

This bulletin describes materials produced by RCA for use in the manufacture of plates, radiating collars, and other similar electron tube parts. Included are gas-carbonized all-nickel materials, an aluminum-clad steel material, and nickel-on-steel-base materials. The latter types are available in various combinations such as nickel-plated steel, nickel-coated steel, and nickel-plated and coated steel. Several of the steel-base materials are also supplied with a carbon slurry coating on one side or both sides. These materials do not peel and are easily formed and relatively free from impurities harmful to tube life.

Table I gives the RCA designation for each material and describes the treatment used in its preparation. Data on the relative thermal emissivity and per-cent nickel used are also given.

TREATMENT

In the treatment of nickel-plated and nickel-coated steel, the base material is first plated on both sides with a hard dense nickel to seal it against the escape of gases and to prevent oxidation of the steel during the tube manufacturing processes. The plated material is then coated with a nickel oxide slurry which, after reduction in hydrogen, forms a thick spongy layer that can be impregnated with carbon slurry.

The aluminum-clad material is normally supplied with one side wire brushed for better radiation. When the tube is evacuated and the material is heated, it forms a rough slate-gray layer which has a relatively low secondary emission (higher than carbon-coated materials

however). During this process, the temperature at the start of plate heating should be kept below 700 degrees Centigrade to prevent vaporization of the aluminum.

APPLICATIONS

The following are some of the typical applications of the RCA plate materials listed in Table I.

N61B, gas-carbonized nickel, and S72S1, aluminum-clad steel, are suitable for use in close-spaced rf amplifier tubes and beam-power deflection tubes. N61B has a low gas content, low back emissivity, and long life. S72S1 has good forming qualities and in beam-power deflection uses offers the best balance between plate-dissipation, pulse emission, and high-voltage-breakdown requirements. N61B is also suited for use in premium miniatures and computer tubes.

S79 and S2S, both nickel-plated steel materials, are suitable for use as beam-confining electrodes in beam-power deflection tubes. S79 is also useful in high-voltage rectifier tubes.

Of the nickel-coated steel materials having a carbon-slurry coating, S95D is useful in low plate-voltage tubes, and S95E is suitable for use in converter tubes. The latter should be positioned with the bright side outside for reduced noise.

S12S1, nickel-plated and coated steel with one side carbon-slurry coated, is suitable for use in close-spaced, indirectly heated, coaxial structures having high-voltage plate pulses (such as damper tubes). The carbon-slurry

coated surface should face outside, and the uncoated surface facing the cathode should be clean and free from carbon particles.

S8S1, which is similar to S12S1 but is carbon-slurry coated on both sides, is recommended for use in close-

spaced rf amplifier tubes, mixer tubes, oscillator tubes, if and video amplifier tubes, filamentary rectifier tubes, power triodes, and beam-power output tubes. S8S1 is not recommended for use in beam-power deflection tubes because of roughness, but may be used for radiators because of its good heat emissivity.

TABLE I
AVAILABLE PLATE MATERIALS

RCA PLATE MATERIAL DESIG- NATION	Description	Surface Treatment					Total Nickel (% by weight)	Recom- mended Firing Temperature (°C)	Relative Thermal Emitt- ance ▲ (%)
		Nickel Plating Each Side (% by weight)	Nickel Coating Each Side (% by weight)	Gas Carbon- ized	Carbon Slurry Coated				
					One Side	Each Side			
Nickel Types:									
N7	Grid A Nickel (smooth surface)	-	-	-	-	-	100	750	15
N61B or N117	Gas Carbonized Grade A Nickel	-	-	yes	-	-	100	750	80
Steel Base Materials:									
S38	Low-Carbon Steel Deoxidized with Aluminum	-	-	-	-	-	0	800	15
S41	Low-Carbon Rimmed Steel	-	-	-	-	-	0	800	15
Nickel on Steel Base:									
S79	Nickel plated	2.5	-	-	-	-	5	800	15
S2S	Nickel plated	5	-	-	-	-	10	800	15
S95C	Nickel coated	-	5	-	-	-	10	800	48
S6S	Nickel plated & coated	5	5	-	-	-	20	800	48
S95E	Nickel coated and carbon slurry coated*	-	5	-	yes	-	10	800	98
S95D	Nickel coated and carbon slurry coated*	-	5	-	-	yes	10	800	98
S12S1	Nickel plated and coated and carbon slurry coated*	5	5	-	yes	-	20	800	98
S8S1	Nickel plated and coated and carbon slurry coated*	5	5	-	-	yes	20	800	98
Aluminum on Steel Base:									
S72S1	Aluminum Clad Both Sides†	-	-	-	-	-	0	600	80

* Do not use lubricants or solvents (such as methanol) which soften nitrocellulose. Fire parts in hydrogen to remove binder before parts are used.

† Can be rinsed in methanol for quicker drying provided methanol tank is "clean" and a short immersion schedule is used.

▲ Emittance value is expressed as a percent of the value for an ideal black body.