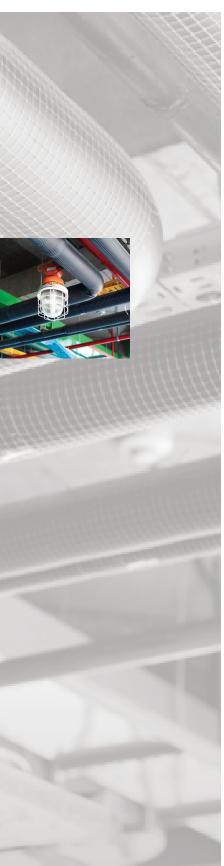
Flow Instrumentation Product Overview











Flow measurement and control you can count on.

About Us



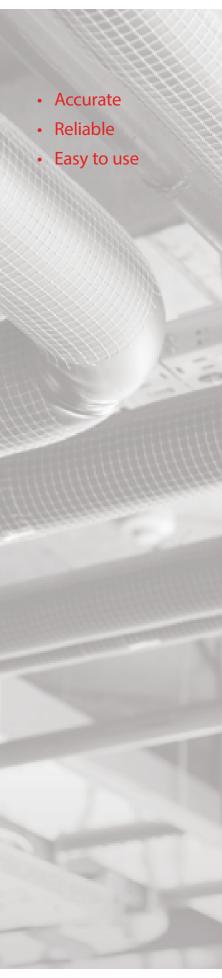
Flow measurement and control you can count on.

Badger Meter Flow Instrumentation understands that companies cannot manage what they cannot measure—and leverages more than a century of flow measurement expertise and a technology-rich portfolio to optimize customer applications worldwide.

An industry leader in both mechanical and electrical flow metering technologies, Badger Meter offers one of the broadest flow control and measurement portfolios in the industry—a portfolio that includes eight out of the 10 major flow meter technologies.

Simply put, Badger Meter Flow Instrumentation provides technology to measure and control whatever moves through a pipe or pipeline, including water, air, steam, oil, other liquids and gases. And we apply our expertise to further enhance our products' ease of use, accuracy and effectiveness.

Customers can rely on Badger Meter Flow Instrumentation for applicationspecific solutions that deliver accurate, timely and dependable flow data and control essential for product quality, cost control, safer operations and regulatory compliance.



Flow Instrumentation Solutions

Badger Meter provides solutions for a variety of unique flow measurement and control challenges, serving a wide array of industries. Use this chart as a first step in matching our flow technologies with your application.

	Coriolis Mass Meters	Electromagnetic Meters	Impeller Meters	Disc Meters	Turbine Meters	Oval Gear Meters	Control Valves	Ultrasonic Meters	Vortex Meters	Variable Area Meters	Differential Pressure Meters	Hydraulic Diagnostic Products
Drinking Water		✓	✓	✓	✓		✓	✓	✓			
Waste Water		✓	✓				✓	✓			✓	
Irrigation		✓	✓		✓			✓	✓			
Process Water/ Semiconductor		✓	✓	✓	✓		✓	✓	✓	✓	✓	
Chemicals	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Food		✓		✓	✓		✓	✓				
Oil/Automotive Fluids	✓		✓	✓	✓	✓	✓			✓		
Petrol	✓		✓	✓	✓	✓	✓	✓		✓		
Pharmaceutical/ Biotechnology		✓	✓				✓	✓			√	
HVAC		✓	✓	✓	✓			✓	✓		✓	
Industrial	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Concrete Batching		✓	✓	✓	✓							
Test & Measurement	✓				✓		✓			✓	✓	✓
Oil & Gas	✓				✓		✓	✓		✓	✓	
Petrochem	✓				✓		✓				✓	
Mining					✓		✓	✓		✓		✓
Machine Tools					✓			✓		✓		✓
Power Generation	✓	✓						✓			✓	
Aerospace					✓		✓			✓		✓
Hydraulic/Fluid Power					✓	✓		✓		✓		✓
Saturated Steam									✓		✓	

