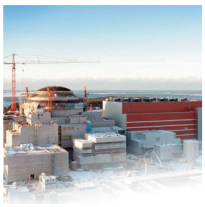
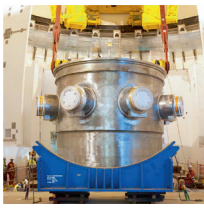
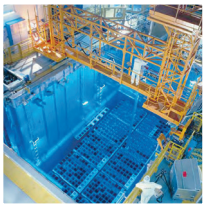
ENGINEERING
YOUR SPRAY SOLUTION

LECHLER

Precision Spray Nozzles for Nuclear Power Industry









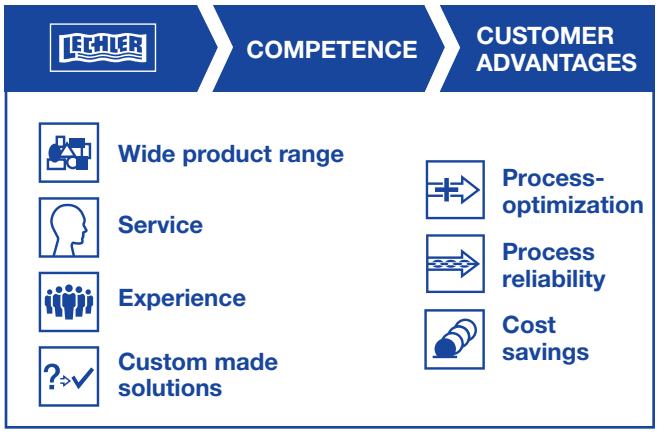
Nuclear Power

INNOVATIVE NOZZLE TECHNOLOGY FOR MAXIMUM SAFETY AND PRODUCTIVITY

Nuclear power is still one of the main sources for energy. Safety and awareness of the risks become more and more important. This is particulary true when it comes to nozzles. A small but important part for many nuclear applications. Who wants to increase safety and productivity needs a deep understanding of nozzle technology as well as the ability to produce with highest precision. This is exactly what we have been doing at Lechler for over 135 years.

Lechler is a worldwide leader in the manufacturing of industrial spray nozzles and systems.

Founded in 1879, Lechler has five manufacturing plants around the world, produces more than 20,000 products, and is represented on six continents. Our nozzles and systems are important parts of spray applications in industries such as steel, power generation, food, beverage, chemical, pharmaceutical, electronics, wastewater, pulp and paper, and general manufacturing.

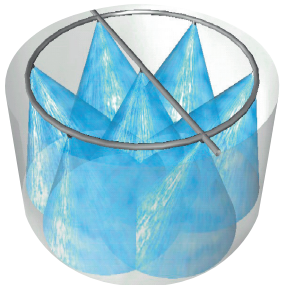


SPRACO = LECHLER

The Spraco name is well introduced in the nuclear industry. For years, Spraco's 1713A and 1751 nozzles have been used in nuclear plants throughout the world. In 1975, Lechler purchased Spray Engineering Company, manufacturer of Spraco products. We continue to manufacture many of the same products that Spraco produced, only now they are under the Lechler brand. This includes the well introduced Spraco 1713A and 1751 nozzles. We continue to sell those nozzles and we design new products at the same time.

Our competence

Lechler is a world leader in nozzle and spraying technology. Our products and solutions are used worldwide in an extremely wide range of sectors – including in the nuclear power industry. Our application engineers are familiar with practical use from many successful applications, and are therefore competent partners in the development and realization of optimal solutions. To date we have completed projects for AREVA, Westingshouse, CNPEC and many other well known companies of the nuclear industry. Our nozzles are used for various applications in pressurized water reactors (CPR1000, AP1000 and EPR) around the world. See pages 4 and 5 for more information.



Special solutions and standard nozzles

In the Lechler series catalog „Precision Spray Nozzles and Accessories" you will find an extensive selection of high-quality nozzles that have proven themselves in practical use over the years. However, standard products are not always sufficient, especially when it comes to special requirements in terms of material or testing.

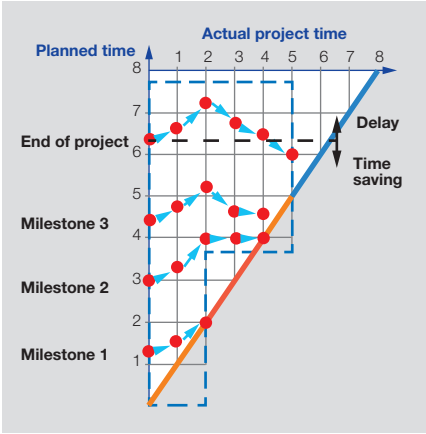
The list below shows a selection of requirements that are often specified when working for the nuclear industry:

- Specific material properties
- Alloy compositions different from the standard requirements (e.g. low cobalt content)
- Compliance with design and construction rules for mechanical components of PWR nuclear islands RCC-M
- Customized quality plans and tests with witness and hold points
- Spray nozzle acceptance tests together with the customer in our facilities
- The awareness of risks and the adoption of a special safety culture are commitments for a higher quality standard when working on nuclear projects

Project Management

Projects are managed by a dedicated project team, managed by an experienced leader.

