CEMENT TESTING

DRILLING FLUIDS TESTING

...Quality is Everything...

Instruments for Testing Drilling Fluids

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AGI NG/ ROLLER OVEN

Aging of Water Based Drilling Fluids

- Roller Oven has two power-driven rollers, a digital temperature controller, and a fail-safe over-temperature protection system.It provides an excellent method of aging fluid samples for further analysis. High-Temperature Aging Cells containing sample fluids are placed in the roller oven where they are subjected to moderate heat and agitation (rolling) on power driven rollers. Samples may also be heated without rolling (static aging). These Roller Ovens are constructed of polished stainless steel and other corrosion resistant materials. They are well insulated and the temperature is regulated by a digital electronic controller. An internal circulation fan assures an even temperature distribution throughout the oven.

- Drilling fluid aging is the process in which a drilling fluid sample, previously subjected to a period of shear, is allowed to more fully develop its rheological and filtration properties. The time period needed to more fully develop properties varies from as little as several hours (usually18 to 24 hours) to as much as several days. The aging can be done at either ambient or elevated temperatures.

- **CAUTION: Wear eye protection whenever drilling fluids are formulated, handled or tested!!!**

Model RCRO-2(2 cells)

Model RCRO-4(4 cells)

Model RCRO-8(8 cells)

- **Features & Benefits**

1. **Lightweight and compact, compatible for lab and field**
2. **Digital temperature controller**

3. **Precise and stable temperature measurements**
4. **Temperature Data Log Output for collecting temperature data**
5. **Uniform temperature distribution**
6. **Efficient and controlled heating**
7. **Better simulation of high pressure/high temperature conditions**
8. **Protection against over-temperature**

Roller Oven Specifications - Aging Cell Capacity

Part No.	Model	Power Supply	Temperature Range	Heater Power	Numbers of Cells	Inside inches / cm	Outside inches / cm	G.W. Pound / kg
173-02	RCRO-2	**AC230V** *(Custom)* AC115V	475°F (246°C)	650 Watt	2	12*10*9 in	21*13*19 in	106 P
						30*26*22cm	53*34*48 cm	48 kg
173-04	RCRO-4		600°F (315°C)	1150 Watt	4	18*18*14in	28*32*27 in	172 P
						46*46*35cm	70*82*69 cm	78 kg
173-08	RCRO-8		600 °F(315°C)	1570 Watt	8	22*14*25in	29*34*28 in	187 P
						56*36*63cm	74*86*72 cm	85 kg

1. AGING CELL (600℉ HIGH TEMPERATURE)

The aging cell is a 500 ml, Type 316 stainless steel pressure vessel, certified for 600°F (315°C) and 2500 psi (17,237 kPa) maximum working pressure.

Teflon Liner and 500mL Aging Cells with pressured valve accessories

Aging Cells Specifications

Part No.	*Material*	*Cell Volume*	*Max. Working Pressure*		*Max. Temp.*		*Shipping information*
			psig	kPa	°F	°C	
175-30	304 Stainless steel	500 mL	2500	17237	500	260	8kg
175-50	316 Stainless Steel	500mL	2500	17237	600	315	10kg
175-60	Teflon Liner with 500mL Aging Cells	500mL	2500	17237	600	315	11kg
175-30-2	304 Stainless steel	260 mL	2500	17237	500	260	5kg
175-50-2	316 Stainless Steel	260mL	2500	17237	600	315	6kg
175-501	Pressurizing Assembly, Valve, 1/8 in.		2500	17237	600	315	0.2kg

2. BALANCE DIGITAL TOP LOADING

The ideal scale for Industrial, Laboratories, Research, Educational, Specialty and more.

Whether weighing multiple fluid samples with totaled results, formulating a mud, counting, percent weighing, specific gravity, or under pan weighing, We has the answer in the Model LT Series digital balance. This digital balance features a flip down protective cover, stainless steel pan and a back-lit display.

- Capacity 2000g
- Readability 0.01g /0.1g
- Protective flip-down and removable plastic cover
- Unique durable design for all applications
- 14 Mass unit conversions (g, oz, lbs, lbs:oz, dwt, ozt, grains, Newton , carats, Taels)
- Optional RS-232 interface kit (field installable)
- Parts counting with selectable reference sample
- 9 volt Battery operation (or included AC adapter)
- External one button calibration with 3 weight options
- Lock down capability

Balance Digital Model LT Series Specifications					
Model	**LT202**	**LT302**	**LT502**	**LT1002**	**LT2002**
Part No.	**202-01**	**302-01**	**502-01**	**1002-01**	**2002-01**
Capacity	200g	300g	500g	1000g	2000g
Readability	0.1/0.01g	0.1/0.01g	0.1/0.01g	0.1/0.01g	0.1/0.01g
Said disc size	Ø115		Ø130		
Display	LCD (with backlighting)				

3. BLENDERS/MIXER

Preparation of drilling fluids and samples used in fluid analysis requires a variety of high speed mixers and blenders. These mixers must conform to *American Petroleum Institute Specification 13A* and require the API recommended single mud impeller blade for mixing either water-based or oil-based drilling fluids. These mixers can also be used to mix cement for field or laboratory testing.

4.1 PART NO. 3070 CONSTANT SPEED BLENDER

The Model 3070 Constant Speed Blender facilitates the preparation of oil well cements for testing according to the guidelines stated within API Specification 10. Research has demonstrated that the properties of well cements are highly dependent upon mixing procedures. When constant speed blenders/mixers are used, data obtained from thickening time tests has greater reproducibility and generally correlates better with data obtained from other laboratories. The Model 3070 provides a means of consistently preparing cement slurries for testing purposes and can also be utilized to mix cements according to the procedures stated by the API.

Method of Operation:

The proper amount of mix water is carefully weighed and poured into the mixing container of the blender. The rotational speed is set to 4,000 RPM and allowed to stabilize. The "START" switch is pressed and the cement is immediately added to the mix water in less than 15 seconds. The rotational speed is automatically increased to 12,000 RPM and the slurry is mixed an additional 35 seconds. A microprocessor maintains the rotational speed and is independent of fluctuations in line voltage and the viscosity of the cement slurry.

Features and Specifications:

- Hardened stainless steel mixing blades
- Stainless steel 1 liter mixing container
- Two preset mixing speeds and variable speed

- Rotational speed is maintained at set point with microprocessor
- Timing relays automatically control mixing times at required RPM
- Digital instrumentation provides excellent readability
- Optional Torque Measuring Module tests crosslinking time for fracturing fluids.

Cementing Constant Speed Blender Specifications			
Part No.	**Model**	**Description &Technical Parameters**	**G.W.**
120-60	HTD-3070	Two preset speeds of 4,000 and 12,000RPM Volume:1000ml ; 230V±5%AC; 50Hz; Power: 380W;	46kg
120-60-1	HTD-3070	Two preset speeds of 4,000 and 12,000RPM Volume:1000ml ; 115V±5%AC; 60Hz; Power: 380W;	46kg

4.2 HAMILTON HIGH SPEED MIXERS

Model HMD-200

Model HMD-400

Most drilling fluid formulations contain a base liquid and additives which must be dissolved or mechanically dispersed into the liquid to form a homogenous fluid. The resulting fluid may contain one or more of the following: water-dispersible (soluble) polymers or resins, clays or other insoluble but dispersible fine solids, and soluble salts.

The fluids are mixed or sheared for times appropriate to achieve a homogenous mixture and are then set aside to "age." Drilling fluid aging is the process in which a drilling fluid sample, previously subjected to a period of shear, is allowed to more fully develop its rheological and filtration properties. Aging is done under conditions which vary from static to dynamic and from ambient to highly elevated temperatures.

Hamilton Beach Mixers, Single and Three-Speed Models are recommended for use in general purpose mixing of drilling fluids in preparation for laboratory tests of mud materials. The Three-Spindle Model has independent speed controls for each spindle. These mixers can also be used to mix cement for field or laboratory testing

Hamilton Beach Mixers Specifications			
Part No.	**Model**	**Description &Technical Parameters**	**G.W.**
205970	HMD-200	1 spindle, Speeds: 0-18,000 RPM No of Speeds: 3. Volume:1500ml ; 220V±5%AC; 50Hz; Power: 200W;	12kg
205974	HMD-400	3 spindle, Speeds: 0-18,000 RPM No of Speeds: 3. Volume:1500ml ; 220V±5%AC; 50Hz; Power: 200W	18kg

4.3 CONSTANT SPEED FREQUENCY MIXER

The Constant Speed Frequency Mixer conforms to API Specification 13A and can be used to mix cement for field or lab testing.

Routine laboratory mixing is easily handled with the Mixer. These mixers are perfect for formulating drilling fluids in the lab, and for pilot testing and mud additive analysis.

Special attention to mixing procedures and reagent preparation is essential in any qualitative fluid analysis. Factors such as low or high shear, initial mix concentrations,

and an ability to change mixing speeds are important considerations when choosing a laboratory or field mixer.

The Mixer has preset rotating speeds of 3000, 4000, 8000, 10, 000, 11,000 and 12,000 rpm/min.

RC-9361

RC-9362

RC-9364

Constant Speed Frequency Mixer ***Specifications***			
Part No.	**Model**	**Description &Technical Parameters**	**Shipping**
152-01	RC-9361	Preset of Speeds: 3000, 4000, 8000, 10, 000, 11,000 and 12,000 RPM 1 spindle, Speeds Range: 0-12,000 RPM. 220V±5%AC; 50Hz; Power: 200W; Volume:500ml ; Time range 0～99 minutes	24kg
152-02	RC-9362	Preset of Speeds: 3000, 4000, 8000, 10, 000, 11,000 and 12,000 RPM 2 spindle, Speeds Range: 0-12,000 RPM. 220V±5%AC; 50Hz; Power: 400W; Volume:500ml×4 ; Time range 0～99 minutes	45kg

152-4	RC-9364	Preset of Speeds:3000, 4000, 8000, 10, 000, 11,000 and 12,000 RPM 4 spindle , Speeds Range: 0-12,000 RPM. 220V±5%AC; 50Hz; Power: 800W; Volume:500ml×4 ; Time range 0～99 minutes	98kg

4.4 PART NO. 163-18 HIGH SPEED DIGITAL MIXER-MODEL GJ-3S

The model GJ-3S machine is special-purpose experimental equipment in petroleum exploration and drilling field. It consists of principal machine and power supply speed regulator. Electrical motor adopts direct current series motor and have the characteristics of small volume, high speeds, small noise, easy maintenance and repair. The numbers on the panel of power supply speed regulator display factual rotating speed.

Part No. 163-18 High speed Digital mixer Specifications			
Item	**Name**	**Technical parameters**	**Remark**
1	Power supply / Rated	220V±5%AC ,50Hz (110V,60HZ); 240W	
2	RPM range	2000～13000rpm/min±3%	
3	Time range	0～90min	
4	Capacity:	500ml	
5	Temperature	0～40℃	
6	Shipping Size & weight	28×42×45 cm ,16 kg	

4.5 PART NO. 151-15 HIGH SHEAR MIXER MODEL D-180

For larger amounts of mud, we recommend the High Shear Mixer!

High Shear Mixer with Stainless Steel Stand,

AC 230 Volt, 4, 000 rpm/minute

The High Shear Mixer achieves a higher shear in less time and maintains a homogeneous material mix without shear depreciation. The mixing head is easily disassembled, cleaned and reassembled. The high shear mixing head and shaft can be provided separately to replace the existing blades and shafts on suitable mixing motors. The mixing motor is mounted on a durable, stable stand that will not vibrate during mixing.

Part No. 151-15 High Shear Mixer Specifications		
Item	**Name**	**Technical Parameters**
1	Volts/Hz /Power	AC230V±5%；50Hz /180W
2	Range	0～4000rpm/min
3	Capacity	50 gallons
4	Packing Information	25*37*70cm 12.0kg

4. CAPILLARY SUCTION TIMER (CST) MODEL CST-440

Adaptable for use as a control parameter for waste disposal facilities

The Model CST-440 Capillary Suction Timer (CST) consists of a digital timer, sample cell, and a specially selected filter paper composed of unidirectional fibers.

Aqueous samples are placed in the sample cell, resulting in variable rates of water passing into the filter paper through capillary suction action. The rates of filtration are dependent upon particle size, solids content, and settling rates of flocculation state. Thus, the instrument is adaptable for use as a control parameter for waste disposal facilities and for classification and qualification of soil types in geotechnical use, evaluation of soil/bentonite liners, and analysis of slurry trench fluids and drilling fluids.

The CST is ideal for use in the field as it operates on a single 9-volt battery which provides over 40 hours of use. A battery eliminator is supplied for laboratory use. The complete CST device consist of a timer unit, test head assembly with funnel, 9 VDC battery and battery eliminator (115 VAC), one box of filter paper, and instructions.

5. VISCOMETER

5.1 MODEL RC-35 VISCOMETERS

The Model RC-35 Viscometer can measure all kinds of rheological parameter, draw flow curve according to the multipoint measure data, determine the flow pattern of liquid during flow behavior, choose the proper formula and take the comparatively accurate measurement for non-Newtonian fluid. It has the characters of simple operation and high accuracy.

It applies to viscosity measurement of drilling fluid in all the big oil fields, scientific research institutions and laboratories and it also applies to geology, chemical industry, coal, wine making and etc.

Viscometer Specifications			
Part No.	**Model**	**Voltage**	**Speeds**
130-06-230	RC-35-6	AC 230V,50Hz	600, 300, 200, 100, 6, 3
Measuring range		Newtonian fluid 1-300mPa.S non-Newtonian fluid 1-150mPa.S	
Shearing stress		0-153.3Pa	
Shipping Size & weight		130-06: 39 X 15 X 27cm ,15 kg	

The Model RC-35 Viscometers are versatile instruments for research or production use. They can be used wherever a regulated-frequency power source is available.

In the six-speed models, test speeds of 600, 300, 200, 100, 6 and 3 rpm are available via synchronous motor driving through precision gearing. Any test speed can be selected without stopping rotation. The shear stress is displayed continuously on the calibrated scale, so that time-dependent viscosity characteristics can be observed as a function of time.

The Model RC-35-12 Twelve total test speeds let you measure over an extended shear-rate range. Test speeds of 600, 300, 200, 180, 100, 90, 60, 30, 6, 3, 1.8 and 0.9 rpm

5.2 MODEL RC-35D ELECTRIC RHEOMETERS

The Model RC-35D Electric Rheometers a new type direct indicating instruments, this is a doddle to control with its well-designed on-screen, and the intelligence Single-Chip Computer system is commissioned in instruments.

In the RC-35D Electric Rheometers, test speeds of 600, 300, 200, 100, 6 and 3 rpm are available via synchronous motor driving through precision gearing. Any test speed can be selected without stopping rotation. The shear stress is displayed continuously on the calibrated scale, so that time-dependent viscosity characteristics can be observed as a function of time.

It applies to viscosity measurement of drilling fluid in all the big oil fields, scientific research institutions and laboratories and it also applies to geology, chemical industry, coal, wine making and etc.

RC-35D Electric Rheometer Specifications			
Part No.	**Model**	**Voltage**	**Speeds**
130-6E-230	RC-35D	AC 230V,50HZ/60HZ	600, 300, 200, 100, 6, 3
Measuring range		Newtonian fluid 1-300mPa.S non-Newtonian fluid 1-150mPa.S	
Shearing stress		0-153.3Pa	

5.3 LCD AUTOMATED DIGITAL RHEOMETER

Model NRC-130

Model NRC-132

The Model NRC-130 and NRC-132 Automated Digital Rheometer measures rheological properties of Newtonian and non-Newtonian fluids.

This rheometer is equipped with R1 Rotor Sleeve, B1 Bob, F1 Torsion Spring, and a stainless steel sample cup for testing according to American Petroleum Institute Recommended Practice.

Application

The Rheometer is suitable for field or laboratory use. A case is available for transporting this instrument.

Advantages

- Pre-programmed API profiles for quick and efficient testing
- Secure fit, left-hand turn for rotor/right-hand turn for bob to help prevent detachment when measuring high viscosity fluids

- OLED display for easier reading
- Push button design for easy operation and better control

Automated Digital Rheometer Specifications

Part No.	Model	Description &Technical Parameters	Remarks
130-06	NRC-130	Power: 100-240 VAC, 50/60 Hz Speeds ange:6 preset(600,300,200,100,6,3) Speed Accuracy: 0.001 rpm Dial Accuracy: 0.5 Dial Resolution: 0.1 Sample Cup Volume : 500ml Torsion Spring : F1 Rotor-Bob : R1, B1 Operating Temperature : 40℉ to 125℉ (4.4℃ to 52℃) Size: 6.5" × 6" × 18" (16.5 × 15 × 46 cm) Weight: 30lb (14 kg)	
132-00	NRC-132	Power: 100-240 VAC, 50/60 Hz 12 preset Speeds: (600,300,200,180,100,90,60,30,6,3,2,1) Shear Rate Range (sec-1): .017-1700 Speed Accuracy: 0.001 rpm Dial Accuracy: 0.5 Dial Resolution: 0.1 Sample Cup Volume : 500ml Torsion Spring : F1 Rotor-Bob : R1, B1 Operating Temperature : 40℉ to 125℉ (4.4℃ to 52℃) Size: 6.5" × 6" × 18" (16.5 × 15 × 46 cm) Weight: 30lb (16 kg)	

6. VISCOMETER ACCESSORIES (THERMO CUPS, TORSION SPRING)

6.1 PART NO. 130-38 THERMOCUPS MODEL RTH-200

Thermocups and cup heaters are designed for controlling the temperature of a mud sample while taking readings with a rheometer or viscometer. Normal heat-up time is 30 minutes and the pilot light turns on when the well reaches the set temperature. Drilling fluid has a low thermal conductivity, so it must be agitated in order to reach a uniform temperature within a reasonable length of time. For safety considerations, the fluid should never be heated above 200°F (93°C). The rotor and bob should not be immersed for long periods in the fluid as vapors will rise up into the bearings and condense, causing corrosion. The holes in the stage of the Viscometers have been positioned to hold the heated cups at a 45° angle to the line of the instrument for better accommodation of thermometers and power cables.

