

KICE INDUSTRIES, INC.



Skilled Air for Industry



FC SERIES FANS

Performance Charts | FCPC-1



KICE INDUSTRIES, INC.

FC SERIES FANS

How to Use Tables

For a given fan size, wheel design, CFM, and static pressure, capacity tables can be used to obtain outlet velocity, wheel RPM and GHP. If capabilities are at conditions other than 70°F, sea level or standard density, correction factors must be applied to static pressure and BHP.

1. Select size, RPM and BHP of fan from capacity table.
2. If temperature or altitude is involved, correct for air density (see charts III and IV).
3. Check the maximum safe speed of the fan at the operating temperature as shown in chart I and II.
4. All ratings shown between the gray lines on capacity tables are within five percent of maximum mechanical efficiency.
5. BHP shown includes bearing drag on smaller sizes where such drag is significant.

Example: Size FC-13 Fan, to furnish 1840 CFM at 5"SP at 600°F at .075 lbs./cu. ft. density.

1. Chart I gives a 2.00 factor for 600°F.
2. 5"SPx2.00 10"SP at 70°F.
3. Capacity tables show 1915 RPM, 5.37 BHP for FC-13 at 1840 CFM at 10"SP at 70°F.
4. Divide BHP and SP by the temperature factor.
 $10 \times 2.00 = 5$ "SP
 $5.37 \div 2.00 = 2.68$ BHP
5. Actual performance: 1840 CFM at 5"SP at 1915 RPM at 2.63 BHP at 600°F.

Note: Unless otherwise specified static pressure is given in inches of water column.

CHART I

MAXIMUM SAFE RPM OF MILD STEEL
WHEELS AT VARIOUS TEMPERATURES

SIZE	70-400°	500°	600°	700°
FC5	4815	4650	4525	4390
FC7	4690	4530	4410	4275
FC9	3650	3525	3430	3330
FC11	3460	3340	3250	3155
FC13	2930	2830	2755	2670
FC15	2530	2440	2380	2305
FC17	2230	2155	2095	2035
FC19	2000	1930	1880	1824
FC21	1810	1750	1700	1650
FC23	1650	1595	1550	1505
FC26	1460	1410	1370	1330
FC29	1310	1265	1230	1195
FC33	1150	1110	1080	1050
FC37	1020	985	960	930
FC41	930	900	875	845
FC45	840	810	790	765
FC49	770	745	725	700

CHART II

MAXIMUM SAFE SPEED FACTORS
FOR ALLOY WHEEL CONSTRUCTION

TEMP	ALUM.	304 STAIN- LESS	316 STAIN- LESS	347 STAIN- LESS
70	1	1	.25	1
200	.97	.89	.32	1
300	—	.82	.88	.99
400	—	.78	.86	.97
500	—	.75	.83	.97
600	—	.73	.8	.97
700	—	.71	.78	.96
800	—	.7	.77	.96
900	—	.68	.76	.95
1000	—	—	.75	.94

CHART III

CORRECTION
FACTORS FOR
TEMPERATURE (°F)

TEMP	FACTOR
-50	.77
-25	.82
0	.87
20	.91
40	.94
60	.98
70	1
80	1.02
100	1.06
120	1.09
140	1.13
160	1.17
180	1.21
200	1.25
225	1.29
250	1.34
275	1.39
300	1.43
325	1.48
350	1.53
375	1.58
400	1.62
450	1.72
500	1.81
550	1.91
600	2
650	2.1
700	2.19
750	2.28
800	2.38

CHART IV

CORRECTION FACTORS
FOR ALTITUDE
(FEET ABOVE SEA LEVEL)

ALT.	FACTOR
0	1
500	1.02
1000	1.04
1500	1.06
2000	1.08
2500	1.1
3000	1.12
3500	1.14
4000	1.16
4500	1.18
5000	1.2
5500	1.24
6000	1.26
6500	1.28
7000	1.3
7500	1.32
8000	1.35
8500	1.37
9000	1.4
10000	1.45

Note: If correction factor for both temperature and altitude is required, multiply factors from charts III and IV together: 3000° and 600° F.
 $1.12 \times 2.00 = 2.24$ (combined factor).

For complete information on all of our air systems and equipment visit kice.com



KICE INDUSTRIES, INC.

FC SERIES FANS

FC-15

Inlet diameter: 15" O.D. Wheel diameter: 26 1/8" Wheel Circumference: 6.84" Fan Outlet Area: 123 sq. ft. Inside

CFM OV	4" SP	5" SP	6" SP	7" SP	8" SP	9" SP	10" SP	12" SP	14" SP	16" SP	18" SP	20" SP													
RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP	RPM BHP													
1230	1000	1040	158	187	227	1279	288	332	322	479	391	1571	457	557	527	1818	674	1966	832	2033	998	2334	117	2357	136
1476	1200	1240	174	193	231	1379	352	475	418	1566	486	1652	561	1812	713	1960	877	2096	105	2229	123	2349	142		
1722	1400	1041	181	193	251	1274	331	376	378	472	447	1554	531	1648	595	1808	755	1956	925	2095	111	2222	129	2346	149
1968	1600	1044	211	1963	271	1274	337	376	406	470	478	1560	553	1647	633	1804	796	1951	972	2089	116	2219	135	2339	155
2214	1800	1051	231	1967	295	1277	364	377	436	471	511	1561	591	1645	672	1802	842	1948	102	2085	121	2215	142	2335	162
2460	2000	1059	253	1974	321	1281	393	390	457	473	546	1560	627	1644	711	1803	891	1948	108	2084	128	2212	148	2333	171
2706	2200	1069	278	1983	349	1286	423	384	502	476	583	1563	667	1647	755	1803	939	1947	113	2082	134	2208	155	2330	177
2952	2400	1081	304	1992	378	1294	456	390	537	481	622	1567	711	1648	798	1804	991	1947	119	2081	141	2206	161	2325	184
3198	2600	1094	332	1204	411	1303	482	398	577	489	665	1573	756	1653	848	1808	105	1949	125	2082	147	2206	169	2325	192
3444	2800	1109	364	1215	445	1315	531	408	619	497	711	1579	803	1681	902	1810	111	1950	131	2082	153	2207	176	2326	201
3690	3000	125	397	1229	472	1327	571	449	663	505	756	1588	855	1687	954	1816	116	1956	138	2084	161	2207	184	2328	209
3936	3200	142	433	1246	523	1341	605	441	709	557	809	1597	908	1675	103	1822	123	1962	145	2091	169	2214	193	2330	218
4182	3400	150	471	1262	565	1356	661	445	761	529	862	1609	966	1686	107	1832	129	1968	153	2095	176	2217	201	2332	227
4428	3600	179	512	1279	611	1373	711	460	814	553	919	1622	103	1697	114	1841	137	1974	161	2103	185	2221	211	2336	236
4674	3800	199	556	1298	659	1398	762	476	871	556	978	1635	109	1710	121	1850	144	1984	169	2108	193	2228	219	2344	247
4920	4000	1221	604	1316	709	1408	821	483	931	573	104	1649	116	1722	127	1862	152	1993	177	2119	203	2235	229	2348	257
5166	4200	1242	653	1336	764	1424	876	509	992	588	111	1664	123	1736	135	1876	161	2005	186	2127	212	2246	241	2356	266
5412	4400	1263	706	1357	822	1445	941	527	106	1606	118	1679	131	1751	143	1889	169	2017	195	2137	222	2255	251	2363	279
5658	4500	1286	763	1378	882	1463	101	1544	113	1624	126	1697	138	1766	151	1902	177	2030	205	2150	213	2263	261	2374	291
5904	4800	1309	822	1400	948	1485	107	1564	121	1641	133	1714	146	1784	161	1917	187	2044	215	2163	244	2276	273	2384	303
6150	5000	1332	885	1422	101	1507	115	1586	128	1660	141	1731	155	1802	169	1933	197	2057	225	2175	255	2268	285	2394	315
6404	5200	1380	102	1468	116	1550	131	1627	144	1700	159	1769	173	1838	188	1967	217	2090	248	2204	279	2392	311	2420	343
7024	5500	1421	118	1515	132	1595	148	1670	163	1742	178	1810	193	1876	208	2003	241	2121	272	2234	304	2342	337	2448	372
7626	6200	1482	135	1564	151	1641	167	1714	182	1785	199	1852	215	1916	231	2039	264	2152	298	2269	332	2375	367	2477	403
8119	6600	1522	153	1613	171	1690	187	1762	204	1830	221	1896	239	1960	256	2080	291	2196	316	2207	361	2408	398	2508	435

FC-17

Inlet diameter: 17" O.D. Wheel diameter: 29 5/8" Wheel Circumference: 7.76" Fan Outlet Area: 158 sq. ft. Inside