Project stakeholders (customers, steering committee, etc.), are informed about the status of the job on a regular basis. The progress of the project is continuously monitored in order to identify problems early to finish the project in time.



Project Documentation

Customized requirements in terms of documentation can be a part of the project. On request Lechler issues the „End of Manufacturing Report" (EOMR) as final report. It is a collection of all project related documents.

Your experienced specialist – anywhere in the world

With subsidiaries in France, China, the USA, Spain, Italy, Finland, Sweden, United Kingdom, Hungary, India and Belgium as well as qualified agents in over 40 countries, Lechler is represented all over the world.

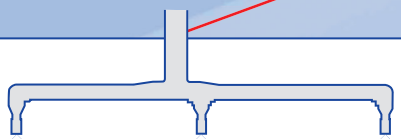
LECHLER NOZZLES ARE USED IN MANY APPLICATIONS FOR THE NUCLEAR POWER INDUSTRY

Containment Spray System

Upon the occurrence of either a secondary break or primary break inside the containment building, the containment atmosphere would become filled with steam. To reduce the pressure and temperature of the building, the containment spray system is automatically started. Lechler **EAS spray nozzles** are known under the well introduced Spraco name **1713A***. This nozzle and the enhanced version of it (**series 300.387**) features a reliable and durable design.

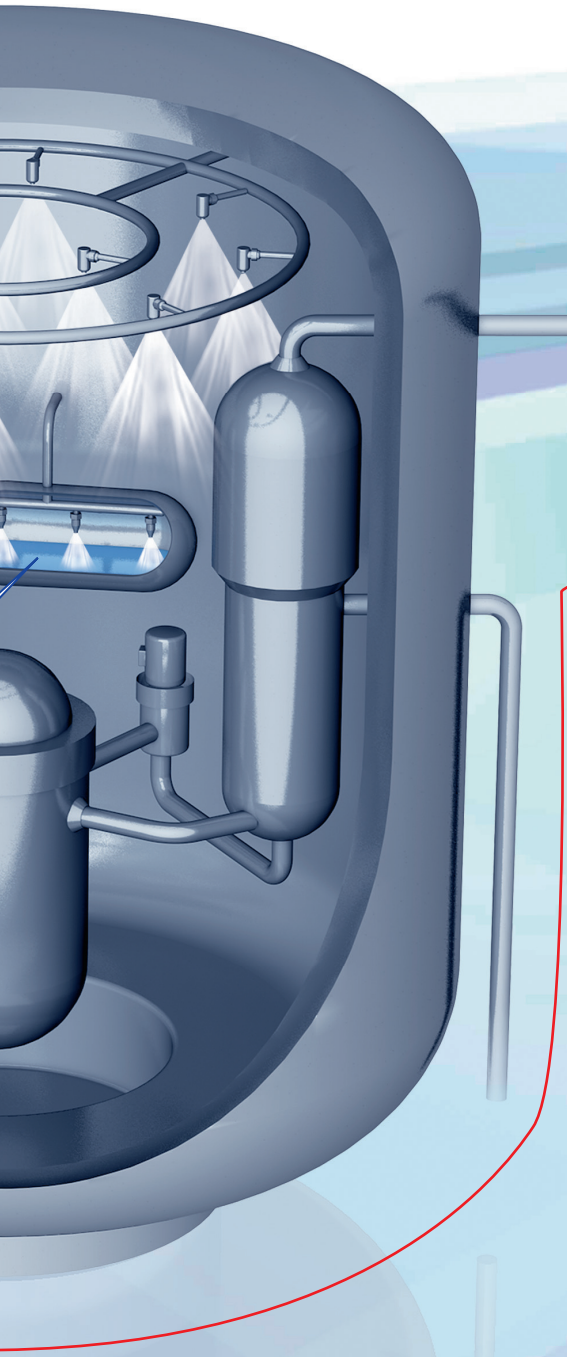
Pressurizer

The pressurizer is the component in the reactor coolant system which provides a means of controlling the system pressure. If pressure starts to deviate from the desired value, the various components will actuate to bring pressure back to the normal operating point. One of these components is the **spray nozzle in the top space of the pressurizer**. It sprays relatively cold water into the steam space to condense the steam into water. The nozzle features 2 internal swirl inserts that create a full cone pattern. The **series no.** is **400.807**.



