

Lost Circulation Material Evaluation Receiver Instruction Manual



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Instrument No. 102308743

LCM Evaluation Receiver Instruction Manual

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Houston, Texas, USA

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1 Introduction

The Lost Circulation Material (LCM) Evaluation Receiver is an alternative back pressure receiver for Fann[®] Permeability Plugging Apparatus (PPA) and Automated Permeability Plugging Apparatus (APPA).

The LCM Evaluation Receiver can handle larger particles without plugging. This new design is beneficial for testing drilling fluids containing various sized material at engineered concentrations. These special drilling fluids seal multiple lost circulation situations, including severe fluid losses.

1.1 Document Conventions

The following icons are used as necessary in this instruction manual.



NOTE. Notes emphasize additional information that may be useful to the reader.



CAUTION. Describes a situation or practice that requires operator awareness or action in order to avoid undesirable consequences.



MANDATORY ACTION. Gives directions that, if not observed, could result in loss of data or in damage to equipment.



WARNING! Describes an unsafe condition or practice that if not corrected, could result in personal injury or threat to health.



ELECTRICITY WARNING! Alerts the operator that there is risk of electric shock.



HOT SURFACE! Alerts the operator that there is a hot surface and that there is risk of getting burned if the surface is touched.



EXPLOSION RISK! Alerts the operator that there is risk of explosion.

2 Safety

Safe laboratory practices and procedures should be observed while operating and maintaining the LCM Evaluation Receiver.

Please review safety practices listed in Fann[®] PPA and APPA instruction manuals and API Recommended Practice for Field Testing Water Based Drilling Fluids, API RP 13B-1, Annex J.

3 Features and Specifications

The LCM Evaluation Receiver can handle drilling fluids containing various particle sizes without plugging. The lower nipple has an internal diameter of 7 mm (0.28 in.), which is the smallest orifice in this receiver. The original back pressure receiver (100 ml) has 2.4 mm (0.10 in.) orifices and may plug, preventing fluid loss (a failed test).

This receiver comes with a re-engineered PPA cell cap that fits securely into all Fann[®] PPA cells (Figure 3-1).

Table 3-1 LCM Evaluation Receiver, P/N 102308743 Specifications

Volume	178 ml
Orifice Size	7 mm (0.28 in.)
Dimensions <i>(Length x Diameter)</i>	16 x 3 inches 41 x 7.6 centimeters
Weight	8.5 lb (3.85 kg)

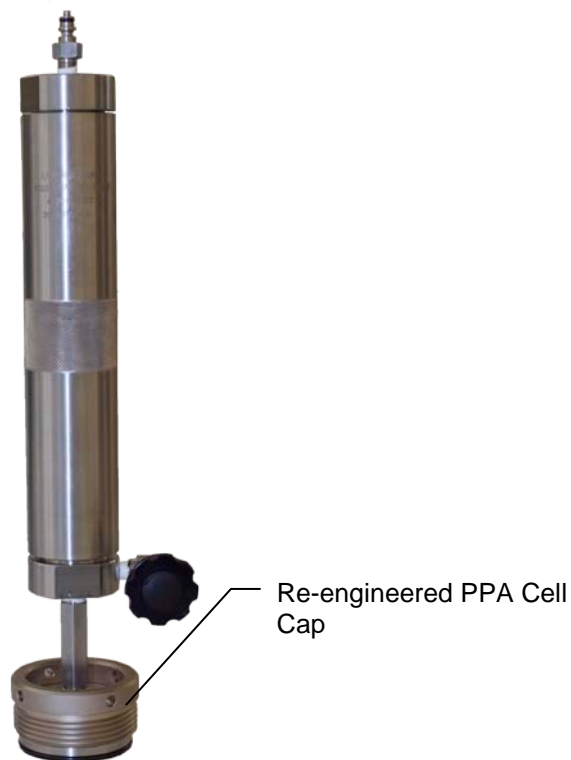


Figure 3-1 LCM Evaluation Receiver

4 Test Method with LCM Evaluation Receiver



This test follows API Recommended Practice for Field Testing Water Based Drilling Fluids, API RP 13B-1, Annex J



Refer to Fann[®] instruction manuals: PPA Manual Number 204249 and APPA Manual Number 102196683

1. This receiver replaces the original receiver and the original cap of the PPA equipment (Figure 4-1). Assemble the PPA cell as described in the Fann PPA instruction manual.
2. Fill the cell with 170 ml of the LCM treated sample.



The LCM Evaluation Receiver holds 190 ml. To prevent overfilling and fluid flowing into the nitrogen regulator, do not fill the PPA cell with more than 170 ml of sample.

3. Attach the hydraulic hose. Raise the fluid level (manually for PPA and automatic prime for the APPA) to sit below the O-ring groove
4. Select the appropriate slotted disc for the test (Table 4-1). Place the disc on top of the O-ring in the cell.



The slotted disc has a raised edge on one side. This edge should be facing up as shown in Figure 4-2.

5. Insert the PPA cell cap into the top of the PPA cell (Figure 4-1) and tighten the cell cap ring with the spanner wrench (P/N 206864).

