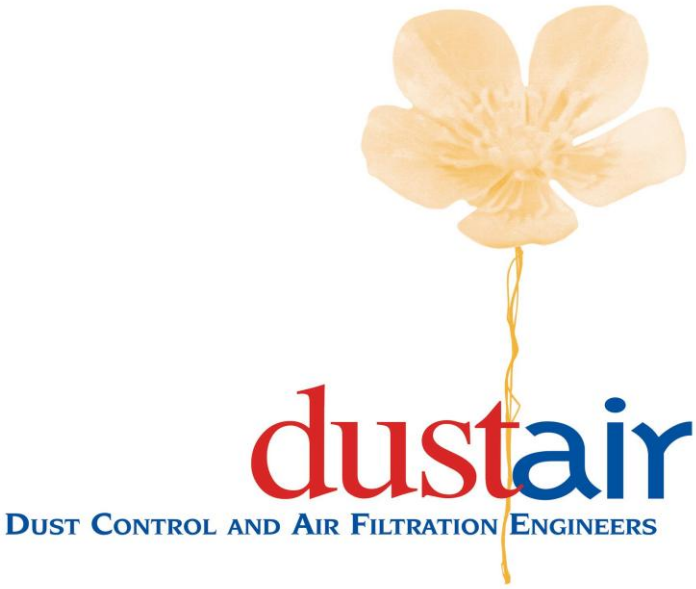


FAN UNITS

OPERATION & MAINTENANCE MANUAL

Issue 1: March 2011

CONTENTS

BEFORE USING THE EQUIPMENT

General

The manufacturer does not accept any liability for damage to the product or personal injury caused by non-observance of the safety instructions in this manual, or by negligence during installation (where installation is not performed by Dustair ltd.), use, maintenance and repair of this product.

Specific working conditions and / or connected equipment may require additional safety instructions. Please contact your supplier or Dustair Ltd if you detect a potential danger when using this product.

The user of this product is always fully responsible for observing the local safety instructions and regulations.

Observe all safety instructions and regulations which apply to machinery or similar connected items.

User Manual

- All persons using this product must be familiar with the contents of this manual and observe the instructions herein.
- The management should instruct the personnel in accordance with the manual and observe all instructions and directions given.
- Never change the order of the steps to perform.
- Always keep a copy of this manual with the product.
- This product should be used only by authorized, trained personnel.
- This manual is intended to cover a range of units. Therefore some aspects may not apply to your particular unit.

FANS – GENERAL OVERVIEW

The fan supplied may be one of the following types:-

- Plate-mounted propeller fan
- Axial flow (cased)
- Axial flow, bifurcated
- Centrifugal

Propeller Fans
These are normally mounted in a wall or similar and used for general extraction ventilation, without ductwork.

Cased Axial Flow Fans
These comprise of a circular outer casing, inside which is a radial impeller. The blades of the impeller are normally of an aerofoil shape in cross-section. The impeller shaft is centrally mounted within the casing and can be directly or belt driven by an electric motor. Air enters at one end of the casing and exits at the other end. Axial fans can be mounted in-line within ductwork systems. Axial flow fans are limited in their pressure.

Axial Flow Bifurcated Fans
These fans are essentially a cased axial fan similar to above, but the casing encloses the drive motor, the air being split into two paths through the fan before converging at the fan exit. This type of fan is extensively used for applications where the drive motor must be kept out of the air stream. As with normal axial flow fans, pressure is limited to around 750 Pascals.

Centrifugal Fans
This type of fan is widely used in industrial applications due to its ability to develop high pressure. A radial impeller on a shaft is mounted centrally within a gradually opening outer scroll casing. Air enters the eye of the impeller and is thrown outwards into the scroll, discharging at the scroll's largest point. Centrifugal fans may be directly driven or indirectly via a pulley belt arrangement.

Dustair filter units, dry and wet, use centrifugal fans rotating at a nominal speed of 3000rpm.

BASIC INSTALLATION INSTRUCTIONS FOR CENTRIFUGAL FAN UNITS/BIFURCATED FAN UNITS

Correct installation, proper operation and preventative maintenance are essential to obtain the most efficient, dependable performance from your equipment. It is assumed the design criteria and selection of the fan type will have been done correctly to suit the requirements of the process by a suitably qualified engineer. In some circumstances additional care must also be taken to ensure the arrangement of the fan (s) in the process is such as not to affect the efficiency or operation of the fan(s). This includes but is not limited to the inlet and outlet configuration, the starting procedure and electrical controls, control or prevention of contra rotation in parallel or series arrangement of multiple fans, effects of pollutant or contamination within the air stream etc. In any areas where these criteria may be present referral to for approval by the original manufacturer will be required. Installation of the equipment where these criteria are ignored may have an effect upon the warranty of the equipment.

