

ANRO SPRAY SOLUTIONS



NOZZLES FOR SPRAY DRYING

BX Series Spray dry nozzles

Spray drying is one of the most complex spraying applications in industry today. The reason for this complexity is due to the interaction of numerous factors such as dryer design, inlet air temperature and volume, feed rate, feed pressure, droplet size and droplet distribution, droplet dispersion in the dryer, as well as the liquid properties of the feedstock. All these factors determine the final quality of the dried product, particle size and distribution, solubility, density, etc.

The spray nozzle is one of the most important components in spray drying, if not the most, since it has a direct effect not only on metering the correct amount of liquid but also on droplet size, distribution, and ultimately the quality of the final product.

Our orifice inserts and cores are made from a special micron grade tungsten carbide to provide excellent corrosion and abrasion resistance.

All of our products are manufactured to the latest standards and exacting tolerances.

Spray Performance

The BX series provides a uniform hollow cone spray distribution with flow rates from 39 gallons per hour @ 500 psi up to 1508 gallons per hour @ 7000 psi and associated spray angles from 50° to 110°. High viscosity feeds do not have a significant affect on the performance.

Nozzle body and cap

The nozzle body and cap are made of stainless steel 316. The nozzle body can be attached to the feed pipe either by welding or by several thread options. The latest version is equipped with a quick coupling plug for easy removal. See page A4 for more information. The nozzle body has no internal seals, the only O-ring used is an easy to remove EPDM ring between the body and the cap.

The maximum recommended operating pressure is 7000 psi.

Cores

The cores are manufactured in one piece, eliminating the seam between core tips and bodies and thus eliminating the potential for feedstock buildup as seen in other two piece designs.

To help reduce potential feed stock build up on the sides of the core body the sides have been finished to a high surface polished.

The free floating cores maintains sanitary conditions and are provided with a tail for easy removal. The cores are laser marked for clear and easy recognition.

Orifice insert

The orifice inserts were designed to exacting tolerances for excellent feed stock control as well as lower it's susceptibility to damage. The orifice inserts are also laser marked for clear and easy recognition. The orifice inserts are easily installed in the nozzle caps by means of a small hand press.

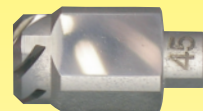
Check valve

The BXS nozzle can be equipped with an internal check valve. Standard opening/closing pressure is 75 psi, but other opening pressures are available upon request. The check valve can be installed without tools and is comprised of only two parts with the stem being of specially treated stainless or special plastic and no seals! The check valve helps eliminate build up of the feed stock.

