Operating & Maintenance Instruction Manual For Centrifugal & Axial Flow Fan & Re Unit

Industrial Motors

Commercial & Appliance Motors

Automation

Digital & Systems

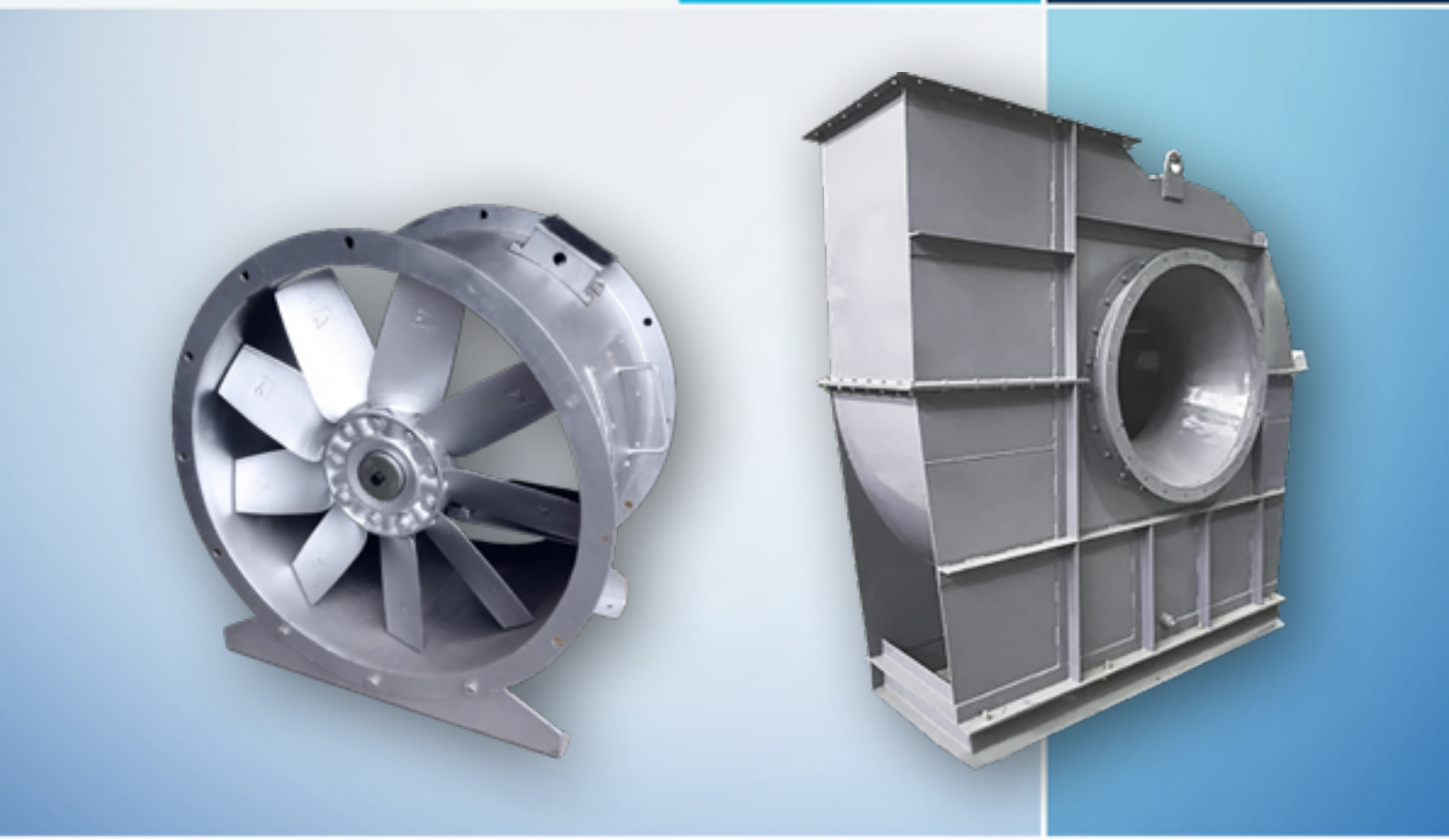
Energy

Transmission & Distribution

Coatings

April 2025

India



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RECEIVING

Normally, all the fans made by Marathon are run-tested prior to their shipment from Works. When the fan is received at site, it should be examined for damage caused in transit. If anything is wrong, both Marathon as well as the carriers must be contacted within three days of receipt. The goods will be accompanied by a delivery note which should be signed and returned to us.