The following instructions are intended to assist you in installing and maintaining the equipment plus reducing shutdown periods and lower expenditure on repairs and replacement of worn parts whilst also helping to prevent breakdowns.

FAN STORAGE

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

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

b) Slowly turn rotating parts at regular/monthly intervals to re-distribute the lubricant. Make sure the impeller finishes at 180^{o} to its former position; this will help eliminate possible vibration caused by the impeller and shaft settling into one place. Never leave fans stationary for any length of time adjacent to other vibrating machinery as this can cause brinelling of the bearing and serious shaft damage.

STORAGE OF BELTS

V-Belts should be stored in a dry stockroom, and contact with hot pipes and direct sunlight carefully avoided. Where possible, handle the belts loosely in single (or triple) coils. Always avoid tying them tightly with thin string.

GUARDS / PROTECTION

Where guards are necessary it is desirable to use the mesh type to permit adequate ventilation BUT MUST comply with current standards for guard design. Any work should be carried out to the manufacturer's instructions in their manuals, but as a minimum when any work is carried out on this unit, it must be isolated such that the fan cannot be started and neither the protective guards around the drive belts nor the inspection door for the fan should be removed unless the fan has been electrically isolated so it may not be started. The impellor and electric motor must be stationary

HANDLING

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. See Fig. 1a, 1b, 2a & 2b.

Where the equipment is despatched in parts, each item should be handled in the appropriate manner, the impeller for instance, will have been dynamically balanced to ensure smooth running and should always be lifted by clamping and back plate, 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. Such items as motors and bearing housings are usually manufactured in cast iron and if dropped will fracture and also require replacement.

INSTALLATION

Foundations

Reinforced concrete is recommended as the best type of foundation for our equipment. Minimum weight of concrete should be about four times the combined weight of all 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.

System Design

It is assumed the design criteria and selection of the fan type will have been done correctly to suit the requirements of the process by a suitably qualified engineer. In some circumstances additional care must also be taken to ensure the arrangement of the fan (s) in the process is such as not to affect the efficiency or operation of the fan(s). This includes but is not limited to the inlet and outlet configuration, the starting procedure and electrical controls, control or prevention of contra rotation in parallel or series arrangement of multiple fans, effects of pollutant or contamination within the air stream etc. In any areas where these criteria may be present referral to for approval by the original manufacturer will be required. Installation of the equipment where these criteria are ignored may have an effect upon the warranty of the equipment.

SETTING UP AND OPERATING INSTRUCTIONS

Before commencing instructions for operation of the fan(s) certain basic checks should be carried out to ensure that the plants are ready to run. This involves the following items:

1. Check that all joints on the ductwork system are locked up tight.
2. Check that all access and inspection doors throughout the system are fitted and bolted down. This includes ductwork and filter unit.
3. Inspect the Main Exhaust Fan to ensure that the belt alignment is correct and that the pulleys and drive turns freely. (Power should be isolated for this check).
4. Check that the drive guard on the exhaust fan belt drive is in position and secured after completion of drive inspection. (If applicable)
5. Check the rotation of the fan. The extraction fan should rotate so the air is pushed out of the outlet by the impellor rotation (similar to a pump) when viewed from the drive side of the fan. A small arrow on the fan should identify rotation direction.

If all of these checks have now been carried out satisfactorily, then the fan(s) can be run up to check that it is rotating in accordance with the instructions above. When the fan is running at full speed, then an air volume check should be carried out to ensure that it is delivering the specified air volume.

After eight hours running belt tension should be checked on the main fan drives. Adjust if required. (See operating instructions or data sheet of proprietary fan suppliers).

MAINTENANCE SAFETY INSTRUCTIONS AND PRECAUTIONS

In the case of the centrifugal fan, work should be carried out to the manufacturer's instructions in their manuals, but as a minimum. When any work is carried out on this unit, it must be isolated such that the fan cannot be started. Neither the protective guards around the drive belts nor the inspection door for the fan should be removed unless the fan has been electrically isolated so it may not be started. The impellor and electric motor must be stationary.

INSPECTION SCHEDULE

1. Daily inspection.
   - Ensure there is no undue vibration or excessive noise from the equipment.
   - Visually check bearings for lubricant leak.
   - Check bearing temperature. After one weeks running from new 50 deg Celsius is acceptable.
   - Visually check drive alignment and tension and rectify if required in first week of running
   - Check fan motor temperature and ensure cooling fan clear.
   - Check motor fixing bolts and foundation bolts.

2. Weekly inspection.
   - Check joints to fan and ducts.
   - Visually check drive alignment and tension weekly for first month and rectify if required.

