

Water Jetting Accessory Catalog

Hundreds of high-pressure accessories — up to 40,000 psi (2,800 bar)



The Leader in High-Pressure Water Jet Technology

Water jet accessories for virtually any job

If you have an application for high-pressure water jets, you've come to the right place. After 40 years of helping customers harness the power of water jetting, this catalog is NLB's most comprehensive yet.

NLB is a global water jet leader, with the industry's widest range of pumps (a great selection of pressures, flows and horsepower), accessories and customer support. We are known for:

- Top-quality equipment
- Convenient regional branches and international distributors
- Experienced application engineering
- Readily available spare parts
- Factory-trained service (always on-call)
- Product and safety training
- Purchase, lease and rental programs

From engineering through manufacturing (all done at our Wixom, Michigan headquarters), the

NLB focus is on making the most productive, reliable equipment you can buy. And every item must pass rigorous testing before it is approved for shipment.

In each section of this catalog (indexed on the preceding page), you will find product photos, specifications and details of key features. For further information, or to consult on an application, we invite you to call us at 248-624-5555. You can also find a lot of helpful information at our website, www.nlbcorp.com.

Thank you for your interest in NLB water jetting accessories. We hope to be your preferred supplier for many, many years.



DUE TO NLB'S CONTINUING PROGRAM OF PRODUCT IMPROVEMENT, SPECIFICATIONS IN THIS CATALOG ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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Field-Repairable!

Accessories with NLB's 60-second cartridge change are indicated by this symbol.

NLB quality to match your pressure and flow requirements



NLB pumps have set the standard for performance and reliability since 1971. Our triplex and quintuplex plunger models operate at low rpm to minimize wear and simplify maintenance. These proven designs are regularly updated with the latest materials and features to keep operating costs as low as possible.

Units for any application, up to 40,000 psi (2,800 bar)

With 41 units to choose from — 27 of them convertible to different pressures and flows — NLB pumps can handle just about any application you throw at them. Many are available with either a hard-working diesel engine (trailer-mounted for easy towing to job sites) or an energy-efficient electric motor. Either way, you get:

- **97% operating efficiency** - Advanced engineering means minimal turbulence and 97% efficiency at 10,000 psi (700 bar).



- **Long-life materials** - Valves and more are precision-machined of high-grade stainless steel, and hard-coated for durability.
- **Simple maintenance** - Time-saving features include 5-minute packing change.
- **Rebuild to extend ROI** - After 20,000 hours, some pumps are done for. Ours are designed to be rebuilt and keep on working. You can see the entire range of NLB units — with pressure, flow and horsepower data — on Pages 6-11.

Replacement pumps, too

NLB pumps are built for continuous, trouble-free operation, using a simple design proven in countless applications over more than four decades. Their mechanical efficiency is simply outstanding. One reason is a heavy-duty power frame that provides stability, gravity lubrication, and easy access to take out packing and plungers for inspection... without removing the stuffing box.

Although these pumps were designed for NLB units, they also make great replacements when pumps wear out in other manufacturers' units. A selection of available pumps is shown on Page 11.

NLB convertible units: top quality with flexibility

NLB is known for the quality of its high-pressure and ultra-high pressure water jet pump units. These include 27 models that you can convert to different operating pressures without a manifold change — you simply change the

cartidge, which usually takes less than 20 minutes.

Our convertible units operate at pressures from 4,000 psi to 40,000 psi (275-2,800 bar). Choose the level of power that best suits your needs,

from 60 hp to 600 hp (45 kW to 450 kW). They have a high degree of commonality — the 125, for example, is a smaller version of the 225, 325 and 605 — and few parts. All are easy to operate and maintain, too.



20-Minute Conversion Kit



- 1 Field-repairable by-pass valve** - The BV series compensates for pressure changes, and doesn't need changing to convert the fluid end.
- 2 Heavy-duty fenders** - Bolt-on fenders are gusseted for extra support, and meet ICC regulations.
- 3 Smooth ride** - Rugged NLB trailers are designed to keep your unit from bouncing, and for easy hook-up and towing.
- 4 DOT-certified lights** - Trailer lights have all wiring protected inside conduit.

- 5 Rugged axles** - Count on our heavy-duty axles to last for years, with grease zerks for easy lubrication.
- 6 Low-rpm for less wear** - Pump runs 100 rpm slower, on average, to generate the same flow with much less wear.
- 7 Extra-secure manifold** - Discharge manifold is held by 12 fasteners (50% more than other pumps), all torqued for security.
- 8 Rugged frame plate** - Solid stainless steel is more durable than castings, separate from the power end (should it ever need replacing) and double-ported.

- 9 Corrosion-resistant piping** - All inlet piping is brass or stainless steel, not galvanized, to eliminate rust.
- 10 Fast freeze protection** - A single gallon of anti-freeze protects the entire unit.
- 11 Dependable clutch** - Brand-name clutch can be serviced at any Cummins or Twin Disc dealer... if it's ever necessary.
- 12 Single throttle control** - One control handles all pressures, and is easy to maintain.

The world's biggest range of

The following tables provide key specifications to help you choose a high-pressure or UHP pump unit for your job. For full details, please contact NLB. Since we are

continuously upgrading and developing new models, specifications may be subject to change.



125 SERIES DIESEL

Model	gpm	lpm	psi	bar		
Model 145 - 145 hp (108 kW)						
6145D	32.5	123	6,000	415	Plunger Kit	Conversion Kit
8145D	24.5	93	8,000	550		
10145D	19.5	74	10,000	700		
15145D	13	49	15,000	1,035	Plunger Kit	
20145D	10	38	20,000	1,400		
24145D	8	30	24,000	1,680		
Model 125 - 125 hp (93 kW)						
6125D	29	110	6,000	415	Plunger Kit	Conversion Kit
8125D	22	83	8,000	550		
10125D	17.5	66	10,000	700		
15125D	12	45	15,000	1,035	Plunger Kit	
20125D	9	34	20,000	1,400		
24125D	7.5	28	24,000	1,680		
Model 115 - 115 hp (86 kW)						
6115D	26	98	6,000	415	Plunger Kit	Conversion Kit
8115D	19.5	74	8,000	550		
10115D	15.5	59	10,000	700		
15115D	10.5	40	15,000	1,035	Plunger Kit	
20115D	8	30	20,000	1,400		
24115D	6.5	25	24,000	1,680		



125 SERIES ELECTRIC

Model	gpm	lpm	psi	bar		
Model 125 - 125 hp (93 kW)						
6125E	32.5	123	6,000	415	Plunger Kit	Conversion Kit
8125E	24.5	93	8,000	550		
10125E	19.5	74	10,000	700		
15125E	13	49	15,000	1,035	Plunger Kit	
20125E	10	38	20,000	1,400		
24125E	8	30	24,000	1,680		
Model 105 - 100 hp (75 kW)						
6105E	28	106	6,000	415	Plunger Kit	Conversion Kit
8105E	20.5	77.5	8,000	550		
10105E	16	60.5	10,000	700		
15105E	11	41.5	15,000	1,035	Plunger Kit	
20105E	8.5	32	20,000	1,400		
24105E	7	26.5	24,000	1,680		
Model 75 - 75 hp (60 kW)						
675E	20	76	6,000	415	Plunger Kit	Conversion Kit
875E	16	60	8,000	550		
1075E	12	45	10,000	700		
1575E	9	34	15,000	1,035	Plunger Kit	
2075E	6.5	24	20,000	1,400		
2475E	5.5	21	24,000	1,680		
Model 60 - 60 hp (45 kW)						
660E	15	57	6,000	415	Plunger Kit	Conversion Kit
860E	12.5	47	8,000	550		
1060E	10	38	10,000	700		
1560E	6.75	25	15,000	1,035	Plunger Kit	
2060E	5	19	20,000	1,400		
2460E	4	15	24,000	1,680		

water jet pump units



225 SERIES DIESEL

Model	gpm	lpm	psi	bar		
Model 305 - 300 hp (224 kW)						
8305D	54	204	8,000	550	Plunger Kit	Conversion Kit
10305D	43	163	10,000	700		
12305D	36	136	12,000	840		
15305D	29	110	15,000	1,035		
20305D	22	83	20,000	1,400	Plunger Kit	
24305D	18	68	24,000	1,680		
35305D	13	47	35,000	2,450		
40305D	10	38	40,000	2,800		
Model 275 - 275 hp (205 kW)						
8275D	44	167	8,000	550	Plunger Kit	Conversion Kit
10275D	38	142	10,000	700		
12275D	32	120	12,000	840		
15275D	25	94	15,000	1,035		
20275D	20	75	20,000	1,400	Plunger Kit	
24275D	16	60	24,000	1,680		
35275D	11	41	35,000	2,450		
40275D	9	34	40,000	2,800		
Model 235 - 235 hp (172 kW)						
4235D	82	310	4,000	275	Plunger Kit	
5235D	66	250	5,000	345		
6235D	55	208	6,000	415		
8235D	38	144	8,000	550		
10235D	34	128	10,000	700	Plunger Kit	Conversion Kit
12235D	29	110	12,000	840		
15235D	21	79	15,000	1,035		
20235D	17	64	20,000	1,400		
24235D	13	49	24,000	1,680	Plunger Kit	
35235D	10	36	35,000	2,450		
40235D	8	30	40,000	2,800		
Model 215 - 200 hp (149 kW)						
4215D	62	235	4,000	275	Plunger Kit	
5215D	50	189	5,000	345		
6215D	41	155	6,000	415		
8215D	29	110	8,000	550		
10215D	25	94	10,000	700	Plunger Kit	Conversion Kit
12215D	19	71	12,000	840		
15215D	16	60	15,000	1,035		
20215D	13	49	20,000	1,400		
24215D	10	38	24,000	1,680	Plunger Kit	
35150D	7	27	35,000	2,450		
40215D	6	23	40,000	2,800		



225 SERIES ELECTRIC

Model	gpm	lpm	psi	bar		
Model 225 - 250 hp (186 kW)						
8225E	44	167	8,000	550	Plunger Kit	Conversion Kit
10225E	38	142	10,000	700		
12225E	32	120	12,000	840		
15225E	25	94	15,000	1,035	Plunger Kit	
20225E	20	75	20,000	1,400		
24225E	16	60	24,000	1,680		
35225E	11	41	35,000	2,450		
40225E	9	34	40,000	2,800		
Model 205 - 200 hp (149 kW)						
4205E	82	310	4,000	275	Plunger Kit	
5205E	66	250	5,000	345		
6205E	55	208	6,000	415		
8205E	38	144	8,000	550	Plunger Kit	Conversion Kit
10205E	34	128	10,000	700		
12205E	28	105	12,000	840		
15205E	22	83	15,000	1,035	Plunger Kit	
20205E	17	64	20,000	1,400		
24205E	13	49	24,000	1,680		
35205E	10	36	35,000	2,450		
40205E	8	30	40,000	2,800		
Model 155 - 150 hp (112 kW)						
4155E	62	235	4,000	275	Plunger Kit	
5155E	50	189	5,000	345		
6155E	41	155	6,000	415		
8155E	29	110	8,000	550	Plunger Kit	Conversion Kit
10155E	25	94	10,000	700		
12155E	19	71	12,000	840		
15155E	16	60.5	15,000	1,035	Plunger Kit	
20155E	13	49	20,000	1,400		
24155E	10	38	24,000	1,680		
35155E	7	27	35,000	2,450		
40155E	6	23	40,000	2,800		

The world's biggest range of



325 SERIES DIESEL

Model	gpm	lpm	psi	bar	
Model 405 - 400 hp (298 kW)					
8405D	74	279	8,000	552	Plunger Kit
10405D	60	228	10,000	700	
12405D	50	190	12,000	828	
15405D	40	152	15,000	1,035	
20405D	30	113	20,000	1,400	Plunger Kit
24405D	25	95	24,000	1,680	
35405D	17	66	35,000	2,450	
40405D	14	53	40,00	2,800	
Model 365 - 365 hp (272 kW)					
8365D	64	242	8,000	552	Plunger Kit
10365D	51	194	10,000	700	
12365D	42	159	12,000	828	
15365D	34	128	15,000	1,035	
20365D	27	102	20,000	1,400	Plunger Kit
24365D	22	83	24,000	1,680	
35365D	15	56	35,000	2,450	
40365D	12	45	40,000	2,800	



325 SERIES ELECTRIC

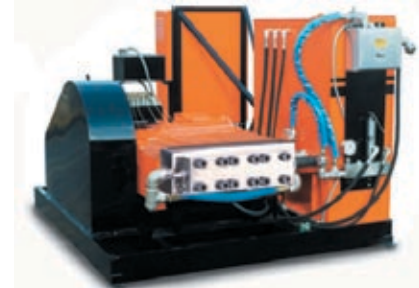
Model	gpm	lpm	psi	bar		
Model 355 - 350 hp (260 kW)						
8355E	74	279	8,000	552	Plunger Kit	Conversion Kit
10355E	60	228	10,000	700		
12355E	50	190	12,000	840	Plunger Kit	
15355E	40	152	15,000	1,035		
20335E	30	113	20,000	1,400	Plunger Kit	
24355E	25	95	24,000	1,680		
35355E	17	66	35,000	2,450		
40355E	14	53	40,000	2,800		
Model 305 - 300 hp (224 kW)						
8305E	64	242	8,000	552	Plunger Kit	Conversion Kit
10305E	51	194	10,000	700		
12305E	42	159	12,000	840	Plunger Kit	
15305E	34	132	15,000	1,035		
20305E	26	103	17,000	1,400	Plunger Kit	
24305E	22	83	24,000	1,680		
35305E	15	56	35,000	2,450		
40305E	12	45	40,000	2,800		
Model 255 - 250 hp (186 kW)						
8255E	54	204	8,000	552	Plunger Kit	Conversion Kit
10255E	43	163	10,000	700		
12255E	36	136	12,000	840	Plunger Kit	
15255E	28	106	15,000	1,035		
20255E	21	79	20,000	1,400	Plunger Kit	
24255E	18	68	24,000	1,680		
35255E	12	46	35,000	2,450		
40255E	10	38	40,000	2,800		

water jet pump units



350 SERIES DIESEL

Model	gpm	lpm	psi	bar		
Model 425 - 425 hp (317 kW)						
8425D	74	279	8,000	550	Plunger Kit	Conversion Kit
10425D	60	228	10,000	700		
13425D	47	178	13,000	900	Plunger Kit	
15425D	40	152	15,000	1,035		
17425D	35	132	17,000	1,175	Plunger Kit	
20425D	30	113	20,000	1,400		
Model 355 - 350 hp (261 kW)						
8355D	64	242	8,000	550	Plunger Kit	Conversion Kit
10355D	51	194	10,000	700		
13355D	39	147	13,000	900	Plunger Kit	
15355D	34	128	15,000	1,035		
17355D	31	117	17,000	1,175	Plunger Kit	
20355D	27	102	20,000	1,400		



350 SERIES ELECTRIC

Model	gpm	lpm	psi	bar		
Model 350 - 350 hp (261 kW)						
8350E	74	279	8,000	550	Plunger Kit	Conversion Kit
10350E	60	228	10,000	700		
13350E	47	178	13,000	900	Plunger Kit	
15350E	40	152	15,000	1,035		
17350E	35	132	17,000	1,175	Plunger Kit	
20350E	30	113	20,000	1,400		
Model 300 - 300 hp (224 kW)						
8300E	64	242	8,000	550	Plunger Kit	Conversion Kit
10300E	51	194	10,000	700		
13300E	39	147	13,000	900	Plunger Kit	
15300E	34	128	15,000	1,035		
17300E	31	117	17,000	1,175	Plunger Kit	
20300E	27	102	20,000	1,400		

The world's biggest range of water jet pump units



605 SERIES DIESEL

Model	gpm	lpm	psi	bar		
Model 605 - 600 hp (447 kW)						
4605D	200	757	4,000	275		Conversion Kit
6605D	143	541	6,000	415		
8605D	107	405	8,000	550	Plunger Kit	
10605D	86	326	10,000	700		
15605D	57	216	15,000	1,035	Plunger Kit	
20605D	43	163	20,000	1,400		
35605D	25	93	35,000	2,450		
40605D	22	83	40,000	2,800		
Model 525 - 525 hp (391 kW)						
4525D	180	681	4,000	275		Conversion Kit
6525D	129	488	6,000	415		
8525D	97	367	8,000	550	Plunger Kit	
10525D	77	291	10,000	700		
15525D	52	197	15,000	1,035	Plunger Kit	
20525D	39	149	20,000	1,400		
35525D	22	84	35,000	2,450		
40525D	20	75	40,000	2,800		
Model 475 - 475 hp (354 kW)						
4475D	160	605	4,000	275		Conversion Kit
6475D	114	431	6,000	415		
8475D	86	326	8,000	550	Plunger Kit	
10475D	69	261	10,000	700		
15475D	46	174	15,000	1,035	Plunger Kit	
20475D	34	129	20,000	1,400		
35475D	20	74	35,000	2,450		
40475D	22	83	40,000	2,800		



605 SERIES ELECTRIC

Model	gpm	lpm	psi	bar	
Model 500 - 500 hp (372 kW)					
4500E	200	757	4,000	275	Plunger Kit
6500E	143	541	6,000	415	
8500E	107	405	8,000	550	Plunger Kit
10500E	86	326	10,000	700	
15500E	57	216	15,000	1,035	Plunger Kit
20500E	43	163	20,000	1,400	
35500E	25	93	35,000	2,450	
40500E	22	83	40,000	2,800	

UHP units and bare pumps



DEDICATED ULTRA-HIGH PRESSURE

Models	Power	Pressure	Flow
3575D	110 hp (82 kW)	35,000 psi (2,415 bar)	4 gpm (15 lpm)
4075D	110 hp (82 kW)	40,000 psi (2,800 bar)	3 gpm (11.4 lpm)
40201D	185 hp (138 kW)	40,000 psi (2,800 bar)	6 gpm (23 lpm)
35220D	240 hp (179 kW)	35,000 psi (2,415 bar)	10 gpm (38 lpm)
40220D	240 hp (179 kW)	40,000 psi (2,800 bar)	8.2 gpm (31 lpm)
40250D	300 hp (224 kW)	40,000 psi (2,800 bar)	10 gpm (38 lpm)
40330D	350 hp (261 kW)	40,000 psi (2,800 bar)	13.3 gpm (50 lpm)

The heart of any NLB water jetting system is the pump, and ours are well-known for reliability and longevity. Their slow-running design minimizes wear and maximizes service life. So when it is finally time for a replacement, why choose anything else?

In fact, with the full line of convertible pumps NLB has, we can usually replace an older NLB triplex or quintuplex pump with a new convertible model to give you operating pressure flexibility and ease of maintenance.

And if you own a non-NLB unit, does the pump give you problems? Perhaps it is time to consider replacing it. NLB pumps last longer, cost less to operate, and provide a user experience unsurpassed in the industry.



225 Series



605 Series



325 Series



350 Series

Actual pump capacity is approximately 95% of the displacement. Horsepower can be computed by using the formula:

$$\text{BHP} = \frac{\text{GPM} \times \text{PSI}}{1715}$$

Model	Max. Pressure	Max. Flow
125	6,000-24,000 psi (415-1,680 bar)	6-33 gpm (23-125 lpm)
225	4,000-40,000 psi (275-2,800 bar)	10-82 gpm (38-310 lpm)
325	4,000-40,000 psi (275-2,800 bar)	22-70 gpm (83-265 lpm)
350	8,000-20,000 psi (550-1,400 bar)	24-74 gpm (91-280 lpm)
605	4,000-40,000 psi (275-2,800 bar)	34-200 gpm (128-757 lpm)
35220	35,000 psi (2,415 bar)	10 gpm (38 lpm)
4012	40,000 psi (2,800 bar)	3 gpm (11 lpm)
36200	40,000 psi (2,800 bar)	6 gpm (23 lpm)
40220	40,000 psi (2,800 bar)	8 gpm (30 lpm)
40250	40,000 psi (2,800 bar)	10 gpm (38 lpm)
40330	40,000 psi (2,800 bar)	13.3 gpm (50 lpm)

Hand Lances



Lances are the basic tools of water jetting, and NLB offers more choices — with more safety and ergonomic features — than any other manufacturer. From adjustable grips and shoulder supports to trigger locks and a patented quick-change cartridge seal, NLB leads the way in operator protection and comfort.

This section features **lances** that work with a wide range of nozzles — dual-trigger, underwater dump, and shut-off models. All feature rigid

stainless steel construction with quick-coupling hose hook-up.

Also in this section, you'll find related accessories — a 40,000 psi (*2,800 bar*) **rotating lance**, **vacuum attachment**, **lance stands**, and **whip hoses**.

NOTE: Operators should not withstand back thrust of more than 1/3 their body weight for an extended time. Please refer to the thrust chart on Pages 102-103 and the formula on the back cover.

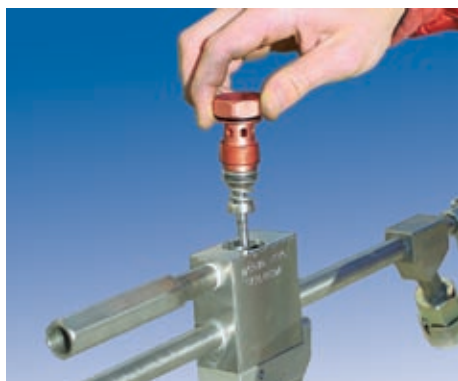
286 SERIES HAS THE FEATURES YOU ASKED FOR

NLB's 286 series of water jet lances are designed for maximum operator protection and productivity. A patented trigger (U.S. patent no. 5,636,789) lets the operator dump pressure immediately by simply pushing forward. It can be operated

with just 8-to-12 pounds of pressure, and a one-finger latch prevents accidental actuation.

The key is a quick-change cartridge that you can replace in the field in less than 60 seconds. This unique

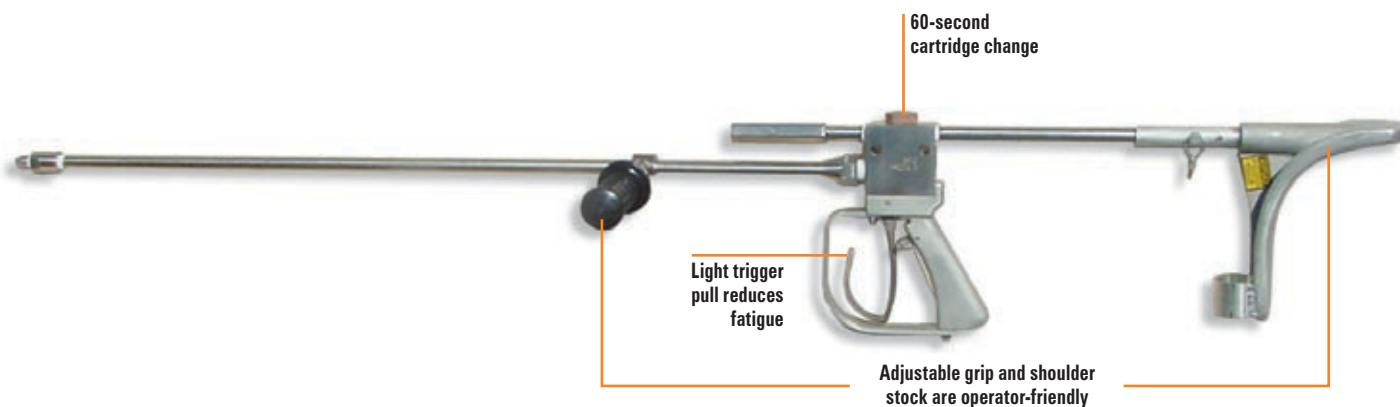
feature is available in all 9 models, with operating pressures as low as 10,000 psi (*700 bar*) and as high as 40,000 psi (*2,800 bar*). Please refer to the accompanying tables for features, benefits and key specifications and dimensions.



Quick-change cartridge seal reduces downtime

Features and Benefits

- Dump type helps protect operator
- Replace cartridge in under 60 seconds
- Lightweight
- Easy trigger actuation, 8 to 12 lbs. (*3.6 to 5.5 kg*)
- New trigger design allows operator to force lance into dump mode (Patent No. 5,636,789)
- One-finger latch to prevent accidental actuation
- Adjustable shoulder stock and hand grip
- Double trigger models require pressure on both triggers to actuate lance



Operator-Friendly

Quick-change cartridge and a choice of barrels

- 3/8" barrel is lightweight for easy handling
- 1/2" barrel is even more rugged and durable

NCG10-286, NCG15-286



Part No.	Pressure Rating	Weight	Inlet Connection	Barrel Connection	Barrel Length	Replaceable Cartridge	Optional Whip Hose
NCG10-286DT-1/2	10,000 psi (700 bar)	12 lbs. (5.5 kg)	1/2" NPT Female	1/2" NPT Male	36" (91.5 cm)	BM15915	See Pg. 18
NCG15-286DT-3/8	15,000 psi (1,035 bar)	12 lbs. (5.5 kg)	1/2" NPT Female	3/8" NPT Male	36" (91.5 cm)	BM15915	See Pg. 18

Patent No. 5,636,789

More Protection:

Dual-trigger lance needs two hands to actuate

- Must squeeze both triggers, enhancing safety
- Lance can be forced into dump mode

NCG10-286DT, NCG15-286DT



Part No.	Pressure Rating	Weight	Inlet Connection	Barrel Connection	Barrel Length	Replaceable Cartridge	Optional Whip Hose
NCG10-286DT-1/2	10,000 psi (700 bar)	16 lbs. (7.3 kg)	1/2" NPT Female	1/2" NPT Male	36" (91.5 cm)	BM15915	See Pg. 18
NCG15-286DT-3/8	15,000 psi (1,035 bar)	16 lbs. (7.3 kg)	1/2" NPT Female	3/8" NPT Male	36" (91.5 cm)	BM15915	See Pg. 18

Patent No. 5,636,789

Underwater Lances

Specially designed for underwater use

- Ideal for piers, pilings, barnacle removal
- Second nozzle at rear balances thrust of jetting action

NCG15-286UW



Part No.	Pressure Rating	Weight	Inlet Connection	Barrel Connection	Barrel Length	Replaceable Cartridge	Optional Whip Hose
NCG15-286UW	15,000 psi (1,035 bar)	12 lbs. (5.5 kg)	1/2" NPT Female	3/8" NPT Male	36" (91.5 cm)	BM15915	See Pg. 18

Patent No. 5,636,789

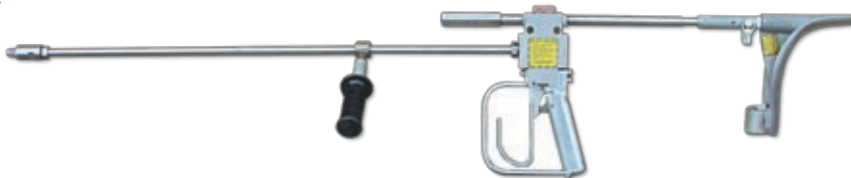
Hand Lances

Up to 24,000 psi

Now the features that made NLB's 10,000 psi hand lances so popular are available at 24,000 psi!

- High flow (up to 35 gpm/ 133 lpm)
- Rebuild in 60 seconds

NCG24-286



Pressure Rating	Weight	Inlet Connection	Barrel Connection	Barrel Length	Replaceable Cartridge	Optional Whip Hose
24,000 psi (1,680 bar)	13.5 lbs. (16 kg)	9/16" MP LHF	9/16" MP LHF	36" (91.5 cm)	BM19524	See Pg. 18

Patent No. 5,636,789

Dual-Trigger

The ultimate in operator protection:

- Requires two hands on the lance during operation
- Can be forced into dump mode with either trigger

NCG24-286DT



Pressure Rating	Weight	Inlet Connection	Barrel Connection	Barrel Length	Replaceable Cartridge	Optional Whip Hose
24,000 psi (1,680 bar)	16 lbs. (7.3 kg)	9/16" MP LHF	9/16" MP LHF	36" (91.5 cm)	BM19524	See Pg. 18

Patent No. 5,636,789

24K Underwater

- Ideal for underwater applications, such as barnacle removal and concrete hydrodemolition
- Balances thrust with a second nozzle at the rear

NCG24-286ZT



Pressure Rating	Weight	Inlet Connection	Barrel Connection	Barrel Length	Replaceable Cartridge	Optional Whip Hose
24,000 psi (1,680 bar)	13.5 lbs. (16 kg)	9/16" MP LHF	9/16" MP LHF	36" (91.5 cm)	BM19524	See Pg. 18

Patent No. 5,636,789

NOTE: To choose a nozzle assembly and nozzle inserts (0° or 15°) for a lance on this page, please refer to Page 23.

UHP with Quick-Change Cartridge

UHP water jetting has never been so easy. This lance has all the easy-rebuild features as other NLB 286 accessories and:

- Lightweight, ergonomic design
- Can be used with NLB SRH40-77 to produce rotating water jets without compressed air

NCG40-286



Pressure Rating	Weight	Inlet Connection	Barrel Connection	Barrel Length	Replaceable Cartridge	Optional Whip Hose
40,000 psi (2,800 bar)	13.5 lbs. (16 kg)	9/16" HP LHF	9/16" HP LHF	36" (91.5 cm)	BM20935	See Pg. 18

Patent No. 5,636,789

NCG40-286UW

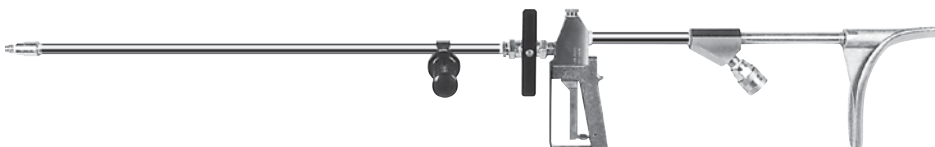


Pressure Rating	Weight	Inlet Connection	Barrel Connection	Barrel Length	Replaceable Cartridge	Optional Whip Hose
40,000 psi (2,800 bar)	13.5 lbs. (16 kg)	9/16" HP LHF	9/16" MP LHF	36" (91.5 cm)	BM19524	See Pg. 18

Patent No. 5,636,789

Dry Shut-off

- For lower pressure applications
- Requires unloader valve (page 29)



Part No.	Pressure Rating	Weight	Inlet Connection	Barrel Connection	Barrel Length	Rebuild Kit	Optional Whip Hose
NSG-300A	10,000 psi (700 bar)	14 lbs. (6.4 kg)	1/2" NPT Female	3/8" NPT Male	36" (91.5 cm)	300ARBKT	See Pg. 18
NSG-600	6,000 psi (415 bar)	7 lbs. (3.2 kg)	1/2" NPT Female	1/2" NPT 14BSP Male	36" (91.5 cm)	600RBKT	See Pg. 18
NSG-700	4,000 psi (275 bar)	7 lbs. (3.2 kg)	3/8" NPT Female	1/4" NPT Male	36" (91.5 cm)	700RBKT	See Pg. 18

Patent No. 5,636,789

NOTE: To choose a nozzle assembly and nozzle inserts (0° or 15°) for a lance on this page, please refer to Page 23.

Hand Lances

Rotating Lances

For ultra-high pressure water jetting in a wider spray pattern, the best choice is usually a **rotating lance** with one of our specially-designed **multi-orifice heads**. The NCG8450A-3 and NCG8450A-3L lances feature an air-driven swivel that drives the nozzle assembly. Use requires a **Bi-Mode™ valve** and a DM14150 hose assembly to connect them. A Bi-Mode™ valve lets two operators run lances from a single pump unit. (Dual lance operation also requires a CM13027 "Y" adapter. See Page 28.)

Key features of the NCG8450A-3 rotating lance include:

- Variable speed rotation, up to 3,000 rpm
- Field-repairable
- Dual-trigger actuation for operator protection
- Instant dump to low pressure when trigger is released
- Lightweight, ergonomic design



NCG8450A-3 and NCG8450A-3L

Part No.	Max. Pressure	Rotation Speed Up to	Air	Inlet Connection	Barrel Connection	Length	Weight
NCG8450A-3	40,000 psi (2,800 bar)	3,000 rpm	22 cfm @ 90 psi (10.4 l/s @ 6 bar)	9/16" - 18	9/16" - 18 LH	40.5" (1.03 m)	16 lbs. (7.3 kg)
NCG8450A-3L	40,000 psi (2,800 bar)	3,000 rpm	22 cfm @ 90 psi (10.4 l/s @ 6 bar)	9/16" - 18	9/16" - 18 LH	52.5" (1.33 m)	18 lbs. (8.2 kg)

Bi-Mode™ Valve

The field-repairable NLB Bi-Mode™ valve can significantly improve UHP system productivity. It uses the same quick-change cartridge valve as our 286 series lances and foot controls. User-friendly features include:

- 60-second cartridge replacement
- Switch from 1-lance to 2-lance operation with a simple nozzle change
- Rounded frame for easier carrying

A DM14150 hose assembly is required to connect a rotating lance to a Bi-Mode™ valve.



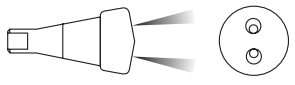
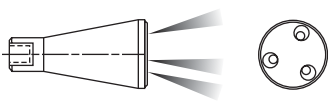
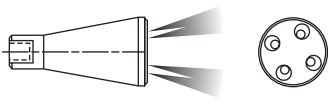
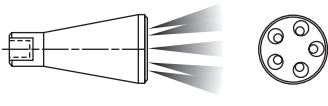
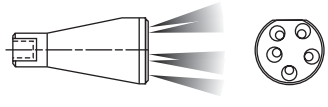
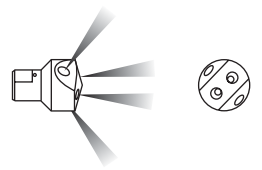
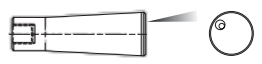
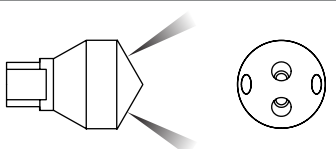
NLB8488

Max. Pressure	Inlet Connection	Outlet Connection	Weight	Cartridge
40,000 psi (2,800 bar)	1-1/8" - 12 UNF	9/16" - 18 male	55 lbs. (25 kg)	BM24521

UHP Rotating Heads

NLB offers a wide selection of multi-orifice heads for the NCG8450A-3 rotating lance. All but one use our standard

BN3539 0° nozzles and BA3894 nozzle retainers. The CM27174 uses a BM27289-XX nozzle with no retainer.

	Part No.	Orifices	Applications	Features/Benefits
	BN16592	2	Thick coatings, heavy deposits	Greater nozzle stand-off for operator flexibility
	BN10096-1	3	Medium coatings	Can remove coatings one layer at a time
	BN10096-2	4	Thin-to-medium coatings and deposits	Smaller orifices reduce impact, simplify removal in layers
	BN10096-3	5	Quick removal of thin coatings	Ideal for steel and other flat substrates
	DN12560	5	Quick removal of thin coatings	Offset nozzle pattern (15° and 60° off centerline) ideal for irregular surfaces
	CN12094-1	4	I-beams, H-beams, interior corners	Two 15° orifices, two 60° orifices
	CN12094-2	4	I-beams, H-beams, interior corners	Two 15° orifices (different offsets), two 60° orifices
	CN12094-3	4	Tight spaces - I-beams, H-beams, interior corners	Two 15° orifices, two 90° orifices
	CM27174	1	Extra-thick coatings	Single orifice maximizes impact force (Uses BM27289 nozzle with no retainer)
	CM33796	4	I-beams, H-beams, interior corners	Two 15° orifices (different offsets), two 30° orifices

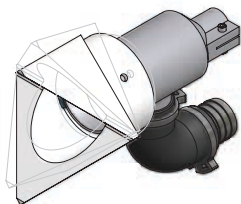


Vacuum Lances

DM16546



DM32283



NLB VacLance attachments turn any NCG8450A-3 hand lance into a vacuum recovery surface preparation tool. Kit DM16546 converts any existing NCG8450A-3. Attach it to a vacuum source (approx. 100 CFM at 1-2 inches of vacuum) via NLB's 2" vac hose (PM16758).

Attachment DM32283 is designed to work in corners. It can be rotated to work vertically or horizontally.

Hand Lances

Whip Hoses

NLB Whip Hoses help protect hand lance operators from potentially dangerous hose failures. Each whip hose assembly consists of a short length of hose, usually no more than 10 feet (3.05m). This is covered with a heavy, dense fabric or reinforced plastic tubing designed to diffuse the energy released by a hose failure.

NLB offers whip hoses for all popular pressures, from 10,000 to 40,000 psi (700 to 2,800 bar).

These include special Whip Hoses with a heavy-duty rubber shroud and a special 90-degree elbow. Attachment to your hand lance may require additional fittings. Please consult NLB about your specific application.

STANDARD WHIP HOSE



Part No.	Pressure	Length (ft.)	Lance Fitting	Hose Fitting	Used on
SW-10K	10,000 psi (700 bar)	7	Male Quick Coupling	1/2" MNPT	NCG-250A-2, NSG-300A, NCG10-280, NCG10-285
SW-15K-7	15,000 psi (1,035 bar)	7	1/2" MNPT	1/2" MNPT	NCG15-286, NCG10-285-1/2
SW-15K-10	15,000 psi (1,035 bar)	10	1/2" MNPT	1/2" MNPT	NCG15-286, NCG10-286-1/2
SW-255	10,000 psi (700 bar)	7	1/2" MNPT	1/2" MNPT	NCG-250A-2, NCG300
275-31	20,000 psi (1,400 bar)	7	3/4"-16 Tube Nipple	3/4"-16 Type M Swivel	NCG20-250, NCG20-280, NCG20-282
BM19662	24,000 psi (1,680 bar)	9	9/16" Tube Nipple w/gland and collar	3/4" Type M Swivel	NCG24-286
BM19662-10	24,000 psi (1,680 bar)	10	9/16" Tube Nipple w/gland and collar	3/4" Type M Swivel	NCG24-286
BM21403	40,000 psi (2,800 bar)	8	9/16"-18 Type M	9/16"-18 Type M	NCG40-286
BM21403-10	40,000 psi (2,800 bar)	10	9/16"-18 Type M	9/16"-18 Type M	NCG40-286
BM21403-20	40,000 psi (2,800 bar)	20	9/16"-18 Type M	9/16"-18 Type M	NCG40-286
DM14150	40,000 psi (2,800 bar)	20	9/16"-18 Type M to 3/8" HP Male	9/16"-18 Type M	NCG40-286



SPECIAL WHIP HOSE



Part No.	Pressure	Length (ft.)	Hose Part No.	Shroud Part No.	Elbow Part No.	Elbow Fitting	Hose Fitting	Used on
PM27152	15,000 psi (1,035 bar)	6	WP3-1/2-6-15K	PM27152-NNH	PM34517	1/2" MNPT	1/2" MNPT	NCG15-286, NCG10-286-1/2
PM28699	15,000 psi (1,035 bar)	10	WP3-1/2-10-15K	PM28699-NNH	PM34517	1/2" MNPT	1/2" MNPT	NCG15-286, NCG10-286-1/2
BM29564	24,000 psi (1,680 bar)	6	47RP-06	PM27152-NNH	PM29292	9/16" Tube Nipple w/gland and collar	3/4" Type M Swivel	NCG24-286

Lance Stands

NLB mobile lance stands let operators share the load of holding a pressurized lance, reducing both strain and risk. Personnel can therefore be rotated less frequently. Models are available in 10,000 psi, 20,000 psi and 40,000 psi (700, 1,400 and 2,800 bar), some with shields for additional operator protection.

NLB lance stands have many advantages:

- Absorb back thrust, minimizing fatigue
- Allows use of greater volume and pressure
- Instantaneous dump to low pressure upon lance trigger release
- 60° pivot point allows broad coverage (horizontal and vertical), for fewer station moves
- Easy maintenance
- Non-skid surface reduces risk of injury
- On wheels to go from job to job



MLS-10000-1A

Type	Max. Pressure	Max. Flow	Height Adjustment	Nozzle Adjustment	Horizontal Movement
Pneumatic Dump	10,000 psi (700 bar)	43 gpm (163 lpm)	36" to 50" (.9 to 1.3 m)	0-8" (0-20 cm)	60 degrees

Model MLS-10000-1A is also available as a dry shut-off unit.