Our Portfolio

Technology/Product	Pag
Mechanical Flow Meters	
Turbine Meters	
Blancett [®]	5
Vision	6
Cox	7
Industrial & Recordall®	8
Oval Gear Meters	
Industrial Oval Gear	9
Nutating Disc Meters	
Recordall® Disc Meters	10
Variable Area Meters	
Hedland®	
Hydraulic Diagnostic Products	
Flo-tech®	12
Impeller Meters	
Impeller	
Differential Pressure Meters	
Preso®	14
Electronic Flow Meters	
Electromagnetic Meters	
ModMAG [®]	15
Coriolis Meters	
RCT1000 Coriolis	16
Ultrasonic Meters	
Dynasonics®	17
Vortex Meters	
Vortex	
Control Valves	
Research Control® Valves & Positioners	19
Flow Measurement Manager	20
Connectivity and Communications	21
Calibration Services	22

Blancett	
Vision	
Cox	
Turbo	
Recordall*	
S Oval Gear	10
W Hedland	
Flo-tech	
Impeller	
Preso°	
ModMAG °	
Coriolis	
Dynasonics °	
Vortex	
RCV	
AquaCUE °	
Flow Dynam	ICS

Blancett® Turbine Flow Meters

Blancett turbine flow meters feature durable stainless steel designs that are well-suited for applications with high-corrosive, temperature or pressure environments.

Flow monitors and transmitters:

- Digital display of flow rate and total with selectable unit of measure
- · Mounting options: meter, remote, swivel, panel and explosion-proof
- Loop, battery and solar-powered options
- Communications options for Modbus RTU

Liquid measurement turbine flow meters:

- Pipe size: 1/2...10 in. (13...254 mm)
- Threaded, flange, wafer and sanitary (3-A) connections
- Operating pressure: up to 5000 psig (344 barg)
- Operating temperature: up to 450° F (232° C)
- Flow range: 0.6...5000 gpm (11.36...18,927 lpm)
- Accuracy: up to ± 1% of reading

Gas turbine flow meters:

- Pipe size: 2 in. (51 mm)
- Wafer mounting provides quick installation and requires minimal space
- Operating pressure: up to 2200 psig (15.3 MPa)
- Operating temperature: up to 330° F (165° C)
- Flow range: 7...350 acfm (12...595 m³/hr)
- Accuracy: up to ± 2% of reading







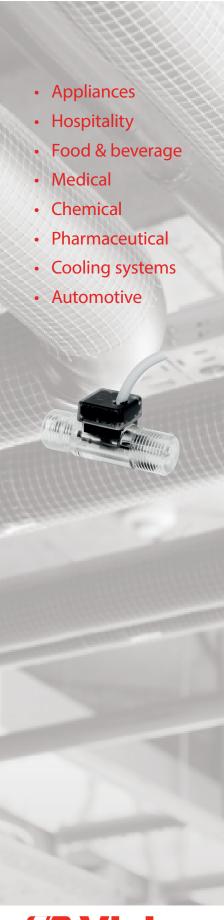
Vision Turbine Flow Meters

The Vision turbine is the smallest flow meter from Badger Meter. The meters are designed for flow measurement of low-viscosity and non-aggressive liquids, including demineralized water, alkaline solutions, oils, salad oil, fuel consumption, beverages, water solutions and coolants. Plus, Vision turbine meters comply with NSF standards and the lead-free provision of the Safe Water Drinking Act.

Turbine meters:

- Pipe size: 1/4...3/4 in. (7...19 mm)
- Flow range: 0.026...17.17 gpm (0.1...65 lpm)
- Accuracy: up to ± 3% of reading
- Trogamid operating pressure: up to 360 psig (25 barg)
- Brass operating pressure: up to 2600 psig (179 barg)
- Operating temperature: -4...100° F (-20...212° C)
- Mountable in any orientation
- Bi-directional flow measurement
- · Frequency output







Cox Precision Turbine Flow Meters

Cox turbine meters provide highly accurate liquid measurement in a compact package. Designed to measure clean fluids, Cox turbine meters use ceramic ball bearings to virtually eliminate friction, providing highly accurate and repeatable measurements and are available in both single rotor and patented dual rotor configurations. Cox flow monitors and transmitters feature several design configurations, while some use Strouhal-Roshko computations to improve flow meter accuracy by compensating for thermal effects on the meter bore diameter. Custom packaging is available upon factory consultation.

