THE SPRAY NOZZLE PEOPLE

Spray Nozzles for the Chemical Industry

Metric Catalogue

SPRAY NOZZLE SOLUTIONS FOR THE CHEMICAL INDUSTRY

The uses of spray nozzles within the chemical processing industry are many and varied.

TWO PRIMARY FUNCTIONS

Whilst there are many different applications for spray nozzles, they will all perform two core functions.

Firstly, they can be used to greatly increase the surface area of a given volume of liquid. The more finely a spray is atomised the greater surface area to volume ratio it will have. High surface areas will mean faster heat/mass transfer or reaction time thus greatly improving the efficiency of many processes.

The second core function of spray nozzles is to deliver the fluid where it is needed. In some cases, very wide distribution is desirable so wide angle nozzles are required but, in other applications, a very focused or narrow distribution of spray is needed.

THOUSANDS OF PRODUCTS

There are many different designs of spray nozzle used to achieve these two primary functions. The Spray Nozzle People have access to over 50,000 different spray nozzle products and have decades of experience specifying the correct nozzle for critical spray applications in the chemical industry. SNP have specialist spray nozzles with the following features:

- Corrosion resistant plastics and alloys including PTFE
- High temperature alloys
- Wide spray angle nozzles
- Clog resistant nozzles
- High turn down (variable flow)
- Low flow, precision sprays
- Air atomising nozzles
- High impact tank cleaning nozzles
- ATEX certified tank cleaners
- Third party certified fire suppression nozzles

In addition to the spray nozzles themselves, we are experts in the design and manufacture of spray lances, retractable lances, spray bars, injection quills and other spray delivery systems. We have a wealth of experience working within the chemical industry for both small niche companies and global players alike.

KEY APPLICATIONS

Gas scrubbing: NOx removal, Flue Gas Desulphurisation,
Gas cooling: prequench, desuperheating, evaporative cooling
Tank/vessel cleaning: reaction tanks, process tanks, storage tanks
Chemical injection: rust inhibitors, hydrogen scavengers, anti-freeze
Foam control: digesters, reaction tanks, distillation towers
Evaporation ponds: evaporative disposal ponds
Deluge fire protection: fuel tanks, gas tanks, storage tanks
Mixing eductors: storage tanks, mixing tanks, dip tanks
Steam condensing: waste water cooling, process water cooling, heat recovery
Spray coating: fluid bed tablet coating, pellet coating, mould release

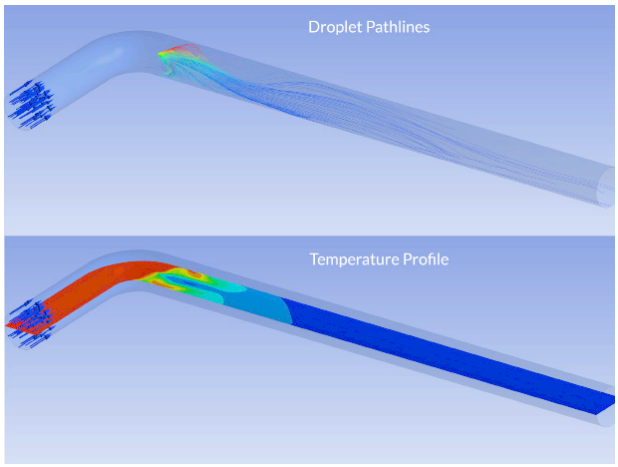
MORE THAN NOZZLES

Selecting the correct spray nozzle to optimise droplet size, spray coverage, flow rates and other spray characteristics is incredibly important for many applications. With so many nozzle products to choose from even seasoned chemical engineers will need to call on specialist companies like SNP to help optimise their spraying systems through correct product selection.

This process of spray selection and optimisation is what we have built our entire business around. What we really sell is not so much the plastic or metal nozzle product but the expert advice that goes with selecting, testing and validating the product.

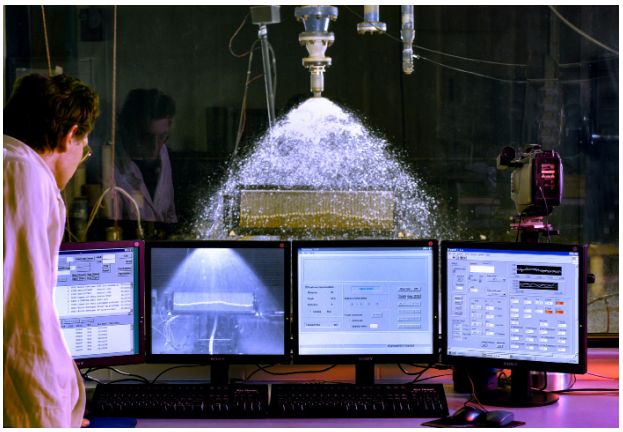
SPRAY ANALYSIS & EXPERTISE

With decades of experience dealing with almost every conceivable spray application, SNP can swiftly help engineers navigate towards the correct spray solution regardless of the application. This is supported by access to proprietory software that gives quick estimates on droplet size and theoretical spray coverage.



For more critical applications we are more than comfortable helping conduct heat exchange and coverage calculations for spray applications. We have full CFD capability if necessary to model how spray systems will perform.