3. Monthly inspection.

CAUTION. ALWAYS ENSURE THE FAN IS ELECTRICALLY ISOLATED AND MAY NOT BE STARTED BEFORE CARRYING OUT ANY MAINTENANCE OR INSPECTION THAT PLACES PERSONS INSIDE THE DEMISTER UNIT OR FAN. SIMILAR PRECAUTIONS MUST BE TAKEN WHEN THE VEE BELT DRIVE COVERS HAVE TO BE REMOVED.

- If the fan is belt driven, on a monthly basis the fan belt tensions should be checked to ensure that there is no belt-slip taking place. During the initial commissioning stage, these may need to be checked on weekly basis until the plant has settled down.

- At the same time that the belts are checked, the main fan bearings should be felt for temperature. These should run at a temperature sufficient to keep your hand on the main bearing casing without discomfort. It will be noted that the bearing nearer to the fan normally runs slightly hotter. In the event that these are running over warm, belt tensions should be checked and the bearings lubricated. (DO NOT OVER LUBRICATE THE BEARINGS).

Any excessive bearing heat and/or vibration (imbalance) of the fan must be investigated immediately. Under no circumstances should the fan be allowed to continue running in a potentially unbalanced state. If in doubt, consult the fan manufacturer / supplier.

4. Quarterly

There are no quarterly inspection schedules required other than the repeat of the above as noted.

5. Annual Inspection.

- The fan should have its access door removed on the fan casing, so that cleaning of the fan blades may take place. All debris should be removed from the blades by first hosing and then scraping with a flat bladed scraper. It is important that the blades are cleaned evenly; otherwise an out of balance condition will arise when the fan is started up. If this situation arises, then the fan would have to be rebalanced. Access may also be achieved by removal of the fan inlet duct section, if required.

- Access doors should be removed from the main ductwork system and an inspection taken place. If there is any accumulation of debris within the duct system, particularly near to bends or junctions, then the debris should be removed

- Inspection of the exhaust stack should be carried out and any debris removed. If corrosion is taking place within the exhaust stack, consideration should be given to repainting.

- The externals of all items of fans and duct or flexible attachments should be inspected and any damage to the equipment or paintwork should be repaired. This is particularly important where plant is located outside or in coastal regions.

- Any dampers associated with the fan operation should be inspected, cleaned and checked for free movement. Ensure correct operation and that all seals are intact.

LUBRICATION SCHEDULE

CAUTION: ALWAYS ENSURE THE FAN IS ELECTRICALLY ISOLATED AND MAY NOT BE STARTED BEFORE CARRYING OUT ANY MAINTENANCE OR INSPECTION THAT PLACES PERSONS INSIDE THE FAN. SIMILAR PRECAUTIONS MUST BE TAKEN WHEN VEE BELT DRIVE COVERS HAVE TO BE REMOVED.

On direct driven types where the fan impellor is attached to the motor shaft see motor manufacturers data sheets for frequency or requirements of lubrication but consider the following as a minimum.

ELECTRICAL MOTOR MAINTENANCE AND LUBRICATION

Totally enclosed, fan cooled moors, corresponding to the British Standard Range are normally fitted, and detailed maintenance instructions should be obtained from the manufacturers. The following general notes are given for guidance.

Provided that the fan is installed in an area reasonably clear of dust, oil and grease, cleaning should only be necessary at infrequent intervals. Dust may be removed by means of a vacuum cleaner after removal of end shields of the motor. Alternatively, a low-pressure air blast may be used taking care to avoid damaging insulation. High-pressure air is to be avoided as dust may be blown further into ventilating ducts and intersticks where it packs tight, and cannot be removed. Petrol, trichloroethylene, or carbon tetrachloride may be used sparingly to prevent the solvent damaging insulation by removing varnish. The solvent must not come into contact with rubber-insulated leads, such as those between windings and the terminal block.

It is general practice for motors fitted with ball and roller bearings to be despatched from the Works with bearing housings correctly filled with grease. Under normal conditions, this is sufficient to last for two years, providing there is no grease leakage. The exact type of grease varies from manufacturer, but in all cases a good grade of lithium-base grease is used.

For re-lubrication purposes, Shell Alvania 3 grease is recommended. As mixture of grease does not always give good results, it is recommended that the old grease be thoroughly cleaned out before the first re-lubrication, and from then, the same grade or brand of grease be subsequently used.

Avoid over filling bearing housings, this can result in overheated bearings, chemical breakdown of the grease and subsequent bearing failure as hardening of the grease takes place within the bearing.

BELT DRIVEN CENTRIFUGAL FAN LUBRICATION.

SEE SUPPLIER'S DATA SHEETS OR AS A MINIMUM APPLY THE FOLLOWING.

