



CADFAN LTD
FANS & VENTILATION EQUIPMENT
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www.cadfan.co.uk

Dear Sirs

Subject: EEC Directives

Cadfan Ltd are incorporating within their designs, such requirements as dictated by mandatory EEC directives.

The design, nature and use of it's products does inevitably mean that some equipment is supplied to customers with certain safety aspects relating to guarding and electrical isolation that is to be completed by others.

In such cases, declarations made by Cadfan Ltd are dependant upon the correct application of it's products, correct installation by competent personnel and their being placed within installations, themselves fulfilling the requirements of EEC Machinery Directive 89/392/EEC to current version.

We consider that the following directives are/will become applicable to our fan products: -

Machinery Directive 89/392/EEC (to current version) mandatory from 01/01/95

Directive on Electromagnetic Compatibility (89/336/EEC) to current version, mandatory from 01/01/96

Low Voltage Directive (73/23/EEC) mandatory from 01/01/97

It is further paramount that Cadfan installation and maintenance instructions are correctly and fully adhered to.

We attach to this letter, for your retention a copy of our Declaration of Incorporation, together with the condensed safety, installation and maintenance instructions- standard fans. This gives you the necessary technical paperwork, which the machinery directive requires us to pass to yourselves, a copy of these are included in our catalogue and further copies are available upon request.

Yours faithfully

A.Freeman

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EC DECLARATION OF INCORPORATION

As defined by the EC Council Directive on Machinery 89/392/EEC, annex 11B

Herewith we declare that the machinery/ machinery component named below is intended to be assembled with other machinery/ machinery components to constitute machinery, which shall not be put into service until the assembled machinery has been declared in conformity with the provision of the EC Council Directive on Machinery.

Designation of equipment	FAN UNITS AND FAN ASSOCIATED EQUIPMENT
Series/Type	CENTRIFUGAL AND AXIAL FAN TYPES
Relevant EC Council Directives 93/68/EEC	Machinery Directive (89/392/EEC in the version
Applied harmonised standards 1 In particular	EN 292-1, EN 292-2, EN294 EN 60404-1
Applied national standards and Technical specification 2 In particular	BS848 part 1 BS848 part 2 BS848 part 5

Date 22-8-01

Signature  _____

Position of signatory Director

Files The original to be kept by the manufacturer.
The copy is for the customer

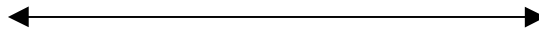
1, For the complete list of applied standards and technical specification see the manufacturers documentation.

2, Where no relevant harmonised standards exist.



Cadfan Ltd

Maintenance & Operating Instructions



Correct installation, proper operation and preventative maintenance are essential to obtain the most efficient, dependable performance from our equipment.

Receiving

The equipment should always be handled carefully to prevent damage. Some units are transported completely assembled and with these it is particularly important to avoid dropping and jarring the equipment. Always use all the lifting points provided, since they have been positioned to reduce the straining of the unit to a minimum.

Where the equipment is despatched in parts, each item should be handled in the appropriate manner. The impeller for instance will have been balanced to ensure smooth running and should always be lifted by clamping the backplate, not by passing a rope or chain through the blades and shroud. If an impeller is damaged through mishandling it will require re-balancing.

Shafts require particular care and should, if possible, be lifted by positioning the sling supports at a distance of approximately one-quarter of the shaft span in from each end. This produces a minimum bending effect on the shaft and will obviously reduce straining. If a shaft is dropped or jarred and becomes sprung, it will never run properly and will have to be replaced.

Storage

If fans are to be stored or installed for a length of time before running, special care should be taken over the following points.

- Where not specifically designed for outdoor use, they should be protected against the elements. Special care should be given to the bearings, motors and rotating parts.
- Slowly turn rotating parts at regular intervals to distribute the lubricant. Make sure that the impeller finishes at 180 degrees to its former position. This will help to eliminate possible vibration due to the impeller and shaft resting in one place.
- Never leave fans stationary for any length of time adjacent to other vibrating machinery as this can cause brinelling of the bearings and serious shaft damage.

Installation

(A) Foundation; Reinforced concrete is recommended as the best type of foundation for our equipment. The minimum weight of concrete should be about four times the combined weight of all the rotating parts or twice the dead weight of the whole unit whichever is the greater

Substantial steel supports can be used but must be well braced in all directions.

A rigid level foundation is vital for smooth, trouble free, quiet operation and the minimum natural frequency of any part of the structure must be 50% higher than the greatest running speed of our equipment.

(B) Assembly; where a unit has been despatched completely assembled it is only necessary to mount it on a level foundation and fix in position using all the foundation points provided. It is very important, to ensure that after the foundation bolts have been tightened, the casing is not strained, since this will usually cause the inlet cone to foul the impeller. Support joints should be shimmed if necessary to make sure that the fan shaft is horizontal after the foundation bolts have been tightened and that the casing sides are parallel to each other. Some fans are sent on carrying angles; remove these before final fitting.