CFM	OV	4" SP	5" SP	6" SP	7" SP	8" SP	9" SP	10" SP	12" SP	14" SP	16" SP	18" SP	20" SP												
RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1580	1000	977	204	1029	272	1128	345	1219	421	1305	503	1385	588	1461	677	1603	667	1724	107	1835	128	1970	151	2079	175
1896	1200	917	224	1026	296	1225	372	1216	453	1300	538	1381	628	1457	721	1588	918	1729	113	1850	135	1966	159	2072	183
2212	1400	918	246	1026	322	1224	402	1213	486	1298	575	1379	671	1453	766	1595	971	1725	119	1847	142	1959	160	2068	191
2528	1600	921	271	1027	349	1223	433	1213	523	1296	614	1378	702	1452	814	1597	102	1721	125	1842	149	1956	174	2063	201
2844	1800	927	297	1029	375	1226	468	1214	561	1297	657	1378	759	1451	864	1589	118	1718	132	1839	156	1953	182	2059	209
3160	2000	934	326	1035	412	1230	505	1217	601	1299	703	1378	806	1450	915	1590	114	1718	139	1838	164	1951	181	2068	218
3476	2200	943	357	1043	449	1234	541	1221	645	1302	751	1378	858	1452	972	1590	121	1716	146	1836	172	1947	190	2095	227
3792	2400	953	391	1051	487	1241	587	1226	691	1306	801	1382	913	1453	103	1591	127	1717	153	1835	181	1946	200	2051	236
4108	2600	964	427	1061	529	1249	633	1233	741	1318	856	1387	972	1457	109	1594	135	1718	161	1836	189	1945	217	2051	247
4424	2800	978	468	1072	571	1259	682	1242	796	1320	913	1393	103	1465	116	1596	142	1720	169	1836	197	1946	227	2052	258
4740	3000	992	511	1084	621	1271	735	1251	852	1327	973	1401	111	1470	123	1601	149	1725	178	1837	206	1947	236	2053	269
5056	3200	1007	557	1098	672	1283	791	1261	912	1336	104	1409	117	1477	131	1607	158	1730	187	1844	217	1952	240	2064	281
5372	3400	1023	606	1113	726	1296	831	1275	979	1348	111	1419	124	1487	138	1615	166	1735	196	1848	227	1955	250	2057	292
5689	3600	1040	658	1138	785	1309	880	1287	105	1360	118	1430	132	1496	146	1623	176	1741	206	1854	238	1958	270	2060	304
6004	3800	1058	715	1145	848	1324	931	1302	112	1372	126	1441	141	1509	155	1632	185	1749	216	1859	248	1965	282	2067	317
6320	4000	1077	777	1161	912	1341	105	1316	121	1387	134	1454	149	1519	164	1642	195	1758	227	1868	261	1971	295	2071	331
6636	4200	1095	841	1178	982	1356	113	1330	128	1401	143	1467	158	1531	173	1654	206	1768	239	1875	273	1980	309	2077	344
6952	4400	1114	908	1197	106	1374	121	1346	136	1416	152	1480	167	1544	183	1666	217	1778	251	1885	286	1987	322	2084	358
7268	4600	1134	981	1215	113	1390	129	1362	145	1432	161	1496	178	1557	194	1677	228	1790	263	1896	299	1996	330	2093	374
7584	4800	1154	106	1235	122	1410	138	1379	154	1447	171	1518	188	1573	205	1691	241	1802	276	1907	313	2007	351	2102	381
7900	5000	1175	114	1254	131	1429	148	1398	165	1464	182	1526	199	1589	217	1705	253	1814	291	1918	327	2017	360	2111	406
8532	5400	1217	131	1325	151	1466	168	1435	186	1499	204	1560	222	1621	241	1735	281	1843	319	1943	358	2039	390	2144	441
9164	5800	1262	151	1396	171	1496	191	1473	209	1536	229	1596	248	1654	268	1766	309	1870	349	1970	391	2066	430	2159	478
9796	6200	1305	173	1379	184	1447	214	1512	235	1574	255	1633	276	1690	297	1799	339	1901	383	2001	437	2094	470	2165	518
10228	6600	1351	197	1423	219	1490	241	1554	263	1614	285	1672	307	1728	329	1834	373	1936	421	2030	465	2124	510	2212	561

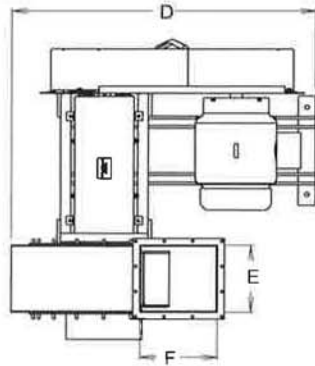
For complete information on all of our air systems and equipment visit kice.com



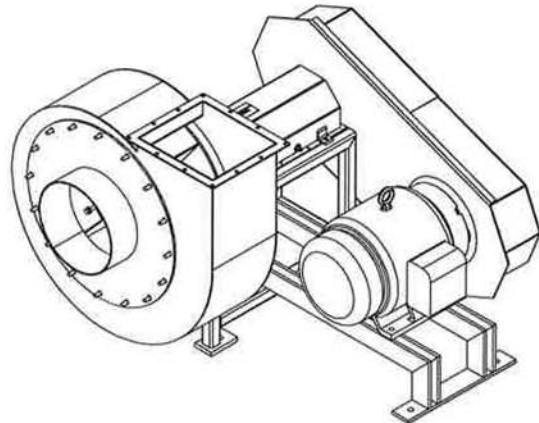
KICE INDUSTRIES, INC. / 5500 Mill Heights Drive / Wichita, KS 67219

FC Arr9FB FANS

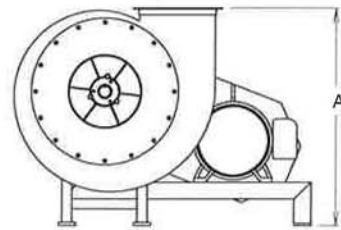
www.kice.com / sales@kice.com



TOP VIEW



MODEL #	A	B	C	D	E	F	EST. WEIGHT
FC - 5	20 1/2	14 1/4	27 11/16	31 3/4	4 1/2	5 1/4	230
FC - 7	22 1/2	14 1/4	32 15/16	31 1/4	6 5/8	7 1/4	269
FC - 9	27 1/2	17	38 1/4	35 1/2	8 1/2	9 3/8	431
FC - 11	32 5/8	20 1/8	42 1/2	44 1/4	9 3/4	11 1/4	580
FC - 13	35 7/8	20 7/8	48	51 3/8	11 1/4	13	742
FC - 15	40 7/8	23 7/8	51 3/4	56 13/16	13	14 7/8	945
FC - 17	46 5/8	27 5/8	55 7/8	61 3/8	15 1/8	17 1/8	1225
FC - 19	51 1/8	30 1/8	59 3/8	63 13/16	16 5/8	18 7/8	1841
FC - 21	56 1/8	32 5/8	64 7/8	72 5/16	18 1/8	20 3/4	1841
FC - 23	62 1/8	36 1/8	71 1/2	72 13/16	19 3/4	22 7/8	2049
FC - 26	71 1/8	41 7/8	73 1/2	85 1/16	21 1/2	25 1/4	2696
FC - 29	77 7/8	45 3/8	77	90 13/16	25	28 5/8	3103



FRONT VIEW

NOTES:

DIMENSIONS SHOWN MAY DEPENDING ON JOB REQUIREMENTS

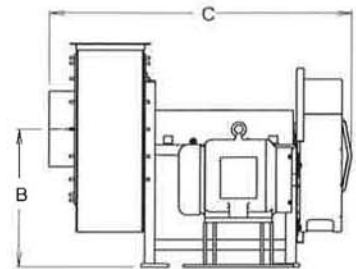
MATERIALS OF CONSTRUCTION PER SPECIFIC JOB

FOOTPRINT UPON REQUEST

MOTOR SIZE PER SPECIFIC JOB

STANDARD ORIENTATION SHOWN, MOTOR LEFT, CW ROTATION, VERTICAL UP DISCHARGE

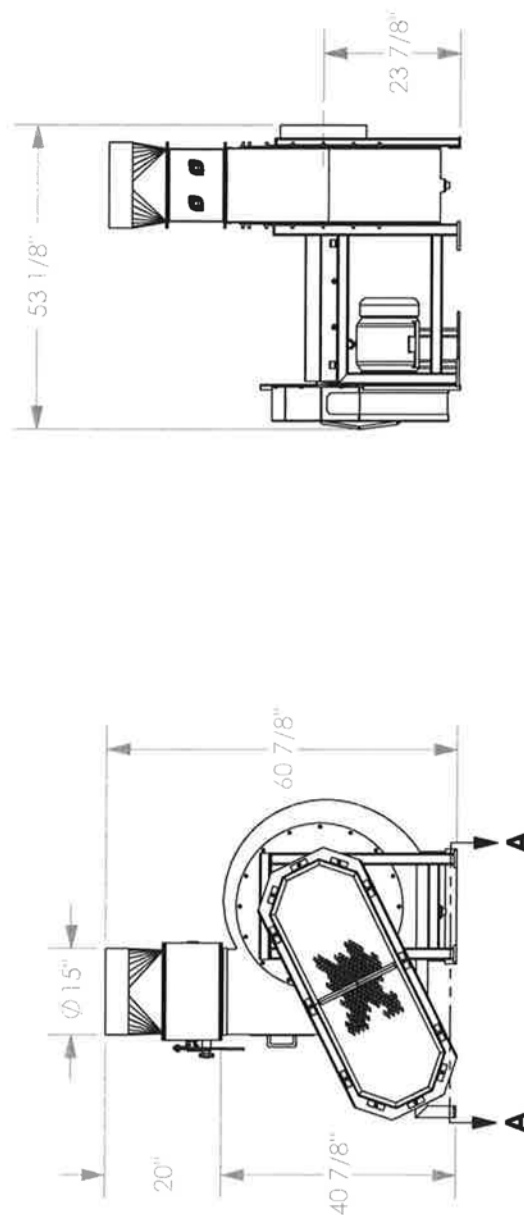
MOTOR POSITION, DISCHARGE DIRECTION AND HOUSING ROTATION MAY VARY PER SPECIFIC JOB REQUIREMENTS



SIDE VIEW

FC Arr9FB FANS

DWG. NO.
FAN-1002



NOTE: SEE JOB FOR ACTUAL FOOTPRINT
WEIGHT: 741

KICE INDUSTRIES, INC.



