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## EC55-1103 Electric Cords : Their Selection and Care

Harriet C. Brigham

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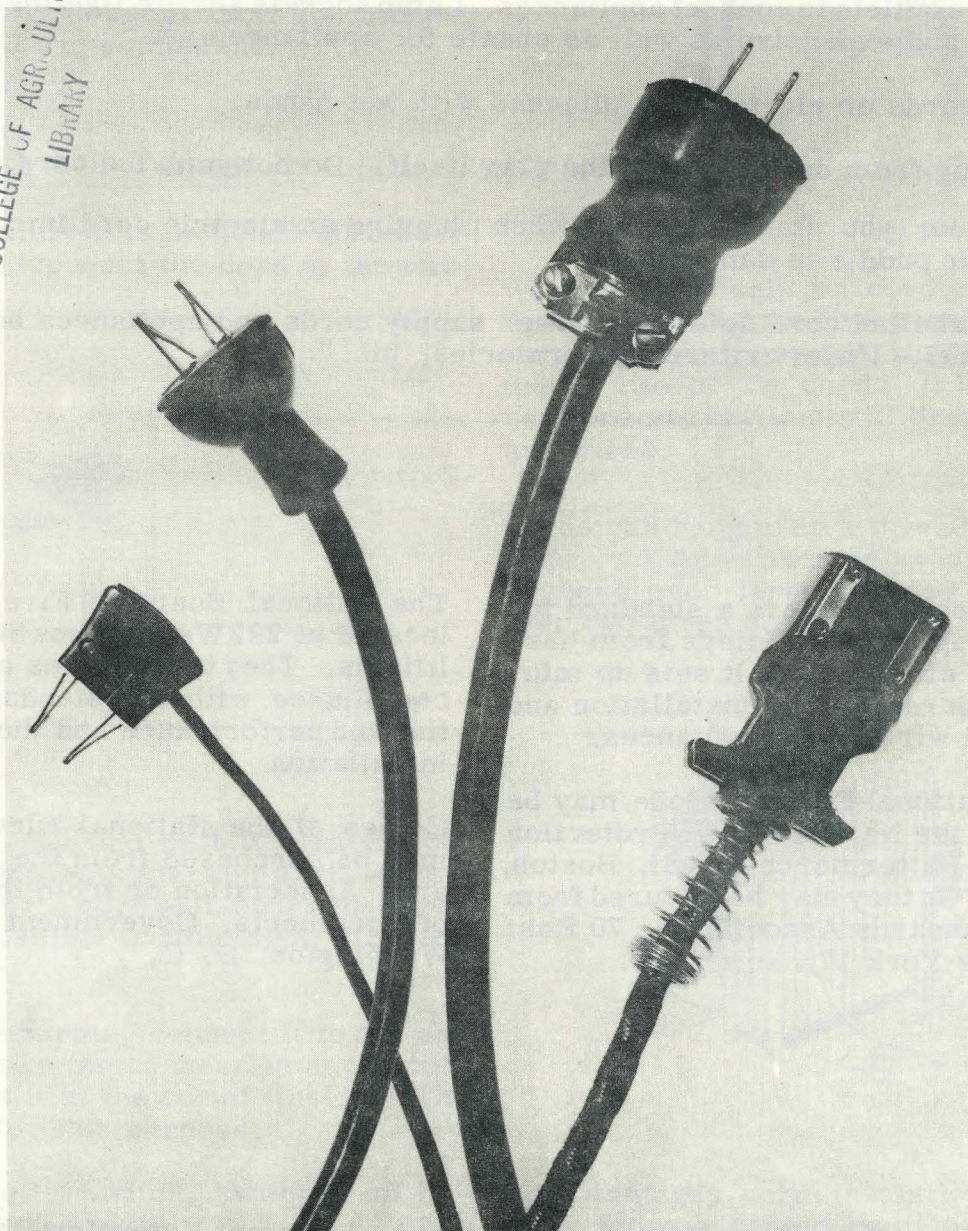
# Electric Cords

## Their Selection and Care

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## FOR SAFETY'S SAKE

Inspect all flexible cords used in the home at least every six months.