Description: Cup Heater with removable Stainless Steel Cup
For regulated temperatures up to 200°F (93°C)
AC 220 Volt, 50ZH, Rated power: 300W.

6.2 PART NO. 130-45 TORSION SPRING CONSTANTS RTSC-35

Measuring range: continuous measurement within spring stiffness range.

The torsion spring constant is the special purpose measuring apparatus for proofreading and correcting torsion spring stiffness and display data errors of the six

speed direct reading viscometer.

It is a kind of associated checking apparatus for assuring the accuracy of viscometer. The torsion spring constant can proofread and correct six speeds viscometer at any moment and has a high correcting accuracy.

Shipping Information: 15 X 18 X 28cm, 4.0kg

Torsion Spring Constants for Model Viscometer

Torsion Spring assembly	Torsion Spring Constant k1 (dyne-cm/deg. defl)	F Factor	Max. Shear Stress With B1 Bob (dynes/cm2)	Color Code
F0.2	77.2	0.2	307	Green
F0.5	193	0.5	766	Yellow
F1	386	1	1,533	Blue
F2	772	2	3,066	Red
F3	1,158	3	4,600	Purple
F4	1,544	4	6,132	White
F5	1,930	5	7,665	Black
F10	3,860	10	15,330	Orange

7. PART NO. 1200 CONSISTMETER-ATMOSPHERIC MODEL RAC-1200

The Model RAC-1200 (Dual Cell) Atmospheric Consistometer provides a simple method for conditioning the cement slurries in preparation for performing these tests. This instrument is used in laboratories involved in oil well cement research programs, research and testing of cement additives, cement manufacturers quality assurance programs, and in the research for well servicing companies and their field labs

Model RAC-1200 left side **Right side**

Cement slurry is prepared according to the procedure outlined in the API Specification 10 and then placed in the slurry containers of the Model RCA-1200 Atmospheric Consistometer. The slurry is stirred at 150 RPM by an API designed paddle assembly. The temperature is controlled by a microprocessor, which displays the process temperature via a digital indicator. Consistency, measured in Bearden Units of Consistency, is determined by measuring the deflection of a calibrated spring. This deflection is created by the amount of torque that the cement slurry exerts on the paddle, which is a function of the consistency of the cement. The API defines 100 Bc as 2,080 g-cm of torque.

Features:

- Maximum operating temperature of 100℃ (212°F)
- Unit is operated at atmospheric pressure
- Temperature is maintained via a PID controller
- Process temperature is displayed digitally
- Heat transfer fluid is continuously circulated
- Heater wattage is 1,500
- Slurry container rotational speed is 150 rpm per API specifications
- Dual container design
- Cooling system included
- Stainless steel temperature bath
- Deadweight calibration unit

- Crated Size: 65 cm x(43 cm x(47 cm Crated Weight: 65.00 kg

Requirements

- Water Supply for Cooling
- Water Drain
- 220 Volt, 50/60 Hz, 3 KVA Power Source

8. PART NO. 1250 MODEL RAC-1250 CONSISTOMETER-ATMOSPHERIC

With the paperless memory recorder

Model RAC-1250

9. CONSISTOMETER-HPHT WITH DATA ACQUISITION SYSTEM

The High-Pressure, High-Temperature (HPHT) Consistometer measures cement slurry viscosity or consistency under elevated pressure and temperature conditions. Its primary function is to determine the maximum available pumping time of a cement slurry before the slurry reaches an un-pumpable consistency before setting. While designed for cement slurries, the effects of pressure, time and temperature can also be observed for other fluids, emulsions, dispersions, or slurries under static or dynamic conditions.

Instruments for Testing Drilling Fluids

The HPHT Consistometer exposes a cement slurry sample to a controlled set of parameters of temperature, agitation and pressure that simulate the down-hole conditions. During a test, these parameters are carefully monitored and precisely controlled by the system software.

A flat panel, High-Resolution, LCD touch-screen provides the interface between the user and the software. The LCD screen provides real-time viewing of temperature, pressure, and consistency data in graphic and text formats. This data is automatically recorded to a database for future analysis to help predict the cement slurry's down-hole performance.

Part No. 8040 Model RHC-8040(Double cell), Part No. 8020 Model RHC-8020 (Single cell)

The Model 8040 and 8020 HTHP Consistometer are designed to condition cement slurries as specified within API Specification 10, and the data sheet as following for your reference:

1. Maximum operating temperature of 600 F (315.5℃)
2. UNIT working pressure: 40000 psi (275,800 kPa)
3. Temperature is maintained via a PID controller 0-100Bearden
4. Slurry container rotational speed is 150 RPM per API specifications
5. Air/Nitrogen Supply: 100 - 150 PSI / 690 - 1,035 kPa
6. 220-Volt, 50/60 Hz, 7.5 KVA power source, 30 Amp electrical power supply

7. Water Supply for Cooling: 40 PSI / 276 kPa

8. Water Drain

9. **Model RHC-8020** Size: 65.4 × 19.3 × 37.4 inches (166 × 79 × 95 cm),

Create Weight: 1500 lb (680 kg)

10. **Model RHC-8040** Size: 65.4 × 19.3 × 49.2 inches (166 × 79 × 125 cm)

Create Weight: 2398 lb (1090 kg)

REQUIREMENTS

- Electrical Power Supply: 230 Volts，50HZ (60HZ specify)
- Current: 30A
- Cooling Water Supply: 30 psig min. (0.207 mPa)
- Compressed Air Supply: 90 psig min. (0.621 mPa)
- Drain for Cooling Water

SAFETY FEATURES

Rupture disc for accidental chamber overpressure

Automatic power shutdown if test temperature exceeds safe operating limits or if a break occurs in the temperature controlling thermocouple

10. PART NO. 7720 RHC-7720 BENCHTOP HTHP CONSISTOMETER

The Model RHC-7720 HTHP Consistometer (Single Cell) is designed to condition cement slurries as specified within API Specification 10, and the data sheet as following for your reference:

Model RHC-7720 Front

Right Side

Left Side

- Maximum operating temperature of 400 F(204.4℃)
- UNIT Working pressure : 20,000psi (1380 kPa)
- Temperature is maintained via a PID controller 0-100Bearden
- Slurry container rotational speed is 150 RPM per API specifications
- 220-Volt, 50/60 Hz, 4 KVA power source，25 Amp electrical power supply
- Air/Nitrogen Supply: 100 - 150 PSI / 690 - 1,035 kPa
- Water Supply for Cooling: 40 PSI / 276 kPa
- Water Drain
- Size: 37.4 × 29.5 × 21.6 inches (95 × 75 × 55 cm)
- Create Weight:330 lb (150kg)

SOFTWARE FEATURES

- Friendly and Flexible User Interface
- Unlimited storage for test data

11. CEMENT CURING CHAMBER

Cement Curing Chambers are specifically designed to prepare cement samples for comprehensive strength testing in strict accordance with API and ISO specifications. These pressurized curing chambers contain pressure vessels with controlled heating rates, and are used to cure standard two-inch cement cube samples. We curing chambers are available to cover the wide range of temperatures and pressures associated with actual conditions found in oil well cementing applications.

CURING CHAMBER TESTING

Testing to determine the compressive strength of samples is usually done after the samples have been in the pressure vessels for periods of 8, 12, and 24 hours, and seven days. The actual testing of the cubes is done with a compressive strength tester. The tester will crush the samples in compliance with the API Specification 10 requirements. The pressurized curing chambers are used in laboratories involved in oil well cement research programs, research and testing of cement additives, cement manufacturer's quality assurance programs, and in the research and field laboratories of well servicing companies. Various models of the series 3, 5 and 30 are available. These units, with their options, cover a wide range of operational temperatures and pressures to simulate a wide variety of down-hole conditions. Both single and dual cell units are available. The dual cell units offer the advantages of a minimum requirement of laboratory space. They also offer a slightly lower cost per cell because two pressure vessels are combined into one cabinet.

BENEFITS

Special long-life "Bridgeman" seal proven to be extremely reliable under high temperature stress and does not require cooling.

Units operate to extremely high temperatures and pressures to include well conditions with geo-thermal temperatures and ultra deep pressures.

We design. Data has shown that the useful life of this unit can easily exceed ten years with normal routine maintenance.

The internal cooling coils permit the circulation of a cooling fluid to cool the chamber quickly -maximizing the number of tests that can be run in a day.

Every curing chamber is fully tested in the factory to the maximum rating of the unit, ensuring that the instrument is completely and satisfactorily operational.

COMMON AVAILABLE MODELS INCLUDE:

11.1 PART NO.7360 BENCHTOP HTHP CURI NG CHAMBER

ITEM	DESCRIPTION	REMARK
1	Rupture Disk:5,500 PSI (38 MPa)	
2	Maximum Temperature:400.0 °F,(204.4°C)	
3	Power Supply:AC 220 Volts, 50 Hz, 40 Amp	
4	Cooling Water Supply:40psi	
5	Nitrogen Supply: Maximum 150 PSI	
6	Safety Features: Pressure Relief Valve, Safety Head with Rupture Disk	
7	Environmental Temperature: 32 to 105°F (0-40°C)	
8	Industry standards API Specification 10	

9	Shipping Information Gross Weight :120kg Dimensions: 72 × 51 × 62 cm	

11.2. PART NO.7370 HTHP CURING MODEL RCC-7370

ITEM	DESCRIPTION		REMARK
1.	Rupture Disk	6,000 PSI (41 MPa)	
2.	Max. Temp.	700.0 °F,(370°C)	
3.	Single Cell	8 cubes	
4.	Power Supply	220 Volts, 50/60 Hz, 30 Amp	
5.	Cooling Water Supply	40psi	
6.	Nitrogen Supply	Maximum 150 PSI	
7.	Safety Features	Pressure Relief Valve Safety Head with Rupture Disk	

8.	Environmental Humidity:	0-95% non condensing	
9.	Environmental Temp.	32 to 105°F (0-40°C)	
10.	Industry standards	API Specification 10	
11.	Shipping Information	Gross Weight 836 lb (380kg) Dimensions: 90×70×160 cm	

11.3. PART NO.7375 HTHP CURING CHAMBER RCC-7375

ITEM	DESCRIPTION		REMAR
1	Rupture Disk	6,000 PSI (41 MPa)	
2	Max. Temp.	700.0 °F,(370°C)	
3	Dual (2) cells	8 cubes / cell (16 total cubes)	

4	Power Supply	220 Volts, 50/60 Hz, 40 Amp	
5	Cooling Water Supply	40psi	
6	Nitrogen Supply	Maximum 150 PSI	
7	Safety Features	Pressure Relief Valve Safety Head	
8	Environmental Humidity:	0-95% non condensing	
9	Environmental Temp.	32 to 105°F (0-40°C)	
10	Industry standards	API Specification 10	
11	Shipping Information	Gross Weight :1300 lb (590kg)	

11.4. CURING CHAMBER- ATMOSPHERIC RCCA- 2128

Part No.2128 Chamber Model RCCA-2128 Specifications

ITEM	DESCRIPTION		REMARK
1	Rupture Disk	Atmospheric	
2	Max. Temp.	210.0 °F,(100°C)	
3	Power Supply	220 Volts, 50/60 Hz	
4	Environmental Humidity:	0-95% non condensing	
5	Environmental Temp.	32 to 105°F (0-40°C)	

12. CENTRIFUGES

Part No. 196-02 Centrifuges Manually Operated HC-2000

Part No. 196-03 Centrifuges Manually Operated HC-2100

Centrifuge mechanically subjects fluids to increased “G forces” that accelerate the settling rate of particles within the fluid. This procedure separates particles from fluids into heavy-coarse and light-fine fractions and is dependent upon separation by particle size and specific gravity.

This hand driven centrifuge is perfect for field use. The simple compact design eliminates complicated operation and assures years of dependable service.

Model HC-2000

Model HC-2100

Two-place centrifuge head includes metal shields for holding 10cc tubes.

Hand Driven – Max Speed is 2000 RPM.

The centrifuge body is constructed of lightweight aluminum alloy with an integral clamp for fixing to a table. Removable pin connections for head and crank handle make storage easy.

Two-place head includes metal shields for 15mL tubes

13. PART NO. 147-50 ELECTRICAL STABILITY TESTER (EST)

The Electrical Stability Tester (EST) is a battery powered portable instrument that conforms to the test procedure described in API *Recommended Practice 13B-2*.

The EST is calibrated in peak volts which is the maximum voltage that the fluid experiences between the two electrodes. Peak voltage may be converted to Root Mean Square (RMS) voltage by multiplying the peak voltage by 0.7071.

Electrical Stability Tester (EST) Specifications

Part No.	Model	Description & Technical Parameters	Remark
147-50	EST	Output Frequency: 340 ± 2 Hz (0-2000v) Output wave form : Sinusoidal Output voltage range: 0 to 2025 V ± 25 V peak to ground (1432 RMS) Breakdown peak output current : 61 micro-amps (1.59mm) Voltage ramp rate : 150 ± 10 V/second Power supply : AC 230V, Internal 27 V batteries Battery life : Approximately 500 tests Accuracy: Cal. Standard; ± 10 V - sample, ± 3% of reading Repeatability: Cal. Standard; ± 5 V - sample, ± 2% of reading Operating temperature range. : 32° to 122°F (0° to 50°C) Dimensions: 25* 15* 12cm (9.8in* 5.9* 4.7in) Complete Weight 11 lbs (5 kg)	

Components:

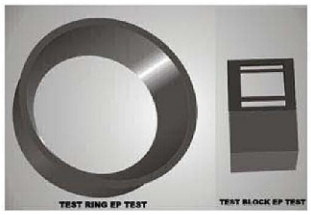
1. Probe with Cable, Battery Holder, 9-Volt
2. Switch - Push Button - On / Off ,Battery, 9-Volt Alkaline

14. PART NO. 112-02 EP / LUBRICITY TESTER MODEL EP-212

Combination EP Lubricity Tester

The ***Model EP-212*** Combination EP (Extreme Pressure) and Lubricity Tester is a high-quality instrument designed to measure the lubricating quality of drilling fluids, provide data to evaluate the type and quantity of lubricating additives that may be required, and predict wear rates of mechanical parts in known fluid systems.

EP tests are performed by applying a measured force with a torque arm to a torque-sensitive, rotating bearing cup. This provides a means of testing lubrication under extreme pressure conditions and produces an indication of the film strength of the fluid being tested.



Parts of test ring and test block

The problem of reduction of friction between the drill string and the borehole requires a different simulation. The more common lubricity test measures fluid resistance (lubricating character) between two hardened steel moving surfaces at a hundred pounds force (which translates into a 5,000 to 10,000 psig (34,470 to 68,940 kPa) pressure on the intermediate fluid film). During the lubricity test, a steel block is pressed against a rotating steel ring. Load in inch-pounds is read directly from the dial on the torque arm.

EP/Lubricity Tester capabilities:

Measure the lubricating quality of drilling fluids

Provide data to evaluate the type and quantity of lubricating additives that may be required

Predict wear rates of mechanical parts in known fluid systems Measure of friction is a requirement for the determination of the film strength of a lubricant, for bit bearing wear, as is obtained in EP test and for the determination of torque or drag of the drill pipe as determined in the lubricity test.

EP and Lubricity Tester Specifications

Part No.	Model	Description & Technical Parameters	Remark
112-02	EP-212	Functions include pre-set speeds (60, 200, 600, and 1000 RPM), Manual speed control and torque zeroing. Maximum Speed - 1,000 RPM Maximum Torque - 600 inch-pounds Power Supply: 230 Volt Crated Dimensions: 48* 35* 35 cm (19.9in* 13.8* 13.8in) Crated Weight 105.6 lbs (48 kg)	

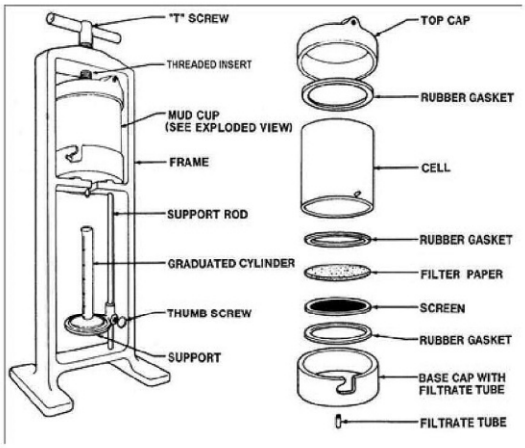
15. FILTRATION - API (LPLT)

Model RCLF-1A Filtration-API Low Pressure/Low Temperature

The low pressure/low temperature filter press design features a cell body to hold the mud sample, a pressure inlet, and a base cap with screen and filter paper. Suitable for field and laboratory use, these units have become the industry standard for low pressure/low temperature filtration testing.

Measuring filtration behavior and wall-cake building characteristics of a mud is essential to drilling fluid control and treatment. The characteristics of the filtrate, such as oil, water or emulsion content, are also fundamentally important. The types and quantities of solids in the fluid and their physical and chemical interactions affect these characteristics. Temperature and pressure in turn affect the physical and chemical interactions. It is therefore necessary to run tests at both low-pressure/low-temperature and high-pressure/high-temperature. Each of these testing conditions requires different equipment and techniques. The most effective means of determining the filtration properties of drilling muds and cement slurries

The Series RCLF-1A APT Low Pressure Low Temperature (LPLT) Filter Press consists of a mud reservoir mounted in a frame, a pressure source, a filtering medium, and a graduated cylinder for receiving and measuring filtrate. The basic unit has a cell assembly constructed of rustproof anodized aluminum and chrome plated brass, and includes the required screen and gaskets.



Filter Press Basic Unit (Graduated Cylinder shown is not included in Basic Unit)

Working pressure is 100 psig and the filtering area is 7.1-in2, as specified in the American Petroleum Institute, API Recommended Practice 13B-1 and 13B-2.