FC15 #9FB

DESCRIPTION:

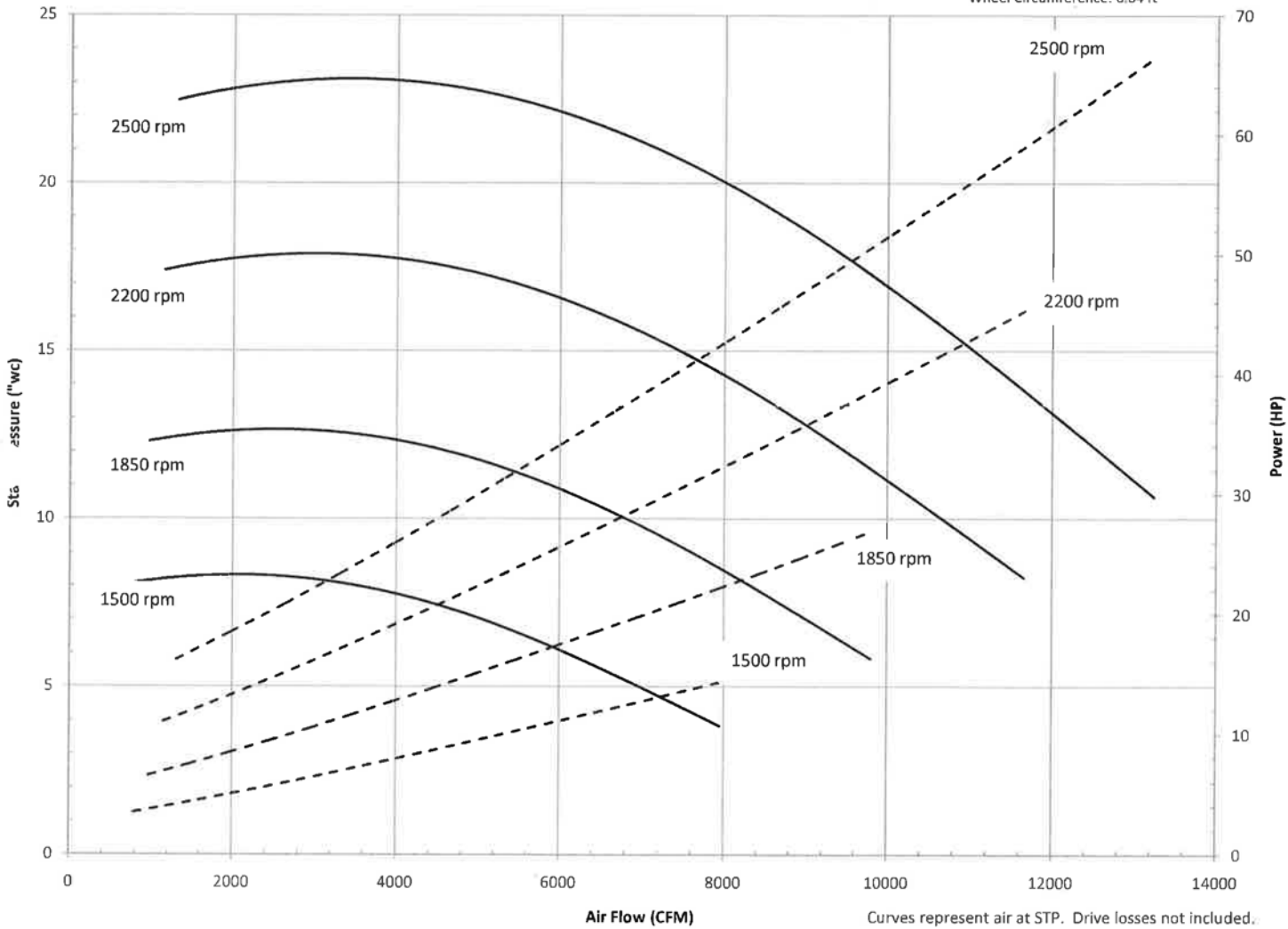
5500 MILL HEIGHTS DR. WICHITA, KANSAS 67219
PH: (316) 744-7151 FAX: (316) 744-7355

10-19-11 FAN-1027

DWN: DATE: DWG. NO.

FC15 Fan Performance Curve

Outlet area: 1.23 ft² inside
Wheel Diameter: 26.125"
Wheel Circumference: 6.84 ft



KICE Industries

KICE

CENTRIFUGAL FAN



OPERATOR'S MANUAL

1. INTRODUCTION

When you purchased your Kice heavy duty industrial fan, you bought an air mover that has proven to be the best design based on thousands of installations and years of proven reliability and operation.

We are proud of our products and the people at Kice Industries who build them. At Kice, we start in our own foundry and follow the construction standards and manufacturing techniques that have proven superior over the last 60 years.

The results of our development work and input from users have resulted in the present design of the Kice industrial fans.

This owner's manual is intended as a guide for proper installation, operation and maintenance to keep your Kice fan operating safely and efficiently on the job. Service and spare parts information are also included for your benefit.

Sincerely,

Drew Kice
President
Kice Industries, Inc.

WARRANTY

The Company warrants the equipment manufactured by the Company to be free of defects in material and workmanship for a period of one (1) year from the date of shipment. Kice agrees to repair or replace, at its option, any parts found to be defective in the opinion of the Company. Kice is not liable for any costs in connection with the removal, shipment or reinstallation of said parts. This warranty does not apply to abrasion, corrosion, erosion, abuse or misuse of the product. Assistance by Kice in system layout or selecting equipment does not imply Kice's responsibility.

Buyer agrees to look to the warranty, if any, of the manufacturer or supplier of equipment manufactured by others and supplied by Kice for any alleged defects in such equipment and for any damages or injuries caused thereby or as a result thereof. Where work is made to measurements or specifications furnished by the Buyer, Kice does not assume any responsibility for the accuracy of Buyer's specifications. Kice will not assume responsibility for alteration or repairs unless the same are made with the written consent and approval of Kice.

PURCHASER SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ELECTRICAL MANUFACTURER'S RECOMMENDATIONS, UNDERWRITERS CODE AND ALL SAFETY PRECAUTIONS

Kice extends no other warranty for any of its products other than the above express warranty and there are no other warranties, express or implied, including warranties of merchantability, fitness for a particular purpose or otherwise which extend beyond the above limited express warranty. Kice and its dealers shall not in any event be liable for consequential or incidental damages and the terms and conditions stated herein provide Buyer's sole and exclusive remedy. Any actions for breach of this agreement or warranty must be commenced within one year after the cause of action has occurred.

TABLE OF CONTENTS

1. INTRODUCTION	2
2. GENERAL INFORMATION	4
3. SAFETY PRECAUTIONS	6
4. RECEIVING, HANDLING, AND INSTALLATION	8
5. FAN MAINTENANCE	12
6. TROUBLESHOOTING - COMMON FAN PROBLEMS	16
7. ILLUSTRATED PARTS LIST	17

IMPORTANT:

Write down the **MODEL** and **SERIAL NUMBER** of the Kice Industrial Fan.

For additional information, application assistance or special service, you should contact the factory. We will need to know the **MODEL** and **SERIAL NUMBER** of your Kice Industrial Fan. For ready reference, please record this information and the date of delivery or installation on the lines below. See the General Information section for the location of the model and serial number.

Model: _____

Serial Number: _____

Date of Delivery or Installation _____ / _____ / _____

2. GENERAL INFORMATION

The purpose of this manual is to assist owners and operators in maintaining and operating the Kice Industrial Fan. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. Separate manuals are included for auxiliary equipment that makes up an air system, such as airlock valves, cyclones and fans. They contain additional information that may not be repeated in this manual. You are urged to read all manuals before attempting any operation or repair of the equipment in the system. If these manuals are not included in your owner's packet, contact our customer service department.

USING THIS MANUAL

General operation, adjustment and maintenance guidelines are outlined for owners and operators of the Kice Industrial Fan. Operating conditions vary considerably and cannot be addressed individually. Through experience, however, operators should have no difficulty in developing good operating, safety and monitoring skills.

The term "**disconnect and lockout**" as used in this manual means that power to the equipment has been completely disconnected through the use of "**Lockout and Tagout Procedures**".

Directions used in this manual, for example **RIGHT** or **LEFT**, **CLOCKWISE** or **COUNTERCLOCKWISE**, refer to directions when facing the drive side of the fan.

Photographs and illustrations were current at the time of printing, but subsequent production changes may cause your Kice Industrial Fan to vary slightly in detail. Kice Industries, Inc., reserves the right to redesign and change the equipment as deemed necessary, without notification. If a change has been made to your Kice Industrial Fan that is not reflected in this owner's manual or the Illustrated Parts List, write or call Kice Industries, Inc., for current information and parts.

MODEL AND SERIAL NUMBER

The model of the Kice Industrial Fan, serial number and date of manufacture can be found stamped on the metal identification plate located on the housing on the opposite side of the inlet.

KICE INDUSTRIAL FAN PARTS AND SERVICE

Use original Kice Industrial Fan replacement parts only. These parts are available from Kice Industries, Inc. To obtain prompt, efficient service, always provide the following information when ordering parts:

1. Correct part description and number, as given in the Illustrated Parts List section of this manual.
2. Correct model number.
3. Correct serial number.

For assistance in service or ordering parts, contact the customer service department:

Kice Industries, Inc.
5500 Mill Heights Drive
Wichita, KS 67219-2358
Phone 316-744-7151; Fax 316-744-7355

GENERAL INFORMATION CONTINUED

IMPORTANT: Any unauthorized modification, alteration, or use of non-approved attachments or drive units voids the warranty and releases Kice Industries, Inc., from any liability arising from subsequent use of this equipment. Each type of Industrial Fan is designed to be used in a specific type of system. Using the Kice Industrial Fan for a purpose other than that for which it was designed could result in personal injury, as well as, product or property damage.

Kice equipment is designed and built to provide years of operation. As with any equipment, the following rules are essential for trouble-free operation:

- Proper installation
- Regular maintenance
- Correct operation within original design parameters
- Proper application within a process

Failure to properly install, maintain or operate Kice equipment can result in a variety of problems, including but not limited to: poor equipment performance, decreased equipment life, equipment failure, or dangerous operating conditions.

The Kice Industries product line includes a variety of equipment, all of which can be custom-made to suit your application. Your Kice equipment was chosen based on your specification of process, product and your application requirements for capacity, operating conditions, operating parameters, etc. It is essential that your Kice equipment be installed, maintained and operated under the conditions for which it was originally designed and specified. Should your process needs change, please consult with Kice Industries prior to utilizing the equipment under different conditions.

MOTOR AND DRIVE PARTS AND SERVICE

The motor and drive components are covered by the manufacturer's warranty. If there is a problem, check with the local supplier or service representative.

3. SAFETY PRECAUTIONS



Figure 1

This safety alert symbol is used on equipment, safety decals and in manuals to call your attention to an important safety message warning you of possible danger to your personal safety. When you see this symbol (Figure 1), be alert; your personal safety or the safety of other persons is involved. Follow the instructions in the safety message.

HAZARD LEVELS



DANGER (RED) – Danger is used to indicate the presence of a hazard that **WILL** cause **SEVERE** personal injury, death, or substantial property damage if the warning is ignored.



WARNING (ORANGE) – Warning is used to indicate the presence of a hazard that **CAN** cause **SEVERE** personal injury, death, or substantial property damage if the warning is ignored.



CAUTION (YELLOW) – Caution is used to indicate the presence of a hazard that **WILL** or **CAN** cause **MINOR** personal injury or property damage if the warning is ignored.



NOTICE (BLUE) – Notice is used to indicate installation, operation, or maintenance information that is important, but not hazard-related. Hazard warnings should never be included under the Notice signal word.