MLS-24000-1A

Type	Max. Pressure	Max. Flow	Height Adjustment	Nozzle Adjustment	Horizontal Movement
Pneumatic Dump	24,000 psi (1,680 bar)	35 gpm (132 lpm)	36" to 50" (.9 to 1.3 m)	0-8" (0-20 cm)	60 degrees

MLS-36000-1A

Type	Max. Pressure	Max. Flow	Height Adjustment	Nozzle Adjustment	Horizontal Movement
Pneumatic Dump	40,000 psi (2,800 bar)	11 gpm (42 lpm)	41" to 53" (1 to 1.3 m)	0-8" (0-20 cm)	60 degrees

SPIN-NOZZLE®



The NLB SPIN-NOZZLE® self-rotating head (U.S. patent no. 4,821,961) turns an ordinary high-pressure lance into a superior water jetting tool. The SPIN-NOZZLE features a specially designed and balanced body, threaded for two standard jetting nozzles in an offset pattern. The SPIN-NOZZLE rotates by the reaction energy of the high-pressure water; no external driver is needed.

Features and Benefits

- Faster production rates due to wide spray pattern and force
- Reduces back thrust for operator
- Self-lubricated

VIPER 24™ AND VIPER 40™

In the Viper 24™ and Viper 40™, NLB has taken its SPIN-NOZZLE® technology to a whole new level. Our latest self-rotating heads operate at higher pressures than ever, and are field-repairable in less than 5 minutes. That's right... you don't have to return them to the factory, like our older models.

The Viper 24™ operates at the same range of pressures as the NLB 225 convertible pump unit, up to 24,000 psi (1,680 bar). The Viper 40™ operates at up to 40,000 psi (2,800 bar) and features a wider spray path. It easily attaches to a standard NLB 286 Series lance, so you no longer need a specially designed, air-driven lance or an air source.

Three Viper 40™ heads are available. The standard SRH40-77 has nozzles mounted at 0°. For wider coverage

and potentially higher production rates, nozzles on the SRH40-77-15 are mounted at a 15° angle and on the SRH40-77-7.5, at a 7.5° angle.

All Viper heads have round bodies, precision machined of rugged stainless steel. This minimizes nozzle strikes and eliminates the need for a protective guard. The nozzle inserts (choose from a wide range) are flush-mounted to further minimize impact.

24,000 psi

Field-repairable



SRH24-77, Viper 24™

Nozzles	Part Number	10,000 psi (700 bar)	15,000 psi (1,035 bar)	20,000 psi (1,400 bar)	24,000 psi (1,680 bar)
#4	BN1123	11.9 gpm (45.0 lpm)	14.6 gpm (55.3 lpm)	N/A	N/A
#3	BN1122	9.4 gpm (35.6 lpm)	11.5 gpm (43.5 lpm)	13.5 gpm (51.1 lpm)	14.8 gpm (56.0 lpm)
#2	BN1121	6.8 gpm (25.7 lpm)	8.4 gpm (31.8 lpm)	9.8 gpm (37.1 lpm)	10.8 gpm (40.9 lpm)
#1.5	BN1137	5.0 gpm (18.6 lpm)	6.1 gpm (23.1 lpm)	7.2 gpm (27.3 lpm)	8 gpm (30.3 lpm)
#1	BN1135	3.5 gpm (13.2 lpm)	4.3 gpm (16.3 lpm)	5.1 gpm (19.3 lpm)	5.6 gpm (21.2 lpm)

This chart shows a few of many nozzle combinations. For more possibilities, please see our complete nozzle chart on pages 96-97.

40,000 psi

Field-repairable



SRH40-77, SRH40-77-15, SRH40-77-7.5, Viper 40™

Nozzles	Part Number	40,000 psi (2,800 bar)
#24	BN10095-24	5.9 gpm (22.4 lpm)
#23	BN10095-23	5.52 gpm (20.9 lpm)
#22	BN10095-22	5.12 gpm (19.4 lpm)
#21	BN10095-21	4.76 gpm (18.3 lpm)
#20	BN10095-20	4.42 gpm (16.7 lpm)

NLB recommends two BN10095-20 nozzles if your pump produces 6 gpm @ 40,000 psi. The use of larger nozzles may keep your system from reaching its maximum pressure, but may improve productivity for some applications. Please consult NLB for other pressure and flow combinations.



Original SPIN-NOZZLE® with protective guard

Model No.	Maximum Pressure	Inlet	Overall Length	Diameter	Weight	Speed	Rebuild Kit	Protection Guard
SRH3-77	3,000 psi (210 bar)	1/4" NPT	3" (7.6 cm)	1-15/16" (4.9cm)	11 oz. (312 g)	3,300 rpm	N/A	BN1512
SRH5-77	5,000 psi (345 bar)	1/4" NPT	3" (7.6 cm)	1-15/16" (4.9cm)	11 oz. (312 g)	4,250 rpm	N/A	BN1512
SRH10-77	10,000 psi (700 bar)	1/2" NPT	3-13/16" (9.7 cm)	2-1/2" (6.4 cm)	1 lb. - 6 oz. (624 g)	4,000 rpm	N/A	BN1190
SRH24-77 Viper 24™	24,000 psi (1,680 bar)	9/16" NPT	4-1/4" (10.8 cm)	2-5/8" (6.7 cm)	2 lb. (908 g)	5,000 rpm	SRH24-77-RBKT	BM23604
SRH40-77 Viper 40™	40,000 psi (2,800 bar)	9/16" NPT	5" (12.7 cm)	2-3/8" (6.0 cm)	3 lbs. - 9 oz. (1.62 kg)	4,000 rpm	SRH40-77-RBKT	BM23604

A 1/2" x 3/8" reducer bushing is required for 10,000 psi (700 bar) lances with a 3/8" NPT barrel.
Order Part No. 04-03-RB-6T-S.

NOTE: To determine flow, select a nozzle size and read across to the column headed by the pressure you will be using. Actual nozzle flow will be about 1 gpm less, as some leakage is needed for lubrication.

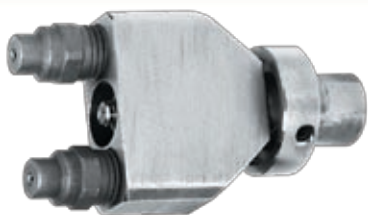
3,000 psi



SRH3-77

Nozzles	Part Number	1,000 psi (70 bar)	2,000 psi (140 bar)	3,000 psi (210 bar)
#5	S2, 2-7M, or SA	5.0 gpm (18.95 lpm)	7.0 gpm (26.53 lpm)	8.6 gpm (32.59 lpm)
#4	S2, 2-7M, or SA	4.0 gpm (15.16 lpm)	5.6 gpm (21.2 lpm)	7.0 gpm (26.53 lpm)
#3	S2, 2-7M, or SA	3.0 gpm (11.37 lpm)	4.2 gpm (15.92 lpm)	5.2 gpm (19.71 lpm)
#2	S2, 2-7M, or SA	2.0 gpm (7.58 lpm)	2.8 gpm (10.61 lpm)	3.4 gpm (12.89 lpm)
#1	S2, 2-7M, or SA	0.6 gpm (2.35 lpm)	0.8 gpm (3.03 lpm)	1.1 gpm (4.02 lpm)

5,000 psi



SRH5-77

Nozzles	Part Number	3,000 psi (210 bar)	4,000 psi (275 bar)	5,000 psi (345 bar)
#3	S2, 2-7M, or SA	5.2 gpm (19.71 lpm)	6.0 gpm (22.74 lpm)	6.8 gpm (25.77 lpm)
#2	S2, 2-7M, or SA	3.4 gpm (12.89 lpm)	4.0 gpm (15.16 lpm)	4.4 gpm (16.68 lpm)
#1	S2, 2-7M, or SA	1.1 gpm (4.02 lpm)	1.3 gpm (5.00 lpm)	1.5 gpm (5.69 lpm)

10,000 psi



SRH10-77

Nozzles	Part Number	6,000 psi (415 bar)	8,000 psi (550 bar)	10,000 psi (700 bar)
#4	S2, 2-7M, or SA	9.8 gpm (37.14 lpm)	11.2 gpm (42.45 lpm)	12.6 gpm (47.75 lpm)
#3	S2, 2-7M, or SA	7.4 gpm (28.05 lpm)	8.4 gpm (31.84 lpm)	9.4 gpm (35.63 lpm)
#2	S2, 2-7M, or SA	5.0 gpm (18.95 lpm)	5.6 gpm (21.22 lpm)	6.4 gpm (24.3 lpm)

Standard Nozzles



When it comes to nozzles, "standard" doesn't mean off-the-shelf. While NLB standard nozzles are designed for general use (instead of specialized uses like pipe cleaning or abrasive cutting), each is customized to suit your application. When ordering, be sure to consider not only the pressure and flow rate of your pump unit, but the actual pressure at the nozzle, which is always lower (ref. Page 98).

Our **standard nozzles** have a single orifice that can provide

either a tightly focused 0° stream or a 15° fan spray, depending on your requirements. The five shown below are designed for a maximum pressure of 20,000 psi (1,400 bar), and simply screw on the end of any NLB lance (and other tools) rated for that pressure.

For pressures up to 40,000 psi (2,800 bar), we offer **UHP 0° and 15° nozzle assemblies**. Both attach easily to our NCG40-286 lance.

DESIGNED AND MANUFACTURED TO THE HIGHEST STANDARDS — YOURS.

For decades, NLB's OEM nozzles have set the standard in the high-pressure water jet industry. They are specially designed for peak performance and made of hardened steel or stainless steel for durability. For even longer

life, orifices can be made of state-of-the-art materials like carbide and sapphire.

Although some people may claim that all nozzles are pretty much the

same, don't settle for imitations. Only NLB nozzles are specifically designed and manufactured to work with NLB high-pressure pumps and accessories.

Up to 20,000 psi (1,400 bar)



Part No.	Thread	Orifice	Spray Pattern	Description - Benefit
S-1	1/4" MNPT	Carbon Steel	0°	Longer orifice - cohesive jet pattern over long range
S-2	1/4" MNPT	Carbon Steel	0°	Carbon steel orifice - improves nozzle life and performance
S-3	1/4" MNPT	Carbon Steel	15°, 25°, 40°, 50°, 65°	Fan nozzle - widens jet coverage
S-7M	1/4" MNPT	Carbide	0°	Carbide insert - longer nozzle life
SA	1/4" MNPT	Sapphire	0°	Sapphire insert - the ultimate in nozzle life
NLB-25	1/4" MNPT	Carbon Steel	0°	Low-profile nozzle

Note: For use as a plug, order NLB-25-UNDRILLED.

Nozzle Assemblies

A 0° nozzle assembly delivers a high-impact, solid stream spray... ideal for precision cutting and other applications requiring a tightly-focused pattern. It uses NLB

sapphire nozzle inserts (also used in rotating lance applications and UHP SPIN JET® systems).

A 15° fan nozzle assembly removes

loose material over a wider area than a solid stream, requiring less overlap and providing a more uniform impact across the cleaning path.



CM34556



CM34557



0°-BL7864



15°-BN6960

Part Number	Max Pressure	Spray Pattern	Nozzle Insert	Connection Thread	Used with Lance
CM34556	24,000 psi (1,680 bar)	0°	BN11XX	9/16"-18 Female	NCG24-286
CM34537	24,000 psi (1,680 bar)	0°	BN10095-XX	9/16"-18 Female	NCG24-286
BL7864	40,000 psi (2,800 bar)	0°	BN3539-XX	9/16"-18 LHF	NCG40-286
BN6960	40,000 psi (2,800 bar)	15°	S-8-15-XXXX	9/16"-18 LHF	NCG40-286
BA11110	40,000 psi (2,800 bar)	0°	BN3539-XX	9/16"-18 RHF	NCG8450A-3 or -3L
BA11117	40,000 psi (2,800 bar)	15°	S-8-15-XXXX	9/16"-18 RHF	NCG8450A-3 or -3L

Nozzle Inserts

Nozzle inserts differ from standard nozzles in that they are held in place by a nozzle retaining assembly. Inserts are used in some of NLB's most popular accessories, including our SRH24 and SRH40 SPIN-NOZZLE® heads, the NLB3750 family of 3-D tools, and our NCG8450 UHP rotating lances.

The chart presented here contains basic pressure, spray pattern and application information for all NLB nozzle inserts, with cross-references to help you choose the best insert for your requirements.



Part No.	Max. Pressure	Orifice	Spray Pattern	Description - Benefit	Reference Page
S-8-15-XXXX	40,000 psi (2,800 bar)	Stainless Steel	15°	Wider coverage results in larger impact area	101
BN11XX	20,000 psi (1,400 bar)	Carbide	0°	Used on many NLB 2-D and 3-D nozzles	96-97
BM19048-X-XX	20,000 psi (1,400 bar)	Stainless Steel	0°	For high-flow applications, like hydrodemolition	100
BN3539-XX	40,000 psi (2,800 bar)	Sapphire	0°	For UHP applications, with sapphire orifice for extended life	98-99
BN10095-XX	40,000 psi (2,800 bar)	Sapphire	0°	The ultimate in long life: high cohesive with an engineered flow path for superior impact force – 3/8-24-UNF thread	98-99
BM27289-XX	40,000 psi (2,800 bar)	Sapphire	0°	The ultimate in long life: high cohesive with an engineered flow path for superior impact force – 9/16-18-UNF thread	98-99

Abrasive Nozzles



The NLB wet abrasive blasting systems combine the force of a high-pressure water jet with the cleaning action of abrasive media — without the dust, costs or health and environmental hazards associated with dry sand blasting.

Wet abrasive blasting can clean steel to a white metal finish or remove

tightly bonded paint from concrete, steel or masonry. NLB offers 10,000 psi, 20,000 psi and 40,000 psi **abrasive nozzles** (700, 1,400 and 2,800 bar), with **rebuild kits**. A **hopper** is required to hold the abrasive media, whose flow rate is variable with the **metering disc** used (see next page for hoppers and discs).

PROFILER™ LETS YOU ABRASIVE BLAST AT ULTRA-HIGH PRESSURES

Abrasive wet blasting at up to 40,000 psi (2,800 bar) is no problem for NLB's Profiler™. It profiles a 4-inch (100mm) path at rates of up to 15 feet (5m) per minute, and leaves an excellent bonding surface for new

coatings. The Profiler operates at flows of 3-6 gpm (11-23 lpm).

This innovative tool works with various abrasive media, to suit specific applications. The abrasive

is fed to the nozzle from an abrasive feed hopper, through metering discs that restrict the flow to a predetermined rate. A typical flow is 2 lbs. (0.9 kg) per minute.

Profiler™

- Profiles metal and welds, for an ideal bonding surface
- Pressures from 20,000 to 40,000 psi (1,400 to 2,800 bar)
- Flows of 3-6 gpm (11-23 lpm)
- Designed to work with NCG24-286 or NCG40-286 UHP lance, with quick-change cartridge.



Part Number	Pressure Rating	End Connections	Replacement Nozzles		
			40,000 psi @ 6 gpm	40,000 psi @ 3 gpm	20,000 psi @ 6 gpm
BM17994*	20,000 psi (1,400 bar)	9/16" MP LHF	N/A	N/A	PM18673
BM17994	40,000 psi (2,800 bar)	9/16" HP LHF	PM18671	PM18672	N/A

*at 20,000 psi, requires BM24622 adapter

NSB-25



10,000 psi (700 bar)

Part Number	Spool No.	Max. Flow	Inlet Connection	Rebuild Kit
NSB-25-1	NSB-25-03-1	14 gpm (53 lpm)	1/2" NPT Female	BV2177-1
NSB-25-2	NSB-25-03-2	16 gpm (61 lpm)	1/2" NPT Female	BV2177-2
NSB-25-3	NSB-25-03-3	19 gpm (72 lpm)	1/2" NPT Female	BV2177-3
NSB-25-4	NSB-25-03-4	6.5 gpm (25 lpm)	1/2" NPT Female	BV2177-4
NSB-25-5	NSB-25-03-5	4.5 gpm (17 lpm)	1/2" NPT Female	BV2177-5
NSB-25-6	NSB-25-03-6	10 gpm (38 lpm)	1/2" NPT Female	BV2177-6

NSB-25-20K



20,000 psi (1,400 bar)

Max. Pressure	Nozzle	Max. Flow	Inlet Connection
20,000 psi (1,400 bar)	S-7-0002-M	4.5 gpm (17 lpm)	Slip Fit/Set Screw
	S-7-0003-M	6.5 gpm (25 lpm)	
	S-7-0004-M	9.0 gpm (34 lpm)	
	S-7-0005-M	11 gpm (42 lpm)	

Abrasive Hopper

- NLB-300-AC hopper holds 300 lbs. (136 kg) of abrasive; NLB-600-AC holds 600 lbs. (272 kg)
- Includes NLB kit DM5820-05 to meter abrasive at adjustable rate (see chart for meter discs included)
- Pressurized hoppers available



NLB-300-AC

Metering Disc Kit

Part Number	Disc Size	Flow Rate Per Minute, #36 or #50 Garnet	Flow Rate Per Minute, #80 Garnet*	Flow Rate Per Minute, Silica Sand**
CA2031	10	1 lb./min. (0.5 kg/min.)	1.1 lbs./min. (0.5 kg/min.)	0.7 lbs./min. (0.3 kg/min.)
CA2032	15	1.5 lbs./min. (0.7 kg/min.)	1.6 lbs./min. (0.7 kg/min.)	1.1 lbs./min. (0.5 kg/min.)
CA2033	20	2 lbs./min. (0.9 kg/min.)	2.1 lbs./min. (0.9 kg/min.)	1.5 lbs./min. (0.7 kg/min.)
CA2034	30	3 lbs./min. (1.4 kg/min.)	3.2 lbs./min. (1.5 kg/min.)	2.2 lbs./min. (1.0 kg/min.)
CA2035	40	4 lbs./min. (1.8 kg/min.)	4.2 lbs./min. (1.9 kg/min.)	2.9 lbs./min. (1.3 kg/min.)
CA2036	50	5 lbs./min. (2.3 kg/min.)	5.3 lbs./min. (2.4 kg/min.)	3.7 lbs./min. (1.7 kg/min.)
CA2037	60	6 lbs./min. (2.7 kg/min.)	6.4 lbs./min. (2.9 kg/min.)	4.4 lbs./min. (2.0 kg/min.)
CA2038	70	7 lbs./min. (3.2 kg/min.)	7.4 lbs./min. (3.4 kg/min.)	5.1 lbs./min. (2.3 kg/min.)
CA2039	80	8 lbs./min. (3.6 kg/min.)	8.5 lbs./min. (3.8 kg/min.)	5.6 lbs./min. (2.5 kg/min.)
CA2040	90	9 lbs./min. (4.1 kg/min.)	9.5 lbs./min. (4.3 kg/min.)	6.6 lbs./min. (3.0 kg/min.)
CA2041	100	10 lbs./min. (4.5 kg/min.)	10.6 lbs./min. (4.8 kg/min.)	7.3 lbs./min. (3.3 kg/min.)

*The flow rate of #80 Garnet is approximately 6% higher than #36 or #50.

**Silica sand is used for wet abrasive blasting, but not recommended for abrasive cutting.

Foot Controls



When an operator has both hands busy (while cleaning tubes and pipes, for example) a **foot control valve** lets him control the water flow. NLB offers five models — dump-style and shut-off style — for applications from 10,000 to 40,000 psi (700 to 2,800 bar).

Dump-style valves allow instantaneous dump to low pressure when the foot pedal is released, and include a muffler to minimize hydraulic shock. Shut-off valves minimize the water in the work area because the dump is initiated some distance away, by an unloader valve.

ADVANCED FEATURES FOR FIELD REPAIR AND OPERATOR PROTECTION

NLB's 286 series foot control valves are designed for maximum operator protection and productivity. A patented pedal design (U.S. patent no. 5,636,789) lets you dump pressure immediately by simply pushing the pedal forward. These valves also have dual dump ports

for superior stability in dump mode and are constructed from corrosion-resistant materials.

One of the most popular features of these valves is a unique quick-change cartridge that you can replace in the field in less than 60

seconds. It is available in all four models, whose operating pressures range from 10,000 psi (700 bar) to 40,000 psi (2,800 bar). Please refer below for features and benefits, and to the tables on the facing page for key specifications.

Dual Dump Ports

Increased stability in "dump" mode

Wetted Parts

Stainless steel for durability

Foot Pedal

- Minimal pressure
- Instant dump when released



Enclosure

Doubles as handy carrying case

Field repairable in under a minute

All NLB dump-style foot controls are now field-repairable in less than 60 seconds, thanks to our exclusive quick-change cartridge valve. This cartridge valve, the same one used in our 286 series lances, simply screws in and out.

Operators will also appreciate the extra protection of NLB's patented pedal design, which lets them force the valve into dump mode.



FC15-286



Type	Pressure Rating	Max. Flow	Weight	Inlet Connection	Outlet Connection	Replacement Cartridge
Dump	15,000 psi (1,035 bar)	25 gpm (95 lpm)	21 lbs. (9.5 kg)	1/2" MNPT	1/2" MNPT	BM15915

Patent No. 5,636,789

FC10-800



Type	Pressure Rating	Max. Flow	Weight	Inlet Connection	Outlet Connection	Replacement Cartridge
Dump	10,000 psi (700 bar)	80 gpm (303 lpm)	27 lbs. (12.3 kg)	1" NPT Male	1" NPT Male	BM16345

Patent No. 5,636,789

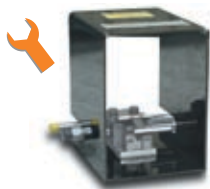
FC-300



Type	Pressure Rating	Max. Flow	Weight	Inlet Connection	Outlet Connection	Rebuild Kit
Dry Shut-Off	10,000 psi (700 bar)	34 gpm (129 lpm)	30 lbs. (13.6 kg)	1/2" NPT Male	1/2" NPT Male	300ARBKT

NOTE: Dry shut-off foot controls require a UL-904 unloader valve to dump pressure (see page 29).

FC24-286



Type	Pressure Rating	Max. Flow	Weight	Inlet Connection	Outlet Connection	Replacement Cartridge
Dump	24,000 psi (1,680 bar)	35 gpm (133 lpm)	31 lbs. (14 kg)	1"-12 UN Type M Male	1"-12 UN Type M Male	BM19524

Patent No. 5,636,789

FC40-286



Type	Pressure Rating	Max. Flow	Weight	Inlet Connection	Outlet Connection	Replacement Cartridge
Dump	40,000 psi (2,800 bar)	10 gpm (38 lpm)	31 lbs. (14 kg)	1-1/8"-12 Type M Male	9/16" HP Type Female	BM20935

Patent No. 5,636,789

Flow and Pressure



Multi-gun valves let you feed two lances at once from a single high-pressure pump unit. **Unloader valves** (with a system valve) divert pressure back to the tank in automated applications. **Pressure**

reducing stations allow accurate pressure and flow adjustments when the pump is not located near the work being done.

MULTI-GUN VALVES

With NLB multi-gun valves, several lances can be operated from a single pump unit at the same time. These valves can be used with any dump-style lance, and the nozzles can be different sizes. You can even add a manifold to run several multi-gun valves at once. Choose from 10,000 psi, 15,000 psi and 20,000 psi units

(700, 1,035 and 1,400 bar). Key features include:

- Each operator independently controls the loading and dumping of his lance
- Switch from "pressure" mode to "dump" mode in a split-second, minimizing system pressure fluctuations
- Simple design allows fast set-up in the field
- Assembly includes mounting plate (for permanent installation), guard, pressure gauge, and quick-couplings for inlet/outlet connections
- Rugged, long-life design

MGV15-3000



MGV20-1000



DO-805Y



DO20-805Y



Model No.	Description	Pressure	Flow	Inlet/Outlet	Rebuild Kit
MGV15-3000	Multi-Gun Valve	4,000 to 15,000 psi (275 to 1,035 bar)	up to 30 gpm per side (up to 113 lpm per side)	1/2" NPT Male, 1/2" NPT Male	BM23073
MGV20-1000	Multi-Gun Valve	12,000 to 20,000 psi (840 to 1,400 bar)	2.8 to 11.5 gpm per side (11 to 45 lpm per side)	9/16" MP port, 1"-12 UN Male	MGV20RBKT
DO-805Y	45° Manifold	10,000 psi max. (700 bar max.)	32 gpm (120 lpm)	1/2" NPT Male, 1/2" NPT Male	N/A
DO20-805Y	45° Manifold	20,000 psi max. (1,400 bar max.)	23 gpm (90 lpm)	1"-12 UN Male, 1"-12 UN Male	N/A
CM13027	3-way Adapter	40,000 psi max. (2,800 bar max.)	10 gpm (37.9 lpm)	1-1/8" -12 HP Male,	N/A

Unloader Valves

Since shut-off-style lances and foot controls have no built-in means of dumping pressure, the safest way to use them is with an unloader valve. These are activated when an operator releases the trigger of the lance. In automated applications, unloader valves can also be used to divert water back to the tank when flow is no longer required at the nozzle. This also requires a system valve.

NLB offers 25 gpm and 50 gpm models, both constructed of stainless steel for long life. Repair kits are available.

Model No.	Max. Pressure	Max. Flow	Inlet Connection	Outlet Connection
UL-452	10,000 psi (700 bar)	25 gpm (95 lpm)	1/2" NPT	1/2" NPT
UL-904	10,000 psi (700 bar)	50 gpm (190 lpm)	1" NPT	1" NPT



UL-452

Pressure Reducing Stations

When you want to use water jets at a location some distance from your high-pressure pump unit — either in a plant or in the field — the simplest solution is a pressure reducing station. We have 10,000 and 20,000 psi units (700 and 1,400 bar), either plate-mounted or mobile. All feature stainless-steel construction and include a rugged NLB by-pass valve, oil-filled pressure gauge and snubber.



**PRS-270
PRS-270-20K**



**PRS-270HC
PRS-270HC-20K**

Model No.	Max. Pressure	Max. Flow	Inlet Connection	Outlet Connection	Weight
PRS-270	10,000 psi (700 bar)	40 gpm (151 lpm)	1/2" NPT	1/2" NPT	50 lbs. (23 kg)
PRS-270-20K	20,000 psi (1,400 bar)	26 gpm (100 lpm)	3/4" NPT	3/4" MP port	53 lbs. (24 kg)

Flex and Rigid Lances



NLB **flexible lances** make pipe and tube cleaning a breeze, snaking around bends and curves to remove even hardened deposits. For straight pipes and tubes (heat exchangers, boilers, etc.), we also offer **rigid lances**. Both reduce risk of injury by putting distance between operators and the water jets (up to 40,000 psi, or 2,800 bar).

Following the five pages of lances and **couplings** are **rotary hand lances**. Then come accessories to

help protect operators from nozzles rebounding unexpectedly out of the pipe, such as **flex lance guards** and **back-out preventers**. A **stinger**, which blocks the opening when needed, is another option; please consult NLB for lengths and diameters.

After this section, you'll find NLB's vast selection of **tube and pipe nozzles**, designed for use with flex and rigid lances.

CHOICES FOR EVERY I.D. AND OPERATING PRESSURE

NLB flex lances have been proven time and again over the past 40 years. Key features include smooth inner core that minimizes pressure drop and a compact end connection to handle a tight bend radius.

RP hose has an abrasion-resistant

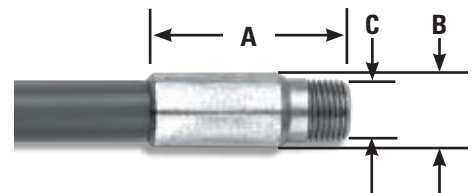
nylon outer cover with a smooth surface that reduces friction as it travels through the pipe or tube. **SRV hose** features two outer spirals of high-tensile stainless steel wire, for added kink resistance. Our **ultra-high pressure flex lance** features six

layers of this wire. NLB flex lances are stocked in 25' and 50', and are also available in lengths up to 200' (7.6m and 15.2m, up to 61m).

When specifying hose, refer to the pressure drop chart on Page 104.

How to Use This Chart:

1. Within your operating pressure, find the diameter of your tube.
2. Choose a lance that will fit in your tube and establish the length that will be required for your application. **NOTE:** The XX in the model number refers to length; 35' and 50' (10.7 m and 15.2 m) are standard. The YYY refers to thread direction and male or female; i.e. RHM for right-hand male, LHF for left-hand female, etc.
3. Read across the chart for potential nozzles and stingers. Couplings can be found in the chart in the lower right-hand corner.



Nozzle Families



Standard
for general cleaning



Triple-Row
removes soft material



Button
moves easily around bends



Polishing
rotating action removes hard deposits and polishes

10K Flex Lances



Model No.	Inlet Connection	Nozzle Thread Connection	Standard Nozzle	Button Nozzle	Triple Row Nozzle	Polishing Nozzle	Footbox to Lance Coupling(s)	Dim. "A" Coupling Length	Dim. "B" Coupling OD	Dim. "C" Coupling ID	Bend Radius	Stinger
22RP-XX-1/16	1/16" MNPT	1/16" MNPT	T-21	T-20	T-21	RLM-2-10K	PM17925 and NQC-22-M	1.06"	0.38"	0.12"	2.36"	RTL15-1/16-STING



24RP-XX-1/16	1/16" MNPT	1/16" MNPT	T-21	T-20	T-21	RLM-2-10K	PM17925 and NQC-22-M	1.2"	0.44"	0.17"	2.95"	RTL15-1/16-STING
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25RP-XX	1/8" MNPT	1/8" MNPT	T-1	T-13	T-9	RLM-3-10K	PM17926 and NQC-22-M	1.28"	0.52"	0.20"	3.75"	RTL15-1/8-STING
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27RP-XX	1/4" MNPT	1/4" MNPT	T-3	T-14	T-10	RLM-4-10K	PM17927 and NQC-22-M	1.56"	0.62"	0.25"	3.50"	RTL15-1/4-STING
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28RP-XX	3/8" MNPT	3/8" MNPT	P-2	P-3	P-14	NA	PM17928 and NQC-22-M	2.95"	0.75"	0.40"	3.00"	RTL15-3/8-STING
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29RP-XX	1/2" MNPT	1/2" MNPT	P-5	P-6	P-15	RLM-5-10K	NQC-22-M	3.37"	1.00"	0.50"	4.00"	RTL15-1/2-STING
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24SRV-XX	1/8" MNPT	1/8" MNPT	T-1	T-13	T-9	RLM-3-10K	PM17926 and NQC-22-M	1.10"	0.47"	0.17"	4.00"	RTL15-1/8-STING
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25SRV-XX	1/4" MNPT	1/4" MNPT	T-3	T-14	T-10	RLM-4-10K	PM17927 and NQC-22-M	2.86"	0.56"	0.20"	4.50"	RTL15-1/4-STING
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Flex and Rigid Lances

20K Flex Lances

	Model No.	Inlet Connection	Nozzle Thread Connection	Standard Nozzle	Button Nozzle	Triple Row Nozzle	Polishing Nozzle	Footbox to Lance Coupling(s)	Dim. "A" Coupling Length	Dim. "B" Coupling OD	Dim. "C" Coupling ID	Bend Radius	Stinger
	44RP-XX-YYY	9/16"-18 Type M Female	MP 1/4"-28 LHM	T-1-20K	NA	NA	RLM-2-20K-AF	DM6023-129	2.10"	0.463"	0.16"	4.10"	NA
	44RP-XX-1/4-YYY	9/16"-18 Type M Female	MP 1/4"-28 RHF	*	*	*	*	DM6023-129	1.91"	0.463"	0.16"	4.10"	NA
	45RP-XX-YYY	9/16"-18 Type M Female	MP 1/4"-28 LHM	T-1-20K	NA	NA	RLM-2-20K-AF	DM6023-129	2.71"	0.490"	0.20"	5.12"	NA
	45RP-XX-3/8-YYY	9/16"-18 Type M Female	MP 3/8"-24 RHF	*	*	*	*	DM6023-129	1.98"	0.490"	0.20"	5.12"	NA
	46RP-XX-YYY	9/16"-18 Type M Female	MP 3/8"-24 LHM	T-3-20K	NA	T-9-20K	RLM-4-20K	DM6023-129	2.60"	0.570"	0.25"	6.10"	NA
	46RP-XX-3/8-YYY	9/16"-18 Type M Female	MP 3/8"-24 RHF	*	*	*	*	DM6023-129	1.83"	0.570"	0.25"	6.10"	NA
	47RP-XX-YYY	3/4"-16 Type M Female	MP 9/16"-18 LHM	T-12-20K	NA	T-10-20K	RLM-6-20K	DM6023-175	3.83"	0.685"	0.32"	6.88"	NA

XX designates length (35' and 50' standard) YYY designates RH or LH and male or female
 * Consult NLB for nozzle options

40K Flex Lances

	PM7630-XX-YYY	9/16"-18 Type M Swivel	HP 3/8"-24 LHM	DN4133-40K	NA	NA	NA	DM6023-241	4.05"	0.82"	0.20"	6.00"	NA
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Rigid Lances

Rigid lances are available in various diameters, rated for all popular pressures. They come in lengths of

20 feet (6m), which can be assembled, with couplings, into longer lances. Optional hand

guides (BL13033) help an operator position the lance and support it without slowing the rotation speed.

15K Rigid Lances



Model No.	Inlet Connection	Nozzle Thread Connection	Standard Nozzle	Button Nozzle	Triple Row Nozzle	Polishing Nozzle	Lance to Lance Coupling(s)
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RTL15-1/16-25	1/16" MNPT	1/16" MNPT	T-21	T-20	T-21	RLM-2-10K	RTLC-3
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RTL15-1/8-25	1/8" MNPT	1/8" MNPT	T-1	T-13	T-9	RLM-3-10K	RTLC-2
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RTL15-1/4-25	1/4" MNPT	1/4" MNPT	T-3	T-14	T-10	RLM-4-10K	RTLC-4
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20K Rigid Lances



RTL20-1/4-25	MP 1/4"-28 LHM	MP 1/4"-28 LHM	T-1-20K	NA	NA	RLM-2-20K-AF	BM12268
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RTL20-3/8-25	MP 3/8"-24 LHM	MP 3/8"-24 LHM	T-3-20K	NA	T-9-20K	RLM-4-20K	BM13606
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RTL20-9/16-25	MP 9/16"-18 LHM	MP 9/16"-18 LHM	T-12-20K	NA	T-10-20K	RLM-6-20K	BM7684
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40K Rigid Lances



RTL40-1/4-25	HP 1/4"-28 LHM	HP 1/4"-28 LHM	CN12267-1	NA	NA	NA	BM12268
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RTL40-3/8-25	HP 3/8"-24 LHM	HP 3/8"-24 LHM	DN4133-40K	NA	NA	NA	BM7683
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RTL40-9/16-25	HP 9/16"-18 LHM	HP 9/16"-18 LHM	P-3-36K	NA	NA	NA	BM7684
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Flex and Rigid Lances

Couplings

NLB's flex and rigid lance couplings are designed to provide the smallest possible O.D. while maximizing the flow of water. There are two basic styles. Models with female threads to join two sections of lance that have male threads on the ends, and models with male threads to join lance sections with female threads on the ends.

NLB also offers couplings with right-hand threads on one side and left-hand threads on the other to quickly join two different styles of lance.

The charts on pages 31-33 show the suggested coupling for each NLB flex and rigid lance.

Stingers

Stingers prevent a nozzle from reversing in the tube or pipe and exiting toward the operator. A stinger should be at least the same length as the tube or pipe diameter. For example, cleaning out an 8" (20 cm) pipe would require at least an 8" (20 cm) stinger. Consult factory for available lengths and diameters. Please specify thread size.



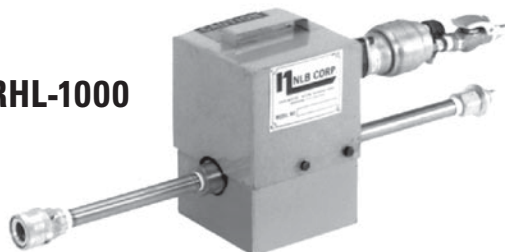
Coupling	Description	Max. Diameter	Length	Tube Size
10,000 psi (700 bar)				
RTLC-3	1/16" FNPT	.375"	.900"	1/16"
RTLC-7	1/16" FNPT x 1/4" FNPT	NA	NA	1/4" x 1/16"
RTLC-2	1/8" FNPT	.500"	.900"	1/8"
RTLC-1	1/4"-28 UNF Fine Female	.315"	2.00"	1/4"
RTLC-4	1/4" FNPT	.625"	1.125"	1/4"
RTLC-5	3/8" FNPT	.815"	1.250"	3/8"
RTLC-6	1/2" FNPT	1.0"	2.00"	1/2"
20,000 psi (1,400 bar)				
BM12268	1/4"-28 LHF	.375"	2.15"	1/4"
BM22604	1/4"-28 RHF	.375"	2.15"	1/4"
BM22605	1/4"-28 LHF x RHF	.375"	2.15"	1/4"
BL1218	1/4"-28 RHM	NA	NA	3/8"
BM13606	3/8"-24 LHF	.563"	2.00"	3/8"
BM22606	3/8"-24 RHF	.563"	2.00"	3/8"
BM22607	3/8"-24 RHF x LHF	.563"	2.00"	3/8"
BM22615	3/8" LHF x 9/16"-18" LHF	.660"	2.40"	3/8" x 9/16"
BM22616	3/8" RHF x 9/16"-18" RHF	.660"	2.40"	3/8" x 9/16"
BM20092	3/8"-24 RHM	.557"	3.25"	9/16"
BM20093	9/16"-18 RHF	.660"	2.40"	9/16"
BM20094	9/16"-18 LHF	.660"	2.40"	9/16"
BM22619	9/16"-18 LHF x RHF	.660"	2.40"	9/16"
40,000 psi (2,800 bar)				
BM12268	1/4"-28 LHF	.375"	2.15"	1/4"
BM22604	1/4"-28 RHF	.375"	2.15"	1/4"
BM22605	1/4"-28 RHF x LHF	.375"	2.15"	1/4"
BM7683	3/8"-24 LHF	.480"	2.15"	3/8"
BM22621	3/8"-24 RHF	.480"	2.15"	3/8"
BM17821	3/8"-24 RHF x LHF	.480"	2.15"	3/8"
BM22625	1/4"-28 RHM	.375"	2.50"	3/8"
BM18661	3/8"-24 LHF x 9/16"-18" LHF	.660"	2.40"	3/8" x 9/16"
BM22624	3/8"-24 RHF x 9/16"-18" RHF	.660"	2.40"	3/8" x 9/16"
BM18006	3/8"-24 RHM	.557"	3.25"	9/16"
BM7684	9/16"-18 LHF	.660"	2.40"	9/16"
BM19229	9/16"-18 RHF	.660"	2.40"	9/16"
BM17820	9/16"-18 LHF x RHF	.660"	2.40"	9/16"

For additional couplings, see Page 70.

RHL Lances

For real tube bundle cleaning efficiency, NLB has added an air-activated rotating SPIN JET® seal to a rigid lance to produce a rotary hand lance. The combination of high-pressure water with the 90 rpm rotating action clears almost any clog (and is also useful for polishing tubes). Our 10,000 psi, 20,000 psi, and 40,000 psi lances all feature stainless steel construction, a fast-acting air valve for speed control, and economical repair kits for field maintenance. A rotary hand lance should always be used with one of NLB's foot control valves.