Employ a qualified electrician to make repairs and additions to house wiring where additional outlets are needed, instead of using extension cords.

Do not run flexible cords under rugs and carpets, nor over radiators or pipes.

Use convenience outlets to connect appliances. Lamp sockets are for lighting. Sockets are inadequate and expensive as well as unsafe for appliance use.

Do not handle cords or electrical appliances with wet hands.

In removing plug from outlet, grasp the plug itself. Do not yank the cord.

Be sure the floor you stand on is dry when plugging an electric cord into an outlet. A damp floor or puddle is dangerous.

Insist on flag labelled cord sets, also power supply cords and appliances bearing the words "Inspected - Underwriters' Laboratories, Inc."

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The National Electric Code is a standard for safeguarding people and buildings from hazards in the use of electricity. It sets up minimum safe standards for the installation and use of electrical wiring and appliances.

Copies of the National Electric Code may be purchased from the National Fire Protection Association, 60 Battermarch Street, Boston, Massachusetts. Or they may be secured from the American Standards Association, 70 East 45th Street, New York 17, New York.

The National Board of Fire Underwriters is located at 222 West Adams Street, Chicago 6, Illinois. They test devices and materials for compliance with the standards of construction and performance and their suitability for installation.

Copies of the National Electric Safety Code may be purchased from the American Standards Association or from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Acknowledgement is made to Milo L. Mumgaard, Assistant Extension Engineer, Farm Electrification, University of Nebraska, for his excellent assistance in the preparation of this circular.

Harriet C. Brigham, Housing and Equipment Specialist, University of Nebraska, formerly Regional Home Economist with the Rural Electrification Administration, U. S. D. A.

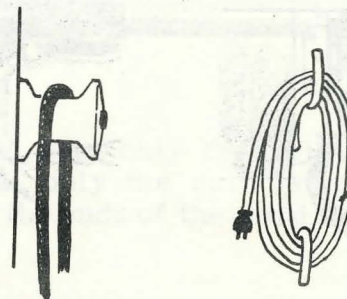


# ELECTRIC CORDS - THEIR SELECTION AND CARE

Harriet C. Brigham

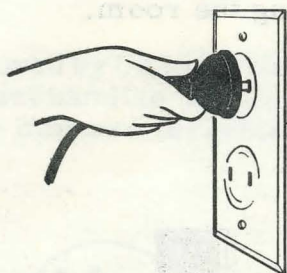
Flexible electric cords used and stored correctly and kept in good repair, can efficiently carry electricity from the outlet to the job to be done.

Shocks, burns and fires are the types of accidents most likely to occur from the misuse of cords and electric equipment.



## CARE OF CORDS

See that the appliance is switched off before you connect or disconnect the cord at the outlet.



Grasp the plug cap and pull it straight out quickly. This prevents sparking at the terminals. Pulling on the cord will loosen the wires and create a possible trouble spot, fire, or short circuit.

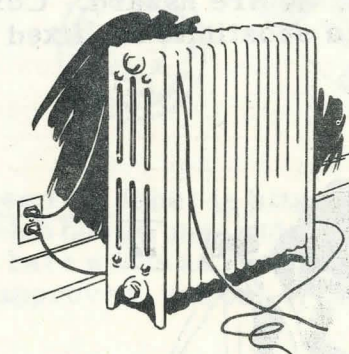
If the cord is separate, connect it to the appliance, then make the connection at the outlet. Disconnect it at the outlet first. The outlet is made for this purpose.

If there is an outlet switch, switch it off before you remove the plug.

Keep cords free of kinks, knots, sharp bends which tend to break fine wires or insulation. Avoid cutting or scraping the insulation over sharp edges.

Wind cord loosely on cord clips or holders. Avoid breaking the fine wires of the conductors. Wrapping cords tightly shortens the useful life of the cord. It loosens the connections and in time will break the insulation and wires.

Cords can hang over a thread spool nailed in place. An adhesive tape spool could be used. Or hang over large rounded wooden pegs or over two large hooks.

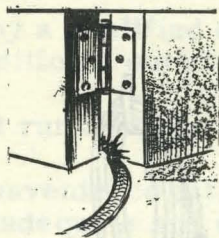


Heat damages cord insulation. Keep cords away from a heated radiator or range. Be sure the appliance is COOL. Do not wrap cord around a hot appliance.

