

Annular-step *MOGUL* **SEN**

Submerged Nozzle



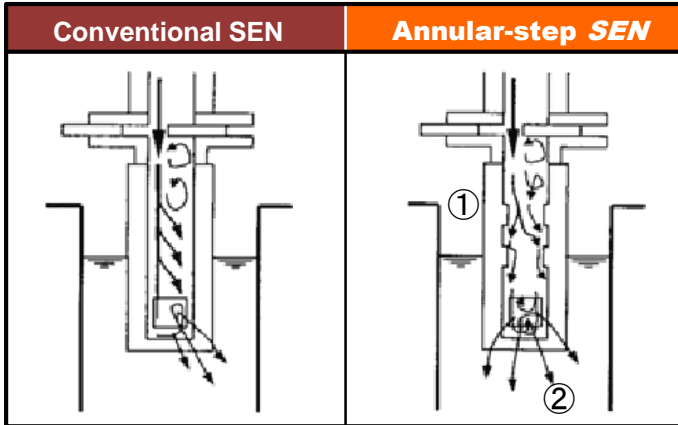
Annular-Step SEN



Conventional SEN

SHINAGAWA has developed annular-step and MOGUL SENs. They give lots of benefits to improve alumina clogging, bias flow in casting mold and so on, and have been used at many casters all over the world with satisfaction.

Benefits of Annular-step SEN

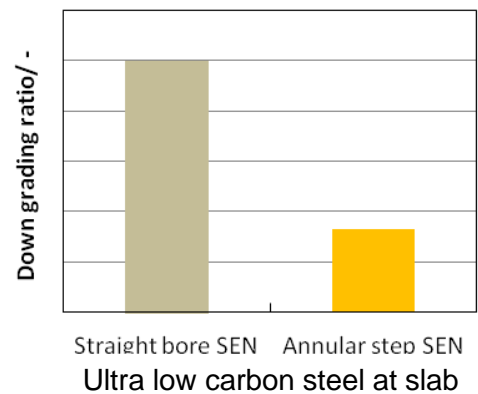
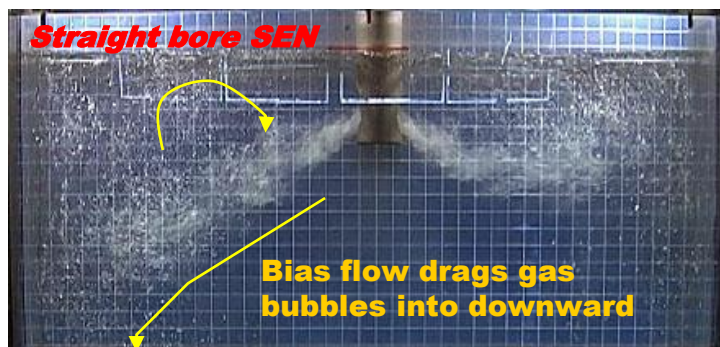
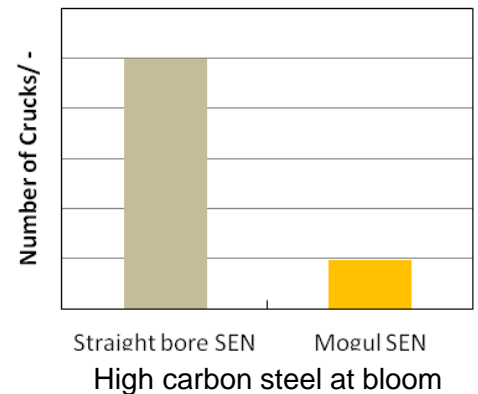


- ① Preventing bias flow
- ② Even outlet flow

Annular-step SEN and MOGUL SENs give various benefits such as 1) even temperature distribution in casting mold, 2) low meniscus fluctuation, 3) low mold flux inclusions, 4) reduced alumina clogging around outlet ports 5) good floatation of non-metallic inclusions and so on, and contribute to improve steel qualities.

Many slab casters have used our annular step and MOGUL SENs with satisfaction for long period.

Steel Quality Improvements



In water model simulation, annular step SEN prevented bias flow and supplied just even flow.

Improvement in steel quality