In additon to CFD modelling we also have a full spray lab. Here we can run empirical tests for specifc spray conditions. This data can be used to feed into CFD modelling to build up a very accurate picture of what will happen in any given spray application once implemented.



DOCUMENTATION & TESTING

The documentation and testing standards required by the chemical processing industry are often stringent.

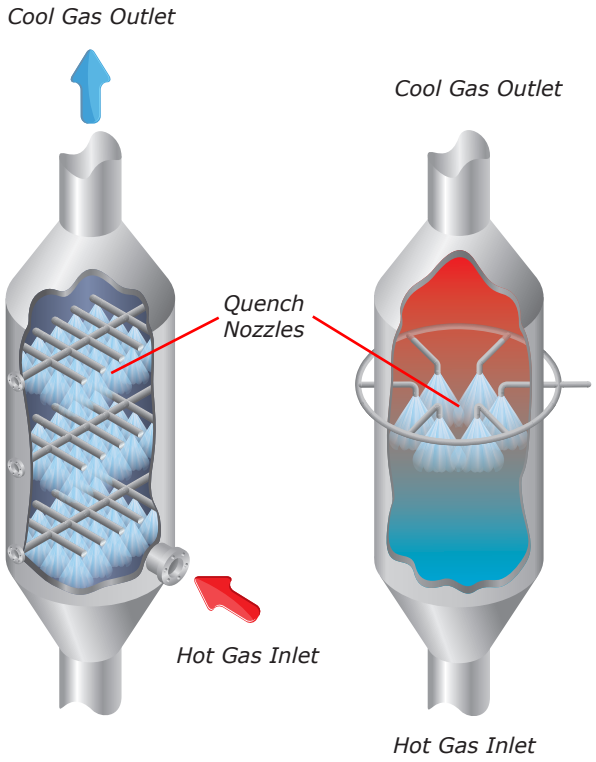
SNP and our associated manufacturers have all the necessary manufacturing process controls in place to meet even the strictest testing and documentation regimes. Just as importantly we have a wealth of experience in the day to day management of complex projects to ensure all the relevant testing/documentation is conducted on time to avoid project delays.

We hold ISO 9001:2015 Certification for quality management.

GAS COOLING

The quenching of hot gases is vital in many chemical production processes. This can be to slow gas flows to improve scrubber efficiency or to protect infrastructure further down the process line. There are two basic types of spray cooling system: dry, where complete evaporation is required, or wet when only partial fluid evaporation is achieved. In both types droplet size plays a critical role as this determines the overall surface area presented to gas and hence the overall rate of heat exchange.

Variable loads in cooling systems necessitate specialist nozzles such as air atomising or spillback types which allow flow rates to be adjusted whilst maintaining a steady droplet size.



Nozzle selection criteria

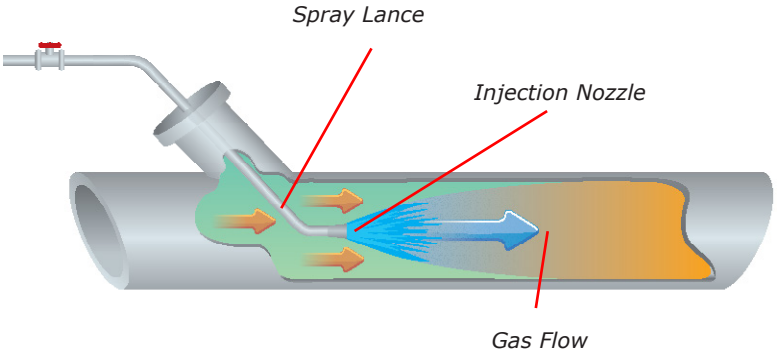
- Smaller droplets to aid in speedy evaporation
- Larger droplets to penetrate fast gas flows
- Temperature resistant materials for very hot gas flows
- Variable flow nozzles to cope with variable gas loads

TF	MP	SA	SpillBack
Standard spiral nozzle	Large free passage axial whirl nozzle	Air atomising high flow rate nozzle	High turn down consistent drop size

CHEMICAL INJECTION

The injection of additives into gas or liquid flows is a common use of spray nozzles.

A spray nozzle, rather than a simple open ended injection quill, will help disperse the injected fluid far more rapidly. Fine atomisation is desirable as this will help disperse the fluid more quickly in the process stream and increase reaction time. At the same time, however, care needs to be taken to ensure the sides of the process pipe or vessel are not hit by the spray.



