**FLOW NOZZLE**

**Introduction:**

Flow nozzles have the most commonly used for measuring flow rate for steam, condensate, and gas. It can be used for high velocity flow measurement where erosion or cavitation would wear or damage a flow element. It does not rely on a sharp edge (which can degrade over time) for accuracy, therefore offering excellent long-term accuracy.

The discharge coefficient of a flow nozzle is such that a nozzle can measure approximately 53% higher flow rates than an orifice plate with a similar beta ratio and design differential pressure.

**Most common types:**

There are two common types of this device:

- **ISA 1932 nozzle:**

  The part of the nozzle inside the pipe is circular. The nozzle consists of a convergent section of rounded profile, and a cylindrical throat.

  ![Fig1: ISA 1932 flow nozzle](image)

- **ASME Long radius nozzle:**

  This type has a contoured elliptical inlet in which the curvature is a quadrant of an ellipse. Long radius nozzle based on beta ratio includes two types:
  High beta ratio and Low beta ratio.
Calculation Standards:

These standards are available in Kimia Exir Co. for flow nozzle calculation:

ISO5167
ISA
AGA
ASME MFC-3M
API
BS 1042
R.W Miller Handbook

Materials:

There is a wide range of materials for manufacturing flow nozzle such as:

304/304L or 316/316L Stainless Steel; ASTM A240 (the most common)
Stainless Steel 316Ti; DIN 1.45710
Hastelloy® C-276; ASTM B575
Copper
Cupronickel 30%
Aluminum bronze
K-Monel
Monel400
Hynes Stellite 25

Other body materials also surface coating for inlet profile are available according to special orders.