SUBJECT METAL MANDREL DISSOLVING
Process Specifications

Standard procedures are given herein for dissolving mandrels from coiled filaments. During treatment for dissolving mandrels the coiled filaments are incidentally cleaned to an indefinite degree.

1. EQUIPMENT:
   a. Steam Bath - 24" x 20" x 8"; suitable for holding six 2-liter beakers
   b. Beakers - 2-liter size.
   c. Hood - With ventilator and fume neutralizer.
   d. Oven - Such as electric type air oven with thermostat, to give temp. of 200°C.

2. MATERIALS:
   A24 §Acid Sulphuric Tech.
   A18 §Acid Nitric Tech.
   A16 §Acid Hydrochloric Tech
   S30 Sodium Hydroxide Tech.
   M15 Methanol
→ *W60 Deionized water
   A9 Ammonium Hydroxide Tech.
   Hot and Cold tap water

** DANGER §ACID SAFETY PRECAUTIONS: See 33-2-7C
AMMONIUM & SODIUM HYDROXIDE SAFETY PRECAUTIONS: See 33-2-8A

3. PROCEDURE - Mandrel Dissolving Schedules

SCHEDULE A - Dissolving Copper or Brass Mandrels from Single Helical Coils.

1. Place coils, 200 to 2000 depending on size, into a 2-liter beaker to a depth of 1/2 to 1-1/2 inches.
2. Place beaker under hood and cover coils with nitric acid. Let stand until reaction ceases. approx. 10 min. NOTE - If reaction time is longer than 15 minutes, check coils for loss of weight.
3. Pour acid into sink and rinse coils thoroly with tap water, preferably hot, 4 or 5 times.
4. Boil coils in distilled water for 3 to 5 min.
5. Pour water into sink and thoroly rinse coils 2 times in clean methanol, using enough methanol each time to cover coils. Discard methanol into reclaiming can after each rinse.
6. Transfer coils to a clean paper towel in a tray and allow them to dry in air.

SCHEDULE B - Dissolving Steel Mandrels from Single Helical Tungsten or Tungsten Molybdenum Coils. (A more rapid process for dissolving mandrels from tungsten coils is given in Sched. C.)

1. Place coils, 200 to 2000 depending on size, into a 2-liter beaker to a depth of 1/2 to 1-1/2 inches.
2. Place beaker under hood and cover coils in beaker with 80% hydrochloric acid solution.

Solution Formula: 800 cc Hydrochloric Acid
200 cc Tap water

3. PROCEDURE - Mandrel Dissolving Schedules (Cont'd)

SCHEDULE B (Cont'd) - Dissolving Steel Mandrels from Single Helical Tungsten or Tungsten-Molybdenum Coils.

3. Boil until reaction ceases, 1/2 to 1 hour.

4. Pour acid into sink and rinse coils thoroly with tap water, preferably hot, 4 or 5 times.

5. Cover coils with 10% sodium hydroxide solution and boil 3 to 5 min.

Solution Formula: 100 grams Sodium Hydroxide
1 Liter tap water

6. Pour hydroxide solution into sink and rinse coils thoroly in tap water, preferably hot, 4 or 5 times.

7. Boil coils in distilled water 3 to 5 min.

8. Pour water into sink and thoroly rinse coils 2 times in clean methanol, discarding methanol into reclaiming can after each rinse.

9. Remove coils from beaker and allow them to dry in air on a clean paper towel in a tray.

SCHEDULE C - Dissolving Steel Mandrels from Single Helical Tungsten Coils (Process specified initially for CF306)

NOTE : This process is not recommended for dissolving steel mandrels from tungsten-molybdenum coils due to possibility of nitric acid reacting with molybdenum and reducing coil weight.

1. Place 300-400 cut coils into a 1-liter Pyrex glass beaker and cover coils with about 400 cc of acid solution made up as follows:

Hydrochloric Acid	- 3	parts	(by volume)	
Nitric Acid	- 1	"	"	"
Tap Water	- 4	"	"	"

2. Dissolve mandrels in coils by boiling for 20 min. under a hood. (Discard acid solution each time after boiling 300-400 coils).

3. Rinse coils in hot tap water.

4. Cover coils with a solution consisting of equal parts, by volume, of ammonium hydroxide and distilled water. Agitate coils in beaker and then pour off liquid.

5. Cover coils with 200-250 cc distilled water. Agitate coils and then discard water.

3. PROCEDURE - Mandrel Dissolving Schedules (Cont'd)

SCHEDULE C (Cont'd) - Dissolving Steel Mandrels from Single Helical Tungsten Coils

6. Rinse coils in 2 successive baths of methanol using 200-250 cc of methanol for each rinse or bath.

NOTE: Each time after rinsing 3 lots of coils, rotate methanol baths by discarding the methanol used for the first bath, using the second bath as the first bath, and using new methanol for the second bath. Save used methanol for reclaiming.

7. Spread coils out on clean smooth surface such as glass, metal, or glazed paper and dry in oven at 160°-200°C for 1 hr. (max.)

** SCHEDULE D - Dissolving Molybdenum Mandrels from Double Helical Tungsten Coils

NOTE: Initially used for CF399

1. Preparation of Acid Solution

a. Mix acids in order shown, in suitable beaker adding sulphuric acid SLOWLY and in following proportions by volume:

20% Tap water
50% Acid nitric
30% Acid sulphuric

2. Procedure

a. Wash with agitation about 500 coils in 500 cc of above acid solution until reaction ceases. To make sure that entire mandrel has been dissolved, keep coils in acid solution for at least ten min. If reaction is slow, as evidenced by evolution of bubbles, heat solution to boiling.

b. Decant acid into sink and rinse coils 3 or 4 times in running tap water, preferably hot.

c. Rinse coils in 1 liter of methanol. Renew methanol after each 5,000 coils. Save used methanol for reclaiming.

d. Spread coils on clean smooth glass or metal surface and dry in air oven at 90°C. (Coils are now ready for spraying).

4. CLEANING COILS BY FIRING

Coils from which mandrels have been dissolved may be further cleaned by firing as described in 34-14-38A.

STANDARDIZING SECTION
ENGINEERING DEPT.

☆ INDICATES A CHANGE ☆☆ INDICATES AN ADDITION