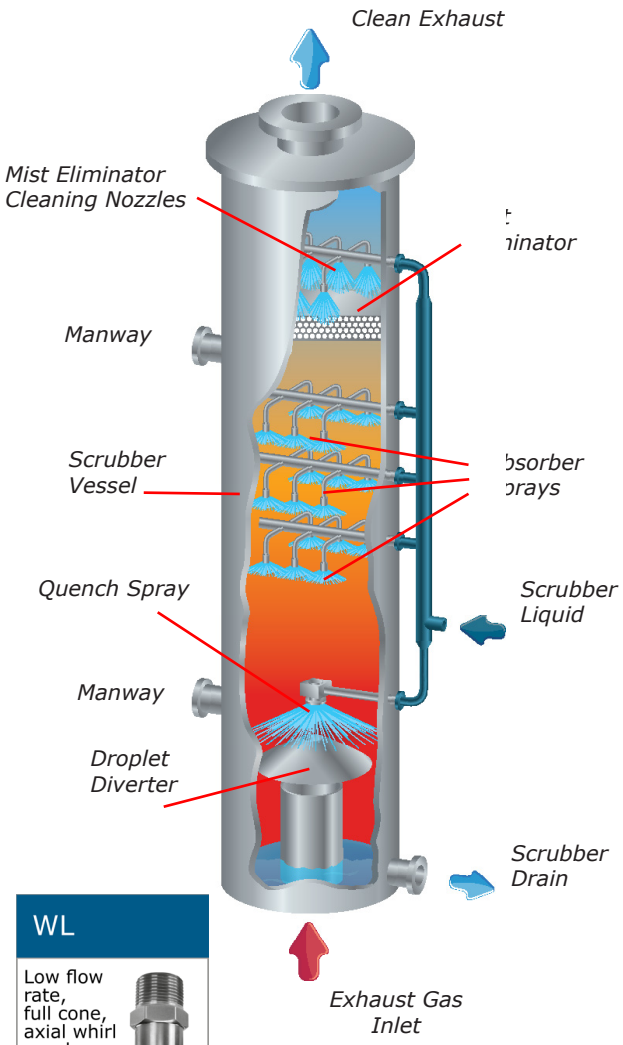
Nozzle selection criteria

- Small droplet size to ensure reaction
- Narrow spray angle to avoid hitting vessel walls
- Corrosion resistant materials
- Low flow / precise control of fluid

TF	PJ	NC	L
Standard spiral nozzle	Impingement, low flow rate, misting nozzle	Full cone plastic axial whirl nozzle	Low flow rate spiral nozzle

GAS SCRUBBING

The removal of contaminants from gas flows is a common application in which spray nozzles are deployed. A nozzle serves two main functions, to atomise the fluid and so increase the overall surface area and to distribute the fluid to where it is needed. Both functions are important in gas scrubbers.



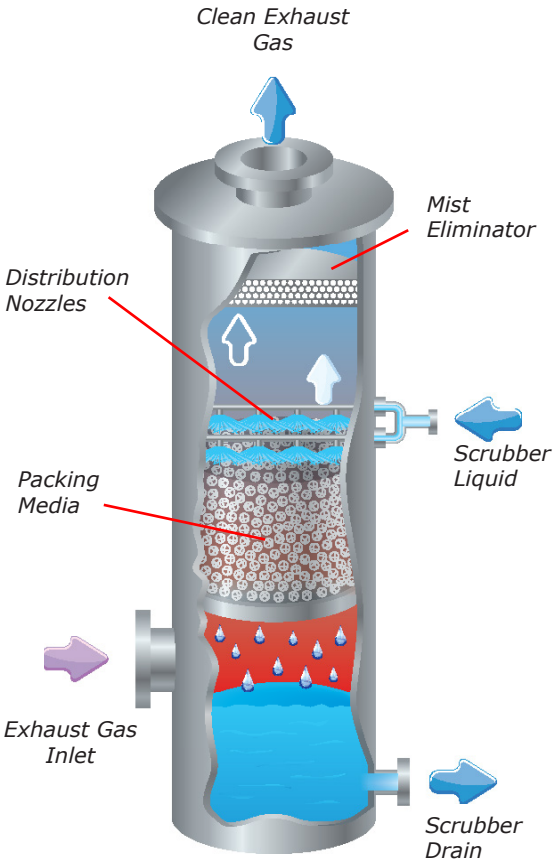
Nozzle selection criteria

- Smaller droplet nozzles for maximum surface area/reaction
- Larger droplets for improved dwell time in fast gas flows
- Wide angle nozzles for wide area fluid distribution
- Special materials for corrosive high wear environments

TF	MP	NC	TFXP
Standard spiral nozzle	Large free passage axial whirl nozzle	Full cone plastic axial whirl nozzle	Large free passage spiral nozzle

WL
Low flow rate, full cone, axial whirl nozzle

Mist eliminator cleaning nozzle



For packed bed scrubbers droplet size is not so important as the increase in the fluid's surface area is delivered by the packing media rather than by direct contact with the spray. As such, often different nozzles are selected for this design of scrubber.

Nozzle selection criteria

- Wide spray distribution
- Relatively even spray distribution
- Larger droplets for improved dwell time in fast gas flows
- Special materials for corrosive high wear environments

TF	MP
Standard spiral nozzle	Large free passage axial whirl nozzle

WL
Low flow rate, full cone, axial whirl nozzle

Mist eliminator cleaning nozzle

TANK CLEANING

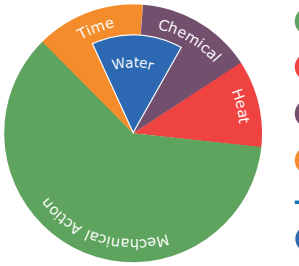
The thorough cleaning of process vessels and storage tanks is essential to prevent cross contamination. Often the residues that need to be cleaned are tough and sticky, calling for powerful cleaning actions. In other situations the environment can be extremely corrosive to even high quality metal alloys so PTFE tank cleaning heads will be required. In yet other applications the tank being cleaned may be an explosion risk so ATEX certified equipment is a must. Regardless of the environment SNP have tank cleaning heads to suit.