Please check that all the items indicated have been received and, if not, contact us immediately. If the fans are to be put into stores by non-engineering personnel, it is recommended that inspection on receipt be carried out by a skilled person.

HANDLING

The fan should be handled carefully to prevent damage. The lifting lugs should be used wherever provided. Extra care should be given to the impeller or the dynamic balancing may be affected.

The shaft and bearings are also very important for on them depends the vibration-free running. Where the fan has been despatched complete, never “sling” under the shaft.

STORAGE

When fans are to be stored or installed for any length of time before running, special care should be taken as follows:

(a) When not specifically designed for outdoor use, they should be protected against the elements, special care being given to bearings, motors and rotating parts.

(b) Slowly turn rotating parts at regular intervals to redistribute the bearing lubricant, making sure that the shaft finishes at 180 degree to its former position. Never leave the fans stationary for any length of time adjacent to other vibrating machinery. These precautions will diminish the possibility of brinelling of the bearings and / or serious shaft damage.

INSTALLATION

The fan should be erected on firm foundations of adequate depth, taking particular care with the levelling and alignment. Reinforced concrete is recommended, the minimum weight being four times the combined weight of all the rotating parts, or twice the dead weight of the whole unit whichever is the greater.

Special care is necessary where sets are mounted on steel supporting structures. These can be used but must be level well braced in all directions to ensure the adequate rigidity. Such foundations are vital for trouble- free quiet operation. The minimum natural frequency of any part of the structure must be 50% higher than the running speed of our equipment. Before erection, foundations should always be checked to the fan arrangement drawing as follows:

(a) Concrete foundations: check height and ensure that there is the required grouting allowance between the foundation and the fan base. Suitable pockets should be provided for the bolts to be grouted in after levelling and aligning. For vee belt/indirect drives the foundation bolts should be of adequate length and well embedded in the concrete. The location of plinths should be checked in relation to the fan layout drawing. Use steel packers to obtain the correct height of the fan: the packers should be approximately the same width as the base plate and placed each side of and close to the H.D.bolts.

(b) supporting steelwork levels should be checked (including holes in beams). The steelwork should be level and rigid. Make certain that all bolts are tight: welded supporting structures are preferable.

ERECTION - COMPLETE UNITS

Unless too large for transit (size 1400 mm and above), fans are assembled in our works. It is therefore only necessary to put them on a level foundation pockets and fix in position using all the foundation points provided. It is important however to ensure that after the foundation bolts have been initially tightened, the fan pedestal is not twisted, as this may affect the bearing alignment. In extreme cases it will strain the casing which in turn may cause the inlet cone/venturi to foul the impeller. A spirit level should be used for levelling the unit and if necessary the support points should be shimmed.

THE FOLLOWING SHOULD ALSO BE NOTED

(a) Correct positioning of a fan to the drawing should be based on the discharge flange.

(b) The foundation/H.D. bolts, when set in concrete, should be left after initial grouting for 4/5 days to allow them to fully harden. If the foundation bolts are into steel, they can be tightened down evenly immediately the fan is considered to be level.

(c) Connecting ductwork must not be tightened to a fan unit until it is fully and securely bolted down.

(d) Inferior concrete foundations or grouting can be a cause of fan vibration, and if this is considered to be so, the only satisfactory solution is to renew concrete or grouting with a stronger mixture of good quality material.

(e) The plinth should be feathered into a concrete floor.

Where ductwork, pipe connections, or other ancillary equipment are connected to the inlet or outlet of the fan, it is essential that they should be supported entirely independently of the machine. Conversely, fans must be independently supported and not suspended from ductwork etc. When handling air or gas at high temperatures, suitable expansion joints should be provided between the inlet or outlet and the connecting ductwork.

START-UP

When erection is complete, shafts and impellers should be checked for freedom of rotation. As erection proceeds care should be taken to ascertain that no tools, pieces of packing etc, are left in the fan or ducts to cause obstructions or damage when the machine is started up.

When direct motor driven, the direction of rotation of the motor should be checked with the fan, preferably before connecting up to impeller, coupling or vee belt drive. This is important where special thrust bearing may be employed. The correct impeller rotation is shown by an arrow on the fan casing.