Ordering Information

Model RCLF-1A
Graduated Cylinder, 25 ml,3 ft Air Hose, Regulator, Bleeder Valve , Hand Pump Pressure Assembly, Filter Paper, Pkg. of 100

Components:
API Bench Mount Filter Press - Basic
Filter Paper, 3 1/2" (8.9 cm), 100/pkg Screen, 60 Mesh
Pressure Assembly

Model RLFM-6A Multiple Unit Filter Press LPLT

Multiple Unit Filter Press assemblies permit simultaneous running of one to six filtration tests. Each one of the assemblies consists of a frame with the indicated number of complete filter cells. Manifolds are complete with air hoses, cut-offs and bleeder valves. Accessories such as pressure regulators and hoses for connection to pressurization source are sold separately.

Ordering Information:

Filter Press API

Part No.	Model	Description	Remark
140-10	LFP-1C	Filter Press W/Case, Hand Pump pressure assembly Working pressure is 100 psig(0.7mPA) the filtering area is 7.1-in2(45.8cm2) 240ml Sample Cell	
140-20	RCLF-1A	Hand Pump pressure assembly Working pressure is 100 psig(0.7mPA) The filtering area is 7.1-in2(45.8cm2) 350 ml Sample Cell	
140-30	RCLF-2A	CO2 Balloon Pressure Assembly Working pressure is 100 psig(0.7mPA) The filtering area is 7.1-in2(45.8cm2) 350 ml Sample Cell	
140-35	RCLF-3A	CO2(N2) Tanks with Assembly Working pressure is 100 psig(0.7mPA) The filtering area is 7.1-in2(45.8cm2) 350 ml Sample Cell	
140-40	MFP-4A	4 units 350ml Cells Regulator Assembly ,For Nitrogen(CO2) Pressure Working pressure is 100 psig(0.7mPA) The filtering area is 7.1-in2(45.8cm2)	
140-60	MFP-6A	6 units 350ml Cells Regulator Assembly ,For Nitrogen(CO2) Pressure Working pressure is 100 psig(0.7mPA) the filtering area is 7.1-in2(45.8cm2)	

16. FILTRATION – HPHT

FILTER PRESS (HIGH-PRESSURE, HIGH TEMPERATURE)

High Pressure-High Temperature (HPHT) Filter Presses are an efficient means of evaluating the filtration properties of drilling muds at high temperatures and pressures. The cells have a filtering area of 3.5 in2 and can be operated at pressures up to 900 psi with the compact, easily attached CO2 pressuring unit provided.

Measurement of the filtration behavior and all-cake-building characteristics of an oil mud are fundamental to the treatment and control of a mud, as are the characteristics of the filtrate, such as the oil, water or emulsion content.

Filtration characteristics of an oil mud are affected by the quantity, type and size of solid particles and emulsified water in the mud and by properties of the liquid phase. Interactions of these various components may be influenced by temperature and pressure. Therefore, filtration tests are often performed at both ambient temperature and at high-temperature conditions to provide data for comparison purposes.

Safety Feature

CELLTELL POSITIVE PRESSURE INDICATOR

HPHT Filter Presses are furnished with the **CellTell™ Positive Pressure Indicator**. The **CellTell™** Positive Pressure Indicator provides an instant indication of the pressure status of any HPHT cell. The **CellTell** is unaffected by temperature, and resistant to motion caused by vibration and rotation. **CellTell** positive pressure indicators

are standard equipment on all configurations of HPHT cells assemblies and all versions of HPHT Filter Presses.

HPHT Filter Presses are available in various component configurations which allow for greater flexibility in choosing the system and options that suite each individual need. Pressurization; with CO2 Cartridges, bottled Nitrogen, or an in-house (user provided) source. Single or double opening cells; that accept different filter media. Filter media; that includes the API standard Filter Paper, Ceramic Discs of several calculated porosities, and various mesh sized screens.

1. Model RCFH-71 FILTER PRESS 500ML

Model RCHFH-71 500 ml HPHT Filter Press units can be pressurized to 1800 psig on the cell and 750 psig on the back pressure receiver. Maximum operating temperature is 500°F. For operation above 400°F, the filter paper should be backed with a glass fiber filter, or a stainless steel filter.

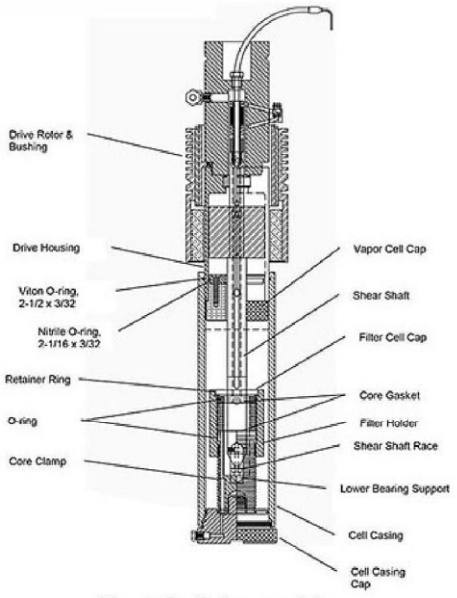
Model RCFH-71 Filter Press 500ml	
Maximum Working Pressure	1800 PSIG
Maximum Temperature	500 °F
Power Requirement	220/110 VAC 50/60 Hz
Sample Cell Volume	500 ml
Receiver Volume	100 ml
Heating Capacity	800 watts
Filtering Area	22.6 cm² (3.5 in²)

2. Model RCFH-42 FILTER PRESS 175ML

Model RCFH-42 FILTER PRESS 175 ml HPHT Filter Press units can be pressurized to 1200 psig on the cell and 750 psig on the back pressure receiver. Maximum operating temperature is 350°F. The filter paper should be backed with a glass fiber filter, or a stainless steel filter.

Model RCFH-42	
Maximum Working Pressure	1200 PSIG
Maximum Temperature	350 °F
Power Requirement	115/230 VAC 50/60 Hz
Sample Cell Volume	175 ml
Receiver Volume	15ml
Heating Capacity	400 watts
Filtering Area	22.6 cm² (3.5 in²)

17.MODEL DHF-1 DYNAMIC HPHT FILTER PRESS



Test Cell Assembly

Instruments for Testing Drilling Fluids

HPHT filtration testing determines if fluid is properly conditioned to drill through permeable formations. Test results include two numbers: the dynamic filtration rate and the cake deposition index (CDI). The dynamic filtration rate is calculated from the slope of the curve of volume versus time. The CDI is calculated from the slope of the curve of volume/time versus time.

Utilizing a wide range of available filter mediums, the DYNAMIC HPHT filtration system can be heated and pressurized to provide the closest possible simulation of down-hole conditions. Several safety features have been designed into the system to protect the user and help ensure reliable test results.

The filter medium is a thick-walled cylinder with rock-like characteristics to simulate the build-up of filter cake on the formation. The filter medium is available in varying porosities and permeabilities to simulate down hole formations.

Filtration occurs radically from the inside of the filter core to the outside. At the same time, the filter cake is formed on the inside of the filter core to simulate filter cake formation on the wall of a borehole. Following completion of a test, the filter cake can be inspected visually. A polished stainless steel shear bob runs through the central axis of the filter core. The shear bob is rotated to produce a concentric cylinder-type shear across the filtration surface.

Ordering Information & Specifications

Working pressure	1800 psig
Maximum temperature	500°F
Maximum differential pressure	500+ psig (actual maximum limited by core strength)
Maximum power requirements	1500 watts
Heater power	1200 watts
Power supply	120/240V, 50/60 Hz

Sample volume	500 cc
Filtrate volume	50 cc
Shear bob drive	¼ hp motor with belted magnetic drive; no dynamic seals to wear out
Shear rate constant	2693 1/s per rpm (no filter cake)
Initial shear rate range (with standard bob)	9, to 269 1/s
Dimensions	12.5 x 17.75 x 28 in (305 x 455 x 711 mm)
Weight	170 pounds (77 kg)

Operational Features

• Fully automatic control with built-in computer controller; 8-line, 40-column LCD display; 16-key input control; menu-driven software

• Ramping of temperature, pressure, differential pressure, and shear rate can be established with up to 20 sequence steps

• Automatic volume collection of filtrate; data reported in 1/3 cc increments

• Each data point comprised of elapsed time, total volume of filtrate, pressure, differential pressure, sample temperature, and shear rate

• Data from most recent test stored in non-volatile memory, which allows user to view data on LCD display, print for hardcopy analysis, or download to PC

• Two test sequences stored in memory:

- Standard test that cannot be edited by operator

- Most recent test sequence used, which can be retrieved and edited before use

• Audible tones to alert user of outer limit parameters

• Built-in pump for automatic purge cycle to saturate the core and clear air from pressure lines; magnetically-driven pump to eliminate dynamic seals and leakage potential

• Single pressure port for high pressure; back pressure regulated automatically

• External yoke cell that requires no threaded closures; threaded bottom cap to facilitate cell loading and unloading

• Magnetically-driven shear bob with rpm monitoring; 30-1000 rpm rotation speed

• Quick-connect fittings on filtrate hoses

Safety Features

• Rupture disk on high pressure gas supply

• Safety pressure relief valve on the heated, pressurized cell

• Independent over-temperature shutdown

• Heater and motor cut-off interlock door when door is opened

• Automatic cool-down upon completion of test

• Proper positioning of cell and collector required before system will pressurize

• Pressure must be relieved to less than 5 psig before the cell can be disassembled for cleanup

• Cell design uses no stressed threaded closures, no set screws or caps which require tightening

• Cell constructed of Monel K500 with stainless steel end caps

• Unit has no welded joints on stressed parts

• All stainless steel pressure fittings

18. PART NO. 197-01 GARRETT GAS TRAIN TEST MODEL RHS-2

The concentration of soluble sulfides or soluble carbonates in a drilling fluid can be determined by the Garrett Gas Train method. The **Garrett Gas Train** (GGT) measures the concentration of sulfides or carbonates in drilling fluids and drilling fluid filtrates. This measurement gives a quantitative indication of the rate and amount of intrusion of hydrogen sulfide or carbon dioxide from the formation in the drilling fluid.

The Garrett Gas Train kit contains all hardware and reagents required to conduct the procedure according to *API Recommended Practice 13B-1, ANSI/API 13B-1/ISO 10414-1*. Two types of Dräeger tubes are supplied to adequately span the range of hydrogen sulfide concentrations that may be found in water based drilling fluid filtrates and in oil based drilling fluids. CO2 Dräeger tubes and 1 liter gas bags are supplied for determination of carbonate concentration. Inert carrier gases, both CO2 and NO2 are supplied for all tests. All items are securely packaged in a waterproof, high-impact plastic carrying case.

Hydrogen Sulfide Test Paper discs (supplied) can be used in the Garrett Gas Train to give a qualitative indication of the presence of sulfide. If the presence of sulfide is indicated by darkening of the paper disc, a Dräeger tube should be used for quantitative analysis.

Sulfides

Soluble sulfides include H2S and the sulfide (S2-) and bisulfide (HS-) ions. Drilling fluid filtrate is acidified in a Garrett Gas Train, converting all sulfides to H2S which is evolved by bubbling an inert carrier gas through the sample. The gas train separates the gas from the liquid. The gas stream is passed through a Dräeger tube which responds to H2S by darkening along its length. The darkened length is proportional to the total sulfide in the drilling fluid filtrate. The low-range Dräeger tube, H2S 100/a, (0-120 ppm) turns from

white to brownish-black. The high-range Dräeger tube, H2S 0.2%/A, (60-4080 ppm) turns from pale blue to jet-black.

Carbonates

Total soluble carbonates include CO2 and the carbonate (CO32-) and bicarbonate (HCO3-) ions. Drilling fluid filtrate is acidified in a Garrett Gas Train, converting all carbonates to CO2, which is then evolved by bubbling an inert carrier gas through the sample. The gas train separates the gas from the liquid. The gas stream is collected in a 1 liter gas bag (to allow CO2 to mix uniformly) and subsequently drawn through a Dräeger tube at a fixed flow rate. The Dräeger tube responds to CO2 by progressively staining purple along its length. A reaction between CO2 and a hydrazine chemical causes a crystal violet indicator to turn purple. The stain length is proportional to the total carbonate concentration in the filtrate.

19. PART NO.153-52 HYDROMETER KIT MODEL RH-8

The Hydrometer Kit includes eight (8) hydrometers to measure specific gravity in the range from 0.8 to 2.4 specific gravity (SG) at 60°F. A thermometer with a scale of -30°F to 120°F is a standard accessory to the kit. All the instruments are protected in a non-corrosive, padded, easy to carry case. Individual pieces of the kit are available upon request. A 250ml cylinder (made of heavy glass) is offered as a convenient addition to the kit.

All hydrometers measure to the nearest 0.002 specific gravity. These hydrometers are recommended for use in brine analysis and are designed to work in conjunction with the Brine Test Kit.

20. HTHP SWELL METER MODEL RHSM-2A

Drilling problems such as stuck pipe, tight hole, washout, and sloughing can be related to shale stability. The Capillary Suction Timer (CST) and the Linear Swell Meter (LSM) help determine if specific shales are likely to cause drilling and completion problems.

The HTHP Swell Meter is designed to test and study the reactivity of shales encountered in oil well drilling. The objective is to apply the information to anticipate and/or correct problem shale encounters, thereby minimizing drilling risks and costs caused by these often times unpredictable materials. Much attention has been given over the years to the development of chemical and mechanical tests and to diagnostics methods that can measure the reactivity of shales.

The HTHP Swell Meter Model RHSM-2A helps determine shale hydration or dehydration by measuring the increase or decrease in length over time of reconstituted or intact shale core. Together the swell Meter and Capillary Suction Time (CST) tests determine the recommended mud system for drilling

through a specific shale formation. First, a CST test is conducted to determine the correct inhibitor for the shale. Then, a variety of fluids are tested.

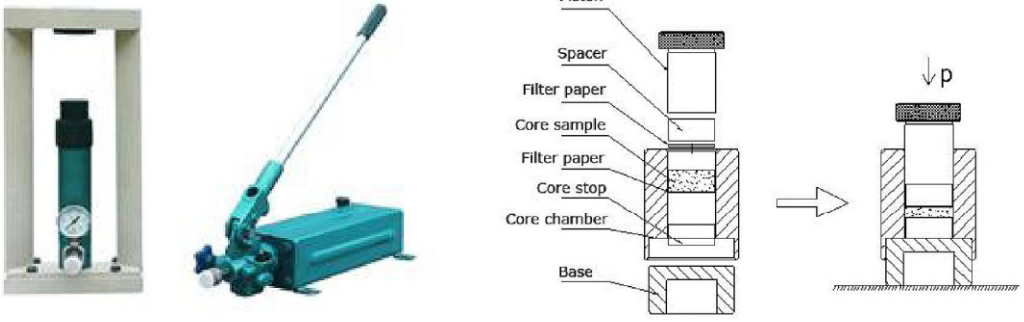
Test results are graphed to show the percent of swelling versus swelling time in minutes. The swell meter test demonstrates the inhibitive effects of these various fluids on shale swelling.

Maximum Working Pressure	508 PSIG
Maximum Temperature	<250 °F
Power Requirement	115/230 VAC 50/60 Hz
Testing Range	15mm
Testing resolution ratio	0.01mm
Heating Capacity	200 watts
Non-linear	0.3%
Gas Source	> 5mPa (N2 or compressed air)

21. DYNAMIC LINEAR SWELL METER

Part No. 150-87 Dynamic Linear Swell Meter with Data Acquisition System and Compactor and Computer

Helps determine shale hydration or dehydration



Instruments for Testing Drilling Fluids

Problems such as stuck pipe, tight hole, washout, and sloughing can be related to shale stability. Tests used to determine if a specific shale is likely to cause problems include the capillary suction time (CST) test and the linear-swell meter (LSM) test. CST test results show the inhibitive effects of various slats and their concentrations on the dispersion of a shale.

The Linear Swell Meter is designed to simultaneously test up to four drilling fluids (expandable to eight) on a representative shale sample for extended periods of time at temperatures up to 200°F.

The Linear Swell Meter (LSM) helps determine shale hydration or dehydration by measuring the increase or decrease in length over time of reconstituted or intact shale core. Together the LSM and Capillary Suction Time (CST) tests determine the recommended mud system for drilling through a specific shale formation. First, a CST test is conducted to determine the correct inhibitor for the shale. Then, a variety of fluids are tested.

Test results are graphed to show the percent of swelling versus swelling time in minutes. The LSM test demonstrates the inhibitive effects of these various fluids on shale swelling.

Most swell meters are designed to test shale samples in static fluid. However, fluids circulate as you drill, so testing shale samples in a static environment does not always provide accurate readings.

Part No. 150-87 Dynamic Linear Swell Meter W/ Data Acquisition System			
Part No.	Model	Description	Remark
150-87	DLSM-87	Stirring Speed: 0-2500rpm Working Temperature: 0-93℃ (200℉) Measuring Range: 0-20mm Accurancy: 0.01mm Sample Diameter: 28.6mm Measuring Units 4 head Power supply : 240V, 50/60 Hz Size: 98* 48* 26cm (38.6* 18.9* 10.2in) Weight: 68kg (149.6lb)	

22. SWELLING METER-NORMAL PRESSURE& TEMPERATURE NP-01

Investigating the swelling characteristics of shale formations is vital in selecting a proper drilling fluid to give maximum inhibition and wellbore stability. While drilling a well, a shale formation will immediately begin to swell if the drilling fluid is not completely compatible with the formation. This swelling can cause many problems, such as bit balling, pipe drag, hole sloughing, or other “gumbo” related problems. Therefore, selecting the proper drilling fluid prior to, or during the drilling operation, can be very beneficial in achieving a stable wellbore.

Ordering Information:

DESCRIPTAION	*SPECIFICATIONS:*
Testing Range	15mm
Testing resolution ratio	0.01mm
Cylinder capacity:	24ml

23. MARSH FUNNEL VISCOMETER MODEL MLN-3

The Marsh Funnel Viscometer is a rugged, easy to operate instrument that is used for making rapid, on the spot measurements of drilling mud viscosity. The Marsh Funnel readings are only general measurements, but the frequent reporting of the Marsh Funnel Viscosity will alert the mud engineer to sudden changes in the mud viscosity that could require corrective action.

