+ CLIF MOCK True Cut

Sampling technologies

Over the past 60 years, CLIF MOCK* has been recognized as the pioneer brand in the international sampling industry. When the CLIF MOCK True Cut C Series* sample probe was first introduced in 1960, it was the first isokinetic sample probe on the market.

After all these years, this groundbreaking design has proven to be a top performer in a wide range of applications, with thousands of applications around the globe. The pairing of the CLIF MOCK True Cut C Series sample probe with the CLIF MOCK True Cut CD Series* actuator and sampler controller has proven to be the perfect combination of ruggedness and simplicity for crude oil, condensate, and refined product sampling applications.

CLIF MOCK TRUE CUT C SERIES SAMPLE PROBE

The CLIF MOCK True Cut C Series sample probe is an isokinetic inline sampling probe (shown here assembled with a CLIF MOCK True Cut CD Series actuator and sampler controller) that is electromechanically actuated and requires neither air nor hydraulics to capture a sample. The probe and sampling controller are actuated by a dry contact from an external pacing device such as a meter or flow computer and uses existing pipeline pressure to fill the sample chamber with product. When the probe is actuated, a sample chamber opens, allowing process fluid to flow through the chamber. As the internals rotate, the sample is captured at process conditions and pushed into a receptacle. CLIF MOCK True Cut C Series sample probes are designed to be used for sampling light crude oils, refined hydrocarbon liquids, and noncorrosive chemicals that are free of sediment.

C-22 SAMPLE PROBE

The C-22 sample probe is designed for line pressures between 345 kPa and 1,345 kPa (50 to 195 psi). With line pressures above 1,345 kPa (195 psi), use the pressure equalizing valve (PEV) found in the accessories section of this datasheet.

C-22V SAMPLE PROBE

The C-22V sample probe equipped with the V-series spring assist and is designed for line pressures that frequently fall below 345 kPa (50 psi). With a minimum operating pressure of 34.5 kPa (5 psi), this is the perfect sample probe for tank farms where the line pressure is created by the liquid head pressure of the tank or upstream of pipeline pump.

C-22S SAMPLE PROBE

The C-22S sample probe is designed for specialty applications where linear flow velocities are faster than 10 ft/sec. The body design breaks up velocity-induced vortices that can potentially lead to vibration. This reduction in vibrations will significantly improve the performance and longevity of the CLIF MOCK True Cut C Series sample probe in high pipeline velocity applications. The C-22S sample probe is perfect for large-diameter transmission lines that are transporting light crude oils, condensates, and light refined hydrocarbon liquids at high line velocities. The C-22S sample probe can also be provided with the optional V-series spring assist for low line pressure applications between 5 psi and 50 psi.

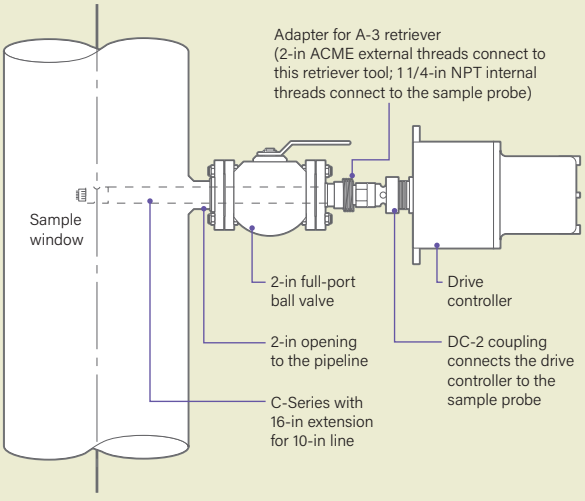
CLIF MOCK TRUE CUT CD SERIES ACTUATOR AND SAMPLER CONTROLLER

The CLIF MOCK True Cut CD Series actuator and sampler controller is installed in combination with the CLIF MOCK True Cut C-Series sample probe. The CLIF MOCK True Cut CD Series actuator and sampler controller can be connected to a pacing device (flowmeter or flow computer) to allow for flow proportional control. The CD-20, CD-20A, and the CD-30 versions can also be configured to actuate in a time-proportional manner, which can be used in pipelines that run at static flow rates and do not have a flowmeter. Each model of the CLIF MOCK True Cut CD Series actuator and sampler controllers is equipped with an internal DC motor that rotates the internals of the CLIF MOCK True Cut C-Series sample probe 180° with the request of a sample grab.