When the machine is driven through a coupling it is particularly important that alignment of the two shafts be achieved by checking the coupling by recognized methods for the particular type; levelling up for this purpose is obtained by interposing steel packing between the underside of the bedplate and the top of the foundations.

Alignments should be re-checked at the running temperature of the machine after the set has been run sufficiently long to allow for possible foundation settlement.

When the machine is indirect driven the pulleys should be checked for correct alignment and spacing, and the driving and driven shafts must be parallel to each other to ensure that the vee belts run truly in the grooves and with recommended tension. Excessive tension will overload bearing and cause possible damage to shafts and vee belts; conversely slack tension can result in slip leading to excessive wear on belts and pulleys.

Before starting up check especially that the Storage, Installation and Lubrication instructions have been followed. Then close dampers on inlet and/or outlet of machine. Start and run up to full speed with dampers closed, then open gradually until required duty is obtained. These precautions will minimise starting time and avoid excessive load on driving motor.

WARNING

An electric motor may be overloaded if a fan is allowed to run up to speed with inlet and outlet fully open. The set should be connected to the duct-work system, or the inlet or outlet dampered. Where shaft seals are provided, adjustment may be necessary. If circumstances necessitate the fan being on site for a considerable time before erection and starting up, the lubricant in the bearing should be replaced. If it has been subjected to vibration from other machinery while standing, the bearings themselves may have suffered from indentation of the races by the roller and they should be examined and if necessary replaced before putting to work.

REMEMBER

1. Ensure that no tools, pieces of wood etc, are left in the fan casing or associated ductwork.

2. Check freedom of rotation of shaft assembly.

3. Check vee belt drive alignment and tension (or coupling gap and radial alignment)

4. Check lubrication of bearings (and coupling if fitted)

5. Check that air connections are correctly made.

6. Check that shaft and cooling fan guards are correctly fitted and adequate clearances are main tained with rotating parts.

7. Fully closed inlet and/or outlet damper.

8. Check motor and fan rotation by a flick of the starter on first start. Rotation should agree with rotation arrow on fan casing. If incorrect consult the motor manufacturer’s manual.

9. Start motor and allow to run up to speed.

10. Gradually open any damper (s) ensuring that motor amperes do not exceed duty figures.

MAINTENANCE

EVERY SHIFT

When taking over plant at beginning of shift, operators should check that all bearings are cool.

EVERY WEEK

Check for undue vibration. If present, stop fan at earliest opportunity, check impeller for any dirt buildup on the blades, and clean as necessary.

EVERY SIX MONTHS

(a) Consult motor-manufacturer's manual and carry out instructions.

(b) Check coupling alignment and condition.

EVERY 12 MONTHS

(a) Examine impellers, fan bearings, inlet spigots/venturi. Check vee belts and pulleys or coupling element (s). If any wear, replace as necessary.

(b) Check clearance at impeller, level of shaft, and general alignment. Adjust as necessary.

(c) Check all H.D. bolts for tightness.

(d) Refer to motor and control gear manufacturer's maintenance instructions and act accordingly.

(e) Grease -lubricated bearings should be cleaned out and grease renewed.
Refer also to all proprietary item literature and act as instructed. Lubrication should be carried out regularly accordingly to operating conditions.

FAN BEARINGS

Spherical roller grease-lubricated bearings are charged with suitable grease before despatch. Do not run more that one year (approximately 8000 running hours) before changing grease.

The period during which a grease-lubricated bearing will function satisfactorily without re-lubrication is dependent on the bearing type, size, speed, operating temperature, and the grease used. The re-lubrication intervals (hours of operation) obtained from Table 1 are valid for bearings in Series 28 fans where loading conditions are normal. The table is based on the use of an age-resistant, average quality grease and is only valid for bearing operating temperature up to + 70°C. The intervals should be halved for every 15°C increase in temperature above +70°C, but the maximum permissible operating temperature for the grease must not be exceeded. However, it should be noted that re-lubrication intervals may vary significantly even when apparently similar greases are used. Where there is definite risk of the grease becoming contaminated the re-lubrication intervals should be reduced.

The amount of grease is obtained from : G = 0.005 DB

Where G = grease quantity (g)

D = bearing outside diameter (mm)

B = bearing width (mm)

Procedure Apply grease as follows:

For speeds up to dn* = 20 000 the roller cage should be coated with grease and the other parts lightly covered for protection. The remaining space in the lower half housing should be filled with grease of the whole housing may be completely filled to aid sealing in wet or dirty conditions.

