

## COMPOUNDS

Compounds are a high dielectric strength filler material used in terminations, cableheads, cable boxes and cable joints. An ideal compound should be chemically inert, adhesive and tacky; have low melting point to permit flow into all unoccupied space before solidifying, low moisture absorption, low dielectric loss, high dielectric strength and high flash and fire point for personnel safety. The selection of the proper compound for a particular installation depends upon:

1. Cable type and kind of insulation
2. Operating voltage and temperatures
3. Cable system elevation differentials (PILC cable only).

### TYPES OF COMPOUND

NOVOID "A" is a medium soft asphaltic base compound recommended for use in most termination and cablehead (switch or box) installations at 38kV or below.

NOVOID "C" is a medium hard asphaltic base compound recommended for use in terminations and cableheads for application in hot climates or hot exposure at voltages up to and including 38kV.

NOVOID "X" is a hard resin-base, oil insoluble compound recommended for use in terminations, cableheads and joints where migration of the cable-tape impregnant may be a problem. There are temperature limitations.

NOVOID #224 is a heavy polybutene base compound recommended for use in terminations, cableheads and joints for polyethylene and EPR insulated cables.

NOVOID "9A" is a very soft asphaltic base compound recommended for use in spreaderhead installations up to 38kV where the compound must be very fluid to rise up in lead or copper tubes. The lower part of the spreaderhead may be filled with Novoid "X" to provide a barrier to help prevent migration of the Novoid "9A" down into the cable.

NOVOID #219 is a medium viscosity oil recommended for use as a "flushing compound" for building cable splices or terminating where such "flushing" is required. It may also be used as a filling compound in terminations and joints on solid type paper insulated cables where oil filled accessories are desired.

OZITE "B" is a medium soft asphaltic base compound recommended for use in terminations or cableheads.

## THERMOMETERS

Thermometers have a stainless steel stem, adjustable clip handle and temperature scale in either Centigrade or Fahrenheit.

Catalog Number	Temperature Range	Stem Length (Inches)
CT3	150°F. to 750°F.	6
CT3-12	150°F. to 750°F.	12
CT3-18	150°F. to 750°F.	18
CT3-C	0°C. to 300°C.	6
CT3-C-12	0°C. to 300°C.	12
CT3-C-18	0°C. to 300°C.	18



Compounds are available in 1 gal., 2 gal., and 5 gal. containers.

### COMPOUND SELECTOR CHART

TYPE OF CABLE INSULATION	COMPOUNDS			
	NOVOID A	NOVOID C	NOVOID X	NOVOID 224
Paper Insulated, Lead Covered P.I.L.C.	Yes	Yes Note 1	Yes Note 2	No
Varnish Cambric, Lead Covered V.C.L.C.	Yes	Yes	Yes	No
Butyl Rubber I.I.R. Type	Yes Note 3	Yes Note 3	No	No
Cross Linked Polyethylene X-L Poly.	Yes	No	No	Yes
Ethylene Propylene Rubber E.P.R.	Yes Note 3	No	No	Yes
Hi-Molecular Weight Poly	No	No	No	Yes
Kerite Insulation Permashield Type	Yes	Yes	No	No

Note 1: For abnormal temperatures -30° C (-22°F) to above 40°C (104°F).

Note 2: Not recommended for terminations and cableheads operating above 15 kV where temperature may fall below -12°C (+ 10°F), or 15 kV and below, where temperature may fall below -24°C (-10°F). No temperature limitation for compound used in joints.

Note 3: Maximum pouring temperature 150°C (302°F).

Temperature ranges are specified in IEEE 48-1975 standards.

