

NEWSLETTER

PRECISION FERROUS WEAR DEBRIS MONITORING

Undetected machine wear costs industries billions every year in unexpected downtime, component failures, and unplanned maintenance. The most reliable early warning signal is the ferrous particle content of in-service lubricating oils — but only if you can measure it accurately, quickly, and repeatably. The **Particle Quantifier (PQ) method** detects all ferromagnetic wear particles regardless of size, making it uniquely sensitive to the large, damaging particles that conventional elemental analysis misses.

Torontech's ToronPQ™ Series represents **a new generation of Particle Quantifier Instruments** fully conforming to **ASTM D8184** — the internationally recognized standard for ferrous wear debris monitoring. Three models — the ToronPQ™ 1000, 2000, and 3000 — provide scalable solutions from high-throughput laboratory environments to field-deployed condition monitoring programs.

How PQ Measurement Works?

A PQ instrument **measures disturbances** in a calibrated magnetic field caused by **ferromagnetic particles in an oil sample**.

This disturbance is quantified as the **PQ Index**, reflecting the total ferrous debris mass, regardless of particle size or shape.

An increasing PQ Index over time serves as an **early warning** of component wear, prompting investigations to prevent catastrophic failure.



PRODUCT HIGHLIGHTS

ToronPQ™ 1000 – Standard Laboratory PQI

ASTM D8184 Compliant | Fixed-Volume Benchtop Model

- **Fixed-volume Measurement:** Standardized sample volume ensures measurement consistency and inter-laboratory comparability.
- **Fast Results in Under 10 Seconds:** Automated sample transfer and signal processing minimize operator waiting time during high-volume lab workflows.
- **Broad Particle Sensitivity ($\geq 1 \mu\text{m}$):** Detects ferrous particles across all sizes — capturing the large, damaging particles that ICP elemental analysis routinely misses.
- **PC Data Management Software Included:** Import measurements, generate trend curves, and export reports for predictive maintenance records.





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ToronPQI™ 2000 — Enhanced Precision with Volume Control

ASTM D8184 Compliant | Adjustable Volume Model



- › **Adjustable Sample Volume Control:** Accommodate variable oil sample volumes — useful when sample availability is limited or when testing high-viscosity lubricants and greases.
- › **Enhanced Precision Measurement:** Refined signal processing for improved repeatability across samples with differing viscosities and fluid types.
- › **Suitable for Oils, Greases, and Hydraulic Fluids:** The volume-adjustable system allows testing of diverse fluid types under a single standardized workflow.
- › **Designed for High-Throughput Reliability Programs:** Supports large-volume oil sampling programs with consistent, documented results.

ToronPQI™ 3000 — Rugged, Portable & Intelligent

ASTM D8184 Compliant | Advanced Portable Flagship Model



- › **Flagship of the ToronPQI™ Series:** Combines advanced ferrous wear debris detection with rugged field-ready construction and intelligent onboard diagnostics.
- › **Portable Field Deployment:** Compact and robust design enables on-site oil analysis at remote industrial locations, production floors, and field service environments.
- › **Intelligent Onboard Diagnostics:** Built-in data processing and guidance aids interpretation of PQ Index values for faster maintenance decision-making in the field.
- › **Extended Industry Applications:** Suited for mining, marine, power generation, military, aviation, and heavy construction equipment monitoring.



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INDUSTRIES SUPPORTED BY THE TORONPQI™ SERIES

- **Automotive & Transportation:** Engine wear monitoring, transmission fluids, axle gear oils.
- **Mining & Heavy Equipment:** Crusher, conveyor, and haul truck drivetrain monitoring.
- **Aerospace & Defense:** Aircraft engine and gearbox oil analysis, military vehicle maintenance.
- **Marine & Shipping:** Main engine, gearbox, and hydraulic system condition monitoring.
- **Power Generation:** Turbine, generator, and hydraulic oil health programs.
- **Oil & Gas:** Compressor, pump, and downhole equipment lubrication monitoring.

Did You Know?

Grease samples present **a special challenge for PQ measurement** because their semi-solid consistency means volume cannot be measured the same way as liquid oils.

Adjustable-volume PQ instruments were **specifically developed to handle this**—critical for monitoring grease-lubricated bearings in wind turbines and heavy industry.



Why Choose Torontech

for Your Oil Analysis Program

- **Full ASTM D8184 Compliance Across All Models:** Standardized, traceable, and auditable PQ Index results — accepted by oil analysis laboratories, fleet operators, and reliability engineers worldwide.
- **Scalable Model Selection:** From the fixed-volume PQI-1000 for lab benchwork to the portable PQI-3000 for remote field deployment — one platform covers every operational context.
- **Sensitivity Beyond Elemental Analysis:** PQ measurement detects all ferrous particle sizes including large debris $\geq 5 \mu\text{m}$ that ICP analysis routinely misses — catching catastrophic wear events earlier.
- **Fast, Non-destructive Testing:** Results in under 10 seconds with no sample pre-processing — maximizing throughput in high-volume oil analysis programs.
- **Complementary to Full Oil Analysis Programs:** PQI works alongside ICP elemental analysis and ferrography — providing a complete picture of machine wear when used as part of an integrated condition monitoring program.

Ready to Strengthen Your Predictive Maintenance Program?

The ToronPQI™ Series helps oil analysis laboratories, fleet operators, and reliability engineers detect ferrous wear earlier, document machine health trends, and prevent costly unplanned failures. Explore the full ToronPQI™ lineup [here](https://www.torontech.com/particle-quantifier-instrument-toronpqi-series/):

For expert guidance on selecting the right PQI model: sales@torontech.com