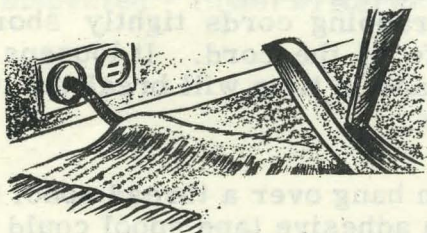
Store cords in a cool, dry place. Coil cords loosely.



The National Electrical Code states. "Flexible cords shall not be used where they run through doorways, windows or similar openings." At these spots excessive wear would rub off the covering of the wires and could cause a short circuit.



"Flexible cords shall not be used where attached to building surfaces."



Not under rugs. A fire hazard. Cords shall not be used as a substitute for fixed wiring.

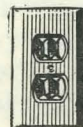


Long cords can cause trips and falls, a serious traffic hazard.

Avoid the use of long cords. Efficiency and voltage are lessened in longer cords. Use only the length needed. The shorter the better.



Never leave a room with an iron connected. Many fires have been caused by irons being left on. Disconnect the heater cord from the outlet before leaving the room.



"Flexible cords shall not be used as a substitute for the fixed wiring of a structure." Install electric outlets at needed places with adequate wiring.

Oil is harmful to rubber. Do not allow cords to become oil or water soaked. Wipe off oil, grease or other soil before storing cords.

Avoid handling cords with wet hands, especially the fabric covered and heater cords.



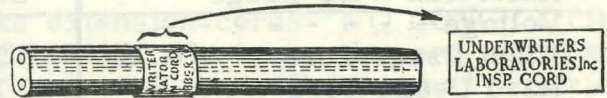
## Choice Of Cords

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"Flexible cords shall be suitable for the conditions of use and location." Choose cords with care. Know what to select and why.

The Yellow UL label or bracelet label is attached at five foot intervals on all types of flexible cords.

For safety and efficiency as well as economy, **USE THE RIGHT CORD FOR THE JOB.**



All flexible cords have electrical conductors made up of many strands of fine copper wires. The wires are covered usually with a layer of cotton or fiber wrap and with rubber insulation. Added layers of insulation and buffers are used to protect the wires and the insulation of the conductors.

If the cord has only the yellow bracelet it means that only the cord is approved. The devices at the ends of the cord may not be approved.

The flag type label is a strip of paper about one-third inch wide with an adhesive back. It is wrapped around the cord once and the two loose ends pressed together forming a flag which projects from the cord. It bears the words "Inspected--Underwriter's Laboratories, Inc."

The fine wires of the conductors may be molded in rubber or thermoplastic.

The flag label means that the whole cord assembly has been tested for electrical safety, for resistance to pull, crushing, impact, abrasion and wear, and for general all-around fitness.

"Approved by Underwriters"\* guarantees that the merchandise is suitable and safe if used for the purpose for which it was intended.



For a cord that complies with the minimum safety standards, look for one having a marker of the Underwriters' Laboratories, Inc. Installed, maintained and rightly used it will give good service.

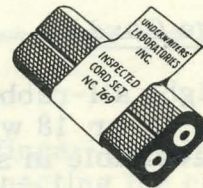
The Green UL label is attached to a length of cord which has at one end an attachment plug and has bare wires at the other end. The cord set, if approved, has one of these two types of labels.

The Blue UL label is shaped like a washer and the approved cord has one slipped over the cord. This indicates that the plug and cap, as well as the cord have been approved by the UL.

Note: The fact that the cord carries approval does not necessarily mean that the appliance is approved. It, too, should have a label by UL. Look for the Underwriter's Label on the appliance.

INSPECTED - An important word in electrical safety.

Cord sets may carry a blue flag type label or the washer type. Both indicate approval for the whole cord set.





## Flexible Electric Cords

Cord are rated for their use by the size of the wire and the type and thickness of the covering or insulation. (See cover.)

