Proline Promass Q 300/500
Premium Density

The top-performing density meter for the oil and chemical industries

Endress+Hauser
People for Process Automation

Endress+Hauser process automation

Solutions for the oil and chemical industries

Endress+Hauser is a world-leading supplier of measuring devices, services and solutions for industrial process engineering. We offer a wide range of measuring technologies to meet our customers' requirements – whether the application is exploration, production, refining, custody transfer or logistics.

Our devices for level, pressure, flow, temperature, analysis and registration are manufactured according to the highest quality standards. Endress+Hauser stands for continuity, industry-specific expertise and long-term customer relationships.

In the oil and chemical industries, the practical and qualitative requirements are very challenging. Therefore, our foremost objective is to create trust with practicable solutions. In addition, our global network of over 600 experts and sales/service engineers ensures that everything works perfectly at your end.

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For more information about your industry:
www.endress.com/oil-gas

Superior density measuring performance

For optimum quality control and quantity determination in real-world applications

Density is one of the most prominent parameters to classify physical properties of crude oil, refined products and chemicals. Accurate density measurement, therefore, has an increasingly significant importance in the process industry.
Promass Q Premium Density is currently the most reliable inline density meter on the market – exceeding the accuracy and repeatability achieved in real-world conditions by other inline meters. The labor-intensive and prone-to-error traditional hydrometer can therefore be replaced by this highly accurate, real-time density measurement.

Your benefits

- Best-in-class density measurement with superior performance for any fluids and process conditions
- Continuous and maintenance-free density measurement – ideal for slipstream applications
- Patented unique design for compensating effects of temperature, pressure, flow rate, viscosity, device orientation and other process parameters in real time
- Premium performance:
  – Density accuracy: ±0.1 kg/m³ (±0.0001 g/cm³)
  – Repeatability: ±0.02 kg/m³ (±0.00002 g/cm³)
- No time-consuming and costly sampling as with traditional measuring methods
- Ideal for replacing error-prone manual systems (e.g. hydrometers) or traditional, less accurate density meters
- In accordance with API MPMS 9.4 "Continuous Density Measurement Under Dynamic (flowing) Conditions"
- OIML R117 certified

Guaranteed accuracy

Over a wide range of fluid, process and ambient conditions

The excellent performance of Promass Q Premium Density is based on the compensation of a large number of parameters that influence the density measurement:

- Process pressure
- Process temperature
- Ambient temperature
- Flow (centrifugal forces in the measuring tubes)
- Device orientation in the pipe
- Fluid viscosity

In addition, Promass Q Density is equipped with a Gas Fraction Handler (GFH) software and Multi-Frequency Technology (MFT), which allow a reliable measurement of inhomogeneous liquids with entrained gas. These diagnosis functions provide the user with additional information, such as the relative amount of micro-bubbles or small suspended bubbles in the process fluid.

Density calibration
The primary density calibration is performed in a factory laboratory at different temperatures, accredited by the Swiss Accreditation Service (SAS). The resulting high accuracy at different densities, viscosities, pressures and temperatures has been tested and confirmed by independent world-class laboratories for density metrology (see page 5).