1/4BX



C645



I540



SC645



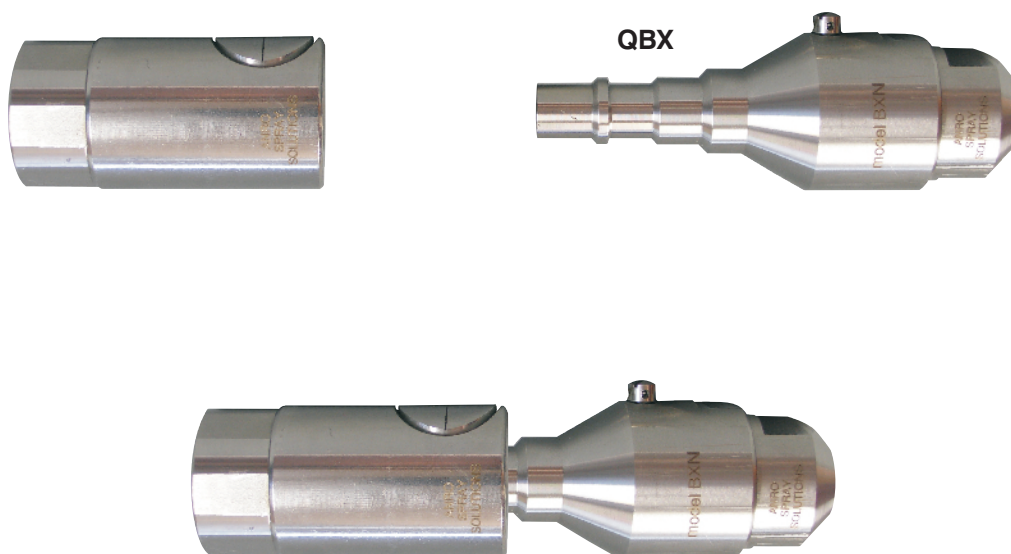
Orif.size number	Core size number	Capacity (gph) @ various pressures (psi)										Approx. sprayangle
		500	1000	1500	2000	2500	3000	3500	4000	5000	7000	
I540	(S) C 427	39	55	67	78	87	95	103	110	123	146	65°
I530	(S) C 427	43	61	74	86	96	105	114	121	136	161	70°
I520	(S) C 427	47	66	81	93	104	114	123	132	147	174	75°
I510	(S) C 427	50	71	86	100	111	122	132	141	158	187	75°
I500	(S) C 427	53	75	91	105	118	129	139	149	167	197	80°
I540	(S) C 628	53	75	92	106	119	130	141	150	168	199	60°
I490	(S) C 427	56	79	97	112	125	137	148	158	177	209	80°
I530	(S) C 628	58	83	101	117	130	143	154	165	184	218	65°
I480	(S) C 427	59	83	102	118	132	144	156	166	186	220	85°
I540	(S) C 632	63	89	109	125	140	153	166	177	198	234	50°
I520	(S) C 628	63	89	109	126	141	154	167	178	199	236	65°
I460	(S) C 427	64	90	110	128	143	156	169	180	202	239	85°
I510	(S) C 628	67	95	116	134	150	165	178	190	213	252	70°
I440	(S) C 427	69	97	119	137	154	168	182	194	217	257	90°
I530	(S) C 632	69	98	120	139	155	170	183	196	219	259	55°
I500	(S) C 628	71	100	122	141	158	173	187	200	224	265	80°
I490	(S) C 628	75	106	130	150	168	184	198	212	237	280	75°
I520	(S) C 632	76	107	131	151	169	185	200	214	239	283	60°
I420	(S) C 427	76	108	132	153	171	187	202	216	241	286	90°
I480	(S) C 628	79	111	136	157	176	192	208	222	248	294	75°
I400	(S) C 427	81	114	140	161	180	197	213	228	255	302	90°
I510	(S) C 632	81	115	141	163	182	199	215	230	257	304	60°
I520	(S) C 640	82	116	142	164	183	201	217	232	259	307	50°
I370	(S) C 427	83	117	143	165	185	203	219	234	262	310	95°
I460	(S) C 628	85	120	147	170	190	208	224	240	268	317	80°
I350	(S) C 427	85	120	147	170	190	208	224	240	268	317	95°
I500	(S) C 632	86	122	149	173	193	211	228	244	273	323	65°
I510	(S) C 640	88	125	153	177	198	217	234	250	280	331	55°
I320	(S) C 427	88	125	153	177	198	217	234	250	280	331	100°
I440	(S) C 628	91	129	158	182	204	223	241	258	288	341	80°
I490	(S) C 632	92	130	159	184	208	225	243	260	291	344	65°
I310	(S) C 427	93	131	160	185	207	227	245	262	293	347	100°
I500	(S) C 640	94	133	163	188	210	230	249	266	297	352	60°
I480	(S) C 632	97	137	168	194	217	237	256	274	306	362	60°
I300	(S) C 427	98	139	170	197	220	241	260	278	311	368	100°
I490	(S) C 640	100	142	174	201	225	246	266	284	318	376	60°
I420	(S) C 628	101	143	175	202	226	248	268	286	320	378	85°
I460	(S) C 632	105	149	182	211	236	258	279	298	333	394	70°
I480	(S) C 640	106	150	184	212	237	260	281	300	335	397	60°
I290	(S) C 427	106	150	184	212	237	260	281	300	355	397	105°
I400	(S) C 628	107	152	186	215	240	263	284	304	340	402	85°
I500	(S) C 645	111	157	192	222	248	272	294	314	351	415	55°
I370	(S) C 628	112	158	194	223	250	274	296	316	353	418	85°
I440	(S) C 632	114	161	197	228	255	279	301	322	360	426	75°
I460	(S) C 640	115	163	200	231	258	282	305	326	364	431	65°
I350	(S) C 628	116	164	201	232	259	284	307	328	367	434	90°
I320	(S) C 628	117	166	203	235	262	288	311	332	371	439	90°
I240	(S) C 427	122	172	211	243	272	298	322	344	385	455	105°
I440	(S) C 640	122	173	212	245	274	300	324	346	387	458	65°
I480	(S) C 645	126	178	218	252	281	308	333	356	398	471	55°
I310	(S) C 628	127	179	219	253	283	310	335	358	400	474	90°
I420	(S) C 632	127	179	219	253	283	310	335	358	400	474	75°
I490	(S) C 650	127	180	220	255	285	312	337	360	402	476	50°
I200	(S) C 427	132	187	229	264	296	324	350	374	418	495	110°
I300	(S) C 628	136	192	235	272	304	333	359	384	429	508	95°
I480	(S) C 650	136	193	236	273	305	334	361	386	432	511	50°
I400	(S) C 632	136	193	236	273	305	334	361	386	432	511	75°
I460	(S) C 645	141	199	244	281	315	345	372	398	445	527	60°
I420	(S) C 640	141	199	244	281	315	345	372	398	445	527	70°
I370	(S) C 632	143	202	247	286	319	350	378	404	452	534	80°
I290	(S) C 628	146	206	252	291	326	357	385	412	461	545	95°
I350	(S) C 632	148	209	256	296	330	362	391	418	467	553	80°