WARNING: All owners and operators should read this manual, or be instructed in safe operating and maintenance procedures, before attempting to uncrate, install, operate, adjust, or service this equipment.

SAFETY DECALS

The safety decals on the fan should not be removed, covered over, painted, or otherwise become illegible. If this occurs, the decals should be replaced immediately. Contact our customer service department for replacements.

Kice Industries, Inc.
5500 Mill Heights Drive
Wichita, KS 67219



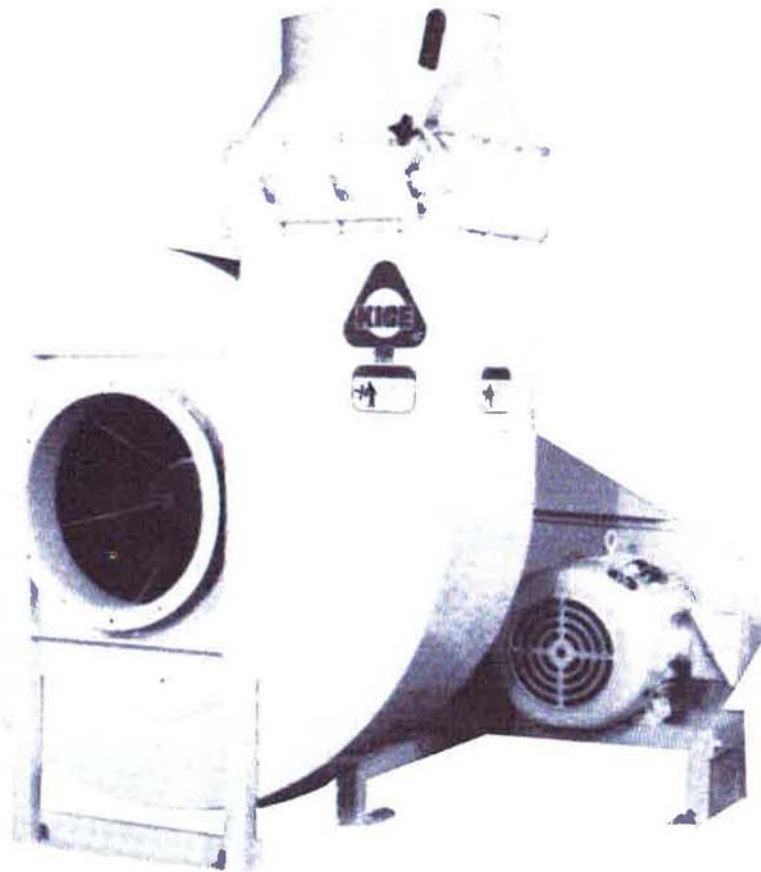
www.kice.com

P: 316-744-7151
F: 316-744-7355



Fan Manual

Assembly • Safety Instructions • Controls • Operation • Service & Maintenance



MOTOR:

SEIMENS

15 HP

1760 RPM

60 HZ

CLASS F

3 PH

1. INTRODUCTION

When you purchased your Kice Heavy Duty Industrial Fan, you bought an air mover that has been proven the best design, based on thousands of installations and years of proven reliability and operation.

We're proud of our products and the people at Kice Industries who build them. At Kice, we start in our own foundry and follow the construction standards and manufacturing techniques, which have proven superior over the last 40 years.

The results of our development work and input from the users has resulted in the present design of the Kice Industrial Fans.

This owner's manual is intended as a guide for proper installation, operation and maintenance to keep your Kice Fan operating safely and efficiently on the job. Service and spare parts information is also included for your benefit.

Sincerely,

Thomas F. Kice, President
Kice Industries, Inc.

WARRANTY

The Company warrants the equipment manufactured by the Company to be free of defects in material and workmanship for a period of one year from the date of shipment. The Company agrees to repair or replace, at its option, any parts found defective in the opinion of the Company. The Company is not liable for any costs in connection with the removal; shipment or reinstallation of said parts. This warranty does not apply to abrasion, corrosion, or erosion.

Purchaser agrees to look to the warranty, if any, of the manufacturer or supplier of equipment manufactured by others and supplied to the Company for any alleged defects in such equipment and for any damages or injuries caused thereby or as a result thereof.

PURCHASER SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ELECTRICAL MANUFACTURER RECOMMENDATIONS, UNDERWRITER'S CODE AND ALL SAFETY PRECAUTIONS.

The only warranty extended under this agreement is the above express warranty and there are no other warranties, express or implied, including warranties or merchantability, fitness for a particular purpose or otherwise which extend beyond the face hereof. The Company and its dealers shall not in any event be liable for consequential or incidental damages and this agreement provides purchaser's sole and exclusive remedy. Any actions for breach of this agreement or warranty must be commenced within one year after the cause of action has occurred.

TABLE OF CONTENTS

1. Introduction	2
2. General Information	3
3. Safety Precautions	4
4. Receiving, Handling & Installation	6
5. Fan Maintenance	9
6. Troubleshooting	11
7. Illustrated Parts List	12 & 13

IMPORTANT

Write down the MODEL and SERIAL NUMBER of the Kice Fan, along with the same information for the auxiliary equipment. (Motors, Sheave size, type and any special modifications to standard).

For additional information, application assistance or special service, you should contact the factory. We'll need to know the MODEL and SERIAL NUMBER of your Kice Fan. For ready reference, please record this information and the date of delivery or installation on the lines below. See the General information section for the location of model and serial number.

MODEL FC-15 9FB

Serial Number 268261-1

Date of delivery or installation / /

2. GENERAL INFORMATION

To the New Owner

The purpose of this manual is to assist owners and operators in maintaining and operating the Kice Industrial Fan. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. Separate manuals are included for auxiliary equipment that make up an air system such as discharge airlock valves, cyclones and filters. They contain additional information that may not be repeated in this manual. You are urged to read all manuals before attempting any operation or repair of the equipment in the system. If these manuals are not included in your owner's packet contact our customers service department.

Using this Manual

General operation, adjustment and maintenance guidelines are outlined for owners and operators of Kice Industrial Fans. Operating conditions varies considerably and cannot be addressed individually. Through experience, however, operators should find no difficulty in developing good operating safety and monitoring skills.

The term "disconnect and lock-out" as used in this manual means that power to the equipment has been disconnected through the use of a padlockable, manual, power cut-off, or power lockout switch.

Directions used in this manual, for example RIGHT or LEFT, CLOCKWISE or COUNTERCLOCKWISE, refer to directions when facing the fan from the drive side. The metal identification plate, containing the model and serial number, attached to the fan housing above the inboard bearing.

Photographs and illustrations were current at the time of printing, but subsequent production changes may cause your Kice Fan to vary slightly in detail. Kice Industries, Inc. reserves the right to redesign and change the equipment as deemed necessary, without notification. If a change has been made to your Kice Industrial Fan which is not reflected in this owner's manual, or the illustrated parts list, write or call Kice Industries Inc., for current information and parts.

Model and Serial Number

The Kice Industrial Fan and serial number can be found stamped on the metal identification plate, located on the housing above the inboard bearing.

Fan Parts and Service

Use original Kice Fan replacement parts only. These parts are available from Kice Industries, Inc. To obtain prompt,

efficient service, always provide the following information when ordering parts:

1. Correct part description and number, as given in the Illustrated Parts List section of this manual.
2. Correct model number.
3. Correct serial number.

For assistance in service or ordering parts, contact the customer service department:

Kice Industries, Inc.,
5500 North Mill Heights Drive
Wichita, KS 67219-2658
Phone 316-744-7151, Fax 316-744-7355

IMPORTANT: Any unauthorized modification, alteration, or use on non-approved attachments or drive units voids the warranty and releases Kice Industries, Inc., from any liability arising from subsequent use of this equipment. Each type of Fan is designed to be used in a specific type of system. Using the Kice Fan for a purpose other than what it was designed for could result in personal injury, as well as product or property damage.

Kice equipment is designed and built to provide years of operation. As with any equipment, the following rules are essential to trouble-free operation:

- ◆ Proper Installation
- ◆ Regular Maintenance
- ◆ Correct Operation within Original Design Parameters
- ◆ Proper application within a Process

Failure to install, maintain or operate Kice equipment can result in a variety of problems, including but not limited to; poor equipment performance, decreased equipment life, equipment failure or dangerous operating conditions.

Kice Industries product line includes a variety of equipment, all of which can be custom made to suit your application. Your Kice equipment was chosen based on your specification of process, product and your application requirements for capacity, operating conditions, operating parameters, etc. It is essential that your Kice equipment is installed, maintained and operated under the conditions originally designed and specified. Should your process needs change, please consult with Kice Industries prior to utilizing our equipment under different conditions.

Motor "V" Drive Parts and Service

The motor and "V"-Belt drives are covered by the manufacturer's warranty. If there is a problem, checking with the local supplier or service representative.

3. SAFETY PRECAUTIONS



This safety alert symbol is used to call your attention to an important safety message on equipment, safety decals and in manuals, to warn you of possible danger to your personal safety. When you see this symbol be alert, your personal safety or the safety of other persons is involved. Follow the instructions in the safety message.

Hazard levels: The following definitions, for identifying hazard levels are:

DANGER (RED) - Danger is used to indicate the presence of a hazard, which **WILL** cause **SEVERE** personal injury, death, or substantial property damage if the warning is ignored.

WARNING (ORANGE) - Warning is used to indicate the presence of a hazard, which **CAN** cause **SEVERE** personal injury, death, or substantial property damage if the warning is ignored.

CAUTION (YELLOW) -- Caution is used to indicate the presence of a hazard which **WILL** or **CAN** cause **MINOR** personal injury or property damage if the warning is ignored.

NOTICE (Blue) -- Blue is used to notify people of installation, operation, or maintenance information, which is important but not hazard-related. Hazard warnings should never be included under the Notice signal word.



WARNING: All owners and operators should read this manual or be instructed on safe operating and maintenance procedures, before attempting to uncrate, install, operate, adjust, or service this equipment.

SAFETY DECALS

The safety decals on the Fan should not be removed, covered over, painted, or otherwise become illegible. If this occurs the decals should be replaced immediately. Contact our customer service department for replacements.

1. Do not attempt to install, connect power to, operate or service your new Fan without proper instruction and until you have been thoroughly trained in its use by your employer.