CLIF MOCK True Cut CD Series actuator and sampler controllers are available in four different models supporting time and volume proportional sampling, multiple power input supply options, and hazardous location approvals. The CD-20 models are UL certified (US/Canada Class I, Groups C and D) , and the CD-30 models are CSA certified (Class 1, Division 1). The CD-20 and the CD-20 SFA versions can provide an electronic output signal to allow samples to be counted remotely or to verify the rotation of the motor.

INSTALLATION

The sample probe should be installed on the side of a horizontal pipe so that any entrained water flows out of the probe. The probe should be positioned so that the pipeline fluid flows directly through the aperture window and so the window sits in the center half of the pipeline, as per the API and ISO standards. For product selection and sizing assistance, please contact the Sensia Measurement sales team.



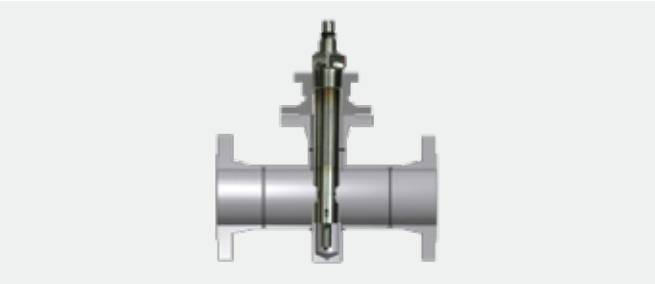
CLIF MOCK TRUE CUT C SERIES SAMPLE PROBE ACCESSORIES

PRESSURE EQUALIZING VALVE (PEV)

The pressure equalizing valve (PEV), is used in applications where the maximum operating pipeline pressure is above 1,345 kPa (195 psi). The PEV is connected to the sample outlet of the CLIF MOCK True Cut C Series sample probe and then uses the pipeline pressure to balance the pressures across the probe. By equalizing the pressure across the probe, stress is reduced on the internal components. This turn reduces maintenance and increases the longevity of the probe and CLIF MOCK True Cut CD Series actuator and sampler controller.

LA LINE ADAPTER

The LA-22 line adapter may be required to properly position a CLIF MOCK True Cut C Series sample probe in a small pipeline (2- to 4-in diameter). The spool-type adapter is mounted in the pipeline to ensure that the probe is correctly positioned within the pipeline, so the sample window is positioned in the center half of the pipeline.

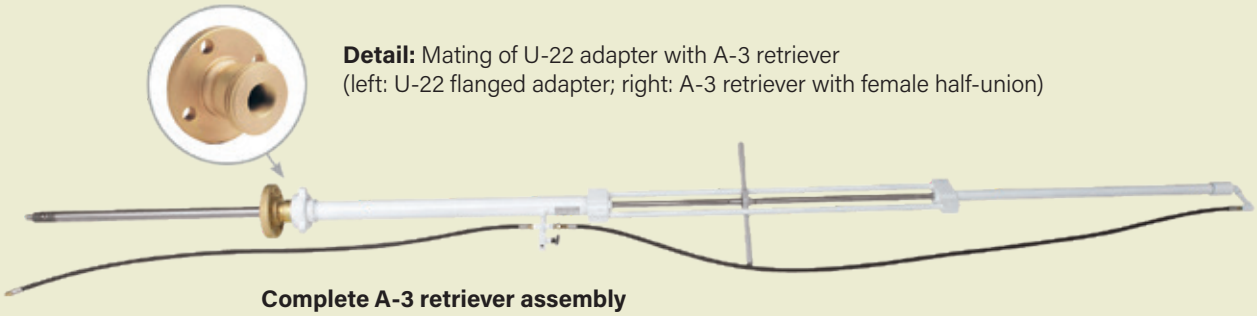


U-22 LINE ADAPTER

The U-22 line adapter is used as a standard mounting adaptor for the CLIF MOCK True Cut C Series sample probe, but also acts as a coupling point for the A-3 sample probe retriever. It is used in applications where the CLIF MOCK True Cut C Series sample probe is to be occasionally removed from the line for maintenance, but the pipeline cannot be shut down and depressurized.

A-3 SAMPLE PROBE RETRIEVER

The A-3 sample probe retriever allows an operator to install or remove a CLIF MOCK True Cut C Series sample probe, for inspection or maintenance, from a pressurized pipeline or vessel (up to 1,000 psig) without interrupting service.



