fann®

Calcimeter and Recording Calcimeter Kit
Instruction Manual

Part No. 204213 Rev. F

Printed in USA

NOTE:
Fann reserves the right to make improvements in design, construction and appearance of our products without prior notice.

Fann Instrument Company
PO Box 4350
Houston, Texas USA 77210
Telephone: 281- 871-4482
Toll Free: 800-347-0450
Fax: 281- 871-4358

TABLE OF CONTENTS

Section **Page No.**

1 Description 1

2 Safety Considerations 2

3 Fann Test Procedure 3

4 ASTM Standard Test Method 5

5 Construction of a Calibration Curve 8

6 Fann Recording Calcimeter 11

7 Maintenance and Repair 14

8 Parts List 17

9 Warranty 19

Figure

1 Calcium Carbonate -Pressure 6

2 Dolomite - Pressure 6

3 Total Pressure - Calcium Carbonate plus Dolomite 6

4 Calibration Curve 10

5 Chart Installation 13

6 Transducer & Power Cord Assembly 16

7 Wiring Diagram 18

SECTION 1
DESCRIPTION

The Fann Calcimeter and the Fann Recording Calcimeter are used to determine the amount of Calcium Carbonate and Magnesium Carbonate (Dolomite) in a sample of alkaline earth carbonates such as oil well cores or drilled cuttings. Calcite builds up in drilling fluids and in water treatment processes causes scaling problems. Data from the Fann Calcimeter can help determine the proper chemical treatment.

These instruments comply with the ASTM D 4373 - 84 (Reapproved 1990) **STANDARD TEST METHOD FOR CALCIUM CARBONATE CONTENT IN SOILS.** This test method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D -18.13 on Marine Geotechnics, published July 1984. The ASTM procedure is described in Section 4.

In the Fann Calcimeter the calcium carbonate and magnesium carbonate are reacted with 10 percent Hydrochloric Acid to form CO_2. This is done in a sealed reaction cell and the pressure build up due to the CO_2 is measured using either a pressure gauge or a pressure recorder. The use of a Calibration Curve, Fig. 4, determined through the use of pure Calcium Carbonate reagent allows the pressure developed to be related to the weight of calcium carbonate in the calibration sample. Several weights of sample are suggested to assure an accurate curve. These tests can be conducted using either the pressure gauge or recorder with the reaction cell. The sample can be weighed on a portable balance (10 mg Precision or better). Refer to Section 5 for calibration procedure.

The calcium carbonate content of soil [ASTM Procedure D 4373) is determined by treating a 1 gm dried soil specimen with hydrochloric acid (HCl) in an enclosed reactor vessel. Carbon dioxide gas is evolved during the reaction between the acid and carbonate fraction of the specimen. The resulting pressure generated in the closed reactor is directly proportional to the carbonate content of the specimen. This pressure is measured with a bourdon tube pressure gauge that can be pre-calibrated with reagent grade calcium carbonate. Refer to Section 5 for calibration procedure.

SECTION 2
SAFETY CONSIDERATIONS

The Calcimeter Test depends on reacting $CaCO_3$ with HCl. Hydrochloric Acid may be Corrosive and may cause Chemical Burns. Use care in handling the Hydrochloric Acid so that no acid is spilled on either skin or clothing or splashed into eyes. If acid contacts skin or eyes, immediately flush with large quantities of water for at least 15 minutes. Do not inhale vapors. Process Hydrochloric Acid beneath a laboratory hood or in a well ventilated area to reduce the inhalation of fumes. Wear appropriate safety equipment.

Do not take internally. Get medical attention immediately if accidentally contacted by the acid.

Always open the pressure bleed valve of the reaction cell following each test. Do not attempt to open the cell until all pressure has been dissipated.

The Fann Recording Calcimeter uses an electrically powered transducer and recorder to record the pressure in the Reaction Cell. The following Safety Considerations should be used with this Recorder as with any electrical appliance:

1. Make sure the Power switch is OFF before connecting power cable to electrical outlet.

2. Verify the power cable and the outlet receptacle are three wire grounding type plug and receptacle.

3. Always unplug the power cable before opening the Recorder for renewing the chart paper or other maintenance or repair work.

SECTION 3
FANN TEST PROCEDURE

Before starting the Test Procedure, make sure the equipment is clean and in good operating condition. Verify that a calibration curve is available for the particular equipment to be used. Should a calibration curve not be available, follow the procedures outlined in Section 5 to construct one. For an illustration of this curve Refer to Fig. 4.

A. Obtain a sample of Core, Drilled Cuttings, or other solids that are to be analyzed. The sample should be dry and free of contaminants. Grind sample to 100 mesh or finer, using a mortar and pestle and a 100 mesh sieve. If it is unknown whether the sample has been dried, it is recommended to heat the sample in an oven at 220 °F (105 °C) for 12 to 24 hours.

B. Weigh Sample for test, paragraph 1 or 2 depending on pressure capacity of equipment.

1. Weigh approximately (.5 to .7 gms) of the ground sample and record the weight to nearest .001 gm (10 mg) if a calcimeter with a 15 psig gauge or 15 psig recorder and a small (10 ml) capacity acid cup is being used.

2. Weigh approximately (1.0 to 1.4 gms) of the ground sample and record the weight to nearest .001 gm (10 mg) if a calcimeter with a 30 psig gauge or 30 psig recorder and a large (20 ml) capacity acid cup is being used.