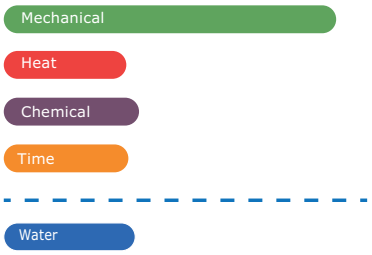
OPTIMISING CLEANING

Any cleaning action has four elements: mechanical action, heat, chemical action and time. Overall fluid consumption is a function of the time and chemical action components. The choice of tank cleaning head will dramatically affect the mix of these elements. Optimising tank cleaning systems to reduce caustic or water use involves understanding how each tank cleaning head affects this mix.

Tank cleaner selection criteria

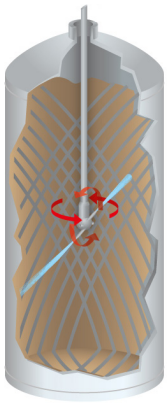
- Reach of cleaning fluid appropriate to tank size
- Material suitable to the tank environment
- High mechanical action heads to reduce water consumption
- Fast cycle cleaners to reduce cleaning times
- ATEX zone 0 certified cleaners for explosive environments

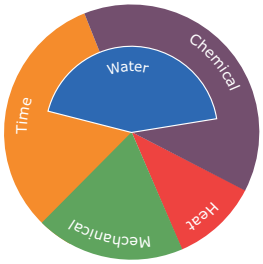


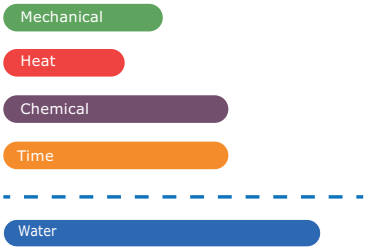


Rotary Jet

Orbitor Compact	Orbitor 2	Orbitor 4
Compact tank cleaner with 4 nozzles 	2 nozzle high power tank cleaner 	4 nozzle tank cleaner with 360° or 180°clean 

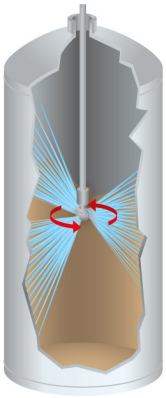


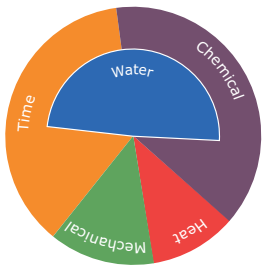


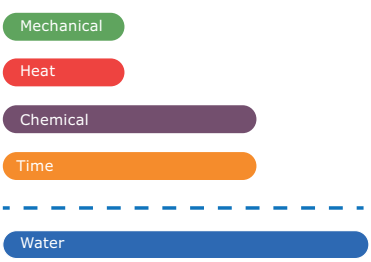


Rotary Spray

HWP	HWS	RSB
Rotary fan PTFE tank cleaner 	Rotary fan tank cleaner 	Rotary tank cleaning head 

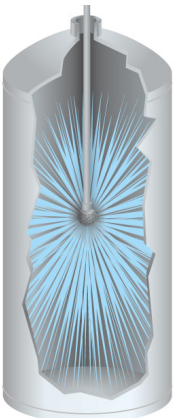






Static

SVSTW	TW	HydroClaw
Static tank cleaning spray ball 	Very wide angle spiral tank cleaning nozzle 	Clog resistant tank cleaner 

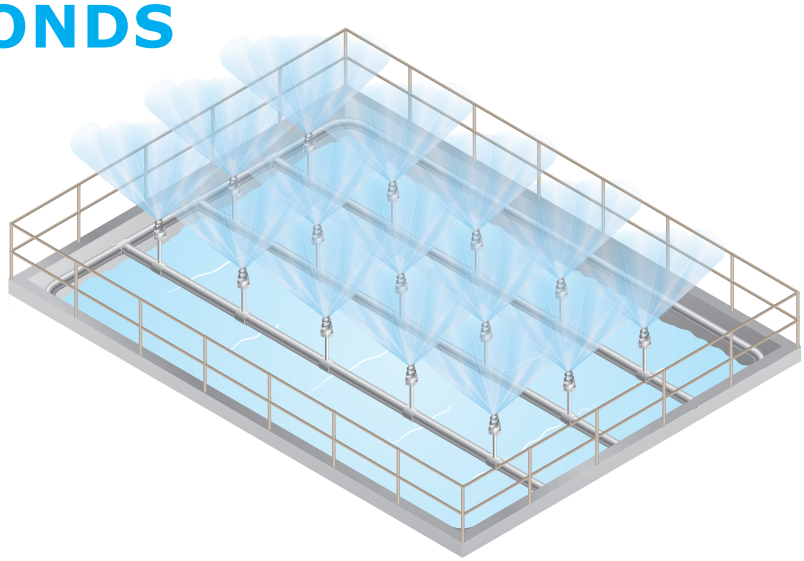


www.spray-nozzle.co.uk

EVAPORATION PONDS

Waste water from many chemical production processes contains solid contaminants. Removing these contaminants by evaporating the water and then collecting the remaining solids requires large evaporation ponds.