Exact dual rotor meters:

- Pipe size: 1/4...4 in. (6.35...101.6 mm)
- Flow range: 0.025...1500 gpm (0.095...5678 lpm)
- Linearity: ± 0.1% of reading, with a flow processor
- Absolute accuracy: ± 0.10% of reading
- Repeatability: ± 0.02% of reading

Precision single rotor meters:

- Pipe size: 1/4...2 in. (6.35...50.8 mm)
- Flow range: 0.05...310 gpm (0.19...1173.5 lpm)
- Repeatability: ± 0.02% of reading
- Linearity: ± 0.50% (± 0.1% with flow processor)
- Frequency output: 1200...1500 Hz
- Response time: 2...3 ms (at 1.2 cSt)

Precision gas meters:

- Pipe size: 1/4...2 in. (6.35...50.8 mm)
- Flow range: 0.40...250 acfm (0.07...424.75 m³/hr)
- Repeatability: ± 0.25% of reading
- Response time: 20...30 ms or better

Precision LoFlo turbine flow meters:

- Pipe size: 3/8 in. (9.5 mm)
- Flow range: 0.006...1.25 gpm (0.024...4.73 lpm)
- Repeatability: ± 0.25% of reading
- Response time: 20...30 ms or better (at 1.2 cSt)





Industrial & Recordall® Turbine Flow Meters

Industrial Turbo Meters

Industrial Turbo meters are ideally suited for the toughest flow conditions where continuous service and minimal maintenance are required. They are available in various materials and pressure ratings and can be combined with a large selection of Badger Meter accessories to suit numerous applications.

Specifications:

- Pipe size: 2...6 in. (50.8...152.4 mm)
- Flow range: 8...2000 gpm (3.8...7570 lpm)
- · Operating pressure: up to 150 psi
- Accuracy: ± 1.5%
- Repeatability: ± 0.25%
- Temperature range: -30...250° F (-34.4...121.1° C)



Recordall Turbo Series Meters

Recordall Turbo Series meters are ideally suited for any water application, performing with great accuracy over a wide flow range. They also have very low pressure loss, increasing system efficiency.

Specifications:

- Pipe size: 1.5...12 in. (DN 40...500)
- Flow range: 4...8,800 gpm (100% at ± 1.5%)
- · Operating pressure: up to 150 psi
- Accuracy: ± 1.5%
- Repeatability: ± 0.25%
- Operating temperature: up to 120° F (49° C)











Industrial Oval Gear (IOG) Flow Meters

Badger Meter IOG flow meters provide an effective solution for optimizing process operations—even in very low-flow environments—enabling users to match the meter size to their application for utmost accuracy. The meters deliver precise flow measurements to eliminate waste, and thanks to low pressure drop, have minimal impact on system energy requirements to move liquids.

Displays, transmitters and registers:

- Meter-mount, local display registers with choice of no output, scalable pulse output, quadrature/dual pulse output or 4...20 mA output
- Meter-mount, non-scaled transmitters with either a single-reed switch or dual-reed switch
- Meter or remote-mount large display options include models with choice of 4...20 mA output, Modbus RTU or BACnet MSTP

Oval gear meters:

- Pipe size: 1/4...3 in. (6...76 mm)
- Flow range: 0.07...185 gpm (0.26...700 lpm)
- High accuracy and repeatability
- Operating pressure: up to 740 psi
- Liquid viscosity: 5...1000 cP
- Construction: choice of aluminum or 316L stainless steel
- Mountable in any orientation







Recordall® Nutating Disc Flow Meters

Recordall (RCDL) positive displacement meters are one of the most cost-effective methods in metering industrial fluids. The RCDL meter has a simple, efficient design for high accuracy and repeatability over the entire meter flow range.

Features:

- Wide flow range
- Rugged bronze or thermoplastic housing
- Models 25 and 70—Bronze: 250° F (121° C) option
- Easily maintained without removing from line
- Durable components for minimal maintenance
- Wide range of compatible accessories

Performance:

- Accuracy: ± 1.5%
- Repeatability: ± 0.5%
- Maximum operating pressure: 150 psi
- Maximum operating temperature:
 - Plastic housing: 100° F (37.78° C) Bronze housing: 120° F (48.89° C)







Hedland® Variable Area Flow Meters

The Hedland family of products features over 18,000 inline variable area flow meters for oil, phosphate esters, water, water-based liquids and compressed gases. Capable of operating in any position, Hedland meters are easy to read and built for use in rugged environments.

