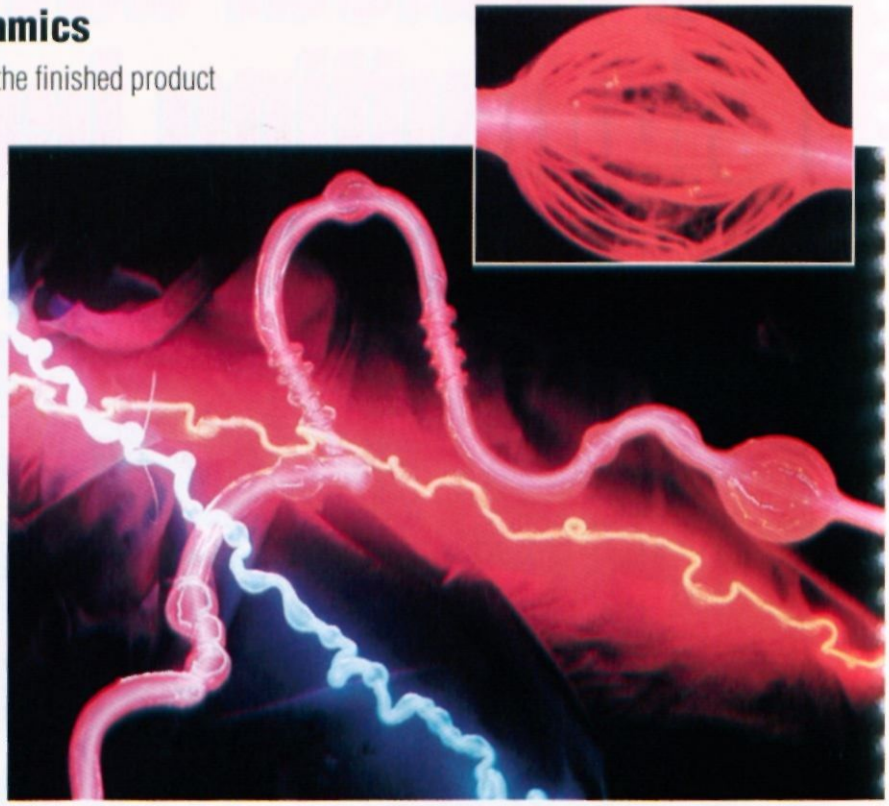
NEON TECHNIQUES

By Rusty Russo

Harold S. Russo is a neon glassblower, glass sculptor and a former neon sign company owner who currently serves as a technical consultant for a major glass and electrode manufacturer.

Processing Dynamics

What's happening inside the tube affects the finished product



Various glass diameters and fill pressures produce dramatically different results, including arc-stream matriculations in high-pressure neon fill (inset).

Many neon fabricators haven't the slightest interest in subjects like the nature of pressure, electron behavior, mean-free path and gas-molecule behavior. Of course, it's possible to learn the bombarding process without understanding the physical dynamics inside a neon tube. But it's equally true that those who understand the science behind neon production have a distinct advantage.

It's always necessary to adjust the standard bombarding process somewhat to accommodate the particular physical characteristics of each unit. Tube length, diameter, glass composition, phosphor coating (single or double), electrode size and relative humidity all affect physical reactions during processing. Thus, understanding the tube's internal dynamics helps you make appropriate adjustments. Paying close attention to visible and audible signals during bombardment, as well as monitoring instruments, plays a key role in achieving optimal results.

Ionization

First, let's examine how some frequently used terms relate to the bombarding process. One of the first steps in bombarding is opening the main stopcock to evacuate the tube. This creates a partial vacuum inside the tube, allowing the bombarder to strike an arc. This step also creates a condition where the number of gas molecules inside the tube is less than the number in the outside atmosphere. Reducing the tube's internal pressure also reduces its electrical resistance, making it easier to light. This is true because, at lower pressure, fewer gas molecules are present inside the tube. Thus, resistance to an electrical discharge is also less.

What happens inside a neon tube when we strike an arc? Ionization (in this case, the process of creating positive ions) occurs when a gas mole-

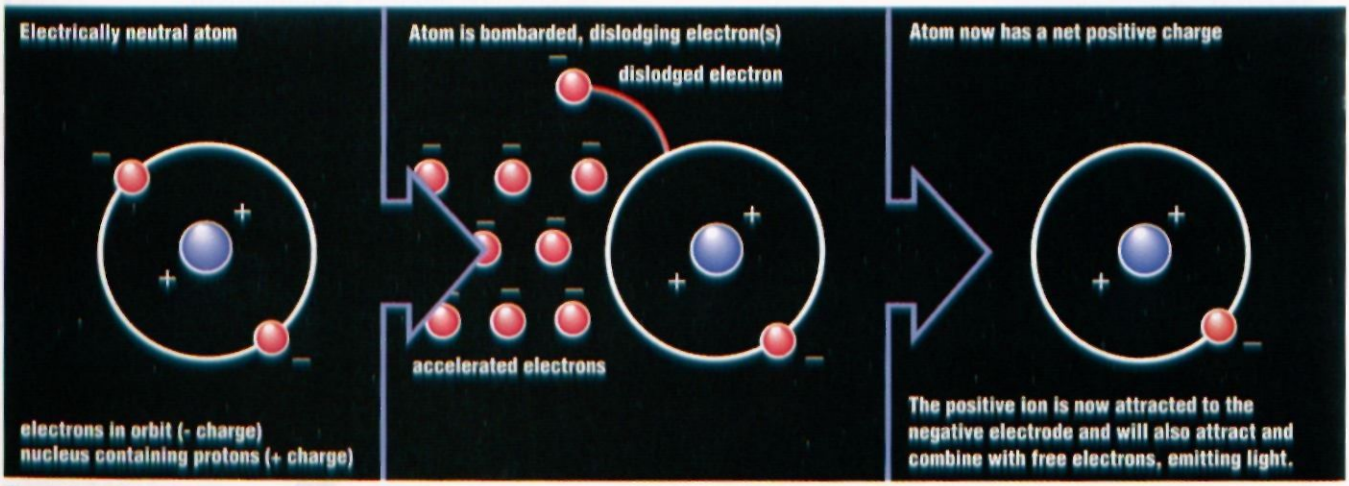


Fig. 1: Ionization of an atom