DBS. MANUFACTURING

LOW SPEED AERATORS | NSA SERIES



dbsmfg.com

OVERVIEW

With over 40 years of experience in designing and building aerators, DBS will provide you with the right solution for every application. Our NSA low-speed aerators are cost competitive with and at least 30% more efficient than high-speed aerators. In many cases, the energy cost savings will pay back the investment made in a DBS aerator.

SURFACE AERATORS

Surface mechanical aerators fall into two categories:

- High-speed aerators use an electric motor to directly drive an impeller that pumps water up and sprays it out horizontally. While this design is inexpensive, it has low oxygen transfer efficiency because the pump impeller wastes significant energy by moving water faster than needed.
- Low-speed aerators are more efficient because the rotor operates nearer the optimum aeration speed. But they are more expensive because they require a gearbox to reduce motor speed to turn a large diameter aeration rotor. This gearbox is

typically mounted a few feet above the rotor and requires a larger shaft with substantial support bearings.

DBS NSA AERATORS

Before DBS introduced the NSA, a user had to weigh the long-term power savings of the low-speed, highefficiency aerator against the initial capital savings of the high-speed, low-efficiency aerator. Now the DBS NSA low-speed aerator provides high efficiency at a lower cost. The power savings can be significant, up to 20% to 30% or more.



NSA TECHNICAL FEATURES

NSA Aerators are designed to provide the efficiency of low-speed aerators with the cost savings of high-speed aerators.



GEARBOX

The NSA aerator uses a planetary gearbox to drive the aerator rotor. This mass-produced gearbox offers an excellent power/cost ratio. The gearbox is uniquely mounted directly in the aerator rotor, which provides a number of benefits:

- The gearbox operates partially submerged. Water flowing through the impeller cools the gearbox to near ambient temperature, allowing longer oil life.
- The gearbox directly drives the rotor preventing inherent driveshaft vibration problems common in traditional low-speed aerators.

The gearbox and rotor assembly is attached to the electric motor by a "torque tube," which flexes laterally to dampen shocks caused by wave impact on the rotor.

ROTOR

The NSA features a traditional high-efficiency backward-curved radial blade rotor or a DBS dynamic draft tube (DDT) rotor.



DBS offers floating aerators from 7.5 HP to 200 HP to match any aeration requirement.





MODEL	HORSE POWER	SERVICE FACTOR ¹	02/HOUR ²	ØA 1800 RPM INPUT	ØA 1500 RPM INPUT	В	ØC	WEIGHT	
	HP KW	50hz 60hz	LB KG	IN MM	IN MM	IN MM	IN MM	LB KG	
NSA1-08	7.5 5.6	6.97 8.41	26 12	42 1,067	46 1,168	98 2,489	38 965	1,047 475	
NSA1-10	10 7.5	5.22 6.3	35 16	46 1,168	49 1,245	98 2,489	38 965	1,112 504	
NSA1-15	15 11	3.48 4.20	53 24	49 1,245	52 1,321	98 2,489	38 965	1,203 546	
NSA1-20	20 15	2.61 3.15	70 32	52 1,321	57 1,448	98 2,489	38 965	1,253 568	
NSA2-25	25 19	2.95 3.57	88 40	68 1,727	74 1,880	240 6,096	40 1,016	1,960 889	
NSA2-30	30 22	2.46 2.97	105 48	72 1,829	78 1,981	240 6,096	40 1,016	2,100 952	
NSA3-30	30 22	4.23 5.11	105 48	76 1,930	83 2,108	240 6,096	46 1,168	2,558 1,160	
NSA3-40	40 30	3.17 3.83	140 63	80 2,032	86 2,184	240 6,096	46 1,168	2,682 1,216	
NSA3-50	50 37	2.54 3.06	175 79	86 2,184	96 2,438	240 6,096	46 1,168	3,046 1,381	
NSA3-60	60 45	2.12 2.55	210 95	88 2,235	99 2,515	240 6,096	46 1,168	3,264 1,480	
NSA3-75	75 56	NR 2.04	263 119	91 2,311	NR NR	240 6,096	46 1,168	3,500 1,587	
NSA4-75	75 56	3.95 4.76	263 119	116 2,946	122 3,099	300 7,620	60 1,524	6,520 2,957	
NSA4-100	100 75	3.59 2.97	350 159	122 3,099	130 3,302	300 7,620	60 1,524	6,847 3,105	
NSA4-125	125 93	2.37 2.86	438 198	130 3,302	136 3,454	300 7,620	60 1,524	7,200 3,265	
NSA4-150	150 112	1.97 2.38	525 238	136 3,454	144 3,658	300 7,620	60 1,524	7,700 3,492	
NSA5-200	200 149	2.23 2.69	700 317	144 3,658	165 4,191	300 7,620	60 1,524	8,400 3,810	
1. Minimum recommended service factor is 1.8									