CAUTION

Do not attempt to run larger than 0.7 gm sample with the 10 ml acid cup.

C. Load the Test Sample in the CO_2 reaction cell.

1. Unscrew and remove the top with pressure gauge or pressure transducer from the Reaction Cell then remove the acid cup.

2. Inspect to be sure CO_2 reaction cell and top are clean and dry.

3. Be sure reaction cell "O" Ring seal on the top, and the "O" Ring on the bleed valve are in good condition. Use a light coating of Vacuum Grease on "O" Ring seals. Make sure all pipe or tubing connections are tight and do not leak. Refer to Section 7-A.

4. Slide one paper and its sample to the bottom of the reaction cell by holding cell in horizontal position. Raise cell to vertical and dump sample onto cell bottom. Brush paper with small brush to remove traces of sample then remove the paper.

5. Pour 10 ml or 20 ml of 10% [1 Normal] Hydrochloric Acid (HCL) into the acid cup and cautiously lower the cup into the cell. Be careful not to spill or get any HCL on bottom of cup.

6. Hand tighten cell cap being careful not to splash acid onto sample.

7. Open bleed valve until a Zero pressure reading is obtained on the pressure gauge or on the recorder chart, then close the bleed valve tightly.

A. Tip the reaction cell and start timing the test. This will start the reaction between the HCl and the $CaCO_3$. Observe the rapidly rising pressure and record it at 30 seconds after the reaction cell was tipped. Record this as $CaCO_3$ pressure. There should be a pause, and then a slow second rise in pressure will be noted if dolomite is present. The dolomite reaction and pressure rise is much slower for dolomite. Swirl reaction cell and allow sufficient time for completion of the pressure build up. The reaction is assumed complete when the pressure stops increasing and remains constant. This should happen in 30 to 45 minutes. This final value of pressure is the total $CaCO_3$ plus dolomite pressure. To obtain the pressure due to the dolomite, subtract the calcium carbonate pressure (30 second reading) from the total reading (30-45 minute reading).

E. For interpretation of the pressure readings. Refer to Fig. 1, 2, and 3. These are representative of pressure versus time graphs as they would appear on a Pressure Recorder Chart. Fig. 1 is representative of the $CaCO_3$ only. Fig. 2 is representative of dolomite only. Fig. 3 is representative of combined $CaCO_3$ and dolomite.

F. Use equations [1] and [2] below for calculation of the percentages of $CaCO_3$ and dolomite. For values of "Slope" refer to Section 5.

[1] $\%CaCO_3$, as recorded

$$= \frac{(\text{Pressure Reading, PSI})\,(100)}{(\text{Sample Weight})\,(\text{Average Slope})}$$

[2] % Dolomite, as recorded

$$= \frac{(\text{Total Press.} - \text{Press. } CaCO_3)\,(100)\,(.92)}{(\text{Sample Weight})\,(\text{Average Slope})}$$

SECTION 4
ASTM STANDARD TEST METHOD FOR CALCIUM CARBONATE CONTENT OF SOILS

Before starting the test procedure for the ASTM Standard Test for Calcium Carbonate Content of Soils, make sure the equipment is clean and in good condition. Refer to Section 5 to verify that a calibration curve is available for the equipment to be used, and that the equipment uses a 20 ml acid cup. Should a calibration curve not be available, follow the procedures outlined in Section 5 to construct one using the 7 point plot. This ASTM test specifies the use of a 1.00 gm test specimen. For an illustration of the 7 point plot Refer to Fig. 4.

A. Select a 20 to 30 gm. sample of Core, surface grab sample, or other specimen that is to be analyzed. The sample should be dried in an oven at 220 F (105 C) for 12 to 24 hours. Pulverize the sample with a mortar and pestle (or hammer) until all particles pass through a No. 10 (2mm) sieve or finer. The finer the sample, the faster the reaction.

B. Weigh out onto as small piece of glazed paper accurately a 1 gm. +/- 10 mg. sample of the specimen as prepared in Section A above.

NOTE: If pressure response is very low, as will be found in specimens of low calcium carbonate containment, the weight of the sample can be doubled, then dividing the pressure reading by 2 to obtain the correct calcium carbonate content. Conversely, if only a 10 ml acid cup or a 15 psig gauge or recorder is available, the size of the sample can be cut to 0.50 grams, then doubling the pressure reading.

C. Load the Test Sample in the CO_2 reactor cell.

1. Unscrew and remove the top with pressure gauge or pressure transducer from the Reactor Cell then remove the acid cup.

2. Inspect to be sure CO_2 reactor cell and top are clean and dry.

3. Be sure cell "O" Ring seal on the top, and the "O" Ring on the bleed valve are in good condition. Use a light coating of Vacuum Grease on "O" Ring seals. Make sure all pipe or tubing connections are tight and do not leak.

4. Slide one paper and its 1.00 gm. test sample to the bottom of the cell while holding cell in horizontal position. Raise cell to vertical and dump sample onto cell bottom. Brush the paper with small brush to remove traces of sample then remove the paper.

5. Pour 20 ml of 10 percent HCL into acid cup (20 ml is the line on the side of the cup), and lower acid cup into cell. Be careful not to spill or get any HCL on bottom of cup.

6. Hand tighten cell cap being careful not to splash acid onto sample.

7. Open bleed valve until a Zero pressure reading is obtained on the pressure gauge or on the recorder chart, then close the bleed valve tightly.