Variable area flow meters with visual indicator:

- Pipe size: 1/4...3 in. (6.35...76.2 mm)
- Accuracy: up to ± 2% of full scale
- Operating pressure: up to 6000 psig (414 barg)
- Operating temperature: up to 500° F (260° C)
- Also available: ± 5% full scale accuracy model from 1/2...3 in. (12.7...76.2 mm) for systems with lower operating pressure and temperature ratings

Variable area flow meters with outputs and digital display:

- Pipe size: 1/4...1.5 in. (6.35...38.1 mm)
- Accuracy: up to ± 2% of full scale
- Operating pressure: up to 6000 psig (414 barg)
- Operating temperature: up to 240° F (116° C)
- Analog outputs: 4...20 mA, 0...5V DC or 0...10V DC
- · Digital display of flow rate and total
- Programmable keypad offers selectable engineering units and in-field linearization







Flo-tech® Hydraulic Diagnostic Products

Flo-tech products are used extensively in hydraulic testing and analysis. Capable of simultaneous flow, pressure and temperature measurement, typical product applications include:

- Flow measurement
- Test stands with flow, pressure and temperature sensors
- · On-site diagnostics and troubleshooting

USB-powered hydraulic system analyzer:

- Captures pressure spikes up to 10,000 psi (0.2 ms response time)
- Logs up to 12 hours and exports data to Microsoft Excel® and other spreadsheet programs
- High and low set point alarms

Handheld hydraulic analyzer:

- Hydraulic horsepower calculation
- 2.5 MB data logging storage
- Automatic Sensor Detection
- Five sensor inputs: turbine meter, two pressure sensors, temperature sensor and rpm speed sensor

Inline hydraulic turbine flow sensors:

- Flow range: up to 350 gpm (1324 lpm)
- Accuracy: ± 1% of full scale
- Operating pressure: up to 6000 psig (414 barg)
- Operating temperature: up to 300° F (149° C)
- Frequency pulse, 4...20 mA and voltage outputs







Data Industrial® Impeller Flow Meters

The Data Industrial impeller flow meters feature a six-blade or a symmetrical four-blade paddle-wheel design with a patented sensing mechanism. Unlike some mechanical metering technologies, impellers can tolerate bursts of air and vibration that would often damage other meters. Impeller solutions are extensible with network and data acquisition options.

Inline Flow Meters:

- Pipe size: 1/2...4 in. (12.7 to 101.6 mm)
- Accuracy: up to \pm 2% of full scale
- Features available:
 - Built-in energy meter
 - Construction for use in super clean water
 - Design for below-grade usage
 - Point-to-point wireless

Insertion Flow Meters:

- One size meter fits a range of pipe diameters
- Available options include:
 - Hot insertion sensors
 - Battery-powered insertion sensors
 - Bi-directional sensors







Preso® Differential Pressure Flow Meters

Preso differential pressure flow meters are precision-engineered to offer exceptional turndown ratios and superior accuracy. Designed to accommodate any manufacturer's pressure transducer, the Preso family offers a complete line of primary flow elements including Pitot tubes, venturi meters and wedge meters.

Ellipse® Pitot tube flow meters:

- Innovative elliptical design offers 17:1 turndown ratios and very low pressure loss
- · For liquids, gases or steam
- Pipe size: 2...120 in. (50.8...3048 mm)
- Accuracy: ± 0.75% of reading

COIN® wedge flow meters:

- Fluid viscosity: up to 3000 cP
- Reynolds Number: as low as 300
- Calibrated accuracy: ± 0.5% of reading
- Low pressure losses
- Maintenance free (no moving parts)
- Suitable for abrasive slurries, viscous or dirty fluids such as bitumen or coal tar
- Pipe size: 1/2...48 in. (13...1219 mm)
- Custom designs available

Venturi flow meters and inserts:

- · Three designs for optimal combination of accuracy, repeatability and cost
- Maintenance free (no moving parts)
- Pipe size: 1/2...72 in. (13...1829 mm)
- Calibrated accuracy: up to \pm 0.25% of reading
- Maximum pressure loss: 6% of DP
- Custom designs available

Cone flow meters:

- · For liquids, steam, air and industrial gases
- Pipe Size: 1.0 inch (13 mm) and larger
- Flow Range: 10:1 and greater
- Accuracy: ± 0.5% of actual flow
- Standard Beta Ratio: 0.40...0.80, special betas available
- · Approvals: CRN
- · Little or no straight-run piping requirements





ModMAG® Electromagnetic Flow Meters

Whether it's improving accuracy, decreasing system maintenance or meeting the demands of challenging liquid conditions, Badger Meter electromagnetic meters deliver the performance and precision that your critical flow measurement applications require.