TEST	A.S.T.M. Designation	NOVOID "A"	NOVOID "C"	NOVOID "9A"	NOVOID "X"	NOVOID 219	NOVOID 224	OZITE "B"
Flash Point (°C)	D92	320	293	204	232	160	221	320
Fire Point (°C)	D92	370	307	252	269	170	273	370
Softening Point (°C)	D36	35	90	32	54	—	—	35
Pouring Temp (°C) Max	—	227	232	149	177	121	121	227
Normal	—	149	149	121	149	110	88	149
Loss on Heating (%)	D6	.26	.27	.22	.12	.40	.30	.26
Vol. Coef. of Exp. (in <sup>3</sup> /°C)	D1168	.0006	.00056	.0007	.0006	.00065	.00065	.0006
Specific Gravity	D70	.98	.97	.99	1.14	.86	.90	.98
Dielectric Str (v/mil) 25°C	D149 & D176	1000	920	800	900	400	500	1000
Power Factor (%) 25°C		1.9	1.5	1.8	9.0	.001	.015	1.9
50°C	D150	2.5	2.9	5.2	7.8	.001	.025	2.5
75°C		14.4	12.0	20.0	19.3	.002	.028	14.4
S.I.C. 25°C		2.6	2.6	2.8	4.7	2.4	2.1	2.6
50°C	D150	2.7	2.7	2.9	6.6	2.3	2.2	2.7
75°C		2.8	2.7	3.0	7.5	2.2	2.2	2.8
Consistency at 25°C	—	semi-solid	med hard	soft	hard	fluid	fluid	semi-solid
Color	—	black	black	black	brown	clear	clear	black
Weight (lbs./gal.)	—	10	10	10	11.5	7.2	7.5	10

All test data are typical values.

## NEED FOR COMPOUND

Compound is used in cable terminations to fill the internal space around the prepared cable end with an insulating material superior to that of air. Considering air as the insulating medium, when sufficient potential exists between the live conductor and the cut back ground shielding, ionization of the air (corona) will begin at the shielding end. The effects of weather and atmospheric contamination materially decrease the effective surface insulation and may result in failure (flashover) of the cable under normal operating voltage.

## PROPER COMPOUND FILLING PROCEDURES

Proper compound filling is essential to the performance of the cable termination. The following techniques and considerations should be noted:

1. Always fill the termination compartment from the bottom up. Compounding should never be done with terminations in a horizontal position.
2. A  $\frac{3}{16}$  inch minimum clearance must be provided between the porcelain wall and cable or stress cone to permit the compound to rise into the porcelain.
3. Preheat the termination compartment body to at least 70°F to prevent premature cooling of the compound. This can be done using hot oil, hot air or infra-red lights. DO NOT apply an open flame directly onto the porcelain.
4. Use a large diameter riser pipe (see figure 1). The pipe should extend approximately one foot above the high point of the porcelain to provide a static pressure head. The riser pipe should be the same size as the pipe boss or larger.

5. To vent the porcelain, loosen but do not remove the porcelain hoodnut and gasket.

6. For better and safer compounding, the compound should be heated and poured at the recommended temperature as shown on the compound container label or corresponding chart printed in this catalog. Always use a thermometer to assure proper pouring temperature.

If the pouring temperature is too low, the compound may bridge across the smaller cavities and leave voids or clog up the filling and venting pipes. Also, all moisture laden air might not be driven out. When installing terminations in cold weather, it may be necessary to preheat the porcelain insulator and metal parts with a heating blanket, hot air oven or immersion in hot oil.