At 1.0 service factor, gears have a theoretical infinite life.

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NR Not recommended.

BRIDGE-MOUNTED NSA AERATOR

DBS offers bridge mounted aerators from 7.5 HP to 300 HP to match any aeration requirement.



MODEL	HORSE POWER	SERVICE FACTOR ¹	02/HOUR ²	ØA 1800 RPM INPUT	ØA 1500 RPM INPUT	B³	WEIGHT	
	HP KW	50hz 60hz	LB KG	IN MM	IN MM	IN MM	LB KG	
NSA1-08B	7.5 5.6	6.97 8.41	26 12	42 1,067	46 1,168	13 330	659 299	
NSA1-10B	10 7.5	5.22 6.30	35 16	46 1,168	49 1,245	13 330	724 328	
NSA1-15B	15 11	3.48 4.20	53 24	49 1,245	52 1,321	13 330	815 370	
NSA1-20B	20 15	2.61 3.15	70 32	52 1,321	57 1,448	13 330	865 392	
NSA2-25B	25 19	2.95 3.57	88 40	68 1,727	74 1,880	19 483	1,515 687	
NSA2-30B	30 22	2.46 2.97	105 48	72 1,829	78 1,981	19 483	1,655 751	
NSA3-30B	30 22	4.23 5.11	105 48	76 1,930	83 2,108	19 483	2,113 958	
NSA3-40B	40 30	3.17 3.83	140 63	80 2,032	86 2,184	19 483	2,237 1,015	
NSA3-50B	50 37	2.54 3.06	175 79	86 2,184	96 2,438	19 483	2,237 1,015	
NSA3-60B	60 45	2.12 2.55	210 95	88 2,235	99 2,515	19 483	2,605 1,181	
NSA3-75B	75 56	NR 2.04	263 119	91 2,311	NR NR	19 483	2,742 1,244	
NSA4-75B	75 56	3.95 4.76	263 119	116 2,946	122 3,099	28 711	4,804 2,179	
NSA4-100B	100 75	2.96 3.57	350 159	122 3,099	130 3,302	28 711	5,131 2,327	
NSA4-125B	125 93	2.37 2.86	438 198	130 3,302	136 3,454	28 711	5,484 2,487	
NSA4-150B	150 112	1.97 2.38	525 238	136 3,454	144 3,658	28 711	6,148 2,788	
NSA5-200B	200 149	2.23 2.69	700 317	144 3,658	165 4,191	28 711	6,988 3,169	
NSA5-250B	250 186	1.78 2.15	875 397	156 3,962	177 4,496	28 711	7,683 3,484	
NSA5-300B	300 224	NR 1.79	1 050 476	165 4 191	NR NR	28 711	7 950 3 605	

1 Minimum recommended service factor is 1.8.

At 1.0 service factor, gears have a theoretical infinite life.

3 Bridge platform must have a hole larger than B dimension for installation.

NR Not recommended.

2 Under standard conditions. Performance under field conditions may vary.

DBS DYNAMIC DRAFT TUBE **AERATOR ROTOR**

The Dynamic Draft Tube (DDT) Aerator combines two proven aeration devices: the low speed surface aerator and the draft tube, into one unique, efficient device.