For speeds over dn = 20 000, the cage and parts should be coated as above plus 25% of listed grease weight housing in the housing.

All cartridge end bore seals should be well lubricated on assembly including the bores of revolving triple labyrinth seals. Blanking plates should be sealed with grease or joining compound.

Never assemble the bearing dry or inject the grease after closing the cartridge during assembly.
*d = bearing bore (mm), n = rev/min

Lubrication points Bearings housing tapped ¼ pipe or other according to size and series. Lubricating nipples or temporary plugs are fitted as standard. The lubricant is injected through the outer race directly to the rolling surfaces.

Extreme pressure grease are usually normal range and suffixed EP. High temperature greases should be checked for speeds over dn = 100,000 and replenishment intervals may be reduced.

Deviation from the above standard recommendations will be notified separately when required. It is essential not to over grease as this will raise the running temperature of the bearing and may shorten its life.

INSTRUCTIONS FOR REMOVAL OF ROTATING ASSEMBLY FROM UNIT

Note: Before removing any pieces of equipment, the relative positions of mating parts should be marked to simplify erection.

1. Remove any coupling or drive guards.

2. Remove any shaft guard by unfastening the set screws with spring washers.

3. Remove any vee belts or coupling elements.

4. Disconnect inlet ducting, Supporting as necessary.

5. (For Split casings)
   Disconnect inlet spigot from inlet side plate unbolting the setscrew. Slide shaped inlet away from impeller until it is cleat of the impeller shroud. Support the loose venturi (shaped inlet)

6. Remove both halves of any shaft washer, unfastening the screws.

7. Unfasten the bolts along the horizontal join in the drive side plate.

8. Unfasten the bolts along the horizontal join in the inlet side plate.

9. Secure slings through the lifting eyes on top of the casing side plates.

10. Unfasten the bolts along the horizontal join in the scroll.

11. Disconnect any outlet ducting from the casing, unfastening the bolts on each sideplate and the bolts on top and below.

12. The top half of the casing now be carefully hoisted above the unit and removed.

13. Place slings around shaft adjacent to impeller, on the main bearing side, and adjacent to tail-bearing on the impeller side. The impeller must be propped in the casing, as it will tend to tip the shaft upwards when the pedestal top halves are removed.

14. Remove top halves of bearing blocks, unfastening the bolts on each pedestal. Now carefully lift the shaft, impeller, and roller bearings out of the unit, taking care not to damage any of them. The drive end of the shaft should be held down to avoid tipping.

The instructions given above do not apply fully to fans in Arrangements 4 and 5 where the impellers are mounted directly on the motor shaft extension and there are no separate shafts and bearings.

REMOVAL OF IMPELLER FROM SHAFT

1. Mount the shaft on suitable supports terminating in hardwood vee blocks. The coupling/pulley end of the shaft must be restrained from moving upwards under the tipping action of the impeller. Ensure also that the impeller is clear of the ground.

2. Mark position of centre bush on shaft and make a note of impeller blade angle relative to rotation and bearings. Oil shaft and slide impeller and bush towards inlet end of shaft and remove, taking care not to damage the shaft. Remove key from key-way. When removing impeller it should be supported on nylon or padded slings, between backplate and shroud, and around 4 blades.

REMOVAL OF BEARINGS FROM SHAFT

This is done after the impeller and any coupling element or vee belts have been removed, as the bearings help to balance the assembly.

Spherical roller adapter sleeve bearings

1. Remove the bearing cap setscrew and take off bearing caps, being careful to note which way round they are fitted, and to which plummer block. Note also which is located before removing rings.

2. Lift out shaft and bearings being careful to use rope slings and not to damage anything.

3. Position shaft in wooden vee blocks on a suitable bench.

4. Carefully prise out tab of washer Loosen off lock-nut and remove.

5. Bearings may now be removed by carefully tapping down taper of the adapter sleeve.

6. Adapter sleeves may now be removed.

INSTRUCTION FOR REFITTING OF NEW FAN BEARINGS ON TO SHAFT

Spherical roller adapter sleeve bearings

1. The bearing should not be taken from its packing until required. Do not remove the protective grease except from the bore which should be wiped with a clean cloth dampened with white spirit.

