RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
STANDARDIZING SEC., ENG. DEPT. EE4E
HARRISON, N. J., U. S. A.

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STANDARDIZING NOTICE 34-15-5A

SUBJECT RIBBON CHANNELING AND GETTER COATING PROCESS

SUPERSEDED DATE 10/10/46

A machine process for forming a channel in a metal ribbon as molybdenum, depositing a getter coating in the channel and drying the coating is standard.

AT RELATIVE HUMIDITIES ABOVE 60% THE MACHINE MUST NOT BE OPERATED AS THE GETTER COATING DETERIORATES RAPIDLY. THIS DOES NOT APPLY TO MOISTURE-RESISTANT GETTER.

SINCE THE GETTER COATING IS ALSO UNSTABLE AT RELATIVE HUMIDITIES ABOVE 50%, the following precautions must be observed for successful operations:

Keep getter bottles tightly stoppered.
Renew getter in coating cups every 8 hrs. after wiping out with clean cloth and washing with acetone, **during June thru Sept. In other months clean cups at least once a week.
Pack getter assemblies in clean cans taped with metacel tape to keep out moisture.
Therefore during periods of relative humidity of 50% and above, as will be determined by experience, the humidity should be checked hourly.

1. MATERIALS - Ribbon, getter coating as specified on getter assembly. Binder for thinning is the same as used in preparation of getter coating. Packing materials as specified in 29-0-9, p. 3C-2.

1A. GETTER COATING TEST PROCEDURE

a. Four ounce sample of coating to be tested is to be delivered to Dept. 851, with four copies of the Material Test Report (Form 23B31A).

b. Coating is to be tested for application and adherence characteristics and accepted or rejected by the getter manufacturing department, as indicated.

Getters made for the test should be one of the following whenever possible:

33-B-70 - - - - FZ323R
33-B-76 - - - - FZ323H, Q
33-B-81 - - - - FZ323AC, FZ452A, FZ461A

If the coating is accepted for application and adherence, send approximately 100 getters to the Chemical Laboratory for Gas and Barium Yield checks, with the three copies of Form 23B31A, stating the adherence characteristics and weight data.

The getter manufacturing department is to report the weight of coating by weighing five (5) completed getters, scraping out all of the coating in the five (5) getters, and reweighing the channels. The weight differential equals the coating weight per five getters.

Report the coating weight giving the average weight, and the range by noting the high and low readings.

If the coating is rejected for application, not result on forms, sending one copy to the Chemical Laboratory and one copy to Engineering Office, Dept. 853.

2. EQUIPMENT - Getter coating machine Model No. 714-JJ. Wet and dry bulb thermometers with chart to determine humidity.

3. PROCEDURE

A. Setting Up Machine For Operation (Adjustments, Etc.)

a. Ribbon Curvature vs. Position of Spool on Unwinding Head -

Ribbon curvature is usually, but not necessarily, in the direction of the winding on spool. If the ribbon has curvature, the curvature should be reversed with respect to direction of ribbon around guide pulley ahead of feed slide so that end of ribbon will later tend to pitch downward and rest on vacuum feed support, rather than pitch upward and away from the support. If ribbon is free from curvature, then position of spool on unwinding head is immaterial, i.e., the ribbon may unwind from either the back or front side of the spool.

b. Ribbon Tension -

Tension on the spool should be just enough so that the ribbon cannot become slack or underwind on the spool.

c. Ribbon Feed -

To assure making getter tabs of the proper length, and excess of ribbon should always be fed by the feed slide. The excess shows up as a bow in the ribbon between feed slide and extrance to die. a leather plug under pressure in the die housing preventing the ribbon from springing forward in its guide channel and being double formed.

d. Ribbon Side Wave -

Side wave or camber of ribbon passing thru the die must be compensated for. The ribbon should pass under forming punches as centrally as possible to center the depressions evenly from both edges of ribbon.