6. Disconnect the hydraulic hose and place the completed cell assembly in the preheated heater jacket.
7. Reconnect the hydraulic hose.
8. The nipple between the receiver and the PPA cell should be filled with enough water to obtain accurate fluid loss measurement.
 - a. Remove the LCM Receiver top cap and pour approximately 20 ml of water into the receiver body.
 - b. Replace the top cap.
 - c. Open the collection valve and drain excess water from the receiver. The receiver should now contain approximately 10 ml or less of water.
9. Connect the nitrogen supply hose.
10. Apply the appropriate pressure as described in the PPA and APPA instruction manuals.
11. When the test temperature is reached, increase the pressure from the bottom side to the required pressure differential.
12. Collect samples from the collection valve at the desired time intervals.



For the PPA: If pressure does not build or hold after ~ 20 strokes with the hydraulic hand pump, then this indicates a 'total fluid loss' and the test needs to be stopped. (According to the hydraulic pump manual, each stroke would be equivalent to 5 cm³ of fluid and 325 psi maximum pressure.)



For the APPA: If pressure does not build or hold to the required differential pressure with the LCM Evaluation Receiver connected to the APPA, press the APPA red knob to stop the test.

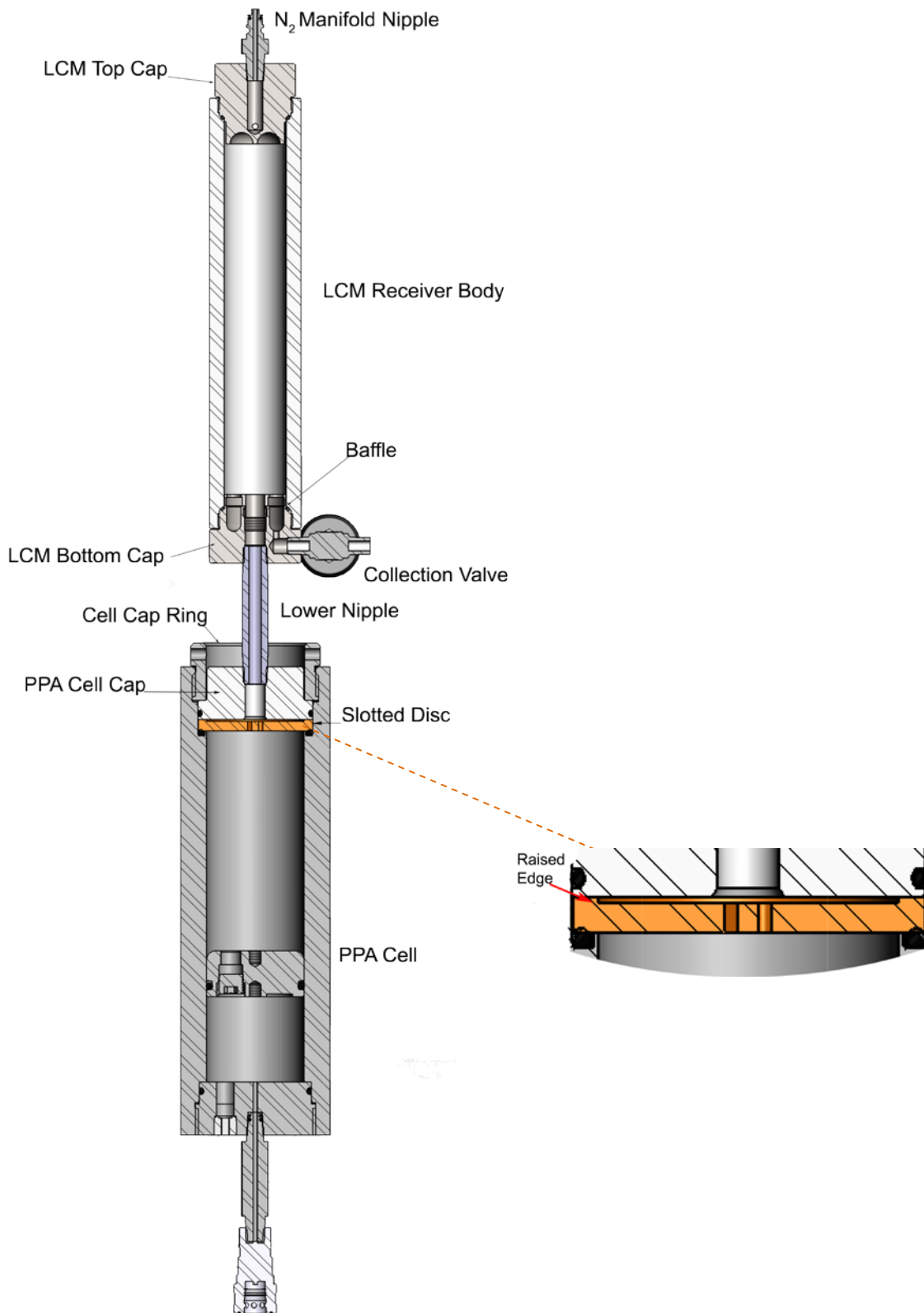


Figure 4-1 LCM Receiver Connected to PPA Cell

4.1 Testing with Stainless Steel Slotted Discs


To test LCM fluids containing larger particle sizes, the following discs are recommended. (These discs are available as separate purchases.)