This process can be greatly speeded up by recirculating the fluid through a series of spray nozzles to atomise the liquid, increasing surface area and so reducing evaporation time.



TF	WL	TFXP
Standard spiral nozzle	Low flow rate, full cone, axial whirl nozzle	Large free passage spiral nozzle

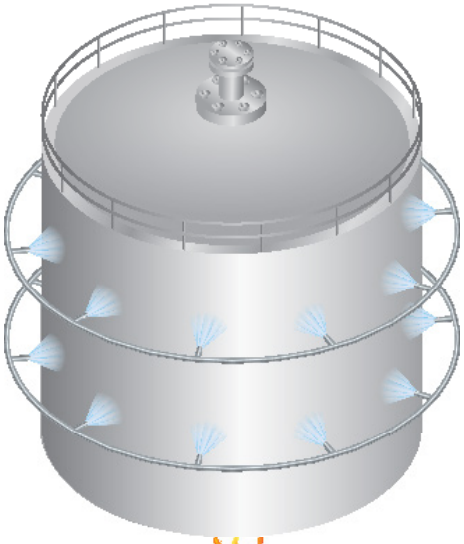
Nozzle selection criteria

- Clog resistant nozzles to cope with solid contaminants
- Wide angle nozzles to disperse the fluid
- Small droplet sizes at low pressures to increase evaporation rates
- Good spray patterns at low pressures to reduce pump duty

FIRE PROTECTION

Protecting potentially explosive assets in the event of a fire is a potentially life-saving application requiring specialist spray nozzles.

Due to the critical nature of the application, stringently tested nozzle systems are required that will ensure the delivery of the correct volume of fluid onto the asset through a fire. This involves careful consideration of the drop size mix. Thankfully, many third party agencies such as United Life Guards, Factory Mutual and Lloyds have verified specialised nozzles for use in these systems.



Nozzle selection criteria

- Certification from third party agencies
- Droplet size mix
- High flow rate / spray density
- Spray angles to ensure correct coverage
- Specialist corrosion resistant materials to ensure correct function when needed

FF	TF 29-180	N	AFF
Deflector flat fan nozzle	Ultra wide angle spiral nozzle	Specialist fire-fighting spiral nozzle	Specialist fire fighting flat fan nozzle

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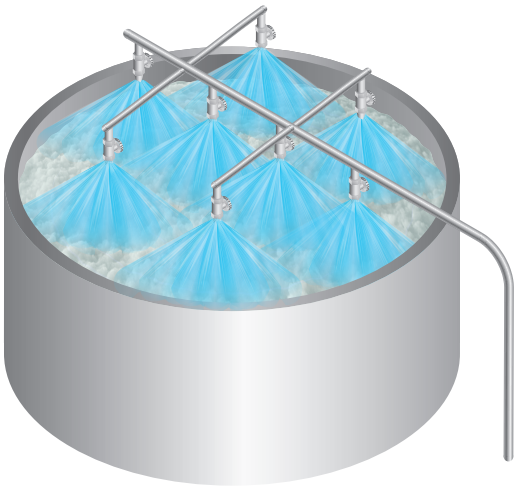
FOAM CONTROL



To control the foams that may form in many chemical production processes sprays are used to deliver foam retardants.

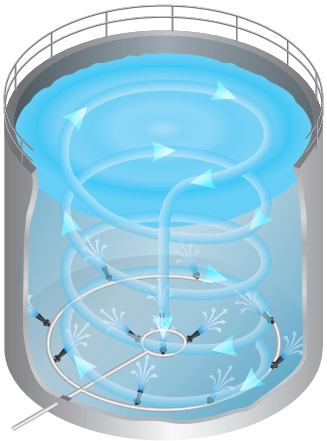
The amount of spray delivered per square metre of foam is generally the critical variable. Precise dosing will depend on the type of foam being formed and the rate of foam production.

Nozzle selection criteria

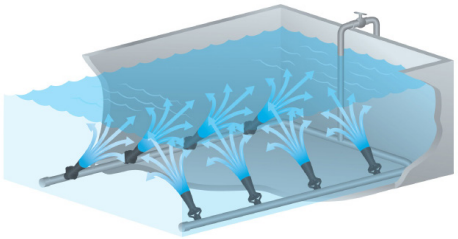
- Spray density per m2
- Droplet size optimised for maximum foam destruction
- Clog resistant nozzles
- Chemically resistant materials

MPL	TF	WL	MP
Axial whirl, full cone, clog resistant low flow rate nozzle 	Standard spiral nozzle 	Low flow rate, full cone, axial whirl nozzle 	Large free passage axial whirl nozzle 