2. Saturate the felt seals in a mixture of two thirds lubricating oil and one third hallow at 80-85°C.

3. Caps and bases are not interchangeable or reversible -- do not mix them.

4. Clean the inside of the housing thoroughly. Press the felt seal into the groove in the base, and cut off the ends flush with the machined face. Pack the remaining felt in the cap groove and trim off the surplus. Make sure there are no frayed edges to prevent the cap fitting correctly, but do not cut off too much as a gap between the ends will allow foreign matter to enter.

5. Secure the housing base to a support and check for alignment. Lightly smear the outer ring seating of the housing with a thick oil containing a rust inhibitor.

6. Remove any sharp edges or burrs from the shaft, adapter sleeve, tab washers and nut, then wash them clean and wipe dry. Lubricate the thread and lightly oil the outer surface of the sleeve. Mount the adapter sleeve roller bearing, tab washer and nut loosely on the shaft as previously.

   Make sure the concave side of the tab washer faces the bevelled side of the nut. Tighten the sleeve nut, checking the clearance frequently until it is reduced by approximately 50% when mounting bearings with C3 or C4 fit, the reduction in clearance should be less than 50%.

7. Position the shaft in the lower half of each housing. Tighten the nut of the locating bearing sufficiently to position the sleeve on the shaft, which should be supported so that there is no load on the bearing when finally tightening up.

8. Check the radial clearance between the rollers and the outer ring with a feeler gauge (in C type bearing it is easier to check the clearance at the lower part of the bearing). After tightening the nut, swivel the outer ring of is not expanded too much; over tightening may cause premature failure.

9. Use special ‘D’ spanners to tighten the nut. Do not use drifts or punches as these mutilate the nut and may damage the tab washer and bearing cage. In the case of large roller bearings, the locking washer may be damaged if placed between the nut and the sleeve during the driving up process. It is preferable to fit the washer after driving up, but if this is not possible, the friction can be reduced by smearing the contact surfaces and threads with oil to lubricate them.

10. After the sleeve has been tightened, bend one tab of the washer into a convenient slot in the nut. To line up a tab and a slot tighten the nut slightly rather than slacken of. The bearing outer ring must not rest on its seating during this operation.

11. Only one fixed or located bearing is used on each shaft, the bearing being positioned axially in the housing by one or two locating rings, depending on its type. If two rings are fitted, position one on each side of the bearing, if one ring is used it is fitted on the same side as the nut. Make sure that the same bearing is located as previously.

12. The outer ring of a free bearing should be in the centre of the housing seating.

13. When fitting the impeller pulley or coupling, support the shaft so that blows cannot be transmitted to the bearing.

14. Thumb grease into both sides of the bearing and, in addition, fill the bottom half of the housing. For low speeds the bearing housing may be filled completely. Smear a little grease around the shaft adjacent to the felt seals to assist in lubrication and seating.

15. After fitting the housing cap check that the shaft does not foul at any point.

REFITTING ROTATING ASSEMBLY INTO UNIT.

1. Support Shaft on nylon or padded slings with one sling as close to impeller as possible on the bearing side and one sling outside tail bearing.

2. Lift shaft assembly carefully, holding coupling or pulley end of shaft down to avoid tipping.

3. Move assembly over until and lower carefully onto bearing pedestals horizontally. Care must be taken not to damage impeller or shaft or bearings. Ensure that the triple seals slide into their corresponding grooves.

4. Replace top half of pedestal housings and fit socket head cap screws on each pedestal (run shaft for a short period before finally tightening pedestal cap screws to ensure swivel alignment).

Remove slings.

5. Fasten tongue to outlet half of scroll using set screws.

6. Bolt up horizontally join in inlet side plate.

7. Bolt up horizontal join in drive side plate.

8. Bolt horizontal join in scroll : attach both halves of shaft washer to drive side plates.

9. Bolt up outlet connections to casing on each sideplate, scroll and tongue.

10. Slide shaped inlet into casing until inlet spigot is flush with casing. Bolt spigot to casing set screws. Check impeller overlap and diametrical clearance. Replace inlet connections.

11. Rotate shaft to check for any obstruction, replace coupling element or vee belts.

12. Check that pulley or coupling is in original position relative to shafts (check alignment first and correct as necessary).

13. Replace coupling or drive guard.

14. Replace shaft guard using set screws with spring washers.

Again the instructions given above are simplified for fans to Arrangements 4 and 5 where the impellers are mounted directly on motor shaft extensions.