Orif.size number	Core size number	Capacity (gph) @ various pressures (psi)										Approx. sprayangle
		50	75	100	150	200	250	300	350	400	450	
I460	(S) C 650	150	212	260	300	335	367	397	424	474	561	50°
I400	(S) C 640	152	215	263	304	340	372	402	430	481	569	70°
I440	(S) C 645	154	218	267	308	345	378	408	436	487	577	60°
I320	(S) C 632	154	218	267	308	345	378	408	436	487	577	80°
I270	(S) C 628	158	223	273	315	353	386	417	446	499	590	95°
I310	(S) C 632	161	228	279	322	360	395	427	456	510	603	85°
I370	(S) C 640	163	231	283	327	365	400	432	462	517	611	75°
I440	(S) C 650	167	236	289	334	373	409	442	472	528	624	55°
I240	(S) C 628	170	240	294	339	379	416	449	480	537	635	100°
I350	(S) C 640	170	241	295	341	381	417	451	482	539	638	75°
I420	(S) C 645	175	247	303	349	391	428	462	494	552	654	65°
I300	(S) C 632	180	255	312	361	403	442	477	510	570	675	85°
I320	(S) C 640	184	260	318	368	411	450	486	520	581	688	75°
I200	(S) C 628	186	263	322	372	416	456	492	526	588	696	100°
I420	(S) C 650	188	266	326	376	421	461	498	532	595	704	55°
I400	(S) C 645	190	269	329	380	425	466	503	538	602	712	65°
I310	(S) C 640	194	275	337	389	435	476	514	550	615	728	80°
I290	(S) C 632	194	275	337	389	435	476	514	550	615	728	85°
I400	(S) C 650	204	288	353	407	455	499	539	576	644	762	60°
I370	(S) C 645	206	291	356	412	460	504	544	582	651	770	70°
I270	(S) C 632	213	301	369	426	476	521	563	602	673	796	90°
I350	(S) C 645	215	304	372	430	481	527	569	608	680	804	70°
I300	(S) C 640	215	304	372	430	481	527	569	608	680	804	80°
I370	(S) C 650	216	306	375	433	484	530	572	612	684	810	75°
I320	(S) C 645	228	322	394	455	509	558	602	644	720	852	70°
I240	(S) C 632	228	322	394	455	509	558	602	644	720	852	90°
I350	(S) C 650	229	324	397	458	512	561	606	648	724	857	75°
I290	(S) C 640	235	332	407	470	525	575	621	664	742	878	80°
I310	(S) C 645	242	342	419	484	541	592	640	684	765	905	70°
I320	(S) C 650	247	349	427	494	552	604	653	698	780	923	65°
I200	(S) C 632	248	351	430	496	555	608	657	702	785	929	90°
I270	(S) C 640	252	357	437	505	564	618	668	714	798	945	85°
I310	(S) C 650	260	367	449	519	580	636	687	734	821	971	65°
I300	(S) C 645	268	379	464	536	599	656	709	758	847	1003	75°
I240	(S) C 640	270	382	468	540	604	662	715	764	854	1011	85°
I290	(S) C 645	288	408	500	577	645	707	763	816	912	1079	75°
I300	(S) C 650	290	410	502	580	648	710	767	820	917	1085	65°
I200	(S) C 640	295	417	511	590	659	722	780	834	932	1103	85°
I290	(S) C 650	312	441	540	624	697	764	825	882	986	1167	65°
I270	(S) C 645	315	446	546	631	705	772	834	892	997	1180	75°
I270	(S) C 650	339	480	588	679	759	831	898	960	1073	1270	70°
I240	(S) C 645	340	481	589	680	761	833	900	962	1076	1273	75°
I270	(S) C 645	340	481	589	680	761	833	900	962	1076	1273	75°
I240	(S) C 650	366	517	633	731	817	895	967	1034	1156	1368	80°
I200	(S) C 645	368	521	638	737	824	902	975	1042	1165	1378	80°
I200	(S) C 650	403	570	698	806	901	987	1066	1140	1275	1508	70°

All tables are based on water at room temperature.

