

**BULLETIN BULLETIN BULLETIN BULLETIN BULLETIN****Date:** December 17, 1986**To:** All Chelsea Power Take-Off Customers**Subject:** Blower Applications

Product blowers that are driven by Power Take-Off's are a subject of great concern that we all recognize. A P.T.O. and blower that have not been correctly applied can spell disaster for the life of the P.T.O. To complicate these applications even further, there are several factors that you must address to properly figure out the torque rating for the blower. These factors are shown below:

1. **START UP TORQUE** which is effected by correct or incorrect start up procedures and step-up gear ratios that allow you to achieve high blower R.P.M. with low engine speeds. Cold weather will also effect your start up torque. Applications where you are operating in temperature below 32 degrees Fahrenheit will increase start-up torque requirements by 10%
2. **RUNNING TORQUE** is determined by the system pressure of the blower. Also the cold weather factor will have to be considered for all running torque ratings.

There are correct start up procedures that should be used to help keep your start up torque to a minimum. They are as follows:

1. Make sure that there are no restrictions down-stream from the blower. Blowers must be started under no load conditions.
2. With engine at low idle, parking brake engaged, transmission in neutral and clutch depressed you can now engage the P.T.O.
3. **SLOWLY** release the clutch. (Warning it is extremely important not to pop the clutch on engagement.)
4. Bring the engine up to recommended operating speed. This should also be done slowly. (Within 3-5 seconds.)
5. For start-ups during cold weather, extra care should be taken in steps 1-4.

If these start-up steps are followed, a lower torque will be seen upon start-up. A high torque would be seen by engaging the P.T.O. at high engine R.P.M. or popping the clutch. An example of this would be a blower with a start-up torque of 171 ft. lbs. with correct starting but with incorrect starting it would see 488 ft. lbs. of torque. As you can see, incorrect starting procedures would demand the torque capacity of an eight-bolt P.T.O. rather than a six-bolt P.T.O.

To help simplify blower applications CHELSEA ENGINEERING has been in contact with several of the blower manufactures. DRUM, DUROFLOW (SCHWITZER), GARDNER-DENVER AND M.D. PNEUMATICS have provided us with excellent information on each of their product line. With this information, it was possible to achieve the steady state running torque and start-up torque for both correct and incorrect start-up procedures.

Tables have been created for the blower manufacturers that provide torque ratings for correct and incorrect start-up and running torque created by different system pressure. We have also accounted for step-up gear head ratios used between the P.T.O. and blower.

All torque values in the tables are to be compared to published P.T.O. intermittent torque ratings. You do not need to derate the P.T.O. torque ratings. The continuous duty cycle of the blower has already been accounted for in the tables.

Lastly, remember for cold weather applications to increase all blower torque ratings by 10% (i.e. 326 lbs. ft. x 1.10 = 358.6 lbs. ft. cold weather torque). Again cold weather applications are when the P.T.O. and blower are operated in temperature below 32 degrees Fahrenheit for more than 50% of the time.

I hope this information will help clear up some of the mystery about blower applications. As we receive new information on new blowers or from other blower manufactures we will pass it along to you.

Sincerely,

A handwritten signature in black ink that reads "Jeff King". The signature is written in a cursive, flowing style.

Jeff King,
Product Manager
Power Take-Off's

/drf

BLOWER TORQUE RATINGS
FOR DRUM INDUSTRIES

BLOWER MODEL	INCORRECT START-UP	TORQUE (LB- FT)		PRESSURE (PSI)
		CORRECT START-UP*	STEADY-STATE RUNNING	
J420	281	98	137	10
			147	14
			158	18
			164	20
			176	25
J660	409	143	174	10
			200	14
			216	18
			220	20
			248	25
D800	280	98	136	10
			190	14
			216	16
			242	18
D1000	336	143	181	10
			214	12
			256	15

*ONLY TO BE USED WITH CORRECT BLOWER START-UP PROCEDURES!

