TECH 2000™ specguide

THIS IS THE BASE STOCK OUR LABEL MFG'R USES.

LM-2111
50# EDP

RUN WITH THE WINNER

PRODUCT DESCRIPTION

An uncoated litho construction designed with 2100 adhesive for EDP/Data Systems label applications.

FACE DESCRIPTION

A 50# uncoated, smudge-resistant, white paper stock that is highly receptive to inks and markings.

PHYSICAL PROPERTIES

	TYPICAL VALUES		Test Method
Tear, grams	55 MD	58 CD	TAPPI T-414
Tensile, lbs./in.	40 MD	20 CD	TAPPI T-494
Caliper, inches	0.0038 ± 10%		TAPPI T-411
Basis Weight, lbs. (25" x 38"/500)	50 ± 10%		TAPPI T-410

ADHESIVE DESCRIPTION

2100 is a general purpose permanent, acrylic adhesive characterized by excellent tack and ultimate adhesion to a wide variety of surfaces.

Thickness, inches	0.0007 ± 10%	
Peel Adhesion, lbs./in.	3.1 lbs. or paper tear	PSTC-1 30 min. applied
Temperature Ranges		
Minimum Application	+40°F.	CTM #45 Curwood Polyester Film Dry Surface
Service Ranges	-65°F. to 180°F.	

LINER DESCRIPTION

A 50# basis weight, semi-bleached, sulfate kraft backing, super-calendered two sides. The release liner displays excellent internal strength, toughness and tear resistance.

Caliper, inches	0.0033 ± 10%	TAPPI T-411
Basis Weight, lbs. (24" x 36"/500 sheets)	54 ± 10%	TAPPI T-410

SHELF LIFE

One year when stored at 72°F. and 50% R.H.

MANUFACTURER WILL NOT COMMIT TO MORE ALTHOUGH IT WILL WORK.

(0186)

IMPORTANT NOTICE The information given and the recommendations made herein are based on our research and are believed to be accurate, but no guaranty of their accuracy or completeness is made. In every case, user shall determine before using any product in full scale production, or in any way whatsoever such product is suitable for user's intended use for their particular purpose under their own operating conditions. User assumes all risk and liability whatsoever in connection with their use of any product. The products discussed herein are sold without any warranty as to merchantability or fitness for a particular purpose or any other warranty, expressed or implied. No representative of ours has any authority to waive or change the foregoing provisions, and no statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by the officers of seller and manufacturer. Nothing contained

2160 ASSEMBLY SEQUENCE

THIS SEQUENCE IS REVISED FOR THE "409" VERSION OF THE DETECTOR

1. Sort the incoming Am241 sources, according to content per sorcsort.txt. This is the method for sorting the Am241 sources to facilitate production during periods of poor quality control at N.R.D.

   A. Verify the calibration of the SAC-4 with 1160 Dpm calibration source per the CALIBRATION PROCEDURE FOR THE S.A.C.-4

   B. Using the source handling tweezers, place the source in questions in the SAC-4 and run a 6 second check on the activity of the source. Place the source in the center of the sample tray with the gold foil facing up. The sources should be grouped as follows:

   0000 to 25000 counts: REJECT and return to ~~manufacturing~~ STORAGE for disposal.
   25000 to 28000 counts: Put in Group A
   28000 to 31000 counts: Put in Group B
   31000 to 34000 counts: Put in Group C
   34000 to 37000 counts: Put in Group D
   37000 and up: REJECT and return to ~~manufacturing~~ STORAGE for disposal.

   Detectors should be built using sources in the same group, this can be accomplished by marking the chambers with magic marker as the sources are swaged onto the chamber endplate.

2. Swage the sources to the endplates and swipe test for leaking sources. Label each endplate with the activity of the source swaged onto it.
3. Make-up reference chamber assembly Make-up reference electrode.

Make-up sample chamber subassembly.
Make-up sample electrode.