RHL-1000



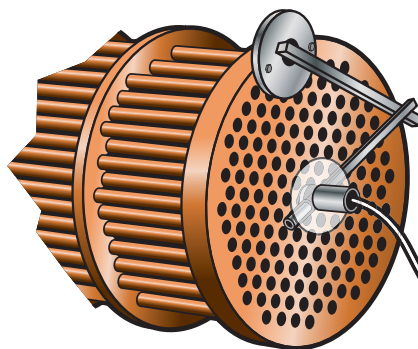
Part Number	Max. Pressure	Air	Speed Up to	Inlet Connection	Outlet Connection	Air Connection
RHL-1000	10,000 psi (700 bar)	20 cfm @ 90 psi (9.4 l/s @ 6 bar)	90 rpm	1/2" NPT	1/2" NPT	1/4" NPT
RHL-2000	20,000 psi (1,400 bar)	20 cfm @ 90 psi (9.4 l/s @ 6 bar)	90 rpm	9/16" NPT	9/16" NPT	1/4" NPT
RHL-3600	40,000 psi (2,800 bar)	20 cfm @ 90 psi (9.4 l/s @ 6 bar)	90 rpm	3/4" - 16 HP RH	9/16" - 18 HP RH	1/4" NPT

Back-Out Preventers

The DM15900 Pipe Back-Out Preventer gives an operator maximum protection against a flex lance unexpectedly coming out of a pipe while in use. It attaches easily to a flanged or non-flanged pipe and is adaptable to pipes with an O.D. from 6" to 36" (152 to 914 mm). It comes complete with mounting hardware, three sets of steel guards, and chains (to secure it to non-flanged pipes).

The NLB Flex Lance Tube Back-Out Preventer is designed to give the operator an easy way to position the flexible lance in front of the tube to be cleaned, and provide a safety system to keep the lance from accidentally withdrawing from the tube. Its articulating arm easily attaches to the tube sheet and can quickly be adapted to different sized bundles by adjusting the arm length.

DM15900



NLB Flex Lance Tube Back-Out Preventer

Flex Lance Guards

A flex lance guard fits around the end of the lance to help prevent a nozzle from being pulled out of a tube while under pressure. Each NLB model fits a variety of lance diameters, thanks to a series of interchangeable stops.



LG-1525A

Part Number	Minimum Tube I.D.	Stops Included for Nozzle O.D.
LG-1525A	0.81" (20.6 mm)	.320" (8.1 mm) .450" (11.4 mm) .515" (13.1 mm)
LG-1525B	1.00" (25.4 mm)	.320" (8.1 mm) .450" (11.4 mm) .515" (13.1 mm)

Pipe and Tube Nozzles



The nozzles shown on the next few pages are designed to work with NLB flex and rigid lances (pages 30-33). All thread on easily and deliver a spraying pattern optimized for your application; the pipe cleaning nozzles also provide back pressure to propel themselves through clogged pipes.

Each NLB nozzle is custom-drilled, using precision machining

techniques, to your specific pressure and flow requirements. Standard drill locations are Straight, 45° Front, 90°, and 45° Back, with as many orifices as the job demands. If you are not sure of the best pattern, NLB will be pleased to recommend one. We can also help you choose the best nozzle for a your tube or pipe I.D., and for your high-pressure pump unit.

NOZZLE FAMILIES



Standard
for general cleaning



Triple-Row
removes soft material



Button
moves easily around bends



Polishing
rotating action removes hard deposits and polishes

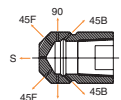
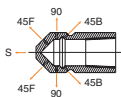
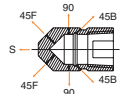
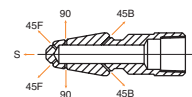
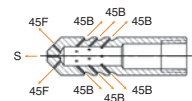
10K Standard



Part Number	Max. Pressure	Diameter	Length	Thread
T-21	10,000 psi (700 bar)	.375" (9.5 mm)	1.38" (35.1 mm)	1/16" NPT
T-1	10,000 psi (700 bar)	.46" (11.7 mm)	1.10" (27.9 mm)	1/8" NPT (1/8" BSP)* (M7 x 1)†
T-3	13,000 psi (900 bar)	.63" (16.0 mm)	1.10" (27.9 mm)	1/4" NPT (1/4" BSP)* (M8 x 1)†
P-2	13,000 psi (900 bar)	.88" (22.4 mm)	1.75" (44.5 mm)	3/8" NPT (3/8" BSP)* (M10)†
P-5	10,000 psi (700 bar)	1.13" (28.7 mm)	1.63" (41.4 mm)	1/2" NPT (1/2" BSP)*

* For British Standard Pipe thread, add "B" to part number.

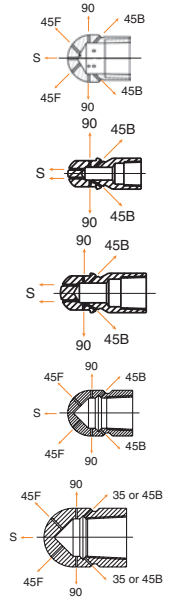
† For metric (DIN) pipe thread, add "D" to part number.



10K Button



Part Number	Max. Pressure	Diameter	Length	Thread
T-20	10,000 psi (700 bar)	.375" (9.5 mm)	.35" (8.9 mm)	1/16" NPT
T-13	13,000 psi (900 bar)	.49" (12.5 mm)	1.16" (29.5 mm)	1/8" NPT (1/8" BSP)* (M7 x 1)†
T-14	13,000 psi (900 bar)	.625" (15.9 mm)	1.36" (34.5 mm)	1/4" NPT (1/4" BSP)* (M8 x 1)†
P-3	13,000 psi (900 bar)	.88" (22.4 mm)	1.25" (31.8 mm)	3/8" NPT (3/8" BSP)* (M10)†
P-6	10,000 psi (700 bar)	1.13" (28.7 mm)	1.59" (40.4 mm)	1/2" NPT (1/2" BSP)*



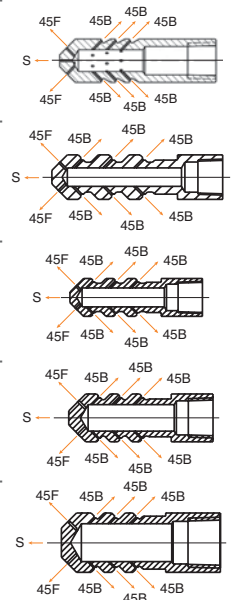
* For British Standard Pipe thread, add "B" to part number.

† For metric (DIN) pipe thread, add "D" to part number.

10K Multi Row



Part Number	Max. Pressure	Diameter	Length	Thread
T-21	10,000 psi (700 bar)	.375" (9.5 mm)	1.38" (35.1 mm)	1/16" NPT
T-9	13,000 psi (900 bar)	.49" (12.5 mm)	1.88" (47.8 mm)	1/8" NPT (1/8" BSP)* (M7 x 1)†
T-10	13,000 psi (900 bar)	.625" (15.9 mm)	2.19" (55.6 mm)	1/4" NPT (1/4" BSP)* (M8 x 1)†
P-14	13,000 psi (900 bar)	.79" (20.1 mm)	2.38" (60.5 mm)	3/8" NPT (3/8" BSP)* (M10)†
P-15	10,000 psi (700 bar)	.98" (24.9 mm)	2.63" (66.8 mm)	1/2" NPT (1/2" BSP)*








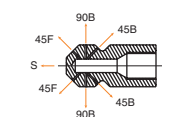
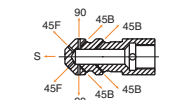
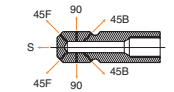
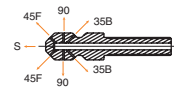
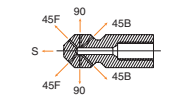
* For British Standard Pipe thread, add "B" to part number.

† For metric (DIN) pipe thread, add "D" to part number.



Pipe and Tube Nozzles

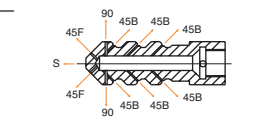
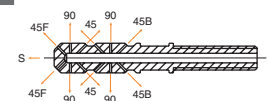
20K Standard

	Part Number	Max. Pressure	Diameter	Length	Thread
	T-1-20K	20,000 psi (1,400 bar)	.46" (11.7 mm)	1.25" (31.8 mm)	1/4" UNF LH
	T-8-20K	20,000 psi (1,400 bar)	.375" (9.5 mm)	1.75" (44.5 mm)	1/4" UNF
	T-3-20K	20,000 psi (1,400 bar)	.563" (14.3 mm)	1.875" (47.6 mm)	3/8" UNF LH
	T-12-20K	20,000 psi (1,400 bar)	.75" (19.1 mm)	1.88" (47.8 mm)	9/16" UNF-LH
	P-2-20K	20,000 psi (1,400 bar)	.875" (22.2 mm)	1.875" (47.6 mm)	9/16" UNF-LH






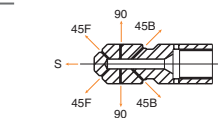
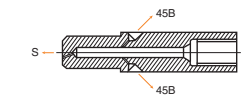
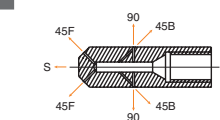
20K Multi Row

	Part Number	Max. Pressure	Diameter	Length	Thread
	T-17-20K	20,000 psi (1,400 bar)	.31" (7.9 mm)	2.12" (53.8 mm)	1/4" UNF
	T-9-20K	20,000 psi (1,400 bar)	.60" (15.2 mm)	1.94" (49.3 mm)	3/8" UNF-LH



40K

	Part Number	Max. Pressure	Diameter	Length	Thread
	DN4133-40K	40,000 psi (2,800 bar)	.50" (12.7 mm)	1.65" (41.9 mm)	3/8" UNF LH
	CN12267	40,000 psi (2,800 bar)	.375" (9.5 mm)	1.65" (41.9 mm)	1/4"-28 UNF LH
	P-3-40K	40,000 psi (2,800 bar)	.75" (19.1 mm)	2.25" (57.2 mm)	9/16" UNF LH



Pipe Cleaning Systems

NLB ROTO-REEL® AUTOMATES PIPE CLEANING

NLB's new automated Roto-Reel® accessories improve pipe cleaning two ways. They save the operator from the strain of feeding the high-pressure hose, and rotate the hose and line mole to maximize the water jet force and simplify getting through tight bends.

Two models are available. The Roto-Reel® 200 is for 20,000 psi (1,400 bar) applications and has a hose capacity of 200 feet (61 m). The Roto-Reel® 500 operates at up to 10,000 psi (700 bar) and can hold up to 500 feet (152 m) of hose. Both:

- Improve cleaning coverage while reducing operator fatigue
- Feed hose out at up to 40 fpm (12 mpm)
- Rotate the reel at 30 rpm
- Come skid-mounted with cage
- Air or hydraulic power

ROTO-REEL® 500

NEW!



ROTO-REEL® 200

NEW!



Model	Max. Pressure	Hose Feed	Hose Capacity	Hose Diameter	Rotation	Dimensions (on skid)	Weight
Roto-Reel® 500	10,000 psi (700 bar)	Out: 40 fpm (12 mpm) In: 60 fpm (18 mpm)	500 ft. (152 m)	3/4" to 1" (19-25 cm)	30 rpm	13' x 6' x 6.5' (4 m x 2 m x 2 m)	3,500 lbs. (1,589 kg)
Roto-Reel® 200	20,000 psi (1,400 bar)	Out: 40 fpm (12 mpm) In: 40 fpm (12 mpm)	200 ft. (61 m)	1/2" (12.7 cm)	30 rpm	9' x 5' x 5.5' (2.75 m x 1.53 m x 1.68 m)	2,500 lbs. (1,134 kg)

NEW!

RHD Rotary Hose Device

For similar labor savings and rotating action in a more mobile package, we also offer the RHD Rotary Hose Device. These are more compact units with adjustable rotation of the hose and line mole from 8 to 100 rpm. Both 12,000 and 20,000 psi (840 and 1,400 bar) models are available; they can be air-powered or hydraulically-powered.



Model	Max. Pressure	Flow	Rotation	Air
RHD-1000	12,000 psi (840 bar)	100 gpm (378 lpm)	8-100 rpm	90 psi @ 100 cfm
RHD-2000	20,000 psi (1,400 bar)	50 gpm (189 lpm)	8-100 rpm	90 psi @ 100 cfm

Pipe and Tube Nozzles



Typhoon™ 10 and 20 Self-Rotating Nozzles

Typhoon™ self-rotating pipe nozzles maximize your pipe and tube cleaning power, with significant improvements to traditional rotating nozzle designs. The rotating action comes from the nozzle instead of the barrel, which focuses the force of the high-pressure water up front, where it can be most effective.

While some leakage is desirable (as lubrication against metal-to-metal friction), an innovative new seal limits it to about half the industry norm. This leakage is distributed at both ends to equalize nozzle wear.

When ordering, please specify cutting/cleaning or polishing nozzles.

Key benefits include:

- 3 styles and 7 models, with varying pressures and flow
- Rotating speeds of up to 7,000 rpm
- Field repairable
- High-grade stainless steel for long life



Typhoon™ 10



The Typhoon™ 10 series is for small tubes; i.e., those with diameters as small as 5/8" (1.6 cm). They operate at pressures from 15,000 to 40,000 psi (700 to 2,800 bar). The first two

digits of the Typhoon part number indicate its pressure and the last two indicate its flow — e.g., RPN2410 is rated for 24,000 psi and 10 gpm.

Part No.	Max. Pressure	Max. Flow	Rotation Speed	Weight	Inlet Connection	O.D.	Length	Pipe Diameter	Polishing Nozzles (4 orifices)	Cutting/Cleaning Nozzles (5 orifices)
RPN1510	15,000 psi (1,035 bar)	10 gpm (38 lpm)	7,000 rpm	2 oz. (0.1 kg)	1/16" Female NPT or 1/8" Female NPT*	0.5" (1.27 cm)	3" (7.6 cm)	5/8" min. (1.6 cm)	CM31983 (10K)	CM31981 (10K)
									CM31985 (15K)	CM31984 (15K)
RPN2410	24,000 psi (1,680 bar)	10 gpm (38 lpm)	7,000 rpm	2 oz. (0.1 kg)	3/8-24 Female, RH or LH**	0.5" (1.27 cm)	3" (7.6 cm)	5/8" min. (1.6 cm min.)	CM31987 (24K)	CM31986 (24K)
RPN1520	15,000 psi (1,035 bar)	20 gpm (76 lpm)	7,000 rpm	4 oz. (0.2 kg)	1/4" Female NPT	0.68" (1.73 cm)	3.75" (9.5 cm)	3/4" min. (1.91 cm min.)	TBD	TBD
RPN2020	20,000 psi (1,400 bar)	20 gpm (76 lpm)	7,000 rpm	4 oz. (0.2 kg)	3/8-24 Female, RH or LH*	0.68" (1.73 cm)	3.75" (9.5 cm)	3/4" min. (1.91 cm min.)	TBD	TBD
RPN4009	40,000 psi (2,800 bar)	9 gpm (34 lpm)	7,000 rpm	4 oz. (0.2 kg)	HP 3/8-24 Female	.68" (1.73 cm)	4-3/4" (12.1 cm)	3/4" min. (1.91 cm min.)	TBD	TBD

NOTE: Rebuild kits are available for the RPN2420 (order RPN2420-RPKT).

*When ordering, add -1/8 or -1/16 to part number. **When ordering, add -RH or -LH to part number.



Typhoon™ 20 (RPN2420)



The Typhoon™ 20 rotating nozzle is designed for pipe diameters from 6 to 10 inches (15.2 – 25.4 cm). It operates at up to 24,000 psi (1,680 bar) and flow up to 20 gpm (76 lpm), rotating at 50 to 500 rpm.

The Typhoon 20 has five sapphire nozzles positioned for peak

efficiency, one in front and four on the sides. The body is precision-machined of stainless steel for long life and weighs just 3 lbs. (1.35 kg). A viscous oil brake insures superior speed control.

*BN10095-xx, 3/8"-24 (see page 23 and pages 98-99)

Part No.	Max. Pressure	Max. Flow	Rotation Speed	Weight	Inlet Connection	O.D.	Length	Pipe Diameter
RPN2420	24,000 psi (1,680 bar)	20 gpm (76 lpm)	50-500 rpm	3 lbs. (1.35 kg)	3/4" Type M	2.5" (6.4 cm)	4" (10.2 cm)	6"-10" (15.2-25.4 cm)

NOTE: Rebuild kits are available for the RPN2420 (order RPN2420-RPKT).

NEW! Typhoon™ 60 Self-Rotating Nozzle

Typhoon™ 60 (RPN2460)



Large blocked pipes (up to 50 inches in diameter, or 127 cm) can typically be cleared in a single pass with a new Typhoon™ 60 rotating water jet nozzle. This high-flow, self-propelling nozzle easily clears blockages horizontally, vertically, or in tight elbows. It rotates at up to 500 rpm to maximize the powerful force of 24,000 psi (1,680 bar) water jets. A

viscous oil brake insures superior speed control.

The Typhoon™ 60 uses a nozzle block (see options below) with six high-cohesive nozzles. It weighs 8 lbs. (3.63 kg). Order part number BN11XX, with XX replaced by the size you need.

Part No.	Max. Pressure	Max. Flow	Rotation Speed	Weight	Inlet Connection	O.D.	Length	Pipe Diameter
RPN2460	24,000 psi (1,680 bar)	60 gpm (227 lpm)	50-500 rpm	8 lbs. (3.63 kg)	3/4" Type M	2.75" (7 cm)	10" (25.4 cm)	11"-50" (28-127 cm)

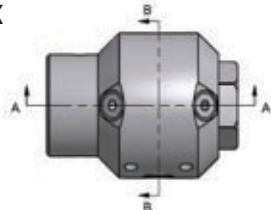
NOTE: Rebuild kits are available for the RPN2460 (order RPN2460-RPKT).

Nozzle Blocks and Centering Guides for the RPN2460

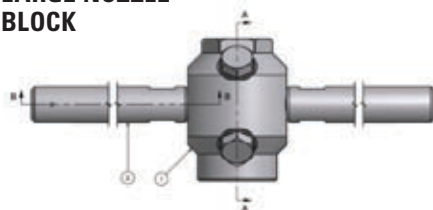
Four nozzle blocks are available for the RPN2460 — two small (for diameters 6" to 10") and two large (for 11" to 50").

Each has two drive nozzles and four ports (2 forward, 2 backward) for nozzle inserts. The ports on the large nozzle blocks also accept nozzle arms of various lengths. Consult NLB to determine which nozzles and arms are best for your application.

SMALL NOZZLE BLOCK



LARGE NOZZLE BLOCK



NLB also offers four centering guides to make pipe cleaning more efficient and avoid impact with the interior walls.

SMALL CENTERING GUIDE

CM28667
6"-10" (152 mm-254 mm)



LARGE CENTERING GUIDE

BM28318
11"-26" (279 mm-660 mm)

CM28319
24"-40" (610 mm-1 m)

CM28320
40"-50" (1 m-1.35 m)



Part No.	Pressure Rating	Flow*	Block Size
CM28822	24,000 psi (1,680 bar)	20 gpm (77 lpm)	Small
CM28806	24,000 psi (1,680 bar)	30 gpm (114 lpm)	Small
CM28823	24,000 psi (1,680 bar)	20 gpm (77 lpm)	Large
CM28807	24,000 psi (1,680 bar)	30 gpm (114 lpm)	Large

*This much of the total flow is required to drive the nozzle rotation.

Pipe and Tube Nozzles

Line Moles

For large pipes — diameters of 4" (100mm) and more — you need NLB line moles. Simply thread one on the end of your lance for most jobs, or connect a towline to the forward port for really long runs or vertical pipes. Metric threads and British Standard Pipe threads are available.

Nozzles for NLB line moles are chosen to suit your application, as are the number and location of orifices where they will be inserted. All orifices must be filled with a nozzle or plug for efficient operation. For selection, refer to Page 22. All orifice threads are 1/4" MNPT.



P-7-X



P-9-24



P-10

Part No.	Pressure Rating	Inlet	Body Diameter	Length	Orifices
P-7-5	10,000 psi (700 bar)	1/2" NPT	2.2"	2-3/8"	5
P-7-7	10,000 psi (700 bar)	1/2" NPT	2.2"	2-3/8"	7
P-9-25	10,000 psi (700 bar)	1/2" NPT	2.5"	3-1/8"	25
P-10	10,000 psi (700 bar)	1" NPT	3.0"	3-3/4"	10
P-7-4-15K	15,000 psi (1,035 bar)	1/2" NPT	2.2"	2-3/8"	4
P-9-24-15K	15,000 psi (1,035 bar)	1/2" NPT	2.5"	2-3/4"	24
P-7-4-20K	20,000 psi (1,400 bar)	3/4"-16 LHF	2.2"	2-3/8"	4
P-7-20K-5	20,000 psi (1,400 bar)	3/4"-16 LHF	2.2"	2-3/8"	5
P-7-7-20K	20,000 psi (1,400 bar)	3/4"-16 LHF	2.2"	2-3/8"	7
P-9-24-20K	20,000 psi (1,400 bar)	9/16"-18 LHF	2.5"	2-3/4"	24
P-9-25-20K	20,000 psi (1,400 bar)	9/16"-18 LHF	2.5"	3-1/8"	25

Rotating Line Moles

A rotating line mole on a flex or rigid lance quickly blasts through hard deposits in pipes and tubes, polishing the I.D. as it goes.

NLB's new family has over 40 models for tubes from 1/2-inch to 1-1/2-inch (12.7 mm to 38.1 mm). Choose the pressure (10,000 or 20,000 psi, 700 or 1,400 bar), thread (left-hand or right-hand) and rotating action (standard or custom drill patterns) that best suit your needs.

NLB's RLM nozzles have wrench flats to simplify attachment to the lance. Worn parts can be replaced in the field in less than five minutes with a simple rebuild kit, minimizing downtime.



10K and 20K RLM Nozzles



RLM-2-10K-A



RLM-2-20K-AM

	Nozzle	Pressure Rating	Inlet Thread	O.D. (Inch)	Length (Inch)	Max Flow Rate (GPM)	Nozzle Pattern*
RLM-2-10K Family	RLM-2-10K-A	10,000 psi (700 bar)	1/16" Female NPT	0.415	1.93	5	2@30F 6@45B
	RLM-2-10K-C	10,000 psi (700 bar)	1/16" Female NPT	0.415	1.93	5	Blank
RLM-3-10K Family	RLM-3-10K-A	10,000 psi (700 bar)	1/8" Female NPT	0.515	2.32	10	1@S 3@50B
	RLM-3-10K-C	10,000 psi (700 bar)	1/8" Female NPT	0.515	2.32	10	Blank
	RLM-3-10K-H	10,000 psi (700 bar)	1/8" Female NPT	0.515	2.32	10	Custom Drilled
RLM-4-10K Family	RLM-4-10K-A	10,000 psi (700 bar)	1/4" Female NPT	0.66	2.88	12	1@S 3@30F 6@45B
	RLM-4-10K-H	10,000 psi (700 bar)	1/4" Female NPT	0.66	2.88	12	Custom Drilled
RLM-5-10K Family	RLM-5-10K-A	10,000 psi (700 bar)	1/2" Female NPT	1.04	4.12	25	1@S 3@50B
RLM-2-20K Family	RLM-2-20K-AF	20,000 psi (1,400 bar)	1/4"-28 UNF Female Left	0.375	1.6	8	1@S 3@30B
	RLM-2-20K-AFR	20,000 psi (1,400 bar)	1/4"-28 UNF Female Right	0.375	1.6	8	1@S 3@30B
	RLM-2-20K-AM	20,000 psi (1,400 bar)	1/4"-28 UNF Male Right	0.375	1.6	8	1@S 3@30B
	RLM-2-20K-BF	20,000 psi (1,400 bar)	1/4"-28 UNF Female Left	0.375	1.6	8	Blank
	RLM-2-20K-BFR	20,000 psi (1,400 bar)	1/4"-28 UNF Female Right	0.375	1.6	8	Blank
	RLM-2-20K-BM	20,000 psi (1,400 bar)	1/4"-28 UNF Male Right	0.375	1.6	8	Blank
	RLM-2-20K-CF	20,000 psi (1,400 bar)	1/4"-28 UNF Female Left	0.375	1.6	8	Blank
	RLM-2-20K-CFR	20,000 psi (1,400 bar)	1/4"-28 UNF Female Right	0.375	1.6	8	Blank
	RLM-2-20K-DF	20,000 psi (1,400 bar)	1/4"-28 UNF Female Left	0.375	1.6	8	1@S 2@45F 6@45B
	RLM-2-20K-DFR	20,000 psi (1,400 bar)	1/4"-28 UNF Female Right	0.375	1.6	8	1@S 2@45F 6@45B
	RLM-2-20K-EF	20,000 psi (1,400 bar)	1/4"-28 UNF Female Left	0.375	1.6	8	1@S 6@45B
	RLM-2-20K-EFR	20,000 psi (1,400 bar)	1/4"-28 UNF Female Right	0.375	1.6	8	1@S 6@45B
	RLM-2-20K-HF	20,000 psi (1,400 bar)	1/4"-28 UNF Female Left	0.375	1.6	8	Custom Drilled
	RLM-2-20K-HFR	20,000 psi (1,400 bar)	1/4"-28 UNF Female Right	0.375	1.6	8	Custom Drilled
	RLM-2-20K-HM	20,000 psi (1,400 bar)	1/4"-28 UNF Male Right	0.375	1.6	8	Custom Drilled
RLM-4-20K Family	RLM-4-20K-A	20,000 psi (1,400 bar)	3/8"-24 UNF Female Left	0.496	3	10	1@S 4@60B
	RLM-4-20K-AR	20,000 psi (1,400 bar)	3/8"-24 UNF Female Right	0.496	3	10	1@S 4@60B
	RLM-4-20K-B	20,000 psi (1,400 bar)	3/8"-24 UNF Female Left	0.496	3	10	Blank
	RLM-4-20K-BR	20,000 psi (1,400 bar)	3/8"-24 UNF Female Right	0.496	3	10	Blank
	RLM-4-20K-CF	20,000 psi (1,400 bar)	3/8"-24 UNF Female Left	0.496	3.1	10	Blank
	RLM-4-20K-CFR	20,000 psi (1,400 bar)	3/8"-24 UNF Female Right	0.496	3.1	10	Blank
	RLM-4-20K-D	20,000 psi (1,400 bar)	3/8"-24 UNF Female Left	0.496	3.1	10	1@S 3@45F 6@45B
	RLM-4-20K-DR	20,000 psi (1,400 bar)	3/8"-24 UNF Female Right	0.496	3.1	10	1@S 3@45F 6@45B
	RLM-4-20K-E	20,000 psi (1,400 bar)	3/8"-24 UNF Female Left	0.496	3.1	10	1@S 6@45B
	RLM-4-20K-ER	20,000 psi (1,400 bar)	3/8"-24 UNF Female Right	0.496	3.1	10	1@S 6@45B
	RLM-4-20K-H	20,000 psi (1,400 bar)	3/8"-24 UNF Female Left	0.496	3	10	Blank
	RLM-4-20K-HR	20,000 psi (1,400 bar)	3/8"-24 UNF Female Right	0.496	3	10	Blank
RLM-6-20K Family	RLM-6-20K-A	20,000 psi (1,400 bar)	9/16"-18 UNF Left	0.744	4	18	1@S 6@60B
	RLM-6-20K-AR	20,000 psi (1,400 bar)	9/16"-18 UNF Right	0.744	4	18	1@S 6@60B
	RLM-6-20K-B	20,000 psi (1,400 bar)	9/16"-18 UNF Left	0.744	4	18	Blank
	RLM-6-20K-BR	20,000 psi (1,400 bar)	9/16"-18 UNF Right	0.744	4	18	Blank
	RLM-6-20K-D	20,000 psi (1,400 bar)	9/16"-18 UNF Left	0.744	4.18	18	1@S 3@45F 6@45B
	RLM-6-20K-DR	20,000 psi (1,400 bar)	9/16"-18 UNF Right	0.744	4.18	18	1@S 3@45F 6@45B
	RLM-6-20K-H	20,000 psi (1,400 bar)	9/16"-18 UNF Left	0.744	4	18	Custom Drilled
	RLM-6-20K-HR	20,000 psi (1,400 bar)	9/16"-18 UNF Right	0.744	4	18	Custom Drilled

*S - straight-ahead jet, F - forward-facing jet, B - backward-facing jet

Tube Lancers



NLB's automated and semi-automated tube lancers clean heat exchanger tubes in a fraction of the time required by manual methods. They minimize the exposure of operating personnel to debris and high-pressure water and take the variability out of the cleaning process.

No one has more tube lancing

solutions than NLB. We offer rigid or flexible lance systems at pressures up to 20,000 or 40,000 psi (1,400 to 2,800 bar). Systems are available to insert one, two, three or five lances into a tube bundle at once, for maximum productivity. All are easy to set up and operate, with push-button or remote controls.

LET NLB IMPROVE YOUR TUBE LANCING PRODUCTIVITY

NLB's automated tube lancers can be customized to suit your needs. Each system comes configured to clean tubes with lengths to 20' (6.1 m), but longer lengths can be accommodated. The systems can

also be configured to use rotating or non-rotating lances, and the number of lances can vary from one to seven. Heavy-gauge aluminum construction resists corrosion and assures long life.

FEATURES/BENEFITS:

- Higher productivity rates than manual cleaning
- Minimizes operator exposure to debris and high-pressure water
- Simplifies cleaning of tubes up to 72' (22 m) long

Rigid Lance Systems

NLB offers rigid lance systems in 10,000 psi, 20,000 psi and 40,000 psi (700, 1,400 and 2,800 bar). Key features include:

- Multiple lances to accommodate different tube patterns
- Rotary option to clean and polish (fewer nozzle orifices, more flow)
- X, Y and Z movements are pneumatically controlled
- Portable and easy to set up
- Optional operator station has seat and climate control

Systems are configured to your needs, as indicated by the part number. Choices include air or hydraulic power, number of lances (rotating or fixed), stroke length, and controls (on a stand, or wireless).



ATL-4010AR1-22C

1 2 3 4 5 6

1. **4010** - 40,000 psi, designed in 2010
2. **A** - air power (or H for hydraulic)
3. **R** - rotating lances (or F for fixed lances)
4. **1** - number of lances
5. **22** - stroke length; e.g. 22" for a 20" bundle (other options: 32, 42 or 52)
6. **C** - control stand (or W for wireless controls)

Part Number	Max. Pressure	Max. Flow	Inlet Connection	Max. Speed	Tube Length
ATL-1010	10,000 psi (700 bar)	12 gpm (45 lpm) per lance	NPT	2 ft./sec. (61 cm/sec.)	20' (6.1 m) Standard
ATL-2010	20,000 psi (1,400 bar)	12 gpm (45 lpm) per lance	MP	2 ft./sec. (61 cm/sec.)	20' (6.1 m) Standard
ATL-4010	40,000 psi (2,800 bar)	11 gpm (42 lpm) per lance	HP	2 ft./sec. (61 cm/sec.)	20' (6.1 m) Standard

ATL-5000

The ATL-5000, a new, fully-automated water jet system from NLB Corp., cleans tube bundles three times faster than manual methods and sets new standards for operator comfort and protection. An adjustable lance stroke allows the system to be configured for bundles of various lengths up to 30 feet (98.4m).

The system has five rigid lances, each with a specially-designed nozzle to deliver high-pressure water (up to 20,000 psi, or 1,400 bar) to clear the tubes of hardened debris. A powerful hydraulic drive inserts the five lances at a rate of 39" (1m) per second, then withdraws them so they can be positioned to clean the next five tubes. All movements (in/out, up/down and left/right) are controlled by the operator from a convenient overhead station, which provides excellent visibility at a safe distance from the action. The operator can even rotate the bundles with the optional bundle roller control package.

The diesel-powered ATL-5000 is completely self-contained. It requires no external power or air supply and can be taken by trailer to jobsites. Exclusive features include a lockout to prevent accidental actuation and an optional HVAC package to keep the operator station cool and comfortable.

Part Number	Max. Pressure	Max. Flow	Inlet Connection	Max. Speed	Stroke Length
ATL-5000	20,000 psi (1,400 bar)	50 gpm (504 lpm) per lance	MP	39 in./sec. (1 m/sec.)	35' (10.7 m) Standard



Tube Lancers

Flexible Lance Systems

SAFLEX™ 2000

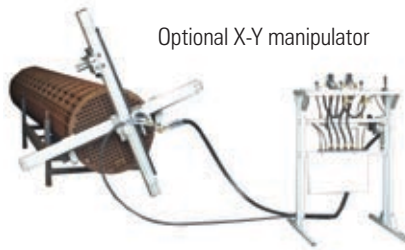
The Saflex™ 2000 system makes it easy for an operator to clean two tubes at once, at a more consistent pace than manual cleaning. He simply positions the lances at the tube openings and indexes them in and out. There are three ways to do this:

1. Manually, with push-button controls on the lance
2. Optional X-Y manipulator, controlled from a stand
3. Remotely, using optional wireless controls

The Saflex 2000 is completely portable and sets up quickly. The system is contained on a cart, which can include an optional dump valve (not shown).



Basic system with manual positioning



Optional X-Y manipulator



Wireless controls

Model	Max. Pressure	Max. Speed	No. of Lances	Size
Saflex 2000	40,000 psi (2,800 bar)	2 ft./sec. (0.61 m/sec.)	2	31" L x 28" W x 50" high (.78m x .71m x 1.27m)

SAFLEX™ 3000

The Saflex™ 3000 semi-automated water jet system has wireless controls that let the operator stand well clear of the action. It typically cleans 100 tubes in under three hours, compared to 16 hours for manual water jetting.

Operating at up to 40,000 psi (2,800 bar), the Saflex™ 3000 inserts three flexible lances at once. Stroke length is adjustable for different bundle sizes and a simple hose change adapts the system for tube diameters from 4 mm to 15 mm. The flex lances are indexed by a track drive system, which eliminates the need for a hose reel.



Model	Max. Pressure	Max. Speed	No. of Lances	Size
Saflex 3000	40,000 psi (2,800 bar)	2 ft./sec. (0.61 m/sec.)	3	97" L x 46" W x 86" H (2.46m x 1.16m x 2.18m)

Shellside Cleaners



High-pressure water jetting brings the same benefits to exterior heat exchanger cleaning as it does to tube lancing. NLB has two automated shellside cleaners, which move nozzles robotically from one end of a tube bundle to another to blast away hardened deposits.

Key benefits include:

- More thorough and productive than manual cleaning

- Minimizes operator risk from debris and high-pressure water
- Cleans bundles up to 25 feet long (7.6 m)
- Hydraulic crane positions cleaning head
- No electrical hook-up required
- All operating controls on a convenient console
- Custom-engineered systems available

AUTOMATE YOUR HEAT EXCHANGER CLEANING

NLB has two standard models, both trailer-mounted with a hydraulic crane to position the water jet head over bundles up to 25 feet long (7.6m). Hydraulically-actuated rollers

turn the bundle to assure thorough cleaning and simplify loading and unloading. The NLB SSC9200A allows a second bundle to be positioned while the first is being

cleaned, doubling throughput. The economical NLB SSC8900A cleans one bundle at a time.



SSC9200A

Max. Pressure	Max. Flow	Bundle Length	Bundle Diameter	Traveller Speed
10,000 psi (700 bar)	140 gpm (530 lpm)	8' to 25' (2.4m to 7.6m)	2' to 8' (.6m to 2.4m)	0-1 ft./sec. (0-0.3m/sec.)



SSC8900A

Max. Pressure	Max. Flow	Bundle Length	Bundle Diameter	Traveller Speed
10,000 psi (700 bar)	100 gpm (379 lpm)	8' to 25' (2.4m to 7.6m)	2' to 8' (.6m to 2.4m)	0-1 ft./sec. (0-0.3m/sec.)

Abrasive Cutting



With an abrasive cutting system from NLB, you can slice through concrete with rebar, cut inspection openings in petrochemical tanks, and cut up composites and many other hard materials.

An automated NLB system includes a self-focusing cutting head (24,000 or 40,000 psi, *1,680 or 2,800 bar*), pipe cutter or track crawler, and hydraulic or pneumatic power unit with control stand. A hopper with metering discs to feed the abrasive are also required.

Features and benefits include:

- adjustable nozzle angles
- speed is adjustable from 0.5" to 18" (*1 cm to 46 cm*) per minute
- vertical or horizontal cuts
- cuts round or flat materials
- hydraulic or air drive

SEVEN GOOD REASONS TO CUT WITH WATER JETS

Many years of experience have shown that the combination of high-pressure water jets and abrasive has some major advantages over other cutting methods.

- 1) Clean cuts, without burrs, slag or warping
- 2) Leaves a smooth edge, with minimal kerf loss
- 3) Less dust, noise and heat
- 4) Without heat build-up, no thermal distortion or changes in metallurgy
- 5) Cuts a variety of materials and shapes
- 6) Easily automated to save labor and improve productivity
- 7) Spark-free, for use in explosive areas

Abrasive Cutting Head - 24,000 psi (1,680 bar)

- Replaceable nozzle features carbide insert
- Compact and lightweight to work with NLB cutter or crawler systems
- Available flows from 1 to 4 gpm (*3.8 to 15.1 lpm*)
- Stainless steel body for long life

NLB-24K-ACSA



Abrasive Cutting Head - 40,000 psi (2,800 bar)

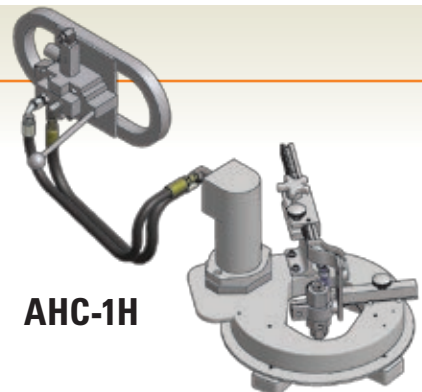
- Ultra-high pressure water with abrasive creates powerful cutting force
- Adjusting rings assure proper angular and lateral alignment
- Includes sapphire orifice nozzle BN3539
- Requires connection kit BA8223

NLB7790



Hole Cutter

- Cuts perfect holes in diameters from 1 inch to 8 inches (*25.4 mm to 203 mm*)
- Compatible with 24,000 psi and 40,000 psi abrasive cutting heads
- Available with magnetic or suction cup mounting system



AHC-1H

Abrasive Pipe Cutter, 20K-APC-1A

- Rugged, yet lightweight
- Chain guides nozzle assembly around pipe
- Adjustable to pipes of different diameters
- Adjustable speed and nozzle angle
- Requires NLB abrasive cutting head
- Hydraulic standard; for optional air power order Part No. 20K-APC-1AP



Abrasive Hoppers

- NLB-300-AC holds 300 lbs. (136 kg) of abrasive
- NLB-600-AC holds 600 lbs. (272 kg) of abrasive
- Both include NLB metering kit DM5820-05, with discs for 11 flow rates (see table)
- Pressurized hoppers available



NLB-300-AC

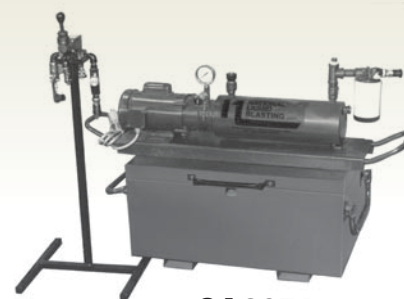
Abrasive Track Crawler, NLB ATS-1

- 4' (1.2 m) heavy-duty stainless steel track in sections for long, continuous cuts
- Lightweight steel base
- Requires NLB abrasive cutting head
- Hydraulic standard; for optional air power order Part No. ATS-1P
- Held in place magnetically or by pneumatic suction cups (8 cfm per section)
- For straight cuts or radial up to 3' (91 cm), order DA9687 (suction cup) or DA33377 (magnetic)
- For radial cuts of 4" to 4' (10 cm to 1.2 m), order DA9688 (suction cup) or DA3338 (magnetic)



Drive and Control Unit

- Adjusts nozzle speed from 0.5" to 18" (1 to 46 cm) per minute
- Hydraulic unit standard with Pipe Cutter or Track Crawler; pneumatic option available
- Model CA2674 — 1/2 hp (.37 kW), 110 volt AC
- Includes Control Stand, BA1969 for forward/reverse and speed adjustment



CA2674

Metering Disc Kit DM5820-05 (with hopper)

Part Number	Disc Size	Flow Rate Per Minute, #36 or #50 Garnet	Flow Rate Per Minute, #80 Garnet*	Flow Rate Per Minute, Silica Sand**
CA2031	10	1 lb./min. (0.5 kg/min.)	1.1 lbs./min. (0.5 kg/min.)	0.7 lbs./min. (0.3 kg/min.)
CA2032	15	1.5 lbs./min. (0.7 kg/min.)	1.6 lbs./min. (0.7 kg/min.)	1.1 lbs./min. (0.5 kg/min.)
CA2033	20	2 lbs./min. (0.9 kg/min.)	2.1 lbs./min. (0.9 kg/min.)	1.5 lbs./min. (0.7 kg/min.)
CA2034	30	3 lbs./min. (1.4 kg/min.)	3.2 lbs./min. (1.5 kg/min.)	2.2 lbs./min. (1.0 kg/min.)
CA2035	40	4 lbs./min. (1.8 kg/min.)	4.2 lbs./min. (1.9 kg/min.)	2.9 lbs./min. (1.3 kg/min.)
CA2036	50	5 lbs./min. (2.3 kg/min.)	5.3 lbs./min. (2.4 kg/min.)	3.7 lbs./min. (1.7 kg/min.)
CA2037	60	6 lbs./min. (2.7 kg/min.)	6.4 lbs./min. (2.9 kg/min.)	4.4 lbs./min. (2.0 kg/min.)
CA2038	70	7 lbs./min. (3.2 kg/min.)	7.4 lbs./min. (3.4 kg/min.)	5.1 lbs./min. (2.3 kg/min.)
CA2039	80	8 lbs./min. (3.6 kg/min.)	8.5 lbs./min. (3.8 kg/min.)	5.6 lbs./min. (2.5 kg/min.)
CA2040	90	9 lbs./min. (4.1 kg/min.)	9.5 lbs./min. (4.3 kg/min.)	6.6 lbs./min. (3.0 kg/min.)
CA2041	100	10 lbs./min. (4.5 kg/min.)	10.6 lbs./min. (4.8 kg/min.)	7.3 lbs./min. (3.3 kg/min.)