DESCRIPTION

For decades, low speed surface aeration rotors have pumped water from beneath the rotor and sprayed it on the surface to mix with air. However, the suction effect of surface aerators is usually limited to 15 feet (4.5 M). To increase the effective working depth, draft tubes below the surface aerator concentrate the aerator's suction deeper into the tank or basin.

BENEFITS

By combining the aeration rotor and draft tube, the DDT draws 100% of its water from the bottom of the ditch or tank eliminating any possibility of short circuiting. No matter how deep the ditch or tank, the DDT will ensure a continuous flow from top to bottom, and the rotating draft tube will efficiently mix water down to the depth of the draft tube.

DDT DBS AERATOR ROTOR

The DDT Aerator Rotor consumes 30+% less power than the standard aerator rotor while providing equal dissolved oxygen levels. Even with less power consumption, the wave (outward flow) action of the DDT rotor is stronger, as evident by the foam pushed further out.



Standard DBS AERATOR ROTOR







DBS DYNAMIC DRAFT TUBE AERATOR ROTOR

The DDT design offers high-aeration efficiency and uniform flow of water for deep oxidation ditches 20 feet (6 M) or more in depth. The DDT rotors can operate in aeration basins at the same depth as fine bubble diffusers 25-30 feet (6-9 M).



MODEL	HORSEPO	WER	02/	HOUR ¹	ROTOR D	IAMETER	DRAFT TUBE DIAMETER		
	НР	KW	LB	KG	IN	ММ	IN	ММ	
NSD1-10	10	7.5	42	19	42	1,067	24	610	
NSD1-15	15 1	11	63	29	48	1,219	30	762	
NSD1-20	20 1	15	84	38	48	1,219	30	762	
NSD2-25	25	19	105	48	64	1,626	40	1,016	
NSD2-30	30 2	22	126	57	64	1,626	40	1,016	
NSD3-40	40 2	20	168	76	74	1,880	50	1,270	
NSD3-50	50 3	37	210	95	74	1,880	50	1,270	
NSD3-60	60 4	45	252	114	88	2,235	60	1,524	
NSD3-75	75 5	56	315	143	88	2,235	60	1,524	
NSD4-100	100 7	75	420	190	116	2,946	80	2,032	
NSD4-125	125 9	93	525	238	116	2,946	80	2,032	
NSD4-150	150 11	12	630	285	130	3,302	90	2,286	
NSD5-200	200 14	49	840	381	144	3,658	104	2,642	
NSD5-250	250 18	86	1,050	457	156	3,962	112	2,844	
NSD5-300	300 22	25	1,260	571	160	4,064	120	3,048	

1 Under standard conditions. Performance under field conditions may vary.



FLOATING NSA AERATOR MOORING OPTIONS

The key to mooring success is careful planning and engineering based on water level fluctuation, mooring distance, weather conditions and aeration basin design.

> The mooring accessories listed below are the minimum requirements for normal applications. You should also adhere to applicable local, state and federal guidelines. Avoid any possibility of tangling the mooring cable in the rotor or rubbing and wearing damage to the cable. Make sure

the entire length of the mooring cable is visible. Use floats when the mooring cable is long. Three-cable mooring is preferred if the water level is stable. Two-cable mooring can better compensate for water level fluctuation, but the aerator tends to drift sideways when the mooring cables are long.

MOORING OPTIONS





Shore Mooring

A two-cable mooring system can be used when the aerator is close to shore. The minimum cable length is 10 feet (3 meters) plus the amount of water fluctuation squared.

Post Mooring

In large lagoons where distances prohibit mooring to shore, posts can be used for anchoring. The cable length can be calculated the same as for shore moorings.

Bottom Mooring

If the mooring point is at the bottom of the basin, the mooring point and the trace of the mooring line must be flagged with floats. The minimum cable length is four times the basin depth plus the water fluctuation squared.

Direct Post Mooring

The arms of a floating aerator can be directly tied to the mooring posts, as long as a sliding mechanism is placed to compensate for water level changes.



FLOATING NSA AERATOR MOORING OPTIONS

DBS Floating NSA Aerators have several mooring options depending on the type of anchoring required, such as shore, post or bottom mooring.