It is suggested that initially these bearings would be inspected weekly for the first month and thereafter on a monthly basis for light greasing. On belt driven type of fans there are normally two fan bearings carrying the main centrifugal drive shaft. In order to lubricate these the fan must be isolated electrically and the bearing filled with grease via the grease nipple

Fans will give long trouble-free service with very little maintenance, and regular inspection will ensure that any conditions likely to reduce service ability are quickly dealt with.

It is recommended that fans be inspected upon receipt and at regular intervals, approximately once a month, unless conditions are very severe, when more frequent inspections should be carried out, approximately one a week.

Provided the correct type of fan has been chosen for the particular duty, cleaning should be required only at infrequent intervals. Where a build up of foreign matter on the fan blades is probable, for example, on Spray Booth Exhaust Fans, cleaning must be carried out at frequent intervals. In such applications, build up on the fan blades can cause the impeller to become out of balance and the consequences can be serious.

Where fan rotors are directly coupled to the motor, the lubrication instructions attached to the motor must be adhered to.

Fans are despatched from the works with bearing housings pre-packed with the correct quantity of Shell Alvania RA. This grease has a melting point well within the operating temperatures of most industrial applications. (By the use of special greases, higher operating temperatures can be accommodated, but the special lubrication instructions applicable must be strictly adhered to. It is most important that normal temperature and high temperature greases should not be mixed). Particular note of the following points should be made:

1) Ensure that grease is clean and uncontaminated before use.
2) Where Stuffer type grease cups are used, the caps must be replaced securely after re-filling.

Where sealed bearings are utilised, under normal conditions no re-lubrication should be necessary as they are pre-packed with the correct grade and amount of grease, and should operate without attention for the whole of their working life (approximately 10,000 hrs under clean ambient temperature conditions).

If conditions are more arduous than normal, and re-lubricating becomes necessary, it is possible to add grease after removing the blanking screw, fitting a grease nipple, and inserting a small amount of grease. DO NOT OVER GREASE. More bearing failures are caused by over greasing than by too little lubrication.

If bearing housings are too tightly packed with grease, over heating occurs by the churning of the grease by rotation of the bearings. The over heating causes the grease to break down chemically, and its lubricating properties are lost; this allows metal to contact the rotating parts, and the consequent bearing failure is inevitable.

General bearing maintenance should allow for the addition of a small quantity of grease at regular intervals, approximately once a month. After twelve months operation, the old grease should be removed and the bearing housings re-packed not more than one-third full with the recommended grade of grease.

Spherical seated ring oiling bearing plummer blocks are fitted with oil level indicator glasses.

Fans are despatched from the works with the oil wells unfilled. Before the fan is run, the bearings must be filled with Shell Vitrea 41 oil or equivalent S.A.E. 20 oil to the oil level indicated.

It is recommended that after the first hundred hours operating time, the sleeve bearing plummer blocks be drained, cleaned and should be maintained by topping up at three monthly intervals.

OVERFILLING MUST BE AVOIDED. When extended lubrication pipes are fitted these should be blown through with compressed air to ensure a clean passage of oil to the bearings.

Where Vee-Belt drives are employed it is important that over-tensioning of the belts be avoided. Over tensioning, besides causing increased belt wear, frequently causes overloading of the motor and fan bearings, and their subsequent failure.

Where Wedge type Vee rope drives are used, the belt should not be under tensioned. Too low a tension allows belt slip, and the friction between belts and pulley generates heat. This heat is conducted to the drive bearing via the shaft, and can give rise to bearing temperatures above the ceiling temperature of the grease, causing bearing failure.

LUBRICATION OF CARTRIDGE BEARINGS (BALL AND/OR ROLLER)

Grease Lubricated type.

Grease nipples are fitted and 1 – 2 shots should be applied from a grease gun every one to two months.

A good quality lithium based grease should be used. Suitable well known brands include the following

SHELL ALVANIA 3.
SHELL ALVIANIA RA.
B.P. ENERGREASE LS 3.
ESSO BEACON 3.
MOBIL MOBILUX 3.
CASTROL SHEEROL AP 3.
CENTRY LUPUS A2.
TEXACO REGAL STARFAX PREMIUM 3.

Occasionally, due to special operating conditions, we recommend oil instead of grease for ball and roller bearings. In such cases, suitable oils are:-

For fans handling atmospheric air:-

MOBIL DTE LIGHT.
SHELL VITREA 25.
CENTURY WLC OIL.
B.P. ENERGOL HL.65.

For fans handling warm gas where the bearing temperature may be up to $93^{o}C$:-

MOBIL DTE HEAVY MEDIUM.
SHELL VITREA 33.
CENTURY WLC OIL.
B.P. ENERGOL HL. 100.

For fans handling hot gases where the bearing temperature may be up to $150^{o}C$:-

MOBIL EXTRA HECLA SUPER CYLINDER.
SHELL VALVATA J. 77.
CENTURY SH. 600.
B.P. ENERGOPL DC. 700.

