

Ceiling Sweep Fans

Why use a Fan?

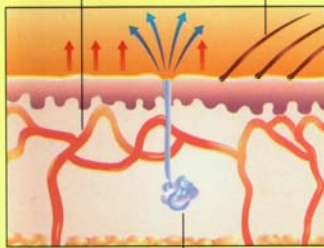
As you can see in diag 1, the skin is an efficient regulator of body temperature. Fans enhance that natural ability by passing air over the skin. In the artificial spaces of our homes, where there is little or no air flow, the fan recreates the environment we were evolved for.

TEMPERATURE CONTROL

Your skin plays a vital part in keeping your body temperature constant, as shown below.

How skin cools down

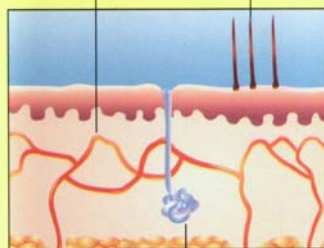
Blood vessels widen, so more heat can be lost through the skin. Hairs (only shown here at the surface) lie flat, so little warm air is trapped.



Sweat is produced. It escapes through holes called **pores**. As it dries, it uses heat from the skin, and cools you down.

How skin retains heat

Blood vessels narrow, so less heat escapes through the skin. Erector muscles contract and make hairs stand up, trapping warm air.



Sweat glands produce less sweat.

Your body also keeps warm by shivering. Your muscles jerk automatically, producing heat as they do so.

Diag 1

Where are they most effective?

Fans work by pulling a given volume of air through the blades, and when used to assist in cooling, forces that air down towards the floor. The result of this (low) pressure movement is to force the still air under the fan down and away from the fan. An effective range where this air movement will still pass over the skin is about 2 metres from the tip of the blade.

E.g. a 52" (130cms) blade will have an effective diameter of 4.13 metres. If the speed of the fan is increased, air flow will improve, but the effective range will remain about the same. (This is because of height and the angle of air flow, if you were to lay on the floor the range would be greater.)

So, placement of the fan where the greatest need is, will be important in large rooms, as they have an limited effective range.

Fans can assist with heating in a room by reversing the air flow and pushing the air up and forcing air down walls at the perimeter of the room. This does two things, it forces hot air back down from the ceiling, where it has naturally risen, and ensures no breeze directly over the body which would cause the skin to cool.



A ceiling fan should be no lower than 7' from the floor – the higher the better. Also, it needs at least 12" between the blades and the ceiling.

Optimal height of blades above floor level is 8' from floor (9' is acceptable)

Diag 2

What's needed to install a fan?

Height, less than 7 feet will put people at risk of being struck by moving blades, (remember even someone of modest height can reach the top of a door frame which 7 foot.) Also the effective range will be reduced.

A securing point, the average fan weighs in at 8kg and above, and because they are moving the stress on the ceiling will be far higher, so a load bearing structure needs to be in place to support the fan. In most cases therefore it will be necessary to enter the ceiling space to secure the fan safely.

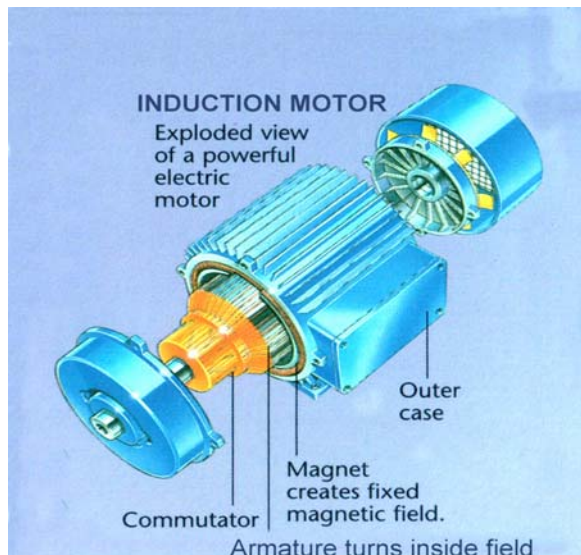
An electrician, it is not safe to install a fan electrically yourself. Electrical compliance has to be tested for, and a certificate issued by a certified electrician. This is necessary to maintain warranty and to ensure you can insure your home.

Ceiling Sweep Fans



What type of motors do Fans use and why?

Fans use what is called an *induction* motor. This type of motor only runs on mains electrical power (AC 240 volt). It is quiet because it has no brushes making contact with the armature, but because of this is usually less powerful, and therefore has to be larger; they run at slower revolutions. So typically a 3/4 Hp induction motor would run at 1075 - 3450 RPM, be about 6" long to 6" diameter and weigh about 19 lbs.



As a point of comparison. The other type of motor used for electrical appliances is a *universal* motor, these motors can run on AC (240 volt) or DC (12 volt) power, and use brushes which contact the armature and because of this deliver more power, they are small motors and run at high revolutions, and are noisy. A typical use might be a vacuum cleaner or portable circular saw, a 3/4 Hp universal motor would run at about 15000 RPM, be about 6"

long and 3" diameter and weigh 2.85 lbs.

Most fans use between 45 watts and 90 watts (0.06 to 0.12 Hp). So a 75 watt fan would cost, if used 12 hrs, approx \$0.16. AUS at \$0.18 /Kw.

What format do fans come in and why?