American Wire Gauge	Size #18	Size #16
Voltage - - - - -	115 volts	115 volts
Light Usage Cord - - -	5 Amp. - 575 watts	7 Amp. - 805 watts
Hard Usage Cord - - -	7 Amp. - 805 watts	10 Amp. - 1150 watts
Extra Hard Service - -	7 Amp. - 805 watts	10 Amp. - 1150 watts
Heater Cord - - - - -	10 Amp. - 1150 watts	15 Amp. - 1725 watts

Size 16 wire is most commonly used for home appliance connections. It must be used for high-wattage appliances and is the most efficient for low-wattage ones.

Wire sizes, like thread sizes, go by number. The higher the number, the finer the wire.

Number 16 wire is larger than 18 and carries electricity to the appliance more easily.

Cords of number 18 wire are used for some lamps and some low-wattage appliances, under 500 watts.

### Light Usage Cord

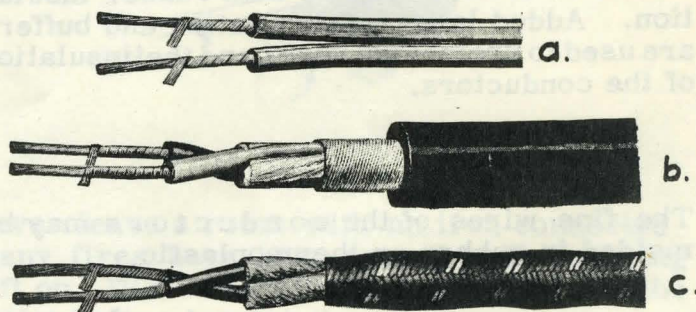
A light weight all-rubber parallel type SP cord, size 16 or 18 with wires imbedded in rubber is available in several colors. (Fig. a)

All-plastic parallel cord, type SPT, has the conductors molded in thermo-plastic. It is suitable for lamps, clocks, radios, low-wattage equipment under 575 watts.

Parallel cord, type PO-1, size 18, is for use only with lamps, portable radios, clocks and similar appliances which are not moved frequently and where appearance is a consideration.

Avoid using light-weight cords on heating appliances or those given hard wear.

These cords are not suitable for extension cords.



### Hard Usage Cord

These cords are not suitable for heating appliances.

They have two or more conductors with rubber or, plastic insulation protected by cotton, jute or other filler, and encased in a rubber or thermoplastic covering. (Fig. b.)

They are suitable for extension cords.

They may be used in damp places and where given hard wear.

Vacuum Cleaner Cord, type SV, size 18, rubber or thermoplastic covering. The individual conductors are twisted together inside the cord for added strength.

Avoid rolling the vacuum cleaner over the cord. Protect the wires.

Junior Hard Service Cord, type SJ, in size 16 and 18 is used for home appliances--food mixers, washing machines, vacuum cleaners.

Type SJ cord can be used for an extension cord for use with lighting or power equipment.



Extra Hard Usage Cord, type S, is the most durable cord. It is used where cords have hard wear--garage, workshop, etc. Sizes 16, 14, 12, 10. It is covered with rubber or thermoplastic. It is recommended for large motors and heavy duty extension cords.(Fig. b)

### Cords for Heating Appliances

These cords must be kept dry. (Fig. c)

Heater Cord, type HPD, has a layer of asbestos over the rubber insulation surrounding each conductor. This is enclosed by a braided cotton, rayon or rubber outer covering.

These cords are designed especially for appliances rated above 500 watts. Heater cord, size 16, is recommended. It is also available in sizes 14 and 12. This is the only cord recommended for appliances which give off heat--irons, toasters, roasters, wafflers, heating pads, etc.

For heating appliances use asbestos insulated cord. For electric irons use HPD heater cord, size 16.

Always plug a heating appliance into a convenience outlet.

For service, economy, satisfaction: Disconnect the heater cord from the outlet when not in use.

### Attachment Plugs

Select the attachment plug or outlet plug to suit the cord and the use to which it will be put.

Quick connecting plugs, plastic, used only on parallel, light weight cord for light electrical loads.

### Extension Cords

Extension cords should never be used as a substitute for permanent wiring. Well planned wiring minimizes the need for extension cords.

Make extension cords **NO LONGER THAN NECESSARY**. The longer the cord, the greater the loss in voltage, efficiency and electricity for the job.