When fixing motors or other drives in position do not strain the fixing points, since they are usually made of cast iron and will fracture when subjected to tensile stresses. Always check that the driving shaft is parallel to the fan shaft.

Wiring diagrams for the electric motors will usually be found inside the terminal box. Circuit diagrams for other types of drivers can be obtained from specific suppliers

Fixing the drive requires great care and accuracy. The pulleys should be lined up after making sure that both the fan shaft and motor shaft are parallel to each other in all directions. Avoid if possible the positioning of either pulley at the extreme end of its shaft, since this amplifies the effect of belt pull and will result in excessive bearing wear.

Starting-up

Before starting-up, make sure that all the bearings are properly lubricated, although this is usually done at the manufacturers works. One bearing will always be located and while checking the grease or oil this location should be checked. Make sure that all retaining blots are tight and pay particular attention to those holding the bearing blocks in position and to those retaining the drive and driving gear. For coupled drives (direct drive) see that the shaft alignment is correct, even if this has been done before the unit left our works.

- (A) All rotating parts should be turned by hand to ensure that everything is running free
- (B) Check the direction of rotation of moving parts – is it correct?
- (C) After the equipment has been running for one hour, check that all bolts, set pins, etc are tight, re-tighten if necessary.
- (D) Check every week for the first three months that there is no loss of lubricant from the bearings.

Maintenance

This consists mainly of keeping all the bearings correctly lubricated, drives correctly adjusted, the impeller free of foreign matter and all metal surfaces painted.

When re-lubricating the bearings it is preferable to remove all the old grease and add fresh grease with the bearing assembly stripped down. In certain cases where it is difficult to strip down an assembly, grease nipples are provided (where requested) on the housings and fresh grease should be added using a grease gun. Always make sure that the bearings are not over packed with grease, as this will result in them running hot and will eventually damage the bearings.

When the fan operates in dirty, wet, hot and / or corrosive conditions, lubricant periods should be shorter than normal. In any case, clean lubricant should be kept in all bearings and couplings at all times. In most cases the motors will have sealed bearings and no additional lubricating will be required.

Belt drives should be checked periodically for tightness and re-adjusted if required. DO NOT use belt dressing or similar dope.

If the fan impeller operates in dirty or corrosive, erosive conditions check periodically for signs of wear, build –up etc and treat as required. An impeller that is very dirty, badly corroded or eroded will go out of balance, resulting in excessive wear on the bearings and stresses to the fan casing. It is good practise to strip down bearing assemblies, coupling etc, during holiday shutdown periods and inspect for wear and replace parts if necessary.

Safety

Before removing any guards or cover plates, ensure that the equipment is electrically isolated.

Should the equipment be handling hazardous or toxic materials, it is important that appropriate protective clothing be worn. I.e.; Safety goggles, gloves, mask, overalls etc.

Spare parts

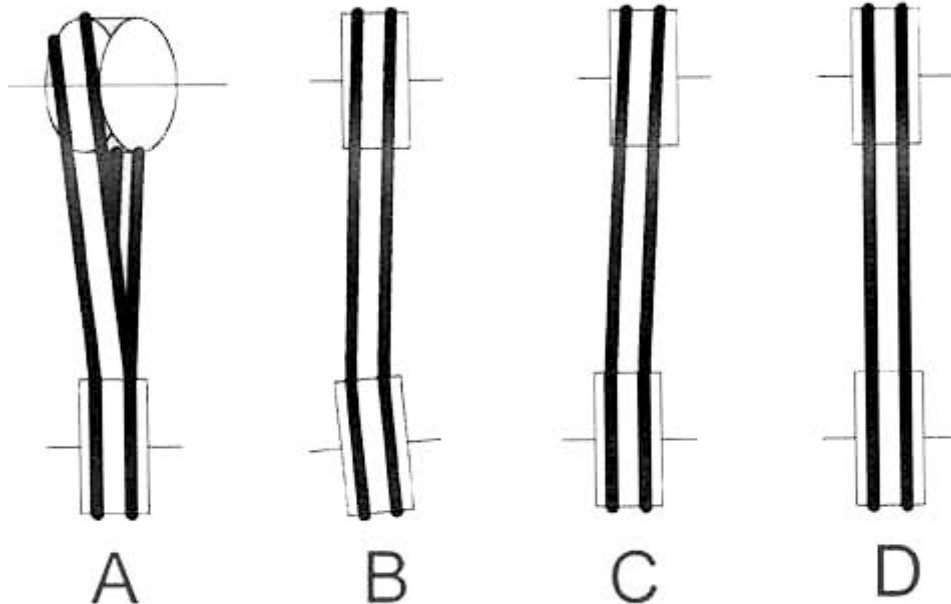
Spare parts may be ordered from ourselves by mentioning the part name (impeller, shaft etc) and the fan serial number. It is recommended that a spare set of bearings be kept on hand at all times.