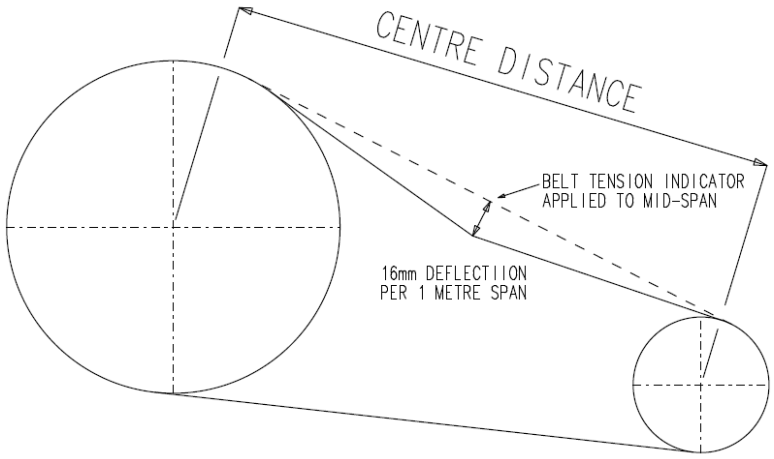
INSTALLATION AND OPERATION OF BELT DRIVES

TYPICAL EXAMPLE OF INSTRUCTIONS FOR INFORMATION ONLY
FAN DRIVE BELT TENSIONING USING BELT TENSION INDICATOR

1. Calculate the deflection distance in mm on a basis of 16mm per metre of span. Centre Distance (m) x 16 = Deflection (mm).
2. Set the lower marker ring at the deflection distance required in mm on the lower scale.
3. Set the upper marker ring against the bottom edge of the top tube.
4. Place the belt tension indicator on top of the belt at the centre of span, and apply a force at right angles to the belt deflecting it to the point where the lower marker ring is level with the top of the adjacent belt.
5. Read off the force value indicated by the top edge of the upper marker ring.
6. Compare this force to the kgf value shown in the table below.
7. If a Belt Tension Indicator is not available, a spring balance and rule will suffice.

NOTE: For single belt drives a straight edge should be placed across the two pulleys to act as a datum for measuring the amount of deflection. If the measured force falls within the values given, the drive should be satisfactory. A measured force below the lower value indicates under-tensioning. A new drive should be tensioned to the higher value to allow for the normal drop in tension during the running-in period. After the drive has been running for 30 minutes, the tension should be checked and re-adjusted to the higher value, if necessary.

BELT SECTION	FORCE REQUIRED 16MM PER METRE	TO DEFLECT BELT OF SPAN	
	SMALL PULLEY	NEWTON (N)	KILOGRAM
	DIA. (MM)		FORCE (kgf)
SPZ	67 to 95	10 to 15	1.0 to 1.5
	100 to 140	15 to 20	1.5 to 2.0
SPA	100 to 132	20 to 27	2.0 to 2.7
	140 to 200	27 to 35	2.7 to 3.5
SPB	160 to 224	35 to 50	3.5 to 5.1
	236 to 315	50 to 65	5.1 to 6.6
SPC	224 to 355	60 to 90	6.1 to 9.2
	375 to 60	90 to 120	9.2 to 12.2
8V	335 & above	150 to 200	15.3 to 20.4
Z|	56 to 100	5 to 7.5	0.5 to 0.8
A	80 to 140	10 to 15	1.0 to 1.5
B	125 to 200	20 to 30	2.0 to 3.1
C	200 to 400	40 to 60	4.1 to 6.1
D	355 to 600	70 to 105	7.1 to 10.7



Belt deflection measurement.

The take up figures in the above table are less than the recommendations of ISO 155 because of the characteristics of wedge belts.

BELT MATCHING

Drive belts are manufactured within internationally accepted length tolerance bands and therefore do not require a matching code number.

On those applications where coded belts are being fitted it is important to ensure that the belts are used in matched sets. The code number, which is printed on the belt close to the label, indicates the actual length related to the nominal length. Each 2mm variation from nominal length is represented by one unit above or below the number 50. For example, D13700 Belts with code number 53 have an actual pitch length of (13700+6)= 13706mm ± 1mm.