The Marsh Funnel Viscosity is the ratio of the speed of the mud as it passes through the outlet tube (the Shear Rate) to the amount of force - the weight of the mud itself - that is

causing the mud to flow (the Shear Stress). Marsh Funnel Viscosity is reported as the number of seconds required for one quart of mud to flow out of a full Marsh Funnel.

MEASURING THE VISCOSITY OF DRILLING MUD

NOTE A. In addition to the Marsh Funnel, this procedure requires a container to collect a mud

sample, a graduated container to receive the mud as it flows out of the funnel, some way to measure elapsed time (preferably a stop watch), and a centigrade or fahrenheit thermometer for measuring the temperature of the mud sample (See the Parts List).

NOTE B. The Marsh Funnel should be clean and dry before beginning this procedure.

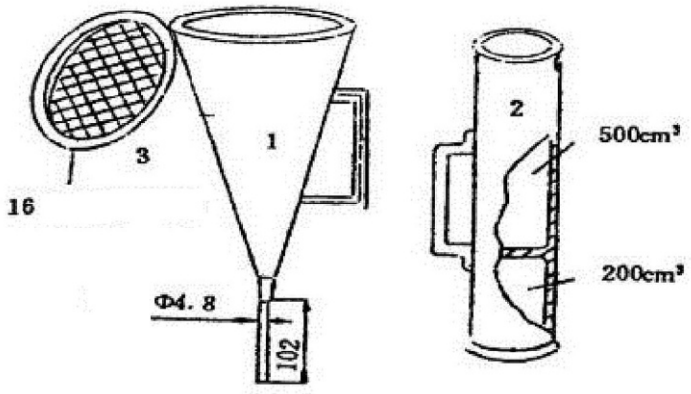
PROCEDURE

1. Collect a fresh mud sample.

2. Hold the funnel erect with a finger over the outlet tube, and pour the mud into the funnel through the screen until the mud level reaches the bottom of the screen (The screen will filter out the larger particles that could clog the outlet tube).

NOTE C When the Marsh Funnel is filled to the proper level it holds more than one quart of mud.

1. Quickly remove the finger from the outlet tube, and at the same time, begin timing the mud outflow.



4. Allow one quart (946 cc) of mud to drain from the Marsh Funnel into a graduated container.

5. Record the number of seconds it takes for the quart of mud to flow out of the funnel, and report this value as the Marsh Funnel Viscosity. Also record the temperature of the mud sample in degrees F or C.

CARE OF THE FUNNEL

Follow these suggestions to care for the Marsh Funnel:

1. Clean and dry the funnel thoroughly after each use.

2. Take special care not to bend or flatten the brass outlet tube at the bottom of the funnel. The Marsh Funnel Viscosity readings are computed using the exact diameter of this outlet and if the outlet is distorted the readings will be inaccurate.

CALIBRATION CHECK

Periodically check the calibration of the Marsh Funnel by measuring the viscosity of fresh water. The funnel is dimensioned so that the outflow of one quart (946 cc) of fresh water at a temperature of 70‘±5‘F (21‘±3‘C) is 26±0.5 seconds. If the Marsh Funnel checks out of calibration, it should be cleaned again, using a pipe cleaner, to make sure that there is nothing obstructing the outlet. If the Marsh Funnel continues to give an incorrect reading for fresh water after cleaning then the outlet tube probably has been bent out of shape and the funnel should be replaced.

MLN-3

MLN-3S

ORDERING INFORMATION

Marsh Funnel Viscometer, Plastic Model

Measuring Cup, Plastic

Measuring Cup, Stainless Steel

24. METHYLENE BLUE TEST KIT MODEL RMBT-25

The Methylene blue dye test is especially designed to determine the capacity of a clay to absorb cations from a solution, and thereby predict how the clay will react in its intended use. The clay may be component of a drilling fluid, a binder in foundry sand, or clay used for some other purpose. The Methylene Blue Test is based on the property of clays known as Base Exchange capacity; that is, clays can exchange some of their ions for the ions of certain other chemicals. The number of ions available for this exchange varies with different types of clay. Western Bentonite, for example, has more Base Exchange capacity than Southern Bentonite. However, only the reactive portions of the clays are involved in the Base Exchange process. Picture above is the Methylene Blue Adsorption Kit with 220 Volt.

25. MUD BALANCE MODEL RCMB

2-Scale Mud Balance, Machined Arm, with Case

Constructed of premium metals for durability, accuracy and ease of use

The Model RCMB Series Mud Balance provides a simple, practical method for accurate determination of fluid density.

It is one of the most sensitive and accurate field instruments available for determining the density or weight-per-unit-volume (specific gravity) of drilling fluids.

An outstanding advantage of this Mud Balance is that the temperature of the sample does not materially affect the accuracy of readings. A high impact plastic case protects the balance during transport and provides a secure base in its working position.

The Model RCMB Series Mud Balance is constructed with an easy-to-read beam graduated into four scales:

- **pounds per gallon**

- **specific gravity**

The volume of space occupied by entrapped gas or air bubbles in a sample fluid may distort the accuracy of the fluid density measurement. This distortion can be significantly reduced by pressurizing the fluid. The density of a fluid containing entrained air or gas can be determined more accurately by using a pressurized fluid density balance.

Part No.112-02 4-Scale Mud Balance, with Case, Model RC-140

Constructed of premium metals for durability, accuracy and ease of use

The Model RC-140 Mud Balance provides a simple, practical method for accurate determination of fluid density.

It is one of the most sensitive and accurate field instruments available for determining the density or weight-per-unit-volume (specific gravity) of drilling fluids.

An outstanding advantage of this Mud Balance is that the temperature of the sample does not materially affect the accuracy of readings. A high impact plastic case protects the balance during transport and provides a secure base in its working position.

The Model RC-140 Mud Balance is constructed with an easy-to-read beam graduated into four scales:

- **pounds per gallon** **specific gravity**

- **pounds per cubic foot pounds per square inch per 1,000 feet of depth**

The volume of space occupied by entrapped gas or air bubbles in a sample fluid may distort the accuracy of the fluid density measurement. This distortion can be significantly reduced by pressurizing the fluid. The density of a fluid containing entrained air or gas can be determined more accurately by using a pressurized fluid density balance.

Mud Balance Specification

Part No.	Model	Description	Remark
115-04	RCMB-4	Material: Stainless Steel Measuring Range(2 Scales):5.8-24 lb/gal(0.7-2.9 gms/cm^3 Specific Gravity) Accuracy:0.01% Mud capacity:140ml Size:50*12*12cm ,Weight:2kg	
115-07	RCMB-7	Material: Stainless Steel Measuring Range(2 Scales): 0.8-13 1b/gal (0.1-1.5 gms/cm^3) Accuracy:0.01% Mud capacity:140ml Size:50*12*12cm ,Weight:2kg	
112-20	RC-140	Material: Aluminium Alloy Measuring Range(4 Scales): 6-24 lb/gal 310-1250 lb/sq in/100ft of depth 45-180 lb/cu ft 0.72-2.88 gms/cm^3 Specific Gravity Accuracy:0.01% Mud capacity:140ml Size:50*12*12cm ,Weight:2kg	

26. TRU-WATE PRESSURIZED BALANCE MODEL RPMB-31

Instruments for Testing Drilling Fluids

Density is a measurement of fluid weight per unit of volume. This measurement is often referred to as mud weight and is reported as Gravity gms/cm3 or as Specific gallon, pounds, the primary function of monitoring density is to control formation pressures and minimize loss of returns.

Pressurized Fluid Density Scale Model RPMB-31

The volume of space occupied by entrapped gas or air bubbles in a sample fluid may distort the accuracy of the fluid density measurement. This distortion can be significantly reduced by pressurizing the fluid. The density of a fluid containing entrained air or gas can be determined more accurately by using a pressurized fluid density balance.

If gas or air bubbles are present in the drilling fluid, the volume occupied by the entrapped gas bubbles may distort the accuracy of the fluid density measurement. This distortion can be significantly reduced by pressurizing the fixed volume of the fluid in the cup, thereby preventing the gas from expanding. The density of a fluid containing entrained air or gas can be determined more accurately by using a pressurized fluid density balance. The pressurized fluid density balance is similar in operation to the conventional mud balance, the difference being that the slurry sample can be placed in the fixed volume cup under pressure.

The Convertible Pressurized Density Balance is a precise, self-contained measuring device used to accurately determine the densities of drilling fluids, cement slurries and similar materials under pressure. This unique instrument can be used as a conventional (non-pressurized) fluid balance or as a pressurized instrument when required. The conversion from one mode to the other is simple and requires only a few moments to complete.

Pressurized Mud Balance id built to traditional standards.
It can withstand the rigors of field use as well as perform consistently and accurately.

FEATURES:

- Field convertible from atmospheric to pressurized operation
- Density readings in four convenient and different scales
- Hand operated
- Easy to clean
- Durable and field ready
- Lower cost than currently available pressurized mud balances
- Designed to API Specifications
- Portable and reliable

Mud Balance RPMB-31 Specification

Part No.	Model	Description	Remark
115-31	RPMB-31	Material: Stainless Steel Measuring Range(2 Scales): (7.5-26lb/gal) / 0.9-3.1 gms/cm^3 (Specific Gravity) Accuracy: 0.01% Mud capacity: 210ml Size: 58*21*16cm Gross Weight: 8kg	

27. MUD TEST KIT / RIG LAB

The Porta Lab family of products has been used by drilling fluid engineers around the world for over forty years. When a series of tests is needed at the drilling site, The Porta Lab includes the entire range of instruments necessary to measure the parameters of a successful drilling fluid operation. The kits are enclosed in rugged, durable cases, built to withstand harsh conditions.

The Rig Lab contains a Direct Reading Viscometer, retort kit, mixer for pilot testing, API filter press, sand content set, pH Meter, glassware for chloride, alkalinity and water hardness tests.

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We can provide customized strokes according to client requirement!!

28. PART NO. 171-91 PERMEABILITY PLUGGING APPARATU PPT-189

The Permeability Plugging Apparatus (PPA) is a high pressure, high temperature instrument designed to simulate downhole static filtration. The PPA operates at temperatures and pressures that represent well conditions, and the filtration medium is positioned above the sample fluid.

The PPA is very useful in predicting how a drilling fluid can form a low permeable filter cake to seal off depleted, under pressured intervals and help prevent differential sticking. Typical differential pressures are much higher than those seen in standard HTHP testing.

The permeability plugging test is useful in predicting a drilling fluid's ability to form a semipermeable filter cake that will seal off depleted under pressure intervals and help prevent differential sticking.

Pressure is applied from the bottom of the cell and filtrate is collected from the top. This arrangement prevents particles that settle during the static test from contributing to the buildup of filter cake. This is important because settling would not normally happen in a well.

Hydraulic pressure is transferred to the drilling fluid sample through a floating piston within the cell. Hydraulic oil and sample contamination is prevented through an O-ring seal on the piston.

The maximum test pressure is 5000 psi (34,473 kPa). And the maximum temperature is 500°F (260°C). The maximum pressure for the backpressure receiver is 750 psi (5171 kPa).

The PPA assembly consists of the following items:

- **PPA Heating Jacket**
- **5000 psi (34,473 kPa) psi stainless steel PPA cell**
- **Backpressure Receiver**
- **Carbon Dioxide Pressurizing Assembly**
- **Hydraulic Hand Pump Assembly**
- **Dial Thermometer**
- **Graduated Cylinder**

29. FA-BX PORTABLE PERMEABILITY PLUGGING APPARATUS

Portable Permeability Plug Apparatus is used to determine penetration depth of drilling fluids. Put 180 cm3 sand (particle size is between 20 meshes and 40 meshes) on filter screen in transparent cylinder drilling fluids cup with no filter paper. Pour 250cm3 drilling fluids in it and fasten upper cup cover. Put through gas source and adjust pressure to 0.69MPa. Open air release valve and let gas into drilling fluids cup, then begin to measure. It has a filter area of 45.6±0.6cm2 (1±0.1in2). Pressure is provided by gas that passes by adjustor. Observe penetration depth of drilling fluids through transparent

cylinder body. It is widely used in oil field, geologic exploration and laboratory to analyze and determine drilling fluids.

Technical Parameters:

1.Effective filter area: 18 cm^2

2.Working pressure: 0.69MPa

3.Volume of injected sand: 180 cm^3

4.Volume of injected drilling fluids: 250 cm^3

5.Outline size: 400× 250× 900mm

30. PH METERS – DIGITAL RELATED TOPICS

Digital pH Meter Model PHS series

The Lab Model Digital pH Meter is a high-quality, bench-type lab pH meter designed to measure the entire pH scale (0-14). This meter has a wide milli-volt range (± 1999). The unit provides accuracy and readability of .02 pH ,The automatic temperature compensation (ATC) range on this instrument runs from 0° to 100° Centigrade. The ATC probe (included with meter) plugs into the front panel of the meter and automatically adjusts the readout to measure temperature variations in the fluid. The analog recorder output may be continuously used in conjunction with a recorder to display and record the pH measurements.

31. PART NO.147-85 RESISTIVITY METER MODEL RMR-100

The Digital Resistivity Meter is a portable measuring instrument designed to give a quick, reliable measurement of the resistivity from a small sample, expressed in Ohm-Meters. This transistorized meter accurately measures the resistivity of fluids, slurries, and semi-solids with resistivities from 0.01 to

100 Ohm-Meters. In addition to resistivity, the device also displays temperature. These solid state electronic instruments are designed to meet the needs of field and laboratory personnel for resistivity measurement according to API procedure.

A built-in temperature probe provides direct measurement of the sample temperature in the transparent Lucite® cell. The instrument features an easy-to-read LCD display for high accuracy. The meter is battery powered and is rugged enough for field usage.

Resistivity Range: 0.01 to 100 Ohm-Meters

Temperature Range: 10 to 50℃ (50 - 122°F)

Cell Length: 3.4" (86.4 mm)

Internal Rechargeable Batteries or AC 230V

Carrying Case: 10.4" × 7.9" × 5.9" (265 × 200 × 150 mm)

Gross Weight: 5kg (11 lbs)

The main technical parameters of the apparatus are listed in the following table.

ITEM	NAME	Technical Parameters
1	Power supply	AC220V±10%；50±1 Hz
2	Continuous working time with rechargeable cell	30 hours
3	Working environment temperature	10～50（℃）
4	Measuring range	0.01～100（Ω·m）
5	Measuring uncertainty	2.0～5.0（Ω·m）variable range in ±3% Others in ±5%
6	Measuring temperature range	10～50（℃）with precision range in ±1℃
7	Setting of standard temperature	15～35（℃） with step is 1℃

8	Compensation of auto-temperature	—10～10（℃）with step is 0.1℃

32. RETORT OIL AND WATER KIT

The Oil and Water Retort provides a simple, direct field method for determining the percent by volume of oil and water in samples in drilling mud or in core samples of the formation. The Retort has been found to be especially useful in determining the oil content of emulsion muds

Suspended and dissolved solids are determined by subtracting these from 100 percent of the initial sample. For fresh-water fluids, the relative amount of barite and clay can be estimated. Corrections must be made for salt in the calculation for solids content by volume.

Model RROW-20

Model RROW-50

Model RROW-50E

Retort Kit Specifications			
Part No.	Model	Description & Technical Parameters	Remark
165-20	RROW-20	Sample Cup: 20 mL capacity Working Temperature: 930°F ± 70° F (516 ±22°C). AC220V,50 Hz,120Watts Dimensions:26*20*14cm(10.3*7.9*5.5in) Weight:8 kg (17.6 lbs)	
165-50	RROW-50	Sample Cup: 50 mL capacity Working Temperature: 930°F ± 70° F (516 ±22°C). AC220V,50 Hz,180Watts Dimensions:31*21*17cm(12.2*8.3*6.7in) Weight:12kg (26.4lbs)	
165-50E	RROW-50E	Sample Cup: 50 mL capacity Working Temperature: 930°F ± 70° F (516 ±22°C). AC220V,50 Hz,700Watts Dimensions:38*24*18cm (15*9.5*7.1in) Weight:19kg(41.8lbs)	

33. MODEL RC-2 LOST-CIRCULATION MATERIAL DEVICE

A type RC-2 of lost-circulation material that is chunky in shape and prepared in a range of particle sizes. Granular LCM is added to mud and placed downhole to help retard the loss of mud into fractures or highly permeable formations. Ideally, granular LCM should be insoluble and inert to the mud system in which it is used. Examples are ground and sized limestone or marble, wood, nut hulls, Formica, corncobs and cotton hulls. Often, granular, flake and fiber LCMs are mixed together into an LCM pill and pumped into the well next to the loss zone to seal the formation into which circulation is lost.

This instrument is made in accordance with API recommend practice and a plugging pressure backing device is added aims to checkout the pressure needed for damaging the plugging zone and research the structure strength of LCM. In addition, this instrument is easy to operate

In the selection of lost circulation material (LCM) it is very important to determine its shut-off capacity to the formation. The hole size changes with the formation so the particle size of LCM must be selected. This instrument is used to help evaluating the LCM. It can simulate different formation effectively using different sized cracks and bed and can evaluate the shut-off efficiency and volume of leakoff before the seal.

Table 1 the technical parameters

ITEM	SPECIFICATIONS	
1	Barrel Capacity	4000ml
2	Gas supply	nitrogen
3	Pressure	0~7MPa
4	Crack size No.	1～6
5	Plugging depth	0～ 77mm

34. PART NO.167-00 SAND CONTENT TEST KIT MODEL RSCT-200

A simple, accurate and inexpensive sieve analysis apparatus for determining the sand content of drilling muds

Sieve analysis is the preferred method for sand content determination because of the reliability of the test and simplicity of equipment. The volume of sand, including that of void spaces between grains, is usually measured and expressed as a percentage by volume of the drilling fluid.

The kit consists of a special 200-mesh sieve 2½ inches in diameter, fastened inside a collar upon which a small funnel is fitted on either end. This is used with a 10 ml glass measuring tube,

graduated to read from 0 to 20% the percentage sand by volume. The collar and funnel are made of polyethylene and the screen is made of brass.