A combination of the following

Blades

- * 3 blades
- * 4 blades
- * 5 blades
- * 6 blades

Controls

- * Wall
- * Remote
- * Pull chain
- * Reversible

Motor Construction

- * Steel
- * Aluminium
- * Galvanized

Motor Size

- * 40 watts
- * 60 watts
- * 80 watts

Blade Construction

- * Wood
- * Plastic
- * Metal
- * Aluminium
- * Rattan
- * Cloth

Lights

- * With light
- * Without
- * Light adaptable

Size (diameter)

- * 30 inch
- * 36 inch
- * 48 inch
- * 52 inch
- * 65inch

A variety of combinations accommodates situations like outdoor installations, where for example a galvanized body and plastic blades (stops warping) is necessary.

Ceiling Sweep Fans

What features do I need to look for?

Evidence in China shows the Chinese using some form of fan at 3000 years BC. In fact the Chinese make 90% of the worlds ceiling sweep fans and have done for many, many years. Such that, they make the very best quality of fans and the worst. So, as with everything a balance between quality and price has to be reached.

The first question to be asked therefore. **Is what do we want to achieve?**

There will always be at least two priorities

- * cooling, and then e.g.
- * in a bedroom...quiet
- * in a living room...max air flow
- * outside...durability
- * in a kitchen...ease of cleaning.

- ♣ With this in mind, we will run through the features to be looked for on a fan to match one of the above situations.

In the main **bedroom** of any home, for quiet running we will want

- * Slow speed
 - * Long flat blades
 - * Quiet motor
 - * Solid mounting
 - * Stable fan
 - * Light adaptable
 - * Easy access to controls
- These last points are merely an extension to what we want to achieve.

Now let's look at fan features

with this in mind.

Motor

- 60 watts or above as all fans are 3 speed now, the larger the motor, the easier it can handle slow speeds.
- Sealed metal bearings, as these will last 20 years plus. But if price the issue the first point is more important.

Blades

- Long blades, (by this I mean 48" or above.) More air flow from the longer blade.
- No rattan inserts and as flat as possible to reduce air turbulence and therefore noise, (output not as important as a soft breeze will be enough for cooling, as we are not active when asleep.)

Hanging mechanism

- The hang sure mechanism below, can accommodate rake in the ceiling, and is a very stable and quiet unit. Recommended

Switching

- Because the ambient temperature at night drops and you might want to



turn the fan down or off a wall control close to the bed may be advisable.

Lights

- Can rattle on fans, and if possible should be avoided in the bedroom, but if a light must be used on the fan, then a solid fitting must be used.

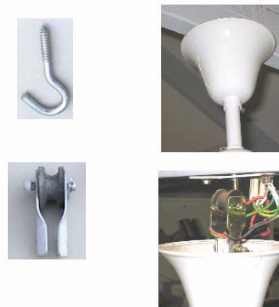
- ♣ To run through another situation.

In this case a **living room**, let's overview what might be applied.

This is a large room, 12' ceilings, 8m x 4m where max. air flow will be required, and it has decorative ceiling roses. We will want

- * Med to high speed
 - * Long efficient blades
 - * Remote control
 - * Light adaptable
 - * Powerful motor
 - * Accommodating mount
- Features necessary will be Hanging mechanism

- A 'J' hook mechanism, as this allows the support rod to be passed though the rose and ceiling ma-



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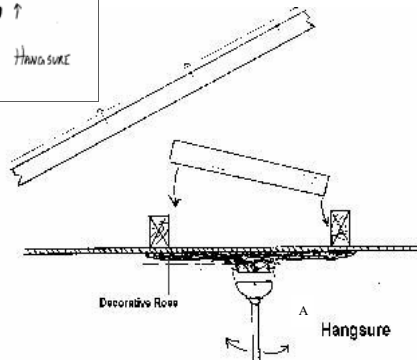
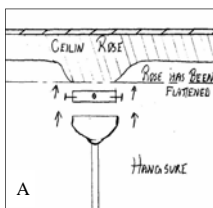
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terial to be secured in the ceiling/roof cavity. (This or "t hook" devise below will be mandatory if the decorative rose is plastic or fiberglass as they are hollow, but a hangsure can be used where the 'rose' is plaster as the solid centre can flattened with a rasp, the advantage would be more stable fan. [There are some warranty issues here! Please check with suppliers if you wish to supply anything extra to what manufacturers recommend.]



T Hook



Powerful motor

- Because the blades need to be long and efficient, e.g. 52" and at 17 deg pitch (the angle the front edge of the blade is pitched to direct air,) a strong motor (60 watts or above) will be needed.
- Increased need for output will see these fans running for long periods at higher speeds. The internal temperature of these motors can reach 110 deg C. and as such, these motors need to be well constructed with quality materials if they are to last.

Light adaptable

- Simply because this may be necessary for this room

Remote control

- This room is quite vast, if cooling the whole room is necessary, than two fans will be required, given this need, a simple and convenient way to control both fans would be with one remote handpiece. (this is not mandatory, just an example of how these products can be applied)

Efficient blades

- 52" blades would give the most reach in this situation. High pitch, with wide paddles would also aid output (air flow). Some blades have an airfoil shape, enhancing output, (this will increase noise, but not a disadvantage in what is a normally busy and therefore noisy room.)

Extension rods

- 12' ceilings will require extension rods. Standard 36" rods are supplied and cut down in this case, (beware some fans require wiring looms to be supplied with ext. rods).

These are examples only, and knowing the product will allow you to apply features of individual models to the various needs of different rooms in the home.