

# PRESSURE REDUCING CHARACTERISTICS TESTING MACHINE



# Pressure Reducing Characteristics Testing Machine — ToronFT™ PRC

ToronFT™ PRC Pressure Reducing Characteristics Testing Machine is a precision hydraulic testing instrument designed for the pressure reducing characteristics evaluation of pressure reducing devices (pressure regulators) used in gas fire extinguishing systems. By slowly increasing inlet pressure while monitoring and recording the actuation pressure of the pressure reducing device, the ToronFT™ PRC enables manufacturers and testing laboratories to verify that pressure regulators operate within the precise setpoint tolerances required by international gas fire suppression standards.

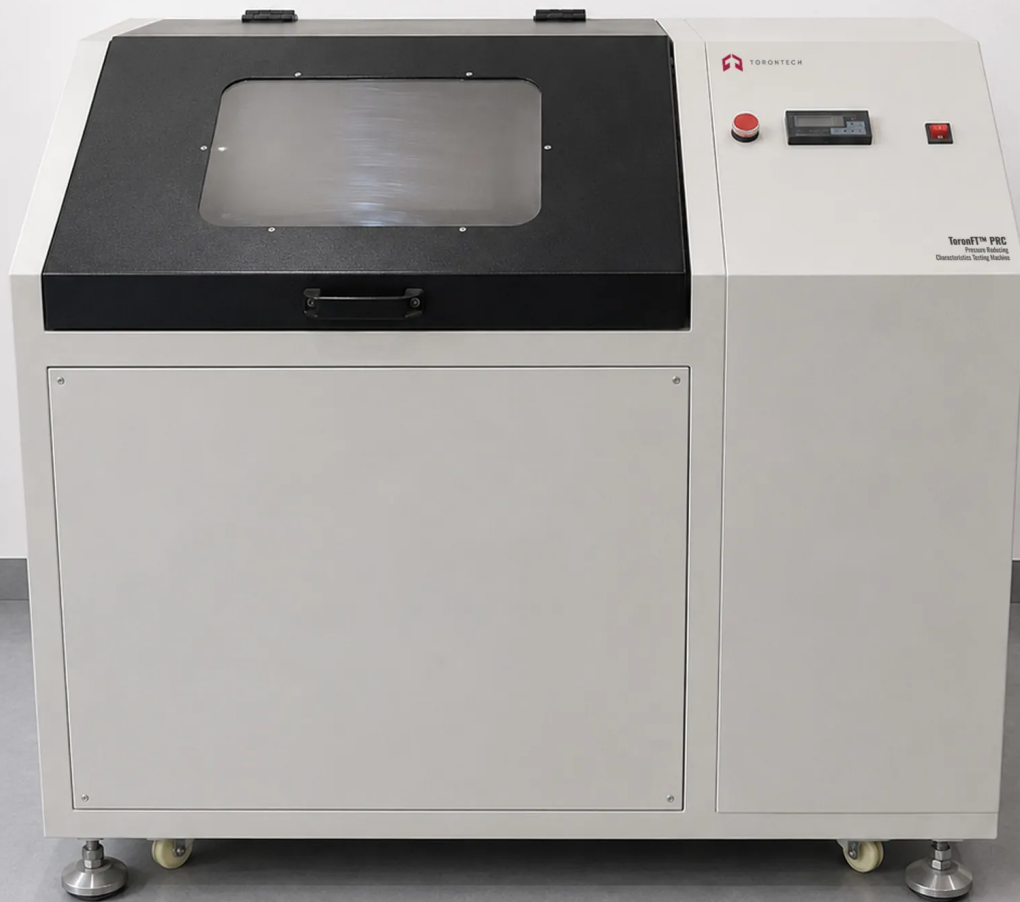
The Pressure Reducing Characteristics Testing Machine is designed to be used in conjunction with the ToronFT™ HSC Hydraulic Strength Comprehensive tester, which provides the high-pressure hydraulic source needed to test pressure reducing devices across the full operating pressure range of gas fire extinguishing systems.

## APPLICATIONS

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### Pressure Reducing Characteristics Testing Machine — ToronFT™ PRC Applications

- Gas fire extinguishing system manufacturers: pressure reducing device characteristic qualification for CO<sub>2</sub>, HFC-227ea, HFC-23, and inert gas system regulators
- Third-party certification and listing laboratories: pressure reducer action pressure testing per ISO 14520 and related international standards
- Quality assurance departments: production-line and incoming inspection verification of pressure reducing device setpoints
- R&D departments: evaluation of new pressure regulator designs and setpoint calibration methods
- System assembly and commissioning: setpoint verification of pressure reducing devices prior to system integration



# Standards

The ToronFT™ PRC supports pressure reducing device characteristic testing in compliance with internationally recognized gas fire extinguishing system standards, including:

- ISO 14520-1: Gaseous fire-extinguishing systems — Physical properties and system design — General requirements
- ISO 14520-9: Gaseous fire-extinguishing systems — HFC 227ea systems
- NFPA 12: Standard on carbon dioxide extinguishing systems
- NFPA 2001: Standard on clean agent fire extinguishing systems
- EN 15004-1: Fixed firefighting systems — Gas extinguishing systems — Design, installation, and maintenance

## FEATURES

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### Pressure Reducing Characteristics Testing Machine — ToronFT™ PRC Key Features

- Designed specifically for pressure reducing device (pressure regulator) characteristic qualification in gas fire extinguishing systems
- Pressure gauge with needle stopping mechanism and instantaneous recording function — captures the exact actuation pressure precisely
- Setpoint specification 1 — fire extinguishing agent bottle group device:  $19 \text{ MPa} \pm 0.95 \text{ MPa}$
- Setpoint specification 2 — drive gas bottle group device:  $\geq 1.25 \times$  max working pressure;  $\leq 95\%$  strength test pressure; within  $(1 \pm 5\%)$  of set value
- Setpoint specification 3 — combined distribution system header pipe device:  $15 \text{ MPa} \pm 0.75 \text{ MPa}$
- Controlled pressure increase rate:  $\leq 0.5 \text{ MPa/s}$  — ensuring gradual, shock-free pressurization
- Air purging procedure prior to test eliminates gas compression effects for accurate hydraulic measurement
- Designed for use in conjunction with the ToronFT™ HSC Hydraulic Strength Comprehensive tester

## THEORY & METHOD

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### Theory and Method

Pressure reducing device characteristic testing verifies that the pressure reducing device (pressure regulator) actuates at the correct inlet pressure for its design setpoint. The inlet of the test sample is connected to the test device, and after removing air from the connecting pipeline and the inner cavity of the sample and sealing all outlets, pressure is slowly increased at a rate of no more than 0.5 MPa/s until the safety pressure relief device operates. The actuation pressure is recorded using a pressure gauge equipped with a needle stopping mechanism and instantaneous recording function.

The ToronFT™ PRC verifies three setpoint specifications: (1) pressure reducing device/regulator on fire extinguishing agent bottle groups must actuate at 19 MPa ± 0.95 MPa; (2) pressure reducing device/regulator on drive gas bottle groups must actuate at ≥ 1.25 times the maximum working pressure of the bottle set, ≤ 95% of the strength test pressure, with the relief action pressure within (1 ± 5%) of the set value; (3) pressure reducing device/regulator on combined distribution system header pipes must actuate at 15 MPa ± 0.75 MPa. This setpoint verification approach ensures that every pressure reducing device in the system will regulate pressure within the safety envelope required for reliable, standard-compliant fire suppression system operation.

## TECHNICAL SPECIFICATIONS

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### Pressure Reducing Characteristics Testing Machine — ToronFT™ PRC Technical Specifications

| Parameter | Specification |
|-----------|---------------|
| Model     | ToronFT™ PRC  |

| Parameter                                      | Specification                                                                                                          |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Test Type                                      | Pressure reducing device actuation pressure / characteristic test                                                      |
| Pressure Increase Rate                         | $\leq 0.5 \text{ MPa/s}$                                                                                               |
| Pressure Gauge                                 | Needle stopping mechanism with instantaneous recording function                                                        |
| Setpoint 1 — Extinguishing Agent Bottle Device | $19 \text{ MPa} \pm 0.95 \text{ MPa}$                                                                                  |
| Setpoint 2 — Drive Gas Bottle Device           | $\geq 1.25 \times \text{max working pressure}$ ; $\leq 95\%$ strength test pressure; within $(1 \pm 5\%)$ of set value |
| Setpoint 3 — Distribution Header Device        | $15 \text{ MPa} \pm 0.75 \text{ MPa}$                                                                                  |
| Required Hydraulic Source                      | ToronFT™ HSC (used in conjunction)                                                                                     |



**Torontech Inc.**

251 Consumers Road, Suite 1200  
Toronto, Ontario, M2J 4R3, Canada 🇨🇦

Phone: +1 416 368 2721 | Fax: +1 416 981 7652  
Email: [info@torontech.com](mailto:info@torontech.com)

**Torontech, LLC**

601 Brickell Key Drive, Suite 700  
Miami, FL 33131, USA 🇺🇸

Toll-Free: 1-866-383-7919  
Email: [sales@torontech.com](mailto:sales@torontech.com)

**Torontech ME FZE**

Meydan Grandstand, 6th Floor,  
Meydan Road, Nad Al Sheba,  
Dubai-261440, UAE 🇦🇪

Phone: +971 488 19252  
Email: [me@torontech.com](mailto:me@torontech.com)