If the pouring temperature is too high, the compound may injure the cable in-

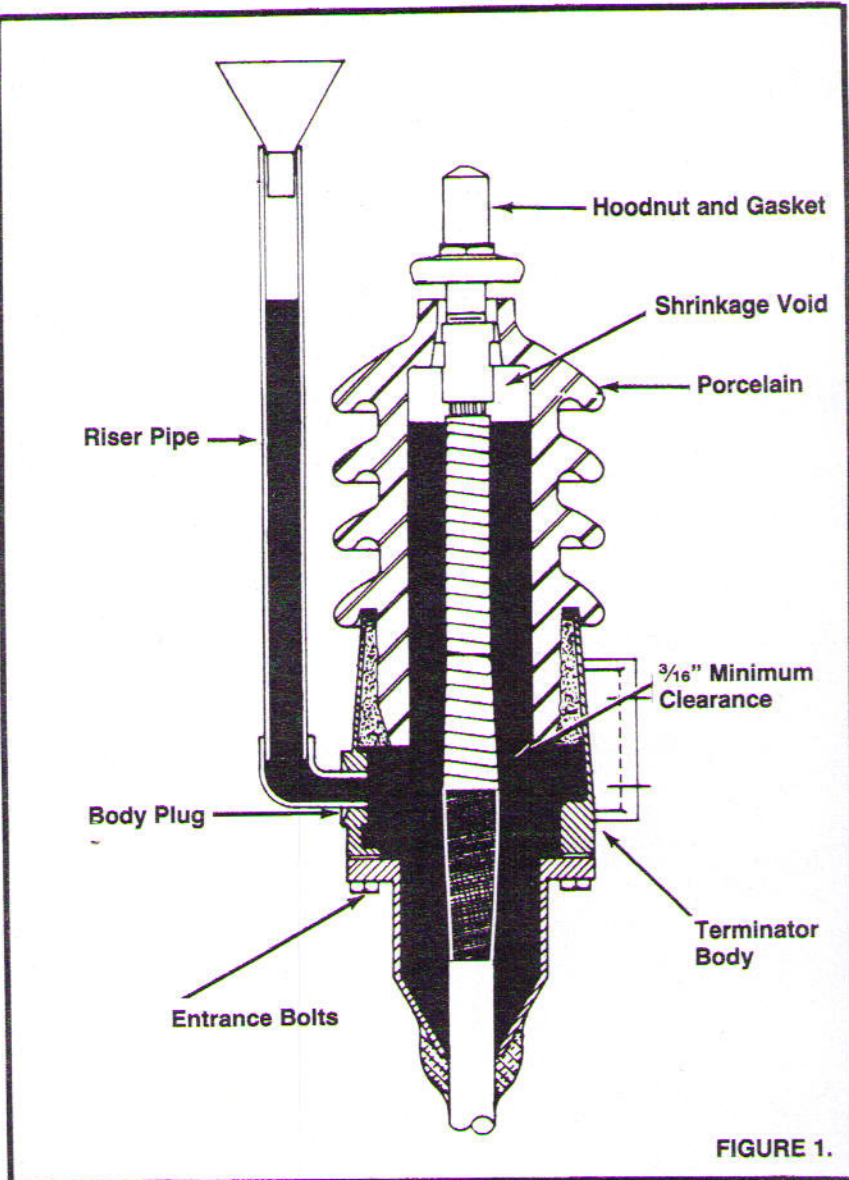


FIGURE 1.

ulation or even reach the flash point of the compound and ignite. Also, the hotter the compound, the more it will shrink while cooling. Compound shrinkage should always be kept to a minimum.

7. For 3/C terminations only, pour the compound through the riser pipe until it shows at the plug in the compartment lid. Secure the plug.

For both 3/C and 1/C terminations, continue pouring until compound shows at the top of the porcelain. Temporarily tighten the hood nuts.

8. Keep the riser pipe full of hot compound during the complete filling operation, including porcelain cooling time.

9. Field compounded terminations will always have shrinkage voids at the top of the vertically mounted porcelains above the cable insulation. A small shrinkage void in this area is not objectionable. This shrinkage space is in a

low stress area and provides room for compound expansion and contraction due to changes in ambient temperatures and load cycling. DO NOT "top off" terminations.

10. Let the compound cool down in the terminations and riser pipe.

11. Remove the riser pipe and secure the termination body plug.

12. Remove the hoodnut. Be certain to wipe the porcelain neck surface clean. Clean the porcelain of any spilled compound.

13. Install the hoodnut and gasket. The gasket must be clean, dry and oil free. Apply torque to the hoodnut to insure proper gasket seal. Torque and check the entrance bolts between the terminations body and entrance fittings.

14. Make the required hoodnut aerial connections.