*The flow rate of #80 Garnet is approximately 6% higher than #36 or #50.

**Silica sand is used for wet abrasive blasting, but not recommended for abrasive cutting.

SPIN JET® Floor and Grate Cleaners



NLB's patented SPIN JET® rotating spray system has long been one of the water jet industry's most effective tools. Our SPIN JET® floor and grate cleaners (maneuvered like a lawn mower) were originally designed to remove overspray from paint booth grates. Today they are also widely used for removing floor and ship deck coatings, highway stripes, runway rubber, and more... and even for concrete scarification.

SPIN JET® units reduce labor, operating costs and energy use.

We offer seven ergonomic models with a range of pressures, flows and cleaning path widths. Standard features include a dump valve that instantly reduces water pressure to near-zero and shields over moving components, hose and quick-disconnects. Rotary seal and dump valve repair kits are available. Options include 4-arm and 6-arm configurations and pneumatic or hard rubber tires. Some models have vacuum recovery.

HOW TO CHOOSE A SPIN JET® UNIT

Self-rotating seals are recommended for most applications, as they allow faster rotating speeds without any power connection. However, pneumatically or hydraulically powered seals are excellent for controlling speed when flow rates are low. Here's a quick comparison:

Self-rotating

- Faster rotation speeds
- No need for compressed air
- Only one hose hook-up
- Economical to operate and maintain

Powered

- Consistent speed at low flows
- Ideal with lower horsepower pumps
- Pneumatic



36-9900-15A

Seal Part No.	Discharge Pressure (Max.)	Max. Flow	Rotation Speed	Air	Weight	Width	Nozzles
DRS12481	40,000 psi (2,800 bar)	11 gpm (42 lpm)	2,000 rpm	65 psi @ 50 cfm (4.5 bar @ 23.6 l/s)	120 lbs. (54.5 kg)	16" (41 cm)	Up to 15

Recommended Spare Parts Kit: 36-9900-15A-1



36-9950-15A

Seal Part No.	Discharge Pressure (Max.)	Max. Flow	Rotation Speed	Air	Weight	Width	Nozzles
DRS12481	40,000 psi (2,800 bar)	11 gpm (42 lpm)	2,000 rpm	65 psi @ 50 cfm (4.5 bar @ 23.6 l/s)	138 lbs. (62.7 kg)	16" (41 cm)	Up to 15

Recommended Spare Parts Kit: 36-9950-15A-1



1115

Type	Seal Part No.	Discharge Pressure (Max.)	Max. Flow	Rotation Speed	Weight	Available Widths	Dump Valve Part No.
Self-Rotating	NLB1535	10,000 psi (700 bar)	50 gpm (189 lpm)	3,000 rpm	267 lbs. (121 kg)	18", 24", 30" (45, 61, 76 cm)	V-550



1550

Type	Seal Part No.	Discharge Pressure (Max.)	Max. Flow	Rotation Speed	Weight	Available Widths	Dump Valve Part No.
Self-Rotating	NLB1535	10,000 psi (700 bar)	50 gpm (189 lpm)	3,000 rpm	250 lbs. (114 kg)	20" (50 cm)	V-550



10-9900-15A and 24-9900-15A

Type	Seal Part No.	Discharge Pressure (Max.)	Max. Flow	Rotation Speed	Weight	Cleaning Width	Dump Valve Part No.
Air-Powered	DM17135	10,000 psi (700 bar)	32 gpm (121 lpm)	2,000 rpm	160-295 lbs. (73-134 kg)	13" (330 cm)	DM16940
Air-Powered	DM24431	24,000 psi (1,680 bar)	20 gpm (76 lpm)	2,000 rpm	180-235 lbs. (82-107 kg)	13" (330 cm)	DM24495



1115-20K

Type	Seal Part No.	Discharge Pressure (Max.)	Max. Flow	Rotation Speed	Weight	Available Widths	Dump Valve Part No.
Self-Rotating	NLB3620-2	20,000 (1,400 bar)	25 gpm (95 lpm)	3,000 rpm	270 lbs. (123 kg)	18", 24" (45, 61 cm)	CV8274



1550-20K

Type	Seal Part No.	Discharge Pressure (Max.)	Max. Flow	Rotation Speed	Weight	Available Widths	Dump Valve Part No.
Self-Rotating	NLB3620	20,000 psi (1,400 bar)	50 gpm (190 lpm)	3,000 rpm	250 lbs. (114 kg)	20" (50 cm)	V20-550-00

SPIN JET® Plate-Mounted



Rotating SPIN JET® units are often mounted in place for automated water jet applications, such as parts and fixture cleaning systems, or casting removal. NLB custom-engineers these systems to meet individual application requirements and specifications. For detail areas requiring precise control, smaller units can be mounted on robots.

Key features include:

- Range of pressures — 10,000 to 40,000 psi (700 to 2,800 bar) — and flows
- Choice of self-rotating, air, electric, or hydraulic
- Versatile mounting bracket adapts to a wide range of fixtures
- Quick-change packing for fast, easy maintenance
- Rugged stainless steel housings

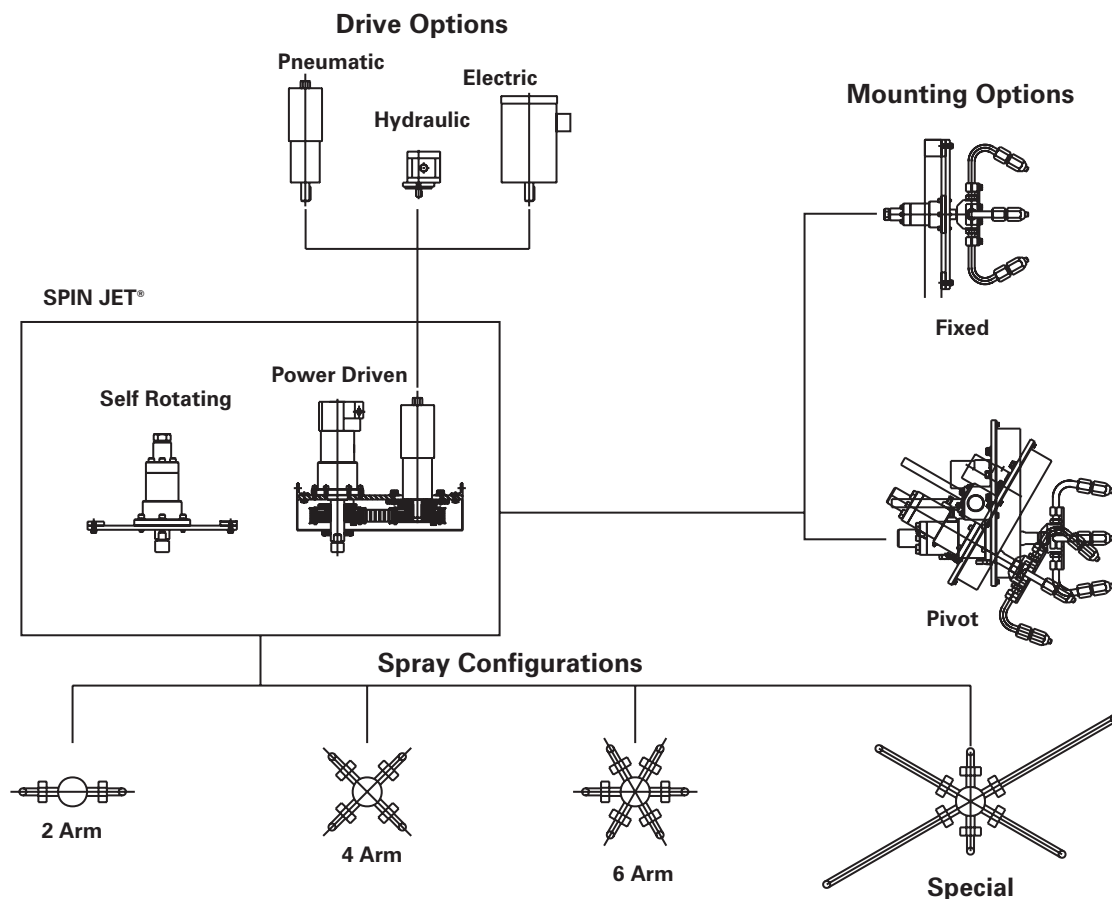
ROTATING WATER JET POWER, CUSTOMIZED FOR YOUR APPLICATION

NLB's plate-mounted SPIN JETs can be configured to match your exact needs. Many customers choose a self-rotating nozzle for ease of use and low maintenance, but if you need better control over rotation

speed, we offer pneumatic, hydraulic and electric drive options.

The area of coverage can also be customized to your application, using our wide range of nozzle angles and

nozzle arm configurations. Please contact the NLB Customer Service Department for help in ordering the right plate-mounted SPIN JETs for your job.



How to Order

Plate-mounted SPIN JET® units are available with a choice of drives, indicated by a letter following the model number: A, H, E, or S. For example:

Model No.	Drive
NLB1200A	Air
NLB1200H	Hydraulic
NLB1200E	Electric
NLB1200S	Self-rotating

Operating pressure for all these models is 10,000 psi (700 bar). Models operating at up to 20,000 psi (1,400 bar) are indicated by the suffix, -20K (e.g., NLB1200A-20K). Ultra-high pressure models (up to 40,000 psi, or 2,800 bar) are indicated by the suffix, -40K (e.g. NLB1300A-40K).



Every plate-mounted SPIN JET® is configured to your application; consult NLB for complete information

High Flow

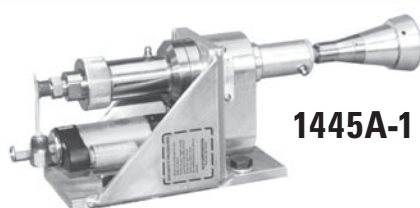
- Pressure up to 20,000 psi (1,400 bar)
- Flow up to 100 gpm (379 lpm)

Model No.	Max. Pressure	Max. Flow	Max. Rotation Speed	Est. Weight	Inlet
1200	10,000 psi (700 bar)	100 gpm (379 lpm)	3,000 rpm	120 lbs. (55 kg)	1/2" NPTF
1200-20K	20,000 psi (1,400 bar)	50 gpm (189 lpm)	3,000 rpm	120 lbs. (55 kg)	3/4" MP

Measurements for height, width and length are all approximate.

Robotic Tooling

Tooling shown with standard head; see Page 17 for other nozzle configurations available.



1445A-1

Low Flow

- Pressure up to 20,000 psi (1,400 bar)
- Flow up to 20 gpm (76 lpm)

Model No.	Max. Pressure	Max. Flow	Max. Rotation Speed	Est. Weight	Inlet
1300	10,000 psi (700 bar)	20 gpm (76 lpm)	3,000 rpm	60 lbs. (27 kg)	1/2" NPTF
1300-20K	20,000 psi (1,400 bar)	16 gpm (61 lpm)	3,000 rpm	60 lbs. (27 kg)	3/4" NPTF

Measurements for height, width and length are all approximate.

Ultra-High Pressure

- Pressure up to 40,000 psi (2,800 bar)
- Flow up to 11 gpm (42 lpm)

Model No.	Max. Pressure	Max. Flow	Max. Rotation Speed	Est. Weight	Inlet
1300-40K	40,000 psi (2,800 bar)	11 gpm (42 lpm)	3,000 rpm	60 lbs. (27 kg)	9/16-18" LH HPF

Measurements for height, width and length are all approximate.

Stack and Pipe Cleaners



A self-rotating seal with NLB's patented SPIN JET® technology is the most efficient way to clean large pipes and stacks. As a towline pulls it through the pipe, spray arms (2 or 4) rotate high-pressure water jets 360° for full coverage. The rotational speed is adjustable up to 3,000 rpm.

Choose from **10,000 psi or 20,000 psi models** (700 or 1,400 bar), with many popular features:

- 2 or 4 spray arms
- Various nozzle offsets available
- Operates with cold or hot water
- Built-in magnetic brake to adjust rotating speed up to 3,000 rpm
- Rugged stainless steel construction
- Optional, adjustable guide to center seal in pipe
- Quick-change packing through top cap
- Reconfigurable nozzle blocks for arms up to 15" (38 cm) long

STORM™: DESIGNED FOR HIGH-FLOW APPLICATIONS

NLB's new Storm™ nozzle makes SPIN JET® technology practical in high-flow applications, such as stacks, boilers, furnaces, and cokers. It has a 6-port head that allows multiple arm configurations and a

wide range of angles to meet diverse application requirements.

The Storm is usually used with one of the NLB 605 Series water jet pump units, which delivers unusually high water flow of 150 gpm (568 lpm) at

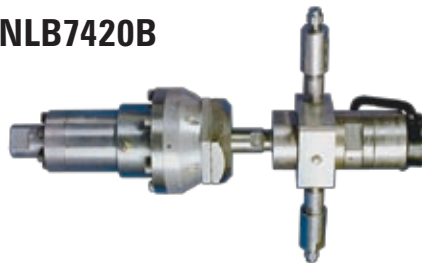
pressures up to 10,000 psi (700 bar). It rotates (pneumatically) from 5 to 60 rpm, extending coverage and maximizing the impact of the water stream as it slides along a rod or cable. It weighs just 65 lbs. (29.5 kg).

NLB7600



Shown with Storm Tracker
(see next page)

NLB7420B

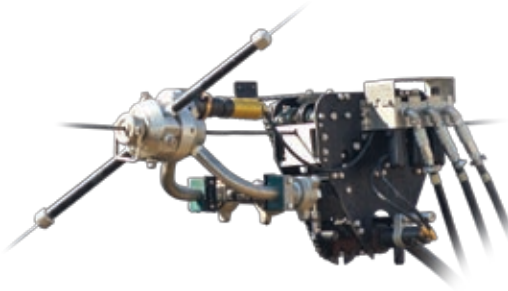


NLB7500B



Model No.	Max. Pressure	Flow	Rotation Speed	Weight	Inlet Connection	Length
NLB7600	10,000 psi (700 bar)	150 gpm (568 lpm)	5-60 rpm	65 lbs. (29.5 kg.)	1" NPT Male	20-1/2" (52.1 cm)
NLB7420B	10,000 psi (700 bar)	10 to 25 gpm (38 to 95 lpm)	200-3,000 rpm	26 lbs. (11.8 kg)	1/2" NPT Female	12-5/16" (31.3 cm)
NLB7500B	10,000 psi (700 bar)	100 gpm (379 lpm)	200-3,000 rpm	58 lbs. (26 kg)	1/2" NPT Female	17-3/4" (45.1 cm)
NLB7420B-20K	20,000 psi (1,400 bar)	16 gpm (61 lpm)	200-3,000 rpm	30 lbs. (13.6 kg)	3/4" MP Female	20-1/2" (52.1 cm)
NLB7500B-20K	20,000 psi (1,400 bar)	50 gpm (189 lpm)	200-3,000 rpm	60 lbs. (27.2 kg)	3/4" MP Female	25-7/8" (65.7 cm)
NLB7420B-40K	40,000 psi (2,800 bar)	20 gpm (76 lpm)	200-3,000 rpm	30 lbs. (13.6 kg)	3/4" MP Female	19-1/8" (48.6 cm)

NLB Storm Tracker™



The new Storm Tracker™ automates the maneuvering of the Storm nozzle (see preceding page) for maximum efficiency. This pneumatically-powered crawler allows operators to more easily feed the Storm nozzle into boilers and furnaces, eliminating the physical strain of pulling a towline under pressure. The Storm nozzle and Tracker are sold separately.

Directed from a remote control cabinet, the Storm Tracker can be programmed to intermittently pause, allowing time to clear especially-tough build-ups. Traversing speeds are adjustable up to 8 inches per second (*203 mm per second*). The controller can run multiple Storm Trackers and store their programs for future use.



Part No.	Speed	Min. Air	Weight (approx.)
DM29218*	0-8 in./sec. (0-203mm/sec.)	18 cfm @ 70 psi (8.5 l/s @ 6 bar)	90 lbs. (41 kg.)

*To order additional crawler assemblies that will be run from an existing controls cabinet, use Part No. DM29219.

Centering Guides



DA10094

Model No.	Adjustment	Connection
DA10094-1	10" to 14" (25.4 to 35.6 cm)	1" NPT Female
DA10094-2	14" to 23" (35.6 to 58.4 cm)	1" NPT Female
DA10094-3	23" to 36" (58.4 to 91.4 cm)	1" NPT Female
DA10094-4	34" to 50" (86.4 cm to 1.27 m)	1" NPT Female

Wheeled Centering Guides



- Adjustable steel frame
- 8 wheels for easy travel through straight or bent pipe
- Configurable for pipe sizes 11" to 24" (279 mm to 610 mm)

Shown with Stack Cleaner (not included)

DM20231

Model No.	Pipe Size	Weight
DM20231	11" to 24" (28 to 61 cm)	36 lbs. (16.3 kg)

Tank Cleaning



NLB's 3-D tank cleaning dramatically reduces tank cleaning time, respects the environment, and eliminates the need for anyone to enter a confined space. The dual cleaning action of the revolving/rotating head, powered by the reaction force of the high-pressure water jets, provides complete, 360° interior coverage of your tank or reactor.

The NLB3750 3-D heads have been removing the toughest chemical and resin build-up for decades —

everything from ABS and PVC to baked-on coke. Some customers have reduced man-hours by as much as 80 percent, while others report that they clean 6 times as many tanks or totes with water jets as with caustics or solvents.

We offer a complete system, with a selection of **3-D heads** and **telescopic lances** plus **swivel turrets**, **protective cages**, and a variety of **nozzle arms** and **extensions** to suit practically any application.

NEW NLB3750 HEADS — 3-D CLEANING PLUS LONGER LIFE

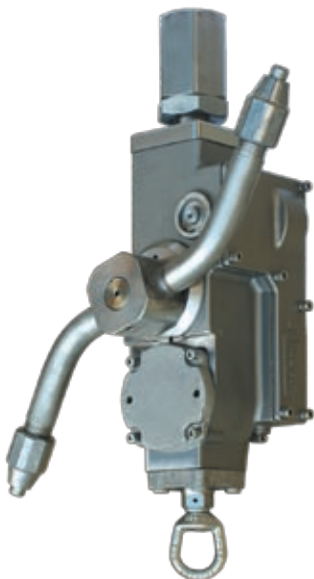
The latest NLB3750 3-D heads are designed for greater productivity than ever, with triple the seal life and significantly shorter rebuild times. The new Torrent™ head, NLB3750-150, also features nozzle tips with carbide orifices for greater cohesiveness.

NLB3750 series heads have proven themselves over the years in countless tank cleaning applications. They offer a wide range of pressures and flows, and some models can be ordered in bronze or lightweight aluminum.

Features include:

- Operating pressures from 3,000 to 20,000 psi (210 to 1,400 bar)
- Flows from 13-110 gpm (49-416 lpm)
- Replaceable seal for long life and easy maintenance

NLB3750



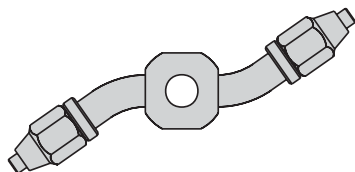
Model No.	Operating Pressure	Flow Rate	Inlet Connection	Weight	Length	Min. Width	Max. Width	Rebuild Kit
NLB3750-40-10K	3,000 - 10,000 psi (210-700 bar)	13-50 gpm (49-189 lpm)	3/4" M/P Female	Bronze: 23 lbs. (10 kg)	14-1/4" (36.2 cm)	6-1/2" (16.5 cm)	9-11/16" (24.6 cm)	NLB3750-10RBKT
NLB3750-40-20K	3,000 - 20,000 psi (210-1,400 bar)	13-50 gpm (49-189 lpm)	3/4" M/P Female	Bronze: 23 lbs. (10 kg)	14-1/4" (36.2 cm)	6-1/2" (16.5 cm)	9-11/16" (24.6 cm)	NLB3750-20RBKT
NLB3750-150	4,000 - 10,000 psi (275-700 bar)	up to 150 gpm (568 lpm)	1-1/4"- 11-1/2 NPT Female	Stainless Steel: 48 lbs. (22 kg)	20" (50.8 cm)	8" (20.3 cm)	14" (35.6 cm)	PM7412-110NB

Nozzle size and rotor offsets are determined by the supply pump rating and pressure available at the 3-D head inlet. Consult NLB for proper nozzle sizes and rotor offsets to suit your application.

To order a 3-D head in aluminum, add "-AL". **Example:** NLB3750-40-20K-AL.

UPGRADES — Customers with older 3-D heads (NLB3750-50, NLB3750-80) can get the long-life features of the new models by purchasing and installing a CM2663 hub kit. Contact NLB for details.

Standard "S" Arms*

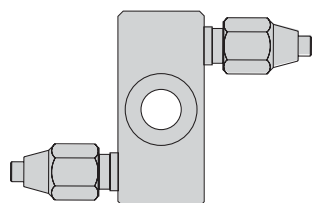


Model No. ¹	Use With	Offsets ²
DM32595-XX	NLB3750-40-10K	10-70 mm
CM32189-XX	NLB3750-150	10-90 mm

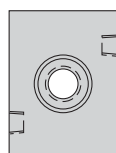
¹ Last 2 digits in model number denote offset angle.

² Offsets available in 5mm increments; consult NLB for proper sizing.

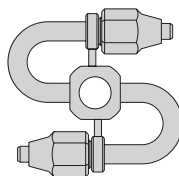
Compact Arms*



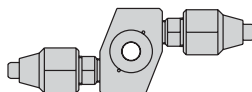
DA11510-XX



BA8149-XX
CM33448



CA13600-XX



CM16114-XX

Model No. ¹	Use With	Offsets ²
DA11510-XX	NLB3750-150	15-55 mm
BA8149-XX	NLB3750-150	15-90 mm
CA13600-XX	NLB3750-150	45-70 mm
CM33448-XX	NLB3750-40K-10K	10-55 mm
CM16114-XX	NLB3750-40-20K	15-48 mm

¹ Last 2 digits in model number denote offset angle.

² Offsets available in 5mm increments; consult NLB for proper sizing. Custom configurations are available.

Extension Arms*

- Used for large diameter vessels
- Puts nozzles closer to surface to be cleaned
- Greater flow stabilization
- Used with standard "S" arm



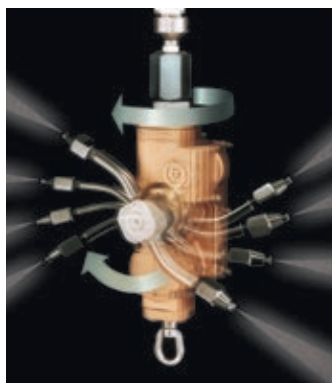
Extension Arm



Adapter

To add an extension arm to an "S" arm with the NLB3750-40-10K 3-D head, use Adapter CN7278. With the NLB3750-40-20K 3-D head, use Adapter BM 16699 with (1) AA-4034 o-ring.

*For a complete list of the components required for arm configuration, please contact NLB.



Model No.	Length
Up to 13,000 psi (900 bar)	
BN7279-12	12" (31 cm)
BN7279-18	18" (46 cm)
BN7279-24	24" (61 cm)
BN7279-30	30" (76 cm)
Up to 20,000 psi (1,400 bar)	
BM16700-12	12" (31 cm)
BM16700-18	18" (46 cm)
BM16700-24	24" (61 cm)
BM16700-30	30" (76 cm)

Tank Cleaning

Swivel Turret

A Lance Swivel Turret (NLB5996) is generally used in small vessels to move the cleaning head into the required working position. The aluminum turret has three movements:

- Extension/Retraction
- Inclination
- Rotation

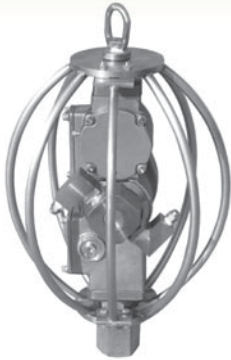
The swivel turret will mount to a vessel's manway with a custom adapter. It can be used in vertical or horizontal applications.

(NLB3750 head, shown in photo, is not included with Swivel Turret.)



Protective Cages

NLB offers four different protective cages to accommodate a range of standard S arms and compact arms.



Model No.	Use With	Diameter
DA8141	NLB3750-150	12-1/4" (31 cm)
DM31913-1	NLB3750-150	18-3/4" (47.6 cm)
DA10185	NLB3750-40-10K	10" (25 cm)
DM16288	NLB3750-40-20K	13" (32 cm)



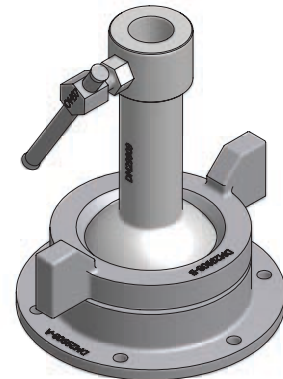
Automated Tank Cleaning Systems

For high-volume cleaning of tanks and totes, NLB custom-engineers automated systems to suit individual needs. For example, totes can enter a cabinet via conveyor, or rotate while the 3-D water jet heads do their job. A wide variety of totes and tanks can be accommodated; please consult NLB about your specific requirements.



Ball and Socket

Model DM29907, made of stainless steel, can be used instead of the Swivel Turret Assembly when cleaning small vessels. (Shown with optional manway adapter.)



Telescopic Lances

A Telescopic Lance is used in large vessels and in areas where overhead height is limited. It features external handwheels to extend/retract, incline and rotate the 3-D head as needed. Custom-designed manway adapters are available to secure the lance to the vessel. Standard lance lengths range from 20" to 295" (5.1 to 7.5 m) to service vessels from 121" to 334" (3.1 to 8.5 m) in height. Custom-engineered sizes are also available, as are fully-automated telescopic lances.

Features/benefits:

- Eliminates need for confined space entry
- Increases uptime by shortening cleaning cycle time
- Reduces manpower — can be operated by a single person
- Corrosion resistant
- External hand wheels for ease of nozzle placement
- Nozzle can be repositioned while under pressure

Special options

Lance Carts are available to transport telescopic lances and raise them into position.

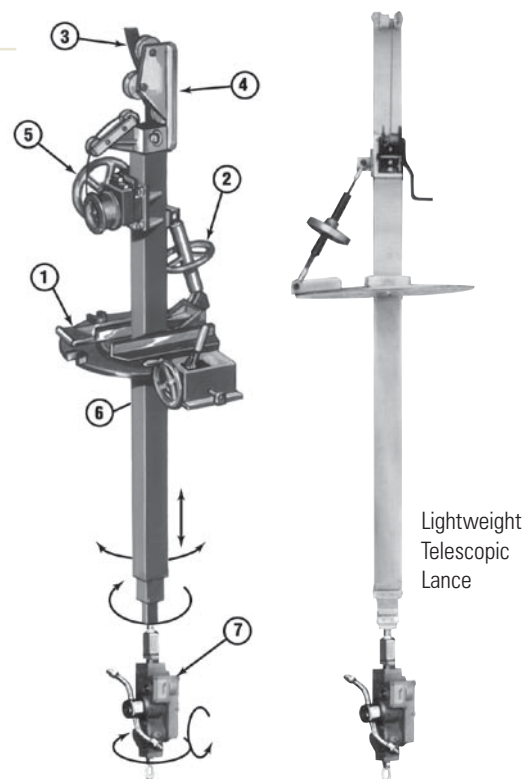
Automated Telescopic Lances are custom-designed to fit any tank, reactor or other vessel for between-batch cleaning. They are generally permanently attached to the vessel. Extension and retraction mechanisms can be electric, hydraulic or pneumatic.

The **Lightweight Telescopic Lance** has most of the same features as a standard NLB telescopic lance, but is made of aluminum and therefore weighs about 80% less. This makes it more maneuverable.

Please contact NLB for details of these special options.

Standard Telescopic Lance

1. Manway Adapter Base
2. Inclination Tilting Handle
3. High-Pressure Hose
4. Hose Guide
5. Extension/ Retraction Handle
6. Base Rotation Handle
7. NLB3750 Nozzle



Model No.	Min. Extension	Max. Extension	Vessel Height	Weight
TL3-35-3/4	33.9" (86 cm)	137.8" (3.5 m)	158-177" (4-4.5 m)	303 lbs. (138 kg)
TL3-45-3/4	46.9" (119 cm)	177.2" (4.5 m)	197-216" (5-5.5 m)	316 lbs. (143 kg)
TL3-55-3/4	59.8" (152 cm)	216.5" (5.5 m)	237-255" (6-6.5 m)	329 lbs. (149 kg)
TL3-65-3/4	72.2" (183 cm)	255.9" (6.5 m)	276-295" (7-7.5 m)	342 lbs. (155 kg)
TL4-35-3/4	20.9" (53 cm)	137.8" (3.5 m)	158-177" (4-4.5 m)	300 lbs. (136 kg)
TL4-45-3/4	30.7" (78 cm)	177.2" (4.5 m)	197-216" (5-5.5 m)	312 lbs. (142 kg)
TL4-55-3/4	40.6" (103 cm)	216.5" (5.5 m)	237-255" (6-6.5 m)	326 lbs. (148 kg)
TL4-65-3/4	50.4" (128 cm)	255.9" (6.5 m)	276-295" (7-7.5 m)	339 lbs. (154 kg)
TL4-75-3/4	60.2" (153 cm)	295.3" (7.5 m)	315-334" (8-8.5 m)	352 lbs. (160 kg)
TL4-35-1-1/4	26.0" (66 cm)	137.8" (3.5 m)	158-177" (4-4.5 m)	320 lbs. (145 kg)
TL4-45-1-1/4	35.8" (91 cm)	177.2" (4.5 m)	197-216" (5-5.5 m)	342 lbs. (155 kg)
TL4-55-1-1/4	45.7" (116 cm)	216.5" (5.5 m)	237-255" (6-6.5 m)	364 lbs. (165 kg)
TL4-65-1-1/4	55.5" (141 cm)	255.9" (6.5 m)	276-295" (7-7.5 m)	386 lbs. (175 kg)
TL4-75-1-1/4	65.4" (166 cm)	295.3" (7.5 m)	315-334" (8-8.5 m)	408 lbs. (185 kg)
Lightweight Telescopic Lances				
TL3-20L-3/4	23.6" (60 cm)	101.4" (2.6 m)	121-140" (3-3.5 m)	60 lbs. (27 kg)
TL3-32L-3/4	47.6" (121 cm)	173.4" (4.4 m)	193-212" (5-5.5 m)	70 lbs. (32 kg)
TL3-44L-3/4	71.6" (182 cm)	245.4" (6.2 m)	265-284" (6.7-7.2 m)	80 lbs. (36 kg)

Note: Special and custom manufactured lances are also available; please consult NLB.

Pump Controls



Some of the most important contributions to pump performance and safety are made by components you hardly ever notice. NLB pump controls can keep your unit operating reliably, year after year. They have earned a reputation for precision, durability and — wherever possible — ease of replacement.

In this section of the catalog you'll find **by-pass valves** and **pulsation dampeners** to regulate and cushion

the flow of high-pressure water, **gauges** to monitor operating pressure, and **snubbers** to enhance gauge accuracy.

Rupture disc assemblies relieve pressure in the event of a spike, while **shut-off valves** quickly close line flow. We also offer engine **throttle controls**, **filters** to keep pumps free of dirt, and **system valves** for remote control of water flow.

EASY ON, EASY OFF

NLB by-pass valves let you adjust the pressure on your pump unit with a simple turn of the T-bar handle... much like opening and closing a faucet. They are hydraulically

cushioned for smooth pressure adjustment, and field repairable. Models are available to handle all common operating pressures.

The housing and all major

components are precision machined of rugged stainless steel. We also offer simple conversion kits that allow older pump units to accept newer by-pass valves.

By-Pass Valves



BV10-400

The advantages of NLB by-pass valves can be retrofitted to older NLB pump units. Our convenient conversion kits include everything you need.

Part No.	Max. Pressure	Flow	Inlet Connection	Outlet Connection	Rebuild Kit
BV10-400	10,000 psi (700 bar)	2-40 gpm (8-151 lpm)	1" NPT	1/2" NPT	BV11316
BV10-650	10,000 psi (700 bar)	35-65 gpm (133-246 lpm)	1" NPT	1" NPT	BV12635
BV20-260	20,000 psi (1,400 bar)	2-26 gpm (8-100 lpm)	1" MP	1/2" NPT	BV11317
BV24-350	24,000 psi (1,680 bar)	2-35 gpm (8-132 lpm)	1" MP	1/2" NPT	BV18102
BV40-010	40,000 psi (2,800 bar)	10 gpm (38 lpm)	1-1/8"-12 HPM	1/2" NPT	BV2180
BV36-115	40,000 psi (2,800 bar)	15 gpm (57 lpm)	1-1/8"-12 HPM	1/2" NPT	BV2180

By-Pass Valve	Conversion Kit
BV10-400	DM11267
BV10-650	DM12744
BV20-260	DM12699
BV24-350	N/A
BV40-010	N/A

Pressure Gauges

NLB's high-pressure, heavy-duty pressure gauges are oil-filled and hermetically sealed. A throttle screw helps protect the gauge from erratic pressure surges. Standard gauges have bottom-mount connection with 4-1/4" (11 cm) faces. Certified gauges are available.

All display both English and metric units of measurement.



Model	Working Pressure	Connection
2009	5,000 psi (345 bar)	1/2" NPT
2008	10,000 psi (700 bar)	1/2" NPT
3008	20,000 psi (1,400 bar)	1/4" MP
5008	40,000 psi (2,800 bar)	1/4" HP

Certified gauges are available.

Note: NLB recommends that every pump be equipped with both a pressure gauge and a snubber.

Snubbers

NLB Snubbers absorb the system pressure pulses that can cause gauge fluctuations. This enhances accuracy and prolongs gauge life.



Model	Max. Pressure	Inlet Connection	Outlet Connection	Use with Gauge
2010	10,000 psi (700 bar)	1/2" NPT Male	1/2" NPT Female	2008, 2009
BM13613*	10,000 psi (700 bar)	1-1/8" - 12	1/2" NPT Female	2008, 2009
3010	20,000 psi (1,400 bar)	1/4" MP port	1/4" MP port	3008
BM13614*	20,000 psi (1,400 bar)	1-1/8" - 12	1/4" MP port	3008
4010	40,000 psi (2,800 bar)	1/4" HP	1/4" HP	5008
BM13615	40,000 psi (2,800 bar)	1-1/8" - 12	1/4" HP	5008






*Snubber kit used with discharge manifolds or pressure reducing stations featuring NLB's "BV" family of By-Pass Valves.

Rupture Disc Assemblies and Discs

Every NLB high-pressure pump unit is equipped with a rupture disc to relieve system pressure in the event of a spike above the unit's maximum operating pressure. The replaceable discs, held in a rupture disc assembly, are available with pressure ratings from 2,000 psi to 40,000 psi (140 to 2,800 bar).

Rupture disc assemblies should always be used with a primary pressure relief or by-pass valve (page 60).



Model No.	Operating Pressure	Used With Rupture Disc Assembly
NSP-2002-2	2,000 psi (140 bar)	 NSP-2000
NSP-2002-3	3,000 psi (210 bar)	
NSP-2002-4	4,000 psi (275 bar)	
NSP-2002-5	5,000 psi (345 bar)	
NSP-2002-6	6,000 psi (415 bar)	
NSP-2002-8	8,000 psi (550 bar)	
NSP-2002-10	10,000 psi (700 bar)	 NSP-3000
NSP-3002-8	8,000 psi (550 bar)	
NSP-3002-10	10,000 psi (700 bar)	
NSP-3002-12	12,000 psi (840 bar)	
NSP-3002-15	15,000 psi (1,035 bar)	
NSP-3002-20	24,000 psi (1,680 bar)	
NSP-3002-24	24,000 psi (1,680 bar)	 NSP-4000
NSP-4002-30	30,000 psi (2,070 bar)	
NSP-4002-34	34,000 psi (2,350 bar)	
NSP-4002-36	36,000 psi (2,500 bar)	
NSP-4002-40	40,000 psi (2,800 bar)	
NSP-4002-42	42,000 psi (2,900 bar)	
PM26756	4,000 psi (275 bar)	 BM 22093
PM22088	6,000 psi (415 bar)	
PM22089	8,000 psi (550 bar)	
PM22090	10,000 psi (700 bar)	
PM29714	12,000 psi (840 bar)	
PM26757	13,000 psi (900 bar)	
PM22091	15,000 psi (1,035 bar)	 BM 22095
PM26758	17,000 psi (1,175 bar)	
PM22092	24,000 psi (1,680 bar)	
PM29715	24,000 psi (1,680 bar)	

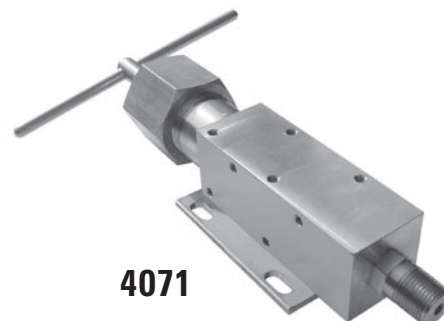
Throttle Controls

Throttle controls help reduce fuel consumption and pump engine wear and tear. They advance a pump's engine speed when a dump-style lance or foot control is activated, and return it to idle when the trigger or pedal is released. We offer three throttle controls, all with a common design, for 10,000 psi, 20,000 psi, 24,000 psi, and 40,000 psi applications (700, 1,400, 1,680, and 2,800 bar).

- Quick-change adapter fits all NLB pump units
- Long seal life

- Brass stop eliminates galling
- Stainless steel spring resists corrosion
- Rebuild with replacement seal PM14983.

Model No.	Max. Pressure	Rebuild Kit
4071-10	10,000 psi (700 bar)	PM14983
4071-20	20,000 psi (1,400 bar)	PM14983
4071-24	24,000 psi (1,680 bar)	PM14983
4071-40	40,000 psi (2,800 bar)	PM14983



4071

Shut-Off Valves

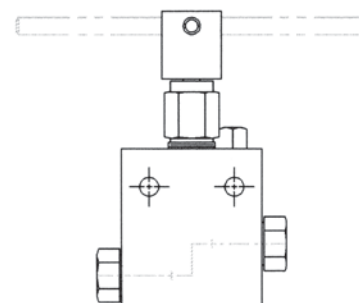
The quickest way to completely close line flow is with a shut-off valve. NLB has ball valves for 10,000 psi (700 bar) applications and needle valves for 24,000 psi (1,680 bar). All are silicone-free. Repair kits are available for the ball valves.