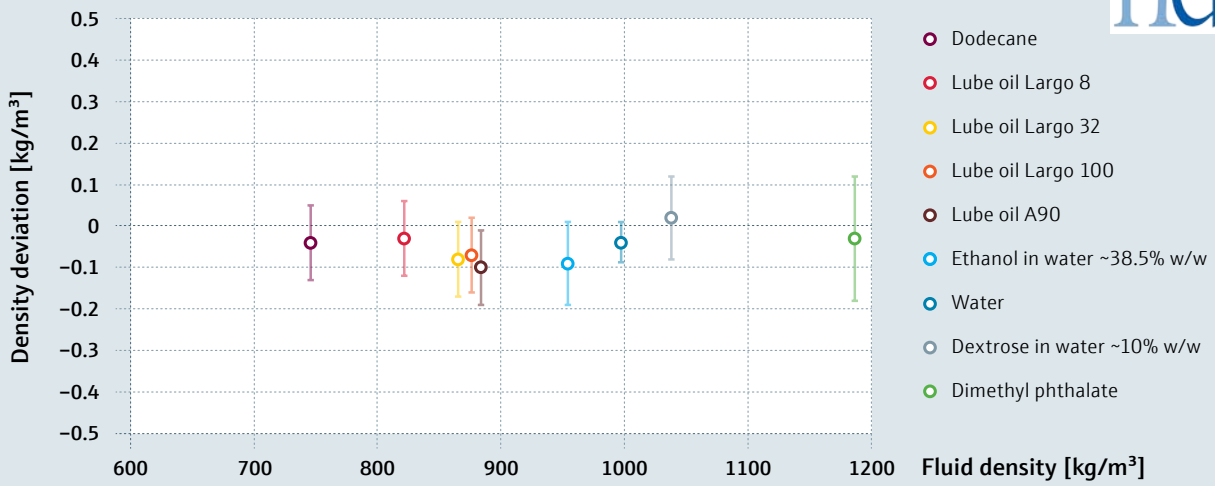
Exact density measurement pays off
Assure the quantity of delivered hydrocarbons

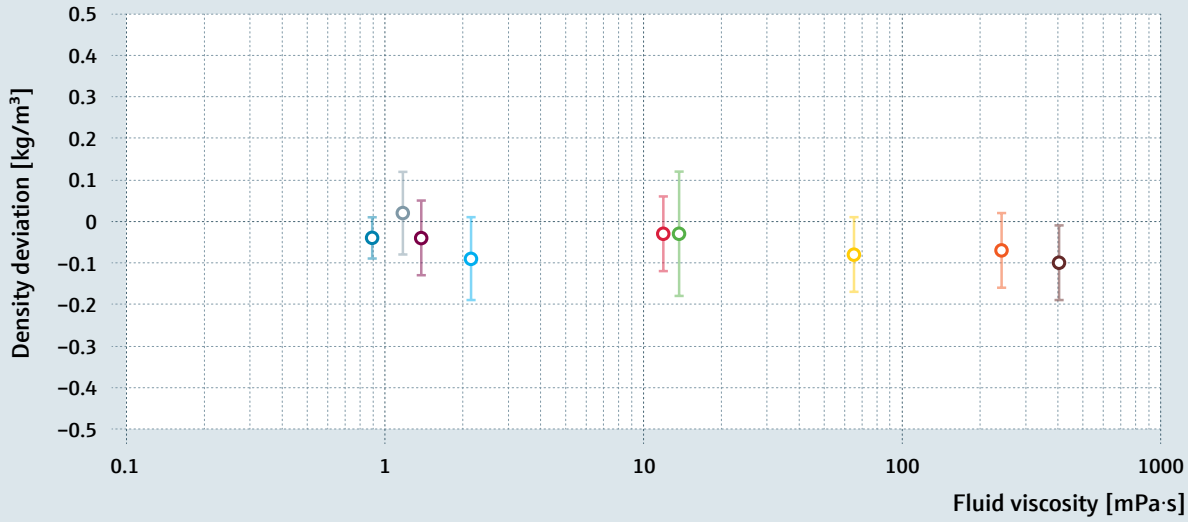
- Application: Transfer of crude oil with volume to mass conversion (e.g. with slipstream sampling)
- Flow rate: 100 000 barrels/day
- Crude oil price: USD 60/barrel
- Potential savings: USD 6000/day or USD 2.2 million/year

"With other density meters in the past, we have seen seasonal influence between summer/winter on the density measurement, which causes us significant amounts of unaccounted losses. With Promass Q Premium Density, things improved immediately! Its specified and traceable density uncertainty is far better."