3. PROCEDURE (Cont'd)

A. Setting Up Machine For Operation (Adjustments, Etc.) (Cont'd)

e. Vacuum Feed Support - Adjust position of vacuum feed support so that formed ribbon will be held in correct alignment for clamping between two pairs of jaws for holding the formed ribbon during cutting and gettering.

f. Mixxing Getter - Stir and break up the caked solids in bottle containing getter; then place bottle into bottle rolling device near base of machine and continue mixing getter until it is to be used. Thereafter it is advisable to keep the bottle rolling.

g. Getter Cup and Wheel - Set getter wheel as near as possible to bottom of cup to keep solids in preparation from settling out. Fill cup, initially, to bottom of slot in side of getter cup.

h. Getter Viscosity - Getter should be thick enough to follow getter wheel when operating at a low speed and be carried around outer edge of wheel. Thin getter with binder. Getter density must be such that weight of getter will be correct when latter fills the formed channel.

i. Getter Application - Adjustments affecting application of getter shall be such that getter will be uniformly distributed thruout the channel. The back of the channel shall be clean and free of coating.

j. Oven Temperature - The temperature of drying oven depends on speed of gettering machine and ribbon material. Adjust temperature to 130-150°C. The getter should dry to the point of handling without stickiness or tackiness but
→ it should not become so dry as to chip when making the *180° twist test referred to in Sec. 4. Uniform temperature control is necessary for good adherence of getter.

B. Production of Getter Assemblies

With clean metal ribbon, from a spool on unwinding head, threaded thru wire feed and forming dies, and over vacuum feed support, and machine otherwise made ready for operation, it is only necessary to start motors on machine. One motor operates getter wheel, conveyor belt, and bottle rotator. The other motor operates feed slide, forming dies, vacuum feed support cutter and jaw assembly and getter applicator. A small vacuum pump for auxiliary operation of vacuum feed support and upper jaws is operated by separate motor which also operates vacuum pumps for other getter machines. The vacuum feed support operates with vacuum on continuously as long as pump operates. The vacuum is used intermittently for upper jaws on transfer arm. With exception of inspection and packing finished getter assemblies and attending to machine when necessary, the process for making getter assemblies is fully automatic.

3A. STANDARD TWIST TEST

1. Testing Device

The instrument to be used is the getter twist testing device, Model → No.⁂722-UU. Two clamps, one of which is moveable, are provided to hold the getter. The distance between the clamps is adjustable so that getters of various lengths may be accommodated. The moveable clamp is an integral part of a shaft mounted in a bearing clamp. The end of the shaft contains a pointer mounted close to a protractor.

The pointer and protractor are used to control the degree of twist to which the getter is to be subjected.

2. Positioning of Specimen

The getter is clamped into position with the coated surface upper-most, between the two clamps.

When clamping, care should be taken to hold only 1 mm of retainer at edge jaw, so as to remove any possibility of disturbing the coating in any manner.

Jaws must be tight so that getter will not move while being twisted.

Getter must be clamped between the two clamps so that the centerline of the getter will coincide with the centerline of the shaft, the moveable clamp, and the fixed clamp. This positioning can be done visually, and will prevent a skewed twisting of the getter.

When the clamps are positioned so that both ends of the getter are horizontal, and the entire getter is flat, the pointer reading on the protractor is 0°.

3. Testing the Getter

A "twist" is defined as a complete cycle from the starting point thru the specified number of degrees and back to the starting point.

The speed of twisting is set so that a twist from 0° to 180° and back will take approximately four seconds. It follows that a twist to 180° would take 2 seconds. A twist to 90° and back to 0° would take 2 seconds.

When the getter has been subjected to a complete twist, its coated surface is uppermost; the getter is then left between the clamps for examination.

The getter should not be distrubed in any manner after the twist is completed, such as scraping, flicking, additional twisting, etc.

⁂ Indicates a correction.

** 3A. STANDARD TWIST TEST (Cont'd)

4. Determination of Results

The getter is examined visually to determine the effects, if any, of the twisting machine motion on the coating, and the getter adherence to the retaining channel. A low power hand magnifier may be used.

The coating may be distributed in any one or more of three manners:

1. Cracking: Cracks on the getter coating are evident either in a longitudinal or transverse direction. This constitutes a separation of material from itself, but not a separation from the retaining channel.

2. Raising: Defined as the separation of the coating, in a mass, from the retainer. Raising may occur to a slight degree so that only a small space of ten or fifteen mils is evident between the retainer channel and the coating. More extensive raising will reveal the bare channel surface.

Raising may occur along either longitudinal edge of the getter, or in a transverse direction.

When the entire mass of getter material is separated bodily from the retainer, the raised mass is coherent and does not crumble into dust during the raising.

NOTE: Raising of the getter material in any direction is a basis for rejection.