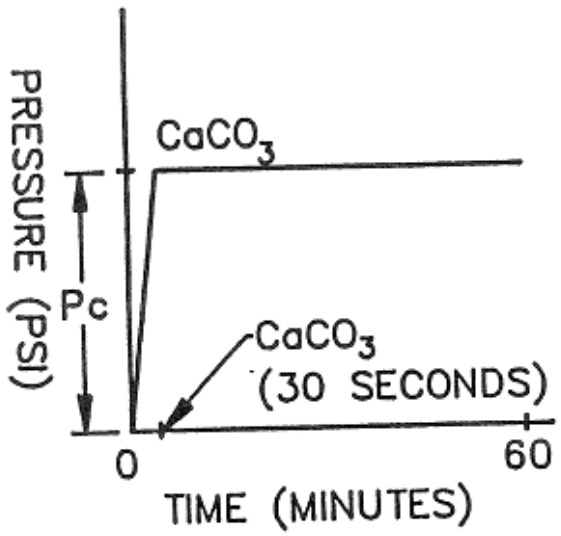


Fig. 1

$CaCO_3$ Pressure

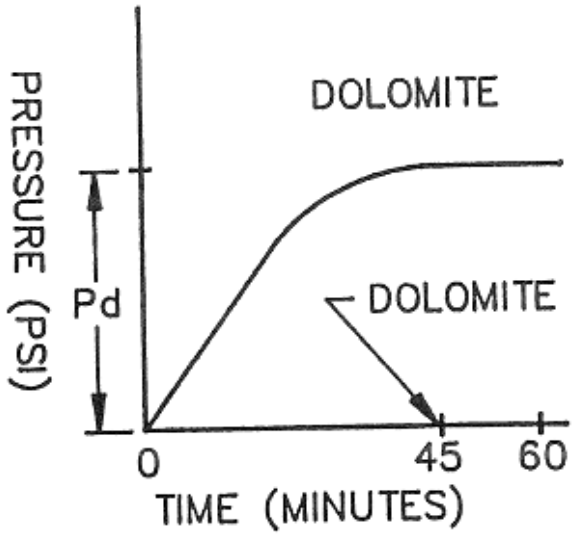


Fig. 2

Dolomite Pressure

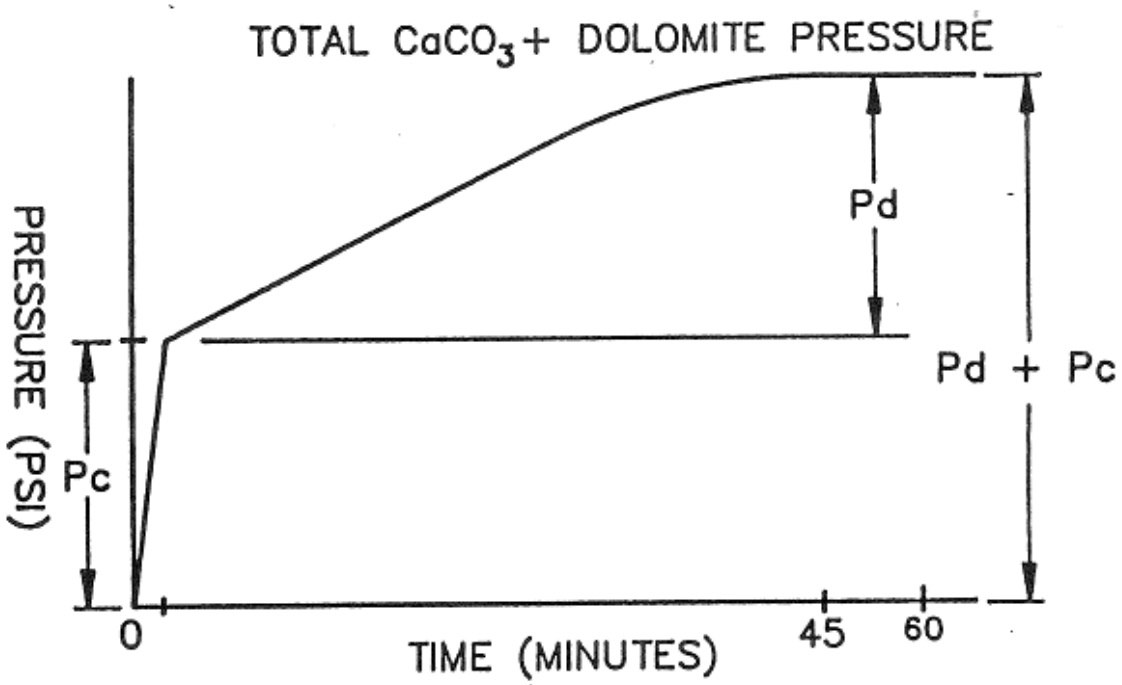


Fig. 3

Total Pressure - $CaCO_3$ + Dolomite

D. Tip the reaction cell and start timing the test. This will start the reaction between the HCl and the $CaCO_3$. Observe the rapidly rising pressure and record it at 30 seconds after the reaction cell was tipped. Record this as $CaCO_3$ pressure. There should be a pause, and then a slow second rise in pressure will be noted if dolomite is present. The dolomite reaction and pressure rise is much slower for dolomite. Swirl reaction cell and allow sufficient time for completion of the pressure build up. The reaction is assumed complete when the pressure stops increasing and remains constant. This should happen in 30 to 45 minutes. This final value of pressure is the total $CaCO_3$ plus dolomite pressure. To obtain the pressure due to the dolomite, subtract the calcium carbonate pressure (30 second reading) from the total reading (30-45 minute reading).