Traceable density calibration measurements by H&D Fitzgerald Ltd

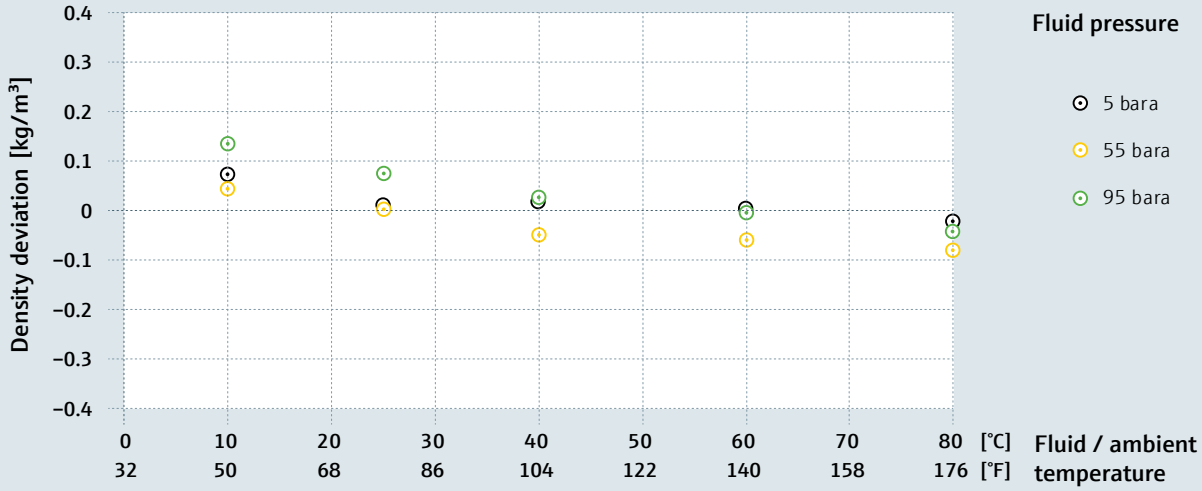
Error bars indicate the recorded expanded uncertainty (k=2) of the different reference fluids in the meter in accordance with UKAS requirements