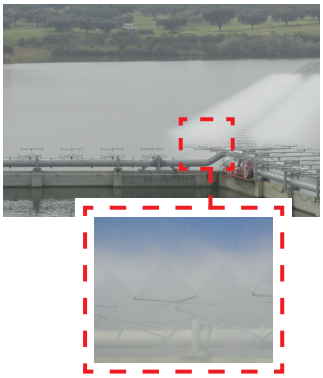
Pressurizer Relief Tank

If pressure inside of the pressurizer continues to increase, the pressurizer relief valves will open and dump steam to the pressurizer relief tank. The pressurizer relief tank is a large tank containing water with a nitrogen atmosphere. Several **full cone spray nozzles** condense the steam into water.



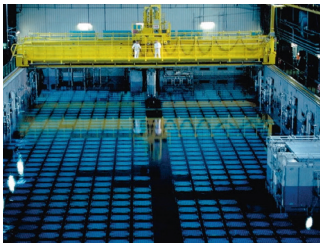
Spray Ponds

A spray pond is a reservoir in which heated water is cooled for reuse. The process is accelerated by nozzles. The warm water is sprayed into cooler air, cooling down as it reaches the basin. The **1751*** nozzle **(series no. 373.445)** is a **Ramp Bottom hollow cone nozzle** most commonly used for spray ponds at nuclear power plants.



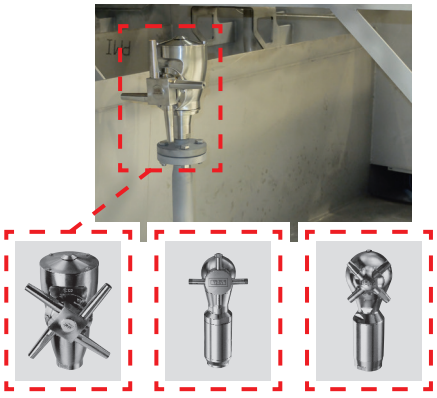
Emergency Cooling of Spent Fuel Pool

In case of a total water loss caused by a break in the pool wall, spray nozzles are used to cover the surface (from the top) of the used rods. The object is to cool the fuel rods as well as possible in order to avoid major problems like what happened in Fukushima. **Tongue type and full cone nozzles** are both suitable for this application.



Nuclear Waste Disposal and other Applications

In addition to the applications listed here there are many others where Lechler nozzles can help to improve the process. For example, our nozzles are used inside of ceramic melters for the disposal of nuclear waste. Lechler offers a large selection of tank cleaning nozzles for various purposes.



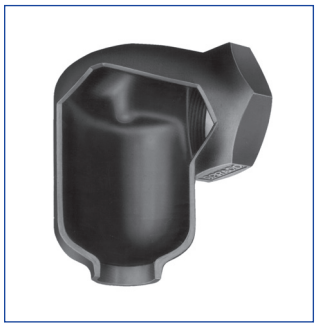
*** Please note that the first two numbers above are Spraco numbers which are still often referred to but now have been assigned Lechler part numbers.**

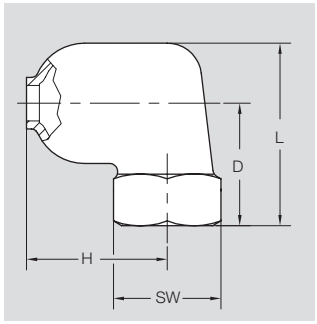
Hollow cone nozzles
1713A and 1751 Nozzle – „Ramp Bottom Design“

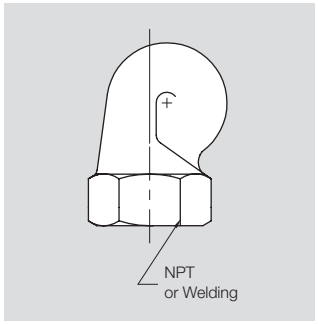
Series 1713A and 1751

1713A and **1751** hollow cone spray nozzles belong to the **Ramp Bottom design** series and are most commonly used for **EAS containment spray and spray ponds at nuclear power plants.**
The nozzle produces a fine, uniform spray even at low pressures and is carefully designed to spray at the proper height necessary for effective cooling without excessive drift.

As shown in the cutaway photo on the left, the 1751 nozzle has a large, free passageway and an absence of interior vanes. As a result, **this nozzle will spray liquids which might contain particles, debris, foreign matter or other impurities, or rubbish that would clog an ordinary nozzle.**
The unique design of this nozzle results in an effective droplet breakup and a uniform spray. These characteristics help the nozzle produce a maximum water cooling with minimum driftage loss.







