different test standards and preventing dynamic pressure overshoot.
- High-Pressure Plunger Pump (12 MPa, 16 L/min): an AR-brand plunger pump delivers precise, pulse-dampened pressure through a 10 MPa rated accumulator for stable, consistent test conditions.
- High-Accuracy Pressure Measurement: a 20 MPa pressure transmitter with 485 digital communication and  $\pm 0.01$  MPa accuracy provides real-time feedback to the PLC and computer at six readings per second.
- Computer-Automated Test Control: the operator sets the target pressure, hold time, and rise rate; the system executes the test automatically, generates the real-time pressure curve, and archives the data with formatted report output.
- Multi-Product Adapter System: interchangeable adapters for DN25 through DN150 couplings, 40 to 65 mm nozzle bores, M39×2 threaded inlets, 1/2" and 3/4" sprinkler threads, and 19 to 38 mm hose bores allow a single machine to cover the full range of fire protection components.



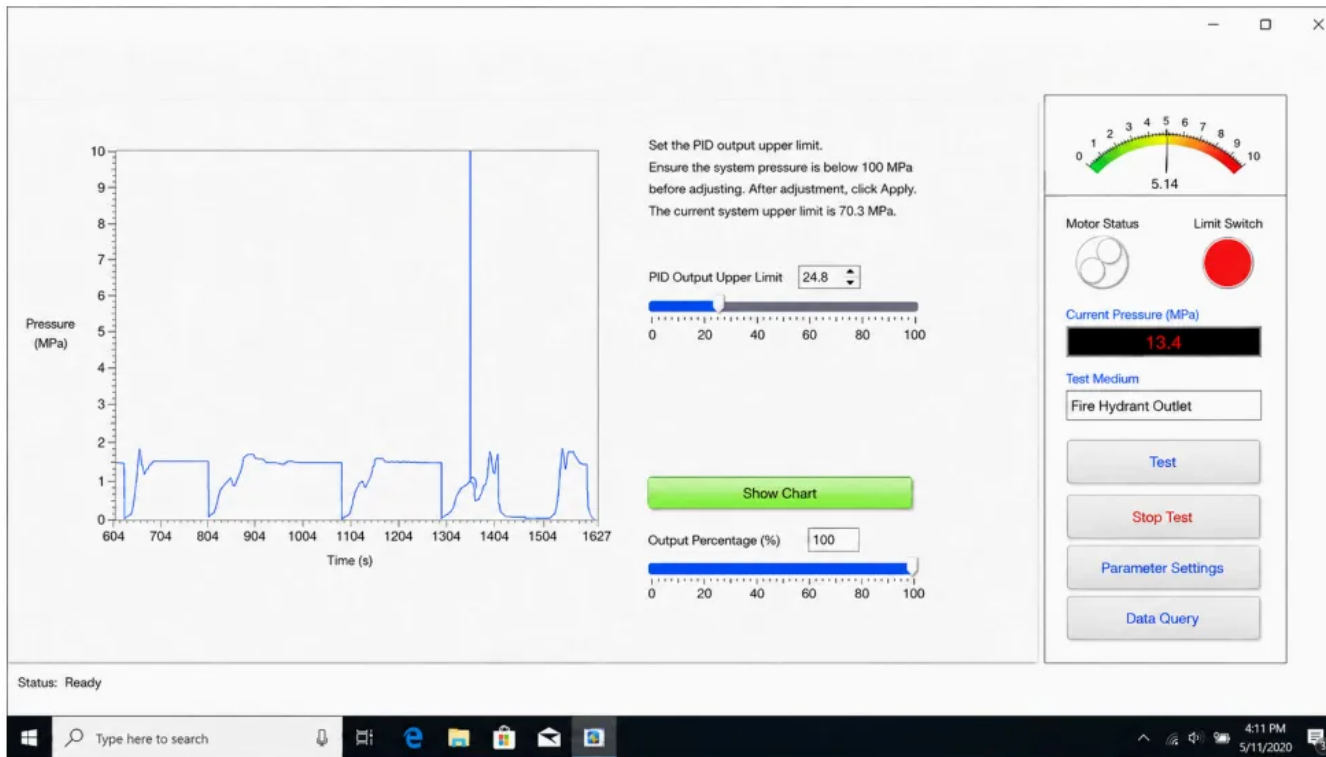
- Quick-Mount Specimen Fixtures: tool-free or minimal-tool specimen installation and removal reduces changeover time between test batches.
- Pressure Stabilization System: a 10 MPa rated accumulator smooths pump pulsations and compensates for minor seal leakage, maintaining steady pressure throughout the hold period.
- Real-Time Pressure Curve Display: the computer plots pressure versus time during every test, giving the operator immediate visual confirmation of ramp rate, hold stability, and any pressure decay.



- Calibration Interface: a built-in calibration screen allows the operator to verify and adjust sensor readings against a reference standard, supporting ISO 17025 traceability requirements.
- Recirculating Water System: the closed-loop water circuit reduces water consumption and keeps the test area clean.