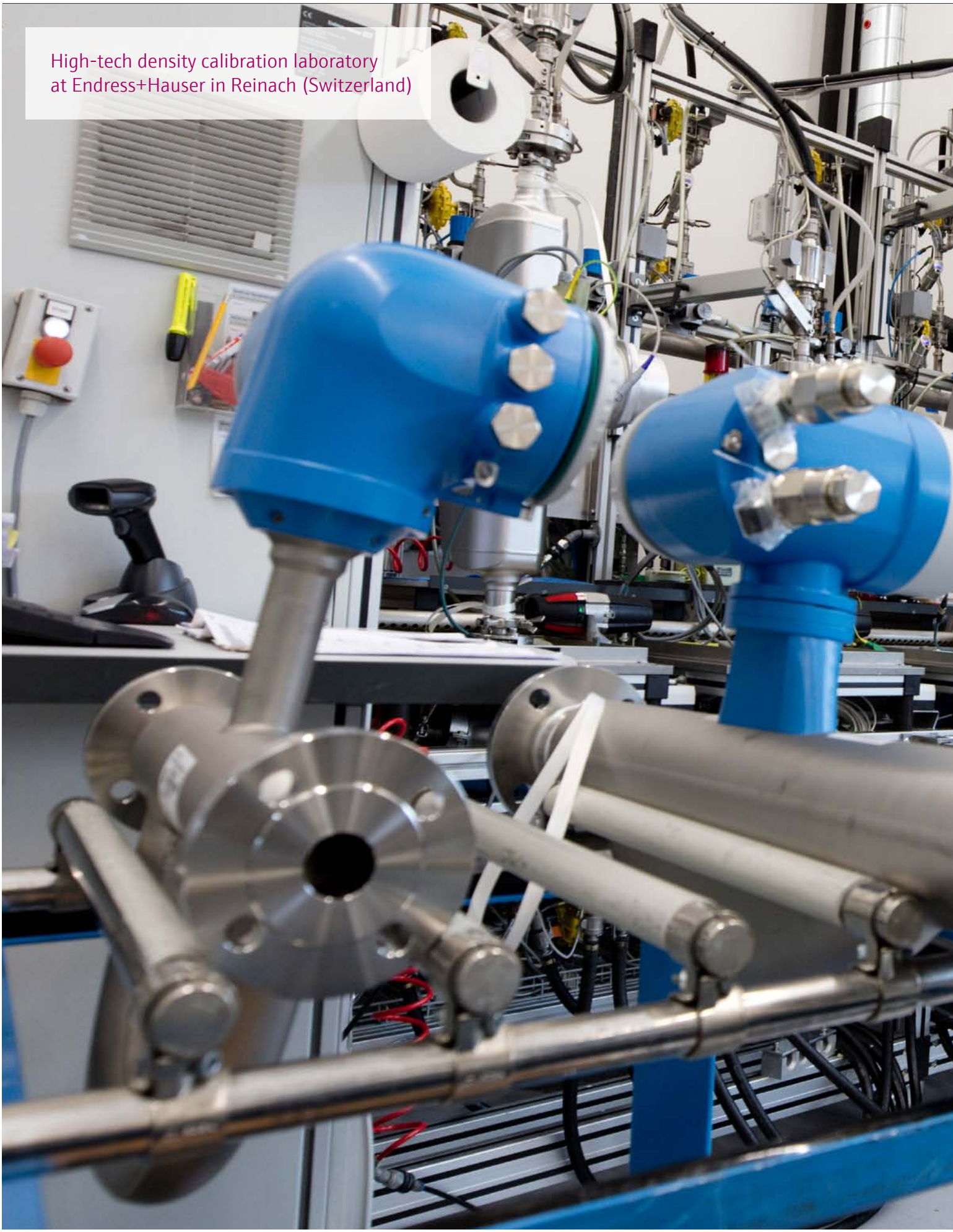




Traceable density calibration measurements by TÜV SÜD National Engineering Laboratory

The expanded uncertainty (k=2) in determining the density of the transfer standard fluid in the meter is estimated to be 0.02% for all data points





High-tech density calibration laboratory
at Endress+Hauser in Reinach (Switzerland)

Broad application areas

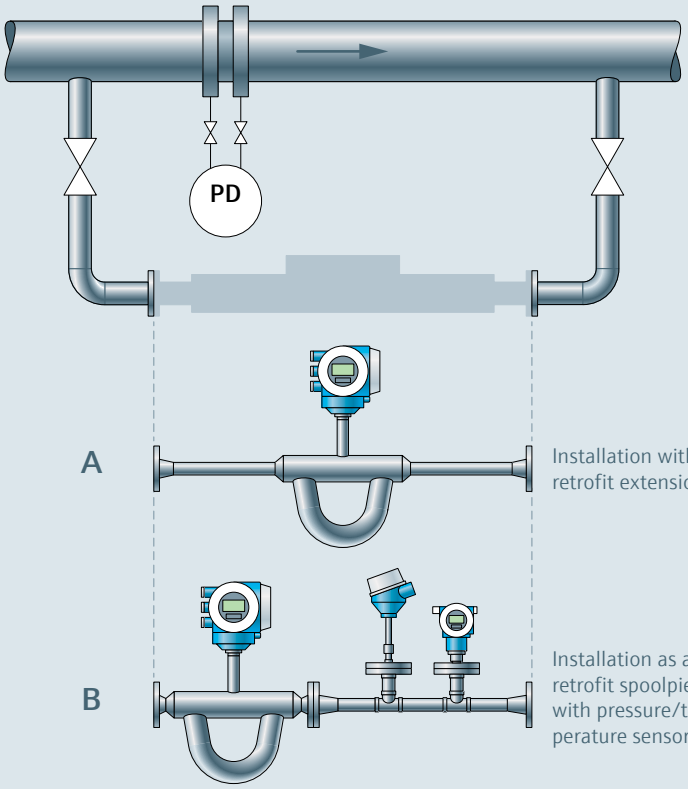
Reliable density measurement around the clock