Dimensions

Type	L [mm]	D [mm]	H [mm]	Hex	Weight [kg]
QA02.H62.B79	67	45	52	41	0.3
300.387.S7.00.00.0	66	44	52	41	0.4
300.387.H1.00.00.0* **	66	44	52	–	0.4
300.387.H1.01.00.0	66	44	52	41	0.4
QA01.W09.B79	108	71	94	71	1.4

*** Dimensions of welding connection on request

Spray angle*	Ordering no.	Equiv. to Spraco type	14408 (GX5CrNiMo19-11-2)	ASTM 316	ASTM/A351 CF3	1“ NPT	2“ NPT	1“ welding	B Ø [mm]	**V̇** [l/min] **p** [bar] 1.0	2.0	at 40 psi [US gal./min]	3.0	5.0	Typical Application
60°	**QA02.H62.B79**	1713A	-	○	-	○	-	-	9.7	34.6	49.0	15.2	60.0	77.5	EAS spray
	300.387.S7.00.00.0**	-	-	-	○	○	-	-	10.0	35.6	50.4	15.6	61.7	79.7	EAS spray
70°	**300.387.H1.00.00.0****	-	○	-	-	-	-	○	11.5	44.5	63.0	19.5	77.0	99.4	EAS spray
	300.387.H1.01.00.0**	-	○	-	-	○	-	-	11.5	44.5	63.0	19.5	77.0	99.4	EAS spray
80°	**QA01.W09.B79**	1751	-	○	-	-	○	-	30.0	287	406	126	498	642	Spray ponds

* at 40 psi/2.76 bar
** Nozzles with part no. 300.387 are a special, precision casted version of series 373.
The precision casting allows for smallest tolerances to ensure best possible performance.
Other sizes and materials are available on request.

Axial-flow full cone nozzles
Special design for Pressurizer Spray Head

Series 400.807 and QA02

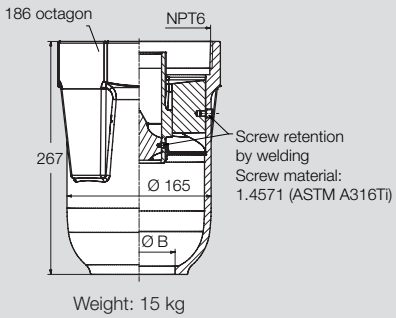
The nozzle spray head is made from a precision casting of stainless steel. It consists of a shell and two internal swirl inserts. It is possible to produce a customized nozzle in order to meet specific nuclear requirements.
During production, a broad spectrum of quality testing ensures the performance required for this important cooling function.

Application

This special full cone nozzle helps the pressurizer control the water pressure in the primary system. If the reactor coolant system temperature starts to increase, the density of the reactor coolant will decrease, and the water will take up more space. Since the pressurizer is connected to the reactor coolant system via the surge line, the water will expand up into the pressurizer. This will cause the steam in the top of the pressurizer to be compressed, and therefore, the pressure to increase. This is when the pressurizer spray head is activated to spray relatively cold water into the steam space and condense the vapor into water, thus keeping the pressure of the system within the desired range.

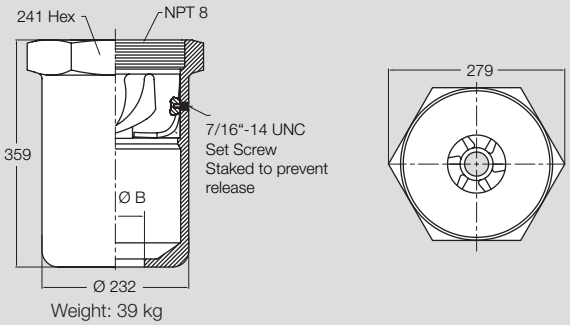
Spray angle	Ordering no.	1.4408	ASTM A743 CF8M	ASTM A479 316 + A743 CF8M	6" NPT	8" NPT	B Ø [mm]	V̇ [l/min] p [bar] 0.25	at 5 psi [US gal./ min]	0.5	1.0	1.5	Typical Application
100°*	**400.807.H1.00.00.0**	○	-	-	○	-	82.5	1736	1986	2290	3022	3554	Pressurizer Spray Head
	400.807.S1.00.00.0	-	○	-	○	-	82.5	1736	1986	2290	3022	3554	
61°**	**QA02.P80.B79**	-	-	○	-	○	91.9	2330	700	3075	4057	4771	
80°**	**QA02.K63.B79**	-	-	○	-	○	108	2863	860	3777	4984	5862	

* at 14.5 psi/1 bar
** at 5psi/0.35 bar
Other sizes and materials are available on request.



Weight: 15 kg

Type 400.807.X1.00.00.0



Weight: 39 kg

Types QA02.P80.B79 and QA02.K63.B79

Axial-flow full cone nozzles
Series 490 / 491

NEW Patent pending

Series 490 / 491

Non-clogging nozzle design. Stable spray angle. Particularly even liquid distribution.
Applications:
Steam quenching e.g. pressurizer relief tank, general cleaning and washing, surface spraying, container cleaning.

