

CABLE SPLICING—GENERAL

PARAFFIN AND SPLICING OIL

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1. GENERAL

1.01 Hot paraffin or a mixture of paraffin and splicing oil is used for boiling out conductor insulation and splicing materials such as muslin, cotton tape, etc. The boiling out removes existing moisture, saturates the material to retard moisture absorption, prevents strip paper or textile insulation from unfurling, and facilitates the skinning of paper or pulp insulation from conductors.

1.02 Pure paraffin is generally used for boiling out strip paper insulation under average temperature conditions.

1.03 A mixture of paraffin and splicing oil is used on strip paper insulation to keep the paper pliable at low temperatures. It is also used for boiling out pulp insulation. Duct splices in large exchange cables with either strip paper or pulp insulation should be boiled out in a mixture containing at least 25 per cent. splicing oil, regardless of the temperature. This will facilitate wrapping the splice to a small diameter and placing the sleeve.

1.04 Do not boil out spool type adjustable wire-wound condensers or fixed mica condensers that are used on toll or special circuits for correcting certain electrical conditions. Boiling out may change their electrical characteristics.

1.05 Do not boil out cables in which polyethylene or rubber is used for conductor insulation or sheath.

1.06 When boiling with paraffin use a pan or trough to prevent the drippings from falling and causing damage to persons or property. When using paraffin near a wall or fence or in a building, protect the property from the drippings. Pedestrians should be warned not to pass beneath a splice in aerial or block cable when it is being boiled out.

2. MIXTURE OF PARAFFIN AND SPLICING OIL

2.01 Paraffin is supplied in cakes which must be broken into small pieces when placed in the paraffin pot.

2.02 Splicing oil is a colorless liquid which is added to paraffin to produce a mixture which does not harden at low temperatures to the extent that pure paraffin does. The quantity of oil to be added is based on a cake of paraffin and the use of the paraffin dipper for measuring the oil. The dipper is considered as full when filled to within 1/2 inch of the brim. The recommended mixtures for use on pulp insulation are given in the following table which is based on the temperature at the location where the boiling is to be done:

<u>Temperature (Fahrenheit)</u>	<u>Percentage of Oil</u>	<u>Dipperfuls of Oil per Cake of Paraffin</u>
Below 10°	50	8
10° - 25°	45	6-1/2
25° - 35°	35	4-1/2
35° - 55°	25	2-1/2
55° - 75°	15	1-1/2
Above 75°	0	0

2.03 For strip paper insulation use about one-half of the oil specified for use on pulp insulation.

2.04 As the mixture is used up it will be necessary to add paraffin and splicing oil. If a quantity of paraffin smaller than a cake is added the quantity of oil should be correspondingly reduced. The proportion of oil in the mixture is only approximate, and if trouble is experienced the mixture can be corrected by adding either paraffin or oil.

3. HEATING

3.01 The correct temperature for the use of paraffin either pure or mixed with oil, is between 375° and 390° F. The temperature should be measured with an approved thermometer. Paraffin heated above 390° F. creates a fire hazard and may char the material being boiled out.

3.02 Specified safety practices should be followed in locating the furnace and in handling the paraffin pot. The pot should never be filled higher than within two inches of the top. The paraffin dipper should always be removed before handling the pot.

3.03 Before using paraffin make the following test to insure that the paraffin is not overheated:

- (1) Remove the pot from the furnace. If electrically operated disconnect the source of supply.
- (2) Take out and pour back several dipperfuls. Hold the dipper several inches above the pot while pouring.
- (3) If the paraffin is overheated it may ignite in which case the cover should be placed on the pot and the pot covered with a canvas blanket or tarpaulin until the flame is smothered.

3.04 Paraffin which has become dirty enough to discolor the conductor insulation should be discarded.

4. BOILING OUT

4.01 Specified precautions should be taken so that boiling out operations will not cause accidents or property damage.

4.02 Boiling out may be done in the following ways:

- (a) With a paraffin trough.
- (b) With a paraffin pan.
- (c) Direct immersion in the paraffin pot. This is used for materials such as muslin and cotton tape and the free ends of small size cables.

4.03 Moisture in the material being boiled out is indicated by a bubbling action in the paraffin, accompanied by a slight frying noise. Boiling out must be continued until all moisture has been removed. In some cases this may require reheating the paraffin and repeating the boiling out. Never pour paraffin continuously at any one point because this may weaken the insulation.