VEE BELT DRIVES : INSTALLATION

1. Clean all oil and grease from pulley grooves and bores.

2. Remove any burrs or rust.

3. Reduce the centre distance until the belts can be placed in the pulley grooves without forcing.

4. Align the pulleys correctly using a straight edge to ensure that the pulleys are in line and the shafts parallel.

5. Tension the drive using the motor slide rail bolts.

6. Check that the vee belts are correctly tensioned :
   (a) Measure the span.
   (b) Apply a force at right angles to the belt at the centre of span.
   (c) This force should deflect one belt 0.016 mm for every millimeter of span length.
   (d) The average value of the force in each belt should be compared with Table 2. Belts should initially be tightened to the higher values.

If the measured force falls within the values given in

Table 2 the drive tension should be satisfactory. A force below the lower value indicates undertensioning. When starting up, a new drive should be tensioned to the higher value. The drive should be re-tensioned at regular maintenance intervals. Make adequate provision for tensioning the belts during their life.

COUPLING AND SHAFT SEALS

Coupling of the grease-filled type will require to be fully charged with suitable grease after alignment and before starting up, and replenishment at monthly intervals unless otherwise advised.

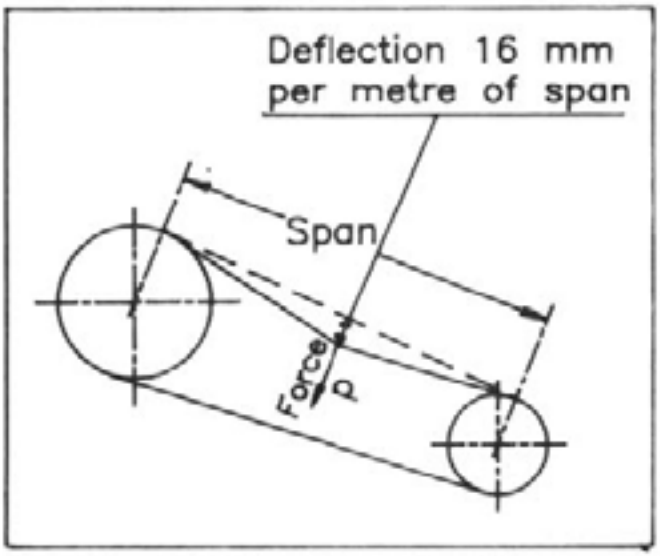
Shaft seals of the packed stuffing box type generally need no lubrication except when lead wool packed when the box should be completely filled with suitable grease and replenished periodically during operation by means of greaser cap provided. This procedure also applies to labyrinth type glands.

GENERAL NOTES

The speed of the machine should not be increased beyond that specified for the particular duty for which it was installed, without first referring the matter to us.

All impellers are accurately balanced during assembly at our works, but on certain applications, imbalance and consequent vibration may develop as a result of a build up of deposits on the impellers. This calls for periodic and thorough cleaning of the impellers to restore the original balance. Corrosion, wear, or damage on certain applications may also cause imbalance and if necessary we shall be pleased to advise on request.

Where a number of machines are installed with one or more acting as stand by it is good practice to use them in rotation or to give the rotors a few turns at regular intervals.



Belt deflection measurement

MAKING THE SYSTEM SAFE.

Fans are made to many different arrangements and cover a variety of sizes and impeller types. Properly installed, run and maintained, they assist in the creation of better living conditions, cool other equipment, provide essential air for combustion, convey materials, and efficiently carry out many other functions. Improper installation, use or maintenance can make them a danger. These notes are intended to assist in the safe installation and use of fans and to inform operating and maintenance personnel of the dangers inherent in all rotating machinery and especially those used in air or gas movement. Often only the fan is of Marathon supply. The customer / user must therefore consider how the rest of the system - motors, drives, starters, etc., may affect fan operation. Installation and maintenance must be carried out by experienced and trained persons. As well as our own instructions it is important that all national and local government requirements are complied with.

GUARDS

All fans have moving parts which may require guarding. It is a fact of life that two danger areas are the fan inlet and outlet. Fan guards have to be designed to reduce the fan's performance as little as possible whilst giving a good measure of safety.

In areas accessible only to experienced and trained personnel, a standard industrial type guard may be adequate. This will prevent the entry of thrown or dropped objects with the minimum restriction of airflow.