Table 4-1 Stainless Steel Slotted Discs (0.25 in. Thick)

Slot Description			Image	Part No.
Length Inch	Width Inch/Micron	Type		
1.000	0.008 in. 203.2 μ	Constant Area 10 radial arms		101896606
1.000	0.02 in. 508 μ	Constant Area 4 radial arms		101896607
0.531	0.04 in. 1016 μ	Constant Area 4 radial arms		101896608
0.381	0.06 in. 1524 μ	Constant Area 4 radial arms		101896609

Slot Description			Image	Part No.
Length Inch	Width Inch/Micron	Type		
0.313	0.08 in. 2032 μ	Constant Area 4 radial arms		101896610
0.279	0.1 in. 2540 μ	Constant Area 4 radial arms		101896611
0.428	0.12 in. 3048 μ	Constant Area 2 radial arms		101911230

Table 4-2 Tapered Slotted Disc

Slot Description				Image	Thickness	Part No.
Length Inch	Width Inch	Width Micron	Type			
1.700	0.04 to 0.1	1016 to 2540	Tapered Slot		1.64	101909848

5 Maintenance

5.1 Cleaning

Standard laboratory procedures apply when cleaning the LCM Evaluation Receiver. After each test, disassemble and thoroughly clean and dry the receiver, including the O-rings and O-ring grooves.

5.2 O-rings

Inspect all O-rings for cuts or nicks while cleaning them. Check for hardening or brittleness. If the O-rings have been exposed to temperatures above 425°F (218°C), replace them.

Replace all damaged O-rings.

Lubricate all O-rings before installing them. For most applications, high temperature grease (thin coating) is sufficient. However, since some O-rings contact the sample, the lubricant must be compatible with the sample and must be applied sparingly.

6 Parts List

Table 6-1 Lost Circulation Material Evaluation Receiver, P/N 102308743

Item No.	Part No.	Quantity	Description
1	205649	1	O-RING, 0.316 X 0.176 X 0.070 IN.
2	209441	1	BACKPRESSURE NIPPLE, 1/8 NPT
3	102473675	1	TOP CAP
4	205668	2	O-RING 1-3/8 X 1/16 IN. NITRILE
5	102473674	1	LCM EVALUATION RECEIVER BODY
6	102473677	1	BAFFLE
7	102473676	1	BOTTOM CAP
8	102473680	1	NIPPLE, 3 X 1/4 IN.
9	208759	1	NEEDLE VALVE, 1/8 X 1/8 IN. CHROME
10	102473678	1	CELL CAP RING
11	102473679	1	CELL CAP
12	204627	1	O-RING, 2.443 X 2.237 X 0.103 IN.

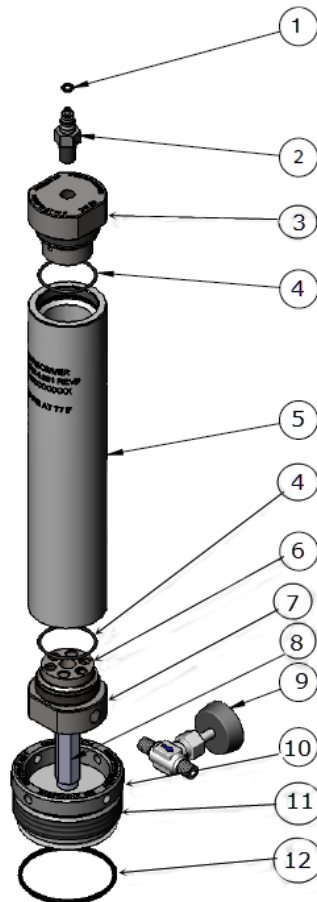


Figure 6-1 LCM Evaluation Receiver Parts

7 Warranty and Returns

7.1 Warranty

Fann Instrument Company warrants only title to the equipment, products and materials supplied and that the same are free from defects in workmanship and materials for one year from date of delivery. **THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED OF MERCHANTABILITY, FITNESS OR OTHERWISE BEYOND THOSE STATED IN THE IMMEDIATELY PRECEDING SENTENCE.** Fann's sole liability and Customer's exclusive remedy in any cause of action (whether in contract, tort, breach of warranty or otherwise) arising out of the sale, lease or use of any equipment, products or materials is expressly limited to the replacement of such on their return to Fann or, at Fann's option, to the allowance to Customer of credit for the cost of such items. In no event shall Fann be liable for special, incidental, indirect, consequential or punitive damages. Notwithstanding any specification or description in its catalogs, literature or brochures of materials used in the manufacture of its products, Fann reserves the right to substitute other materials without notice. Fann does not warrant in any way equipment, products, and material not manufactured by Fann, and such will be sold only with the warranties, if any, that are given by the manufacturer thereof. Fann will only pass through to Customer the warranty granted to it by the manufacturer of such items.

7.2 Returns

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.

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