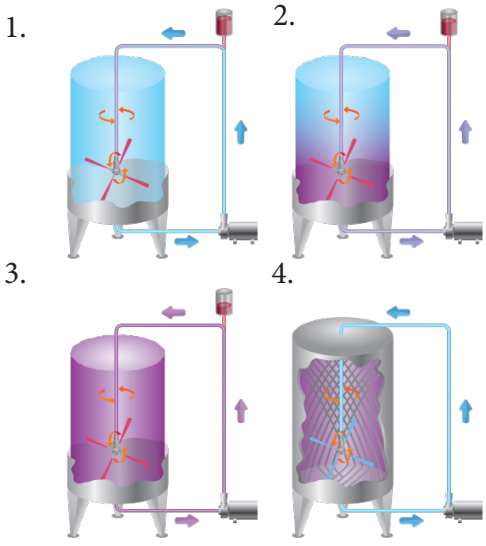
MIXING



Eductor nozzles are an efficient way to recirculate fluids in tanks to either keep particles suspended or to mix two different fluids that would naturally separate. Eductors work via the venturi principle and suck in the surround fluid meaning 5 times as much fluid is moved as is actually delivered through the eductor by the recirculation pump. This helps reduce the pump duty significantly and eliminates the need for mechanical mixers or agitators.



Rotary mixing heads work in the same way as rotary tank cleaners work; indeed, they are essentially the same machine. Fluid from the tank is recirculated through the submerged jet cleaner. Alternatively, the fluid that is to be mixed into the liquid already in the tank is pumped through the rotary mixer. As a bonus, after the mixing process, the rotary mixer can become a tank cleaner.



Nozzle selection criteria

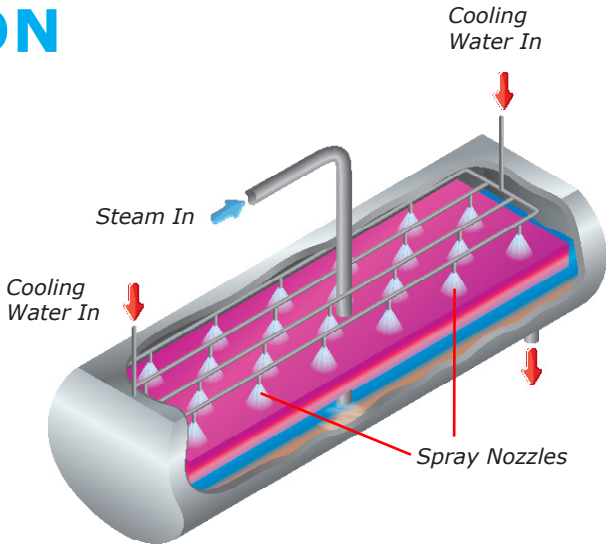
- Desired turn rate
- Tank size compared to plume size
- Materials suitable for the environment

TurboMix	Uni-Eductor	Orbitor
Eductor mixing nozzle 	Eductor mixing nozzle 	Nozzle system with rotary jets for mixing and tank cleaning 

STEAM CONDENSATION

Waste steam from various processes in a chemical plant often needs to be cooled.

This can be achieved by spraying cold water into the steam flow. The spray then acts as a very high surface area heat exchanger and will rapidly cool and condense the steam back to a liquid state. In many cases the resulting warm water is then used for other applications in the factory.



Nozzle selection criteria

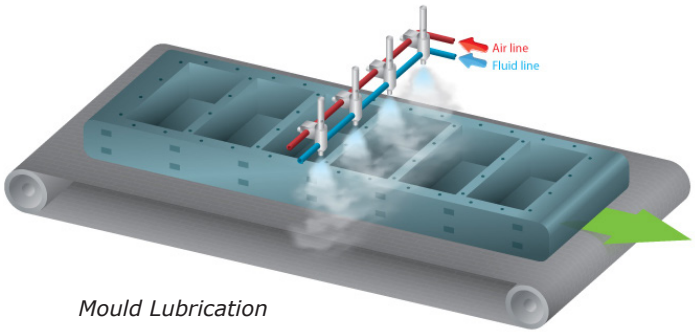
- Full cone nozzles for maximum spray coverage
- Spray patterns at low pressures to minimise pump duty
- Corrosion resistant materials

TF	WT	TF Hollow
Standard spiral nozzle 	Tangential whirl, hollow cone nozzle 	Spiral, hollow cone nozzle 

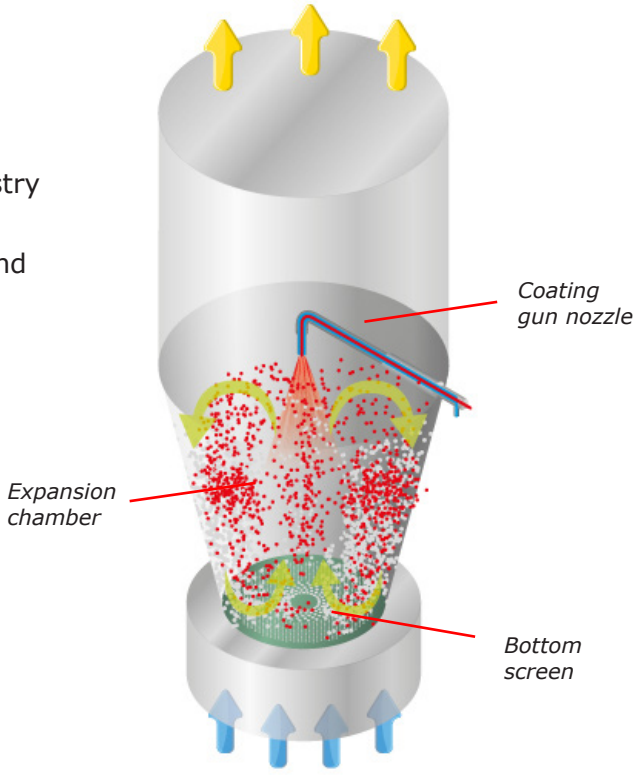
SPRAY COATING

The use of sprays to produce coatings in the chemical industry takes many forms. Coatings can be used for mould release, scent addition, fluid bed tablet coating, aromatic addition and many other applications.