Model No.	Thread Size	Rebuild Kit
VRG-08	1/2" NPT	VRG-8RBKT
VRG-12	3/4" NPT	VRG-12RBKT
VRG-16	1" NPT	VRG-16RBKT
VRG-14	1-1/2" NPT	N/A



VRG

Model No.	Thread Size
PM2889	1" MP



PM2889

Pulsation Dampeners

- Reduce pulsations in permanent piping systems
- No moving parts
- No gas charging
- Can be permanently mounted



Model No.	Max. Pressure	Thread Size
PM8576	3,000 psi (210 bar)	1" NPT
PDS2-16T	3,000 psi (210 bar)	2" NPT
PDS3-16T	5,000 psi (345 bar)	2" NPT
PDS1-16T	10,000 psi (700 bar)	1" NPT
DM9570	24,000 psi (1,680 bar)	1" MP port
DM7831	40,000 psi (2,800 bar)	9/16" HP Male

System Valves



When operators are working some distance from a pump unit, the ability to stop the high-pressure water flow without shutting down the pump is a real convenience. That's where NLB system valves come in.

They handle a wide range of flows and pressures, and you can choose from six actuation methods (see below). Some models can be equipped with proximity switches; some are even explosion-proof. Although usually mounted on a

remote workstation, a system valve can be mounted on the pump.

Features and benefits include:

- Stainless steel construction of all wetted components
- Standard enclosures protect in hostile environments
- Used with electric units for "no-load" start-ups
- Rebuild kits available for fast, easy maintenance

HOW TO CHOOSE A SYSTEM VALVE

When a **dump valve** is actuated, 95% of the high-pressure water is diverted to dump and the system pressure is reduced to near-zero. Until the valve is actuated, the water just passes through. If 100% shut-off is required, or if several workstations need the high-pressure water at once, a

directional valve is recommended.

Most NLB system valves can be ordered with air actuation, hydraulic actuation, or air over electric. Actuation method and special features are designated by a suffix at the end of the model number, as

illustrated in the chart below with the V-485 system valve.

If you have questions about which model is best-suited to a particular application, NLB is always happy to help.

New! Rebuild kits with quick-change cartridge

Rebuild kits for the latest NLB system valves — V10-595, V10-596, V40-660, V24-286, V10-800 and V40-286 — practically eliminate downtime with a quick-change cartridge like the one in NLB lances and foot controls.

System Valve dimensions (all models except V20-495 series):

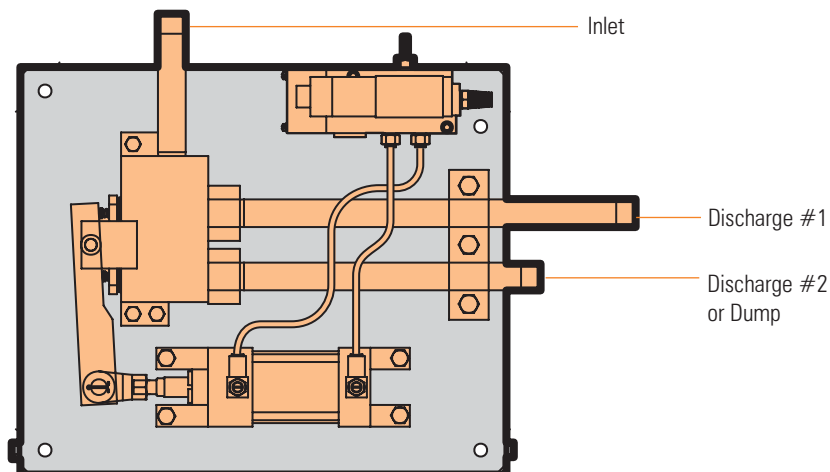
Length: 15 3/8" (39 cm)

Width: 13" (33 cm)

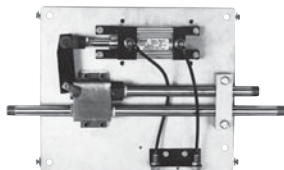
Height: 7" (18 cm)

Weight: 50 lbs. (23 kg)

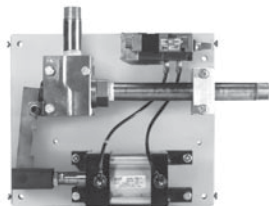
Model No.	Description
V-485	Air
V-485AE	Air over Electric
V-485H	Hydraulic
V-485AE-PROX	Air over Electric, with proximity switch
V-485AE-XP	Air over Electric, explosion-proof
V-485AE-24VDC	Air over Electric, 24 volt DC



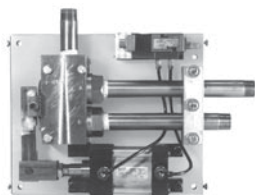
Directional and Dump System Valves



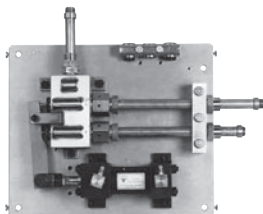
V-560



VH-485



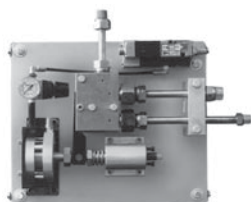
VH-685



V20-660



V20-495



V36-560

Model No.	Type	Max. Pressure	Max. Flow	Inlet Connection	Outlet Connection	Ports*	Rebuild Kit
V-560	Dump	10,000 psi (700 bar)	40 gpm (151 lpm)	1/2" NPT Male	1/2" NPT Male	1 each HP inlet and outlet, and LP outlet	550RBKT
V-660	Directional	10,000 psi (700 bar)	40 gpm (151 lpm)	1/2" NPT Male	1/2" NPT Male	1 HP inlet and 2 HP outlets	650RBKT
VH-485	Dump or Shut-off	10,000 psi (700 bar)	60 gpm (227 lpm)	1" NPT Male	1" NPT Male	1 each HP inlet and outlet	475RBKT
VH-685	Directional	10,000 psi (700 bar)	60 gpm (227 lpm)	1" NPT Male	1" NPT Male	1 HP inlet and 2 HP outlets	685RBKT
V10-495	Directional	10,000 psi (700 bar)	50 gpm (189 lpm)	1" NPT Female	1" NPT Female	1 HP inlet and 2 LP outlets	V10-495A-RBKT
V10-595	Dump	10,000 psi (700 bar)	42 gpm (159 lpm)	1/2" NPT Female	1/2" NPT Female	1 HP inlet and 1 LP outlet	BM19524
V10-596	Directional	10,000 psi (700 bar)	42 gpm (159 lpm)	1/2" NPT Female	1/2" NPT Female	1 each HP inlet and outlet	DM30615
V10-800	Directional	10,000 psi (700 bar)	80 gpm (303 lpm)	1" NPT Male	1" NPT Male	1 each HP inlet and outlet, and 2 LP outlets	BM16345
V20-560	Dump	24,000 psi (1,680 bar)	40 gpm (151 lpm)	9/16" MP Male	9/16" MP Male	1 each HP inlet and outlet, and LP outlet	20-550RBKT
V20-660	Directional	24,000 psi (1,680 bar)	40 gpm (151 lpm)	9/16" MP Male	9/16" MP Male	1 HP inlet and 2 HP outlets	20-650RBKT
V20-495	Directional	24,000 psi (1,680 bar)	40 gpm (151 lpm)	1" MP Male	1" MP Male	1 HP inlet and 2 HP outlets	V20-495 RBKT
V24-286	Directional	24,000 psi (1,680 bar)	35 gpm (132 lpm)	1"-12 UN Female	1"-12 UN Female	1 each HP inlet and outlet, and LP outlet	BM19524
V36-560	Dump	40,000 psi (2,800 bar)	11 gpm (42 lpm)	9/16" HP	9/16" HP	1 each HP inlet and outlet, and LP outlet	36-560RBKT
V36-660	Directional	40,000 psi (2,800 bar)	11 gpm (42 lpm)	9/16" HP	9/16" HP	1 HP inlet and 2 HP outlets	36-660RBKT
V40-286	Directional	40,000 psi (2,800 bar)	10 gpm (38 lpm)	9/16" HP Female	9/16" HP Female	1 each HP inlet and outlet, and LP outlet	BM20935
V40-660	Directional	40,000 psi (2,800 bar)	10 gpm (38 lpm)	9/16" HP Female	9/16" HP Female	1 HP inlet and 2 HP outlets	BM24521

Plumb several V20-495 valves together to create a high-pressure header with multiple discharge points, activated as needed.

*HP designates a high-pressure port; LP designates a high-pressure port.

Filters



Dirty water can be the worst enemy of a high-pressure pump, but you can rely on NLB filters to keep it clean. Choices include bag filters, screen filters and cartridge filters that can

trap particles as small as 3 microns. Replacement gaskets and elements are available for all. For special conditions, please give us a call.

Model No.	Type	Flow	Inlet, Outlet Connection	Replacement Element	Typically Used On
DM20085	Bag	200 gpm (757 lpm)	3" Flange	FSB85-03 (25 Micron)	605 Series
FSP85/FSP85-SS	Bag	220 gpm (833 lpm)	2" NPT Female	FSP85-01 (3 Micron), FSP85-03 (25 Micron), FSP85-04 (50 Micron), FSP85-05 (5 Micron)	10250, 20400,
NLB-124-1 1/2	Screen	100 gpm (379 lpm)	1-1/2" NPT Female	NLB124-1.5-80 (80 Mesh)	1012, 10150, 10200
NLB-124-2	Screen	250 gpm (946 lpm)	2" NPT Female	NLB-124-2-80 (80 Mesh)	10250
NLB-157	Screen	200 gpm (757 lpm)	2" NPT Female	N/A	Diesel units
PM2958	Cartridge	8 gpm (30 lpm)	1" NPT Female	PM2959 (5 Micron) Absolute	4030, 4075
PM3350	Bag	30 gpm (113 lpm)	1-1/2" NPT Female	PM6962 (25 Micron) PM3801 (5-10 Micron)	20153, 20253 36200, 36201
PM10512	Cartridge	20 gpm (76 lpm)	1" NPT Female	PM10511 (5 Micron) Absolute	36200, 36201
PM10573	Cartridge	25 gpm (95 lpm)	2" NPT Female	PM11659 (5 Micron) Absolute	36250D 40250D
PM15120	Bag	100 gpm (379 lpm)	2" NPT Female	PM15121 (100 Micron)	10331D, 10331D-TPX
PM15583	Bag	220 gpm (833 lpm)	3" NPT Female	PM15584 (25 Micron)	10350D
PM15675	Bag	100 gpm (379 lpm)	2" NPT Female	PM16644 (25 Micron)	350 Series
PM19153	Bag	38 gpm (42 lpm)	2" NPT Female	PM16644 (25 Micron)	125, 225 Series



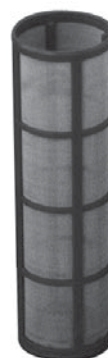
DM20085



FSP85/FSP85-SS



NLB-124-1 1/2



NLB-124-2



NLB-157



PM2958



PM3350



PM10512



PM10573



PM15120



PM15583



PM15675



PM19153

Hoses

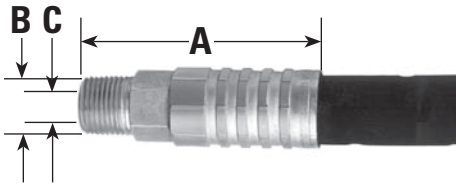


NLB stocks a complete line of high-pressure hoses for all popular working pressures, up to 40,000 psi (2,800 bar). All are designed for long life and dependable service. Most hoses are stocked in 25', 50' and 100' lengths (7.6m, 15.2m and 30.4m), and custom lengths are available. When ordering, please specify part number, length (the XX at the end), and end connection.

Features include:

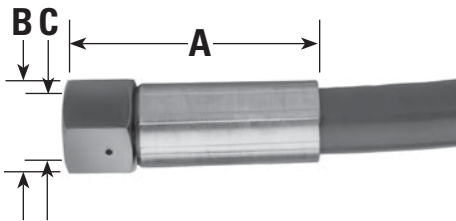
- Smooth inner core to minimize pressure drop
- High-tensile spiraled wire for strength and kink resistance
- Tough outer cover to prevent abrasion and wire exposure
- Short end connections allow movement around tight bend radii

WP Hose, 10,000 to 15,000 psi (700-1,035 bar)



Part Number	Working Pressures Up To	End Connection	Dim. "A" Coupling Length	Dim. "B" Coupling O.D.	Dim. "C" Hose I.D.
WP3-3/8-XX	10,000 psi (700 bar)	3/8" MNPT	2.525" (6.4 cm)	0.915" (2.3 cm)	.38" (.9 cm)
WP3-1/2-XX	10,000 psi (700 bar)	1/2" MNPT	3.385" (8.6 cm)	1.150" (2.9 cm)	.50" (1.3 cm)
WP3-3/4-XX	10,000 psi (700 bar)	3/4" MNPT	3.550" (9.0 cm)	1.400" (3.6 cm)	.75" (1.9 cm)
WP4-1-XX	10,000 psi (700 bar)	1" MNPT	4.500" (11.4 cm)	1.750" (4.5 cm)	1.0" (2.5 cm)
WP3-1/2-12K-XX	12,000 psi (840 bar)	1/2" MNPT	3.385" (8.6 cm)	1.150" (2.9 cm)	.50" (1.3 cm)
WP3-1/2-15K-XX	15,000 psi (1,035 bar)	1/2" MNPT	3.385" (8.6 cm)	1.150" (2.9 cm)	.50" (1.3 cm)

NP Hose, 20,000 to 24,000 psi (1,400-1,680 bar)

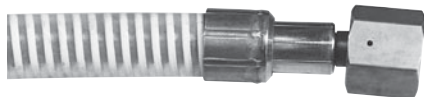


Part Number	Working Pressures Up To	End Connection	Dim. "A" Coupling Length	Dim. "B" Coupling O.D.	Dim. "C" Hose I.D.
NP20-5/16-XX	20,000 psi (1,400 bar)	9/16" M/P Nipple	4.000" (10.2 cm)	0.900" (2.3 cm)	.38" (.9 cm)
NP20-3/8-XX	20,000 psi (1,400 bar)	9/16" M/P Nipple	4.000" (10.2 cm)	0.900" (2.3 cm)	.38" (.9 cm)
NP20-1/2-XX	20,000 psi (1,400 bar)	1"-12 Swivel Nut	3.420" (8.7 cm)	1.440" (3.7 cm)	.50" (1.3 cm)
NP20-3/4-XX	20,000 psi (1,400 bar)	1-5/16"-12 Swivel Nut	3.500" (8.9 cm)	1.750" (4.5 cm)	.75" (1.9 cm)
NP20-1-XX	24,000 psi (1,680 bar)	1-3/8"-12 Swivel Nut	6.000" (15.25 cm)	1.95" (4.95 cm)	0.995" (2.53 cm)
NP24-1/2-XX	24,000 psi (1,680 bar)	1"-12 Swivel Nut	4.250" (10.8 cm)	1.250" (3.2 cm)	.50" (1.3 cm)

NOTE: Some pressure drop is inevitable, and it varies with hose diameter. Please refer to the chart on Page 104.

Ultra-High Pressure Hose, 40,000 psi (2,800 bar)

- Steel wire reinforcement
- Minimum bend radius of 6" (15.2 cm) for 3/16" hose; 8" (20.3 cm) for 5/16" hose



Model No.	Standard Lengths	Working Pressure	Thread Connection	I.D.	O.D.
NP40-3/16-15M	15' (4.6 m)	40,000 psi (2,800 bar)	3/8"-24 LH Male	.20" (5.1 mm)	.68" (17.3 mm)
NP40-3/16-15F	15' (4.6 m)	40,000 psi (2,800 bar)	9/16" Female Swivel	.20" (5.1 mm)	.85" (21.6 mm)
NP40-3/16-35F	35' (10.7 m)	40,000 psi (2,800 bar)	9/16" Female Swivel	.20" (5.1 mm)	.85" (21.6 mm)
NP40-3/16-50F	50' (15.2 m)	40,000 psi (2,800 bar)	9/16"-18 Female Swivel	.20" (5.1 mm)	.85" (21.6 mm)
NP40-5/16-8M	8' (2.4 m)	40,000 psi (2,800 bar)	9/16"-18 LH Male	.33" (8.4 mm)	.90" (22.9 mm)
NP40-5/16-8F Whip Hose	8' (2.4 m)	40,000 psi (2,800 bar)	1-1/8"-12 Female Swivel	.33" (8.4 mm)	1.60" (40.7 mm)
NP40-5/16-15M	15' (4.6 m)	40,000 psi (2,800 bar)	9/16"-18 LH Male	.33" (8.4 mm)	.90" (22.9 mm)
NP40-5/16-15F	15' (4.6 m)	40,000 psi (2,800 bar)	1-1/8"-12 Female Swivel	.33" (8.4 mm)	1.60" (40.7 mm)
NP40-5/16-50M	50' (15.2 m)	40,000 psi (2,800 bar)	9/16"-18 LH Male	.33" (8.4 mm)	.90" (22.9 mm)
NP40-5/16-50F	50' (15.2 m)	40,000 psi (2,800 bar)	1-1/8"-12 Female Swivel	.33" (8.4 mm)	1.60" (40.7 mm)

Whip Hoses

NLB Whip Hoses help protect hand lance operators from potentially dangerous hose failures. Each whip hose assembly consists of a short length of hose, usually 10 feet (3 m) or less, covered with a heavy, dense fabric or reinforced plastic tubing designed to diffuse the energy released by a hose failure.

NLB offers whip hoses for all popular pressures, from 10,000 to 40,000 psi (700 to 2,800 bar).

These include special Whip Hoses with a heavy-duty rubber shroud and a special 90-degree elbow. Attachment to your hand lance may require additional fittings. Please consult NLB about your specific application.

For details of NLB standard or special whip hoses, please see Page 18.

STANDARD WHIP HOSE



SPECIAL WHIP HOSE



Couplings and Fittings



NLB can supply hose connections for virtually any water jet connection — **couplings** for up to 24,000 psi (1,680 bar) and **fittings** for ultra-high pressure, up to

40,000 psi (2,800 bar). Couplings are available in quick-disconnect (sleeve-lock) and wing union (hammer-lock) styles, with economical o-rings for field repair.

Couplings-10,000 to 15,000 psi (700 to 1,035 bar)

QUICK-COUPPLINGS

NLB offers a variety of couplings in quick-disconnect (sleeve-lock) and two screw-lock, or wing union, styles. Inexpensive o-rings are available for repairing all NLB Couplings.

The new NLB NQC-22-15K provides the ease of a quick-disconnect fitting for operating pressures of up to 15,000 psi (1,035 bar). This high-quality fitting has 1/2" female NPT threads on each end for the hose connection.



NQC-11



NSC-4

Part No.	Style	Pressure	Thread
NQC-11	Quick-Connect	10,000 psi (700 bar)	3/8" FNPT
NQC-22	Quick-Connect	10,000 psi (700 bar)	1/2" FNPT
NSC-4	Screw	15,000 psi (1,035 bar)	1/2" FNPT
NQC-22-15K	Quick-Connect	15,000 psi (1,035 bar)	1/2" FNPT

Coupling Shields

NLB high-pressure coupling shields provide a secondary means of protection in the event of coupling release. Hoses stay in place while high-pressure water is deflected.



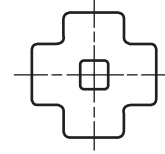
CS-22

Part No.	Max. Pressure
CS-22	10,000 psi (700 bar)

10,000 psi (700 bar)

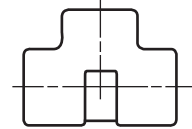
Crosses — Pipe Thread (NPT)

Part No.	Connection Type	Max. Pressure	
		psi	bar
04-CRS-10T-S	1/2" NPTF	10,000	700
06-CRS-6T-S	3/4" NPTF	10,000	700
10-CRS-6T-S	1" NPTF	10,000	700



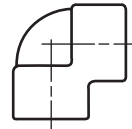
Tees — Pipe Thread (NPT)

Part No.	Connection Type	Max. Pressure	
		psi	bar
03-TEE-6T-S	3/8" NPTF	15,000	1,035
04-TEE-6T-S	1/2" NPTF	10,000	700
06-TEE-6T-S	3/4" NPTF	10,000	700
10-TEE-6T-S	1" NPTF	10,000	700



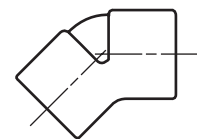
90° Elbows — Pipe Thread (NPT)

Part No.	Connection Type	Max. Pressure	
		psi	bar
01-ELB-90-6T-S	1/8" NPTF	15,000	1,035
02-ELB-90-6T-S	1/4" NPTF	15,000	1,035
03-ELB-90-6T-S	3/8" NPTF	15,000	1,035
04-ELB-90-6T-S	1/2" NPTF	10,000	700
06-ELB-90-6T-S	3/4" NPTF	10,000	700
10-ELB-90-10T-S	1" NPTF	10,000	700



45° Elbows — Pipe Thread (NPT)

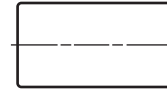
Part No.	Connection Type	Max. Pressure	
		psi	bar
03-ELB-45	3/8" NPTF	15,000	1,035
04-ELB-45-6T-S	1/2" NPTF	10,000	700
06-ELB-45-6T-S	3/4" NPTF	10,000	700
10-ELB-45-6T-S	1" NPTF	10,000	700



Couplings and Fittings

Couplings — Pipe Thread (NPT)

Part No.	Connection Types		Max. Pressure	
	Connection 1	Connection 2	psi	bar
03-02-RC-10T-S	3/8" NPTF	1/4" NPTF	15,000	1,035
04-03-RC-6T-S	1/2" NPTF	3/8" NPTF	10,000	700
06-04-RC-6T-S	3/4" NPTF	1/2" NPTF	10,000	700
10-04-RC-6T-SS	1" NPTF	1/2" NPTF	10,000	700
10-06-RC-6T-S	1" NPTF	3/4" NPTF	10,000	700



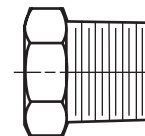
Wing Unions — Pipe Thread (NPT)

Part No.	Connection Type	Max. Pressure	
		psi	bar
PP17518	1/2" NPTF	10,000	700
WU-1002-06	3/4" NPTF	10,000	700
WU-1002-1	1" NPTF	10,000	700
WU-1002-2	2" NPTF	10,000	700
WU-1002-2.5	2-1/2" NPTF	10,000	700



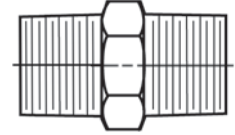
Reducing Bushing — Pipe Thread (NPT)

Part No.	Connection Types		Max. Pressure	
	Connection 1	Connection 2	psi	bar
02-01-RB-6T-S	1/4" NPTM	1/8" NPTF	15,000	1,035
03-01-RB-6T-S	3/8" NPTM	1/8" NPTF	15,000	1,035
03-02-RB-6T-S	3/8" NPTM	1/4" NPTF	15,000	1,035
04-01-RB-6T-S	1/2" NPTM	1/8" NPTF	10,000	700
04-02-RB-6T-S	1/2" NPTM	1/4" NPTF	10,000	700
04-03-RB-6T-S	1/2" NPTM	3/8" NPTF	10,000	700
06-01-RB-6T-S	3/4" NPTM	1/8" NPTF	10,000	700
06-02-RB-6T-S	3/4" NPTM	1/4" NPTF	10,000	700
06-03-RB-6T-S	3/4" NPTM	3/8" NPTF	10,000	700
06-04-RB-6T-S	3/4" NPTM	1/2" NPTF	10,000	700
10-04-RB-6T-S	1" NPTM	1/2" NPTF	10,000	700
10-06-RB-6T-S	1" NPTM	3/4" NPTF	10,000	700
12-10-RB-6T-S	1-1/4" NPTM	1" NPTF	10,000	700
14-10-RB-6T-S	1-1/2" NPTM	1" NPTF	10,000	700
20-10-RB-6T-S	2" NPTM	1" NPTF	10,000	700
20-14-RB-6T-S	2" NPTM	1-1/2" NPTF	10,000	700



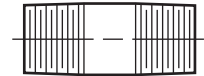
Hex Nipples — Pipe Thread (NPT)

Part No.	Connection Types		Max. Pressure	
	Connection 1	Connection 2	psi	bar
PM21837	3/8" NPTM	1/4" NPTM	15,000	1,035
PM21838	3/4" NPTM	1/2" NPTM	10,000	700
PM3487	3/4" NPTM	3/4" NPTM	10,000	700
PM21840	1" NPTM	1/2" NPTM	10,000	700
PM21841	1" NPTM	3/8" NPTM	10,000	700
PM23139 or PM21839	1" NPTM	3/4" NPTM	10,000	700
PM3485	1-1/4" NPTM	1-1/4" NPTM	10,000	700



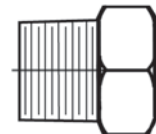
Nipples — Pipe Thread (NPT)

Part No. specify length (in inches) inplace of "XX"	Connection Types	Max. Pressure	
		psi	bar
01-XX-160-S	1/8" NPTM	15,000	1,035
02-XX-160-S	1/4" NPTM	15,000	1,035
03-XX-160-S	3/8" NPTM	15,000	1,035
04-XX-160-S	1/2" NPTM	10,000	700
06-XX-160-S	3/4" NPTM	10,000	700
10-XX-160-S	1" NPTM	10,000	700



Square Plugs — Pipe Thread (NPT)

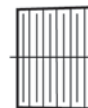
Part No.	Connection Type	Max. Pressure	
		psi	bar
01-PLG-6T-S	1/8" NPTM	15,000	1,035
02-PLG-6T-S	1/4" NPTM	15,000	1,035
03-PLG-6T-S	3/8" NPTM	15,000	1,035
04-PLG-6T-S	1/2" NPTM	10,000	700
06-PLG-6T-S	3/4" NPTM	10,000	700
10-PLG-6T-S	1" NPTM	10,000	700
12-PLG-6T-S	1-1/4" NPTM	10,000	700
14-PLG-6T-S	1-1/2" NPTM	10,000	700
20-PLG-6T-S	2" NPTM	10,000	700



Couplings and Fittings

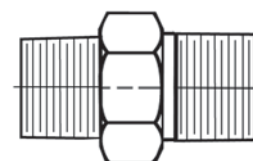
Plugs — Socket Head

Part No.	Connection Type	Max. Pressure	
		psi	bar
02-PLG-4H-10T-S	1/4" NPTM	15,000	1,035
04-PLG-6T-316	1/2" NPTM	10,000	700



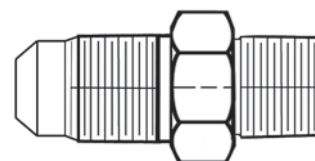
Pipe Thread Male (NPTM) To Type M Male Adapters

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
PM18386	1/4" NPTM	9/16" Type M Male	15,000	1,035
DM6023-354	1/4" NPTM	3/4"-16 Type M Male	15,000	1,035
PM17745	3/8" NPTM	9/16" Type M Male	15,000	1,035
DM6023-350	3/8" NPTM	3/4" Type M Male	15,000	1,035
PM15288	1/2" NPTM	9/16" Type M Male	10,000	700
PM20196	1/2" NPTM	3/4" Type M Male	10,000	700
PM17247	1/2" NPTM	3/4"-16 Type M Male	10,000	700
DM6023-174	1/2" NPTM	1" Type M Male	10,000	700
DM6023-351	3/4" NPTM	3/4" Type M Male	10,000	700
PM7698	3/4" NPTM	1" Type M Male	10,000	700
DM6023-165	1" NPTM	1" Type M Male	10,000	700
DM6023-171	1" NPTM	1-5/16" Type M Male	10,000	700



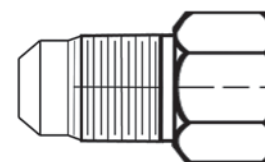
Pipe Thread Male (NPTM) To Medium Pressure Male Adapters

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
PP20569	1/2" NPTM	3/4" MP Male	10,000	700
PM17160	1/2" NPTM	1" MP Male	10,000	700
DM6023-339	3/4" NPTM	1" MP Male	10,000	700
CM10756	1" NPTM	1" MP Male	10,000	700



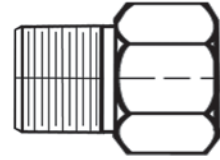
Pipe Thread Female (NPTF) To Medium Pressure Male Adapters

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
DM6023-181	1/4" NPTF	9/16" MP Male	15,000	1,035
PM18422	3/8" NPTF	9/16" MP Male	15,000	1,035
DM6023-130	1/2" NPTF	9/16" MP Male	10,000	700
DM6023-131	1/2" NPTF	3/4" MP Male	10,000	700
PM3549	1/2" NPTF	1" MP Male	10,000	700
CM24608	1/2" NPTF	1" MP Male	10,000	700
DM6023-169	3/4" NPTF	3/4" MP Male	10,000	700
CM12839	3/4" NPTF	1" MP Male	10,000	700
6023-162	1" NPTF	3/4" MP Male	10,000	700
PM17620	1" NPTF	1" MP Male	10,000	700
CM22205	1" NPTF	1-3/8" MP Male	10,000	700



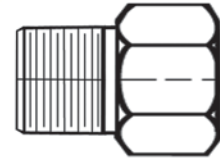
Pipe Thread Male (NPTM) To Medium Pressure Female Adapters

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
DM6023-180	1/4" NPTM	3/8" MP Female	15,000	1,035
PM18339	3/8" NPTM	9/16" MP Female	15,000	1,035
DM6023-134	1/2" NPTM	9/16" MP Female	10,000	700
DM6023-155	3/4" NPTM	3/4" MP Female	10,000	700
DM6023-166	1" NPTM	9/16" MP Female	10,000	700



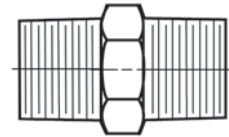
Pipe Thread Female (NPTF) To British Standard Pipe (BSP) Male Adapters

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
BJ2909-M09	1/2" NPTF	G1/2" BSP Male	10,000	700
BJ2909-M10	3/4" NPTF	G3/4" BSP Male	10,000	700



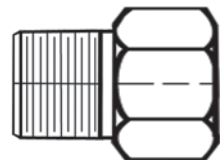
Pipe Thread Male (NPTM) To Metric Male Adapters

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
CA3407-5	1/2" NPTM	M22 x 1.5 Male	10,000	700
CA3407-2	1/2" NPTM	M24 x 1.5 Male	10,000	700
CA3407-7	3/4" NPTM	M24 x 1.5 Male	10,000	700
CA3407-4	1" NPTM	M22 x 1.5 Male	10,000	700
CA3407-1	1" NPTM	M24 x 1.5 Male	10,000	700



Pipe Thread Female (NPTF) To Metric Male Adapters

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
PM24744	1/2" NPTF	M22 x 1.5 Male	10,000	700
CA3407-8	1/2" NPTF	M24 x 1.5 Male	10,000	700



Couplings and Fittings

24,000 psi (1,680 bar)

Quick Couplings

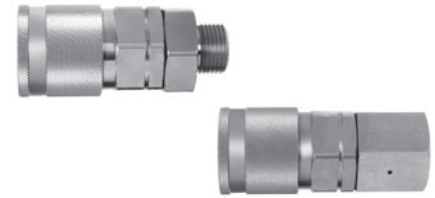
NLB quick-couplings provide solid connections, yet can be easily disconnected. Inexpensive o-rings are available for each model.

MALE



Part No.	Thread Connection
DM6023-112	1"-12 Male
DM6023-152	3/4"-16 Male
DM6023-114	9/16" MP Male
DM6023-128	3/4" MP Female
DM6023-124	9/16" MP Female

FEMALE



Part No.	Thread Connection
DM6023-115	1"-12 Male
DM6023-138	3/4"-16 Male
6023-125	9/16" MP Female
DM6023-127	3/4" MP Female

20K Coupling Shields

NLB high-pressure coupling shields provide a secondary means of protection in the event of coupling release. Hoses stay in place while high-pressure water is deflected.

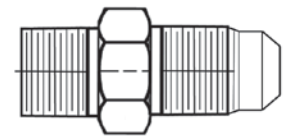


CS20-22

Part No.	Max. Pressure
CS20-22	24,000 psi (1,680 bar)

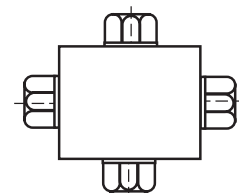
Type M Male To Medium Pressure Male Connectors

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
DM6023-242	9/16" Type M Male	3/8" MP Male	24,000	1,680
DM6023-241	9/16" Type M Male	9/16" MP Male	24,000	1,680
DM6023-246	1" Type M Male	3/8" MP Male	24,000	1,680



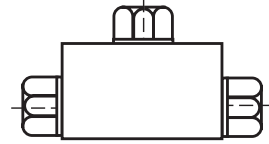
Medium Pressure Crosses

Part No.	Connection Type	Max. Pressure	
		psi	bar
DM6023-83	1/4" MP Female	24,000	1,680
DM6023-365	3/8" MP Female	24,000	1,680
DM6023-63	9/16" MP Female	24,000	1,680
DM6023-68	3/4" MP Female	24,000	1,680
DM6023-73	1" MP Female	24,000	1,680



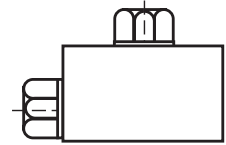
Medium Pressure Tees

Part No.	Connection Type	Max. Pressure	
		psi	bar
DM6023-82	1/4" MP Female	24,000	1,680
DM6023-72	9/16" MP Female	24,000	1,680
DM6023-67	3/4" MP Female	24,000	1,680
DM6023-62	1" MP Female	24,000	1,680



Medium Pressure Elbows

Part No.	Connection Type	Max. Pressure	
		psi	bar
DM6023-81	1/4" MP Female	24,000	1,680
DM6023-71	9/16" MP Female	24,000	1,680
DM6023-66	3/4" MP Female	24,000	1,680
DM6023-61	1" MP Female	24,000	1,680



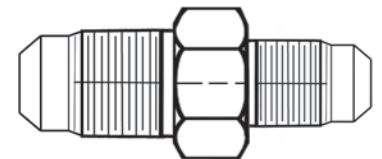
Medium Pressure Straight Couplings

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
DM6023-790	3/8" MP Female	3/8" MP Female	24,000	1,680
DM6023-132	9/16" MP Female	1/4" MP Female	24,000	1,680
DM6023-103	9/16" MP Female	3/8" MP Female	24,000	1,680
DM6023-74	9/16" MP Female	9/16" MP Female	24,000	1,680
DM6023-101	3/4" MP Female	3/8" MP Female	24,000	1,680
DM6023-104	3/4" MP Female	9/16" MP Female	24,000	1,680
DM6023-159	3/4" MP Female	3/4" MP Female	24,000	1,680
PP19867	1" MP Female	9/16" MP Female	24,000	1,680
DM6023-158	1" MP Female	3/4" MP Female	24,000	1,680
DM6023-64	1" MP Female	1" MP Female	24,000	1,680



Medium Pressure Male Connectors

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
DM6023-167V	9/16" MP Male	1/4" MP Male	24,000	1,680
PM10052	9/16" MP Male	9/16" MP Male	24,000	1,680
DM6023-102	3/4" MP Male	1/4" MP Male	24,000	1,680
DM6023-101	3/4" MP Male	3/8" MP Male	24,000	1,680
CM9596	3/4" MP Male	9/16" MP Male	24,000	1,680
PM17225	3/4" MP Male	3/4" MP Male	24,000	1,680
DM6023-244	1" MP Male	9/16" MP Male	24,000	1,680

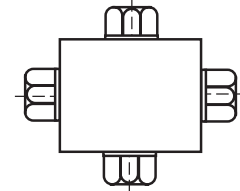


Couplings and Fittings

40,000 psi (2,800 bar)

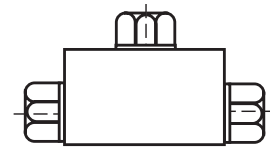
Ultra-High Pressure Crosses

Part No.	Connection Type	Max. Pressure	
		psi	bar
DM6023-203	1/4" HP Female	40,000	2,800
DM6023-204	3/8" HP Female	40,000	2,800
DM6023-205	9/16" HP Female	40,000	2,800



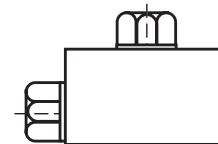
Ultra-High Pressure Tees

Part No.	Connection Type	Max. Pressure	
		psi	bar
DM6023-200	1/4" HP Female	40,000	2,800
DM6023-201	3/8" HP Female	40,000	2,800
DM6023-253	9/16" HP Female	40,000	2,800



Ultra-High Pressure Elbows

Part No.	Connection Type	Max. Pressure	
		psi	bar
DM6023-206	1/4" HP Female	40,000	2,800
DM6023-207	3/8" HP Female	40,000	2,800
DM6023-208	9/16" HP Female	40,000	2,800



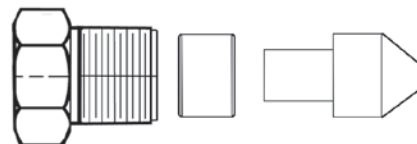
Ultra-High Pressure Straight Couplings

Part No.	Connection Type		Max. Pressure	
	Connection 1	Connection 2	psi	bar
DM6023-218	1/4" HP Female	1/4" HP Female	40,000	2,800
DM6023-315	1/4" HP Female	3/8" HP Female	40,000	2,800
DM6023-317	1/4" HP Female	9/16" HP Female	40,000	2,800
DM6023-219	3/8" HP Female	3/8" HP Female	40,000	2,800
DM6023-108	3/8" HP Female	9/16" HP Female	40,000	2,800
DM6023-220	9/16" HP Female	9/16" HP Female	40,000	2,800



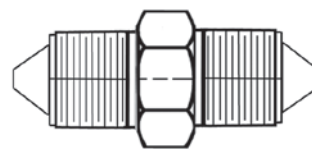
Ultra-High Pressure Gland Nuts, Collars and Plugs

Size	Gland	Collar	Plug
1/4"	DM6023-209	DM6023-212	DM6023-215
3/8"	DM6023-210	DM6023-213	DM6023-216
9/16"	DM6023-211	DM6023-214	DM6023-217



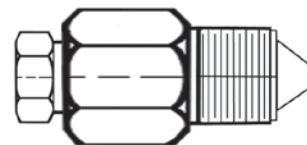
Ultra-High Pressure Male-To-Male Connectors

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
CM6146	1/4" HP Male	1/4" HP Male	40,000	2,800
PP19095	1/4" HP Male	9/16" HP Male	40,000	2,800
PM11143	3/8" HP Male	3/8" HP Male	40,000	2,800
PM11142	3/8" HP Male	9/16" HP Male	40,000	2,800
DM6023-176	9/16" HP Male	9/16" HP Male	40,000	2,800



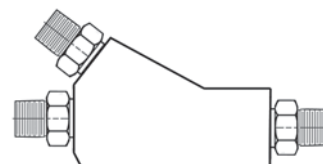
Ultra-High Pressure Male-To-Female Connectors

Part No.	Connection Type		Max. Pressure	
	Connection 1 (C1)	Connection 2 (C2)	psi	bar
DM6023-178	1/4" HP Male	3/8" HP Female	40,000	2,800
PM7879	1/4" HP Male	9/16" HP Female	40,000	2,800
DM6023-163 or 3	3/8" HP Male	9/16" HP Female	40,000	2,800
DM6023-182	9/16" HP Male	1/4" HP Female	40,000	2,800
DM6023-245	9/16" HP Male	3/8" HP Female	40,000	2,800



Y-Adapters

Part No.	Connection Type	Max. Pressure	
		psi	bar
CM13027	9/16" HP Female	40,000	2,800



Safety



Safety has been a priority at NLB since the company began in 1971. In addition to the many design features we integrate into our water jetting pumps and accessories, we offer customers a full line of tools to maximize jobsite safety. These

include everything from space-age protective suits designed to withstand the impact of a 40,000 psi (2,800 bar) water jet to simple signs and barriers that help keep everyone aware of potential risks.

