Factors Affecting Nozzle Performance

· Viscosity

When a liquid flows,the property of internal friction between its molecules is called the viscosity of the liquid.The viscosity is expressed by viscosity,which is used to characterize the resistance factor related to the nature of the liquid.Liquid viscosity is the main factor affecting the spray shape, and to a lesser extent it also affects the flow rate. Relative to water, high viscosity liquids require a higher minimum pressure to produce a spray, and at the same time produce a smaller spray angle.

The influence of non-aqueous fluid viscosity on nozzle performance is shown in the following table.

· Temperature

Temperature changes affect the spray performance of the nozzle,but it often affects viscosity,surface tension, and specific gravity,which in turn affect the performance of the spray nozzle.

The effect of temperature changes on spray nozzle performance is summarized in the following table.

· Surface Tension

Surface tension is the tension acting on any boundary line along the surface of a liquid due to the imbalance of molecular attraction.In general,the forces on the molecules at the interface and the molecules in the bulk of the phase are different due to the different environments.The direction of the force is on the surface,and its value per unit length is the surface tension.The surface tension of water is 73 dynes/cm at 21°C.Surface tension primarily affects the minimum operating pressure,spray angle, and droplet size.

The nature of surface tension is evident in the low operating pressure regime.Higher surface tension reduces spray angle,especially for hollow cone and flat fan spray nozzles.Low surface tension allows the nozzle to operate at low pressure.

See the following table for the general effect of surface tension on the performance of spray nozzles.

Nozzle Characteristic	Increase In Operating Pressure	Increase Of Specific Gravity	Viscosity Increase	Fluid Temperature Increase	Increased Surface Tension
Pattern Characteristic	Improvement	Negligible	Deteriorate	Improvement	Negligible
Droplet Size	Decrease	Negligible	Increase	Decrease	Increase
Spray Angle	Increase and t hen decrease	Negligible	Decrease	Increase	Decrease
Flow Rate	Increase	Decrease	Solid/hollow cone-Increase - flatten - decrease	Depends on the liquid being sprayed and the type of nozzle used	Have no influence
Striking Power	Increase	Negligible	Decrease	Increase	Negligible
Speed	Increase	Decrease	Decrease	Increase	Negligible
Wear	Increase	Negligible	Decrease	Depends on the liquid being sprayed and the type of nozzle used	Have no influence