Where the fan is accessible to untrained personnel or the general public maximum safety guards should be used, even for D.I.D.W. fans, at the cost of some loss of performance. Fans located less than 2 meters above the floor require special consideration. Even roof-mounted equipment will require guards when access is possible.

(a) Inlet and outlet guards

Centrifugal fans are usually connected directly to ductwork which will prevent contact with the internal moving parts, but when the inlet or outlet is exposed a suitable guard should be installed.

(b) Drive guards

Fans may be driven directly from the motor shaft or through a belt drive. In every case where the bearing assembly, rotating shaft, sheaves, or belts are exposed, a suitable guard should be provided.

Customers often prefer to provide their own motors, and drive and drive guards on indirect driven fans. They should in all cases follow the recommendations of relevant local standards.

In restricted access areas, one-sided guards of expanded metal may be acceptable. Readily accessible locations will require maximum protection guards, and in many cases a fully enclosed sheet metal guard. The loss of fan performance on D.I.D.W fans must be weighed against the degree of safety provided. Where the customer/user is in any doubt, he should purchase the complete assembly of fan, drive, motor, guarding, and combination baseplate from Marathon who can provide a fully engineered system to meet any specified standards.

THE HIDDEN DANGER

As well as the normal dangers of rotating machinery, some fans (eg. paddle-bladed) present an additional hazard in their ability to suck in loose materials as well as air. Solid objects can pass through the fan and be discharged by the impeller as potentially dangerous projectiles. They can cause serious damage to the fan itself, if not allowed for in the design.

Intakes to ductwork should whenever possible be screened to prevent the accidental or deliberate entrance of solid objects. For example, on a saw dust handling system an intake screen should be provided which will allow the entry of saw dust but prevent the entry of large pieces of wood. Access doors to a duct system should never be opened with the fan running.

On the down stream (or pressure) side of the system, releasing the door with the system in operation could result in explosive opening. On the upstream (or suction) side the inflow may be sufficient to suck in tools and clothing, etc., and even cause a man to lose his balance. Where quick-release handles are provided on access doors, at least one positive bolt should be installed to prevent accidental opening.

When a fan is being started for the first time, a complete inspection should be made of all of the ductwork and of the fan interior to make certain there is no foreign material which can be sucked into or blown through the ductwork.

NOISE HAZARDS

Excessive noise can be a health hazard. The pressure level at any given location is dependent on the effect of all noise generating equipment and the acoustic environment within the vicinity of the reference point, the fan being only one of the contributing sources. It is, therefore, difficult to predict the sound level without a complete survey of all equipment, orientation of each sound source, acoustic characteristics of the structure, and distances involved to each noise source. Acoustic engineering services should be employed to determine compliance with noise regulations and to make recommendations on any necessary attenuation devices.

START-UP CHECK LIST

Before putting any fan into operation the following operations should be completed. Further information is given under ‘Installation, running and maintenance’.

1. Cut out primary and secondary power source.

2. Make sure the foundation or mounting arrangement and the duct connections are adequately designed in accordance with recognized acceptable engineering particles and with Marathon's recommendations.

3. Check and tighten all holding down bolts.

4. Spin impeller to see if rotation is free and does not bind or rub.

5. Inspect impeller to see if it is the proper handling for the fan design.

6. Check all set screws and tighten if necessary.

7. Check vee drive or coupling for alignment - use recommended belt tension.

8. Check vee drive for proper pulley selection and make sure they are not reversed or the fan could run to excessive speeds as well as overloading the motor.

9. Make certain there is no foreign loose material in ductwork leading to and from fan or in fan itself.

10. Properly secure all safety guards.

11. Check security, correct alignment, and fixing of flexible connectors.

12. Secure all access doors to fan and ductwork.

13. Close any inlet or outlet fan dampers.

14. Switch on electrical supply and allow fan to reach full speed.

15. Progressive open dampers, making certain the system continues to function satisfactorily and that motor does not overload.

16. Check carefully for:
    (a) Correct impeller rotation (shown by rotation arrow on fan casing).
    (b) Excessive vibration.
    (c) Unusual noise

If any problem is indicated switch off immediately. Cut out the electrical supply, check carefully for cause of the trouble, and correct as necessary.

Even if the fan appears to be operating satisfactorily, shut down after a brief period and recheck items 3 to 12 as the initial start-up may have relieved tightness of bolts and set screws, again ensuring electrical supply is cut out before attempting other checks.

