

Track Feeder Soldering Clinic Handout

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Equivalent Wire Gauge to Rail Size

Nickel-Silver has only 6% the conductivity of pure Copper, so wires with conductivity comparable to the rail are much smaller in cross section than the rail. Using a larger gauge than is necessary has no benefit and is harder to solder well. The following table shows the equivalent wire gauge for some common commercial rail sizes. For example, Shinohara Code 70 rail has the same resistance per foot as 28 gauge wire.

Rail Code	Make	Rail Resistivity Ohms/1000'	Equivalent Wire Gauge	Wire Resistivity Ohms/1000'	Wire Diameter Inches
			20	10.4	0.0320
			22	16.5	0.0253
			24	26.2	0.0201
100	Atlas Shinohara~	38	26	41.6	0.0159
83	Walthers Shinohara	52	27	52.5	0.0142
83	Atlas Micro Engineering	78	28	66.2	0.0126
70	Shinohara	77	28	66.2	0.0126
70	Micro Engineering	116	30	105	0.0100

Equipment Suggestions

- Wire Type** Tinned, solid (not stranded), 22 or 24 gauge for HO, 26 gauge for N scale.
- Hole Drill Size** 1/16" drill, close to the tie and rail.
- Soldering Iron** Needs enough heat to quickly heat the rail and wire to avoid melting plastic ties. Minimum of 30 watts, with a good sized tip. Best is a temperature controlled unit, but they are more expensive. A soldering gun can be useful for larger rails.
- Solder** Rosin core (not acid), fine gauge (22 gauge, 0.032", 0.8 mm), 63% Tin / 37% Lead, (60 / 40 OK). Lead free solder does not work as well. Rosin residue does not have to be removed.
- Wire Strippers** Various types, but get a good quality one that can be set to not nick the wires.

Soldering Technique

- Clean the soldering iron tip.
- Apply a small blob of solder to the tip.
- Apply the tip to the joint using the blob of solder to cover the joint, touching both parts.
- Wait about 1-2 seconds, then apply a small amount of solder to add fresh flux.
- Wait 1-2 seconds until the solder flows well, then remove the soldering iron.
- Wash hands after handling lead based solder!

References: (These are just some to get you started, there are many more on the web)

- Rail conductivity info dccwiki.com/Rail_Size
RP Electronics: www.rpelectronics.com
Eurotool: www.eurotool.com
MicroMark: www.micromark.com
Alan Garner's DCC Site: www.wiringfordcc.com/locos.htm
DCC Wiki Decoders: dccwiki.com/Decoder_installation
YouTube Videos: www.youtube.com (Lots, search for "soldering", "dcc decoder", etc)