Sand Content Kit Specification			
Part No.	Model	Description	Remark
167-00	RSCT-200	Mesh sieve: 200-mesh sieve 2½ inches in diameter Glass measuring cylinder:100ml Graduated to read:0.2ml Size:26*12*12cm Weight:2kg	

35. SHEAROMETER KIT MODEL RSK-5

The Shearometer is used for determining the gel strength of drilling muds. The results are read directly from a calibrated scale, and give gel strength in pounds of shear per 100 square feet of area. The Shearometer Kit includes a Shearometer cup with graduated scale, two 5-gram Shearometer tubes and instructions.

When left under static conditions in normal to high tempera tures at the bottom of an open borehole, some fluids tend to thicken and, in some cases, may in predicting the performance of drilling fluids under static, high temperature conditions. A special 20-gram Shearometer Tube with weight support is available for test on drilling mud after aging at high temperature.

36. PORTABLE TURBIDITY METER MODEL RPTM-10

Instruments for Testing Drilling Fluids

The Portable Turbidity Meter combines laboratory accuracy and reliability in an extremely compact, portable instrument for turbidity measurement. It is the ideal choice for regulatory monitoring, process water testing, and environmental water analysis in the field or laboratory. With a wide range of 0 - 4,000 NTUs (Nephelometric Turbidity Units), a microprocessor enables full scale auto-ranging. The direct digital readout has a resolution of 0.01 for the lowest range, with an accuracy of ±2% (0 - 50 NTU) or ±3% (> 50 NTU). A multi-detector optical configuration assures long term stability and minimizes stray light and color interferences. All readings are determined by the process of signal averaging over a 5-second period. This process minimizes fluctuations in readings attributed to large particles and enables rapid, highly repeatable measurements. The unit is supplied with a 9-volt alkaline battery, an AC power adapter, four optically selected sample vials with screw caps, a standardization package of 1.0 NTU and 10.0 NTU standards, and a sturdy carrying case.

Size: 3.4" x 6.4" x 2.6" (9 x 16 x 7 cm)
Weight: 13 lb (5.9 kg)

37. ULTRASONIC CEMENT ANALYZER WITH STATIC GEL STRENGTH

The Ultrasonic Cement Analyzer (UCA) offers a nondestructive method for measuring the compressive strength of cement. The UCA applies an ultrasonic pulse to cement slurry and measures the change in velocity as the ultrasonic Signal travels through the slurry as it cures. These ultrasonic velocity measurements are correlated to the cement's compressive strength.

The UCA system consists of the following:

1. Processor, control software, monitor, and keyboard
2. Pressure controller
3. Autoclave

Application

The UCA continuously monitors the strength development trend of cement compositions while the cement is curing.

The user can determine the initial set time and the wait-on-cement (WOC) time of cement slurry. This test data is useful for planning a cementing schedule for a well.

UCA System Features

Measures up to 8 samples simultaneously with additional autoclaves

Individually controls and monitors autoclaves, up to 8

Displays real-time graph for monitoring slurry quality

Stores unlimited amount of test data

Records and displays signals (events) when sample reaches user-defined strength and time values, up to four each

Start Wizard gives step-by-step instructions and key reminders to prevent errors and missed steps

Data Manager Features

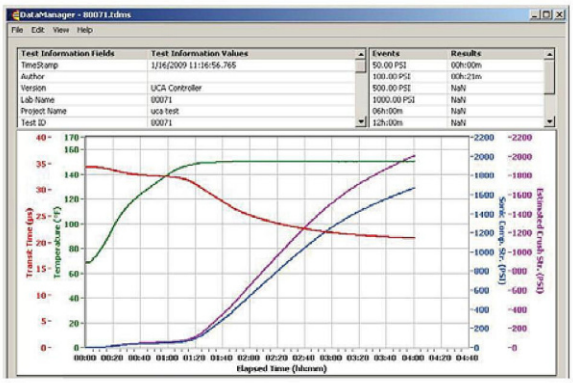
Recalculates data for different cement type or temperature units

Choice to print or save as PDF

Saves data as TXT or CSV file for exporting into spreadsheet or analyzing after test ends

Option to calculate data for new compressive strength or time events after test ends

Zoom in or out on graph for detailed view



Specifications	
Temperature Range	40°F to 400°F 4.4°C to 204°C
Pressure Range: Pressure Controller, 6000 psig	600 psig to 6,000 psig 4 MPa to 41 MPa

Pressure Range : Pressure Controller, 20,000 psig	2000 psig to 20,000 psig 13.8 MPa to 138 MPa
Cup Volume	200 ml
Heating Rate	8oF /min 4.4oC /min
Power	230 VAC, 50/60 Hz, 10 amp
Shipping Information	Dimensions (wxdxh) 29 in. x 20 in. x 29 in. / 74 x 51 x 74 cm Weight 205 lb / 93 kg

**Manufacturer's specifications subject to change without notice*

38. WATER HARDNESS TEST KIT MODEL RWHT-3S

We call the total concentration of calcium ion (Ca^{2+}) and magnesium ion (Mg^{2+}) in water sample the hardness of water. It is an important index for water quality. This meter adopts the electrode method to test and it has the same accuracy with EDTA titration method

2) Adopts 601-F water hardness combination electrode which consists of measuring electrode, Ag/AgCl reference electrode and temperature sensor. The PVC sensitive membrane of measuring electrode made of active material comes from new neutral carrier. It has equal selectivity for Ca2+ and Mg2+ ion in water sample. It has features of new structure, stability potential, fast response speed and easy to use

3) The meter adopts intelligent chip design, which has automatic calibration, automatic temperature compensation, data storage, RS-232 output and stored date locked automatically and other intelligent functions

4) Five water hardness units can be chosen freely: mmol/L, mg/L (CaCO3), mg/L (CaO), mmol/L (Boiler), mg/L (Ca) and other three units, fH (France degree), dH (German degree) and eH (British degree), can be optional used in WH-Link communication

software

5) Equipped with B1, B2 and B3 three calibration solutions

6) Downloads reading to a computer using the RS-232 output port for later analysis

Range: 1.50 x 10^{-2} to 1.00 x 10^{2} mmol/L

Resolution: 0.01 and 0.1 water hardness units.

Accuracy: ±5% full scale

Temperature compensation: 5 to 50°C (automatic or manual)

Communication Connector:

RS-232 output, be equipped with WH-Link communication software.

Calibration Solution: B1, B2 and B3/btl (250mL)

Magnetic Stirrer Model 601 Magnetic Stirrer

Data Storage 128 groups

Power DC9V power adaptor

Dimension and weight 160 x 190 x 70mm/750g;

Electrode Model 601-F water hardness combination electrode.

39. PART NO.165-19 WET SIEVE ANALYSIS KIT MODEL PSA-635

The Particle Size Kit contains all of the equipment necessary to perform particle size analysis as specified in API Specification 13A.

The major solids component of a drilling fluid is often the weight material Barite. The American Petroleum Institute outlines several test procedures that help assure the quality of this important ingredient. Among these is the wet screen procedure for particle size analysis.

The kit is furnished complete with the Standard screens of 200 and 325-mesh, screen holder, and spray wash assembly. The flow pressure regulator is rated for 125 to 200 psig inlet pressure. The outlet pressure is adjustable from 0 to 30 psig The spray system includes a pressure monitoring gauge (0 to 30 PSI), one 24" water hose, and an adapter plug for easy connection to a water supply.

The complete system contains all the components required for a connection to a water source. The spray nozzle has a number TG 6.5 tip with a 1/4 TT body and is attached to the hose with a 1/4 FNPT stainless steel 90 degree elbow.

Part No. 165-19 Wet Sieve Analysis Kit

Part No.	Model	Description	Remark
165-19	PSA-635	Working Pressure:0-10psi Sample Cell:400ml The Standard screens is 200 and 325-mesh Size: 9" × 6" × 6" (23 × 15 × 15 cm) Weight: 11 lb 5 oz (5 kg)	

40. DIFFERENTIAL STICKING TESTER

Measures the Stuck Tendency Coefficient with the Timed Filtrate Test

Model DST-01

Model HDST-02

The Differential Sticking Tester was designed to determine how likely a given drilling fluid will be to produce a *stuck pipe* situation and how effective a given drilling fluid treatment or application of spotting fluid in any given drilling fluid would be in reducing this tendency. This measurement is called the *Stuck Tendency Coefficient*. It takes into account both the stickiness and the cake building capability of the drilling fluid. The Stuck Tendency Coefficient is determined by the Timed Filtrate Test.

The use of the optional yoke attachment along with the radius'd torque plate allows a measurement called *Bulk Sticking Coefficient* to be obtained. By measuring the area of caking using a controlled cake thickness during the test, the Bulk Sticking Coefficient is obtained. The Bulk Sticking Coefficient is determined by the Fixed Cake Thickness Test.

The unit can be pressurized by the CO2 regulator assembly or from any nitrogen source. If Nitrogen is to be used, the Differential Sticking Tester must be fitted with a suitable Nitrogen regulator, gauges, relief valve, hose and fittings.

Differential Sticking Tester Specifications

Part No.	Model	Description &Technical Parameters	Remarks
150-50	DST-01	Stainless steel vessel of approximately 200 mL Working Pressure :477.5 psig (3,291 kPa) Size: 6.5" × 6" × 18" (16.5 × 15 × 46 cm) Weight: 30lb (14 kg)	
150-55	HDST-02	Working Pressure: 477.5 psig (3,291 kPa) Working Temperature: up to 170℃ (340℉) Size: 13.8" × 23.6" × 18" (35 × 50 × 60 cm) Weight: 77lb (35 kg)	
151-60	VFM-3A	Power supply:220V 50HZ Turnover speed:5.5-6.5minutes/round Digital display of the Angle reading Accuracy:0.5% Size:14.6" × 9.3" × 9.3" (35 × 21 × 21 cm) Weight :13 lb. (6 kg)	

PRODUCT CATALOG

DRILLING INSTRUMENTATION

...Quality is Everything...

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1. PRESSURE INDICATING SYSTEM

1.1 MUD PUMP PRESSURE GAUGES

standpipe-type gauges provide dependable, accurate pressure readings

Stand Pipe Gauges provide a quick, accurate display of pump pressure. Main applications are for standpipes and to be mounted on mud pumps. This style of gauge has been in service for many years and has proven to be a tough, dependable and reliable way to monitor pump pressure.

Interchangeable with Cameron type gauges

Temerature range -20 to 250(-29 to 121)

3 gauge models offering a multitude of sizes,pressure ranges and sub end conections

Sub end connections made from steel,stainless steel or bronze.

Dial ranges in PSI,BAR,KGC and KPA.

Model 8 gauges offer dual unit of measure.

Cases made with aluminum .

Sour gas and charpy available.

Flanged subs can have inconel or stainless steel inlays

Hummer Union end and Flange connections.

Xylan coated high pressure adapters

Pressure plug on backside for safely.

TYPE F PRESSURE GAUGE (MODEL 6)

Model F Gauge (Model 6) for capacities up to 20,000 PSI

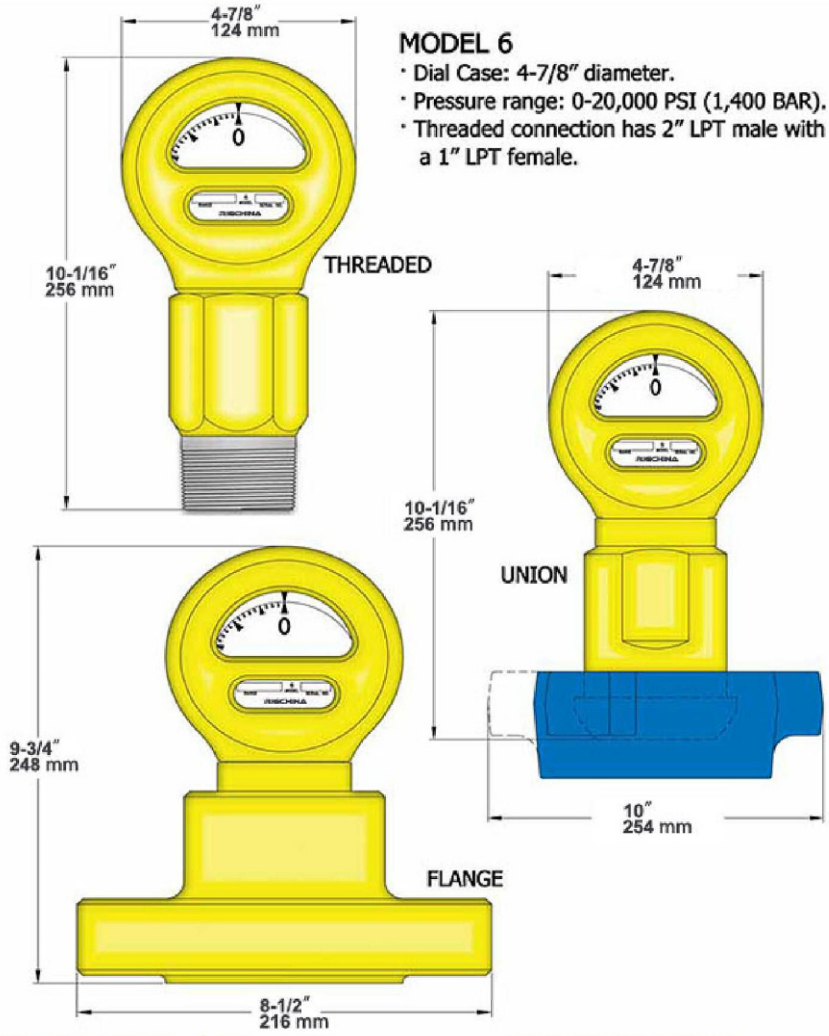
STANDPI PE

UNI ON

FLANGE

FEATURES:

Diameter: 4-7/8"(124 mm), Height: 10-1/16" (256 mm)



Pressure range:

7MPa, 14MPa, 21MPa, 25MPa, 35MPa, 40MPa, 60MPa, 80MPa, 100MPa, 120Mpa,160MPa

1,000 PSI, 1500PSI 3,000 PSI. 5,000 PSI, 6,000 PSI, 10,000 PSI, 15,000 PSI and 20,000PSI

70 Bar, 140 Bar, 210 Bar, 350Bar, 420 Bar, 700Bar, 1,040 Bar and 1,400 Bar

Temperature range: -50°F to 180°F

Liquid surrounding gauge mechanism minimizes wear from vibration and mechanical shock

Heavy duty seals create watertight barrier around gauge mechanism

Combination threaded male 2" line pipe and threaded female 1" line pipe connection

TYPE D PRESSURE GAUGE (MODEL 7)

Model D Gauge for capacities up to 6,000 PSI

STANDPI PE

FLANGE

FEATURES:

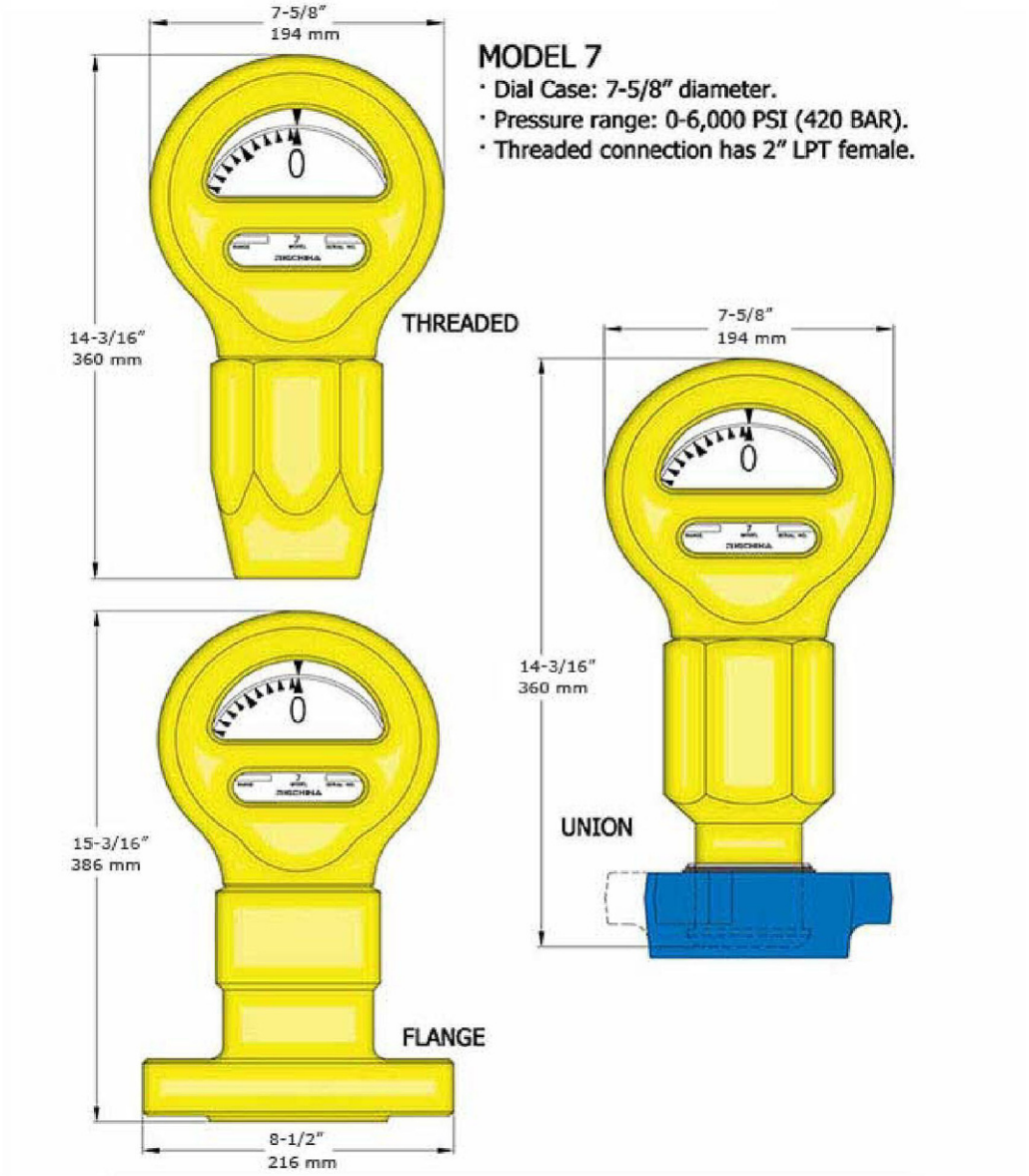
Standard capacities of:

1,000 p.s.i., 3,000 p.s.i. 5,000 p.s.i and 6,000 p.s.i.