Precision spraying is required as well as uniform liquid distribution with a low droplet size to ensure a consistent coating level is achieved.



Mould Lubrication



Fluidised Bed Coating

Nozzle selection criteria

- Small droplet size
- Fast on off cycles for precise control
- Corrosion resistant material
- Spraying viscous fluids
- Anti-bearding design

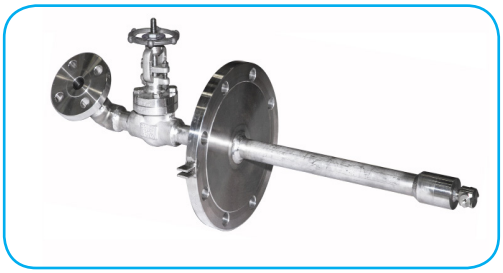
SAM	XA	BJ	HydroPulse
Air atomising, precision spray control nozzle 	Air atomising, modular design, various spray patterns 	Shaped orifice, flat fan, low flow rate nozzle 	Pneumatically pulsed, low flow rate fan nozzle 

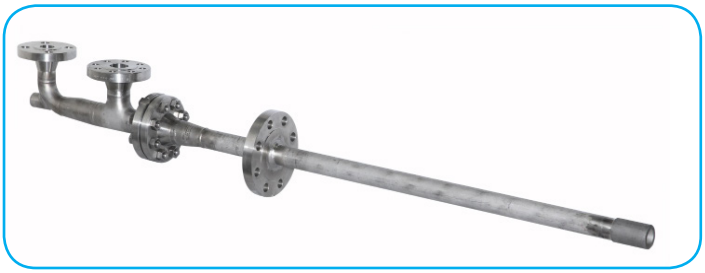
CUSTOM FABRICATIONS

SNP offers everything you need to scope, order, design and produce your custom spray fabrication. Our departments work seamlessly together to ensure the products you receive are of the highest quality. Working with us as your primary fabricator ensures all components are designed to fit and work together. Our one-stop shop custom fabrication service offers:

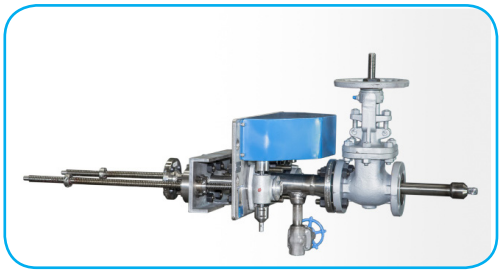
- Reduced need for coordinating between multiple suppliers to save you time and hassle
- Non-destructive Examination (NDE) Qualifications
- PMI, PT, RT, UT, VT, Hydrostatic Testing, Hardness testing
- Certification for your fabrication