## THEORY & METHOD

### Theory and Method

Hydrostatic testing pressurizes a sealed specimen with water to a specified level and holds that pressure for a defined duration to verify two performance characteristics: seal integrity and structural strength. Water is the preferred medium because it is nearly incompressible; if a specimen fails, the stored energy is minimal compared to a pneumatic test, reducing the risk of a violent rupture. The test operator fills the specimen and connecting piping with water, purges all trapped air, and then raises the pressure at a controlled rate.

The seal test (also called the water pressure seal test) holds the specimen at its rated working pressure and checks for visible leakage through gaskets, O-rings, valve seats, or coupling interfaces. Any drip, weep, or moisture film on the external surface constitutes a failure. The strength test (also called the hydrostatic proof or burst-resistance test) raises the pressure to a multiple of the rated working pressure, typically 1.5× or 2×, and holds it for a set period (commonly 1 to 5 minutes). The specimen must show no permanent deformation, no cracking, and no leakage at the proof pressure.

The ToronFT™ FC-FN uses a variable-frequency-driven high-pressure plunger pump to ramp pressure at a programmable rate of 5 to 10 MPa/min, which is slow enough to avoid dynamic overshoot yet fast enough to maintain efficient test throughput. A pressure accumulator dampens pulsations from the pump, and a pressure transmitter sampling at six readings per second feeds the real-time pressure curve to the computer. The computer compares the measured pressure against the setpoint, records the hold duration, and flags any pressure decay that would indicate leakage.

TECHNICAL SPECIFICATIONS

Fire Coupling and Nozzle Hydrostatic Tester - ToronFT™ FC-FN Technical Specifications

| Parameter                     | Specification                       |
|-------------------------------|-------------------------------------|
| Pressure Control Range        | 0 to 10 MPa                         |
| Pressure Rise Rate            | 5 to 10 MPa/min (adjustable)        |
| High-Pressure Pump            | Plunger type, 0 to 12 MPa, 16 L/min |
| Pump Motor Power              | 4 kW                                |
| Number of Test Stations       | 5                                   |
| Pressure Measurement Accuracy | ±0.01 MPa                           |

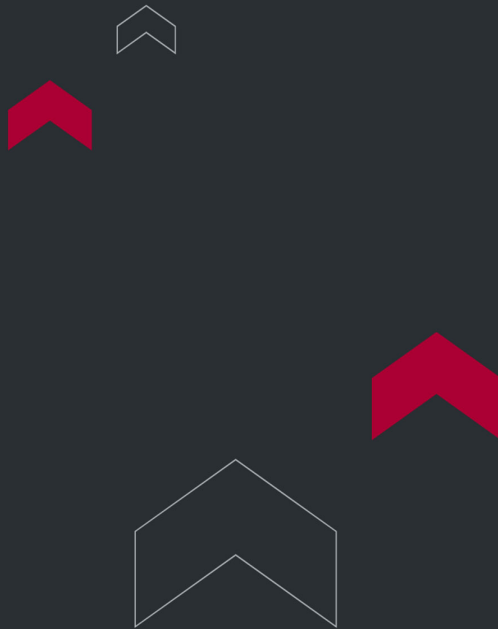
| Parameter                      | Specification                                               |
|--------------------------------|-------------------------------------------------------------|
| Pressure Transmitter           | 20 MPa, 485 communication, digital display                  |
| Pressure Sampling Rate         | 6 readings/s                                                |
| Pressure Accumulator Rating    | 10 MPa                                                      |
| Pressure Piping Rating         | 15 MPa                                                      |
| Variable-Frequency Drive       | 5.5 kW, 380 V, 0 to 50 Hz                                   |
| Controller                     | PLC (Delta DVP-14SS211R) + computer with dedicated software |
| Display                        | 19-inch monitor                                             |
| Test Chamber Finish            | Electrostatic baked paint                                   |
| Test Medium                    | Water (recirculating)                                       |
| Overall Dimensions (L × W × H) | 2,600 × 1,030 × 1,750 mm                                    |
| Weight                         | Approx. 650 kg                                              |
| Voltage                        | AC 380 V, three-phase                                       |
| Total Power Consumption        | 4.5 kW                                                      |

## Supported Product Types and Bore Sizes

| Product                             | Nominal Bore / Thread   | Max. Test Pressure |
|-------------------------------------|-------------------------|--------------------|
| Fire Couplings                      | DN50, DN65, DN80, DN100 | 2.5 MPa            |
| Fire Nozzles (Low Pressure)         | 40, 50, 65 mm           | 4.0 MPa            |
| Fire Nozzles (Medium/High Pressure) | 40 mm or M39×2          | 4.0 MPa            |

| Product                        | Nominal Bore / Thread   | Max. Test Pressure |
|--------------------------------|-------------------------|--------------------|
| Indoor Fire Hydrants (KN-type) | DN25, DN50, DN65        | Per standard       |
| Outdoor Fire Hydrants          | DN100, DN150            | Per standard       |
| Sprinkler Heads                | R2 thread: 1/2", 3/4"   | Per standard       |
| Fire Hose Assemblies           | Ø19, 25, 32, 38 mm bore | Per standard       |

Note: DN50 and DN65 adapters are included as standard. Additional bore-size adapters (DN25, DN80, DN100, DN150, 3/8", 1" sprinkler threads) are available separately. Contact Qualitest for a complete adapter configuration.



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