E. For interpretation of the pressure readings. Refer to Fig. 1, 2, and 3. These are representative of pressure versus time graphs as they would appear on a Pressure Recorder Chart. Fig. 1 is representative of the $CaCO_3$ only. Fig. 2 is representative of dolomite only. Fig. 3 is representative of combined $CaCO_3$ and dolomite.

F. Equations [1] and [2], Page 6, can be used for calculation of the percentages of $CaCO_3$ and dolomite, however since the sample size is specified as 1.00 gm these equations can be further simplified to equations [3] and [4] respectively.

Since sample weight = 1.00 gm,

$$\%CaCO_3 = \frac{Pressure\ PSI\ x\ 100}{Slope} \quad [3]$$

Since sample weight = 1.00 gm,

$$\%Dolomite = \frac{Pressure\ PSI\ x\ 92}{Slope} \quad [4]$$

SECTION 5
CONSTRUCTION OF CALIBRATION CURVE

The volume of the reaction cell of a Calcimeter of the type used for the Fann Calcimeter and described in the ASTM D 4373 controls the relationship of the pressure observed to the amount of CO_2 released by a given weight of $CaCO_3$ when reacted with HCl. This relationship is a constant for a given reaction cell. The calibration curve or calculated calibration factor (the reciprocal of the slope x 100 percent of the calibration curve x 100 percent) are used to translate the observed pressure resulting from the CO_2 released by a given weight of reagent grade $CaCO_3$ to percent calcium carbonate. All points on the calibration curve represent 100 percent $CaCO_3$ for that sample weight. Any number of samples can be used to construct the calibration curve. The following are recommended to give good accuracy.

A. Weigh Out Calibration Samples

1. For 15 psig full scale gauge, 15 psig full scale recorder and a 10 ml acid cup, weigh exactly .200, .400, .600, and .700 gms of Reagent Grade $CaCO_3$ onto small pieces of glazed paper for calibration.

2. For 30 psig full scale gauge, 30 psig full scale recorder and a 20 ml acid cup. weigh out additional samples of .800, 1.000 , and 1.200 gms $CaCO_3$.

   NOTE: Do not use samples of $CaCO_3$ larger than .700 gms unless a 20 ml acid cup is available.

B. Load a Calibration Sample.

Perform the procedure outlined in Section 3-C for Fann Test Procedure, Steps C-1 through C-7.

C. Tip the cell and allow acid to run out of cup onto the sample. Swirl gently and continuously until a constant pressure is obtained. This will usually take about 30 seconds. Keep reactants in lower part of cell to avoid getting acid into pressure gauge or pressure transducer. As soon as the reaction is started observe the rapidly rising pressure. Record this pressure at its peak. Record this as the $CaCO_3$ pressure for the sample weight used.

NOTE: If a mechanical shaker is available, it may be used to agitate the cell rather than swirling the reactants as described above. Agitate the sample for 10 minutes.

D. Repeat the procedure outlined in Section B and C above for each of the samples prepared in Section A above. This will be a total of four samples if a 15 psig gauge or Recorder and a 10 ml acid sample cup are being used or a total of seven samples if a 30 psig gauge or recorder and a 20 ml acid cup are being used.

E. Plot grams of $CaCO_3$ for each sample verses final pressure reading for each sample on linear graph paper. Draw a straight line averaged through these points. A sample graph for the four point plot and the addition for the 7 point graph is shown in Fig. 4. Larger samples of $CaCO_3$ cannot be reacted using the 10 ml acid cup.

F. Note the linear relation between the pressure and sample size, therefore this curve may be assumed to be a straight line, and its slope will be a constant. As illustrated in Fig. 4 the slope of the curve is 2 psig /.1 gm $CaCO_3$, or 20 psig / 1.0 gm sample, resulting in a slope of 20. Therefore the Calibration Factor in this case is 1/20 = .05 x 100 or 5. This number is the slope or average slope for the particular equipment calibrated. It is a function of the volume of the reaction cell.

As shown by equations [5] and [6] below the slope can be written as a "Cell Factor" to multiply the pressure reading by to directly obtain percentages of Calcium Carbonate and Dolomite.

As described above Slope = 20 psig for a 1 gm sample therefore

[5] $\%CaCO_3 = \frac{Pressure \times 100}{1\,gm \times 20}$

or

$\%CaCO_3 = 5 \times Pressure$

[6] $\%Dolomite = \frac{(Total\ Press - CaCO_3\ Press)(.92)(100)}{1gm \times 120}$