Care should be taken to ensure that matched sets fall within the following limits:

BELT PITCH LENGTH	CODE SPEED
UP TO 1899mm	1
1900 to 3149mm	2
3150 to4999mm	3
5000 to 8999mm	4
9000 to 12499mm	6
12500 to 16000 mm	7

INSTALLATION AND TAKE UP ALLOWANCE TABLE

INSTALLATION ALLOWANCES

BELT PITCH	SPZ	SPA	SPB	SPC	8V	TAKE UP
LENGTH (MM)	Z	A	B	C	D	(MM)
410 to 530						5
530 to 840						10
850 to 1160						15
1170 to 1500						20
1510 to 1830	20					25
1840 to 2170						30
2180 to 2830		25				40
2840 to 3500			30			50
3520 to 4160				50		60
4170 to 5140					65	70
5220 to 6150						85
6180 to 7500						105
7600 to 8500						125
8880 to 10170						145
10600 to 12500						175

TENSIONING PULLEYS

If tensioning (jockey) pulleys are to be used on Wedge – Belt drives, they must be fitted with a grooved pulley bearing on the inside of the drive, preferably on the slack side. The pulley should be positioned as close as possible to the large pulley. Flat tensioning pulleys, bearing on the outside of the drive are permissible only with V and not with Wedge-Belts. They should be positioned within one third of the centre distance from the small pulley. The tensioning pulley must be at least the same diameter as the small pulley of the drive. Tensioning pulley movement can only be determined by laying out the drive to scale. It must allow for passing the belts over the outside diameter of one of the pulleys on installation and should also allow for belt stretch.

VEE BELT TROUBLE SHOOTING (see also troubleshooting table on next page)

Small cracks on V-Belt side and base.
Generally caused by shortage of belt tension, but excessive heat and/or chemical fumes can also give same failure.

V-Belt swelling or softening.
Caused by excessive contamination by oil, certain cutting fluids or rubber solvent.

Whipping during running.
Usually caused by incorrect tensioning, principally on long centre drives. If a slightly higher (or lower) tension does not cure the problem there may be a critical vibration frequency in the system, which requires re-design or a Banded belt.

Alignment.
Good alignment of pulleys is important to avoid belt flank wear.

Dual Duty Pulleys.
SPZ pulleys may be used with SPZ or Z section belts
SPA pulleys may be used with SPA or A section belts
SPB pulleys may be used with SPB or B section belts
SPC pulleys may be used with SPC or C section belts

MISMATCHED BELTS AT INSTALLATION	BELTS TOO SHORT AT INSTALLATION	BELTS TOO LONG AT INSTALLATOJN	EXCESSIVE VIBRATION	EXCESSIVE STRETCH	BELT SQUEAL	HARDENING & PREMATURE CRACKING	BELTS TURJNOVER	BROKEN BELTS	SIDE SPLIT	PLY SEPARATION	UNEVEN ENVELOPE WEAR	ENVELOPE WEAR	SPIN BURN	GOUGES	WEATHERING OR CRAZE CRACKS	LOOSE COVER \& SWELL	PROBLEM / PROBABLE CAUSES
																O	EXCESSIVE OIL
															O		EXPOSURE TO ELEMENTS
														O			PRIED OVER PULLEYS
														O			CONTACT W/OBSTRUCTION
			O										O				INSUFFICIENT TENSION
													O				STALLED DRIVE PULLEY
												O					CONSTANT SLIPPAGE
											O						ROUGH PULLEYS
									O	O							SUBSTANDARD PULLEYS
										O							EXCESSIVE TENSION
					O				O								SHOCK LOAD
						O		O									FOREIGN MATERIAL
												O					EXCESSIVE DUST
							O										DRIVE MISALIGNMENT
O				O			O										WORN PULLEYS
							O										EXCESSIVE VIBRATION
						O											HIGH AMBIENT TEMP.
				O													EXCESSIVE TENSION
				O													DRIVE UNDERBELLED
			O														DAMAGED TENSILE MEMBER
	O	O															INCORRECT BELTS
	O	O															INCORRECT DIRVE SETUP
	O	O															INSUFFICIENT TAKE UP
O																	IMPROPER MATCHING
O																	MIXED OLD & NEW BELTS
O																	NON PARALLEL SHAFTS
O																	DIFFERENT MANUFACTURERS
SOLUTION																	
													O			O	**LUBRICATE PROPERLY**
																O	**CLEAN PULLEYS AND BELT**
O			O												O		**REPLACE BELTS**
								O				O			O		**PROVIDE PROTECTION**
			O					O		O				O			**INSTALL PROPERLY**
														O			**CHECK FOR BELT LENGTH**
														O			**REMOVE OBSTRUCTION**
			O	O	O							O	O				**TENSION PROPERLEY**
													O				**FREE PULLEYS**
O				O			O				O						**REPLACE PULLEYS**
											O						**FILE SMOOTH**
									O	O							**REDESIGN DRIVE**
								O									**OPERATE PROPERLY**
O							O					O					**ALIGN DRIVE**
						O											**PROVIDE VENTILATION**
	O	O		O													**CHECK FOR PROPER BELT**
	O	O															**CHECK MACHINERY**
O																	**USE ONLY NEW BELTS**
O																	**USE SINGLE SOURCE**

LUBRICANT LEAKAGE TROUBLE SHOOTING

Leakage may be due to:-

CAUSES	SUGGESTED REMEDY
Badly jointed cartridge covers.	Dismantle, clean and remake joint.
Worn felt packing in end covers.	Renew felts, firstly cutting to length and soaking in oil.
Overheated bearing causing grease To change viscosity with consequent Loss.	Check and adjust vee belt drive.