Series 490/491 represents a new generation within the axial-flow full cone nozzles product group. These nozzles were developed using state-of-the-art design and simulation methods (CFD).

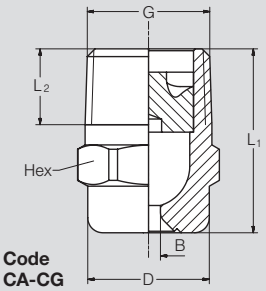
Nozzles of series 490/491 replace series 460/461 which are still available on request.


Series 490

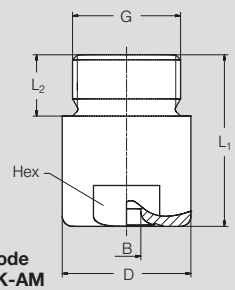

Series 491

Code	Dimensions [mm]					Weight Brass
	G	L_1	L_2	D	Hex	
CA	1/8 BSPT	18.0	6.5	10.0	11	13 g
CC	1/4 BSPT	22.0	10.0	13.0	14	16 g
CE	3/8 BSPT	24.5	10.0	16.0	17	30 g
CE	3/8 BSPT	30.0	10.0	16.0	17	50 g
CG	1/2 BSPT	32.5	13.0	21.0	22	60 g
CG	1/2 BSPT	43.5	13.0	21.0	22	85 g
AK	3/4 BSPP	42.0	15.0	32.0	27	190 g
AM	1 BSPP	56.0	17.0	40.0	36	350 g

Subject to technical modification.
In a critical installation situation, please ask for the exact dimensions.



Code CA-CG



Code AK-AM

Spray angle	Ordering no.									B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar]							Spray diameter D at p = 2 bar	
	Type	Mat. no.		Code															H = 200 mm	H = 500 mm
		1Y AISI 316L	30 Brass	1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPP	1 BSPP			0.5	1.0	2.0	3.0	5.0	7.0	10.0		
45°	**490.403**	○	○	**CA**	-	-	-	-	-	1.25	1.25	0.57	0.76	1.00	1.18	1.44	1.65	1.90	160	400
	490.523	○	○	**CA**	-	-	-	-	-	1.70	1.70	1.15	1.52	2.00	2.35	2.89	3.30	3.81	160	400
	490.603	○	○	-	**CC**	**CE***	-	-	-	2.00	2.00	1.81	2.39	3.15	3.70	4.54	5.20	6.00	160	400
	490.643	-	○	-	-	**CE**	-	-	-	2.45	2.45	2.30	3.03	4.00	4.70	5.77	6.60	7.61	160	400
	490.683	-	○	-	-	**CE**	-	-	-	2.55	5.55	2.87	3.79	5.00	5.88	7.21	8.25	9.52	160	400
	490.703	-	○	-	-	**CE**	-	-	-	2.65	2.65	3.22	4.24	5.60	6.59	8.08	9.24	10.66	160	400
	490.723	○	○	-	-	**CE**	-	-	-	2.85	2.85	3.62	4.77	6.30	7.41	9.09	10.40	11.99	160	400
	490.783	-	○	-	-	-	**CG**	-	-	3.45	3.45	5.17	6.82	9.00	10.58	12.98	14.85	17.12	160	400
	490.843	-	○	-	-	-	**CG**	-	-	3.80	3.80	7.18	9.47	12.50	14.70	18.03	20.63	23.80	160	400
60°	**490.404**	○	○	**CA**	-	-	-	-	-	1.15	1.15	0.57	0.76	1.00	1.18	1.44	1.65	1.90	220	560
	490.444	○	-	**CA**	-	-	-	-	-	1.25	1.25	0.72	0.95	1.25	1.47	1.80	2.06	2.38	220	560
	490.484	○	○	**CA**	-	-	-	-	-	1.45	1.45	0.92	1.21	1.60	1.88	2.31	2.64	3.05	220	560
	490.524	○	○	**CA**	-	-	-	-	-	1.60	1.60	1.15	1.52	2.00	2.35	2.89	3.30	3.81	220	560
	490.564	○	○	**CA**	-	-	-	-	-	1.80	1.80	1.44	1.89	2.50	2.94	3.61	4.13	4.76	220	560
	490.604	○	○	**CA**	**CC**	**CE**	-	-	-	2.05	2.05	1.81	2.39	3.15	3.70	4.54	5.20	6.00	220	560
	490.644	○	○	-	**CC**	**CE**	-	-	-	2.30	2.30	2.30	3.03	4.00	4.70	5.77	6.60	7.61	220	560
	490.684	○	○	-	**CC**	**CE**	-	-	-	2.60	2.60	2.87	3.79	5.00	5.88	7.21	8.25	9.52	220	560
	490.724	○	○	-	**CC**	**CE**	-	-	-	2.95	2.80	3.62	4.77	6.30	7.41	9.09	10.40	11.99	220	560
	490.764	○	○	-	-	**CE**	-	-	-	3.25	3.25	4.59	6.06	8.00	9.41	11.54	13.20	15.22	220	560
	490.804	○	○	-	-	**CE**	-	-	-	3.70	3.70	5.74	7.58	10.00	11.76	14.43	16.51	19.04	220	560
	490.844	○	○	-	-	-	**CG**	-	-	4.05	4.05	7.18	9.47	12.50	14.70	18.03	20.63	23.80	220	560
	490.884	○	○	-	-	-	**CG**	-	-	4.65	4.65	9.19	12.13	16.00	18.82	23.08	26.41	30.46	220	560
	490.924	○	○	-	-	-	-	**AK**	-	5.20	5.20	11.49	15.16	20.00	23.52	28.85	33.01	38.07	220	560
	490.964	○	○	-	-	-	-	**AK**	-	5.80	5.80	14.36	18.95	25.00	29.40	36.07	41.26	47.59	220	560
	491.044	○	○	-	-	-	-	-	**AM**	7.25	7.25	22.97	30.31	40.00	47.04	57.71	66.02	76.15	220	560
	491.084	○	○	-	-	-	-	-	**AM**	8.15	8.15	28.72	37.89	50.00	58.80	72.14	82.53	95.18	220	560