- · Non-intrusive, completely open flow tube design
- Pipe size: 1/4...54 in. (DN6...2000), depending upon model
- Accuracy: up to $\pm 0.2\% \pm 1$ mm/s
- · Corrosion-resistant liners for long life
- · Remote or meter mounted amplifier
- LCD display
- SCADA-ready outputs
- NEMA 4X/6P options
- · NSF approved

Models available include:

- M1000 for basic general area environments or on-truck applications
- M2000 for general area environments
- M3000 for Class 1, Div. 2 environments
- M4000 for Class 1, Div. 1 environments
- M5000 battery powered for locations without power
- M7600 for basic batching applications







Coriolis Mass Flow Meters

The Badger Meter RCT1000 Coriolis mass flow meter identifies flow rate by directly measuring fluid mass over a wide range of temperatures with a high degree of accuracy. For fluids consisting of two liquids or two gases, the RCT1000 Coriolis system can derive the concentration and mass of each fluid based on the density measurement. Furthermore, the unobstructed, open flow design makes it suitable for a variety of fluids such as slurries and other viscous, nonconductive fluids that are difficult to measure with other technologies.

Advantages:

- Unobstructed open flow design
- · Low-maintenance operation with no free-moving parts
- Modbus RTU, Modbus TCP/IP, HART®, and EtherNet I/P network options
- · Advanced fluid diagnostic tools
- · Batching and PID control

Specifications:

- Pipe size: 1/16...3 in. (1.6...76.2 mm)
- Connection size: 1/4...3 in., DN15-80
- Accuracy:
 - Liquids: up to \pm 0.1% of flow rate
 - Density: up to ± 0.0005 g/cm³
- Zero stability: up to \pm 0.025% of full scale
- Repeatability: up to \pm 0.05% of flow rate
- Process temperature range: -40...392° F (-40...200° C)
- General area or hazardous location







Dynasonics® Ultrasonic Flow Meters

Dynasonics ultrasonic flow meters are ideal for liquid flow measurement as a permanently installed meter, a temporarily installed meter or as a portable flow verification device. The clamp-on design for closed pipes is non-intrusive and offers fast installation and setup with no need to cut into or drain piping. Some models also offer energy metering and network connectivity.

Transit time ultrasonic flow meters:

- Pipe size: 1/2 in. (12 mm) and larger
- Accuracy: up to \pm 0.5% of reading (\pm 1.5% of reading for inline model)
- Variety of output options: 4...20 mA, frequency pulse and control relay
- · Options include BACnet MSTP, Modbus RTU, EtherNet/IP, Modbus TCP/IP, BACnet/IP, energy monitoring and data logging

Doppler ultrasonic flow meters:

- Pipe size: 1/4 in. (6 mm) and larger
- Accuracy: up to ± 1% of full scale
- · Fluid velocity: up to 30 feet (9 meters) per second

Portable transit time/Doppler hybrid ultrasonic flow meters:

- Pipe size: 1/2 in. (12 mm) and larger
- Accuracy: ± 1% of reading
- Measures flow and energy
- Full-color display, graphing capabilities, advanced touch-screen interface and wizard-based configuration tools
- 1 GB internal data logging
- · Optional dual-mode pipe wall thickness sensor







Vortex Flow Meters

Vortex flow meters are ideal for accurately measuring liquids, compressed air and saturated steam. Vortex meters have no moving parts and are virtually maintenance-free once installed. Meters are available in wafer, insertion and flange designs.