2. Do not attempt to work on, clean, service the Fan, open, or remove any protective cover, guard, grate or maintenance panel until the POWER has been turned off and LOCKED OUT, and the fan rotor has come to a complete stop.
3. Do not manually override or electrically by-pass any protective device.
4. Do not connect power to or operate the fan unless all moving parts are covered and all covers, guards, grates, and maintenance panels are in place and securely fastened.
5. Do not abuse, overload, mistreat or misuse the fan or attempt to operate the fan if it is in need of service, lubrication, maintenance or repair. Do not attempt to start fan when loaded.
6. Never place any part of your body under or near rotating members or moving parts of the fan.
7. If Fan is not equipped with factory supplied drive and guard, then all rotating members and moving parts must be completely enclosed before connecting power and before operation.
8. If Fan is equipped with maintenance panel, or access door incorporating any Protective Interlocking Limit Switch (PLS), the PLS must be interlocked with all electrical controls. This is to prevent all motors or powered devices on a unit from being energized if any protective cover, guard, grate or maintenance panel is open or removed. Never attempt to manually override or electrically by pass safety device. Interlock function of PLS must be tested and logged daily by supervisory personnel.
9. Many Fans are installed and wired to start automatically or from remote control locations. Keep clear of all moving parts on industrial equipment at all times.
10. Industrial Fans must be equipped with a properly function Protective Interlocking Electrical Control Switch (PCS), a Padlockable Manual Power Lockout Switch and with the other basic safety equipment listed above. On-Off, interlock and padlock functions of the PCS must be tested and logged daily by supervisory personnel.
11. It is the owner and employer's responsibility to adequately train the employee-operator in the proper and safe use of Fans. Written safety programs and

formal instructions are essential. All new employees must be made aware of company policies and operating rules, especially the established safety and health procedures. Refresher training of experienced employees in the potential hazards of the job is important. Up to date training records must be maintained at the job site.

12. Special attention must be devoted to outside contractors engaged to enter and perform work on industrial Fans or in the work place. Special care must be exercised to insure all such personnel are fully informed of the potential hazards and follow plant rules - with special emphasis on explosion proof electrical tools and cutting or welding in unsafe environments.
13. Keep the work place cleaned up and free of dirt and dust at all times. Do not attempt to work on slippery or unsafe ladders or work platforms, when maintenance or repair work is being performed on Fans.
14. Do not climb on ladders or work on platforms unless maximum load rating is posted. Do not exceed maximum load ratings when installing or servicing Fans.
15. Never allow any kind of metal or other foreign objects to enter a Fan while in operation.
16. All Fan inlet and discharge openings must be completely enclosed to prevent human access when the machine is running and remain enclosed until POWER IS TURNED OFF AND LOCKED OUT. Keep away from the moving parts of the fan during operation.
17. Operate safely at all times. Use personnel protective equipment when and where appropriate, such as hard hats, helmets, gloves, ear plugs, and eye protection devices. Keep personal protective equipment in good repair and convenient to the operator.
18. Drive components must be inspected and adjusted after transportation and periodically as required by operating conditions. Check sheaves and coupling alignment and spacing, V-Belt tension, set screws, keys, fasteners, bearings, shafts, and motor as appropriate to job conditions.
19. High voltage and rotating parts can cause serious or fatal injury. Only qualified, trained, and experienced personnel must perform installation, operation and maintenance of electrical machinery. Make sure that the motor and the frame of each fan is effectively grounded in accordance with OSHA safety and health standards, the National Electric Code and local codes.
20. Never stand under and kind of hoist or lifting mechanism, whether or not it is loaded or in operation. Never stand under or near a Fan or component when it is being lifted.
21. All Fan lifting devices must be carefully inspected by qualified personnel before each use. Never use lifting device to transport equipment. Never use lifting device that is damaged, deteriorated or in any way in need of repair.
22. All protective covers, guards, grates, maintenance panels, switches and warning decals must be kept in place and in good repair. Any equipment with damaged, malfunctioning, defective, or missing protective devices must be taken out of service until protective device can be repaired or replaced.
23. Any device powered by air or hydraulic pressure must be equipped with a properly functioning Padlockable Manual Pressure Lockout and Internal Pressure Relief Valve (PLV).
24. Any Equipment which is used in the processing of explosive materials in hazardous environments requires an evaluation on the part of the user and operator of proper and adequate equipment monitoring equipment, dust control, explosion relief venting, and electrical equipment enclosures. Do not use your equipment in hazardous environments unless it has been properly equipped for the hazard.
25. It is ultimately the operator's responsibility to implement the above listed precautions and insure proper use of the equipment, maintenance and lubrication. Keep these instructions and list of warnings with your machine at all times.

WORK SAFELY AT ALL TIMES.

4. RECEIVING, HANDLING & INSTALLATION

Receiving and Inspection

Kice Industries Inc. has prepared your new fan for shipment in accordance with the Uniform Freight Classification, if it is thoroughly inspected at the factory and, barring damage in transit, should be in perfect condition upon arrival.

The fan and accessories should be inspected on receipt for any shipping damage. Turn the wheel by hand to see that it rotates freely and does not bind. If dampers or shutters are provided, check these accessories for free operation of all moving parts.

When a carrier signs the Kice Industries Inc., bill of lading, the **carrier accepts the responsibility** for any subsequent shortages or damage evident or concealed, and **the purchaser must make any claim against the carrier.** Evident shortage or **damage should be noted on the carrier's delivery document** before signature of acceptance. Inspection by the carrier of damage evident or concealed must be requested. After inspection, issue a purchase order for necessary parts or arrange for return of the equipment to Kice Industries Inc., factory for repair.

Handling and Storage

Kice Fans are shipped completely assembled and skidded when size permits. These units may be handled and moved using good rigging techniques, being careful to avoid concentrated stresses that will distort any of the parts. Items or parts of the fan that are shipped knocked down will be clearly labeled for reassembly.

If the fan is not to be installed promptly, store it in a clean, dry location to prevent rust and corrosion of steel components. If outdoor storage is necessary, protection should be provided. Cover the inlet and outlet to prevent the accumulation of dirt and moisture in the housing. Cover motors with waterproof material. Refer to the bearing section for further storage instructions.

Check dampers for free operation and lubricate moving parts prior to storage. Inspect the stored unit periodically. Rotate the wheel by hand every two weeks to redistribute the grease on internal bearing parts.

Fan Installation

Kice Wheels are dynamically balanced when fabricated. Each wheel has been test run on the balancer to check the balance for conformance to Kice vibration standards. Kice Fan wheels are unique in that the wheel is

secured to the shaft with a Browning Taper Hub and Bushing to insure concentric placement on the shaft and to insure that the wheel will retain the balance. (See the fan maintenance section for installation instructions)

To insure proper operation, the unit must be adequately supported and properly installed. All ductwork or stacks should be independently supported as excess weight may distort the fan housing and cause contact between moving parts. Where vibration isolators are used, consult Kice Industries Inc., for proper location and adjustment.

Slab-Mounted Units

A correctly designed and level concrete foundation provides the best means of installing floor-mounted fans. The mass of the base must maintain the fan/driver alignment, absorb normal vibration, and resist lateral loads. The overall dimensions of the concrete base should extend at least six inches beyond the outline of the fan base bars or unitary base. The weight of the slab should be two to three times the weight of the rotating assembly, including the motor. The foundation requires firmly anchored fasteners such as the anchor bolts shown in (figure 1). Hammer drilled expansion fasteners can be used in less demanding applications.

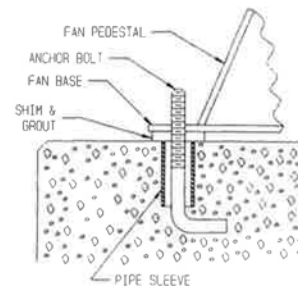


Figure 1

Move the fan to the mounting location and lower it over the anchor bolts, leveling the fan with shims around the bolts. Fasten the fan securely, if grouting is used, shim the fan at least $\frac{3}{4}$ inch from the concrete base. (see fig 1). When isolation is used, check the Kice drawing for installation instructions.

Structural Steel-Mounted Units

When an elevated or suspended structural steel platform is used, it must have sufficient bracing to support the unit load and prevent side sway. The platform should be of welded construction to maintain permanent alignment of all members.

V-BELT DRIVE

On arrangement #9, and 9FB Fans, the V-Belt Drives are factory installed. In some cases the drives are removed to facilitate the installation of the Fan, or the customer provides the drives. The following procedure should be used to mount the V-Belt Drives.

Installation

1. Remove all foreign material from the fan and motor shafts. Coat both shafts with machine oil for easier mounting. Mount the belt guard back plate at this time if partial installation is required prior to sheave mounting.
2. Mount sheaves on the shafts, checking sheave bores and bushings for nicks or burrs. Avoid using force. If resistance is encountered, lightly polish the shaft with crocus cloth until the sheave slides on freely. Tighten tapered bushing bolts sequentially so that equal torque is applied to each.
3. Adjust the motor on its base to a position closest to the fan shaft. Install belts by working each one over the sheave grooves until all are in position. Never pry the belts into place. On Kice arrangement #9 or #9FB fans, sufficient motor adjustment is provided for easy installation of the proper size belts.
4. Adjust sheaves and the motor shaft angle so that the sheave faces are in the same plane. Check this by placing a straightedge across the faces of the sheaves. Any gap between the edge and sheave faces indicates misalignment. Important: This method is only valid when the width of the surface between the belt edge and the sheave face is the same for both sheaves. When they are not equal, or when using adjustable pitch sheaves, adjust so that all belts have approximately equal tension. Both shafts should be at right angles to the center belt.

Belt Tensioning

1. Check belt tension with a tensioning gauge and adjust using the motor slide base. Excess tension shortens bearing life while insufficient tension shortens belt life, and can have adverse affects on fan performance and may cause vibration. The lowest allowable tension is that which prevents slippage under full load. Belts may slip during start up, but slippage should stop as soon as the fan reaches full speed. For more precise tensioning methods, consult the drive manufacturer's literature.
2. Recheck set screws, rotate the drive by hand and check for rubbing, then complete the installation of the belt guard.
3. Belts tend to stretch somewhat after installation. Recheck tension after several days of operation. Check sheave alignment as well as setscrew and/or bushing bolt tightness.