Whip Check

The Whip Check cable is used to secure each high-pressure hose connection. In the event of coupling release, the cable limits hose movement. A nylon version is also available.



PM15924



PM7909



PM15400
WJTA SAFETY VIDEO



PP17384 - CAUTION TAPE



PP17385 - DANGER TAPE



DM34612
DANGER SIGN



PM22602
WJTA
SAFETY DVD

TurtleSkin® WaterArmor™

TurtleSkin® WaterArmor™ is the industry's most advanced protective apparel. Its advanced composite materials are specially woven to withstand the impact of 40,000 psi (2,800 bar) water jets. The unique, "one-size-fits-all" design is adjustable to provide any operator with the ultimate in comfort and safety.

Level of Protection:

TurtleSkin WaterArmor was not penetrated when tested at 40,000 psi (2,800 bar) with a flow rate of 5 gpm (19 lpm), and a nozzle standoff of 3 inches (7.6 cm), traveling 8 feet (2.4 m) per second.

FEATURES/BENEFITS:

- One-size-fits-all
- Fully adjustable straps
- Lightweight - 11 lbs. (5 kg)
- Replaceable panel sections
- Worn under standard wet suits
- Polypropylene outer cover adds chemical resistance
- Can be cleaned with soap and water



Item	Part Number	Description
1	TWA (to order vest or chaps separately, specify TWA-vest or TWA-chaps)	TurtleSkin® WaterArmor™
2	TWAG	Gaiters
(Not Shown)	TWA-GAUNT	Gauntlet

TurtleSkin® and WaterArmor™ are trademarks of Warwick Mills.

Item	Part Number	Description
3	MB-951-size (07 through 13)	Boots, with steel metatarsal guard, sizes 7-13 available
4	HC-69	Hard Hat
5	7	Face Shield Holder
6	10	Face Shield
7	1100	Goggles
8	6780	Rubber Gloves
9	MX-01	Wet Suit, Small
	MX-02	Wet Suit, Medium
	MX-03	Wet Suit, Large
	MX-04	Wet Suit, X-Large
	MX-05	Wet Suit, XX-Large

Jackets and pants are also available separately. To order a jacket, simply add "01" to the part number of the suit size you need. To order pants, add "02".

EXAMPLES: Large suit: MX-03
Large jacket: MX-03-01
Large pants: MX-03-02

NOTE: Always follow all recommended safety procedures, including wearing protective apparel with eye and ear protection. It is the user's responsibility to determine the proper personal protective equipment needed in each particular circumstance. All such equipment and apparel should always be used in strict accordance with the manufacturer's instructions.



NLB's versatile HydroPrep™ system is the most efficient way to remove coatings (paint, epoxies, etc.), scale, and other tough adherents. Our **automated** and **semi-automated** accessories, connected to a rugged NLB high-pressure water jet pump unit, leave metal and concrete undamaged and ready for recoating. (Steel is left with a "white metal" finish, per NACE, SSPC and SIS standards.)

Using nothing but ultra-high pressure water (up to 40,000 psi, or 2,800 bar), HydroPrep™ is as productive as grit blasting. Yet it saves you the associated expense, risks (environmental or sparks) and clean-up problems. You choose the level of automation you need, and vacuum recovery is available.

NLB CRAWLER TAKES SURFACE PREP TO NEW HEIGHTS

It's a tall order to strip epoxy coatings off a 125-foot-tall tank full of Liquefied Natural Gas (LNG), but the NLB Crawler cuts it down to size.

"We've used NLB for years," says B.R. Flowers, president of BR Flowers, Inc., a major surface prep and painting contractor in Norfolk,

Virginia. "I don't think you can get better equipment; it runs very reliably, without problems."

Using an automated Crawler, UHP pump units and other accessories (all from NLB), Flowers was able to remove up to 2,000 square feet per day from the huge tank — without

containment. The Crawler is a proven tool to:

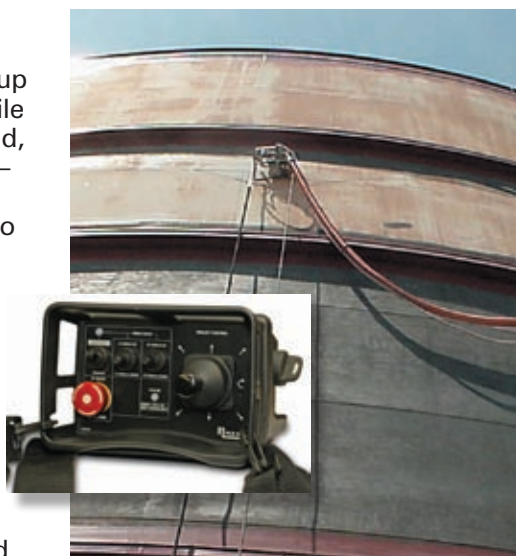
- Reduce operating costs
- Keep projects on schedule
- Minimize risk to personnel and the environment

NEW! NLB Crawler SRT-10-W

For big vertical jobs, like 100-foot storage tanks and ship hulls, more and more contractors are moving up to the NLB SRT-10-W Crawler. While personnel stay safely on the ground, it crawls up, down and sideways — directed from wireless controls — while rotating SPIN JET® nozzles do all the work.

The Crawler uses a vacuum system to grip the surface and to recover wastewater and debris, minimizing clean-up. A winch skid assembly with locking pulleys allows an operator to position the unit and also serves as a fall arrest system.

The SRT-10-W Crawler can be used horizontally as well as vertically. It cleans over welds and plates as thick as 1/2" (12.7mm).



Type	Seal Type	Max. Pressure	Max. Flow	Nozzles	Rotation Speed	Weight	Vacuum Connection
Air-Powered	DS8850A-3	40,000 psi (2,800 bar)	10 gpm (37.8 lpm)	14	3,000 rpm 90 psi, 20 scfm	185 lbs. (84 kg)	4" (10.2 cm)

Patent No. 6,081,960

NEW! VertaJet™ SRT-6 and SRT-6LT



For "in-between" vertical surfaces (too large for manual water jetting but too small for a Crawler), try the NLB VertaJet™ SRT-6. These lightweight, hand-held systems work fast and collect debris.

The SRT-6 has adjustable rotation speed — ideal for soft substrates, like concrete — and a counterbalancing system to minimize operator fatigue. The SRT-6LT weighs just 20 lbs. (9 kg), and requires no air supply. It is ideal for removing coatings from steel

structures. Both have ergonomic handles and dual-trigger operation to dump pressure.

Features and benefits include:

- Vacuum recovery standard
- Counterbalanced to minimize operator fatigue
- 6" (15 cm) cleaning path for high productivity rates
- Uses NLB's exclusive BARJET™ and Bi-Mode™ valve technology

Part No.	Type	Seal Type	Max. Pressure	Max. Flow	Nozzles	Rotation Speed	Weight	Vacuum Connection
SRT-6	Air-Powered	DS8850A-9	40,000 psi (2,800 bar)	6 gpm (23 lpm)	8	3,000 rpm 90 psi, 20 scfm	20 lbs. (9.1 kg)	3" (7.6 cm)
SRT-6LT	Self-Rotating	DS8850A-9	40,000 psi (2,800 bar)	6 gpm (23 lpm)	8	3,000 rpm 90 psi, 20 scfm	20 lbs. (9.1 kg)	3" (7.6 cm)

SPIN JET® Floor and Grate Cleaners



You can quickly remove coatings, pavement markings, runway rubber, and more with a SPIN JET® unit from NLB.

Maneuverable, low-maintenance and ergonomically designed, these hard-working units are used on everything from ship decks to parking lots. Check out these key features:

- Vacuum recovery available
- Air-powered for consistent rotational speed
- Hard rubber wheels for easy movement over different surfaces
- Fast-acting dump valve reduces water pressure to near-zero
- Includes NLB's ultra-high pressure BARJET™ spray bar

36-9900-15A and Vortex™ 36-9950-15A



- No belt or chain drive (integral seal and motor)
- Lightweight aluminum is easy to handle



- Balanced design and adjustable handle
- 4" vacuum attachment (only on the Vortex™ 36-9950-15A)

Seal Part No.	Discharge Pressure (Max.)	Max. Flow	Rotation Speed	Air	Weight	Width	Nozzles
36-9900-15A							
DRS12481	40,000 psi (2,800 bar)	11 gpm (42 lpm)	2,000 rpm	65 psi @ 50 cfm (4.5 bar @ 23.6 l/s)	120 lbs. (54.5 kg)	16" (41 cm)	Up to 15
Vortex™ 36-9950-15A							
DRS12481	40,000 psi (2,800 bar)	11 gpm (42 lpm)	2,000 rpm	65 psi @ 50 cfm (4.5 bar @ 23.6 l/s)	138 lbs. (62.7 kg)	16" (41 cm)	Up to 15

Recommended Spare Parts Kit: 36-9900-15A-1

Vacuum Lance Attachments

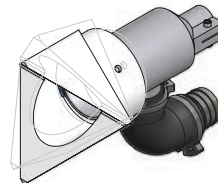
NLB VacLance attachments turn any NCG8450A-3 hand lance into a vacuum recovery surface preparation tool. Kit DM16546 converts any existing NCG8450A-3. Attach it to a vacuum source (approx. 100 CFM at 1-2 inches of vacuum) via NLB's 2" vac hose (PM16758).

VacLance attachment DM32283 is designed to work in corners. It can be rotated to work vertically or horizontally.

DM16546



DM32283



Profiler™

Abrasive wet blasting at up to 40,000 psi (2,800 bar) is no problem for NLB's Profiler™. It profiles a 4-inch (100mm) path at rates of up to 15 feet (5m) per minute, and leaves an excellent bonding surface for new coatings. The Profiler operates at flows of 3-6 gpm (11-23 lpm).

This innovative tool works with various abrasive media, to suit specific applications. The abrasive is fed to the nozzle from an abrasive feed hopper, through metering discs that restrict the

flow to a predetermined rate. A typical flow is 2 lbs. (0.9 kg) per minute.

- Profiles metal and welds, for an ideal bonding surface
- Pressures from 24,000 to 40,000 psi (1,680 to 2,800 bar)
- Flows of 3-6 gpm (11-23 lpm)
- Designed to work with NCG24-286 or NCG40-286 UHP lance, with quick-change cartridge.



Part Number	Pressure Rating	End Connections	Replacement Nozzles		
			40,000 psi @ 6 gpm	40,000 psi @ 3 gpm	24,000 psi @ 6 gpm
BM17994*	24,000 psi* (1,680 bar)	9/16" MP LHF	N/A	N/A	PM18673
BM17994	40,000 psi (2,800 bar)	9/16" HP LHF	PM18671	PM18672	N/A

*at 24,000 psi, requires BM24622 adapter

Ship Bottom Cleaner

With the NLB Ship Bottom Cleaner (SBC36-8300-15A), the entire bottom of a huge tanker ship can be cleaned by a single operator. The SBC is a self-propelled unit that cleans overhead as it travels, with our patented SPIN JET® nozzles.

Some highlights:

- Speed of up to 5 feet per minute (1.5 m/min.)
- Adjustable height, from 40.5" to 70.5" (103 cm to 179 cm)

- Operating pressure up to 40,000 psi (2,800 bar); flow up to 10 gpm (23 lpm)
- Optional vacuum recovery of water and debris
- Convenient, handle-mounted controls
- Pneumatic operation



Type	Seal Type	Max. Pressure	Max. Flow	Nozzles	Rotation Speed	Weight	Vacuum Connection
Air-Powered	DS8800A-3	40,000 psi (2,800 bar)	10 gpm (37.8 lpm)	14	3,000 rpm 90 psi, 20 scfm	185 lbs. (84 kg)	4" (10.2 cm)

Rebuild Kit: Part Number SRT-10-1

Vacuum Recovery



Vacuum recovery of debris and water lets you respect the environment while enhancing safety and productivity. NLB offers several vacuum systems with capacities and degrees of mobility to suit your needs.

This equipment is most commonly used with our HydroPrep™ surface preparation systems and STARJET™ pavement marking removal systems, but has also proven itself in other applications.

MOBILE VACUUM RECOVERY GOES ANYWHERE

NLB's DM33618 vacuum system is designed to work with our HydroPrep™ line of water jet surface preparation tools, simplifying the recovery of water and debris. The system's small footprint and lightweight design allows it to be

mounted in the bed of a one-ton truck, effectively turning any pick-up truck into a vac truck.

The vac system is driven by a 44 hp diesel engine and provides 1,000 cfm @ 6" to 8" of mercury. A 220-gallon

tank collects all waste and debris. The included transfer pump allows the water to be drawn off, leaving only solids in the tank. The standard mounting package includes a skid with forklift slots and lifting lugs.

Vacuum Recovery Units



DM33168

- Compact and lightweight
- Fits in a 1-ton pick-up truck
- Angled debris tank



BM17421

- Trailer-mounted for easy towing
- High-capacity (1,200-gal.) debris tank
- Fast access to washable, 10-micron filter



BM28766

- Positive displacement rotary lobe blower
- Full-diameter, side-hinged rear door with four manual latches
- Liquid return discharge pump is belt-driven (from diesel engine); rated for 70 gpm @ 30 psi

Part No.	Vacuum	Debris Tank	Diesel Engine
DM33168	1,000 cfm @ 6" to 8"	220 gal. (833 l)	44 hp (33 kW)
BM17421	1,000 cfm @ 6" to 8"	1,200 gal. (4,542 l)	44 hp (33 kW)
BM28766	1,975 cfm @ 27"	1,000 gal. (3,785 l)	152 hp (113 kW)

Vacuum Recovery

Vac Hose

Part Number	Description	Connection 1	Connection 2
PM12346	Hose, Vacuum, 6" I.D.	N/A	N/A
PM12230	Hose, Vacuum, 4" I.D.	N/A	N/A
PM16320	Hose, Vacuum, 3" I.D.	N/A	N/A
PM11357	Hose, Vacuum, 2" I.D.	N/A	N/A

Vac Hose Clamps

PM12234	Clamp, Hose, Vacuum, 6"	N/A	N/A
PM12231	Clamp, Hose, Vacuum, 4"	N/A	N/A
PM13826	Clamp, Hose, Vacuum, 3"	N/A	N/A
PM19081	Clamp, Hose, Vacuum, 2"	N/A	N/A

Vac Fittings

Hose Couplers

PM12345	Coupler, Vacuum, 6" Female to 6" Hose	6" Female Hose Coupler	6" Hose Barb
PM13508	Coupler, Vacuum, 6" Male to 4" Female	6" Female Hose Coupler	4" Hose Barb
PM12228	Coupler, Vacuum, 4" Male to 4" Hose	4" Male Hose Coupler	4" Hose
30-LAT-40-G	Coupler, "Y" Vacuum, 3" FNPT	3" Female NPT	2 X 3" FNPT

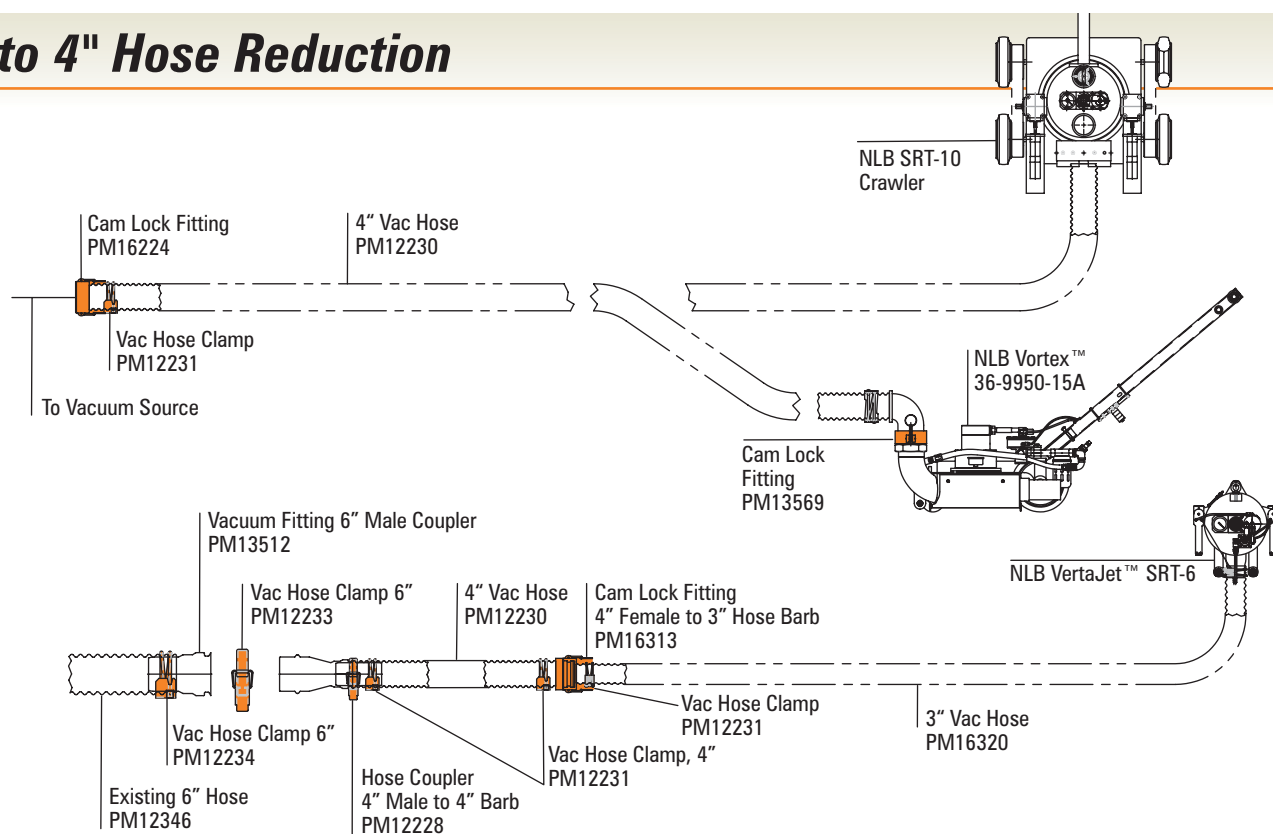
Cam Lock Fittings

PM16314	Cam Lock, Vacuum, 4" Male to 4" Hose Barb	4" Male Cam Lock	4" Male Hose Barb
PM16224	Cam Lock, Vacuum, 4" Female to 4" Hose Barb	4" Female Cam Lock	4" Male Hose Barb
PM13569	Cam Lock, 90° Vacuum, 4" Female to 4" Hose Barb	4" Female Cam Lock	4" Male Hose Barb
PM16313	Cam Lock, Vacuum, 4" Female to 3" Hose Barb	4" Female Cam Lock	3" Male Hose Barb
PM19082	Cam Lock, Vacuum, 4" Male to 3" Male	4" Male Cam Lock	3" Male Cam Lock
PM17324	Cam Lock, Vacuum, 4" Male to 3" MNPT	4" Male Cam Lock	3" MNPT
PM17325	Cam Lock, Vacuum, 3" Male to 3" MNPT	3" Male Cam Lock	3" MNPT
PM17326	Cam Lock, Vacuum, 3" Female to 2" Hose Barb	3" Female Cam Lock	2" Male Hose Barb

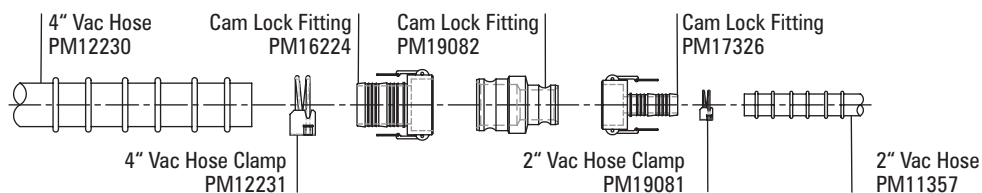
Vacuum Clamps

PM12233	Clamp, Vacuum, 6"	N/A	N/A
PM12229	Clamp, Vacuum, 4"	N/A	N/A

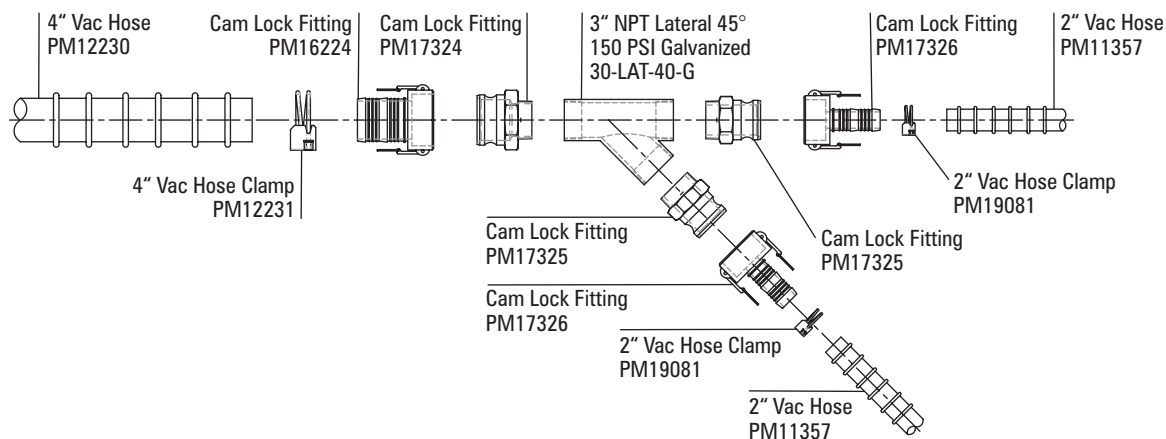
6" to 4" Hose Reduction



4" Hose to 2" Hose Reduction



4" Hose to 15° Splitter and 2" Hose Reduction



Stripe Removal



For over a decade, NLB has pioneered the removal of pavement markings with ultra-high pressure water jets. We have two mobile systems, both with rotating SPIN JET® assemblies mounted on a vehicle, connected to a water supply and NLB pump unit. The **STARJET™** does high-volume removal (like highways and runways), while the compact **STRIPEJET™** is ideal for parking garages and intersections.

The STARJET™ system has all components — patented nozzle

assembly, UHP pump unit, water tank, and optional vacuum recovery — on a heavy-duty truck. It can remove up to 7,000 feet of markings per hour (*2,134 meters per hour*). All operating controls are conveniently located in the cab.

The STRIPEJET™ is very maneuverable, with a tight turning radius and smooth, consistent speed. Five heads are available for each system, for cleaning paths of 8", 10", 15", 20" or 24" (*20, 25.4, 38, 50.8, or 61 cm*). Vacuum recovery is optional.

NLB WATER JETS PUT YOU MILES AHEAD

The advantages of water jetting over abrasive methods for pavement marking removal are much better recognized today than they were a few years ago. UHP water jetting is not only faster and more productive, but when used properly, does virtually no damage to concrete or asphalt.

Other benefits:

- Removes coatings, membranes, thermal plastic, epoxy, rubber build-up, and more
- Complete removal, even from grooved pavement
- Creates a stronger bond for restriping
- Eliminates dust and debris, with optional vacuum recovery
- Saves labor
- No exposure (people or environment) to abrasive media or chemicals

STARJET® features:

- Vacuum recovery
- Articulated robotic arm with proportional controls
- Semi-automated controls for skip line removal
- In-cab video with 3 cameras (2 front, 1 rear)
- Dedicated horsepower for each component to maximize productivity
- 3 waste/debris handling options
- Options: optical line tracking, GPS with weather forecasting, remote internet with email & webcam capabilities



Reference Section



To help customers get the most out of their water jetting equipment, NLB is pleased to present this reference section with a variety of helpful information.

On the following pages, you'll find **typical hook-up drawings** for single lances, dual lances, foot controls, and SPIN JET® grate cleaners, organized by operating pressure. Key accessories are cross-indexed to

their respective pages in the catalog.

Following the drawings are **flow charts** that project the flow of each NLB standard or sapphire orifice nozzle at a variety of operating pressures. These are followed by **pressure drop** calculations for all common hose sizes and a **nozzle thrust** table at any given pressure and flow. All data are presented in both English and metric.

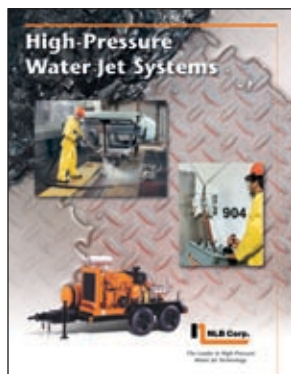
Get the latest information at the NLB website

Additional reference information — as well as the most up-to-date technical data, new products, application literature, and much more — is available 24/7 at our website, www.nlbcorp.com. You can even **request an online** quote

on most of the accessories in this catalog, without leaving your desk. Just click on the "Request for Quote" button on the home page.

All of the brochures shown below can be downloaded in PDF

format from our website. Or you can request them from the NLB marketing department by calling 248-624-5555 or sending an e-mail message to nlbmktg@nlbusa.com.



NLB Capabilities



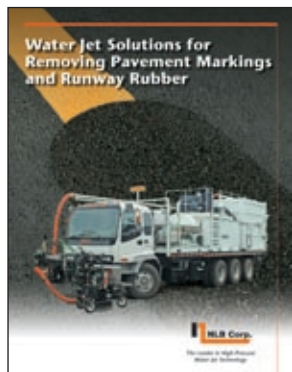
Surface Preparation



Paint Booth Cleaning



Industrial Product Removal



Pavement Marking Removal



Rental Programs

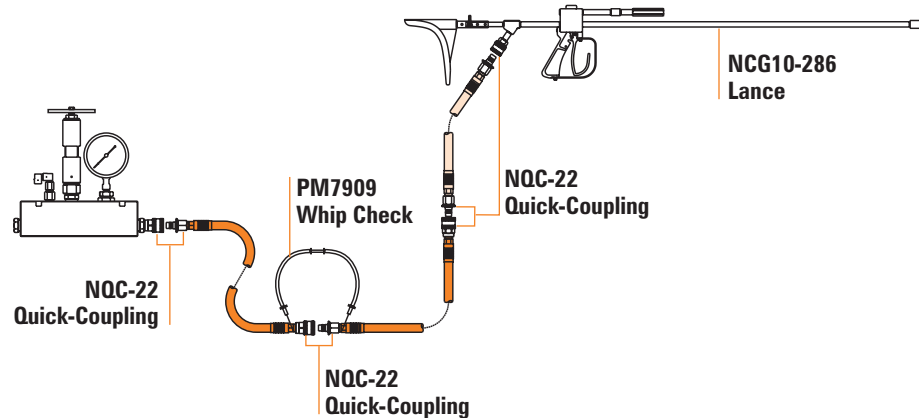


Tank Cleaning White Paper

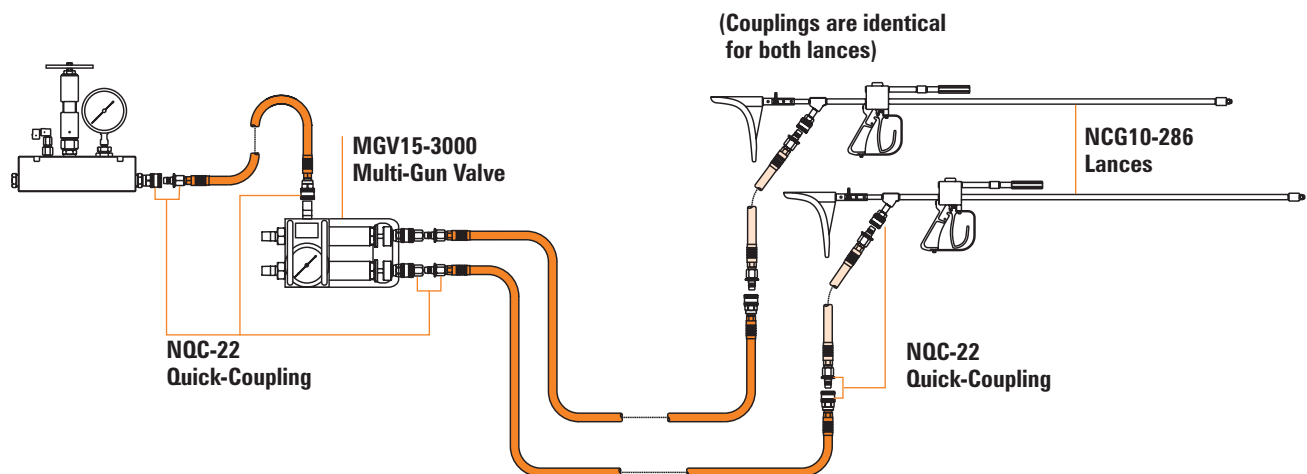
Reference Section

Typical hook-ups, 10,000 psi (700 bar)

Single Lance



Dual Lances



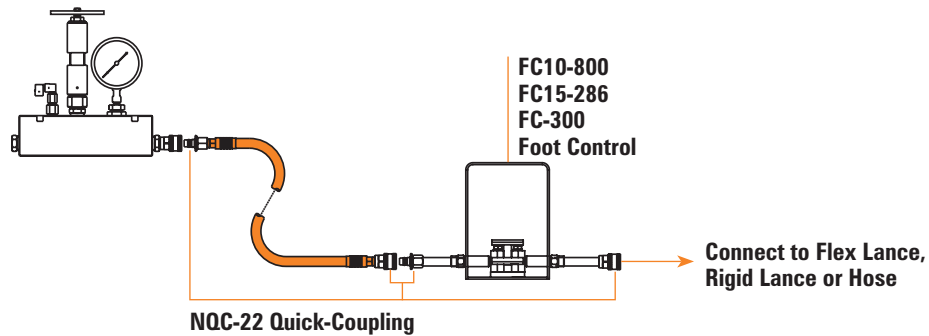
Note: Whip Check can be used on all hose connections, not just hose-to-hose.

LEGEND

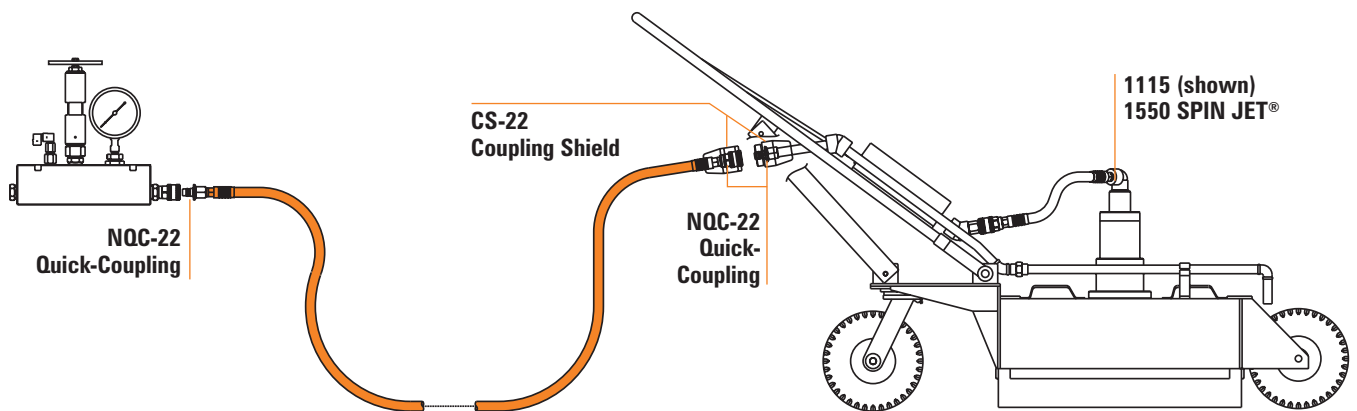
WP3-1/2-50
Hose

SW-15K
Whip Hose

Foot Control



SPIN JET® Floor and Grate Cleaner

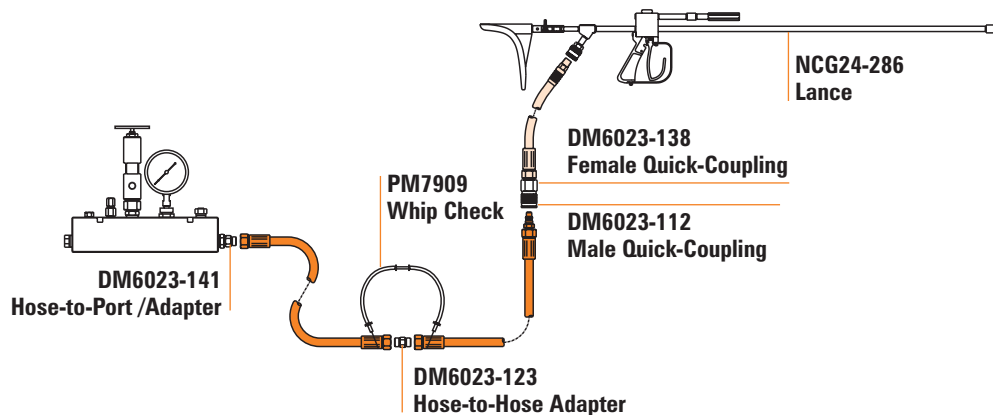


Accessory	Page
Lances	12-19
Foot Controls	26-27
SPIN JET®	50-51
Hoses	68-69
Couplings and Adapters.....	70-79
Whip Check.....	80-81

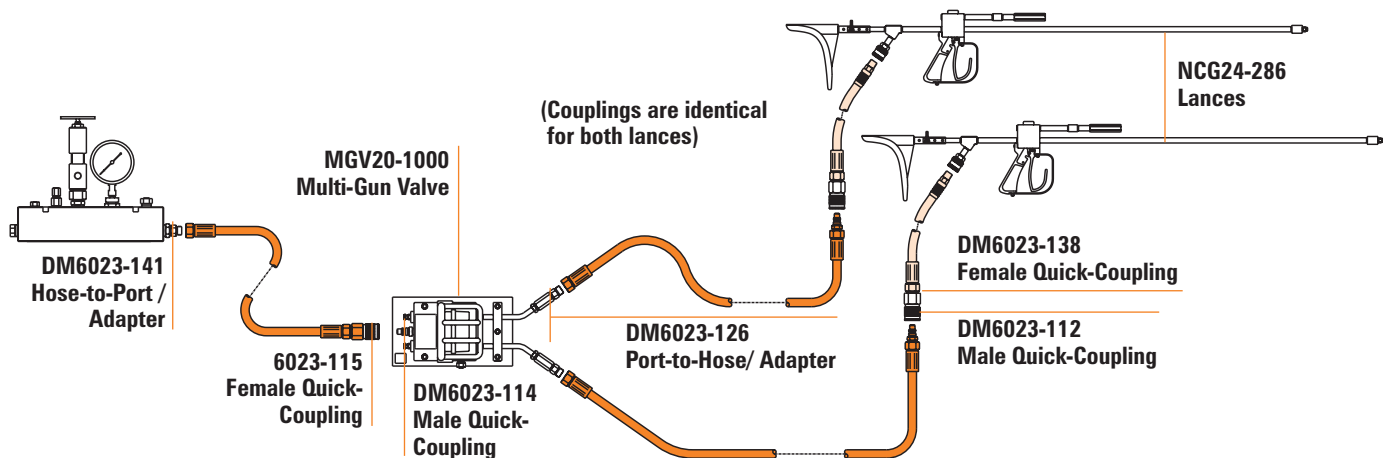
Reference Section

Typical hook-ups, 20,000 psi (1,400 bar)

Single Lance



Dual Lances



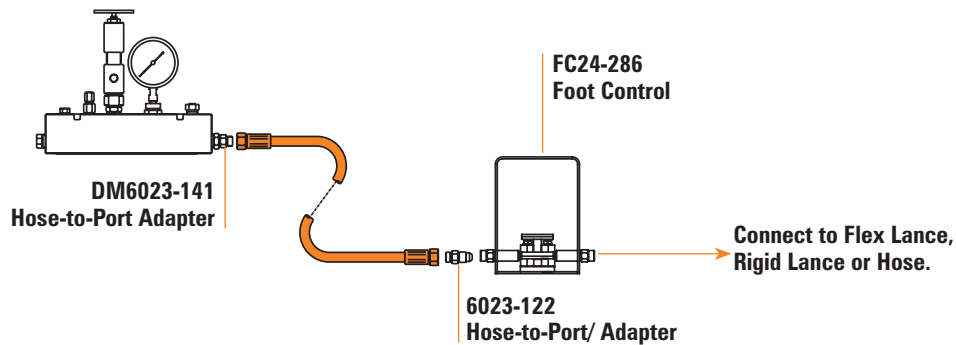
Note: Whip Check can be used on all hose connections, not just hose-to-hose.