or

$\%Dolomite = 4.6 \times (Total\ Press - CaCO_3\ Press)$

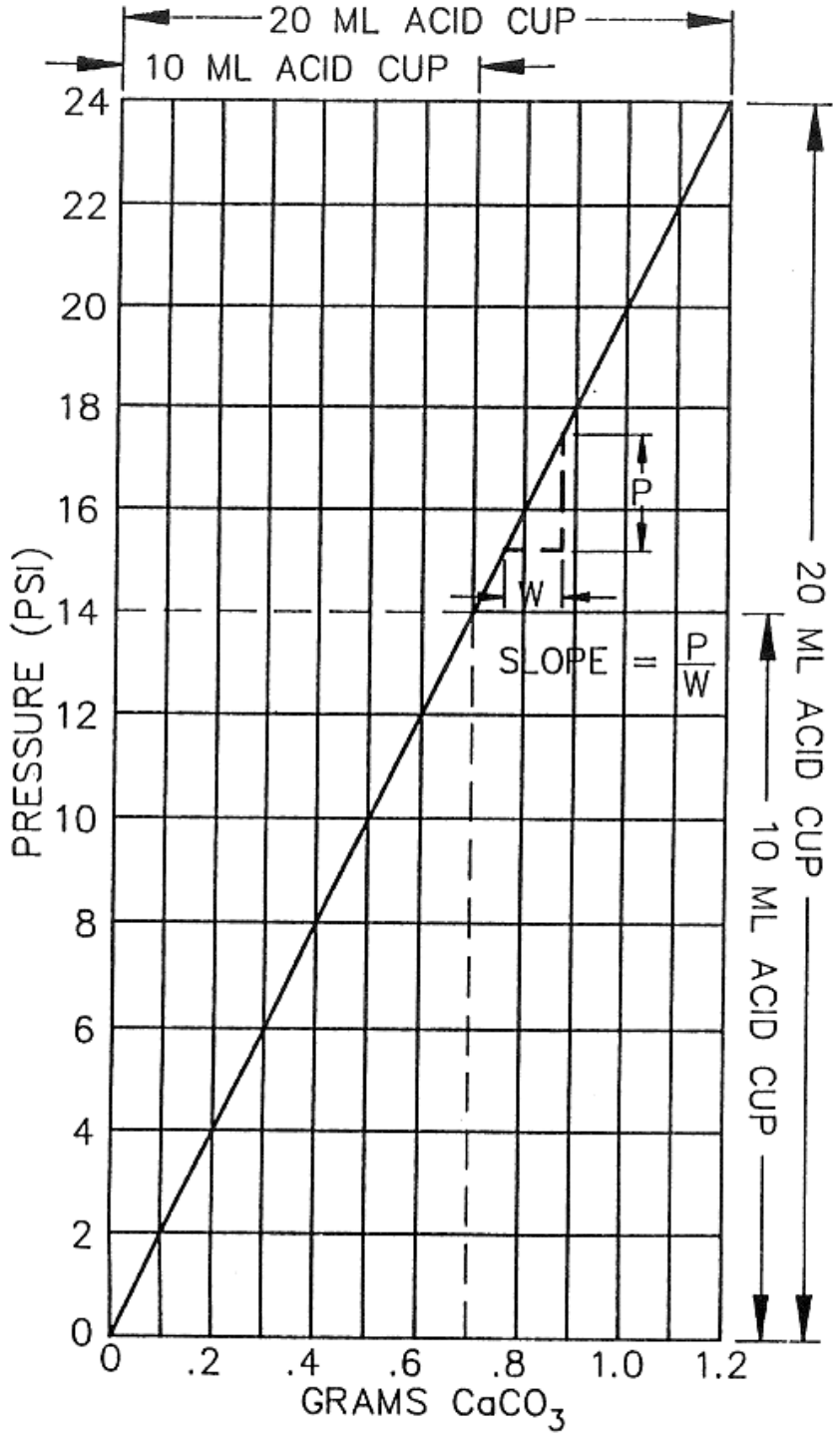


Fig. 4

$CaCO_3$ Calibration Curve

[10 & 20 ml Acid Cups]

SECTION 6
FANN RECORDING CALCIMETER

The Fann Recording Calcimeter differs from the pressure gauge model only in that a pressure transducer and small strip chart recorder is provided to replace the pressure gauge. This section will primarily describe the set up and operation of the transducer and recorder.

A. Description of Recorder.

The recorder is a RUSTRAK with a 2 inch strip chart and 30 inches per hour chart speed. It has been adapted for use with the Calcimeter by connecting a pressure transducer and power supply for the transducer to enable recording of pressure changes in the reactor cell as they occur. The recorder chart will read the pressure in the reaction cell. By applying the calibration factor to the chart reading the percent calcium carbonate and dolomite can be read from the recorder chart.

B. System Specifications

Power	Source	115 Volt AC, 60 Hz.
	Connection	3 wire grounded receptacle
Transducer	Pressure Range	0 to 15 psig (103.4 kPa)
	Output Signal	4 to 20 Milliampers
	Connection	3 - 18 AWG. W/ PLUG & RECEPTICAL
Recorder	Signal input	4 to 20- Milliampers
	Connection	6 terminal Plug and receptacle.
	Chart Speed	30 in/hr.
	Chart length	63 feet.
	Chart Width	2-5/16 inches
	Chart Cal.	2 inches = 15 psig.

C. Chart Installation

A warning to "RENEW CHART" appears on the last three feet of each roll of paper. Refer to item numbers [ ] in Fig. 5. For use with the Calcimeter, the chart paper is loaded in the "Tear Off Mode".

1. Unplug Recorder from power source before loading the paper.

2. Open the recorder by loosening thumbscrew [1].

3. Unlatch paper retaining clips [2].

4. Open panel to chassis latch [3] Right Hand side plate.

5. Slide drive belts [9] from chamfered grooves to center of top roller to release pressure on paper.

6. Remove supply roll [4]. If paper is still attached to supply roll, carefully slide the paper from between the front panel and chart drive. Do not pull the paper backward through the recorder.