*Only available in material 30 · B = bore diameter · E = narrowest free cross section

Continued on next page.

Axial-flow full cone nozzles
Series 490 / 491

Spray angle	Ordering no.										B Ø [mm]	E Ø [mm]	V̇ [l/min] p [bar]							Spray diameter D at p = 2 bar	
	Type	Mat. no.		Code																H = 200 mm	H = 500 mm
		1Y AISI 316L	30 Brass	1/8 BSPT	1/4 BSPT	3/8 BSPT	1/2 BSPT	3/4 BSPP	1 BSPP				0.5	1.0	2.0	3.0	5.0	7.0	10.0		
90°	**490.406**	○	○	**CA**	-	-	-	-	-		1.20	1.20	0.57	0.76	1.00	1.18	1.44	1.65	1.90	380	860
	490.446	-	○	**CA**	-	-	-	-	-		1.30	1.30	0.72	0.95	1.25	1.47	1.80	2.06	2.38	380	860
	490.486	○	○	**CA**	-	-	-	-	-		1.45	1.45	0.92	1.21	1.60	1.88	2.31	2.64	3.05	380	860
	490.526	○	○	**CA**	-	-	-	-	-		1.70	1.55	1.15	1.52	2.00	2.35	2.89	3.30	3.81	380	860
	490.566	○	○	**CA**	-	-	-	-	-		1.90	1.90	1.44	1.89	2.50	2.94	3.61	4.13	4.76	380	860
	490.606	○	○	**CA**	-	**CE**	-	-	-		2.10	2.05	1.81	2.39	3.15	3.70	4.54	5.20	6.00	380	860
	490.646	○	○	-	**CC**	**CE**	-	-	-		2.40	2.40	2.30	3.03	4.00	4.70	5.77	6.60	7.61	390	960
	490.686	○	○	-	**CC**	**CE**	-	-	-		2.70	2.70	2.87	3.79	5.00	5.88	7.21	8.25	9.52	390	960
	490.726	○	○	-	**CC**	**CE**	-	-	-		3.20	2.80	3.62	4.77	6.30	7.41	9.09	10.40	11.99	390	960
	490.746	○	○	-	-	**CE**	-	-	-		3.15	3.15	4.08	5.38	7.10	8.35	10.24	11.72	13.52	390	960
	490.766	○	○	-	-	**CE**	-	-	-		3.40	3.40	4.59	6.06	8.00	9.41	11.54	13.20	15.22	390	960
	490.806	○	○	-	-	**CE**	-	-	-		3.90	3.90	5.74	7.58	10.00	11.76	14.43	16.51	19.04	390	960
	490.846	○	○	-	-	**CE**	-	-	-		4.65	4.00	7.18	9.47	12.50	14.70	18.03	20.63	23.80	390	960
	490.886	○	○	-	-	-	**CG**	-	-		5.45	4.50	9.19	12.13	16.00	18.82	23.08	26.41	30.46	390	960
	490.926	○	○	-	-	-	**CG**	-	-		5.90	4.50	11.49	15.16	20.00	23.52	28.85	33.01	38.07	390	960
	490.966	○	○	-	-	-	CG	**AK**	-		6.55	4.85	14.36	18.95	25.00	29.40	36.07	41.26	47.59	390	960
	491.006	○	○	-	-	-	-	**AK**	-		7.55	5.50	18.09	23.87	31.50	37.05	45.45	51.99	59.97	390	960
	491.046	○	○	-	-	-	-	**AK**	-		8.60	6.60	22.97	30.31	40.00	47.04	57.71	66.02	76.15	390	960
	491.086	○	○	-	-	-	-	-	**AM**		9.45	7.25	28.72	37.89	50.00	58.80	72.14	82.53	95.18	390	960
	491.126	○	○	-	-	-	-	-	**AM**		10.40	8.00	36.18	47.75	63.00	74.09	90.89	103.98	119.93	390	960
	491.146	○	-	-	-	-	-	-	**AM**		11.00	7.50	40.78	53.81	71.00	83.50	102.43	117.19	135.16	390	960