COMI ONENTS	10100				JIINCKLL						
Specification	HIGH FLEX 304 STAINLESS STEEL, 7 X 19 CABLE			STAINLESS STEEL	STAINLESS STEEL						
Picture			† 1			•			F◄		
Kaulaniahlan		D	BREAKIN	G STRENGTH		S WORKLOAD LIMIT		TEST	FORCE		
		IN MM	LBS	Ν		IN	мм	LBS	Ν	LBS	Ν
NS	A1	0.19 5	3,700	16,444		0.38	10	2,000	8,889	1,300	5,778
Minimum NS	A2	0.25 7	6,400	28,444		0.38	10	2,000	8,889	4,000	17,778
Recommendations NS	A3	0.25 7	6,400	28,444	For proper	0.50	13	4,000	17,778	4,500	20,000
NS	A4:75-125	0.31 8	9,000	40,000	cable size	0.63	16	6,000	26,667	10,000	44,444
NS	A4:150 & up	0.38 10	12,000	53,333		0.75	20	8,500	37,778	14,000	62,222

1 Under standard conditions. Performance under field conditions may vary.

DBS "RACETRACK" OXIDATION DITCH

Oxidation ditches have proven to be efficient, economical wastewater treatment systems for decades. DBS Manufacturing Inc., has improved upon this technology by incorporating their new DBS Aerator.

DESCRIPTION

DBS Racetrack Oxidation Ditches are powered by the patented NSA low-speed aerator that provides high efficiency and long life at a substantially lower cost than competitive aerators. Plus, maintenance parts are available worldwide.

Equipped with DBS stainless steel high-efficiency backward curved aeration rotors, DBS Racetrack

Oxidation Ditch aerators maximize pumping rate for superior mixing and aeration.

The DBS Racetrack Oxidation Ditch not only offers guaranteed performance for the mechanical equipment, but also for the biological process and ditch velocity.



DBS Racetrack OXIDATION DITCH

LOW SPEED AERATORS AEROBIC DIGESTORS – LAGOON AERATION

DBS Floating Aerators are ideal for lagoon and aerobic digester applications because their compact design makes these units easy to assemble and install.



DESCRIPTION

All wetted parts such as the aeration rotor, float arm lower link, and float hardware are made from corrosion resistant stainless steel for long life and reliability. The flexibility of the DBS stainless steel mooring winch

may significantly benefit lagoon applications. Two winches make easy work of moving the DBS aerator across the lagoon to maximize mixing efficiency.



Post Mounted AERATOR



Floating Aerator WITH WINCH

ORDERING INFORMATION

DBS offers several options for our NSA Low Speed Aerators. Contact DBS or a DBS representative for assistance in deciding your equipment requirements.



NSA LOW SPEED AERATOR MODEL OPTIONS											
	ROTO	GEARBOX			HORSE	POWER	MOUNTING				
NSA Aerator				S							
	CODE		CODE	RATIO	MAX HP	CODE	HP	CODE	MOUNTING		
	А	D	1	21.1:1	20	08	7.5	В	Bridge		
	Standard	Backwards	2	24.9:1	30	10	10	Omit	Floating		
	backwards	curved	3	29:1	75	15	15				
	curved	rotor with	4	38.9:1	150	20	20				
	rotor	dynamic	5	41.26:1	300	25	25	_			
		draft tube				30	30				
						40	40				
						50	50				
						60	60				
						75	75				
						100	100				
						125	125				
						150	150				
						200	200				
						250	250				
						300	300				

EXAMPLE: MODEL NSA5-300B is for an Aerator with a standard backward-curved rotor, size 5 gearbox, 300 HP electric motor, bridge mounting.

OPTIONS

- Stainless steel construction
- Special coating
- Maintenance platform
- Low oil level switch

dbsmfg.com



LOW SPEED | AERATORS NSA SERIES MODELNSA5-300B CLARIFIER & THICKENER DRIVES

RETROFITS

LOW-SPEED SURFACE AERATORS

ROTARY DISTRIBUTOR CENTER MECHANISMS

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