Detail: Mating of U-22 adapter with A-3 retriever
(left: U-22 flanged adapter; right: A-3 retriever with female half-union)

Complete A-3 retriever assembly
(connected to U-22 adapter and C-Series probe)

CLIF MOCK TRUE CUT C SERIES SAMPLE PROBE SPECIFICATIONS

	C-22 Sample Probe	C-22V Sample Probe	C-22 plus Pressure Equalizing Valve (PEV)	C-22S	C-22SV
Fluid Type	Light crude oils, condensates, noncorrosive chemicals that are free of sediment	Light crude oils, condensates, noncorrosive chemicals that are free of sediment	Light crude oils, condensates, noncorrosive chemicals that are free of sediment	Light crude oils, condensates, noncorrosive chemicals that are free of sediment	Light crude oils, condensates, noncorrosive chemicals that are free of sediment
Viscosity Range	2 cSt to 350 cSt @ process temperatures	2 cSt to 350 cSt @ process temperatures	2 cSt to 350 cSt @ process temperatures	2 cSt to 350 cSt @ process temperatures	2 cSt to 350 cSt @ process temperatures
Operating Pressure	345 to 1,345 kPa (50 to 195 psi)	70 to 1345 kPa (10 to 195PSI)	1,345 to 10,342 kPa (195 to 1,500 psi)	345 to 1345 kPa (50 to 195PSI)	70 to 1345 kPa (10 to 195PSI)
Max Operating Pressure	10,342 kPa (1,500 psi)	10,342 kPa (1,500 psi)	10,342 kPa (1,500 psi)	10,342 kPa (1,500 psi)	10,342 kPa (1,500 psi)
Operating Temperature Range	0° to 115°C (32° to 275°F)	0° to 115°C (32° to 275°F)	0° to 115°C (32° to 275°F)	0° to 115°C (32° to 275°F)	0° to 115°C (32° to 275°F)
Flow Velocity Range	<3.1 m/sec (<10 ft/sec)	<3.1 m/sec (<10 ft/sec)	<3.1 m/sec (<10 ft/sec)	>3.1 m/sec (>10 ft/sec)	>3.1 m/sec (>10 ft/sec)
Pipeline Sizes (ID)	50.8 mm to 914.4 mm (2 to 36 in)	50.8 mm to 914.4 mm (2 to 36 in)	50.8 mm to 914.4 mm (2 to 36 in)	304.8 mm to 914.4 mm (12 to 36 in)	304.8 mm to 914.4 mm (12 to 36 in)
Sample Grab Size	1.5 m^3 (+/- 5%)	1.5 m^3 (+/- 5%)	1.5 m^3 (+/- 5%)	1.5 m^3 (+/- 5%)	1.5 m^3 (+/- 5%)
Standard Process Connection	31.75-mm NPT (1.25-in NPT)	31.75-mm NPT (1.25-in NPT)	31.75-mm NPT (1.25-in NPT)	31.75-mm NPT (1.25-in NPT)	31.75-mm NPT (1.25-in NPT)
Standard Body Materials	316 Stainless Steel	316 Stainless Steel	316 Stainless Steel	17-4 Stainless Steel	17-4 Stainless Steel
Standard Seal Materials	Viton (Buna and Teflon optional)	Viton (Buna and Teflon optional)	Viton (Buna and Teflon optional)	Viton (Buna and Teflon optional)	Viton (Buna and Teflon optional)
Certifications	CRN	CRN	CRN	CRN	CRN

CLIF MOCK TRUE CUT CD SERIES ACTUATOR AND SAMPLER CONTROLLER SPECIFICATIONS

	CD-20	CD-20 A	CD-20 SFA	CD-30 A
Voltage	115 VAC, 230 VAC, 24 VDC	115 VAC, 230 VAC, 24 VDC	115 VAC, 230 VAC, 24 VDC	115 VAC
Peak Motor Current (VDC)	1 A	1 A	1 A	1 A
Peak Motor Current (VAC)	300 mA	300 mA	300 mA	300 mA
Volume Proportional Control	x	x	x	x
Time Proportional Control	x	x	–	x
Scalable Input	–	x	–	x
Pulse Output	x	–	–	–
Certifications	UL (US/Canada)	UL (US/Canada)	UL (US/Canada)	CSA (Canada)

CD-20, CD-20 A, and CD-20 SFA are UL-listed for Class I Groups C and D hazardous locations.
CD-30 A is CSA-listed for Class I Div 1 Group D hazardous locations.

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