70 Bar, 210 Bar 350 and 420 Bar

* 2" Nutted version available

Diameter: 7-5/8"(194 mm), Height: 14-3/16"(360 mm)



Temperature range: -50°F to 180°F

Liquid surrounding gauge mechanism minimizes wear from vibration and mechanical shock

Heavy duty seals create watertight barrier around gauge mechanism

Impact resistant, clear polymer lens

Connects with threaded female 2" line pipe

TYPE E PRESSURE GAUGE (MODEL 8)

Model 8 Gauge for capacities up to 20,000 PSI

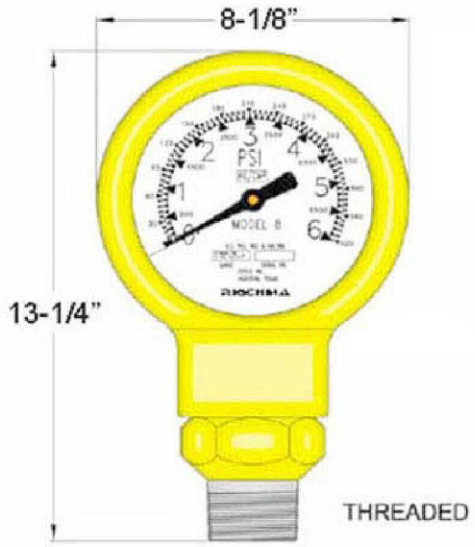
Liquid surrounding gauge mechanism minimizes wear from vibration and mechanical shock

Heavy duty seals create watertight barrier around gauge mechanism

Impact resistant, clear polymer lens

Dial sizes: 8-1/8" (206 mm) dials

STANDPI PE



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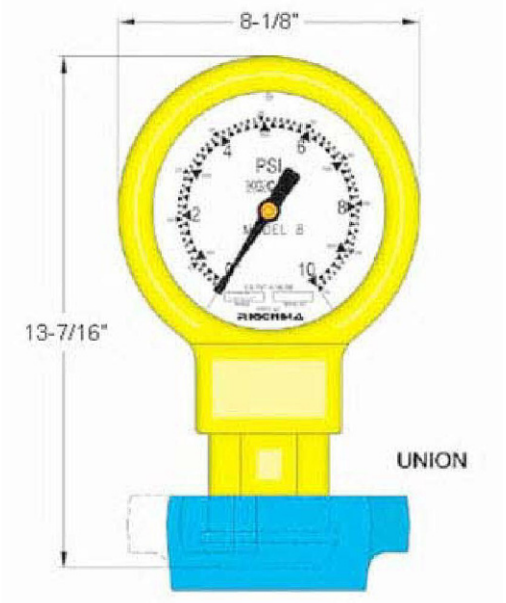
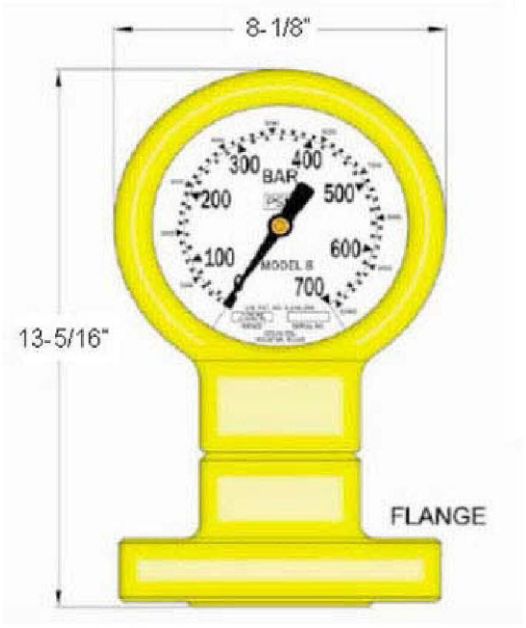




FLANGE

FEATURES:

Standard capacities of:

7MPa,14MPa,21MPa,25MPa,35MPa,40MPa,60MPa,80MPa,100MPa,120MPa and 160MPa
1,000 PSI, 1500PSI 3,000 PSI. 5,000 PSI, 6,000 PSI, 10,000 PSI,15,000 PSI and 20,000PSI
70 Bar, 140 Bar, 210 Bar, 350Bar, 420 Bar, 700Bar,1,040 Bar and 1,400 Bar
Accuracy: ± 1.6% of full range

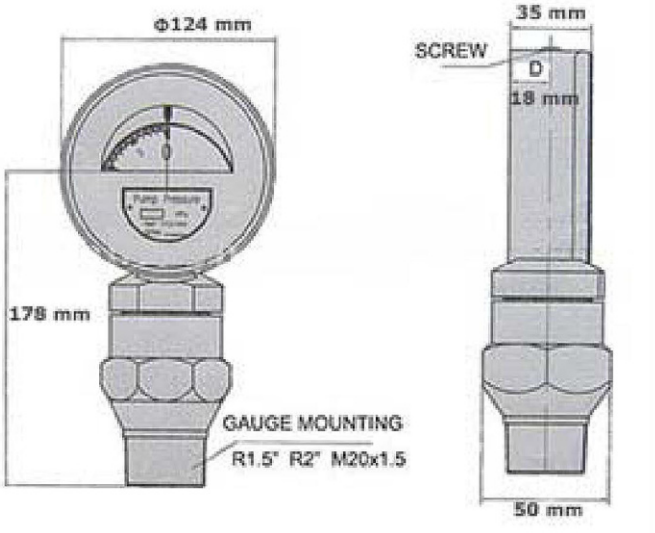
Threaded:2” LPT male with 1” LPT female

Temperature range: -50°F to 180°F

TYPE RC-100 PRESSURE GAUGE

Model RC-100 Gauge for capacities up to 20,000 PSI

STANDPI PE



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FEATURES:

Standard capacities of:

7MPa,14MPa,21MPa,25MPa,35MPa,40MPa,60MPa,80MPa,100MPa,120MPa and 160MPa
1,000 PSI, 1500PSI 3,000 PSI. 5,000 PSI, 6,000 PSI, 10,000 PSI,15,000 PSI and 20,000PSI
70 Bar, 140 Bar, 210 Bar, 350Bar, 420 Bar, 700Bar,1,040 Bar and 1,400 Bar
Dial sizes: 124 mm dials

Accuracy: ± 1.6% of full range

Threaded:2" LPT male with 1" LPT female or 2" LPT female

Temperature range: -50°F to 180°F

Liquid surrounding gauge mechanism minimizes wear from vibration and mechanical shock

Heavy duty seals create watertight barrier around gauge mechanism

Impact resistant, clear polymer lens

TYPE RC-150 PRESSURE GAUGE

Model RC-150 Gauge for capacities up to 20,000 PSI

STANDPI PE

UNI ON

FLANGE

FEATURES:

Standard capacities of:

7MPa,14MPa,21MPa,25MPa,35MPa,40MPa,60MPa,80MPa,100MPa,120MPa and 160MPa
1,000 PSI, 1500PSI 3,000 PSI. 5,000 PSI, 6,000 PSI, 10,000 PSI,15,000 PSI and 20,000PSI
70 Bar, 140 Bar, 210 Bar, 350Bar, 420 Bar, 700Bar,1,040 Bar and 1,400 Bar
Dial sizes: 100 and 150 mm dials

Accuracy: ± 1.6% of full range

Threaded:2" LPT male with 1" LPT female or 2" LPT Female

Temperature range: -50°F to 180°F

Liquid surrounding gauge mechanism minimizes wear from vibration and mechanical shock

Heavy duty seals create watertight barrier around gauge mechanism

Impact resistant, clear polymer lens

Main Technical Specification

Part-No.	Model	Description &Technical Parameters	Remarks
125-6	F(6)	Dial sizes: 4-7/8" (123 mm) dials Accuracy: ± 1.6% of full range Pressure Range: 7MPa,14MPa,21MPa,25MPa,35MPa,40MPa,60MPa,80MPa, 100MPa,120MPa and 160MPa 1,000 PSI,1500PSI 3,000 PSI. 5,000 PSI, 6,000 PSI, 10,000 PSI,15,000 PSI and 20,000PSI 70 Bar, 140 Bar, 210 Bar, 350Bar, 420 Bar, 700Bar, 1,040 Bar and 1,400 Bar Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 11lb (5 kg)	
200-7	D(7)	Dial sizes: 4-7/8" (123 mm) dials Accuracy: ± 1.6% of full range Pressure Range: 7MPa,14MPa,21MPa,25MPa,35MPa,40MPa and60MPa 1,000 PSI,1500PSI 3,000 PSI. 5,000 PSI and 6,000 PSI, 70 Bar, 140 Bar, 210 Bar, 350Bar and 420 Bar Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 33lb (15 kg)	
200-8	8	Dial sizes: 8-1/8" (206 mm) dials Accuracy: ± 1.6% of full range Threaded:2” LPT male with 1” LPT female Pressure Range: 7MPa,14MPa,21MPa,25MPa,35MPa,40MPa,60MPa,80MPa, 100MPa,120MPa and 160MPa 1,000 PSI, 1500PSI 3,000 PSI. 5,000 PSI, 6,000 PSI, 10,000 PSI,15,000 PSI and 20,000PSI 70 Bar, 140 Bar, 210 Bar, 350Bar, 420 Bar, 700Bar, 1,040 Bar and 1,400 Bar Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 26.4lb (12 kg)	
200-8U	8U	Dial sizes: 8-1/8" (206 mm) dials	

		Accuracy: ± 1.6% of full range Threaded:UNION,2” FIG.1502 Male UNION,2” FIG.2002 Male UNION,2” FIG.2202 Male UNION,3” FIG.1502 Male UNION,3” FIG.1502 Female Pressure Range: 7MPa,14MPa,21MPa,25MPa,35MPa,40MPa,60MPa,80MPa, 100MPa,120MPa and 160MPa 1,000 PSI, 1500PSI 3,000 PSI. 5,000 PSI, 6,000 PSI, 10,000 PSI,15,000 PSI and 20,000PSI 70 Bar, 140 Bar, 210 Bar, 350Bar, 420 Bar, 700Bar, 1,040 Bar and 1,400 Bar Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 33lb (15 kg)	
200-8F	8F	Dial sizes: 8-1/8" (206 mm) dials Accuracy: ± 1.6% of full range Threaded:FLANGE,1.81,RJ,BX-151 FLANGE,2.06,RJ,R-24 FLANGE,2.06,RJ,BX-152 FLANGE,3.12,RJ,R-35 Pressure Range: 7MPa,14MPa,21MPa,25MPa,35MPa,40MPa,60MPa,80MPa, 100MPa,120MPa and 160MPa 1,000 PSI, 1500PSI 3,000 PSI. 5,000 PSI, 6,000 PSI, 10,000 PSI,15,000 PSI and 20,000PSI 70 Bar, 140 Bar, 210 Bar, 350Bar, 420 Bar, 700Bar, 1,040 Bar and 1,400 Bar Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 35lb (16 kg)	
100-3	RC-100	Dial sizes:3.94" (100 mm) dials Accuracy: ± 1.6% of full range Pressure Range: 7MPa,14MPa,21MPa,25MPa,35MPa,40MPa,60MPa,80MPa, 100MPa,120MPa and 160MPa 1,000 PSI,1500PSI 3,000 PSI. 5,000 PSI, 6,000 PSI, 10,000 PSI,15,000 PSI and 20,000PSI 70 Bar, 140 Bar, 210 Bar, 350Bar, 420 Bar, 700Bar, 1,040 Bar and 1,400 Bar Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 8.8lb (4 kg)	
150-4	RC-150	Dial sizes: 5.91" (150 mm) dials Accuracy: ± 1.6% of full range Pressure Range:	

		7MPa,14MPa,21MPa,25MPa,35MPa,40MPa,60MPa,80MPa, 100MPa,120MPa and 160MPa 1,000 PSI,1500PSI 3,000 PSI. 5,000 PSI, 6,000 PSI, 10,000 PSI,15,000 PSI and 20,000PSI 70 Bar, 140 Bar, 210 Bar, 350Bar, 420 Bar, 700Bar, 1,040 Bar and 1,400 Bar Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 11lb (5 kg)	

1.2 PRESSURE INDICATING SYSTEM

PRESSURE gauges provide quick, accurate readings of your rigs.

E-17 DIAPHRAGM PROTECTOR 1:1 Piston

Protects measuring or recording device from working fluid while transmitting no-lag, linear pressure signal.

Rugged workhorse sensor found in every corner of the world doing every conceivable pressure sensing job.

Robust, time proven design allows easy field repair and maintenance.

Available in flanged, threaded, and weld on female sub configurations.

Certified models available E-17 Diaphragm Protector.

Standard Capacities include:

3,000, 5,000, 6,000, 10,000, and 15,000 psi, (210, 350, 420, 700, and 1,000 kg/cm 2)

10K, 21K, 42K, 70K, 80K, (21, 35, 42, 70, 100 MPa)

DB1004A 4:1 PRESSURE DEBOOSTER

The Debooster is a stepped piston device which reduces the line pressure by a ratio of 4:1. System Pressure Gauges and Recorders are therefore calibrated at ¼ the line pressure. The Debooster external configurations are based on 2" Buttweld Sub and Wing Nut Unions.

The Debooster Cylinder replaces the Union Male Sub. The Union Wing Nut is used; the buttweld Female Sub is optionally available. A fluid Separator replaces the Union Seal Ring.

Specifications:

Working Pressure: 15,000 PSI / 1,000 Kg/Sq Cm / 100 Mpa

Accuracy: Debooster ±0.5% FSV, system ±2.0% FSV

Pressure Reduction Ratio: 4.07:1

Separator Diaphragm: Viton

Maximum Hose Length: 100 ft/30 M

Recommended Hose: SAE 100R2 Type A or Type B, SAE 100R10 or SAE 100R11

Operating Temperature: -37 to 65ºC (-35 yo 150ºF)

REMOVE PRESSURE INDICATING SYSTEM

Provides quick, accurate check on mud pump operation; helps detect washed out drill pipe or bit nozzle problems.

Indicator gauges can be mounted in the weight indicator box, driller's console, or locally on the mud pump

The system consists of a 6 inch Pressure Gauge a Gauge Protector and a high pressure hose.

FEATURES:

Standard capacities include:

3,000, 5,000, 6,000, 10,000, and 15,000 psi

210, 350, 420, 700, and 1,000 kg/cm²

Also available in kPA, MPa, and BAR capacities

Durable Gauge Protector mounts with 2-inch NPT sub

Standard 50-foot hose, with other hose lengths available

BENEFITS

Easy to mount in a variety of locations: in a weight-indicator box, in the driller's console, or on the mud pump.

Full 360° dial calibration accurately indicates small pressure changes.

Fluid-filled gauge protects readings from truck or rig vibration.

Large, easy-to-read 6-inch, fluid-filled dial face.

Operator-adjustable high-pressure damper ensures accurate readings.

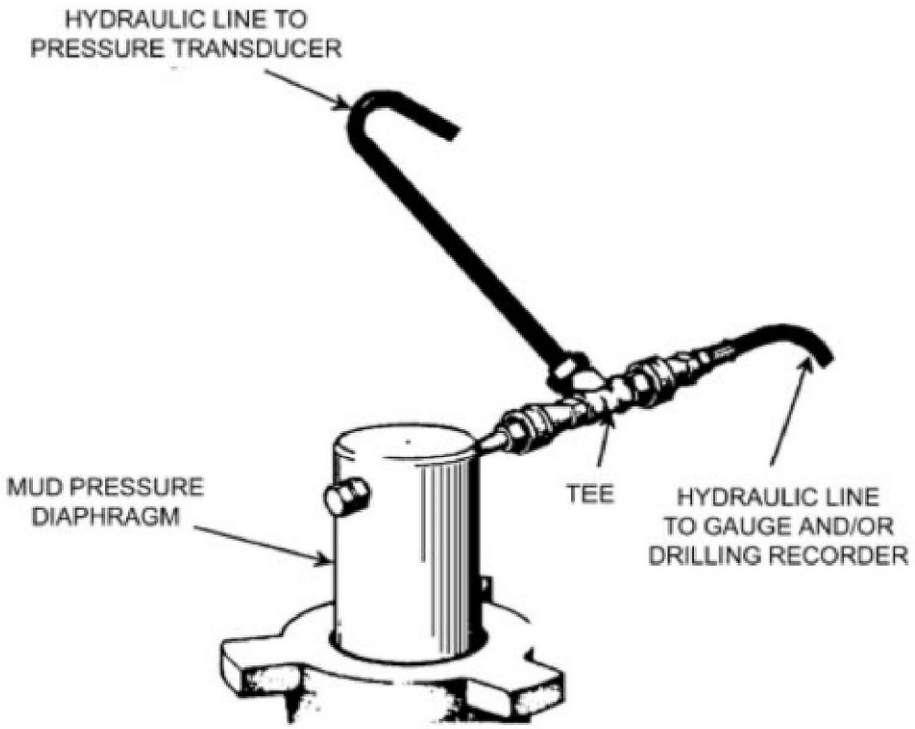
Application

Required capacity

Length of hose from sensor to gauge

Gauge mounting

PRESSURE INDICATING SYSTEM WITH 1:1 PISTON



Single Pointer and Dual-pointer pressure indicator systems deliver accurate measurements for mud, cementing, acidizing, and fracturing operations

Model GM-6 1:1 PISTON

Dual-pointer pressure indicator systems deliver accurate measurements for mud, cementing, acidizing, and fracturing operations

Model GM-4 1:1 PISTON

PRESSURE INDICATING SYSTEM with 4:1 Piston

Single Pointer and Dual-pointer pressure indicator systems deliver accurate measurements for mud, cementing, acidizing, and fracturing operations

Model GM-6A 4:1 PISTON

Dual-pointer pressure indicator systems deliver accurate measurements for mud, cementing, acidizing, and fracturing operations

Model GM-4A 4:1 PISTON

1.3 PRESSURE INDICATOR W/ SHUT-OFF SWITCH SYSTEMS GM-7A

GM-7 Single Pointer Pressure Indicator with Shut-off Switch systems deliver accurate measurements for mud, cementing, acidizing, and fracturing operations.