VIBRATION FAULT FINDING

If a fan is allowed to run for long periods in an unbalanced state, either the impeller shaft or bearings will sustain damage. Impellers out of balance should be corrected as soon as possible. Causes of vibration and suggested remedies are given below.

CAUSES	SUGGESTED REMEDY
Deposit on impeller.	In most cases, deposits will be heaviest on back of blades. This must be removed and the impeller thoroughly cleaned with a wire brush.
Misalignment of fan and Driving unit.	Correct the alignment.
Abrasion of impeller.	Impeller wear may cause out of balance even though wear is not sufficiently severe to justify replacement. Rebalance impeller in position.
Impeller damaged in transit or erection. Impeller blade shed or bent by foreign body.	Rectify any obvious damage and rebalance impeller in position. If badly damaged, return impeller to works.
Bent fan shaft.	Shaft should be replaced
Slack H.D. bolts in bearings baseplate or pedestals.	Tighten all H.D. bolts and check alignment.
Excessive carry over leading to an accumulation of sludge in bottom of fan case and build up of dust on impeller.	Clean out fan assembly; check air rate not exceeding that specified and picking up too much material

FAN DATA SHEET

CLIENT: DUSTAIR **ITEM No:**

Ref. No: E **PO:** **JOB No: W°**

DATE OF DELIVERY:

TYPE OF FAN:

SERIAL No:

Ref No:

TYPE OF APPLICATION: **EXTRACT**

Drg. No:

HANDING:

FAN OPERATION: **FUME EXTRACTION**

VOLUMETRIC THROUGHPUT: **CFM (m3/s)**

SPEED: **rpm**

TOTAL COMPRESSION: **ins WG (Pa) @ 20˚C**

POWER: **Kw @ 20˚C**

MOTOR

MAKE: **-**

FRAME SIZE:

POWER: **Kw**

SPEED: **rpm**

SUPPLY: **415v 3ph 50Hz**

SERIAL No: **-**

Motor data sheet, if available

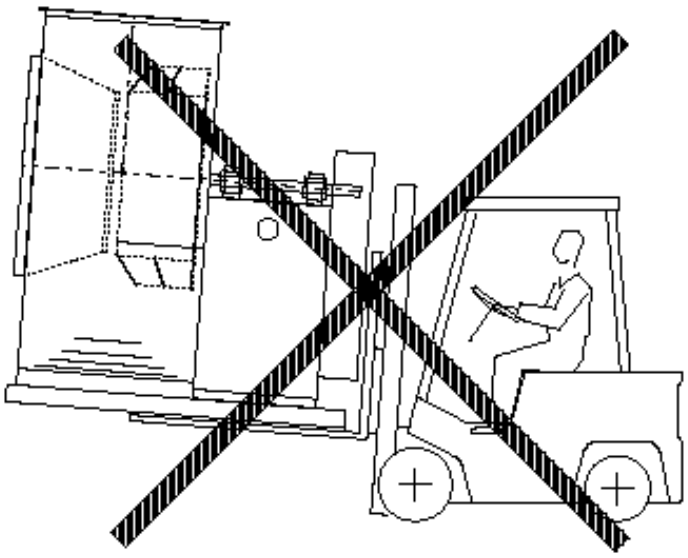


Fig. 1a

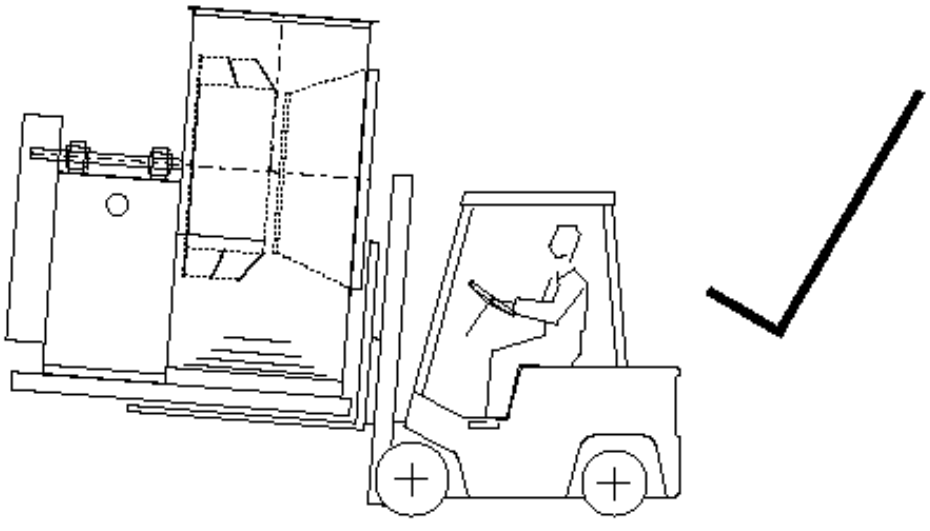


Fig. 1b

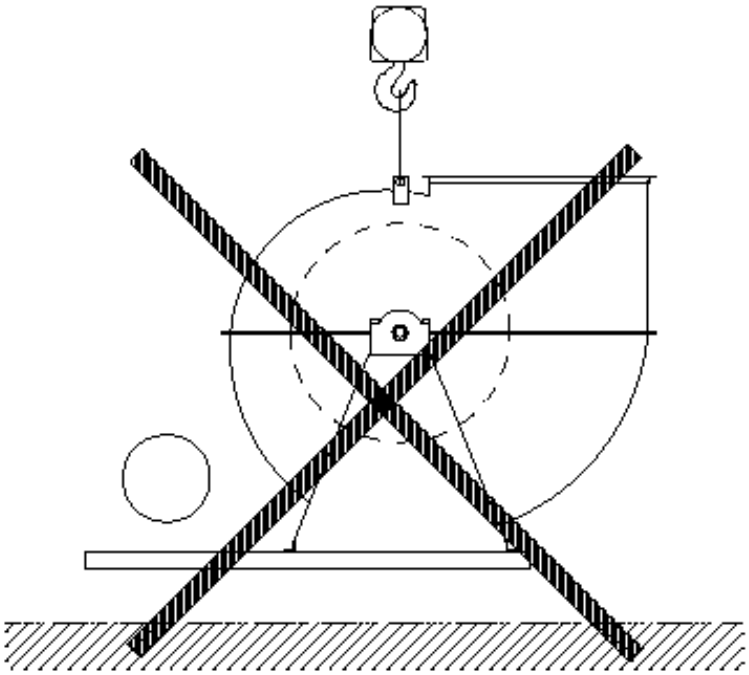


Fig. 2a

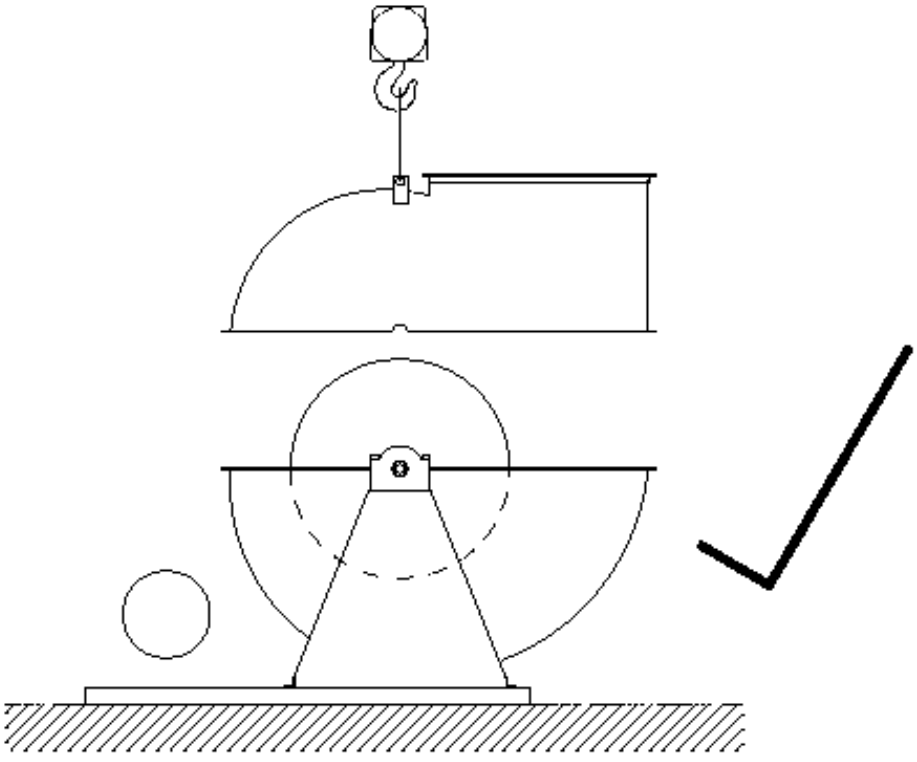


Fig. 2b