120°	**490.368**	○	○	**CA**	-	-	-	-	-		0.85	0.65	0.36	0.48	0.63	0.74	0.91	1.04	1.20	680	1220
	490.408	○	○	**CA**	-	-	-	-	-		1.20	1.20	0.57	0.76	1.00	1.18	1.44	1.65	1.90	680	1220
	490.448	○	○	**CA**	-	-	-	-	-		1.30	1.30	0.72	0.95	1.25	1.47	1.80	2.06	2.38	680	1220
	490.488	○	○	**CA**	-	-	-	-	-		1.45	1.45	0.92	1.21	1.60	1.88	2.31	2.64	3.05	680	1220
	490.528	○	○	**CA**	-	-	-	-	-		1.70	1.70	1.15	1.52	2.00	2.35	2.89	3.30	3.81	680	1220
	490.568	○	○	**CA**	-	-	-	-	-		1.90	1.90	1.44	1.89	2.50	2.94	3.61	4.13	4.76	680	1220
	490.608	○	○	**CA**	-	-	-	-	-		2.10	2.05	1.81	2.39	3.15	3.70	4.54	5.20	6.00	680	1220
	490.648	○	○	-	**CC**	**CE**	-	-	-		2.40	2.40	2.30	3.03	4.00	4.70	5.77	6.60	7.61	680	1330
	490.688	○	○	-	**CC**	**CE**	-	-	-		2.75	2.75	2.87	3.79	5.00	5.88	7.21	8.25	9.52	680	1330
	490.728	○	○	-	**CC**	**CE**	-	-	-		3.20	2.80	3.62	4.77	6.30	7.41	9.09	10.40	11.99	680	1330
	490.748	○	○	-	-	**CE**	-	-	-		3.20	3.20	4.08	5.38	7.10	8.35	10.24	11.72	13.52	680	1330
	490.768	○	○	-	-	**CE**	-	-	-		3.45	3.45	4.59	6.44	8.00	9.41	11.54	13.20	15.22	680	1330
	490.808	○	○	-	-	**CE**	-	-	-		3.90	3.90	5.74	7.58	10.00	11.76	14.43	16.51	19.04	680	1330
	490.848	○	○	-	-	CE	-	-	-		4.70	4.00	7.18	9.47	12.50	14.70	18.03	20.63	23.80	680	1330
	490.888	○	○	-	-	-	**CG**	-	-		5.10	4.50	9.19	12.13	16.00	18.82	23.08	26.41	30.46	680	1330
	490.928	○	○	-	-	-	**CG**	-	-		5.80	4.75	11.49	15.16	20.00	23.52	28.85	33.01	38.07	680	1330
	490.968	○	○	-	-	-	CG	**AK**	-		6.65	4.85	14.36	18.95	25.00	29.40	36.07	41.26	47.59	680	1330
	491.048	○	○	-	-	-	-	**AK**	-		9.20	5.85	22.97	30.31	40.00	47.04	57.71	66.02	76.15	680	1330
	491.128	○	○	-	-	-	-	-	**AM**		10.80	7.75	36.18	47.75	63.00	74.09	90.89	103.98	119.93	680	1330
	491.148	○	-	-	-	-	-	-	**AM**		11.40	7.65	40.78	53.81	71.00	83.50	102.43	117.19	135.16	680	1330

B = bore diameter · E = narrowest free cross section

Example for ordering:	Type	+	Material no.	+	Code	=	Ordering no.
	490.406	+	**1Y**	+	**CA**	=	**490.406.1Y.CA**

Tongue-type nozzles
Special design series 600.471

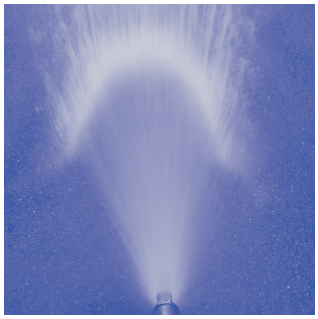
Series 600.471

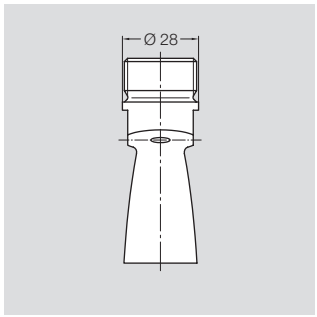
This special tongue type nozzle is often used to protect objects from fire. The geometry of the nozzles tongue produces a spray which covers objects beneath. The spray consists of **very coarse droplets** which **reduces the amount of drift.**