NOTE: BLOWER TORQUE RATINGS ARE TO BE COMPARED TO CHELSEA INTER-MITTENT P.T.O. TORQUE RATINGS

BLOWER TORQUE RATINGS

FOR DUROFLOW

BLOWER MODEL	INCORRECT START-UP	TORQUE (LB- FT)		PRESSURE (PSI)
		CORRECT START-UP*	STEADY-STATE RUNNING	
4504	122	43	59	15
			48	12
			38	10
			31	8
			21	5
			9	2
4504 with 2:1 step-up	392	183	118	15
			96	12
			76	10
			62	8
			42	5
			18	2
4506	178	63	90	15
			72	12
			60	10
			49	8
			31	5
			13	2
4506 with 2:1 step-up	560	260	180	15
			142	12
			120	10
			98	8
			62	5
			26	2
4509	262	91	131	15
			107	12
			90	10
			73	8
			48	5
			23	2
4509 with 2:1 step-up	540	378	262	15
			214	12
			180	10
			146	8
			96	5
			46	2

BLOWER TORQUE RATINGS

FOR DUROFLOW

BLOWER MODEL	INCORRECT START-UP	TORQUE (LB- FT)		PRESSURE (PSI)
		CORRECT START-UP*	STEADY-STATE RUNNING	
4512	342	120	167	15
			138	12
			115	10
			91	8
			63	5
			28	2
4512 with 2:1 step-up	702	491	334	15
			276	12
			230	10
			182	8
			126	5
			56	2

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BLOWER TORQUE RATINGS
FOR GARDNER-DENVER

BLOWER MODEL	INCORRECT START-UP	TORQUE (LB- FT) CORRECT START-UP*	STEADY-STATE RUNNING	PRESSURE (PSI)
T5CDL9	410	192	143	12
			188	16
			228	20
T5CDL12	474	265	184	12
			244	16
			304	20
T5CDL13	512	286	203	12
			255	16
			304	20

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BLOWER TORQUE RATINGS
FOR M.D. PNEUMATICS

BLOWER MODEL	INCORRECT START-UP	TORQUE (LB- FT)		PRESSURE (PSI)
		CORRECT START-UP*	STEADY-STATE RUNNING	
4009 with 2.5:1	326	114	134	10
			161	12
			204	15
4009 with 2:1	214	75	107	10
			129	12
			163	15
4009 with 1.6:1	142	50	86	10
			103	12
			131	15
4009 with 1.4:1	112	39	75	10
			90	12
			114	15
4009 1:1 (direct)	63	22	54	10
			64	12
			82	15
4012 with 2.5:1	399	140	178	10
			214	12
			284	15
4012 with 2:1	261	91	142	10
			171	12
			227	15
4012 with 1.6:1	172	60	114	10
			137	12
			182	15
4012 with 1.4:1	135	47	99	10
			120	12
			159	15
4012 with 1:1 (direct)	76	27	71	10
			86	12
			114	15

BLOWER TORQUE RATINGS

FOR M.D. PNEUMATICS

BLOWER MODEL	INCORRECT START-UP	TORQUE (LB- FT)		PRESSURE (PSI)
		CORRECT START-UP*	STEADY-STATE RUNNING	
71-4009, 06 GH9 2.5:1	488	171	128	10
			173	15
			230	20
			285	25
with 2:1	318	111	102	10
			138	15
			184	20
			228	25
with 1.6:1	209	73	82	10
			110	15
			147	20
			182	25
with 1.4:1	163	57	71	10
			97	15
			129	20
			159	25
with 1:1 (direct)	91	32	51	10
			69	15
			92	20
			114	25
5507- 76X2G with 2.5:1	715	500	250	12
			303	15
			358	18
			408	20
with 2:1	466	326	200	12
			242	15
			286	18
			326	20
with 1.6:1	460	215	160	12
			194	15
			229	18
			261	20

BLOWER TORQUE RATINGS
FOR M.D. PNEUMATICS

BLOWER MODEL	INCORRECT START-UP	TORQUE (LB- FT)		
		CORRECT START-UP*	STEADY-STATE RUNNING	PRESSURE (PSI)
5507- 76X2G with 1.4:1	480	167	140	12
			169	15
			200	18
			228	20
with 1:1 (direct)	268	93	100	12
			121	15
			143	18
			163	20
5509- 76X2G with 2.5:1	853	598	253	10
			278	12
			360	15
with 2:1	555	389	202	10
			222	12
			288	15
with 1.6:1	545	254	162	10
			178	12
			230	15
with 1.4:1	425	198	141	10
			155	12
			202	15
with 1:1 (direct)	312	109	101	10
			111	12
			144	15

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NOTE: BLOWER TORQUE RATINGS ARE TO BE COMPARED TO CHELSEA INTER-MITTENT P.T.O. TORQUE RATINGS