The following as a guide used in the fitting of our **own** equipment, consult your equipment manufacturer/supplier for further information.

Guide to Vee Belt Drive Fitting & Alignment

1. Always use a matched set of new belts of the same type and manufacture.
2. Clean any oil and grease from the pulleys and remove traces or other foreign matter from the pulley grooves.
3. Mount the pulleys on the shafts as near to the shaft support as possible (this will reduce shaft deflection and bearing loads).
4. After checking that the driving and driven shafts are parallel, the pulleys should be aligned by the use of a straight edge, the two pulleys will be in correct alignment when the near and far points on the face of each pulley touch the straight edge.
5. The belts may now be fitted after ensuring that sufficient adjustment is present for tensioning, on no account should the belts be forced over the pulley rim as this will damage the belt cover and tension members, resulting in early failure.
6. Ensure adequate ventilation is provided, use expanded metal or wire mesh in the construction of the drive guard.

Alignment guide



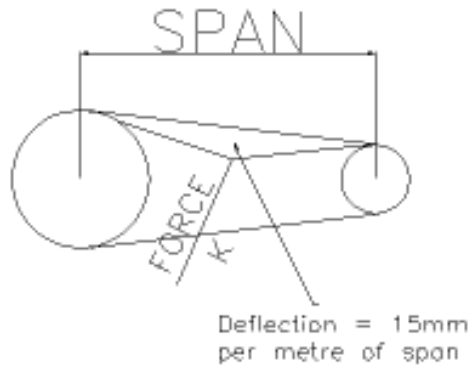
- A. Angled. shafts not in same plane (correct by setting shafts in same plane)
B. Angled. shafts not parallel (correct by re-setting shafts, making sure no deflection is taking place in supporting framework or shafts)
C. Offset. (Correct by moving either pulley along the shaft until aligned)
D. Correct.

Belt tension check

1. Measure span length
2. At the centre of the span apply a force at right angles to the belt to deflect one belt 15mm for every 1 metre of span length.
3. Compare this force with values in the table below. if the measured force falls within the values given, the drive tension should be satisfactory. A measured force below the lower value indicates under-tensioning, if the force is higher than the upper value the drive is over tensioned.

Note!

A new drive should, however, be tensioned to nearer the higher value to allow for the normal drop in tension during the running-in period. After the drive has been running for a few days, the Vee belts will be seated into the pulley grooves and the drive tension re-checked.



Belt Type	Smallest pulley Diameter	Force K min Kg	Force K max Kg
SPZ	63-85	1.5	2.0
	Above 85	2.0	3.0
SPA	90-125	3.5	4.5
	Above 125	4.0	5.0
SPB	140-230	4.0	5.5
	Above 230	5.0	7.0
SPC	Above 224	8.0	11.0

Minimum pulley diameters

To limit the effect of belt pull and shaft stress, avoid using pulley diameters on the fan shaft less than those listed in the table below

Dimensions in millimetres

Fan Size	335	370	410	450	500	550	610	670	740	820	900
BL	92	104	120	125	137	152	167	185	206	226	251
CMV	104	120	125	137	152	167	185	206	226	251	280

Bearing information

Normal temperature applications up to 100 deg c

All ball and roller bearings leave our works in "ready to run" condition and are packed with sufficient grease for approximately 6 months running.

If grease nipples are fitted, a little grease should be added periodically, but it is advisable at the end of 6 months running to remove all grease, clean the bearings and replenish grease using the correct grade (see table below).

Care should be taken not to over-pack the bearing housing with grease, a useful guide would be to pack the housing up to two thirds of its capacity. Over-packing with grease will cause excessive heating by friction.

High temperature applications up to 100 deg c to 250 deg c

Similar considerations as above also apply to high temperature applications, the critical factor is the re-greasing interval, which should be every 2 months, also for these applications a high temperature grease should be used (see table below).

Bearing condition

The condition of a bearing can be deduced from;

1. The sound emitted while the fan is running.
2. The bearing housing temperature.
3. Noting the colour of the grease.

Bearing replacement

Replacement of a fan bearing is straight forward, but particular care must be taken with the adapter sleeves, which should be tightened up sufficiently to prevent the bearing working loose while in service. Care must be taken not to over tighten, the outer race of the bearing should run freely, otherwise expansion of the inner ring may occur with consequent reduction of running clearance in the bearing which will impair operation.

Motor bearings

On motors which are not provided with lubrication facilities, the bearing are pre-packed sealed for life type. Where motors are equipped with provision for re-greasing, these should be attended and maintained according to the motor manufacturers maintenance instructions.

Recommended greases

FAN	Normal temperature applications	Nerita HV
FAN	High temperature applications	Derina R2

Further information can be obtained from the following publications

FAG Publ.No. WL 90118/2 EA

Brook Hansen 1821 EFD issue 6

Note! failure to follow the operating and maintenance instructions will invalidate any warranty.