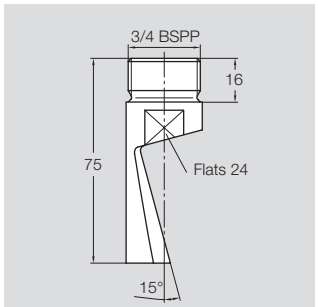
At a pressure of 8 bar the nozzle can reach a horizontal spray distance of more than 10 m. Measurement diagrams can be supplied on request.

For easy adjustment we suggest ball joints.

Applications:
Emergency cooling of Spent Fuel Pool, fire protection of objects.

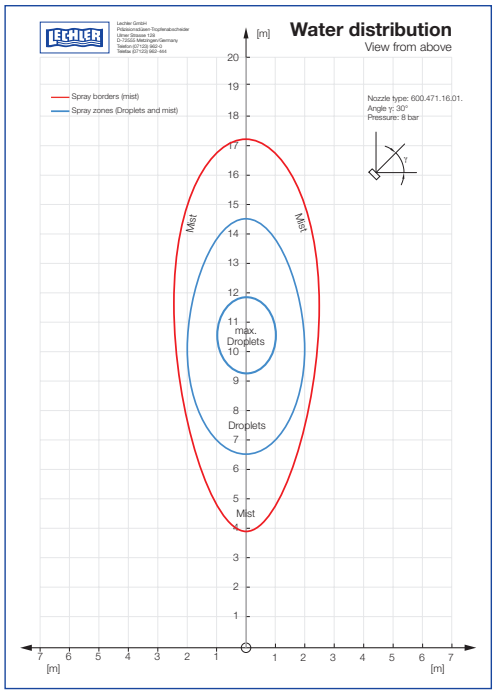






Spray angle	Ordering no. / Type	Flow rate V̇									
		p [bar] l/min					**p** [bar] m³/h				
		5	6	7	8	9	5	6	7	8	9
30°	**600.471.16.00**	31.6	34.6	37.4	40.0	42.4	1.9	2.1	2.2	2.4	2.5
45°	**600.471.16.01**	79.1	86.6	93.5	100.0	106.1	4.7	5.2	5.6	6.0	6.4

Other sizes and materials are available on request.

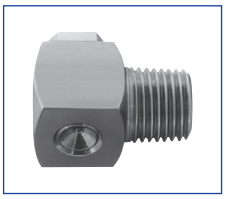


YOU WILL FIND OTHER NOZZLES FOR USE IN THE NUCLEAR INDUSTRY IN OUR STANDARD CATALOG . . .

Over the years, our catalog for precision spray nozzles and accessories has become very popular.

It contains valuable tools with comprehensive technical information about Lechler products.

Tangential-flow hollow cone nozzles	Series		V̇ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**373 „Ramp Bottom“**	70° 80° 90°	63.00 – 227.00	1 BSPP 1 1/4 BSPP 1 1/2 BSPP	Cooling and cleaning of gas, dust control, water recooling, chemical process engineering. **Longer service life thanks to the patented »ramp bottom« design of the mixing chamber.**	**2.13**

Tangential-flow full cone nozzles	Series		V̇ [l/min] at **p** = 2 bar	Connection	Application/ Design	Page
	**422**	60° 90° 120°	1.00 – 100.00	1/4 BSPT 3/8 BSPT 1/2 BSPT 3/4 BSPT 1 BSPT	Cleaning and washing process, cooling of gaseous fluids and solids, improving on chemical reactions, dust control, steam control (condensation). **Without swirl inserts, non-clogging.**	**3.12**

... AND IN DIFFERENT SPECIAL BROCHURES

We have collected information about special nozzles in their own brochures covering various subject areas that are also of particular interest to the chemical industry.

All documents can be downloaded from our web-site at www.lechler.com. We would also be happy to send you the brochures.

Brochure „Precision Spray Nozzles for Tank and Equipment Cleaning“

Brochure „Precision Spray Nozzles for the Chemical Industry“

Brochure „Precision Spray Nozzles for Surface Technology“

Brochure „Air nozzles and Accessories“

ENGINEERING
YOUR SPRAY SOLUTION

ON THE INTERNET, YOU CAN FIND EVEN MORE INFORMATION AND SUPPORT FOR YOUR WORK AT: www.lechler.com

You can also find on the Internet additional information about our entire range of services, work aids, our global presence and much more besides – we look forward to your visit.

LECHLER WORLD-WIDE

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