LEGEND

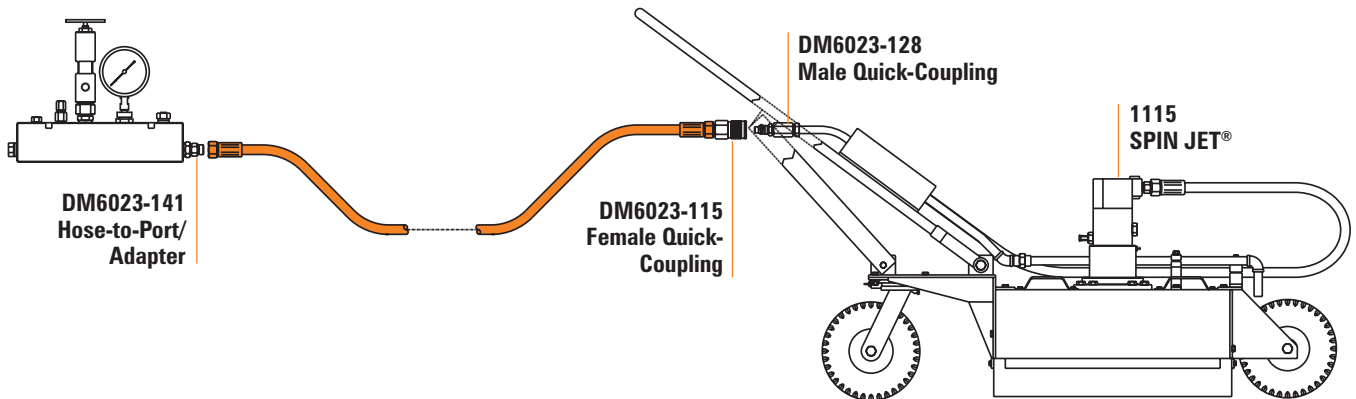
NP20-1/2-50F
Hose with Swivel Nuts

BM19662
Whip Hose

Foot Control



SPIN JET® Floor and Grate Cleaner

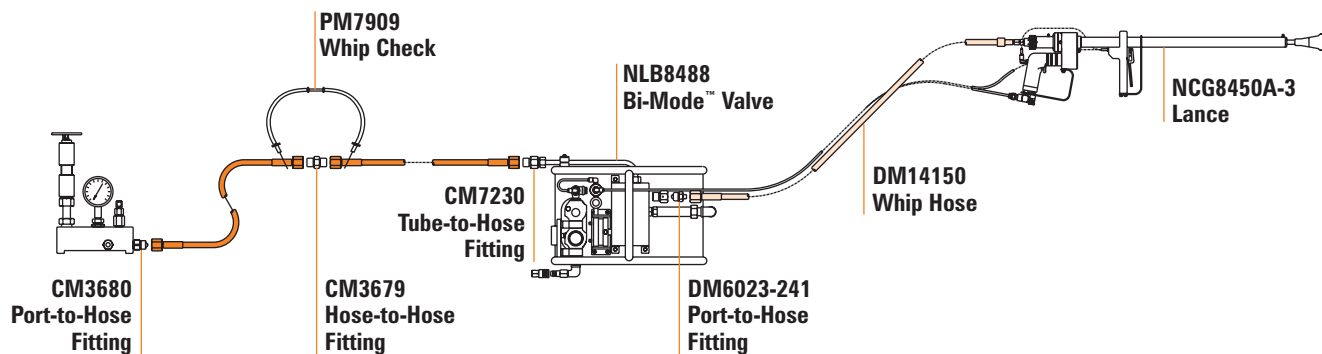


Accessory	Page
Lances	12-19
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Whip Check.....	80-81

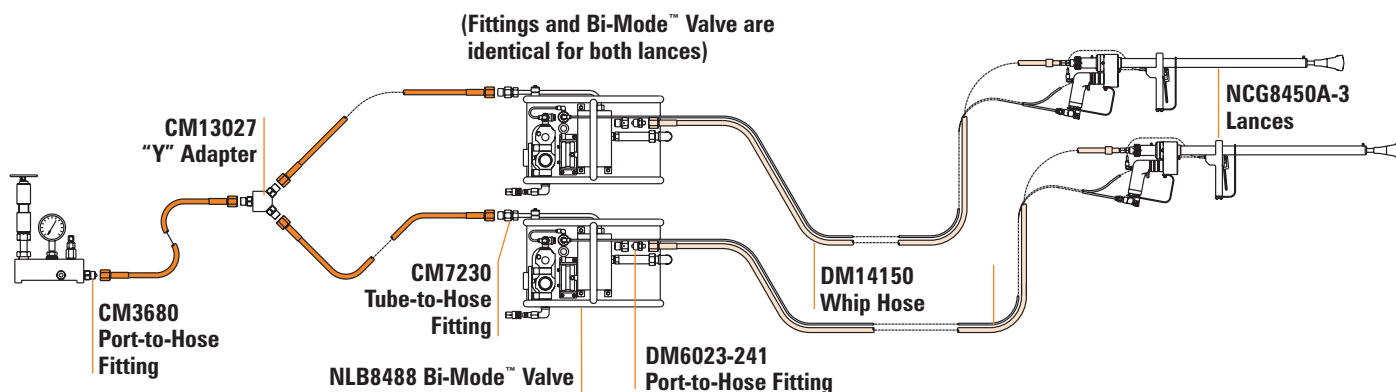
Reference Section

Typical hook-ups, 40,000 psi (2,800 bar)

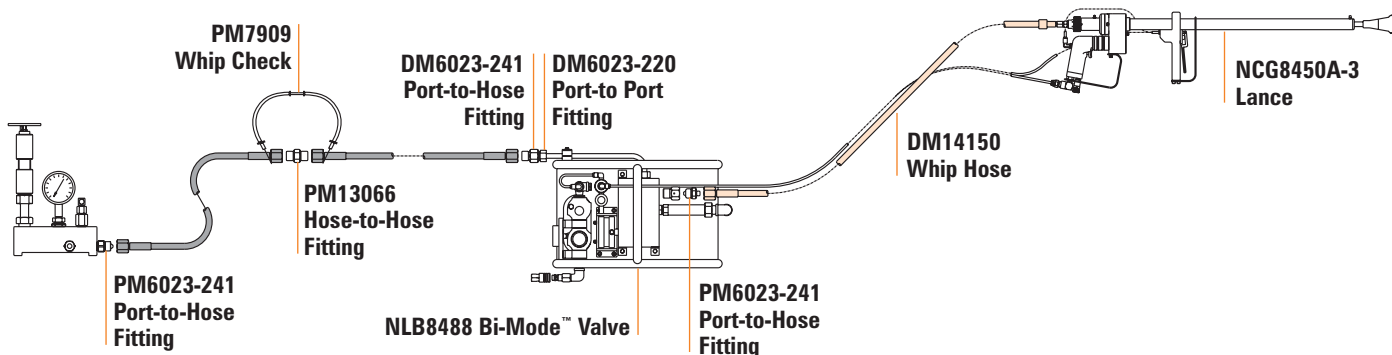
Single Lance



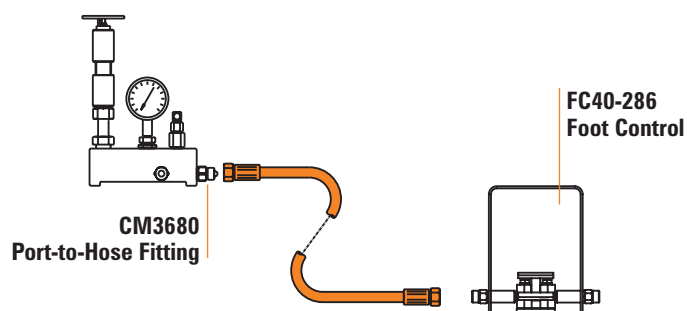
Dual Lances



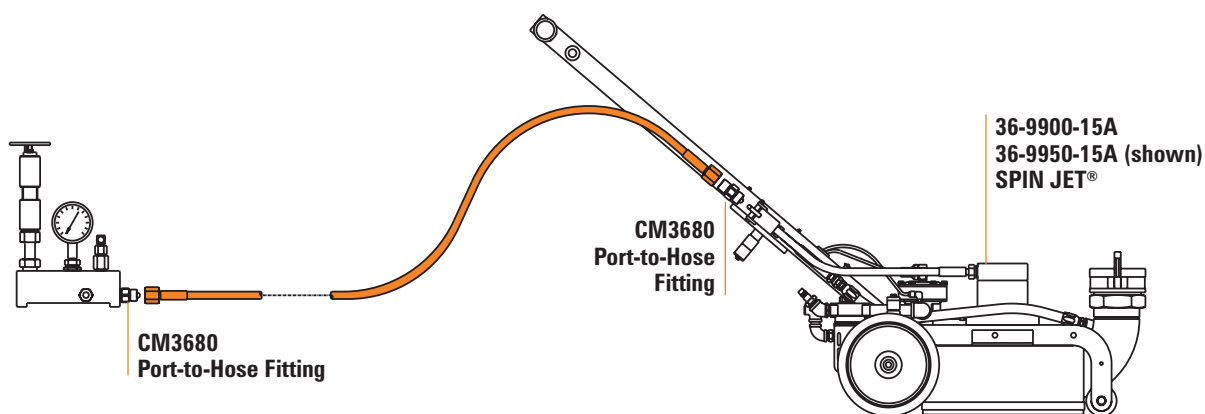
Single Lance with Typical NLB 4075 Pump






Foot Control



SPIN JET® Floor and Grate Cleaner



LEGEND

 NP40-5/16-50F Hose	 DM14150 Whip Hose
 NP40-3/16-50F Hose	

Accessory	Page
Lances	12-19
Bi-Mode™ Valves	16
Foot Controls	26-27
"Y" Adapter.....	28
SPIN JET®	50-51
Hoses	68-69
Couplings and Adapters.....	70-79
Whip Check.....	80-81

Reference Section

Nozzle Flow Charts (Theoretical) - GPM (LPM)

0° - Nozzle (S-1, S-2, S-7M)

Insert	Nozzle No.	Pressure PSI (BAR)									
		1,000 (70)	2,000 (140)	3,000 (210)	4,000 (275)	5,000 (345)	6,000 (415)	7,000 (490)	8,000 (550)	9,000 (630)	10,000 (700)
—	0000.5	.21 (0.79)	.30 (1.14)	.37 (1.40)	.42 (1.59)	.47 (1.78)	.52 (1.97)	.56 (2.12)	.60 (2.27)	.64 (2.42)	.67 (2.54)
BN1135	0001	.31 (1.17)	.40 (1.51)	.53 (2.01)	.66 (2.50)	.75 (2.84)	.84 (3.18)	.90 (3.41)	.95 (3.60)	.98 (3.71)	1.0 (3.79)
—	0001.5	.63 (2.38)	.80 (3.03)	1.05 (3.97)	1.30 (4.92)	1.45 (5.49)	1.61 (6.09)	1.79 (6.78)	1.90 (7.19)	1.95 (7.38)	2.0 (7.57)
BN1121	0002	1.0 (3.79)	1.4 (5.30)	1.7 (6.43)	2.0 (7.57)	2.2 (8.33)	2.5 (9.46)	2.6 (9.84)	2.8 (10.60)	3.0 (11.36)	3.2 (12.11)
BN1122	0003	1.5 (5.68)	2.1 (7.95)	2.6 (9.84)	3.0 (11.36)	3.4 (12.87)	3.7 (14.00)	3.9 (14.76)	4.2 (15.90)	4.5 (17.03)	4.7 (17.79)
BN1123	0004	2.0 (7.57)	2.8 (10.60)	3.5 (13.25)	4.0 (15.14)	4.5 (17.03)	4.9 (18.55)	5.3 (20.06)	5.6 (21.20)	6.0 (22.71)	6.3 (23.85)
—	0004.5	2.3 (8.71)	3.2 (12.11)	3.9 (14.76)	4.5 (17.03)	5.1 (19.30)	5.5 (20.82)	5.9 (22.33)	6.3 (23.85)	6.8 (25.74)	7.1 (26.87)
BN1124	0005	2.5 (9.46)	3.5 (13.25)	4.3 (16.28)	5.0 (18.93)	5.6 (21.20)	6.2 (23.87)	6.6 (24.98)	7.1 (26.87)	7.5 (28.39)	7.9 (29.90)
—	0005.5	2.8 (10.60)	3.9 (14.76)	4.7 (17.79)	5.5 (20.82)	6.2 (23.47)	6.8 (25.74)	7.3 (27.63)	7.8 (29.52)	8.3 (31.42)	8.7 (32.93)
BN1125	0006	3.0 (11.36)	4.2 (15.90)	5.2 (19.68)	6.0 (22.71)	6.8 (25.74)	7.4 (28.01)	7.9 (29.90)	8.5 (32.17)	9.0 (34.07)	9.5 (35.96)
—	0006.5	3.3 (12.49)	4.6 (17.41)	5.6 (21.20)	6.5 (24.60)	7.3 (27.63)	8.0 (30.28)	8.6 (32.55)	9.2 (34.82)	9.8 (37.09)	10.3 (38.99)
—	0007	3.5 (13.25)	4.9 (18.55)	6.0 (22.71)	7.0 (26.50)	7.9 (29.90)	8.6 (32.55)	9.2 (34.82)	9.9 (37.47)	10.5 (39.74)	11.1 (42.01)
BN1126	0008	4.0 (15.14)	5.6 (21.20)	6.9 (26.12)	8.0 (30.28)	9.0 (34.07)	9.8 (37.09)	10.6 (40.12)	11.3 (42.77)	12.0 (45.42)	12.6 (47.69)
—	0009	4.5 (17.03)	6.3 (23.85)	7.7 (29.14)	9.0 (34.07)	10.2 (38.61)	11.1 (42.01)	11.9 (45.04)	12.7 (48.07)	13.5 (51.10)	14.2 (53.75)
BN1127	0010	5.0 (18.93)	7.0 (26.50)	8.6 (32.55)	10.0 (37.85)	11.3 (42.77)	12.3 (46.56)	13.2 (49.96)	14.1 (53.37)	15.0 (56.78)	15.8 (59.80)
BN1129	0012	6.0 (22.71)	8.4 (31.79)	10.3 (38.99)	12.0 (45.42)	13.6 (51.48)	14.8 (56.02)	15.8 (59.80)	16.9 (63.97)	18.0 (68.13)	19.0 (71.92)
BN1130	0015	7.5 (28.39)	10.5 (39.74)	12.9 (48.83)	15.0 (56.78)	16.8 (63.59)	18.5 (70.02)	19.8 (74.94)	21.2 (80.24)	22.5 (85.16)	23.7 (89.70)
BN1134	0020	10.0 (37.85)	14.0 (52.99)	17.2 (65.10)	20.0 (75.70)	22.4 (84.78)	24.6 (93.11)	26.4 (99.92)	28.2 (106.74)	30.0 (113.55)	31.6 (119.61)
BN1133	0030	15.0 (56.78)	21.0 (79.49)	25.8 (97.65)	30.0 (113.55)	33.5 (126.80)	36.9 (139.67)	39.6 (149.89)	42.3 (160.11)	45.0 (170.33)	47.4 (179.41)
—	0040	20.0 (75.70)	28.0 (105.98)	34.4 (130.20)	40.0 (151.40)	44.7 (169.19)	49.2 (186.22)	52.8 (199.85)	56.4 (213.47)	60.0 (227.10)	63.2 (239.21)
—	0050	25.0 (94.63)	35.0 (132.48)	43.0 (162.76)	50.0 (189.25)	55.9 (211.58)	61.5 (232.78)	66.0 (249.81)	70.5 (266.84)	75.0 (283.88)	79.0 (299.02)

15° - Fan Nozzle (S-3)

Nozzle No.	Pressure PSI (BAR)									
	1,000 (70)	2,000 (140)	3,000 (210)	4,000 (275)	5,000 (345)	6,000 (415)	7,000 (490)	8,000 (550)	9,000 (630)	10,000 (700)
1501	.31 (1.17)	.40 (1.51)	.53 (2.01)	.66 (2.50)	.75 (2.84)	.84 (3.18)	.90 (3.41)	.95 (3.60)	.98 (3.71)	1.0 (3.79)
1502	1.0 (3.79)	1.4 (5.30)	1.7 (6.43)	2.0 (7.57)	2.2 (8.33)	2.5 (9.46)	2.6 (9.84)	2.8 (10.60)	3.0 (11.36)	3.2 (12.11)
1503	1.5 (5.68)	2.1 (7.95)	2.6 (9.84)	3.0 (11.36)	3.4 (12.87)	3.7 (14.00)	3.9 (14.76)	4.2 (15.90)	4.5 (17.03)	4.7 (17.79)
1504	2.0 (7.57)	2.8 (10.60)	3.5 (13.25)	4.0 (15.14)	4.5 (17.03)	4.9 (18.55)	5.3 (20.06)	5.6 (21.20)	6.0 (22.71)	6.3 (23.85)
1505	2.5 (9.46)	3.5 (13.25)	4.3 (16.28)	5.0 (18.93)	5.6 (21.20)	6.2 (23.47)	6.6 (24.98)	7.1 (26.87)	7.5 (28.39)	7.9 (29.90)
1506	3.0 (11.36)	4.2 (15.90)	5.2 (19.68)	6.0 (22.71)	6.8 (25.74)	7.4 (28.01)	7.9 (29.90)	8.5 (32.17)	9.0 (34.07)	9.5 (35.96)
1507	3.5 (13.25)	4.9 (18.55)	6.0 (22.71)	7.0 (26.50)	7.9 (29.90)	8.6 (32.55)	9.2 (34.82)	9.9 (37.47)	10.5 (39.74)	11.1 (42.01)
1508	4.0 (15.14)	5.6 (21.20)	6.9 (26.12)	8.0 (30.28)	9.0 (34.07)	9.8 (37.09)	10.6 (40.12)	11.3 (42.77)	12.0 (45.42)	12.6 (47.69)
1509	4.5 (17.03)	6.3 (23.85)	7.7 (29.14)	9.0 (34.07)	10.2 (38.61)	11.1 (42.01)	11.9 (45.04)	12.7 (48.07)	13.5 (51.10)	14.2 (53.75)
1510	5.0 (18.93)	7.0 (26.50)	8.6 (32.55)	10.0 (37.85)	11.3 (42.77)	12.3 (46.56)	13.2 (49.96)	14.1 (53.37)	15.0 (56.78)	15.8 (59.80)
1512	6.0 (22.71)	8.4 (31.79)	10.3 (38.99)	12.0 (45.42)	13.6 (51.48)	14.8 (56.02)	15.8 (59.80)	16.9 (63.97)	18.0 (68.13)	19.0 (71.92)
1515	7.5 (28.39)	10.5 (39.74)	12.9 (48.83)	15.0 (56.78)	16.8 (63.59)	18.5 (70.02)	19.8 (74.94)	21.2 (80.24)	22.5 (85.16)	23.7 (89.70)
1520	10.0 (37.85)	14.0 (52.99)	17.2 (65.10)	20.0 (75.70)	22.4 (84.78)	24.6 (93.11)	26.4 (99.92)	28.2 (106.74)	30.0 (113.55)	31.6 (119.61)
1530	15.0 (56.78)	21.0 (79.49)	25.8 (97.65)	30.0 (113.55)	33.5 (126.80)	36.9 (139.67)	39.6 (149.89)	42.3 (160.11)	45.0 (170.33)	47.4 (179.41)
1540	20.0 (75.70)	28.0 (105.98)	34.4 (130.20)	40.0 (151.40)	44.7 (169.19)	49.2 (186.22)	52.8 (199.85)	56.4 (213.47)	60.0 (227.10)	63.2 (239.21)
1550	25.0 (94.63)	35.0 (132.48)	43.0 (162.76)	50.0 (189.25)	55.9 (211.58)	61.5 (232.78)	66.0 (249.81)	70.5 (266.84)	75.0 (283.88)	79.0 (299.02)

Insert	Nozzle No.	Pressure PSI (BAR)									
		11,000 (770)	12,000 (840)	13,000 (900)	14,000 (980)	15,000 (1,035)	16,000 (1,120)	17,000 (1,190)	18,000 (1,260)	19,000 (1,330)	20,000 (1,400)
—	0000.5	.70 (2.65)	.73 (2.76)	.76 (2.88)	.79 (2.99)	.82 (3.10)	.85 (3.22)	.87 (3.29)	.89 (3.37)	.92 (3.48)	.95 (3.60)
BN1135	0001	1.05 (3.97)	1.09 (4.13)	1.14 (4.31)	1.18 (4.47)	1.22 (4.62)	1.27 (4.81)	1.3 (4.92)	1.34 (5.07)	1.38 (5.22)	1.41 (5.34)
—	0001.5	2.1 (7.95)	2.18 (8.25)	2.28 (8.63)	2.36 (8.93)	2.44 (9.24)	2.54 (9.61)	2.60 (9.84)	2.68 (10.14)	2.76 (10.45)	2.82 (10.67)
BN1121	0002	3.36 (12.72)	3.51 (13.29)	3.65 (13.82)	3.79 (14.35)	3.92 (14.84)	4.05 (15.33)	4.17 (15.78)	4.29 (16.24)	4.41 (16.69)	4.53 (17.15)
BN1122	0003	4.93 (18.66)	5.15 (19.49)	5.36 (20.29)	5.56 (21.04)	5.76 (21.80)	5.95 (22.52)	6.13 (23.20)	6.31 (23.88)	6.48 (24.53)	6.65 (25.17)
BN1123	0004	6.61 (25.02)	6.9 (26.12)	7.18 (27.18)	7.45 (28.20)	7.72 (29.22)	7.97 (30.17)	8.2 (31.04)	8.45 (31.98)	8.68 (32.85)	8.91 (33.72)
—	0004.5	7.45 (28.20)	7.78 (29.45)	8.09 (30.62)	8.4 (31.79)	8.69 (32.89)	8.98 (33.99)	9.23 (34.94)	9.53 (36.07)	9.79 (37.06)	10.04 (38.00)
BN1124	0005	8.29 (31.38)	8.69 (32.89)	9.01 (34.10)	9.35 (35.39)	9.68 (36.64)	9.99 (37.81)	10.3 (38.99)	10.6 (40.12)	10.89 (41.22)	11.17 (42.28)
—	0005.5	9.12 (34.52)	9.53 (36.07)	9.92 (37.55)	10.29 (38.95)	10.66 (40.35)	11.0 (41.64)	11.34 (42.92)	11.67 (44.17)	11.99 (45.38)	12.3 (46.56)
BN1125	0006	9.96 (37.70)	10.41 (39.40)	10.83 (40.99)	11.24 (42.54)	11.64 (44.06)	12.02 (45.50)	12.39 (46.90)	12.75 (48.26)	13.09 (49.55)	13.44 (50.87)
—	0006.5	10.8 (40.88)	11.28 (42.69)	11.74 (44.44)	12.19 (46.14)	12.61 (47.73)	13.03 (49.32)	13.43 (50.83)	13.82 (52.31)	14.2 (53.75)	14.57 (55.15)
—	0007	11.64 (44.06)	12.16 (46.03)	12.66 (47.92)	13.13 (49.70)	13.59 (51.44)	14.04 (53.14)	14.47 (54.77)	14.89 (56.36)	15.3 (57.91)	15.69 (59.39)
BN1126	0008	13.21 (50.00)	13.8 (52.23)	14.37 (54.39)	14.91 (56.43)	15.43 (58.40)	15.94 (60.33)	16.43 (62.19)	16.9 (63.97)	17.37 (65.75)	17.82 (67.45)
—	0009	14.89 (56.36)	15.56 (58.89)	16.19 (61.28)	16.8 (63.59)	17.39 (65.82)	17.96 (67.98)	18.51 (70.06)	19.05 (72.10)	19.6 (74.19)	20.1 (76.09)
BN1127	0010	16.57 (62.72)	17.31 (65.52)	18.01 (68.17)	18.69 (70.74)	19.35 (73.24)	19.99 (75.66)	20.6 (77.97)	21.2 (80.24)	21.8 (82.51)	22.3 (84.41)
BN1129	0012	19.93 (75.44)	20.81 (78.77)	21.66 (81.98)	22.48 (85.09)	23.27 (88.08)	24.0 (90.84)	24.8 (93.87)	25.5 (96.52)	26.2 (99.17)	26.9 (101.82)
BN1130	0015	24.86 (94.10)	25.96 (98.26)	27.02 (102.27)	28.0 (105.98)	29.0 (109.77)	30.0 (113.55)	30.9 (116.96)	31.8 (120.36)	32.7 (123.77)	33.5 (126.80)
BN1134	0020	33.14 (125.43)	34.6 (130.96)	36.0 (136.26)	37.4 (141.56)	38.7 (146.48)	40.0 (151.40)	41.2 (155.94)	42.4 (160.48)	43.6 (165.03)	44.7 (169.19)
BN1133	0030	49.7 (188.11)	51.9 (196.44)	54.0 (204.39)	56.0 (211.96)	58.0 (219.53)	60.0 (227.10)	61.8 (233.91)	63.6 (240.73)	65.3 (247.16)	67.0 (253.60)
—	0040	66.3 (250.95)	69.2 (261.92)	72.0 (272.52)	74.8 (283.12)	77.4 (292.96)	79.9 (302.42)	82.4 (311.88)	84.8 (320.97)	87.1 (329.67)	89.4 (338.38)
—	0050	82.9 (313.78)	86.5 (327.40)	90.1 (341.03)	93.5 (353.90)	96.8 (366.39)	99.9 (378.12)	103.0 (389.86)	106.0 (401.21)	108.9 (412.19)	111.7 (422.78)

Nozzle No.	Pressure PSI (BAR)									
	11,000 (770)	12,000 (840)	13,000 (900)	14,000 (980)	15,000 (1,035)	16,000 (1,120)	17,000 (1,190)	18,000 (1,260)	19,000 (1,330)	20,000 (1,400)
1501	1.05 (3.97)	1.09 (4.13)	1.14 (4.31)	1.18 (4.47)	1.22 (4.62)	1.27 (4.81)	1.3 (4.92)	1.34 (5.07)	1.38 (5.22)	1.41 (5.34)
1502	3.36 (12.72)	3.51 (13.29)	3.65 (13.82)	3.79 (14.35)	3.92 (14.84)	4.05 (15.33)	4.17 (15.78)	4.29 (16.24)	4.41 (16.69)	4.53 (17.15)
1503	4.93 (18.66)	5.15 (19.49)	5.36 (20.29)	5.56 (21.04)	5.76 (21.80)	5.95 (22.52)	6.13 (23.20)	6.31 (23.88)	6.48 (24.53)	6.65 (25.17)
1504	6.61 (25.02)	6.9 (26.12)	7.18 (27.18)	7.45 (28.20)	7.72 (29.22)	7.97 (30.17)	8.2 (31.04)	8.45 (31.98)	8.68 (32.85)	8.91 (33.72)
1505	8.29 (31.38)	8.69 (32.89)	9.01 (34.10)	9.35 (35.39)	9.68 (36.64)	9.99 (37.81)	10.3 (38.99)	10.6 (40.12)	10.89 (41.22)	11.17 (42.28)
1506	9.96 (37.70)	10.41 (39.40)	10.83 (40.99)	11.24 (42.54)	11.64 (44.06)	12.02 (45.50)	12.39 (46.90)	12.75 (48.26)	13.09 (49.55)	13.44 (50.87)
1507	11.64 (44.06)	12.16 (46.03)	12.66 (47.92)	13.13 (49.70)	13.59 (51.44)	14.04 (53.14)	14.47 (54.77)	14.89 (56.36)	15.3 (57.91)	15.69 (59.39)
1508	13.21 (50.00)	13.8 (52.23)	14.37 (54.39)	14.91 (56.43)	15.43 (58.40)	15.94 (60.33)	16.43 (62.19)	16.9 (63.97)	17.37 (65.75)	17.82 (67.45)
1509	14.89 (56.36)	15.56 (58.59)	16.19 (61.28)	16.8 (63.59)	17.39 (65.82)	17.96 (67.98)	18.51 (70.06)	19.05 (72.10)	19.6 (74.19)	20.1 (76.08)
1510	16.57 (62.72)	17.31 (65.52)	18.01 (68.17)	18.69 (70.74)	19.35 (73.24)	19.99 (75.66)	20.6 (77.97)	21.2 (80.24)	21.8 (82.51)	22.3 (84.41)
1512	19.93 (75.44)	20.81 (78.77)	21.66 (81.98)	22.48 (85.09)	23.27 (88.08)	24.0 (90.84)	24.8 (93.87)	25.5 (96.52)	26.2 (99.17)	26.9 (101.82)
1515	24.86 (94.10)	25.96 (98.26)	27.02 (102.27)	28.0 (105.98)	29.0 (109.77)	30.0 (113.55)	30.9 (116.96)	31.8 (120.36)	32.7 (123.77)	33.5 (126.80)
1520	33.14 (125.43)	34.6 (130.96)	36.0 (136.26)	37.4 (141.56)	38.7 (146.48)	40.0 (151.40)	41.2 (155.94)	42.4 (160.48)	43.6 (165.03)	44.7 (169.19)
1530	49.7 (188.11)	51.9 (196.44)	54.0 (204.39)	56.0 (211.96)	58.0 (219.53)	60.0 (227.10)	61.8 (233.91)	63.6 (240.73)	65.3 (247.16)	67.0 (253.60)
1540	66.3 (250.95)	69.2 (261.92)	72.0 (272.52)	74.8 (283.12)	77.4 (292.96)	79.9 (302.42)	82.4 (311.88)	84.8 (320.97)	87.1 (329.67)	89.4 (338.38)
1550	82.9 (313.78)	86.5 (327.40)	90.1 (341.03)	93.5 (353.90)	96.8 (366.39)	99.9 (378.12)	103.0 (389.86)	106.0 (401.21)	108.9 (412.19)	111.7 (422.78)

Reference Section

Nozzle Flow Chart (Theoretical) for NLB 0° Sapphire Orifice Nozzle

BN3539-XX, BN-10095-XX and BM27289-XX

Nozzle No.	Pressure PSI (BAR)							
	20,000 (1,400)	22,000 (1,520)	24,000 (1,680)	25,000 (1,725)	26,000 (1,800)	28,000 (1,930)	30,000 (2,070)	32,000 (2,210)
-6	0.11 (0.42)	0.11 (0.42)	0.12 (0.45)	0.12 (0.45)	0.12 (0.45)	0.13 (0.49)	0.13 (0.49)	0.14 (0.53)
-7	0.15 (0.57)	0.15 (0.57)	0.16 (0.61)	0.17 (0.64)	0.17 (0.64)	0.17 (0.64)	0.18 (0.68)	0.19 (0.72)
-8	0.19 (0.72)	0.20 (0.76)	0.21 (0.79)	0.22 (0.83)	0.22 (0.83)	0.23 (0.87)	0.24 (0.91)	0.24 (0.91)
-9	0.24 (0.91)	0.26 (0.98)	0.27 (1.02)	0.27 (1.02)	0.28 (1.06)	0.29 (1.10)	0.30 (1.14)	0.31 (1.17)
-10	0.30 (1.14)	0.32 (1.20)	0.33 (1.25)	0.34 (1.28)	0.34 (1.30)	0.36 (1.35)	0.37 (1.40)	0.38 (1.45)
-11	0.37 (1.38)	0.38 (1.45)	0.40 (1.51)	0.41 (1.54)	0.42 (1.58)	0.43 (1.64)	0.45 (1.70)	0.46 (1.75)
-12	0.43 (1.64)	0.46 (1.73)	0.48 (1.80)	0.49 (1.84)	0.50 (1.87)	0.51 (1.95)	0.53 (2.01)	0.55 (2.08)
-13	0.51 (1.93)	0.54 (2.03)	0.56 (2.11)	0.57 (2.16)	0.58 (2.20)	0.60 (2.28)	0.62 (2.36)	0.65 (2.44)
-14	0.59 (2.24)	0.62 (2.35)	0.65 (2.45)	0.66 (2.50)	0.67 (2.55)	0.70 (2.65)	0.72 (2.74)	0.75 (2.83)
-15	0.68 (2.60)	0.71 (2.70)	0.74 (2.82)	0.76 (2.87)	0.77 (2.93)	0.80 (3.04)	0.83 (3.15)	0.86 (3.25)
-16	0.77 (2.92)	0.81 (3.07)	0.85 (3.20)	0.86 (3.27)	0.88 (3.34)	0.91 (3.46)	0.95 (3.58)	0.98 (3.70)
-17	0.87 (3.30)	0.92 (3.46)	0.96 (3.62)	0.98 (3.69)	0.99 (3.76)	1.03 (3.91)	1.07 (4.04)	1.10 (4.18)
-18	0.98 (3.70)	1.03 (3.88)	1.07 (4.05)	1.09 (4.14)	1.12 (4.22)	1.16 (4.38)	1.20 (4.53)	1.24 (4.68)
-19	1.09 (4.12)	1.14 (4.33)	1.19 (4.52)	1.22 (4.61)	1.24 (4.70)	1.29 (4.88)	1.33 (5.05)	1.38 (5.22)
-20	1.21 (4.57)	1.27 (4.79)	1.32 (5.01)	1.35 (5.11)	1.38 (5.21)	1.43 (5.41)	1.48 (5.60)	1.53 (5.78)
-21	1.33 (5.04)	1.40 (5.28)	1.46 (5.52)	1.49 (5.63)	1.52 (5.75)	1.58 (5.96)	1.63 (6.17)	1.68 (6.37)
-22	1.46 (5.53)	1.53 (5.80)	1.60 (6.06)	1.63 (6.19)	1.67 (6.31)	1.73 (6.54)	1.79 (6.77)	1.85 (7.00)
-23	1.60 (6.05)	1.68 (6.34)	1.75 (6.62)	1.79 (6.76)	1.82 (6.89)	1.89 (7.15)	1.96 (7.40)	2.02 (7.65)
-24	1.74 (6.58)	1.82 (6.90)	1.91 (7.21)	1.94 (7.36)	1.98 (7.50)	2.06 (7.79)	2.13 (8.06)	2.20 (8.32)
-25	1.88 (7.10)	1.98 (7.49)	2.07 (7.82)	2.11 (7.98)	2.15 (8.14)	2.23 (8.45)	2.31 (8.75)	2.39 (9.04)
-26	2.04 (7.73)	2.14 (8.10)	2.24 (8.46)	2.28 (8.63)	2.33 (8.81)	2.42 (9.14)	2.50 (9.46)	2.58 (9.77)
-27	2.20 (8.33)	2.60 (9.86)	2.41 (9.13)	2.46 (9.31)	2.51 (9.50)	2.60 (9.86)	2.70 (10.20)	2.78 (10.54)
-28	2.37 (8.96)	2.48 (9.39)	2.59 (9.81)	2.65 (10.02)	2.70 (10.21)	2.80 (10.60)	2.90 (10.97)	2.99 (11.33)
-29	2.54 (9.61)	2.66 (10.08)	2.78 (10.53)	2.84 (10.74)	2.90 (10.96)	3.00 (11.37)	3.11 (11.77)	3.21 (12.15)
-30	2.72 (10.28)	2.85 (10.79)	2.98 (11.26)	3.04 (11.50)	3.10 (11.73)	3.22 (12.17)	3.33 (12.60)	3.44 (13.01)
-31	2.90 (11.00)	3.04 (11.52)	3.18 (12.03)	3.24 (12.28)	3.31 (12.52)	3.43 (12.99)	3.55 (13.45)	3.67 (13.89)
-32	3.09 (11.70)	3.24 (12.27)	3.39 (12.82)	3.46 (13.08)	3.53 (13.34)	3.66 (13.85)	3.79 (14.33)	3.91 (14.80)
-33	3.29 (12.45)	3.45 (13.05)	3.60 (13.63)	3.68 (13.91)	3.75 (14.19)	3.89 (14.72)	4.03 (15.24)	4.16 (15.74)
-34	3.49 (13.21)	3.66 (13.85)	3.82 (14.47)	3.90 (14.77)	3.98 (15.06)	4.13 (15.63)	4.27 (16.18)	4.41 (16.71)
-35	3.70 (14.00)	3.88 (14.68)	4.05 (15.33)	4.14 (15.65)	4.22 (15.96)	4.38 (16.56)	4.53 (17.14)	4.68 (17.71)
-36	3.91 (14.81)	4.10 (15.53)	4.29 (16.22)	4.37 (16.56)	4.46 (16.89)	4.63 (17.53)	4.79 (18.14)	4.95 (18.73)
-37	4.13 (15.64)	4.34 (16.41)	4.53 (17.14)	4.62 (17.49)	4.71 (17.84)	4.89 (18.51)	5.06 (19.16)	5.23 (19.79)
-38	4.36 (16.50)	4.57 (17.31)	4.78 (18.08)	4.87 (18.45)	4.97 (18.82)	5.16 (19.52)	5.34 (20.21)	5.51 (20.87)
-39	4.59 (17.38)	4.82 (18.23)	5.04 (19.07)	5.13 (19.43)	5.24 (19.82)	5.43 (20.56)	5.62 (21.29)	5.81 (21.99)
-40	4.83 (18.28)	5.07 (19.18)	5.29 (20.03)	5.40 (20.44)	5.51 (20.85)	5.72 (21.64)	5.92 (22.39)	6.11 (23.13)

Inserts - GPM (LPM)

Nozzle No.	Pressure PSI (BAR)							
	33,000 (2,280)	34,000 (2,350)	35,000 (2,420)	36,000 (2,500)	37,000 (2,550)	38,000 (2,620)	39,000 (2,690)	40,000 (2,800)
-6	0.14 (0.53)	0.14 (0.53)	0.14 (0.53)	0.15 (0.57)	0.15 (0.57)	0.15 (0.57)	0.15 (0.57)	0.15 (0.57)
-7	0.19 (0.72)	0.19 (0.72)	0.20 (0.76)	0.20 (0.76)	0.20 (0.76)	0.20 (0.76)	0.21 (0.79)	0.21 (0.79)
-8	0.25 (0.95)	0.25 (0.95)	0.26 (0.98)	0.26 (0.98)	0.26 (0.98)	0.27 (1.02)	0.27 (1.02)	0.27 (1.02)
-9	0.31 (1.17)	0.32 (1.21)	0.32 (1.21)	0.33 (1.25)	0.33 (1.25)	0.34 (1.29)	0.34 (1.29)	0.35 (1.32)
-10	0.39 (1.47)	0.39 (1.49)	0.40 (1.51)	0.40 (1.54)	0.41 (1.55)	0.42 (1.57)	0.42 (1.59)	0.43 (1.61)
-11	0.47 (1.78)	0.48 (1.80)	0.48 (1.83)	0.49 (1.86)	0.50 (1.88)	0.50 (1.90)	0.51 (1.93)	0.52 (1.95)
-12	0.56 (2.11)	0.57 (2.14)	0.58 (2.18)	0.58 (2.21)	0.59 (2.24)	0.60 (2.27)	0.61 (2.30)	0.61 (2.33)
-13	0.66 (2.48)	0.67 (2.52)	0.68 (2.56)	0.68 (2.59)	0.69 (2.62)	0.70 (2.66)	0.71 (2.69)	0.72 (2.73)
-14	0.76 (2.88)	0.77 (2.92)	0.78 (2.96)	0.79 (3.00)	0.80 (3.04)	0.81 (3.08)	0.83 (3.12)	0.84 (3.17)
-15	0.87 (3.30)	0.89 (3.35)	0.90 (3.40)	0.91 (3.45)	0.92 (3.49)	0.94 (3.54)	0.95 (3.59)	0.96 (3.63)
-16	0.99 (3.76)	1.01 (3.81)	1.02 (3.87)	1.04 (3.93)	1.05 (3.97)	1.06 (4.03)	1.08 (4.08)	1.09 (4.13)
-17	1.12 (4.24)	1.14 (4.30)	1.15 (4.37)	1.17 (4.43)	1.19 (4.49)	1.20 (4.55)	1.22 (4.61)	1.23 (4.67)
-18	1.26 (4.75)	1.28 (4.83)	1.29 (4.90)	1.31 (4.97)	1.33 (5.03)	1.35 (5.10)	1.36 (5.17)	1.38 (5.23)
-19	1.40 (5.30)	1.42 (5.38)	1.44 (5.45)	1.46 (5.53)	1.48 (5.60)	1.50 (5.68)	1.52 (5.76)	1.54 (5.83)
-20	1.55 (5.87)	1.57 (5.96)	1.60 (6.05)	1.62 (6.13)	1.64 (6.21)	1.66 (6.29)	1.68 (6.38)	1.71 (6.46)
-21	1.71 (6.47)	1.74 (6.57)	1.76 (6.67)	1.79 (6.76)	1.81 (6.85)	1.83 (6.94)	1.86 (7.03)	1.88 (7.12)
-22	1.88 (7.10)	1.91 (7.21)	1.93 (7.32)	1.96 (7.42)	1.99 (7.51)	2.01 (7.62)	2.04 (7.72)	2.06 (7.82)
-23	2.05 (7.76)	2.08 (7.88)	2.11 (7.99)	2.14 (8.11)	2.17 (8.21)	2.20 (8.32)	2.23 (8.43)	2.26 (8.54)
-24	2.23 (8.45)	2.27 (8.58)	2.30 (8.71)	2.33 (8.83)	2.36 (8.94)	2.39 (9.06)	2.43 (9.18)	2.46 (9.30)
-25	2.42 (9.18)	2.46 (9.31)	2.50 (9.45)	2.53 (9.58)	2.56 (9.70)	2.60 (9.83)	2.63 (9.96)	2.67 (10.09)
-26	2.62 (9.92)	2.66 (10.07)	2.70 (10.22)	2.74 (10.36)	2.77 (10.49)	2.81 (10.64)	2.85 (10.78)	2.88 (10.92)
-27	2.83 (10.70)	2.87 (10.86)	2.91 (11.02)	2.95 (11.18)	2.99 (11.32)	3.03 (11.47)	3.07 (11.62)	3.11 (11.77)
-28	3.04 (11.51)	3.09 (11.68)	3.13 (11.85)	3.18 (12.02)	3.22 (12.17)	3.26 (12.34)	3.30 (12.50)	3.34 (12.66)
-29	3.26 (12.34)	3.31 (12.53)	3.36 (12.71)	3.41 (12.89)	3.45 (13.05)	3.50 (13.23)	3.54 (13.41)	3.59 (13.58)
-30	3.49 (13.21)	3.54 (13.41)	3.59 (13.60)	3.65 (13.80)	3.69 (13.97)	3.74 (14.16)	3.79 (14.35)	3.84 (14.53)
-31	3.73 (14.11)	3.78 (14.32)	3.84 (14.53)	3.89 (14.73)	3.94 (14.92)	3.99 (15.12)	4.05 (15.32)	4.10 (15.52)
-32	3.97 (15.03)	4.03 (15.26)	4.09 (15.48)	4.15 (15.70)	4.20 (15.89)	4.26 (16.11)	4.31 (16.33)	4.37 (16.54)
-33	4.22 (15.98)	4.29 (16.23)	4.35 (16.46)	4.41 (16.70)	4.47 (16.90)	4.53 (17.13)	4.59 (17.36)	4.64 (17.59)
-34	4.48 (16.97)	4.55 (17.22)	4.62 (17.48)	4.68 (17.72)	4.74 (17.94)	4.80 (18.19)	4.87 (18.43)	4.93 (18.67)
-35	4.75 (17.98)	4.82 (18.25)	4.89 (18.52)	4.96 (18.78)	5.02 (19.01)	5.09 (19.27)	5.16 (19.53)	5.22 (19.78)
-36	5.03 (19.02)	5.10 (19.31)	5.18 (19.59)	5.25 (19.87)	5.32 (20.12)	5.39 (20.39)	5.46 (20.66)	5.53 (20.93)
-37	5.31 (20.10)	5.39 (20.40)	5.47 (20.70)	5.55 (21.00)	5.61 (21.25)	5.69 (21.54)	5.76 (21.83)	5.84 (22.11)
-38	5.60 (21.20)	5.68 (21.51)	5.77 (21.83)	5.85 (22.14)	5.92 (22.41)	6.00 (22.72)	6.08 (23.02)	6.16 (23.32)
-39	5.90 (22.33)	5.99 (22.66)	6.08 (22.99)	6.16 (23.32)	6.24 (23.61)	6.32 (23.93)	6.40 (24.25)	6.49 (24.56)
-40	6.21 (23.49)	6.30 (23.84)	6.39 (24.19)	6.48 (24.53)	6.56 (24.84)	6.65 (25.17)	6.74 (25.51)	6.82 (25.84)