COUPLING

Coupling alignment should be checked after installation and prior to start up. Alignment is set at the factory, but shipping, handling and installation can cause misalignment. Fans with wheel sizes 40 inch and larger are normally shipped with the flexible element removed to minimize potential for damage. (See section on alignment procedure.) Also check for proper coupling lubrication. For details on lubrication and for alignment tolerances on the particular coupling supplied, see the manufacturer's installation and maintenance supplement in the shipping envelope.

Installation

Most Kice fans are shipped with the direct drive-coupling factory installed. In some cases the drives are removed to facilitate the installation of the Fan, or the customer provides the drives. The following procedure should be used to mount the coupling.

1. Remove all foreign material from fan and motor shafts and coat with machine oil for easy mounting of coupling halves.
2. Mount the coupling halves on each shaft, setting the gap between the faces specified by the manufacturer. Avoid using force. If mounting difficulty is encountered, lightly polish the shaft with crocus cloth until the halves slide on freely.

Alignment

1. Align coupling to within manufacturer's limits for parallel and angular misalignment (see figure 2). A dial indicator can also be used for alignment where greater precision is desired. Adjustments should be made by moving the motor to change shaft angle, and by the use of foot shims to change motor shaft height. Do not move the fan shaft or bearing.
2. When correctly aligned, install the flexible element and tighten all fasteners in coupling and motor base. Lubricate coupling if required.
3. Recheck alignment and gap after a short period of operation, and recheck tightness of all fasteners in the coupling assembly.

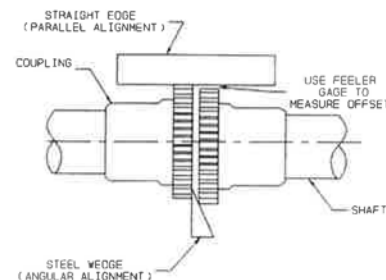


Figure 2

Start-Up

Safe operation and maintenance includes selection and use of appropriate safety accessories for the specific installation. This is the responsibility of the system designer and requires consideration of equipment location and accessibility as well as adjacent components. All safety accessories must be installed properly prior to start up.

Safe operating speed is a function of system temperature and wheel design. Do not under any circumstances exceed the maximum safe fan speed published in the Kice Fan bulletin, which is available from Kice Industries, Inc.

Procedure

1. If Kice does not supply the drive components, verify with the manufacturer that the starting torque is adequate for the speed and inertia of the fan.
2. Inspect the installation prior to starting the fan. Check for any loose items or debris that could be drawn into the fan or dislodged by the fan discharge. Check the interior of the fan as well. Turn the wheel by hand to check for binding.
3. Check drive installation and belt tension.
4. Check the tightness of all setscrews, nuts and bolts. When furnished, tighten hub setscrews or bolts to the proper torque.
5. Install all remaining safety devices and guards. Verify that the supply voltage is correct and wire the motor. **"BUMP"** the starter to check for proper wheel rotation.
6. Use extreme caution when testing the fan with ducting disconnected. Apply power and check for unusual sounds or excessive vibration. If either exists, see section on Common Fan Problems. To avoid motor overload, do not run the fan for more than a few seconds if ductwork is not fully installed. On larger fans, normal operating speed may not be attained without motor overload unless ductwork is attached. Check for correct fan speed and complete the installation. Ductwork and guard must be fully installed for safety.

If a problem is detected, TURN IT OFF IMMEDIATELY. Lock out the electrical supply. Check carefully for the cause of the trouble, and correct as necessary.

Even if the fan appears to be operating satisfactorily, shut down, and lockout the electrical supply after a brief period, and recheck the following items:

1. Check and tighten all hold-down (securing) bolts on the feet of the base.
2. Spin the fan wheel by hand to see if rotation is free and does not bind or rub.
3. Inspect the fan wheel to see if it is rotating the proper way for the fan housing.
4. Check all set screws and tighten, if necessary.
5. Check V-drive or coupling for alignment – check belt tension and adjust if necessary.
6. Check V-drive for proper sheave selection and make sure they are not reversed, or the fan should be running too fast or too slow, depending on the desired final speed.
7. Properly secure all safety guards.
8. Secure all access doors to the fan housing and the ductwork.

The fan may now be put into operation, but during the first eight hours of running it should be periodically observed and checked for excessive vibration and noise. At this time, checks should be also made of the motor input current and motor and bearing temperatures to insure that they do not exceed the manufacturer's recommendations.

After eight hours of satisfactory operation, the fan should be shut down and the power locked out to check the following items and adjust, if necessary.

1. Check and tighten all hold-down (securing) bolts on the feet of the base.
2. Check all setscrews, and tighten if necessary.
3. Check V-drive or coupling for alignment – check belt tension and adjust if necessary.
4. Properly secure all safety guards.

After twenty-four hours of satisfactory operation, the fan should be shut down and power locked out to check the following items and adjust, if necessary.

1. Check V-drive – check belt tension and adjust as required.

5. FAN MAINTENANCE

Kice fans are manufactured to high standards with quality materials and components. Proper maintenance will ensure a long and trouble free service life.

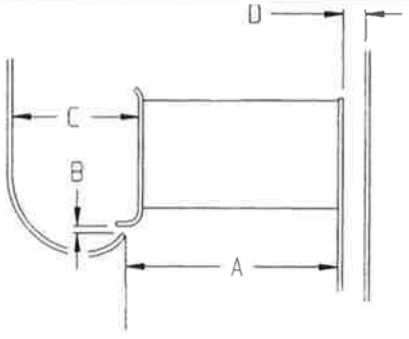
Do not attempt any maintenance on a fan unless the electrical supply has been completely disconnected and locked out. In many cases, a fan can windmill despite removal of all electrical power. The rotating assembly should be blocked securely before attempting maintenance of any kind.

The key to good fan maintenance is regular and systematic inspection of all fan parts. Inspection frequency is determined by the severity of the application and local conditions. Strict adherence to an inspection schedule is essential.

Regular fan maintenance should include the following:

1. Check the fan wheel for any wear or corrosion as this can cause catastrophic failures. Check also for the buildup of material, which can cause unbalance resulting in vibration, bearing wear and serious safety hazards. Clean or replace the wheel as required.

NOTE; Shut the fan down immediately if there is any sudden increase in fan vibration.



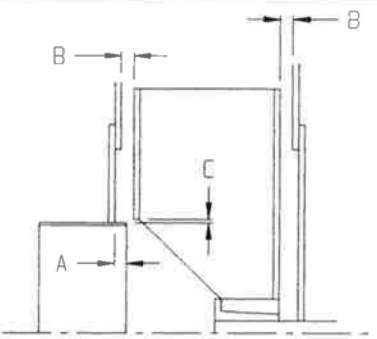
FA SERIES

Fan Size	A	B	C	D
FA 18	7	$\frac{1}{8}$	$4\frac{1}{4}$	$1\frac{3}{8}$
FA 22	$8\frac{1}{4}$	$\frac{1}{8}$	$6\frac{1}{16}$	$1\frac{3}{4}$
FA 24	$9\frac{5}{16}$	$\frac{1}{8}$	$7\frac{5}{16}$	1
FA 27	$10\frac{5}{16}$	$\frac{1}{8}$	$7\frac{1}{8}$	2
FA 30	$11\frac{1}{4}$	$\frac{1}{8}$	$8\frac{5}{16}$	$2\frac{5}{8}$
FA 33	$11\frac{1}{4}$	$\frac{1}{8}$	$9\frac{1}{8}$	$2\frac{7}{8}$
FA 36	$13\frac{3}{8}$	$\frac{3}{16}$	$10\frac{5}{16}$	$3\frac{7}{16}$
FA 40	$14\frac{11}{16}$	$\frac{1}{16}$	$11\frac{1}{2}$	$3\frac{11}{16}$
FA 44	$16\frac{1}{4}$	$\frac{3}{16}$	$12\frac{13}{16}$	$4\frac{1}{16}$
FA 49	$17\frac{15}{16}$	$\frac{3}{16}$	$14\frac{7}{16}$	$4\frac{1}{2}$
FA 54	20	$\frac{1}{4}$	$15\frac{11}{16}$	$4\frac{3}{16}$
FA 60	$22\frac{1}{2}$	$\frac{1}{4}$	$17\frac{13}{16}$	$4\frac{1}{16}$
FA 66	$24\frac{1}{2}$	$\frac{1}{4}$	$19\frac{1}{2}$	5
FA 73	$27\frac{1}{2}$	$\frac{1}{4}$	$21\frac{13}{16}$	$4\frac{13}{16}$

Figure 3

2. Check the V-belt drive for proper alignment and tension (see section on V-belt drives). If belts are worn, replace them as a set, matched to within manufacturer's tolerances. Lubricate the coupling of direct-driven units and check for alignment (see section on couplings).
3. Lubricate the bearings, but do not over lubricate (see the bearing section for detailed specifications).
4. Ceramic felt shaft seals require no maintenance; although worn seals should be replaced. When lip-type shaft seals are provided, lubricate them with "NEVER SEEZ" or other anti-seize compound.
5. During any routine maintenance, all setscrews and bolts should be checked for tightness. See table for correct torque.
6. When installing a new wheel or inlet section, the proper wheel to inlet clearance must be maintained (see fig. 3 for correct full width wheel dimensions.)

Installation of a Kice fan wheel is different than most other fans because of the hub design. The Kice fan wheel uses a Browning split taper hub and bushing, to insure accurate replacement on the shaft. Using a taper hub and bushing insures that the fan wheel will be centered and the balance is the same as when it left the factory.



FC SERIES

FAN SIZE	A	B	C
FC 5	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{3}{8}$
FC 7	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
FC 9	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{9}{16}$
FC 11	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{9}{16}$
FC 13	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{9}{16}$
FC 15	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{9}{16}$
FC 17	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$
FC 19	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$
FC 21	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$
FC 23	$\frac{1}{2}$	$1\frac{1}{16}$	$\frac{3}{4}$
FC 26	1	$1\frac{1}{4}$	$\frac{5}{8}$
FC 29	1	$1\frac{3}{4}$	$\frac{3}{4}$
FC 33	1	$1\frac{3}{4}$	$1\frac{13}{16}$
FC 37	1	$1\frac{7}{8}$	1
FC 41	2	$2\frac{1}{16}$	1
FC 45	2	$2\frac{1}{8}$	1

Check the fan hub and bushing and remove all foreign material from the fan shaft, the hub and the bushing. Inspect the surfaces and edges to insure that there are no burrs. Clean the machined surfaces of any grit or dirt and coat with a light film of oil. The fan wheel is placed on the shaft in the housing. The hub is then slid on the shaft, and into the fan hub. The wheel is then slid forward on the bushing and the bolts inserted through the bushing flange into the three taped holes in the hub, and tightened in sequence. Check the wheel clearances between the back plate and the inlet eye.