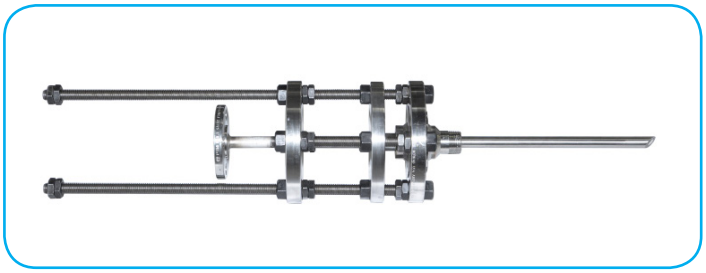
SPRAY LANCES



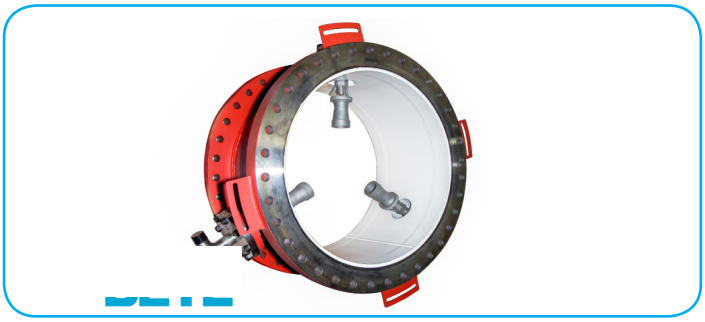


RETRACTABLE LANCES

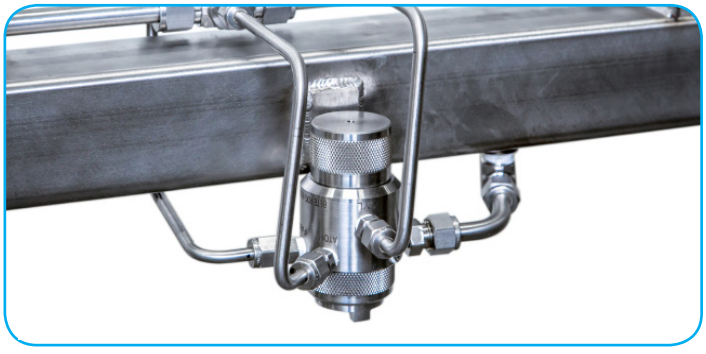




SPOOL SECTIONS



HEADERS



ABOUT US

THE SPRAY NOZZLE PEOPLE

As our name would suggest, we are a specialist supplier of spray nozzles and spray nozzle solutions. Our products are used in many different industries and by companies of all sizes. We as are comfortable dealing with large projects for blue chip food, beverage, chemical and petrochemical giants as well as dealing with start-ups or single person operations.

Key Suppliers

BETE®

Dasic group

Uni-Spray Systems Inc.

We have distribution agreements with multiple high quality manufacturers of spray nozzles and tank cleaning heads.

We hold the exclusive distribution rights for the BETE spray nozzle range, air atomisers and tank cleaning heads and have access to BETE's spray fabrications services, spray systems and advanced spray engineering solutions.

We also distribute the Dasic range of tank cleaning heads and the Uni-Spray range of specialist injection-moulded plastic spray nozzles.

The Group

The Spray Nozzle People are part of the Spray People Group which consists of business units focusing on specialist products and solutions.

SPG — THE SPRAY PEOPLE GROUP

SSP — THE SAFETY SHOWER PEOPLE — Emergency Showers and eye baths

ANP — THE AIR NOZZLE PEOPLE — Air nozzles, air knives, vortex coolers and other air related products

TFP — THE FULFILMENT PEOPLE — Specialist high care warehousing and logistics

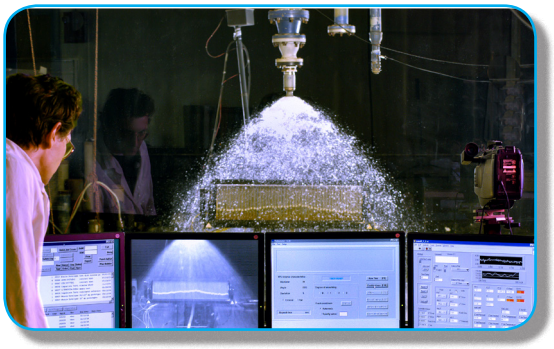
PSP — THE PROFESSIONAL SPRAYERS PEOPLE — Backpack and hand held spraying equipment

THE SPRAY NOZZLE PEOPLE

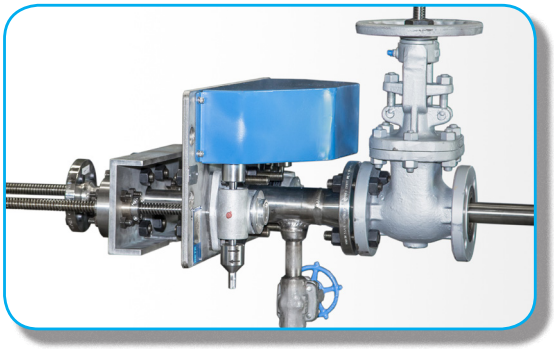
SPRAY NOZZLE SOLUTIONS FOR THE CHEMICAL INDUSTRY

SPRAY NOZZLES

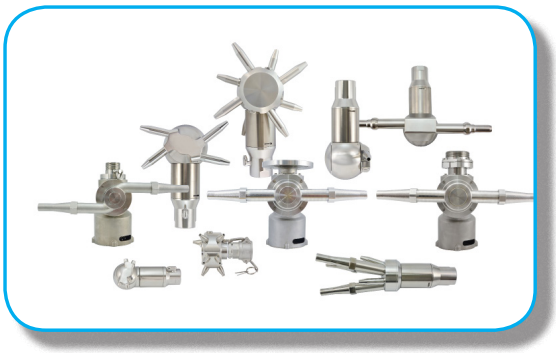
SPRAY TESTING & ANALYSIS



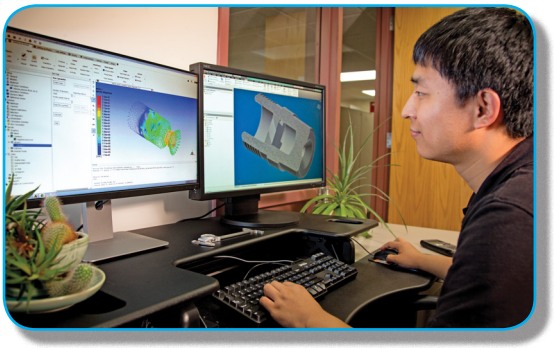
SPRAY SYSTEM FABRICATION



TANK CLEANING



SPRAY SYSTEM DESIGN/ENGINEERING



SNP
PO Box 2748
Lewes
East Sussex
BN8 4HZ
Website: www.spray-nozzle.co.uk
e-mail: info@spray-nozzle.co.uk
Telephone: +44 (0) 1273 400092