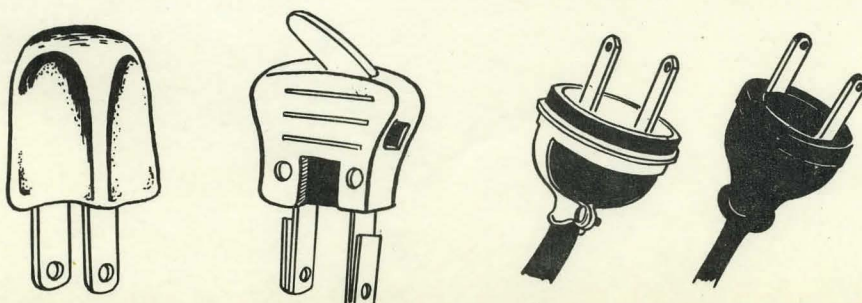
Use plastic or rubber covered extension cords for lamps, radio, low-wattage appliances. Avoid fabric covered ones.

Use moisture-resistant cords for all equipment used in damp or wet locations, such as basement, barn, etc., or places exposed to weather. These cords should have rubber sockets and plugs for safety and durability.

A Cord of 2-wire, size 16 or 14, heavy-duty composition or rubber covered will serve many uses including a 1/3 horsepower motor.

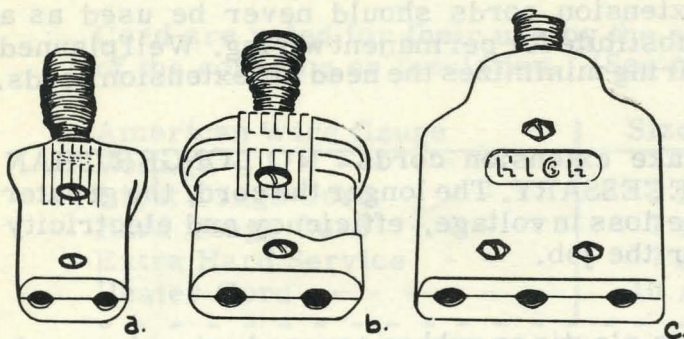
Only in an emergency use heater cord for an extension cord on a heating appliance.

When the emergency is over, have an outlet installed for the permanent use of the appliance.





## Appliance Plugs, Heater Plugs



- The appliance plug, holes for the prongs are  $1/2$  inch apart.
- The iron plug has holes spaced farther apart,  $11/16$  inch from the center of one hole to the center of the other.
- Two-heat plug provides for low heat in one position. Attached in the second position the appliance uses high heat.

The trend is to permanently attach the cord eliminating the need for appliance plugs.

**Grounding** - All grounding devices must be properly installed.

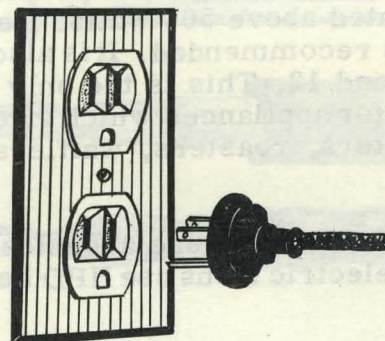
Grounding is especially important for equipment installed or used where there is moist dust or dampness. The basement, garage, workshop and farm buildings are examples.

Anything with a metallic covering should be grounded, where there is the possibility of electric shock for the operator of the equipment.

An electric cord with a grounding conductor is used with an approved attachment plug.

Green is the color used for the grounding conductor. The cord may have three or more conductors.

Be sure the green conductor is connected to the grounding contact prong of the attachment plug. Connect the white or light conductor to the aluminum-colored screw. Connect the darker colored or black conductor to the brass screw.



A three prong plug provides a connection for grounding metal parts of appliances for increased safety. It is used for 115 volt equipment such as washers and 115 volt driers. It has a contact prong for connecting the grounding conductor to the grounded outlet, raceway or to a grounding conductor installed for the purpose of grounding the equipment. The grounding prong is slightly longer than the two current carrying prongs.

For further information see  
University of Nebraska, Extension Circular 55-1104,  
"Repair of Electric Cords"