4. A. Circuit card prep. All operations performed with gloves to prevent oxidation.
   1. Swage P1, P2 and P3 onto the circuit boards.
   2. Install 100 Ohm 5 watt ceramic resistor R19 and C1, the 4.7p,F mica capacitor, clinch and solder leads.
   3. Soldermask the holes for the poprivit posts, the pot holes (R4) and the pass through hole for W3 and W4.
5. Put on the grounded wrist strap and cotton gloves.
6. Arrange the circuit boards on antistatic foam bats on the board assembly.
7. Populate the circuit boards. Install the components in the following order: Resistors first, then diodes, capacitors, the CD4049 integrated circuit, the R20/c9 assembly and finally the wires.
8. Inspect the circuit boards for population errors, against the component layout.
9. Wearing respiratory protection mask and gloves, carefully remove the circuit boards from the foam bat, making sure all of the components are flat against the board. Dip the circuit board into the flux, and solder the circuit board.
10. On grounded surface with gloves and strap, inspect and correct unsoldered pads then trim the excess component leads.
11. On grounded surface with gloves and strap, inspect and touch-up the circuit cards under a magnifying glass. Rub off all dross with a brass brush and correct all solder bridges, cold joints, voids, etc. Install the potentiometer, R4, on the solder side of the circuit board. Then attach the solder lug to the mica capacitor and install the safety wire. Make sure that the safety wire and the capacitor are on opposite sides of the lug,

and that the hole is still open so that the gate of the F.E.T. can be installed later. Reinspect the circuit card for soldering flaws.

12. Install chamber connection solder lugs.
13. Install the five (5) poprivet stand-offs with SD45BS poprivits, #7 lockwashers and the post alignment tool. The lockwasher goes between the poprivit and the solder side of the circuit board. Make sure that the safety wire takes the correct path: from lug out through poprivit posts 4 and 5, then around to turret post P1.
14. P.C. board visual Q.C. inspection.
15. P.C. board electro-check for proper circuit operation Electro Test #1.
    1. Connect the detector card to the test bed.
    2. Check the positive power supply, should be 16.5 to 17.5 volts. If not check the regulator portion of the circuit. (Q3 base should be .7 volts above the check R15 value, Z1 value.
    3. Check Vs on P1, this point should be approximately 12.5 to 13.5 volts, if not check R1, R2 R3, R4, R5 and R7 for incorrect values.
    4. Short the drain and source pins for the F.E.T. with a 501K resistor and verify that the detector goes into alarm within 1 second for a 2160 or 6 seconds for a 2165.
16. P.C. board burn-in 48 hours at 60 degrees C. Take care that the wires (W1 and W2) that go to the chambers don't touch each other or one of the power supply legs, as this will short the on board regulator.
17. Repeat P.C. board electro-check for proper circuit operation Electro Test #1, the circuit board check in step #14 of this procedure.
18. FET preparation, dessicate the F.E.Ts as follows: Note that this must be done on a grounded surface with wriststraps and finger cots.

Cotton gloves are not acceptable.

A. Fill the alcohol bath with alcohol. The alcohol can only be used for cleaning 500 F.E.T.'s.
B. Carefully cut open bag of F.E.T.'s at one end.
C. Gently count out 100 F.E.T.'s into the cleaning basket without touching the F.E.T.'s, handoil is a contaminant.
D. Place the cleaning basket into the alcohol bath and soak overnight.
E. Prepare the desicator by heating it in the curing oven for 3 hours at 250 F.
F. Place the cleaning baskets into the desicator and bake for 3 hours at 200 F. Please note that the cleaning baskets must sit on bare metal and the top must be snapped on, or a discharge event may occur.

19. FET installation must be performed on a grounded surface with fingercots and wriststrap.
    A. On a grounded surface and with a wriststrap, pick up one F.E.T. with a hemostatic clamp by grabbing the drain and gate leads. Clip the case lead and form the source, drain the gate leads.
    B. Immediately install the F.E.T. into the circuit board by threading the gate lead through the lug and soldering the source and drain leads.
    C. Solder the gate lead, and make sure that the F.E.T. can is not resting on any other component.
    D. Bend up the solder lug so that it is out of the way for coating and remove the clamp.
20. Coat the circuit card with conformal coating with the jumper in place.
21. Place the circuit cards in an antistatic bin and allow 96 hours for the conformal coating to cure.
22. On a grounded surface, using a wrist strap and cotton gloves, assemble the electrode assemblies

onto the circuit cards.