7. Insert the supply roller into the new roll of chart paper. The perforated end of the paper nearest the roller shoulder.

8. Unroll about a foot of paper. Slide the paper between the panel and side plate, sprocket holes first. Keep the paper taut and close to the drive drum to prevent snagging the pointer.

9. Engage the supply roller shaft in both seating notches [6] and check to be sure that the paper sprocket holes engage the time drum sprockets.

10. Pull the drive belts [9] back into the grooves [10].

11. Close clips [2], latch [3], and recorder front panel. Tighten thumbscrew [1].

12. Advance paper with the chart advance thumb wheel [8] by pushing inward and turning downward, to assure that paper drives through the recorder. Set the time using the chart advance thumb wheel.

13. Reconnect power to the recorder.

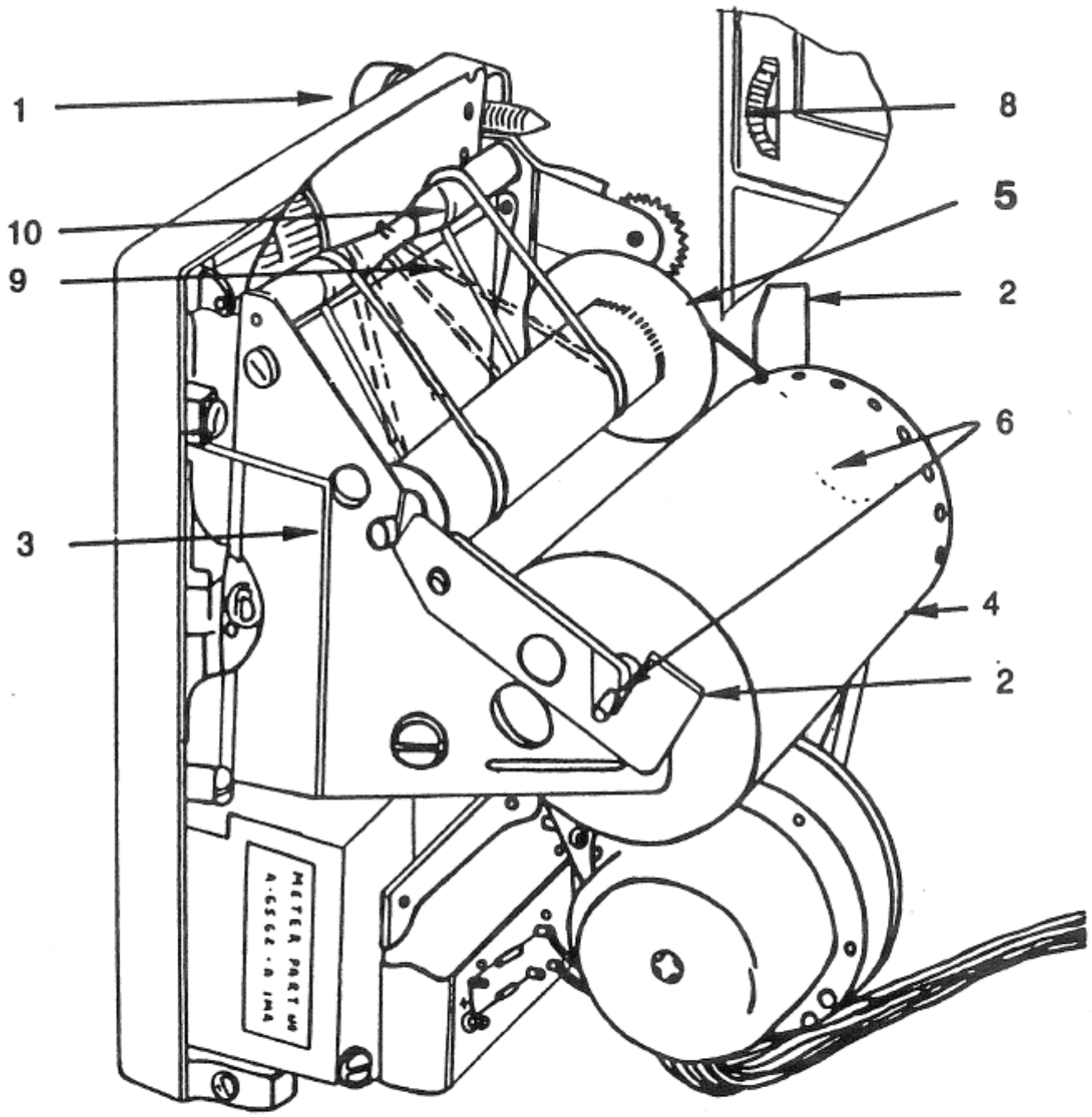


Fig. 5

CHART INSTALLATION - RUSTRAK RECORDER
TEAR OF MODE

SECTION 7
MAINTENANCE AND REPAIR

A. Testing For Leaks

Leaks in the pressure system are probably the greatest source of potential trouble.

1. Periodically inspect Reaction Cell and replace O-Rings if necessary.

2. Check the pipe thread connection between the reaction cell top and the pressure Gauge or transducer with a brush and soap suds. Repair by disassembling the pipe threaded connection between the reaction cell and the gauge or transducer. Use Locktite pipe sealant with teflon or similar product.

3. Check for plugging in the connection between reaction cell and gauge or transducer, also in the gauge entrance or the transducer barrel and diaphragm for build-up of calcium deposit over long periods of time. A warm Chlorox wash should clean these parts.