Each bolt is tightened in turn, and then a torque wrench is used to set each bolt to the proper torque. To insure that the bushing and hub are properly seated, the fan wheel is taped with a hammer on the check plate and allowed to ring, and the bolts retighten with a torque wrench. In most instances, the bolts will tighten another few degrees. Rotate the wheel and listen for any rubbing sound between the wheel and the housing.

WHEEL HUB BOLT TORQUE (in.lbs.)		
Hub Size	Grade 5 Carbon Steel Bolts	
	Size	Torque
P1-P2 & P4	3 ea. 5/16 x 1	192 in.lbs.
Q1-Q2 & Q3	3 ea. 3/8 x 1 1/4	348 in.lbs.
R1 & R2	3 ea. 3/8 x 1 1/4	348 in.lbs.
U1 & U2	3 ea. 5/8 x 2 3/4	1680 in.lbs.

(Figure 4)

Bearings

Any stored bearing can be damaged by condensation caused by temperature variations. Therefore, Kice fan bearings are filled with grease at the factory to exclude air and moisture. Such protection is adequate for shipment and subsequent immediate installation.

For long term or outdoor storage, mounted bearings should be regressed and wrapped with plastic for protection. Rotate the fan wheel by hand at least every two weeks to redistribute grease on internal bearing parts. Each month the bearings should be purged with new grease to remove condensation, since even a filled bearing can accumulate moisture. Use caution in purging, as excessive pressure can damage seals. Rotate the shaft while slowly adding grease.

Operation

Check setscrew torque before start up (see table for correct values). Since bearings are completely filled with grease at the factory, they may run at an elevated temperature during initial operation. Surface temperatures may reach 180 degrees Fahrenheit and grease may bleed from the bearing seals. This is normal and no attempt should be made to replace lost grease.

Bearing surface temperatures will decrease when the internal grease quantity reaches a normal operating level. Lubrication should follow recommended schedule.

BEARING SETSCREW TORQUE, LB.IN.			
Setscrew Diameter	Link Belt	Sealmaster (setscrew locking)	Sealmaster (Skwezloc locking)
# 10	40	--	81-90
1/4	90	65	162-180
5/16	135	125	360-400
3/8	325	230	
7/16	460	350	
1/2	680	500	
5/8	1350	1100	
3/4	2350		

(Figure 5)

NOTE: Split pillow block bearings are fixed to the shaft with tapered sleeves and generally do not have setscrews.

Lubrication

Use the following chart for lubrication scheduling according to operating speed and shaft diameter. Bearings should be lubricated with good quality lithium-based grease conforming to NLGI Grade 2 consistency.

Examples are:	Mobil	Mobilith 22
	Texaco	Premium RB
	Standard Oil	Amolith #2
	Gulf Oil	Gulf Crown #2
	Shell	Alvania #2

Do not use "High temperature" greases, as many are not formulated for the high speeds associated with fan bearings.

Add grease to the bearing while running the fan or rotating the shaft by hand. Be sure all guards are in place if lubrication is performed while the fan is operating. Add just enough grease to cause a slight purging at the seals. Do not over lubricate.

Split pillow block bearings (Link-Belt 6800&6900, SKF 22500) should be cleaned and repacked at approximately every eighth lubrication interval. This requires removal of the bearing cap. Clean out old grease and repack with fresh grease. Pack the bearing fully and fill the housing reservoir to the bottom of the shaft on both sides of the bearing. Replace the bearing cap, being careful not to mix caps, as they may not interchangeable from one bearing to another. For static oil lubrication, follow the bearing manufacture's recommendations. Consult the separate supplement for circulating oil lubricated bearings.

6. TROUBLE SHOOTING – COMMON FAN PROBLEMS

Problem	Probable Cause/Suggested Remedies
<p>Excessive Vibration</p> <p>A common complaint regarding industrial fans is "excessive vibration." Kice Industries Inc., is careful to ensure that each fan is precisely balanced prior to shipment; however, there are many other causes for fan vibration including:</p>	<ol style="list-style-type: none"> 1. Loose mounting bolts, setscrews, bearings or couplings. 2. Misalignment or excessive wear of couplings or bearings. 3. Misalign or unbalanced motor. 4. Bent shaft due to mishandling or material impact. 5. Accumulation of foreign material on the rotor. 6. Excessive wear or erosion of the rotor. 7. Excessive system pressure or restriction of airflow due to closed dampers. 8. Inadequate structural support, mounting procedures or material. 9. Externally transmitted vibration.
<p>Inadequate Performance</p>	<ol style="list-style-type: none"> 1. Fan wheel rotating in the wrong direction or installed backwards on the shaft. 2. Fan wheel running too slow, drive sheaves mounted as a slow down drive instead of a speed up drive. 3. Incorrect testing procedures or calculations. 4. Wheel not properly centered relative to the fan inlet 5. Damaged or incorrectly installed cutoff sheet or diverter. 6. Poor system design closed dampers, air leaks, clogged filters or coils. 7. Obstructions or sharp elbows near the fan inlet 8. Sharp deflection or air stream at the fan outlet
<p>Excessive Noise</p>	<ol style="list-style-type: none"> 1. Fan operating near "stall" due to incorrect system design or installation. 2. Vibration originating elsewhere in the system. 3. System resonance or pulsation, (type of Cavitation). 4. Improper location or orientation of fan intake and discharge. 5. Inadequate or faulty design of fan structural supports. 6. Nearby sound reflecting surfaces. 7. Loose accessories or components. 8. Loose V-Belt Drive, or worn sheaves. 9. Worn bearings.
<p>Premature component failure</p>	<ol style="list-style-type: none"> 1. Prolonged or major Vibration. 2. Inadequate or improper maintenance. 3. Abrasive or corrosive elements in the air stream or surrounding environment. 4. Misalignment or physical damage to rotating components or bearings. 5. Gearing failure from incorrect or contaminated lubricant or grinding through the bearing while arc welding. 6. Excessive fan speed. 7. Extreme ambient or air stream temperatures.

7. ILLUSTRATED PARTS LIST

REPLACEMENT PARTS:

It is recommended that only Kice Manufactured supplied replacement parts be used. Kice fan parts are built to be fully compatible with the original fan, using specific alloys and tolerances. These parts carry a standard Kice warranty.

When ordering replacement parts, specify the part name, Kice Serial Number, Fan model, Fan size, type, rotation (viewed from the drive side), discharge and bearing size or shaft size. Most of this information is on the metal nameplate attached to the fan housing.

Example:

Part required: Wheel
Kice Serial Number: 100515
Fan model: FC-19WX Arr. #9FB
Motor Right hand, Clockwise Rotation,
Vertical Up Blast
Bearings Seal Master NPD 39

Suggested replacement parts include:

Wheel

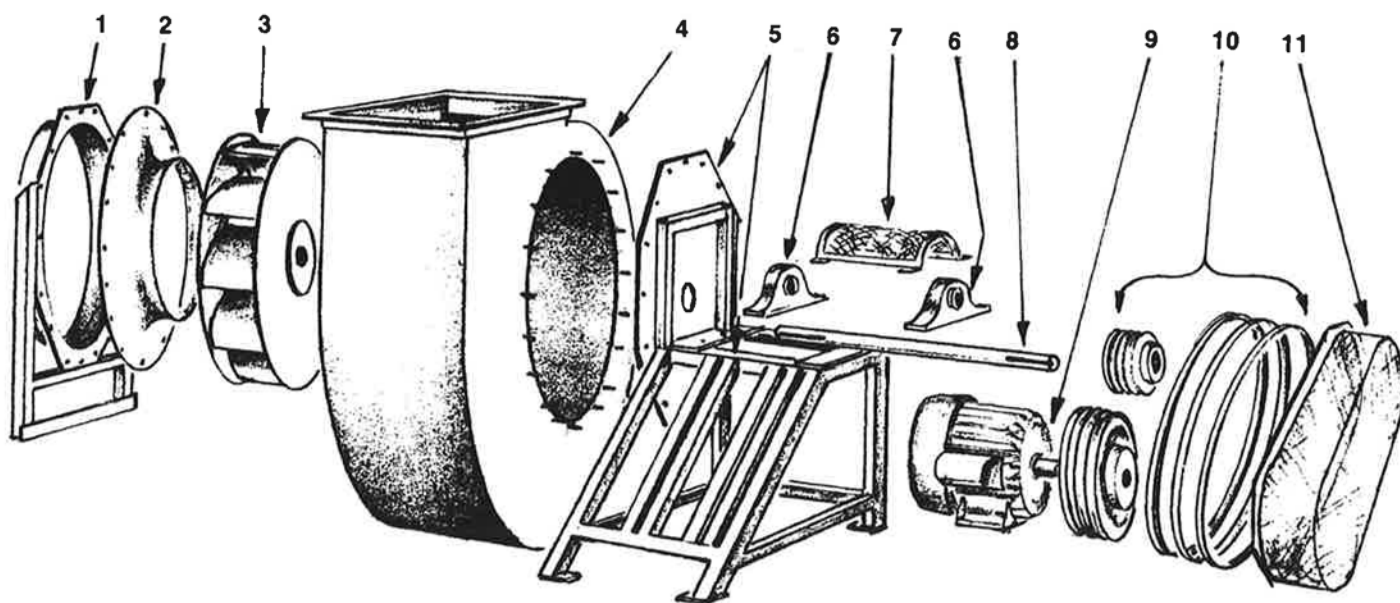
Components Parts:

Damper, Shaft, 2 ea. Bearings and the
Inlet and outlet isolations sleeves

NOTES

KICE FA SERIES FANS

- | | | |
|------------------------|--------------------------|------------------|
| 1. Eye Plate with legs | 5. Base with Cheek Plate | 9. Motor |
| 2. Inlet Cone | 6. Bearings | 10. V-Belt Drive |
| 3. Wheel | 7. Shaft Guard | 11. Belt Guard |
| 4. Housing | 8. Shaft | |