23. On a grounded surface, using a wrist strap, cotton gloves and a grounded pop rivet gun, install the two chamber assemblies. Install the reference chamber first, the first rivit shall be the one near post 4 and the R20/C9 subassembly. The positive power supply lug and wire (W1-Red) goes between the circuit card (component side) and the chamber foot.

23.5 Swipe test both chamber ends for removable radiation.

24. Install locator pin and ground strap on detector base body.

25. Assemble p.c. board and chambers subassembly to detector base with 5 base pins.

26. Check detector subassembly for proper voltages as defined in electro test #1, lines 1, 2 and 3. Stamp box #2.

27. The detector subassembly is ready for calibration.
    1. Install the detector in the calibration test bed.
    2. Attach the leads from the dial potentiometer on the test bed to the detector at P2 and P3. Adjust detector potentiometer fully clockwise (min sens.) and turn the dial pot to 100 kohms. Place surrogate shell on the detector.
    3. Insert sensitivity checker probe. Wait 30 seconds for the detector to reach steady state.
    4. Test the detector with the sensitivity checker, record the resultant number in display S.
    5. Multiply the sensitivity checker number, S, by .7179 to get V. (S x .7179 = V)
    6. Subtract 1.96 from V to get P. (V - 1.96 = P)
    7. Reset the sensitivity checker and the detector and read Vs from the test set voltmeter.
    8. Subtract P from Vs to get the set point voltage V set. (Vs - P = V set)

9. Adjust the test fixture dial-potentiometer until the voltmeter reads out the calculated set point voltage, V set.
10. Retest the sensitivity with the sensitivity checker. It would be 300 - 30. If so, select the fixed resistor with a value which is equal to the dial-potentiometer reading or the closest larger value of the potentiometer indicates a non-standard resistance value.
11. If the outcome of the above step yielded a sensitivity less than 270, increase the dial-potentiometer to one standard value larger and repeat #40-10.
12. If the outcome of step 40-10 yielded a sensitivity greater than 300, decrease the dial-potentiometer to one standard value smaller and repeat #40-10.
13. Do not proceed until the correct value is found.
14. Solder the resistor between pins P2 and P3.
15. Check the sensitivity with the sensitivity checker and with the shell on. It should be 300 - 30 (270 to 300). If so, proceed, if not remove the resistor on pins P2 and P3 and go back to Step #40.
16. Adjust the detector to maximum sensitivity by turning the detector potentiometer fully counter clockwise.
17. Check the sensitivity with the sensitivity checker and the surrogate detector shell. It should be 200 - 20 (180 to 200). If not recheck minimum sensitivity per step #40-10.
18. On the QA trace label: stamp box 3, put the date in box 4, enter the maximum sensitivity in box 5 and the minimum in box 6.

28. Burn-in at room temperature for 48 hours.

29. Recheck sensitivity at maximum sens. and minimum sens; should be between 180 to 200 for maximum and 270 to 300 for minimum.
30. Test the detector outputs in the final check test fixture.
31. Final check detectors at max. sensitivity with the sensitivity checker and the procedure below. it should be 180 to 200. Green Dot.
    1. Check the sensitivity twice, if the numbers are good on both tries, the detector may go to the smoke chamber.
    2. If one, or both, of the readings are out of range, take a third reading and average the three readings.
    3. If the average of the three readings is out of range, return the detector for recalibration.
    4. If the average of the three readings is in range, and the readings are all within +/- 10% of the average, then the detector may go to the smoke chamber. otherwise the detector must be recalibrated.
32. Fill-in detector hex label with sensitivity max/min and serial number.
33. Send 100% of each days production to smoke chamber in the R and D lab per the method outlined in "SMOKEBOX".
    The UL 268 smoke box is supposed to be operated under the following conditions:
    SMOKE CHAMBER CONDITIONS
    1. Temperature:
       English: 73F+/-3.6F
       Metric: 23C+/-2C
    2. Relative Humidity:
       50% +/1 20%
    3. Barometric Pressure
       29.92+/-1.18 in. Hg
       760mm Hg +/-30mm
    4. Air speed:
       32 ft/min +/-2fpm
       0.16m/sec. +/-.001m/s
    5. X-Y plotter
       X axis 0.5mV/cm

