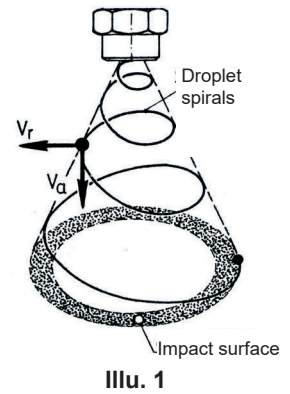


Hollow cone and full cone nozzles are so called swirl nozzles. Inside of the nozzle, pressurized liquid is caused to rotate with the help of a swirl insert or tangential grooves in the swirl chamber. This rotating liquid flow then proceeds in spirals towards the nozzle outlet. Here, it forms a hollow cone before it diverges into droplets. The result is a circular jet diameter.

A nozzle's scattering angle is a function of the radial velocity  $V_r$  and the velocity  $V_a$ .

If friction inside of the swirl chamber is increased, e.g. by installing a cone or with the help of a swirl insert's axial groove, the radial velocity decreases continuously inside of the whirl.

A full cone with circular jet diameter is created for homogeneous distribution of the liquid.

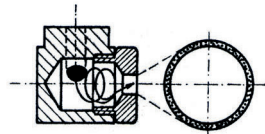


Illu. 1

### Eccentric hollow cone nozzles

with tangential swirl chamber injection. All bores used are large enough to be clog-resistant.

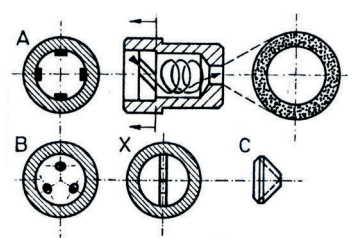
Illu. 2



### Axial-flow hollow cone nozzles

- A with slotted swirler
- B with bore swirler
- X with X-swirler resp. winged swirler
- C with conic slot swirler (molecular atomizer)

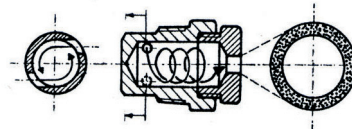
Illu. 3



### Axial-flow hollow cone nozzles

with tangential swirl chamber inlet.

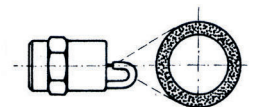
Illu. 4



### Impingement nozzles

Liquid impinges on the pin's end and forms the finest droplet spectrum possible, even for hollow cone nozzles.

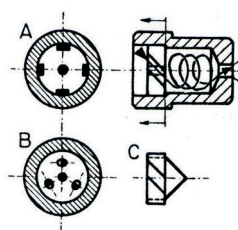
Illu. 5



### Axial-flow full cone nozzles

- A with slotted swirler and axial bore
- B with bore swirler and axial bore
- C with slotted swirler and cone for maximum atomization

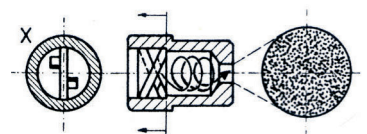
Illu. 6



### Axial-flow full cone nozzles

with X-swirler resp. winged swirler.

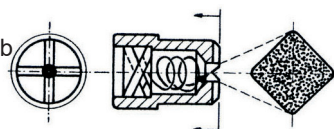
Illu. 7



### Square full cone nozzles

have a slotted swirler or X-swirler; the shape of the outlet's curb allows for a full cone spray pattern to be formed.

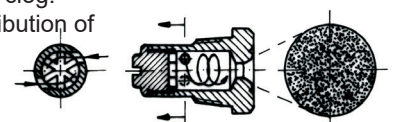
Illu. 8



### Axial-flow full cone nozzles VL

Nozzle without swirl insert component, which could clog. Consistent, optimal distribution of liquids with the help of pressure-resistant spray angle at largest spray width with axial liquid outlet. Highest flow rates of all axial-flow full cone nozzles possible.

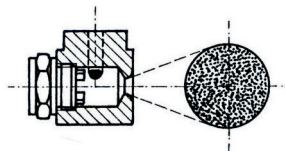
Illu. 9



### Tangential-flow full cone nozzles VTL

Nozzle without possibly clogging swirl insert components. Uniform, optimal distribution of liquids with help of pressure-resistant spray angle at largest spray width with tangential liquid outlet.

Illu. 10



### Spiral and hollow cone nozzles

These are special nozzles which use the impingement principle to create a full cone with spiral liquid distribution. They are very safe and clog-resistant.

Illu. 11