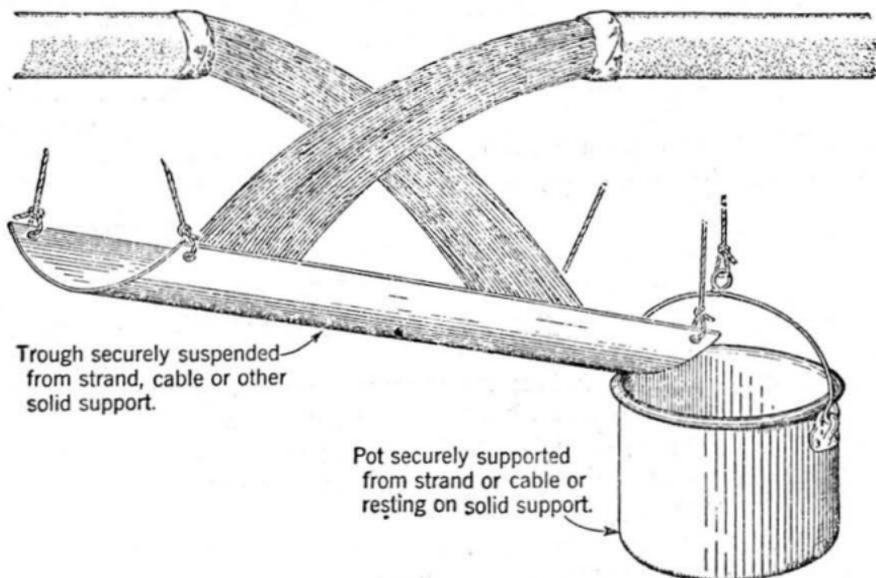
Ends of Cable

4.04 Free cable ends should be boiled out as follows:

- (1) Remove the core wrapping papers.
- (2) In multiple unit cable loosen the unit binders and tie each unit with its binder near the end of the sheath.

If necessary, twist the units and core so that the units will be in proper alignment for splicing before boiling.

- (3) In layer type cable with paired conductors divide the color groups into bunches convenient for splicing. In large cables with 101 pair groups the division will generally be into a bunch of about 60 pairs for splicing toward the back of the splice and a 41 pair bunch toward the front of the splice. Tie the end of each bunch to keep the pairs together.
 - (4) Separate the pairs or quads to permit the paraffin to pass freely through them, and bend them down so that their ends will be below the level of the cable.
 - (5) Start pouring the paraffin about 6 inches back on the sheath.
 - (6) After the sheath is hot continue pouring gradually toward the end of the conductors until all moisture is removed.
- 4.05 The following illustration shows a typical boiling out operation on cable ends using the paraffin trough.

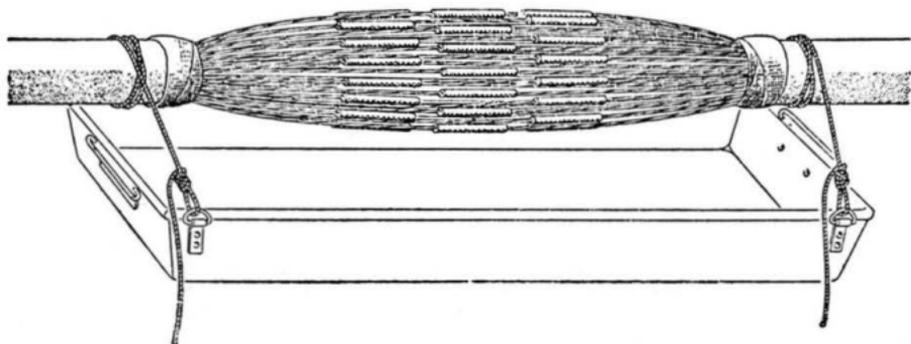


- 4.06 When working under very damp conditions it is advisable to strip and boil out only one end at a time.

Splices and Continuous Cable Through Sheath Opening

- 4.07 Boil out the splice immediately after completion of the wire work in the following way: (A cable which is not cut at a sheath opening is also boiled out in this way.)

- (1) Start pouring the paraffin about 6 inches back on the sheath on one side. After the sheath is hot continue pouring gradually toward the center.
 - (2) Boil out the opposite side in a similar manner.
 - (3) Continue pouring over the splice working slowly back and forth until all moisture is removed.
- 4.08 The following illustration shows a typical boiling out operation on a splice using the paraffin pan.



- 4.09 When splicing cables larger than 404 pairs it is advisable to boil out one or more times, depending on moisture conditions, during the wire operations.
- 4.10 After a splice has been wrapped it should be given a final boiling.

Splicing Materials

4.11 Splicing materials such as muslin and cotton tape are generally boiled out by direct immersion in the paraffin pot. The material should be made up into a loose coil, roll or hank and suspended in the pot with a piece of cotton tape or sleeving. The material should be lowered gradually into the paraffin.

5. REMOVING EXCESS PARAFFIN

5.01 Excess paraffin should be drained after completion of the boiling out operation. In the case of a cable end this can be accelerated after the conductors have cooled slightly by means of a temporary wrapping of dry muslin. The ends of the conductors should be lowered to permit drainage into the trough or pan. The wrapping should be tight and should start from the sheath. Shake the excess paraffin from boiled out muslin, unroll it, and then reroll it tightly.