Removal of some amounts of getter material duringthe twisting operation, (but in a manner that the getter coating adheres to the retaining channel so that its bare surface is not exposed) is not classified as "raising". Such a phenomenon involves only the loosening of some coating from the surface of the mass of getter material, it is classified as "chipping".

3. Chipping: Defined as the removal of a slight amount of getter material so that the bare surface of the retainer is not exposed.

Chipping is sometimes caused by cracking at the top surface of the getter coating.

In the determination of the quality of getters being tested, cracking and/or chipping are not a criteria of rejectable getters.

4. CHECKING ADHERENCE OF COATING ON GETTER ASSEMBLIES

Check quality of coating on getter assemblies at machine, at start of operations, when any changes are made in coating material, etc., during the operation, and otherwise as often as necessary for proper control of quality. Getter shall not chip or rub off. Getter baked at too low a temperature will be soft and rub off. If baked at too high a temperature the getter tends to chip. Standard "twist" test for all getters except the FZ447 series is 180°. For the FZ447 series it is 50°.

In case of poor quality after other factors have been checked, send sample (4 or 5 assemblies) to Laboratory for a check on the index of refraction of coating material. This does not apply to moisture resistant getter.

5. CHECKING WEIGHT OF COATING ON GETTER ASSEMBLIES

Using a torsion balance, weigh 4 getter assemblies every hour and record average weight readings.

Getter No.	Min.Wgt.	**Lower Control	**Avg. Wgt.	*Upper Control
FZ323H	2.8 mg	3.16 mg	3.51 mg.	3.85 mg
FZ323Q	4.5	4.64	5.44	5.93
FZ323AC	3.5	4.19	4.60	5.00
FZ323AE	5.5	6.40	7.13	7.85
FZ323AF	1.2	2.02	2.25	2.47
FZ323AG	2.0	3.13	3.51	3.88
FZ323AN	3.5	4.13	4.58	5.02
FZ323AR	3.5	5.55	6.21	6.86
FZ447A,C	13.0	16.72	17.48	19.76
FZ447B,D	13.0	15.74	16.5	18.78
FZ452 series	1.2	1.41	1.78	2.42
FZ461 " , except F	1.2	1.46	1.84	2.21
FZ461F	1.0	1.46	1.84	2.21
FZ464 series	2.3	2.90	3.55	4.19
FZ469	1.9	2.55	3.08	3.60
FZ470,1 & 2	1.4	1.78	2.37	2.95
FZ473	3.0	5.04	5.93	6.81
FZ474	2.2	3.10	3.44	3.77

If weight falls below the lower control, increase bu one or more of the following methods:

1. Replenish supply of coating in applicator cup.
2. Add more binder to cup.
3. Adjust level of coating on the top of roller, using flat pressure blade, so more coating will be picked up by applicator blade.

5. CHECKING WEIGHT OF COATING ON GETTER ASSEMBLIES (Cont'd)

If weight exceeds the upper control, reduce by either or both of the following methods:

1. Use slightly less binder in cup.
2. Adjust pressure blade on cup roller so that less coating is picked up.

Note: Coating on the back surface of channel is usually an indication that getter has more coating than the above maximum.

6. PACKING GETTER ASSEMBLIES

Allow getter assemblies to fall directly from conveyor of machine into a suitable container, the quantity depending on size of getter assemblies. For packages and quantities refer to 29-0-9. To prevent deterioration of getter, each box must be sealed by taping around the seam as specified on the packing page.

7. NOTES ON MAINTENANCE

a. IMPORTANT: Special precautions must be taken to keep the ribbon free of oil and grease from machine or hands. The minimum amount of lubricant absolutely necessary should be used. Keep oil from top plunger out of die.

1. Do not operate machine during lubrication.
2. Remove ribbon and getter material from machine during lubrication.
3. Wipe off excess grease and oil from machine before resuming operations.

b. When carboloy tips in feed slide become round due to wear, the bottoms should be flattened by stoning.

c. Avoid accumulation of small particles, slivers, etc., of ribbon material in die recess, as this will cause misformed or fractured getters.

d. Keep vacuum support clean over entire opening. Keep getter out of the opening. Clean with thin steel blade (.010" spring steel may be used) and syringe out with acetone.

e. Jaws must clamp evenly on both ends of getter tab.

f. Keep jars clean, using acetone, and a .015" wire for cleaning out vacuum holes. If necessary, open screws in top of jaws to clean out holes.

ENGINEERING SECTION
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