Reference Section

Nozzle Flow Chart (Theoretical) for NLB 0° Carbide Orifice Nozzles — GPM (LPM)

BM19048-XXX

Nozzle No.	Pressure PSI (BAR)			
	5,000 (345)	10,000 (700)	15,000 (1,035)	20,000 (1,400)
0.25	0.2 (0.76)	0.3 (1.14)	0.3 (1.14)	0.4 (1.51)
0.30	0.3 (1.14)	0.4 (1.51)	0.5 (1.89)	0.6 (2.27)
0.35	0.4 (1.51)	0.5 (1.89)	0.7 (2.65)	0.8 (3.03)
0.40	0.5 (1.89)	0.7 (2.65)	0.9 (3.41)	1.0 (3.79)
0.50	0.8 (3.03)	1.1 (4.16)	1.4 (5.30)	1.6 (6.06)
0.60	1.1 (4.16)	1.6 (6.06)	2.0 (7.57)	2.3 (8.71)
0.70	1.5 (5.68)	2.2 (8.33)	2.7 (10.22)	3.1 (11.73)
0.80	2.0 (7.57)	2.8 (10.60)	3.5 (13.25)	4.0 (15.14)
0.90	2.5 (9.46)	3.6 (13.63)	4.4 (16.65)	5.1 (19.30)
1.00	3.1 (11.73)	4.4 (16.65)	5.4 (20.44)	6.3 (23.85)
1.10	3.8 (14.38)	5.4 (20.44)	6.6 (24.98)	7.6 (28.77)
1.20	4.5 (17.03)	6.4 (24.22)	7.8 (29.52)	9.0 (34.07)
1.30	5.3 (20.06)	7.5 (28.39)	9.2 (34.82)	10.6 (40.12)
1.40	6.2 (23.47)	8.7 (32.93)	10.7 (40.50)	12.3 (46.56)
1.50	7.1 (26.87)	10.0 (37.85)	12.2 (46.18)	14.1 (53.37)
1.60	8.0 (30.28)	11.4 (43.15)	13.9 (52.61)	16.1 (60.94)
1.70	9.1 (34.44)	12.8 (48.45)	15.7 (59.42)	18.1 (68.51)
1.80	10.2 (38.61)	14.4 (54.50)	17.6 (66.62)	20.3 (76.84)
1.90	11.3 (42.77)	16.0 (60.56)	19.6 (74.19)	22.7 (85.92)
2.00	12.6 (47.69)	17.8 (67.37)	21.8 (82.51)	25.1 (95.00)
2.10	13.8 (52.23)	19.6 (74.19)	24.0 (90.84)	27.7 (104.84)
2.20	15.2 (57.53)	21.5 (81.38)	26.3 (99.55)	30.4 (115.06)
2.30	16.6 (62.83)	23.5 (88.95)	28.8 (109.01)	33.2 (125.66)
2.40	18.1 (68.51)	25.6 (96.90)	31.3 (118.47)	36.2 (137.02)
2.50	19.6 (74.19)	27.8 (105.22)	34.0 (128.69)	39.2 (148.37)
2.60	21.2 (80.24)	30.0 (113.55)	36.8 (139.29)	42.5 (160.86)
2.70	22.9 (86.68)	32.4 (122.63)	39.6 (149.89)	45.8 (173.35)
2.80	24.6 (93.11)	34.8 (131.72)	42.6 (161.24)	49.2 (186.22)
2.90	26.4 (99.92)	37.3 (141.18)	45.7 (172.97)	52.8 (199.85)
3.00	28.3 (107.12)	40.0 (151.40)	48.9 (185.09)	56.5 (213.85)
3.10	30.2 (114.31)	42.7 (161.62)	52.3 (197.96)	60.3 (228.24)
3.20	32.2 (121.88)	45.5 (172.22)	55.7 (210.82)	64.3 (243.38)
3.30	34.2 (129.45)	48.4 (183.19)	59.2 (224.07)	68.4 (258.89)
3.40	36.3 (137.40)	51.3 (194.17)	62.9 (238.08)	72.6 (274.79)
3.50	38.5 (145.72)	54.4 (205.90)	66.6 (252.08)	76.9 (291.07)
3.60	40.7 (154.05)	57.5 (217.64)	70.5 (266.84)	81.4 (308.01)
3.70	43.0 (162.76)	60.8 (230.13)	74.5 (281.98)	86.0 (325.51)
3.80	45.3 (171.46)	64.1 (242.62)	78.5 (297.12)	90.7 (343.30)
3.90	47.8 (180.92)	67.5 (255.49)	82.7 (313.02)	95.5 (361.47)
4.00	50.2 (190.01)	71.0 (268.74)	87.0 (329.30)	100.5 (380.39)
4.20	55.44 (209.88)	78.41 (296.81)	96.03 (363.52)	110.89 (419.76)
4.30	58.12 (219.99)	82.19 (311.11)	100.66 (381.04)	116.23 (439.98)
4.50	63.65 (240.93)	90.01 (340.73)	110.24 (417.30)	127.29 (481.86)
4.70	69.43 (262.82)	98.19 (371.69)	120.26 (455.22)	138.86 (525.65)
5.00	78.58 (297.45)	111.12 (420.65)	136.10 (515.19)	157.15 (594.89)

Nozzle Flow Charts (Theoretical) for - GPM (LPM)

NLB 15° Fan Nozzles (S-8)

Part No.	Pressure PSI (BAR)								
	20,000 (1,400)	21,000 (1,450)	22,000 (1,520)	23,000 (1,590)	24,000 (1,680)	25,000 (1,725)	26,000 (1,800)	27,000 (1,865)	28,000 (1,930)
S-8-15005	1.09 (4.13)	1.12 (4.24)	1.15 (4.35)	1.17 (4.43)	1.20 (4.54)	1.22 (4.62)	1.25 (4.73)	1.27 (4.81)	1.32 (5.00)
S-8-15006	1.48 (5.60)	1.52 (5.75)	1.56 (5.91)	1.59 (6.02)	1.63 (6.17)	1.66 (6.28)	1.69 (6.40)	1.73 (6.55)	1.79 (6.78)
S-8-1501	2.28 (8.63)	2.34 (8.86)	2.39 (9.05)	2.44 (9.24)	2.50 (9.46)	2.55 (9.65)	2.60 (9.84)	2.65 (10.03)	2.76 (10.45)
S-8-15015	3.24 (12.26)	3.32 (12.57)	3.40 (12.87)	3.48 (13.17)	3.55 (13.44)	3.63 (13.74)	3.70 (14.00)	3.77 (14.27)	3.90 (14.76)
S-8-1502	4.38 (16.59)	4.49 (17.00)	4.59 (17.37)	4.69 (17.75)	4.78 (18.09)	4.89 (18.51)	4.99 (18.89)	5.09 (19.27)	5.27 (19.95)
S-8-1503	6.25 (23.66)	6.40 (24.22)	6.55 (24.79)	6.70 (25.36)	6.84 (25.89)	6.98 (26.42)	7.12 (26.95)	7.26 (27.48)	7.52 (28.46)
S-8-1504	11.04 (41.79)	11.32 (42.85)	11.59 (43.87)	11.85 (44.85)	12.10 (45.80)	12.35 (46.75)	12.59 (47.65)	12.83 (48.56)	13.30 (50.34)

Part No.	Pressure PSI (BAR)								
	29,000 (2,000)	30,000 (2,070)	31,000 (2,140)	32,000 (2,210)	33,000 (2,280)	34,000 (2,350)	35,000 (2,420)	36,000 (2,500)	40,000 (2,800)
S-8-15005	1.32 (5.00)	1.34 (5.07)	1.36 (5.15)	1.38 (5.22)	1.40 (5.30)	1.42 (5.38)	1.45 (5.49)	1.47 (5.56)	1.52 (5.75)
S-8-15006	1.79 (6.78)	1.82 (6.89)	1.85 (7.00)	1.88 (7.12)	1.91 (7.23)	1.94 (7.34)	1.97 (7.46)	2.00 (7.57)	2.13 (8.06)
S-8-1501	2.76 (10.45)	2.79 (10.56)	2.84 (10.75)	2.88 (10.90)	2.93 (11.09)	2.97 (11.24)	3.02 (11.43)	3.06 (11.58)	3.24 (12.26)
S-8-15015	3.90 (14.76)	3.98 (15.06)	4.04 (15.29)	4.10 (15.52)	4.17 (15.78)	4.23 (16.01)	4.29 (16.24)	4.35 (16.47)	4.56 (17.26)
S-8-1502	5.27 (19.95)	5.36 (20.29)	5.45 (20.63)	5.53 (20.93)	5.62 (21.27)	5.71 (21.61)	5.79 (21.92)	5.87 (22.22)	6.17 (23.35)
S-8-1503	7.52 (28.46)	7.65 (28.96)	7.77 (29.41)	7.90 (29.90)	8.02 (30.36)	8.14 (30.81)	8.26 (31.26)	8.38 (31.72)	8.87 (33.57)
S-8-1504	13.30 (50.34)	13.53 (51.21)	13.75 (52.04)	13.97 (52.88)	14.19 (53.71)	14.40 (54.50)	14.61 (55.30)	14.82 (56.09)	15.66 (59.27)

Reference Section

Nozzle Thrust (Theoretical) LB•F — Water

psi	1 gpm	2 gpm	3 gpm	4 gpm	5 gpm	6 gpm	7 gpm	8 gpm	9 gpm	10 gpm	11 gpm	12 gpm	13 gpm	14 gpm	15 gpm	16 gpm	17 gpm	18 gpm	19 gpm	20 gpm	21 gpm	22 gpm	23 gpm
1,000	1.7	3.3	5.0	6.7	8.3	10.0	11.7	13.3	15.0	16.7	18.3	20.0	21.7	23.3	25.8	26.7	28.3	30.0	31.7	33.3	35.0	36.7	38.3
2,000	2.4	4.7	7.1	9.4	11.8	14.1	16.5	18.9	21.2	23.6	25.9	28.3	30.6	33.0	35.4	37.7	40.1	42.4	44.8	47.1	49.5	51.8	54.2
3,000	2.9	5.8	8.7	11.5	14.4	17.3	20.2	23.1	26.0	28.9	31.8	34.6	37.5	40.4	40.3	46.2	49.1	52.0	54.8	57.7	60.6	63.5	66.4
4,000	3.3	6.7	10.0	13.3	16.7	20.0	23.3	26.7	30.0	33.3	36.7	40.0	43.3	46.7	50.0	53.3	56.7	60.0	63.3	66.7	70.0	73.3	76.7
5,000	3.7	7.5	11.2	14.9	18.6	22.4	26.1	29.8	33.5	37.3	41.0	44.7	48.4	52.2	55.9	59.6	63.3	67.1	70.8	74.5	78.3	82.0	85.7
6,000	4.1	8.2	12.2	16.3	20.4	24.5	28.6	32.7	36.7	40.8	44.9	49.0	53.1	57.1	61.2	65.3	69.4	73.5	77.6	81.6	85.7	89.8	93.9
7,000	4.4	8.8	13.2	17.6	22.0	26.5	30.9	35.3	39.7	44.1	48.5	52.9	57.3	61.7	66.1	70.5	75.0	79.4	83.8	88.2	92.6	97.0	101.4
8,000	4.7	9.4	14.1	18.9	23.6	28.3	33.0	37.7	42.4	47.1	51.8	56.6	61.3	66.0	70.7	75.4	80.1	84.8	89.6	94.3	99.0	103.7	108.4
9,000	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0	85.0	90.0	95.0	100.0	105.0	110.0	115.0
10,000	5.3	10.5	15.8	21.1	26.3	31.6	36.9	42.2	47.4	52.7	58.0	63.2	68.5	73.8	79.0	84.3	89.6	94.9	100.1	105.4	110.7	115.9	121.2
11,000	5.5	11.1	16.6	22.1	27.6	33.2	38.7	44.2	49.7	55.3	60.8	66.3	71.9	77.4	82.9	88.4	94.0	99.5	105.0	110.5	116.1	121.6	127.1
12,000	5.8	11.5	17.3	23.1	28.9	34.6	40.4	46.2	52.0	57.7	63.5	69.3	75.0	80.8	86.6	92.4	98.1	103.9	109.7	115.5	121.2	127.0	132.8
13,000	6.0	12.0	18.0	24.0	30.0	36.1	42.1	48.1	54.1	60.1	66.1	72.1	78.1	84.1	90.1	96.1	102.1	108.2	114.2	120.2	126.2	132.2	138.2
14,000	6.2	12.5	18.7	24.9	31.2	37.4	43.6	49.9	56.1	62.4	68.6	74.8	81.1	87.3	93.5	99.8	106.0	112.2	118.5	124.7	130.9	137.2	143.4
15,000	6.5	12.9	19.4	25.8	32.3	38.7	45.2	51.6	58.1	64.5	71.0	77.5	83.9	90.4	96.8	103.3	109.7	116.2	122.6	129.1	135.5	142.0	148.4
16,000	6.7	13.3	20.0	26.7	33.3	40.0	46.7	53.3	60.0	66.7	73.3	80.0	86.7	93.3	100.0	106.7	113.3	120.0	126.7	133.3	140.0	146.6	153.3
17,000	6.9	13.7	20.6	27.5	34.4	41.2	48.1	55.0	61.8	68.7	75.6	82.5	89.3	96.2	103.1	109.9	116.8	123.7	130.5	137.4	144.3	151.2	158.0
18,000	7.1	14.1	21.2	28.3	35.4	42.4	49.5	56.6	63.6	70.7	77.8	84.8	91.9	99.0	106.1	113.1	120.	127.3	134.3	141.4	148.5	155.5	162.6
19,000	7.3	14.5	21.8	29.1	36.3	43.6	50.8	58.1	65.4	72.6	79.9	87.2	94.4	101.7	109.0	116.2	123.5	130.8	138.0	145.3	152.5	159.8	167.1
20,000	7.5	14.9	22.4	29.8	37.3	44.7	52.2	59.6	67.1	74.5	82.0	89.4	96.0	104.3	111.8	119.2	126.7	134.1	141.6	149.1	156.5	164.0	171.4
36,000	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	110.0	120.0	130.0	140.0	150.0	160.0	170.0	180.0	190.0	200.0	210.0	220.0	230.0
40,000	10.5	21.1	31.6	42.2	52.7	63.2	73.8	84.3	94.9	105.4	115.9	126.5	137.0	147.6	158.1	168.6	179.2	189.7	200.3	210.8	221.3	231.9	242.4

psi	24 gpm	25 gpm	26 gpm	27 gpm	28 gpm	29 gpm	30 gpm	31 gpm	32 gpm	33 gpm	34 gpm	35 gpm	36 gpm	37 gpm	38 gpm	39 gpm	40 gpm	41 gpm	42 gpm	43 gpm	44 gpm	45 gpm
1,000	40.0	41.7	43.3	45.0	46.7	48.3	50.0	51.7	53.3	55.0	56.7	58.3	60.0	61.7	63.3	65.0	66.7	68.3	70.0	71.7	73.3	75.0
2,000	56.6	58.9	61.3	63.6	66.0	68.3	70.7	73.1	75.4	77.8	80.1	82.5	84.8	87.2	89.6	91.9	94.3	96.6	99.0	101.3	103.7	106.1
3,000	69.3	72.2	75.0	77.9	80.8	83.7	86.6	89.5	92.4	95.3	98.1	101.0	103.9	106.8	109.7	112.6	115.5	118.3	121.2	124.1	127.0	129.9
4,000	80.0	83.3	86.7	90.0	93.3	96.7	100.0	103.3	106.7	110.0	113.3	116.7	120.0	123.3	126.7	130.0	133.3	136.6	140.0	143.3	146.6	150.0
5,000	89.4	93.2	96.9	100.6	104.3	108.1	111.8	115.5	119.2	123.0	126.7	130.4	134.1	137.9	141.6	145.3	149.1	152.8	156.5	160.2	164.0	167.7
6,000	98.0	102.0	106.1	110.2	114.3	118.4	122.5	126.5	130.6	134.7	138.8	142.9	147.0	151.0	155.1	159.2	163.3	167.4	171.4	175.5	179.6	183.7
7,000	105.8	110.2	114.6	119.0	123.5	127.9	132.3	136.7	141.1	145.5	149.9	154.3	158.7	163.1	167.5	172.0	176.4	180.8	185.2	189.6	194.0	198.4
8,000	113.1	117.8	122.5	127.3	132.0	136.7	141.4	146.1	150.8	155.5	160.3	165.0	169.7	174.4	179.1	183.8	188.5	193.3	198.0	202.7	207.4	212.1
9,000	120.0	125.0	130.0	135.0	140.0	145.0	150.0	155.0	160.0	165.0	170.0	175.0	180.0	185.0	190.0	195.0	200.0	205.0	210.0	215.0	220.0	225.0
10,000	126.5	131.7	137.0	142.3	147.6	152.8	158.1	163.4	168.6	173.9	179.2	184.4	189.7	195.0	200.3	205.5	210.8	216.1	221.3	226.6	231.9	237.1
11,000	132.6	138.2	143.7	149.2	154.8	160.3	165.8	171.3	176.9	182.4	187.9	193.4	199.0	204.5	210.0	215.6	221.1	226.6	232.1	237.7	243.2	248.7
12,000	138.5	144.3	150.1	155.9	161.6	167.4	173.2	179.0	184.7	190.5	196.3	202.0	207.8	213.6	219.4	225.1	230.9	236.7	242.5	248.2	254.0	259.8
13,000	144.2	150.2	156.2	162.2	168.2	174.2	180.3	186.3	192.3	198.3	204.3	210.3	216.3	222.3	228.3	234.3	240.3	246.3	252.4	258.4	264.4	270.4
14,000	149.6	155.9	162.1	168.4	174.6	180.8	187.1	193.3	199.5	205.8	212.0	218.2	224.5	230.7	236.9	243.2	249.4	255.6	261.9	268.1	274.4	280.6
15,000	154.9	161.4	167.8	174.3	180.7	187.2	193.6	200.1	206.5	213.0	219.4	225.9	232.4	238.8	245.3	251.7	258.2	264.6	271.1	277.5	284.0	290.4
16,000	160.0	166.6	173.3	180.0	186.6	193.3	200.0	206.6	213.3	220.0	226.6	233.3	240.0	246.6	253.3	260.0	266.6	273.3	280.0	286.6	293.3	300.0
17,000	164.9	171.8	178.6	185.5	192.4	199.3	206.1	213.0	219.9	226.7	233.6	240.5	247.4	254.2	261.1	268.0	274.8	281.7	288.6	295.5	302.3	309.2
18,000	169.7	176.8	183.8	190.9	198.0	205.0	212.1	219.2	226.2	233.3	240.4	247.5	254.5	261.6	268.7	275.7	282.8	289.9	296.9	304.0	311.1	318.2
19,000	174.3	181.6	188.9	196.1	203.4	210.7	217.9	225.2	232.4	239.7	247.0	254.2	261.5	268.8	276.0	283.3	290.6	297.8	305.1	312.3	319.6	326.9
20,000	178.9	186.0	193.8	201.2	208.7	216.1	223.6	231.0	238.5	245.9	253.4	260.8	268.3	275.7	283.2	290.7	298.1	305.6	313.0	320.5	327.9	335.4
36,000	240.0	250.0	260.0	270.0	280.0	290.0	300.0	310.0	320.0	330.0	340.0	350.0	360.0	370.0	380.0	390.0	400.0	410.0	420.0	430.0	440.0	450.0
40,000	253.0	263.5	274.0	284.6	295.1	305.7	316.2	326.7	337.3	347.8	358.4	368.9	379.4	389.9	400.5	411.1	421.6	432.1	442.7	453.2	463.8	474.3

Nozzle Thrust (Theoretical) N — Water

bar	1 lpm	2 lpm	3 lpm	4 lpm	5 lpm	6 lpm	7 lpm	8 lpm	9 lpm	10 lpm	11 lpm	12 lpm	13 lpm	14 lpm	15 lpm	16 lpm	17 lpm	18 lpm	19 lpm	20 lpm	21 lpm	22 lpm	23 lpm
70	1.97	3.94	5.92	7.89	9.86	11.83	13.80	15.78	17.75	19.72	21.69	23.66	25.64	27.61	29.58	31.55	33.52	35.50	37.47	39.44	41.41	43.38	45.36
140	2.89	5.77	8.66	11.55	14.43	17.32	20.21	23.09	25.98	28.87	31.75	34.64	37.53	40.41	43.30	46.19	49.07	51.96	54.85	57.73	60.62	63.51	66.39
210	3.57	7.15	10.72	14.30	17.87	21.45	25.02	28.60	32.17	35.75	39.32	42.89	46.47	50.04	53.62	57.19	60.77	64.34	67.92	71.49	75.07	78.64	82.22
275	4.01	8.03	12.04	16.06	20.07	24.08	28.10	32.11	36.12	40.14	44.15	48.17	52.18	56.19	60.21	64.22	68.24	72.25	76.26	80.28	84.29	88.30	92.32
345	4.41	8.82	13.23	17.64	22.05	26.46	30.87	35.28	39.69	44.10	48.50	52.91	57.32	61.73	66.14	70.55	74.96	79.37	83.78	88.19	92.60	97.01	101.42
415	4.83	9.66	14.49	19.32	24.15	28.98	33.81	38.64	43.47	48.30	53.13	57.96	62.80	67.63	72.46	77.29	82.12	86.95	91.78	96.61	101.44	106.27	111.10
490	5.16	10.33	15.49	20.66	25.82	30.98	36.15	41.31	46.48	51.64	56.80	61.97	67.13	72.29	77.46	82.62	87.79	92.95	98.11	103.28	108.44	113.61	118.77
550	5.53	11.06	16.58	22.11	27.64	33.17	38.69	44.22	49.75	55.28	60.80	66.33	71.86	77.39	82.91	88.44	93.97	99.50	105.03	110.55	116.08	121.61	127.14
630	5.87	11.74	17.61	23.48	29.34	35.21	41.08	46.95	52.82	58.69	64.56	70.43	76.30	82.16	88.03	93.90	99.77	105.64	111.51	117.38	123.25	129.12	134.98
700	6.24	12.47	18.71	24.94	31.18	37.42	43.65	49.89	56.12	62.36	68.60	74.83	81.07	87.30	93.54	99.78	106.01	112.25	118.48	124.72	130.96	137.19	143.43
770	6.50	13.00	19.49	25.99	32.49	38.99	45.48	51.98	58.48	64.98	71.48	77.97	84.47	90.97	97.47	103.96	110.46	116.96	123.46	129.96	136.45	142.95	149.45
840	6.79	13.58	20.37	27.16	33.95	40.74	47.53	54.32	61.11	67.90	74.69	81.49	88.28	95.07	101.86	108.65	115.44	122.23	129.02	135.81	142.60	149.39	156.18
900	7.07	14.14	21.21	28.28	35.36	42.43	49.50	56.57	63.64	70.71	77.78	84.85	91.92	98.99	106.07	113.14	120.21	127.28	134.35	141.42	148.49	155.56	162.63
980	7.36	14.72	22.08	29.44	36.80	44.16	51.52	58.88	66.24	73.60	80.96	88.32	95.68	103.04	110.40	117.76	125.12	132.48	139.83	147.19	154.55	161.91	169.27
1,035	7.64	15.28	22.91	30.55	38.19	45.83	53.46	61.10	68.74	76.38	84.01	91.65	99.29	106.93	114.56	122.20	129.84	137.48	145.11	152.75	160.39	168.03	175.66
1,120	7.85	15.71	23.56	31.41	39.26	47.12	54.97	62.82	70.67	78.53	86.38	94.23	102.09	109.94	117.79	125.64	133.50	141.35	149.20	157.05	164.91	172.76	180.61
1,190	8.10	16.19	24.29	32.39	40.48	48.58	56.68	64.77	72.87	80.97	89.06	97.16	105.26	113.35	121.45	129.54	137.64	145.74	153.83	161.93	170.03	178.12	186.22
1,260	8.33	16.67	25.00	33.33	41.67	50.00	58.33	66.67	75.00	83.33	91.67	100.00	108.33	116.67	125.00	133.33	141.67	150.00	158.33	166.67	175.00	183.33	191.66
1,330	8.56	17.13	25.69	34.25	42.82	51.38	59.94	68.51	77.07	85.63	94.20	102.76	111.32	119.89	128.45	137.01	145.58	154.14	162.70	171.27	179.83	188.39	196.96
1,400	8.82	17.64	26.46	35.28	44.10	52.91	61.73	70.55	79.37	88.19	97.01	105.83	114.65	123.47	132.29	141.11	149.92	158.74	167.56	176.38	185.20	194.02	202.84
2,500	11.79	23.57	35.36	47.14	58.93	70.71	82.50	94.28	106.07	117.85	129.64	141.42	153.21	164.99	176.78	188.56	200.35	212.13	223.92	235.70	247.49	259.27	271.06
2,800	12.47	24.94	37.42	49.89	62.36	74.83	87.30	99.78	112.25	124.72	137.19	149.66	162.14	174.61	187.08	199.55	212.03	224.50	236.97	249.44	261.91	274.39	286.66

bar	24 lpm	25 lpm	26 lpm	27 lpm	28 lpm	29 lpm	30 lpm	31 lpm	32 lpm	33 lpm	34 lpm	35 lpm	36 lpm	37 lpm	38 lpm	39 lpm	40 lpm	41 lpm	42 lpm	43 lpm	44 lpm	45 lpm
70	47.33	49.30	51.27	53.24	55.22	57.19	59.16	61.13	63.10	65.08	67.05	69.02	70.99	72.96	74.94	76.91	78.88	80.85	82.82	84.80	86.77	88.74
140	69.28	72.17	75.05	77.94	80.83	83.71	86.60	89.49	92.38	95.26	98.15	101.04	103.92	106.81	109.70	112.58	115.47	118.36	121.24	124.13	127.02	129.90
210	85.79	89.36	92.94	96.51	100.09	103.66	107.24	110.81	114.39	117.96	121.54	125.11	128.68	132.26	135.83	139.41	142.98	146.56	150.13	153.71	157.28	160.86
275	96.33	100.35	104.36	108.37	112.39	116.40	120.41	124.43	128.44	132.46	136.47	140.48	144.50	148.51	152.53	156.54	160.55	164.57	168.58	172.59	176.61	180.62
345	105.83	110.24	114.65	119.06	123.47	127.88	132.29	136.70	141.11	145.51	149.92	154.33	158.74	163.15	167.56	171.97	176.38	180.79	185.20	189.61	194.02	198.43
415	115.93	120.76	125.59	130.42	135.25	140.08	144.91	149.74	154.57	159.40	164.23	169.06	173.89	178.73	183.56	188.39	193.22	198.05	202.88	207.71	212.54	217.37
490	123.93	129.10	134.26	139.43	144.59	149.75	154.92	160.08	165.25	170.41	175.57	180.74	185.90	191.07	196.23	201.39	206.56	211.72	216.88	222.05	227.21	232.38
550	132.66	138.19	143.72	149.25	154.77	160.30	165.83	171.36	176.88	182.41	187.94	193.47	199.00	204.52	210.05	215.58	221.11	226.63	232.16	237.69	243.22	248.74
630	140.85	146.72	152.59	158.46	164.33	170.20	176.07	181.94	187.80	193.67	199.54	205.41	211.28	217.15	223.02	228.89	234.76	240.62	246.49	252.36	258.23	264.10
700	149.66	155.90	162.14	168.37	174.61	180.85	187.08	193.32	199.55	205.79	212.03	218.26	224.50	230.73	236.97	243.21	249.44	255.68	261.91	268.15	274.39	280.62
770	155.95	162.45	168.94	175.44	181.94	188.44	194.93	201.43	207.93	214.43	220.93	227.42	233.92	240.42	246.92	253.41	259.91	266.41	272.91	279.41	285.90	292.40
840	162.97	169.76	176.55	183.34	190.13	196.92	203.71	210.50	217.29	224.08	230.88	237.67	244.46	251.25	258.04	264.83	271.62	278.41	285.20	291.99	298.78	305.57
900	169.70	176.78	183.85	190.92	197.99	205.06	212.13	219.20	226.27	233.34	240.41	247.49	254.56	261.63	268.70	275.77	282.84	289.91	296.98	304.05	311.12	318.20
980	176.63	183.99	191.35	198.71	206.07	213.43	220.79	228.15	235.51	242.87	250.23	257.59	264.95	272.31	279.67	287.03	294.39	301.75	309.11	316.47	323.83	331.19
1,035	183.30	190.94	198.58	206.21	213.85	221.49	229.13	236.76	244.40	252.04	259.68	267.31	274.95	282.59	290.23	297.86	305.50	313.14	320.78	328.41	336.05	343.69
1,120	188.47	196.32	204.17	212.02	219.88	227.73	235.58	243.43	251.29	259.14	266.99	274.85	282.70	290.55	298.40	306.26	314.11	321.96	329.81	337.67	345.52	353.37
1,190	194.32	202.41	210.51	218.61	226.70	234.80	242.90	250.99	259.09	267.19	275.28	283.38	291.48	299.57	307.67	315.77	323.86	331.96	340.06	348.15	356.25	364.35
1,260	200.00	208.33	216.66	225.00	233.33	241.66	250.00	258.33	266.66	275.00	283.33	291.66	300.00	308.33	316.66	325.00	333.33	341.66	350.00	358.33	366.66	375.00
1,330	205.52	214.09	222.65	231.21	239.78	248.34	256.90	265.47	274.03	282.59	291.16	299.72	308.28	316.85	325.41	333.97	342.54	351.10	359.66	368.23	376.79	385.35
1,400	211.66	220.48	229.30	238.12	246.93	255.75	264.57	273.39	282.21	291.03	299.85	308.67	317.49	326.31	335.13	343.94	352.76	361.58	370.40	379.22	388.04	396.86
2,500	282.84	294.63	306.41	318.20	329.98	341.77	353.55	365.34	377.12	388.91	400.69	412.48	424.26	436.05	447.83	459.62	471.40	483.19	494.97	506.76	518.54	530.33
2,800	299.33	311.80	324.27	336.75	349.22	361.69	374.16	386.63	399.11	411.58	424.05	436.52	448.99	461.47	473.94	486.41	498.88	511.35	523.83	536.30	548.77	561.24

Reference Section

Pressure Drop (Theoretical) Calculated for 50-Foot Sections

PSI

GPM	Hose Diameter					
	3/16"	1/4"	3/8"	1/2"	3/4"	1"
2	332	82	11	3		
4	1098	295	41	10	1	
6	2337	625	87	22	3	
8	4320	1064	148	36	5	1
10	6528	1608	223	55	8	2
12	9147	2253	313	77	11	3
14	12165	2997	416	103	14	4
16		3837	533	132	18	5
18		4771	662	164	23	6
20		5798	805	198	28	7
25		8760	1216	299	42	10
30		12275	1704	419	58	14
35			2266	559	77	19
40			2901	715	99	24
45			3607	889	123	31
50			4384	1080	150	37
55			5229	1288	178	44
60			6142	1514	210	52
65			7123	1755	244	61
70			8170	2013	279	69
75			9282	2287	318	77
80			10459	2576	359	88
85				2882	399	97
90				3204	445	110
95				3542	492	120
100				3993	541	133
110				4644	646	158
120				5419	758	187
130				6325	879	216
140				7256	1009	248
150				8243	1144	281

BAR

LPM	Hose Diameter					
	4.7 mm	6.4 mm	9.5 mm	13 mm	19 mm	25.4 mm
7.6	22.91	5.66	0.76	0.21		
15.1	75.76	20.36	2.83	0.69	0.07	
22.7	161.25	43.13	6.00	1.52	0.21	
30.3	298.08	73.42	10.21	2.48	0.35	0.07
37.9	450.43	110.95	15.39	3.80	0.55	0.14
45.4	631.14	155.46	21.60	5.31	0.76	0.21
53.0	839.39	206.79	28.70	7.11	0.97	0.28
60.6		264.75	36.78	9.11	1.24	0.35
68.1		329.20	45.68	11.32	1.59	0.41
75.7		400.06	55.55	13.66	1.93	0.48
94.6		604.44	83.90	20.63	2.90	0.69
113.6		846.98	117.58	28.91	4.00	0.97
132.5			156.35	38.57	5.31	1.31
151.4			200.17	49.34	6.83	1.66
170.3			248.88	61.34	8.49	2.14
189.3			302.50	74.52	10.35	2.55
208.2			360.80	88.87	12.28	3.04
227.1			423.80	104.47	14.49	3.59
246.0			491.49	121.10	16.84	4.21
265.0			563.73	138.90	19.25	4.76
283.9			640.46	157.80	21.94	5.31
302.8			721.67	177.74	24.77	6.07
321.7				198.86	27.53	6.69
340.7				221.08	30.71	7.59
359.6				244.40	33.95	8.28
378.5				275.52	37.33	9.18
416.4				320.44	44.57	10.90
454.2				373.91	52.30	12.90
492.1				436.43	60.65	14.90
529.9				500.66	69.62	17.11
567.8				568.77	78.94	19.39

Water Jet System Connections

Type "M" Swivel Nut

The Type "M" Swivel End Fitting is a swivel nut joint with a 58° male cone hose insert. Their maximum working pressure rating is 20,000 psi (1,400 bar).

Medium-Pressure

Medium-Pressure (sometimes known as "Slimline") Fittings have a 58°/60° coned and threaded tubing design. With large bore sizes, their maximum working pressure rating is 20,000 psi (1,400 bar).

High-Pressure

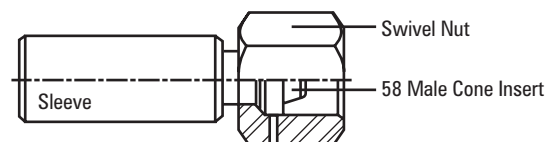
A High-Pressure Fitting is a 58°/60° coned and threaded tubing design. With a small bore size, the maximum working pressure rating is 60,000 psi (4,140 bar).

National Pipe Tapered

NPT fittings are threaded with a maximum working pressure of 10,000 psi (700 bar).

Type "M" Swivel Nut Connection

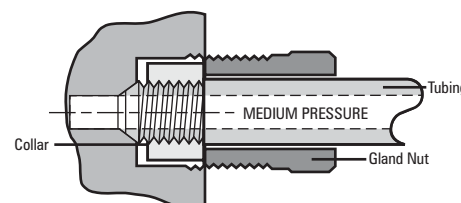
Thread Sizes Determined by Hose Type
9/16"-18
7/8"-14
3/4"-16
1"-12
1-5/16"-12



Medium-Pressure Connection

Tube O.D.	Tube I.D.	Collar Thread	Gland Nut Thread
1/4"	.11"	1/4" - 28 LH	7/16" - 20
3/8"	.20"	3/8" - 24 LH	9/16" - 18
9/16"	.31"	9/16" - 18 LH	13/16" - 16
3/4"	.43"	3/4" - 16 LH	3/4" - 14 NPS
1"	.56"	1" - 14 LH	1-3/8" - 12

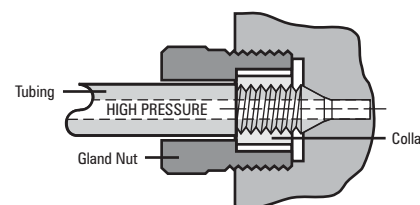
Identification is by tubing O.D.



High-Pressure Connection

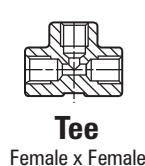
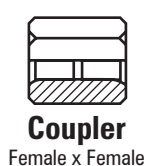
Tube O.D.	Tube I.D.	Collar Thread	Gland Nut Thread
1/4"	.08"	1/4" - 28 LH	9/16" - 18
3/8"	.125"	3/8" - 24 LH	3/4" - 16
9/16"	.31"	9/16" - 18 LH	1-1/8" - 12

Identification is by tubing O.D.



National Pipe Tapered (NPT)

Thread Sizes
1/8"-27
1/4"-18
3/8"-18
1/2"-14
3/4"-14
1"-11.5



English-Metric Conversions

Metric Equivalents

Measurement	Conversion	Example
Length	1 in. = 25.4 mm	12 in. x 25.4 = 304.8 mm
	1 in. = .0254 m	120 in. x .0254 = 3.05 m
	1 ft. = .3048 m	12 ft. x .3048 = 3.68 m
	1 mm = .03937 in.	100 mm x .03937 = 3.94 in.
	1 m = 39.37 in.	10 m x 39.37 = 393.7 in.
	1 m = 3.281 ft.	10 m x 3.281 = 32.81 ft.
Weight	1 lb. = .454 kg	10 lbs. x .454 = 4.54 kg
	1 kg = 2.205 lbs.	10 kg x 2.205 = 22.05 lbs.
Pressure	1 psi = .069 bar	20,000 psi x .069 = 1,380 bar
	1 bar = 14.5 psi	1,000 bar x 14.5 = 14,500 psi
Flow	1 gpm = 3.785 lpm	30 gpm x 3.785 = 113.55 lpm
	1 lpm = .264 gpm	100 lpm x .264 = 26.4 gpm
Force	1 lb. (f) = 4.44 N	100 lbs. (f) x 4.44 = 444 N
	1 N = .2248 lbs. (f)	900 N x .2248 = 202.32 lbs. (f)
Power	1 hp = .7457 kW	50 hp x .7457 = 37.29 kW
	1 kW = 1.341 hp	50 kW x 1.341 = 67.05 hp
Air Flow	1 cfm = .47195 l/s	10 cfm x .47195 = 4.72 l/s
	1 l/s = 2.1189 cfm	10 l/s x 2.1189 = 21.2 cfm

Quick-Reference Pressure Chart

U.S.	Metric	Metric (Rounded)*
40,000 psi	2,760 bar	2,800 bar
36,000 psi	2,484 bar	2,500 bar
30,000 psi	2,070 bar	2,070 bar
24,000 psi	1,656 bar	1,680 bar
20,000 psi	1,380 bar	1,400 bar
15,000 psi	1,035 bar	1,035 bar
13,000 psi	897 bar	900 bar
10,000 psi	690 bar	700 bar
5,000 psi	345 bar	345 bar
3,000 psi	207 bar	210 bar
1,000 psi	69 bar	70 bar

*Rounded pressures are used throughout this catalog for the reader's convenience.

Hydraulic Power Calculations

ENGLISH	METRIC
$\text{hhp} = \frac{\text{gpm} \times \text{psi}}{1715}$	$\text{hkW} = \frac{\text{lpm} \times \text{bar}}{600}$

Back Thrust Calculations

$$\text{lb.f} = .052 \times \text{gpm} \times \sqrt{\text{psi}}$$

$$N = .2357 \times \text{lpm} \times \sqrt{\text{bar}}$$

DUE TO NLB'S CONTINUING PROGRAM OF PRODUCT IMPROVEMENT, SPECIFICATIONS IN THIS CATALOG ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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