Corrosion Resistant Inline:

- · Liquid Measurement
- Pipe size: 1/4...3 in.
- Accuracy: up to ± 1% of reading
- Repeatability: up to \pm 0.25% of actual flow
- Operating pressure: up to 150 psig (10.3 barg)
- Operating temperature: up to 203° F (95° C)
- Available material options include PVC, PVDF, CPVC and polypropylene

Stainless Steel Insertion:

- · Liquid, compressed air and saturated steam measurement
- Pipe size: 2...36 in.
- Accuracy: up to ± 1% of reading
- Repeatability: up to \pm 0.25% of reading
- Operating pressure: up to 1000 psig (68.9 barg)
- Operating temperature: up to 400° F (204° C)
- Reduced noise interference with dual piezoelectric sensors and filtering







Research Control® Valves & Positioners

Badger Meter manufactures and markets a complete range of precision control valves and accessories to meet the most critical and demanding applications.

Small control valves:

- RCV, 9000 and 9100 control valves
- Pipe size: 1/4...2 in.
- CV: 0.0000018...70.0
- Multiple trim sizes per valve size
- Precise accurate control
- Operating temperature: -450...1800° F (-267.78...982.22° C)
- Operating pressures: full vacuum to 60,000 psi
- Materials: 316 SST, Hastelloy, Monel, Inconel, Tantalum and other exotics

Actuators:

- · Air-to-open
- Air-to-close
- · Integral top-mounted positioners
- · Stainless steel option available on most models

Electronic actuator SEVA:

- Fast response
- Universal Input Power (24V DC, 115V 230 VAC)
- Protocols: Ethernet/IP, Modbus RTU, Modbus TCP/IP and Hart
- Manual override
- Standard 4...20 mA; Configurable 0...5/10V DC

Positioners:

- · Easy two-step commissioning
- · Auto-start with self-calibration
- 4...20 mA, HART®, FOUNDATION™ fieldbus H1 or Profibus® PA communications
- IP66, NEMA 4X and XP enclosures
- SIL3 certification







AquaCUE® Flow Measurement Manager

AquaCUE flow measurement manager combines an intuitive software suite with proven flow measurement technology. It leverages cellular network infrastructure to deliver a simple yet powerful dashboard solution for improving management of the use of water throughout your property, including domestic hot and cold water, irrigation systems, recreational use, tenant sub-metering, HVAC systems and more.

Features:

- Customizable dashboards to deliver information in a format matched to your requirements
- Ability to set unique alert conditions to define and monitor exceptions
- Secure, cloud-based platform—ISO 27001 certified and SCO 2 examined for security, availability and confidentiality
- Automatic software updates



Ideal solution for:

- Universities
- Hotels & resorts
- Commercial properties
- Industrial operations
- Turf irrigation
- Agriculture irrigation
- HVAC systems
- BAS enhancement





Connectivity and Communications Add-Ons

Displays and Calculations

- Batch controllers
- Displays
- Energy calculators







Network Adapters

- Modbus RTU
- BACnet MSTP
- LonWorks
- Metasys
- Wireless mesh
- Point-to-point wireless



Data Management

- Data acquisition
- Fluid management
- Inventory management
- AquaCUE flow measurement manager







Flow Dynamics® Calibration Services

Flow Dynamics is a major, independent primary standard flow calibration laboratory, supplying both manufacturers and end users with unparalleled calibration results.

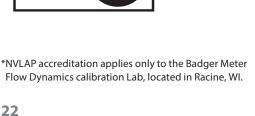
What we provide:

- Calibration and repair of most types of flow meters
- Multiple viscosity liquid calibrations using Strouhal-Roshko analysis
- · Calibration history files for future comparisons
- Research and development testing for flow measurement devices
- Variety of inert gas calibrations
- · Correlation and extrapolation methods simulating hazardous fluids
- Electronic calibrations for flow computers and signal conditioners
- OEM production calibration service
- NIST-traceable calibrations























Rely on Badger Meter Flow Instrumentation

Today's industries face accelerating demands to contain costs, reduce product variability and meet ever-changing safety and regulatory requirements. To address these challenges, they must reap more value from every component in their systems. This system-wide scrutiny has heightened the focus on flow instrumentation in industrial process, manufacturing, commercial fluid, building automation and precision engineering applications where flow measurement and control are critical.

Customers can rely on Badger Meter Flow Instrumentation for applicationspecific solutions that deliver accurate, timely and dependable flow data and control essential for product quality, cost control, safer operations and regulatory compliance. Product qualityControl costsRegulatory





Control. Manage. Optimize.

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