Model GM-7A 4:1 PISTON

COMPOUND POINTER PRESSURE GAUGE MODEL GA-110

Provides quick, accurate check on mud pump operation; helps detect washed out drill pipe or bit nozzle problems

Indicator gauges can be mounted in the weight indicator box, driller's console, or locally on the mud pump

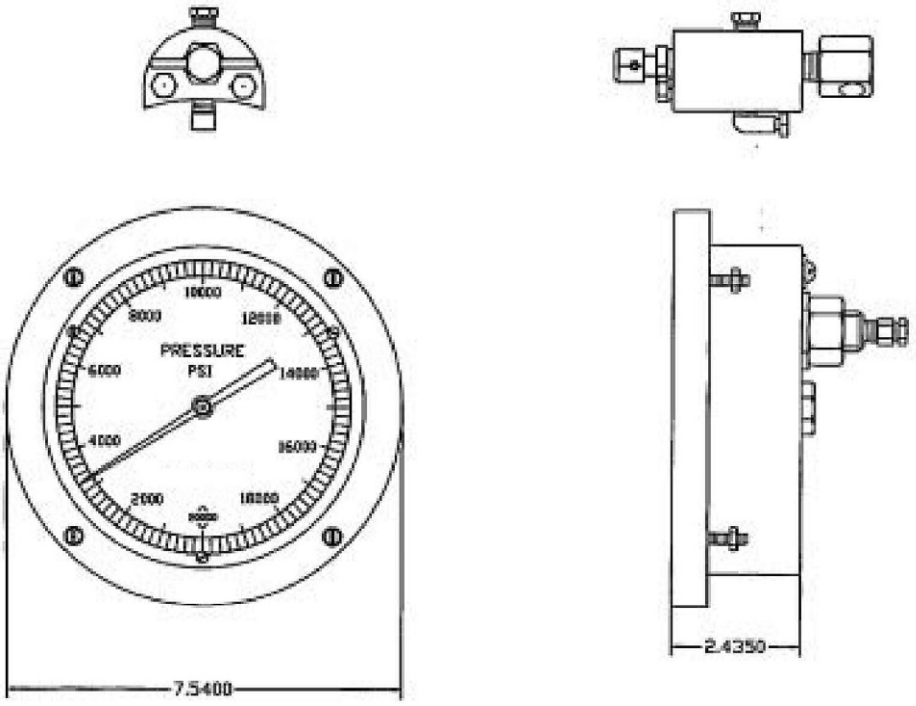
Full 360° dial calibration for maximum pointer movement; shows the smallest pressure changes

Fluid filled gauge has large easy to read 6" dial face and high pressure damper adjust

Typically used with rugged E-17 Diaphragm Protector in Pressure Indicating Systems

Hose lengths to 50 feet are standard; longer lengths available in some pressure ranges

Panel Mounted



Standard Capacities include:

4000, 8000, 12,000 and 16,000 psi

400 and 800 kg/cm2 (40 and 80 MPa)

Main Technical Specification

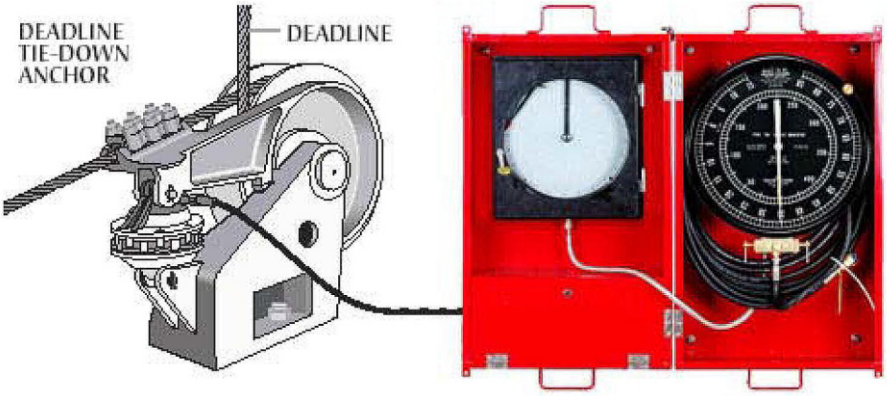
Part No.	Model	Description &Technical Parameters	Remarks
CD-106X	E17-152	**Diaphragm Protectors and Piston Isolators** Durable Gauge Protector mounts with 2-inch NPT sub Available in flanged, threaded, and weld on female sub configurations.	
CW-DB4X	DB1004A	**Pressure Deboosters** Standard Capacities include: 10,000, 15,000, 20,000 psi Equivalent values in kg/cm 2 , MPa, BAR	
CG-602	GA-113	**Dual-pointer pressure indicator** Standard capacities include: 3,000, 5,000, 6,000, 10,000, and 15,000 psi 210, 350, 420, 700, and 1,000 kg/cm² Also available in kPA, MPa, and BAR capacities Dial sizes: 6" (152.4 mm) dials Accuracy: ± 1.0% of full range Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 17.6lb (8 kg)	
CG-600	GA-112	**Single Pointer Pressure Gauge** Standard capacities include: 3,000, 5,000, 6,000, 10,000, and 15,000 psi 210, 350, 420, 700, and 1,000 kg/cm² Also available in kPA, MPa, and BAR capacities Dial sizes: 6" (152.4 mm) dials Accuracy: ± 1.0% of full range Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 17.6lb (8 kg)	

CMG-101	GM-4	**Dual-pointer pressure indicator system 1:1 Piston** Standard capacities include: 3,000, 5,000, 6,000, 10,000, and 15,000 psi 210, 350, 420, 700, and 1,000 kg/cm² Also available in kPA, MPa, and BAR capacities Dial sizes: 6" (152.4 mm) dials Accuracy: ± 1.0% of full range Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 17.6lb (8 kg)	
CMG-100	GM-6	**Single Pointer Pressure Gauge System 1:1 Piston** Standard capacities include: 3,000, 5,000, 6,000, 10,000, and 15,000 psi 210, 350, 420, 700, and 1,000 kg/cm² Also available in kPA, MPa, and BAR capacities Dial sizes: 6" (152.4 mm) dials Accuracy: ± 1.0% of full range Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 17.6lb (8 kg)	
CMG-104	GM-7	**Single Pointer Pressure Indicator with Shut-off Switch systems 1:1 Piston** Standard capacities include: 3,000, 5,000, 6,000, 10,000, and 15,000 psi 210, 350, 420, 700, and 1,000 kg/cm² Also available in kPA, MPa, and BAR capacities Dial sizes: 6" (152.4 mm) dials Accuracy: ± 1.0% of full range Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Packing Weight:36 kg	
CMG-106	GM-7A	**Single Pointer Pressure Indicator with Shut-off Switch**	

		systems 4:1 Piston Standard capacities include: 3,000, 5,000, 6,000, 10,000, and 15,000 psi 210, 350, 420, 700, and 1,000 kg/cm² Also available in kPA, MPa, and BAR capacities Dial sizes: 6" (152.4 mm) dials Accuracy: ± 1.0% of full range Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Packing Weight: 36 kg	
252-112	GA-110	Panel Mounted Dial sizes: 6" (152.4 mm) dials Accuracy: ± 1.0% of full range Standard Capacities include: 4000, 8000, 12,000 and 16,000 psi Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 17.6lb (8 kg)	

2. DEADLINE ANCHORS & WEIGHT INDICATOR SYSTEMS

2.1 ANCHOR TYPE WEIGHT INDICATORS-INDICATOR SYSTEM



Accurate and reliable indications of hook load and weight on bit are essential to drillers for the efficient control of ROP and hole direction. The hydraulic deadline anchor type weight indicator is a standard of the industry, and the weight indicators set the standards for quality, accuracy, and reliability against which all others are judged.

We has weight indicator models designed to work in conjunction with all industry-standard deadline anchors using either tension or compression hydraulic load cells. Indicator systems are supplied as either portable box-mount instrument systems or panel-mounted as part of a driller's console.

Each system accurately senses tension in the deadline and uses this to indicate hook load and weight on bit. Many models have separate pointers for both hook load and weight on bit. In addition, integral circular hydraulic recorders are also offered on several models.

STANDARD FEATURES

Large, easy-to-read gauge

Unique friction-free diaphragm-type hydraulic load cell withstands the toughest drilling and environmental conditions

Complete with high pressure hose assembly and disconnect fittings

Needle-type dampers to eliminate hydraulic shock loads and extreme pointer oscillation during rough drilling or jarring operations

4:1 vernier movement for sensitive bit weight indications

Main Technical Specification

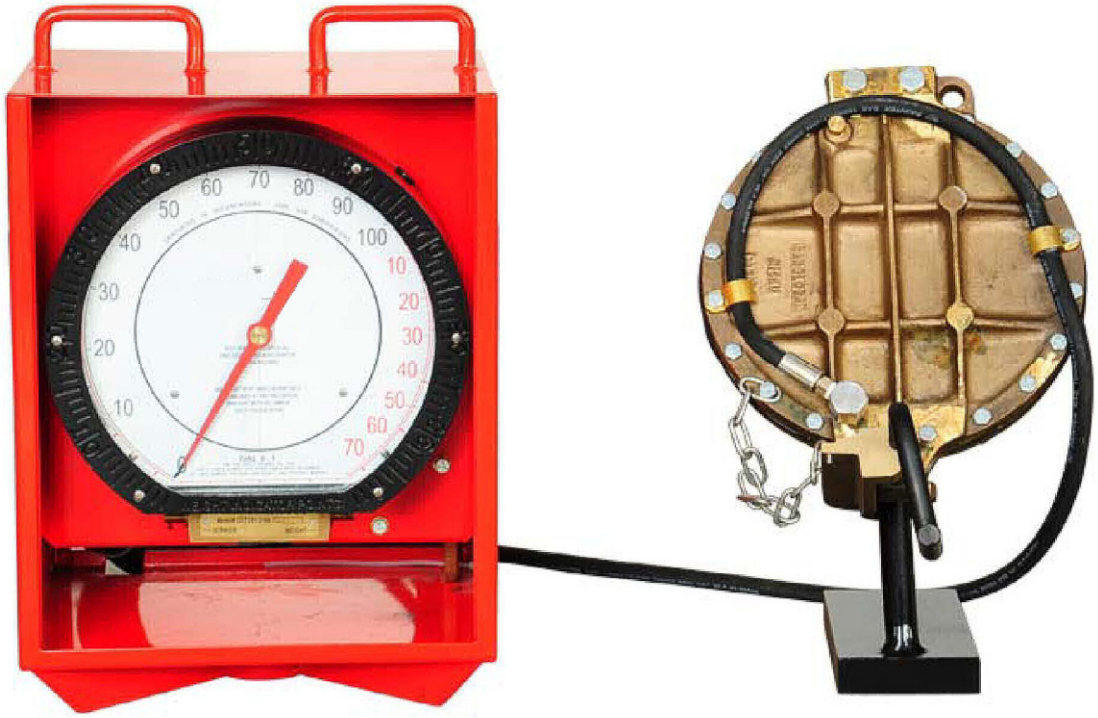
Part No.	Model	Description &Technical Parameters	Remarks
AWE-200	JZ-900	For deadline loads to 168,000 lb (750 kN) 10, 12, 14, and 16 lines strung E551 compression load cell or E543 Sensater tension load cell 16" indicator 9 MPa	
AWE-150	JZ-700	For deadline loads to 130,000 lb (580 kN)	

		10, 12, 14, and 16 lines strung E551 compression load cell or E543 Sensater tension load cell 16" dial indicator 7.49 MPa	
AWE-125	JZ-500	For deadline loads to 103,400 lb (460 kN) 10, 12, 14, and 16 lines strung E551 compression load cell or E543 Sensater tension load cell 16" dial indicator 6.83MPa	
E-100	JZ-250	For deadline loads to 95,400 lb (420 kN) 6, 8, 10, and 12 lines strung E551 compression load cell or E543 Sensater tension load cell 16" dial indicator 6MPa	
D-75	JZ-75	For deadline loads to 67,500 lb (300 kN) 6, 8, 10, and 12 lines strung E551 compression load cell or E543 Sensater tension load cell 16" dial indicator 5.2MPa	
FS-60	JZ-60	For deadline loads to 22,500 lb (100 kN) 4, 6, and 8 lines strung E551 compression load cell or E543 Sensater tension load cell 16" dial indicator 4.2MPa	

2.2 DEFLECTION-TYPE (CLIPPER) WEIGHT INDICATOR

Model CDT-1013

For other drilling rig applications, including workover rigs, service rigs and pulling units that do not have conventional wireline anchors, We offers several weight indicator solutions. These include Clipper type weight indicators that have a diaphragm that clamps to the deadline and Summarizer type weight indicators that have pad type load cells to directly sense mast loads.



Each weight indictor is shipped with 10 dials so moving it from rig to rig is easy and by simply changing a dial you can switch between drill line size and number of lines strung. Each Weight Indicator system consists of a Gauge, Deadline Diaphragm connected by a high-pressure Hose and a C-Clamp to attach the diaphragm to the drill line. The deadline diaphragm works on a deflection principle, the tighter the drill line gets the more force is applied to the diaphragm which converts the deflection to hydraulic pressure and sends that pressure to the 12”gauge which displays weight. The whole weight indicator system fits into the steel case for convenient, compact storage. Built-in handles make the entire system easy to transport.

FEATURES:

12-inch gauge comes standard.

Complete set of 10 dials included from 2-lines 7/8" to 8-Lines 1"

Weight Indicator has two pointers, one for weight and the other for sensitivity which is a 6:1 ratio and ideal for work such as setting packers and bridge plugs.

Standard model comes in a compact box. Larger box available to with space for 5 6" gauges and one circular recorder.

48,000-pound maximum single-line load with 1" drill line

25-foot heavy duty hose standard. Other lengths available upon request

Circular recorder (optional) can record weight.

Available in English, Metric and SI Metric

BENEFITS

Ready for immediate use out of the crate. Each system is assembled, calibrated and tested before

Shipping. System is shipped as a sealed unit from the factory with All Weather Instrument Fluid.

Two adjustable dampers, one for weight and one for sensitivity allow the operator to have full control of the desired sensitivity.

Versatile mounting options allows the weight indicator to be mounted just about anywhere on the drill floor but the diaphragm and Indicator gauge should be mounted at roughly the same height.

TO ORDER SPECIFY:

Size of rig

Dial reading required, English, Metric (kg) or SI Metric (daN)

Size of drilling wireline

Derrick capacity in pounds

Number of lines strung

Hose length

2.3 WIRELINE WEIGHT INDICATORS

Wireline Weight Indicators Ideally suited for used by wireline service trucks.

Model CW-50 Wireline Weight Indicators

Model CW-20 Wireline Weight Indicators

FEATURES:

-6” or 8.5” fluid filled gauge with dial faces available in decanewtons, pounds, kilograms, or dual scale.

-Damper system allows operator to increase or decrease sentivity easily to monitor the minutest changes.

-Each system is calibrated in our factory and is shipped precharged and ready to use.

-Calibration and line pull certificates are sent with the system.

-Available in the following capacities: 1000, 2000, 3000, 4000, 5000, 6000, and 10,000 pounds.

2.4 DEADLINE ANCHORS

Deadline anchors provide accurate weight measurements and secure deadlines

Full line of all-weather, quality-built deadline anchors pull capacities from 30,000 to 160,000 pounds

Constructed with top-quality steel and proof-tested to 150% of rated capacity, Deadline Anchors are highly accurate, super-strong anchors of exceptional reliability.

Deadline Anchors are designed to be used with hydraulic Load Cells to provide sensitive weight signals for transmission to Weight Indicators. These anchors also provide a reliable way to secure deadlines, while allowing for fast and easy line-slipping.

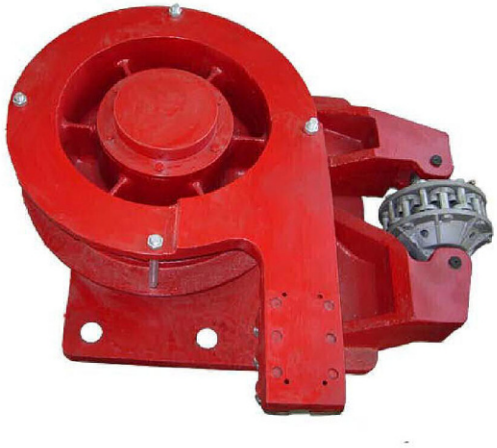
FEATURES:

- Models available to handle wireline sizes from 5/8 inches to 1-7/8 inches.
- Deadlines pull capacities from 30,000 to 160,000 pounds.

- Models available in a variety of sizes — from lightweight models for mounting on wheel- mounted rigs and on helicopter rigs — to models designed for 2-million-pound drilling masts.