   Note: Some units have a filter in the connection. Replace this filter if plugged.

4. On recorder models check that the paper travel is 1/2 " per minute. Refer to Section 6-C.

5. To check for leaks, pressurize the instrument as described in Section 5 -A1, B, and C. using a .6 gm. sample and let stand at least one hour. Pressure should not decrease unless leaks are present.

B. Calibration Data Does Not Give a Straight Line

If there are no leaks in the system, but results are not giving a straight line calibration curve or data is otherwise questionable check the following:

1. Check for sticking pressure gauge or recorder malfunction. Refer to Section 7-C below for possible malfunction of Rustrak recorder or transducer circuit.

2. Make sure the scale or balance is clean and free of corrosion on weights and pans. Shield balance from air currents and vibration as much as possible when weighing sample or $CaCO_3$ for calibration.

3. Check Reaction Cell for contaminants. Be sure cell is clean and dry.

4. Check for impurities in reagents. Moisture in $CaCO_3$ standard will result in low pressure readings.

C. Recorder Not Responding To Pressure Changes In Reaction Cell.

1. Make sure the power cable is plugged into the electrical out and that power is available at the outlet.

2. Verify the Power switch in the recorder is ON.

3. Check the plug and receptacle going into the recorder to make sure they are making a good connection.

4. Check the plug and receptacle connecting the transducer to the Recorder. Make sure this plug and receptacle are making good connection.

D. Checking the Transducer Circuit

This test sequence requires a qualified electrical technician familiar with electrical test instruments and the potential hazards of electrical circuits.

1. Check AC terminals of power supply mounted on top of recorder for 115 volt AC. If No, check wiring to power supply Refer to Transducer and Power Cord Assembly and Wiring Diagram - Recording Calcimeter, 43210-W.

2. Check + to - terminals on power supply for 12 volt DC. If 115 volts is found but no 12 Volt DC, power supply is defective.

3. Test 12 Volt circuit from + on power supply to [orange wire] through recorder connector pin 2, then [red wire] to transducer. Then back from transducer [black wire] to pin 1 of connector, then to the + side of the recorder galvanometer, then from the - of the galvanometer [w/black wire] to the - of the power supply.

4. Disconnect either the [red] wire or the [W/black] wire from the power supply. Connect a suitable VOM (volt-ohm-meter) set on a milliampere scale to measure up to 20 milliamperes DC in series between the terminal and the removed wire. Pressure the Reactor Cell and the transducer up to 15 psig. Measure the current. Zero pressure should read 4 Ma, 15 psig should read 20 Ma. If not the transducer is either defective or connected backward.

5. If the Galvanometer does not follow the signal, check to see that when the striker is in its maximum open position the distance between the striker and the paper should be 1/8 inch. The pointer should be midway. If the pointer is not centered, the galvanometer could have a bent pointer, broken taut band, or cracked jewel. Defects not so visible such as open or shorted coil or debris in the air gap will also cause the problem.

6. The chart speed used on this instrument is 30 inches per hour or 1/2 inch per minute. If the chart is not moving at this rate, the chart drive motor is not getting power, is defective, or the gear train is defective.

7. If tests in 3 and 4 above show good, and the checks in 5 or 6 show problems, the recorder is defective and must be repaired.