Y axis 0.005V/cm

Measuring Ionization Chamber Conditions
Chamber Current: 100 picoamperes
+/-1.5pa
Suction Rate: 25 1/min +/-5 1/m

OPERATING INSTRUCTIONS

CALIBRATION

1. If the smoke box has not yet been turned on, turn on the main power switch on the main powersupply, the Fluke Meter, and the chart recorder. Do not leave the plotter with either of the inputs on "measure", leave them on "0" and make sure the pen is up.
2. Wait a minimum of thirty minutes for the power supply to stabilize.
3. Once the power supply has stabilized and with the "measure" switch on the plotter still turned off, rotate the silver knobbed potentiometer to the left of the chart recorder fully counter-clock-wise. Now rotate the pot 5 turns in the clock-wise direction.

   Adjust the "voltage adjust" knob on the Powermate power supply until the Fluke meter reads 100.0mV.
4. Close all the doors on the smoke box and check the air speed. It should be 32 feet per minute, +/- 2 fpm. If the speed is off, adjust it very carefully using the circulation fan adjustment on the right end of the box. Before making any adjustment make sure that the circulation fan is turned on and the exhaust fan is off.
5. Turn on the vacuum pump.
6. Adjust the needle valve on the front of the M.I.C. controller for 25 i/m +/- 5 i/m. The center of the ball indicates the suction rate.
7. Switch the function switch on the M.I.C. to Zero Cal. Adjust the small adjustment screw until the meter reads zero.
8. Switch the function switch to F.S.D. and adjust the small adjustment screw until the needle is at the end

of the scale.

9. Turn the function switch on the front of the M.I.C. controller to "I ch" and adjust the "adjustment" knob on the front of the controller for 100 picoamperes.

THE SMOKEBOX IS NOW CALIBRATED

TESTING PROCEDURE:

1. Check the calibration of all of the smokebox instruments to make sure none of them have drifted.
2. Place detectors in the chamber.
3. Close all the doors to the chamber, turn off the exhaust fan and close the exhaust port.
4. Turn on the vacuum pump, adjust it for 25 l/m (+/-5 l/m) and adjust the M.I.C. chamber current for 100 picoamperes.
5. Allow the air flow to stabilize for a minute and check the air speed. It should be 32 fpm, +/- 2 fpm; adjust the circulation fan potentiometer as needed.
6. Place a piece of graph paper on the platter of the X-Y plotter and secure it with the magnetic hold-down strips. Then switch the input modules from '0' to 'measure', switch the pen control to the pen down position and zero the pen position.
7. Cut a 1.5 inch piece of cord, put it in the holder and light the cord making sure that it is evenly lit.
8. Place the lit wick in the test chamber and switch on the paper feed on the chart recorder. The wick should be placed in the middle of the wick support tube, if it is not, the burning characteristics may not comply with the UL 268 test standards.
9. Note the first and last detectors to go into alarm.
10. At the end of the test:
    1. Switch the pen to the up position.
    2. Remove the wick.
    3. Open the exhaust port.
    4. Turn on the exhaust fan.

11. The technician running the test must write down his initials, the date, the number of detectors which failed the test. This information should be written next to the test and the test should be checked against the acetate of the UL268 smoke test envelope.
12. The exhaust fan should run for at least 15 minutes.
13. The chamber is now ready for the next test.

Stamp the base with initials.

34. Put shell on the detector.
35. Alarm all detectors with A punk stick, check all outputs for proper function. Reset detectors and recheck outputs.
36. Glyptol one of the three cap screws holding the shell on the base. <u>Do not</u> get any glyptol in the hex socket of the cap screws.
37. Swipetest the shell endplate and side of each detector for removable radiation.
38. Hypot each detector at 750V for 6 seconds to test isolation to ground.

38.5 Recheck sensitivity at min. Green dot on base.

39. Place the wrapped detectors into detector boxes, check off the appropriate serial number and place into a shipping carton.

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