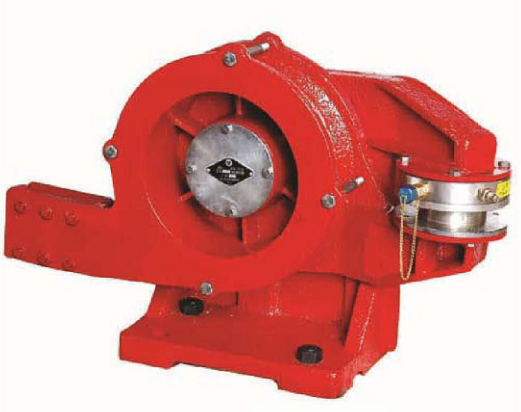
TO ORDER SPECIFY:

- Size of rig
- Derrick capacity in pounds
- Size of drilling wireline
- Number of lines strung
- Right or left hand model



JZG-41

JZG72



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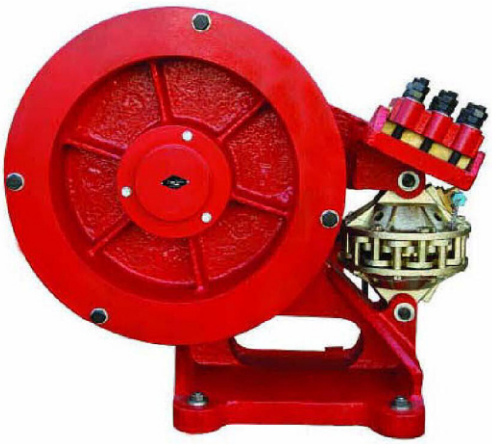


JZG24

Main technical specification for deadline anchor (Weight Indicator)

Model of weight indicator	Specification of deadline anchor	Mounting Type Welding(W) Casting(C)	Max deadline pulling force (pounds)	Deadline numbers	Max load (pounds)	Load Sensor（Mpa）	Drilling Rig
JZ900	JZG72	Leg (W)	161862 (720 Kn)	14	2266068	9	12000 m
				12	1942344		
	JZG72(AO1)		161862 (720 Kn)	14	2266068		9000 m
				12	1942344		
	JZG72(AO2)		161862 (720 Kn)	14	2266068		E551 Sensor
				12	1942344		
JZ900A	JZG72A	Floor (W)	161862 (720 Kn)	14	2266068	9	
				12	1942344		
JZ700	JZG60	Floor (W)	134885 (600 Kn)	14	1888390	9	
				12	1618620		
JZ700A	JZG56	Leg (W)	125893 (560 Kn)	14	1762502	7.49	
				12	1510716		
JZ600	JZG46	Leg (W)	103412 (460Kn)	14	1447768	6.83	Left hand model
				12	1240944		
JZ600A	JZG46A	Leg Welding(W)	103412 (460Kn)	14	1447768	6.83	E551Sensor, Left hand
				12	1240944		
JZ600B	JZG46B	Leg (W)	103412 (460Kn)	14	1447768	6.83	Right Hand
				12	1240944		
JZ500	JZG42	Floor(C)	94420 (420Kn)	12	1133040	6	
				10	944200		
JZ500A	JZG41	Leg (C)	92172 (410Kn)	12	1106064	6.83	
				10	921720		
JZ500D	JZG42A	Leg (C)	94420 (420Kn)	12	1133040	6.83	Left hand
				10	944200		
JZ400	JZG35	Floor(C)	78683 (350Kn)	12	944196	6	
				10	786830		
				8*	629464		
JZ400B	JZG34A	Leg (C)）	76435 (340Kn)	12	917220	6	
				10	764350		
JZ400C	JZG34B	Leg (W)	76435 (340Kn)	12	917220	6	
				10	764350		
JZ400D	JZG34C	Leg (W)	76435 (340Kn)	12	917220	6	E543Sensor
				10	764350		
JZ400E	JZG35A	Floor(W)	78683 (350Kn)	12	944196	6	Crown block
				10	786830		

				8	629464		
JZ300	JZG30	Leg (C)	67443 (300Kn)	12	809316	6	
				10	674430		
JZ300A	JZG30A	Leg (W)	67443 (300Kn)	12	809316	5.2	E551Sensor
				10	674430		
JZ250	JZG24	Floor(C)	53954 (240Kn)	12*	647448	6	
				10	539540		
				8	431632		
JZ200	JZG20	Floor(C)	44962 (200Kn)	10	449620	6	
				8	359696		
				6*	269772		
JZ150A	JZG18A	Floor(C)	40466 (180Kn)	10	404660	6	
				8	323728		
				6	242796		
JZ150	JZG18	Leg (C)	40466 (180Kn)	10*	404660	6	
				8	323728		
				6	242796		
JZ100	JZG15	Leg (C)	33721 (150Kn)	10*	337210	6	
				8	269768		
				6	202326		
JZ100A	JZG15A	Floor(C)	33721 (150Kn)	10*	337210		
				8	269768		
				6	202326		
JZ60	JZG10	Pull line	33721 (150Kn)	8	337210	4.2	
				6	269768		
				4*	202326		
JZ40	JZG10A	Leg	22481 (100Kn)	6	134886	6	
				4	89924		
JZ82	JZG13	Pull line	30709 (136.6Kn)	6	184254	6	
JZ75	JZG12	Pull line	28101 (125Kn)	6	168606	5.2	

3. PUMP STROKE COUNTER/RATE METER MODEL PSC-3

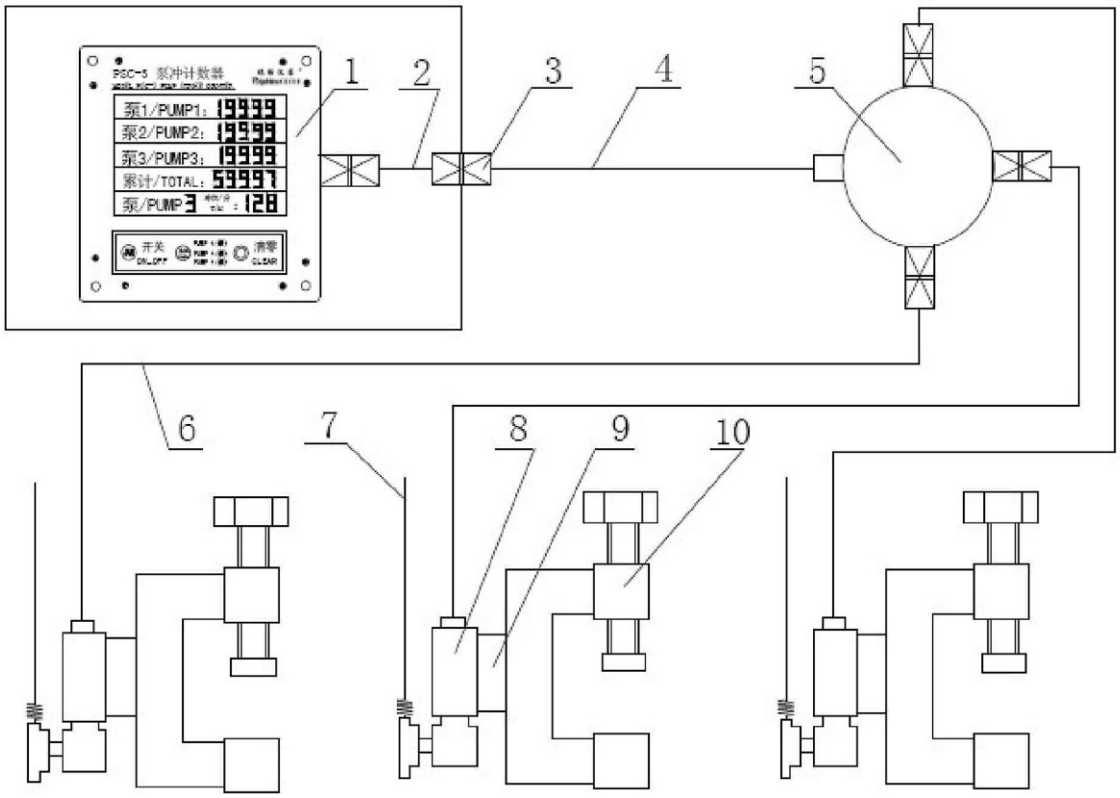
Monitors and displays number of strokes and stroke rate for two mud pumps

The Pump Stroke Counter/Rate Meter displays both the total number of strokes and the strokes per minute for 3 mud pumps up to 1,024 strokes per minute for each pump. Push buttons conveniently located on the front of the instrument make it easy for the operator to reset each pump count. A stainless steel enclosure ensures reliable readings even in the toughest operating environments.

FEATURES

- **Displays total number of strokes — from 0 to 9,999**
- **Displays number of strokes per minute — from 7.5 to 1,024**
- **Low current consumption — approximately 100 uA in standby mode**
- **LCD display height: 0.7 inch**

- **Operates in temperatures from -4° to 140° F (–20° to 60° C)**
- **Available model that meets Class 1, Division 1 standards**
- **Displays strokes for 3 mud pumps**



1. Model PSC-3 pump stroke counter
2. Cable in the hydraulic control console（1.5m）
3. Connection end for pump stroke counter
4. Main cable（50m）
5. Explosion-proof pull box
6. Branch cable（25m）
7. Sensing probe for pump stroke counter
8. Sensing switch for pump stroke counter.
9. Installation plate
10. Fixed clip

BENEFITS:

- **Battery powered — no external power required.**
- **Low energy use adds the extra benefit of an intrinsically safe design.**
- **Stainless steel enclosure ensures accurate readings in harsh environments.**
- **Easy-to-read display and easy-to-use control buttons.**
- **Low maintenance, with a long life expectancy of 50,000 hours of continuous use.**
- **Requires no calibration.**

4. MODEL CMM100 MECHANICAL SANDLINE DEPTHOMETER

Easy to use and maintain, gives operators accurate readings of sandline depth. Hand held Sandline Depthometer's help operators avoid situations that can cause damage to their sandline and possible safety issues with sandline. Mechanical Depthometers can be used on workover rigs, casing set rigs and mining coring rigs. Each Depthometer comes in either Metric or English readings. An optional floor mount bracket is available.

- **Sand line (9/16" wire rope)**
- **Counter**
- **Completer Mechanical Counter**
- **Cavins or Equivalent**

FEATURES:

- **Light weight**
- **Accurate readings even over thousands of Meters**
- **Ease of use makes this system ideal for all work over applications**
- **Low maintenance for years of service**

BENEFI TS:

- **Increases safety and optimizes efficiency by providing warnings about possible sandline out of hole situations**
- **Low Cost alternative**
- **Years of proven reliability.**

TO ORDER SPECI FY:

- **Metric or English**
- **Carrying case required; Yes or No**
- **Floor bracket required; Yes or No**

5. MECHANICAL DYNAMOMETER MODEL GLG-02

The Dynamometer has proven to have limitless versatility as a tension, traction and weight measuring instrument. It has been used for such diverse jobs as mounting cables for bridges; adjusting tension on guy wires; field testing chain, rope, wire—anything requiring precision force or tension measurement.

Utility companies count on the Model GLG-02 Dynamometer. Communication tower erectors employ several dynamometers during installation to properly tension guy wires.
The Dynamometer is also working every day for the aviation industry and is used worldwide in military installations.

Main Technical Specification

Part No.	Model	Description &Technical Parameters	Remarks
201-02	GLG-02	Dial sizes: 10" (250 mm) dials Accuracy: ± 1.0% of full range Wide range of capacities:5,10,30, 50,80, 100, 120 ,160Kn Zero control Maximum Overload: 125% of Rated Capacity Flexing beam fabricated from high specification steel. Heat treated for maximum strength. Generous shackle openings mate with most hooks and hardware. Anti-parallax dial and pointer offers accurate readings from varying sightlines. Dial is mar and fog resistant. Operating Temperature : 40°F to 125°F (4.4°C to 52°C) Size: 6.5" × 6" × 10.2" (16.5 × 15 × 26 cm) Weight: 44lb (22 kg)	

6. TONG TORQUE AND TONG LINE PULL INDICATION SYSTEMS

The Tong Line Pull and Tong Torque Systems are designed to give accurate readings for makeup and breakout torque to reduce drill collar and tool joint failure.

The systems indicate the torque applied to drill pipe, drill collars, tubing, and casing while joints are made. This is important for reducing drill collar and tool joint failure resulting from improper make-up. Each tong system consists of a hydraulic load cell, shackles (on tension type models), hose assembly, 6" liquid filled gauge with damper assembly,
Bracket to mount gauge (except on panel mount versions), and recharge kit consisting of hand pump, and (1) qt. of instrument fluid. Both types of Tong Systems are available in English, Metric, or dual scale capacities up to 30,000 pounds straight line pull. There are two types of systems available:

6.1 UNIVERSAL TONG LINE PULL SERIES:

Indicates make-up or break-out torque in pounds of line pull for tool joints, drill collars, and drill string components. This is useful in applications where the user wants to use the system with different length tong handles. To obtain the foot pounds equal to the pounds reading on the indicator the operator simply multiplies the pounds reading of the indicator by the tong handle length (in feet) that he is using, and this will give him the foot pounds equivalent.

6.2 TONG TORQUE (JOINT TORQUE) SERIES:

Indicates torque in foot pounds applied to each joint when using power tongs to run pipe or casing. These systems are available for specific makes and models of power tongs and come with either compression or tension type load cells.

OILFIELD INSTRUMENTS

FEATURES:

- Adjustable target pointer can be set to the desired capacity so the driller can work to a clear mark
- Models and capacities available to work with wide range of manual and power tongs
- Available in wide range of capacities and in English, Metric, or dual scale capacities
- Models available for temporary or permanent installation
- Load cells available in either tension or compression type
- Durable, rugged design

BENEFITS:

- Rugged design ensures years of reliable service and minimum maintenance
- Gauge target pointer can be set to the required torque to give driller a clear target mark
- Fluid filled design of gauge reduces the need for repairs and protects your equipment investment
- Provides accurate torque indications, reducing drill collar and tool joint failure
- Multiple design configurations allows user to use every time collars are run, or only for spot checks

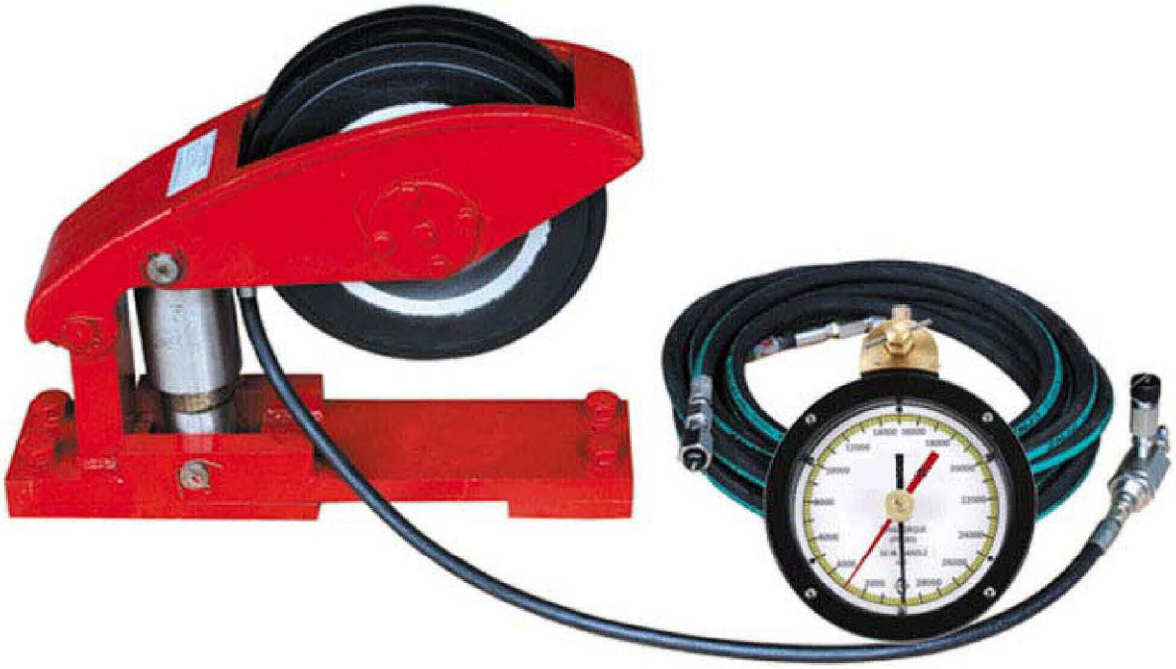
TO ORDER SPECIFY:

- Capacity and scale needed (English or Metric)
- Handle length or tong to be used with (Tong Torque Systems only)
- Panel or box mount indicator
- Tension or compression type load cell (Tong Torque Systems only)
- Hose length needed (if different than standard)

7. MECHANICAL ROTARY TORQUE SYSTEM

Delivers reliable torque measurements for rigs that use chain-driven rotary tables

Available in box-mount or panel-mount configurations, the Hydraulic Rotary Torque System provides accurate indications of changes in torque for rigs that use chain-driven rotary tables.



Each system includes an Idler assembly and a Gauge.
Torque sensor measures torque variation of the drilling tool driven by the rotary table with rotary table torque sensor of tension pulley type, so as to show the operating condition of the downhole drilling tool and changes in the bottom hole stratum, which is helpful to know the downhole condition and avoid accident.

TECHNICAL SPECIFICATION:

1. Output hydraulic pressure signal range: 0~6MPa
2. Tension pulley external diameter: F305mm
3. High-pressure cylinder diameter: F65mm
4. Minimum height of sensor: 355.5mm
5. Operating temperature: -40. ~+85 °C
6. Non-linear error: 0.5%

FEATURES:

6-inch fluid-filled Gauge
Available in 500 and 1,000 points
Gauge has operator-adjustable dial to zero out drill string
in order to monitor torque at the bit
Standard 25-foot hose, with other hose lengths available
Rugged Steel Sprocket available (replaces rubber wheel located in Idler assembly)

8. WARRANTY AND RETURNS

8.1 WARRANTY

We warrants its products to be free from defects in material and workmanship for a period of 24 months from the time of shipment. If repair or adjustment is necessary, and has not been the result of abuse or misuse within the twelve-month period, please return, freight prepaid, and correction of the defect will be made without charge.

Out of warranty products will be repaired for a nominal charge.

Please refer to the accompanying warranty statement enclosed with the product.

8.2 RETURNS

For your protection, items being returned must be carefully packed to prevent damage in shipment and insured against possible damage or loss. Rigchina will not be responsible for damage resulting from careless or insufficient packing.

Before returning items for any reason, authorization must be obtained from Rigchina Instrument Company. When applying for authorization, please include information regarding the reason the items are to be returned.