The commutator must be as smooth and round as possible to ensure satisfactory performance (Table 3). The smooth surface maximizes brush-commutator contact and reduces friction. The commutator must be round to prevent camming action where the brushes lift as a high point passes beneath them. At higher speeds, the brush continues its upwards movement and can separate from the commutator. If this happens, destructive arcing occurs under the brush.

TABLE 3: COMMUTATOR RUNOUT AND FINISH

	Peripheral speed	
	≤ 5000 ft/min	> 5000 ft/min
Max. total indicated runout	.0030" (.076 mm)	.0015" (.038 mm)
Max. total indicated runout in any quadrant	.0015" (.038 mm)	.0010" (.025 mm)
Max. between adjacent bars	.0002" (.005 mm)	.0002" (.005 mm)
Max taper (in/ft)	.0020" (.051 mm)	.0020" (.051 mm)
Surface finish	40 to 70 microns	

Next, machine the commutator to ensure concentricity with the shaft as well as roundness.