In spite of fluctuating process conditions, Promass Q allows a continuous density measurement around the clock and without time-consuming and costly manual sampling! This opens up numerous fields of applications:

- Highly accurate custody transfer measurements due to a precise, density-based determination of gross and net standard volumes, as well as volume-to-mass or mass-to-volume conversion
- Reliable measurements for allocation
- Comprehensive inventory control in tank farms
- Optimum product quality control and monitoring, e.g. with refined products output
- Precise blending in refineries or tank farms
- Dependable interface detection in batch pipeline operations
- Perfect process control around the clock

Installation made easy

Optionally, Promass Q Premium Density is available in two versions (A or B). Due to the standardized installation length, traditional density measuring points can thus be converted quickly and easily.



Technical data

Transmitter

		
	Proline 300 (compact)	**Proline 500 (remote)**
Display	– 4-line backlit display with Touch Control (operation from outside) – Option: with remote display	4-line backlit display with Touch Control (operation from outside)
Operation	Via local display, web server or WLAN as well as various operating tools (FieldCare, HART handheld terminal, etc.)	
Materials	– Transmitter housing: Aluminum, stainless steel die cast – Remote display: Aluminum, stainless steel die cast	– Transmitter housing: Aluminum, polycarbonate, stainless steel – Sensor connection housing: Aluminum, stainless steel
Power supply	AC 100 to 230 V (50/60 Hz) DC 24 V (50/60 Hz)	
Ambient temperature	Standard: –40 to +60 °C (–40 to +140 °F) Option: –50 to +60 °C (–58 to +140 °F)	
Degree of protection	IP66/67 (Type 4X enclosure)	
Outputs Inputs Communication	**Port 1** Current output 4–20 mA HART or digital communication via Modbus RS485 (other protocols on request) **Port 2/3** Configurable I/O modules: – Time period signal output – Current output (4–20 mA) – Pulse/frequency/switch output – Pulse output (phase-shifted) – Relay output – Current input (4–20 mA) – Status input	**Port 1** Current output 4–20 mA HART or digital communication via Modbus RS485 (other protocols on request) **Port 2/3/4** (Proline 500 digital): Configurable I/O modules: – Time period signal output – Current output (4–20 mA) – Pulse/frequency/switch output – Pulse output (phase-shifted) – Relay output – Current input (4–20 mA) – Status input

Sensor	Promass Q Premium Density
Nominal diameter	DN 25 (1")
Process connections	Flanges: EN (DIN), ASME, JIS
Materials (wetted parts)	▪ Measuring tube, manifold: stainless steel, 1.4404 (316/316L) ▪ Process connections: stainless steel, 1.4404 (316/316L)
Process pressure	▪ EN flanges up to 100 bar (1450 psi) ▪ ASME flanges up to 102 bar (1480 psi)
Process temperature	−50 to +205 °C (−58 to +401 °F)
Degree of protection	IP66/67 (Type 4X enclosure)
Max. measured error (liquid density)	Standard: ±0.2 kg/m³ (±0.0002 g/cm³) Optional: ±0.1 kg/m³ (±0.0001 g/cm³)
Repeatability (liquid density)	Standard: ±0.1 kg/m³ (±0.0001 g/cm³) Optional: ±0.02 kg/m³ (±0.00002 g/cm³)
Approvals	OIML R117

Subject to modification

The Promass Q Premium Density measuring system fulfills the EMC requirements according to IEC/EN 61326 and NAMUR NE21.
It also conforms to the requirements of the EU and ACMA directives and thus carries the CE and the mark.

www.addresses.endress.com

Eco-friendly produced and printed
on paper from sustainable forestry.

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