How to order

Ordering a complete nozzle	B1/4 BXI490/C628-T bspt female conn. model orifice insert core tailless
Ordering a complete nozzle	QBXS1500/SC632P quick release model orifice insert core polished
Ordering a core	SC640-P core number of slots size no. polished
Ordering an orifice insert	I540 size no.



Quick release couplings

Model Q is equipped with a male quick coupling plug which fits several female quick coupling sockets and has a working pressure up to 5000 psi. To release the nozzle just simply press the button on the side. The female quick sockets are available in two types, unvalved or single valved versions. The single valve automatically shuts off the liquid feed keeping it from dripping when disconnecting. Both quick sockets are equipped with EPDM seals.

Valved sockets		
	end connection	partnumbers
Female thread	3/8" BSP	RBE11.1102/IC/HPI/JE/OD
	1/2" BSP	RBE11.1103/IC/HPI/JE/OD
	3/4" BSP	RBE11.1104/IC/HPI/JE/OD
	3/8" NPT	RBE11.1202/IC/HPI/JE/OD
	1/2" NPT	RBE11.1203/IC/HPI/JE/OD
	3/4" NPT	RBE11.1204/IC/HPI/JE/OD
	end connection	partnumbers
Male thread	3/8" BSP	RBE11.1152/IC/HPI/JE/OD
	1/2" BSP	RBE11.1153/IC/HPI/JE/OD
	3/4" BSP	RBE11.1154/IC/HPI/JE/OD
	3/8" NPT	RBE11.1252/IC/HPI/JE/OD
	1/2" NPT	RBE11.1253/IC/HPI/JE/OD
	3/4" NPT	RBE11.1254/IC/HPI/JE/OD

Unvalved sockets		
	end connection	partnumbers
Female thread	3/8" BSP	RBE11.1102/IC/HPI/JE/OS
	1/2" BSP	RBE11.1103/IC/HPI/JE/OS
	3/4" BSP	RBE11.1104/IC/HPI/JE/OS
	3/8" NPT	RBE11.1202/IC/HPI/JE/OS
	1/2" NPT	RBE11.1203/IC/HPI/JE/OS
	3/4" NPT	RBE11.1204/IC/HPI/JE/OS
	end connection	partnumbers
Male thread	3/8" BSP	RBE11.1152/IC/HPI/JE/OS
	1/2" BSP	RBE11.1153/IC/HPI/JE/OS
	3/4" BSP	RBE11.1154/IC/HPI/JE/OS
	3/8" NPT	RBE11.1252/IC/HPI/JE/OS
	1/2" NPT	RBE11.1253/IC/HPI/JE/OS
	3/4" NPT	RBE11.1254/IC/HPI/JE/OS

Orifice gauge

The orifice gauges are available in a wide variety of sizes, and consist of two gauge pins with an accuracy of 1 micron. One gauge pin determines the size of a new or still usable orifice, while the other side indicates if excessive orifice wear has occurred. These gauges require no skills and one can calibrate an orifice very quickly. The pins are made from corrosion and wear resistant materials.



Orif. ins.	Ø in inches	Orif. ins.	Ø in inches	Orif. ins.	Ø in inches	Orif. ins.	Ø in inches
I200	0.161"	I310	0.120"	I420	0.094"	I500	0.070"
I240	0.152"	I320	0.116"	I440	0.086"	I510	0.067"
I270	.0144"	I350	0.120"	I460	0.085"	I520	0.063"
I290	0.136"	I370	0.104"	I480	0.076"	I530	0.059"
I300	0.129"	I400	0.098"	I490	0.073"	I540	0.055"

Core number	Number of slots	Slot sizes
C427	4	0.025"
C628	6	0.025"
C632	6	0.032"
C640	6	0.042"
C645	6	0.045"
C650	6	0.051"

BXP Handpress

The specially designed stainless steel handpress not only saves time but also helps prevent damage to the tungsten carbide orifice inserts and doubles as a tool for the orifice insert removal. The BXP handpress is equipped with a special tool holder and convenient mounting holes in the base to secure it to most work surfaces.



Useful formulas

To determine the flow rate based on water use the following formula:

$$\frac{\text{capacity}_1}{\text{capacity}_2} = \frac{\sqrt{\text{pressure}_1}}{\sqrt{\text{pressure}_2}}$$

To calculate the estimate flow rates of liquids other than water you can use the following table:

Specific gravity	0,90	0,95	1,00	1,05	1,110	1,15	1,20	1,25	1,30	1,35	1,40	1,45
Multiply factor	1,054	1,026	1,000	0,976	0,953	0,933	0,913	0,894	0,877	0,861	0,845	0,830

Or use the following formula:

$$\text{capacity} = \text{capacity H}_2\text{O} \times \frac{1}{\sqrt{\text{specific gravity}}}$$