

## 2025 JPMA AWARD

### F. EFFORT PRIZE

#### F-1 Sintered Guide Bushings for Electric Capacity Control Valves (ECV) in Automotive Air Conditioning Compressors

PORITE CORPORATION

This product is a guide bush used in the capacity control valve (ECV) of automotive air conditioner compressors. Variable capacity compressors for car air conditioners are equipped with an ECV to suppress fluctuations in outlet air temperature and reduce compressor load. Traditionally, the ECV used a machined brass bushing to support the sliding movement of the movable valve. However, to improve sliding performance and reduce costs, the use of a sintered guide bush was considered.



For the sintered bush, the shape was designed to ensure sufficient refrigerant flow area while taking into consideration manufacturability. For material selection, since the impregnated lubricating oil tends to be displaced by the refrigerant, a non-impregnated material was chosen. A Cu-Sn-P-C-based material containing a solid lubricant (graphite 2.0–3.0 mass%) was adopted, enabling use without oil impregnation.

As a result, sliding characteristics were improved, and production costs were reduced by more than 50% compared to the conventional machined bush..