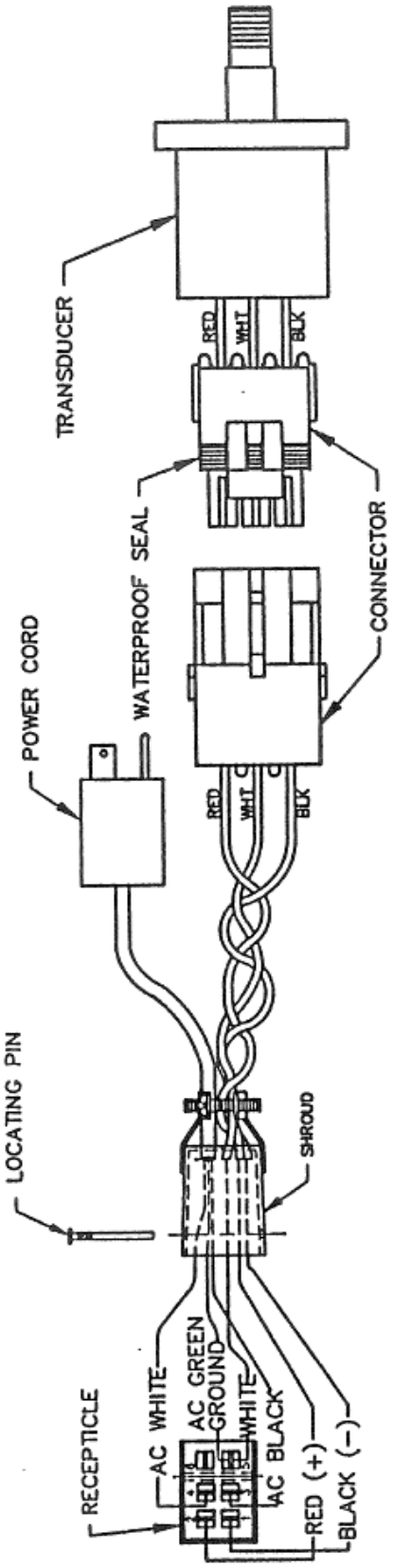
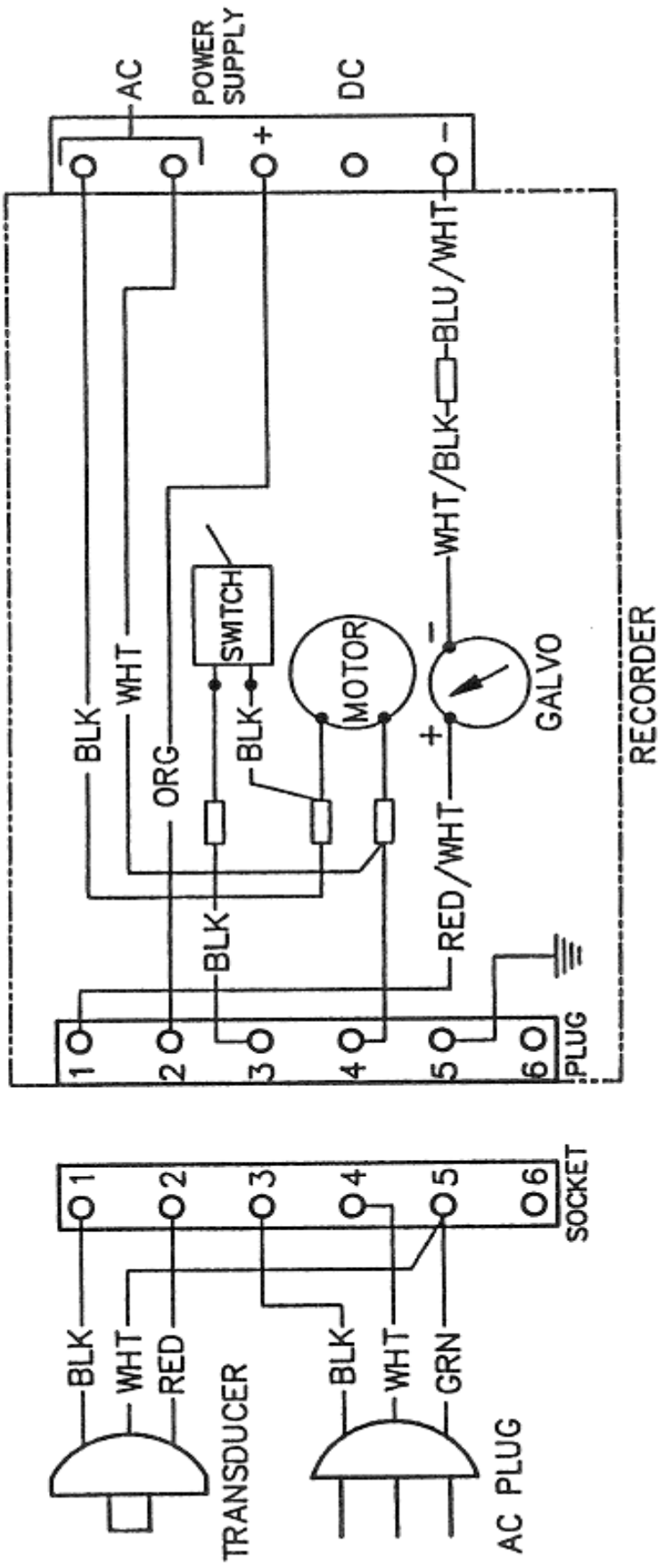


FIG. 6

TRANSDUCER AND POWER CORD ASSEMBLY

SECTION 8
PARTS LIST

PART NO.	DESCRIPTION
207697	ELL, STREET, BRASS, 1/4 FNPT X 1/4 MNPT
209697	REACTION CELL
209702	ACID CUP W/HANDLE
209699	CASE SS FOR CALCIMETER W/ RECORDER
204213	CALCIMETER INSTRUCTIONS
204368	POWER SUPPLY FOR TRANSDUCER
205607	GAUGE, 30 PSIG 3.5 INCH
205625	LUBRICANT GREASE
205650	"O" RING, 1/4 ID X 1/16, BLEED VALVE
205659	"O" RING, 1-3/8 ID X 1/16, CELL TOP
205745	SWITCH, RECORDER POWER
205795	PAPER, CROSS SECTION, F/CAL. CHART
205803	MORTAR & PESTLE
205805	RECORDER, RUSTRAK
205806	PAPER, RUSTRAK, WB
205833	BALANCE, PORTABLE
205868	CYLINDER, 25 ML,GRADUATED
206072	TRANSDUCER
REAGENTS	
209933	10 % HYDROCHLORIC ACID SOLUTION, 8 OZ.
209940	CALCIUM CARBONATE, REAGENT GRADE
209938	WETTING AGENT



WIRING DIAGRAM – RECORDING CALCIMETER

Warranty

Fann Instrument Company warrants its products to be free from defects in material and workmanship for a period of 12 months from the time of shipment. If repair or adjustment is necessary, and has not been the result of abuse or misuse within the 12-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

Return of Items

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

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

Our correspondence address is:

Fann Instrument Company
P.O. Box 4350
Houston, Texas USA 77210

Telephone: 281-871-4482
Toll Free: 800-347-0450
FAX: 281-871-4446
Email: fannmail@fann.com

Our shipping address is:

Fann Instrument Company
15112 Morales Road, Gate 7
Houston, Texas 77032 USA