FAN SIZE	WHEEL DIAMETER	SHAFT DIAMETER	SHAFT LENGTH	BEARINGS			
				BRAND/MODEL		SUBSTITUTE	
FA-18	18¼	1 ⁷ / ₁₆	33	H	NP 23 T-CXU	G	F
FA-22	22¼	1 ¹¹ / ₁₆	36	H	NP 27 T-CXU	G	F
FA-24	24¼	1 ¹⁵ / ₁₆	38	H	NP 31 T-CXU	G	F
FA-27	27	1 ¹⁵ / ₁₆	41	H	NP 31 T-CXU	G	F
FA-30	30	2 ¹ / ₁₆	43	H	NP 35 T-CXU	G	F
FA-33	33	2 ⁷ / ₁₆	44	H	NP 39 T-CXU	G	F
FA-36	36½	2 ¹¹ / ₁₆	47	H	SPD-43	G	F
Arrangement 9F Base							
FA-40	41¼	2 ¹⁵ / ₁₆	50	H	SPD-47	G	F
FA-44	45½	2 ¹⁵ / ₁₆	50	H	SPD-47	G	F
FA-49	50	3 ¹ / ₁₆	58	E	PB22455FH	G	J
FA-54	55¼	3 ¹⁵ / ₁₆	58	E	PB22463FH	G	J
FA-60	61¼	4 ⁷ / ₁₆	63	E	PB22571FH	G	J

E - Link Belt

F - Dodge

G - SKF

H - Sealmaster

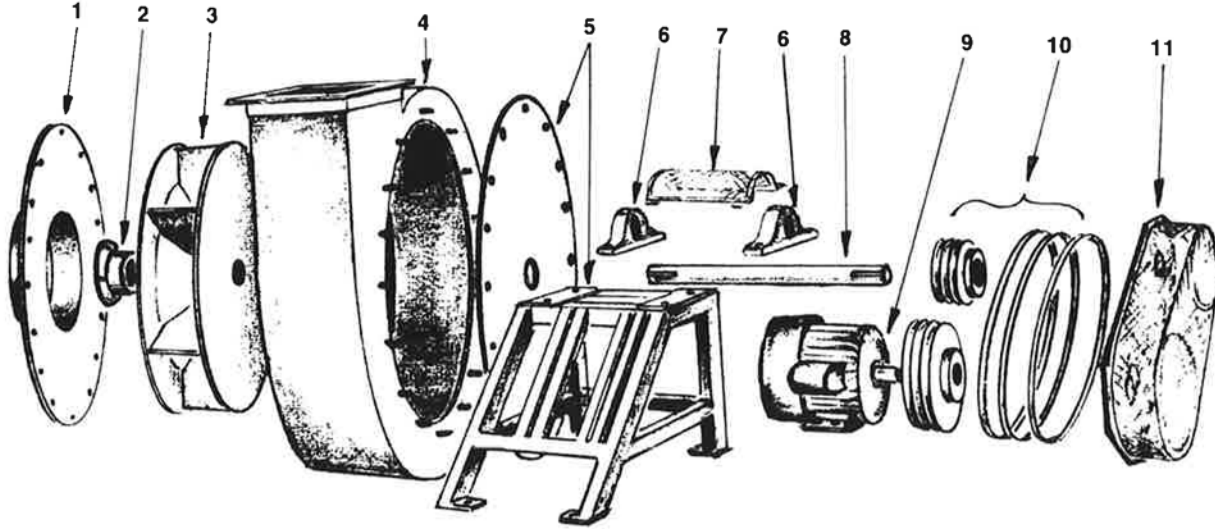
J - Rex

KICE FC SERIES FANS

Arrangement 9 base

Straight Radial Blades

- | | | | | | |
|----|---------------------|----|-----------------------|-----|--------------|
| 1. | Eye Plate with legs | 5. | Base with Cheek Plate | 9. | Motor |
| 2. | Tapered Busing | 6. | Bearings | 10. | V-Belt Drive |
| 3. | Wheel | 7. | Shaft Guard | 11. | Belt Guard |
| 4. | Housing | 8. | Shaft* | | |



FAN SIZE	WHEEL DIAMETER	BUSHING	SHAFT DIAMETER	SHAFT LENGTH	BEARINGS			
					BRAND/MODEL		SUBSTITUTE	
FC-5	8¾	P1 Browning	1 ⁷ / ₁₆	19½	H	NP 23 T-CXU	G	F
FC-7	12¼	P1 Browning	1 ⁷ / ₁₆	21½	H	NP 23 T-CXU	G	F
FC-9	15 ³ / ₈	Q2 Browning	1 ⁷ / ₁₆	28½	H	NP 23 T-CXU	G	F
FC-11	19 ¹ / ₈	Q2 Browning	1 ¹¹ / ₁₆	30½	H	NP 27 T-CXU	G	F
FC-13	22 ³ / ₈	Q3 Browning	1 ¹⁵ / ₁₆	34½	H	NP 31 T-CXU	G	F
FC-15	26 ¹ / ₈	Q3 Browning	1 ¹⁵ / ₁₆	38	H	NP 31 T-CXU	G	F
FC-17	29 ⁵ / ₈	Q3 Browning	2 ³ / ₁₆	41½	H	NP 35 T-CXU	G	F
FC-19	33	R2 Browning	2 ⁷ / ₁₆	47½	H	NP 39 T-CXU	G	F
FC-21	36½	R2 Browning	2 ¹¹ / ₁₆	49½	H	SPD-43	G	F
FC-23	40	R2 Browning	2 ¹⁵ / ₁₆	52½	H	SPD-47	G	F
FC-26	45¼	R2 Browning	3 ⁷ / ₁₆	54	H	PB22455FH	G	J
FC-29	50½	R2 Browning	3 ⁷ / ₁₆	54	E	PB22455FH	G	J
FC-33	57½	U2 Browning	3 ¹⁵ / ₁₆	63½	E	PB22463FH	G	J
FC-37	64 ¹ / ₈	U2 Browning	3 ⁷ / ₁₆	66	E	PB22571FH	G	J
FC-41	71¼	U2 Browning	4 ¹⁵ / ₁₆	74	E	PB22579FH	G	SAF 2252
FC-45	78¼	U2 Browning	4 ¹⁵ / ₁₆	74	E	PB22579FH	G	SAF 2252

E - Link Belt

F - Dodge

G - SKF

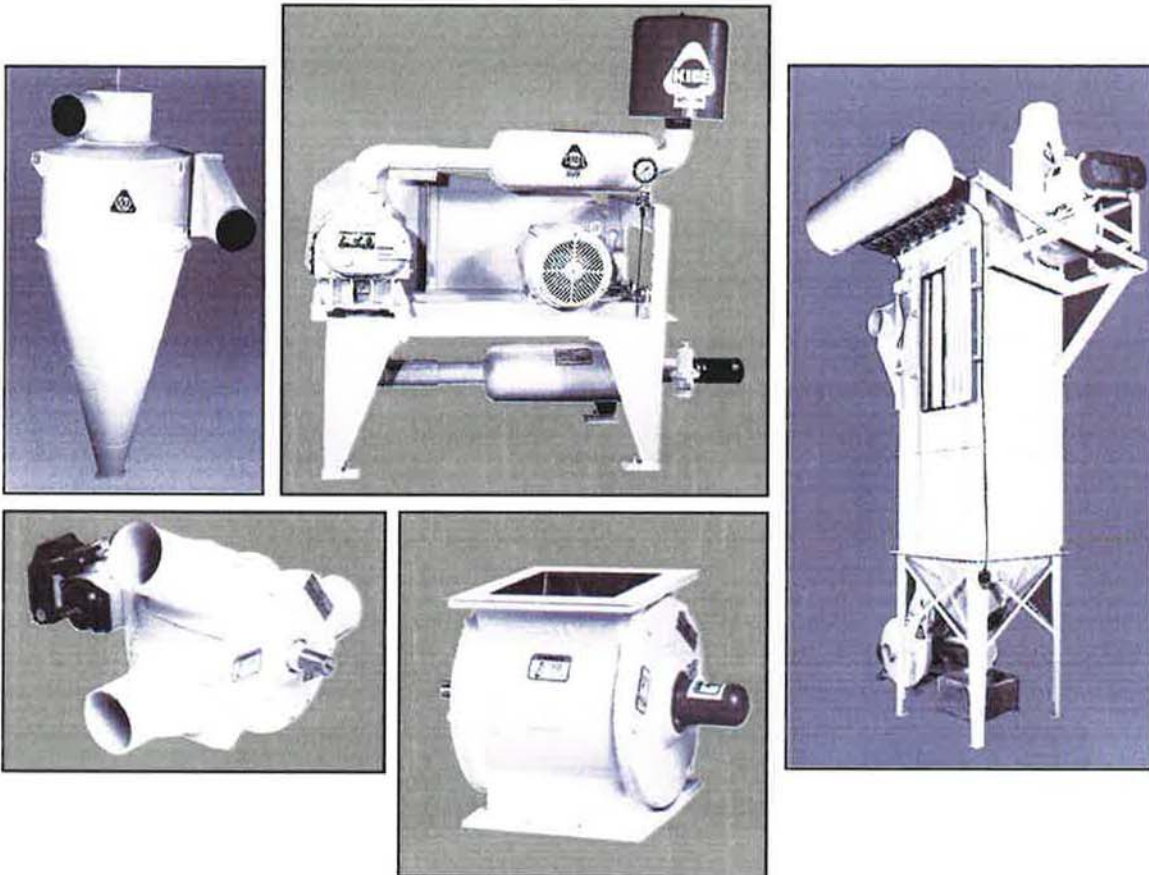
H - Sealmaster

J - Rex

NOTES

Kice Performance-Proven Components Are Your Best Assurance Of A Dependable System.

We offer a complete line of standard components such as airlock and diverter valves, cyclone collectors, filters, fans and air power units. Custom engineering is available.



Kice Headquarters, Wichita, Kansas.



South Plant, Wichita, Kansas.



KICE INDUSTRIES, INC.

5500 N. Mill Heights Drive • Wichita, KS 67219-2658 USA
TEL: (316) 744-7151 • FAX (316) 744-7355
QUIKSHIP CENTER: 1-877-289-5423 • quikship@kice.com
e-mail: sales@kice.com • web site: www.kice.com



CFM Foundry Division, Blackwell, Oklahoma.