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 the same time checks should be made on motor input current and motor temperatures to ensure that they do not exceed manufacturer's recommendations.

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

1. All set screws and hold down bolts including guard fixings.

2. Drive coupling alignment.

3. Vee coupling alignment.

4. Vee drive belt tensions should be readjusted to recommended tension.

5. Security of flexible connections.

SPECIAL PURPOSE SYSTEMS.

Fans which are used to move anything other than clean air at normal temperatures (75°C) may require special precautions to ensure safe operation. Explosive or toxic fumes or gases, transported solids, high temperature, and corrosive contaminants will present special hazards which must be carefully considered. All local codes should be reviewed together with any applicable industry standards. Marathon's recommendations for the specific application should be closely followed.

When the system will handle explosive fumes- even in traces - care must be taken to ensure that fumes have not collected in areas which require access by workmen. Concentrations of fumes can collect in 'air trap' area, particularly when a system is shut down.

Fan ratings and maximum speed limits are based on the use of air at 20°C. At temperatures above the normal range (over say 150°C) a reduction must be made in the maximum speed limit. Information on this and on other precautions to be taken for high temperature applications may be obtained from Marathon.

Corrosive contaminants can be formed when moisture combines with an active airborne chemical. Unprotected fans subjected to corrosive attack will eventually fail, , but suitable protective coatings or material used in the fan construction will resist corrosion. Even protected fans must be regularly inspected to ensure that the protection remains effective.

ROUTINE INSPECTION

Under normal circumstances, handling clean air, the system will need checking only about twice a year. However, the fan and system should be checked at regular intervals to detect any unusual accumulation.

The fan impeller should be specially checked for build-up of material or dirt which may cause an imbalance, with resulting undue wire on bearings and V-belt drives. A regular maintenance programme must be established to prevent this build-up.

The rotating assembly should be inspected regularly to detect any weakening of the impeller shaft and bearings resulting from corrosion, erosion, or metal fatigue.

Do not attempt any maintenance on a fan unless the electrical supply has been completely disconnected. If a disconnect switch has not been provided, remove all fuses from the circuit and lock the fuse panel so that they cannot be accidentally replaced.

EXCESSIVE VIBRATION

Check for build-up of material on the wheel. Generally this will show up as material flaking off the fan wheel and causing an imbalance which may lead to fatigue failure of the wheel. Neven allow a fan to operate if the amplitude of vibration is above the maximum safe limit.

HIGH MOTOR TEMPERATURE

Check that cooling air to the motor has not been diverted or blocked by dirty guards or similar. Check input power : an increase may indicate that some major change has been made in the system. For other motor problems refer to motor manufacturer's instruction.

HIGH FAN BEARING TEMPERATURE

Usually caused by improper lubrication (either 'Over' or 'under'). In every case if the cause of the trouble is not easily seen, experienced personnel should examine the equipment before it is put back into operation.

Fan Speed							
Bearin Size (MM)		125	250	500	1000	2000	4000
	40	8000	8000	4500	2240	1000	400
	50	8000	8000	4000	1800	800	315
	55	8000	7500	3550	1700	750	280
	60	8000	7100	3150	1600	710	224
	65	8000	6300	2800	1400	630	180

Table 1: Relubrication interval (operating hours)

		Smart Pulley		Belt Speed	
Belt Section		PCD (mm)	0 to 10 m/s.	10 to 20 m/s.	20 to 30 m/s.
	SPZ	95	12 to 18	10 to 16	6 to 14
	SPZ	95	18 to 26	16 to 24	14 to 22
	SPA	140	22 to 32	18 to 26	15 to 22
	SPA	140	32 to 48	26 to 40	22 to 34
	SPB	250	38 to 56	32 to 50	28 to 42
	SPB	250	56 to 72	50 to 64	42 to 58
	SPC	355	72 to 102	60 to 92	50 to 80
	SPC	355	102 to 132	90 to 120	80 to 110
	Z	50		4 to 6	
	A	75		10 to 15	
	B	125		20 to 30	
	C	200		40 to 60	
	D	355		70 to 105	

Table 2 : Correct vee belt tensions : required force N at Centre of Span for Vee Belt Speed. To obtain Kgf divide N by 10 to give approximate value.

The scope of WEG Group solutions
is not limited to products and solutions
presented in this catalogue.
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