# What is Gas Ducted Heating (GDH)?


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# Introduction

The best way to feel more comfortable in your home this winter and spend less on heating is to reduce the heat losses. Reducing those losses is best done **FIRST** –

- Sealing off all draughts
- Reducing leaks
- Insulating ceilings & walls
- Adding insulating window coverings and
- Insulating floors

For a more information on the above and more, please refer to another article we have compiled ***"Heating and Cooling Energy Tips".***

Gas ducting heating is a long term investment so before you even begin looking at heating systems, there are a few things you should consider. For instance, how will future lifestyle changes affect your heating needs? Think ahead, and purchase a system that fulfils your current needs as well as your future ones. Determine how many rooms you want to heat at any given time. Figure this out, and you're half way to finding the heating system that's right for you.

In most areas, electricity costs are rising faster than gas, so natural gas heating offers a cost-effective alternative. Plus it's kinder to the environment, as it produces fewer greenhouse gas emissions than most other forms of heating sources.

Australian Gas Association research found that gas ducted heating (GDH) systems produced just one third of the emissions of heating produced by black coal-generated electricity.
**(Source: Assessment of Greenhouse Gas Emissions from Natural Gas, Australian Gas Association, 2000).**

## *ABSOLUTE COMFORT*

Gas Ducted Heating (GDH) provides powerful, natural heat for either whole home or a zoned single room solution; you will always feel warm and comfortably no matter how cold it gets outside. Air is drawn from inside your home, rapidly heated, and then distributed through ceiling or floor vents.

With lower upfront costs than reverse-cycle and running costs (depending on your location and climate) you will save money while you efficiently and effectively heat your home.

GDH offers better performance than reverse cycle depending on your climate. As the outside temperatures drop, reverse cycle systems lose efficiency (meaning less heat output for the same electricity spend), often turning off to defrost ice build-up on the outdoor condensing Unit. GDH systems keep your home ***WARM no matter how cold it gets!***

As with electric reverse cycle heating systems, GDH systems are required to have their energy performance tested, and to carry a gas energy rating label on a scale from 1 to 6 stars, the higher the star rating, the closer to 100% of the gas is being converted into heat. A few manufacturers like BRIVIS and BRAEMAR offer highly efficient 5 and 6 Star systems.

If a GDH system is what you want or you are not sure, read on as we try and explain how it works. If you find something you don't agree with or require further information…..let us know……if we can improve the article……let us know.

# What Is Gas Ducted Heating (GDH)

Central heating systems or gas ducted heaters (GDH) are used to heat a whole house, or can be zoned to heat portions of a house. Space heaters (single heater) are different in the sense they are used to heat an area or single room.

With GDH air is heated by a gas furnace by passing cold air over a heat exchanger and the warmed air (generally to 50oC to 70oC) is then pushed through ducts into the home via a series of vents in the ceiling or floor. The furnace draws the air from inside your home into a return air grille where it may pass through a filter, from here it then flows through the heat exchanger where it's warmed, repeating this cycle throughout the whole operation (recirculating the air within the home).

A thermostat senses the air temperature inside the home and sends a signal to the heater to cycle on, or off, to maintain the desired temperature. All by-products of the combustion cycle are all discharged (via a flue) safely to outside the home in an internal system is used.

The two main types of gas furnace used in residential homes are -

- Internal-only which are generally installed sub-floor or in roof cavities;
- Outdoor-only attached to an external wall and are weather-proof

***Less common are multi-purpose type suitable for outdoor / indoor***

# Gas Ducted Heater Efficiencies

In Australia, GDH systems are required to have their energy performance tested, and to carry a gas energy rating label indicating efficiency on a scale from 1 to 6 stars. Many are classified as follows:

- Standard efficiency, which are 1 to 2 star rating;
- Mid efficiency heaters (fan assisted), which corresponds to a 3 to 4 star rating;
- High efficiency heaters (fan assisted heater with a 'condensing heat exchanger'), which corresponds to a 5 to 6 star rating.

Mid-efficiency heaters are traditionally designed to extract only heat from the combustion gases generated by the burner meaning efficiencies of no more than about 80% - 85%.

High-efficiency condensing heaters have a more efficient heat exchanger design which recovers the energy contained in the heated exhaust gases (normally lost to the atmosphere when discharged through the flue). This raises the efficiency to around 90% to 95%.

# Ducting, Zones & Accessories

Homes can be ducted to heat the whole house, part of a house or selective areas where a system can "zoned" with the aid of motorized dampers.

As mentioned earlier, these systems can be installed under the floor or through the ceiling when there isn't sufficient underfloor access or when both heating and cooling is required through the same outlets.

When the GDH system is located in the roof space the heated air is delivered to the given areas through down jet type grilles that direct the air downwards for maximum air mixing and to minimize heat stratification. The intake grille (return air) is located at ground level to "draw" the heat down otherwise stratification will also occur.

With external (located on the side of the house) and under-floor GDH systems, air is delivered through ducts that run under the floor and discharged through floor grilles. The intake grille (return air) is also located at floor level, or in below a staircase, or linen cupboard in a central area.

Talking of ductwork, request the highest insulated flexible duct, the higher the "R-values" the more efficient and less gas consumption. All duct connectors should also be insulated.

Just like an air conditioning system, a thermostat (usually built-in to the controller) is required to control the supply of warm air. Almost all brands offer programmable controllers, some are pre-programmed. Location

of the thermostat is very important to ensure you're not overheating the home, you can have two controllers for a large or double storey home.

GDH can be made to heat the whole home or zoned into multiple areas. Some brands even allow you to set different temperatures for the different zones. The high efficiency GDH systems have a number of gas burn rates and fan speeds which scale back both the heat and fan rate as the air within the home approaches the set point.

# Making the System Efficient

The gas furnace is the heart of the overall system which includes the ducting, controller, thermostat(s), grilles and the installation. Your type of home and how well it is insulated, what measures you have taken to draft-proof areas and window furnishings will have a **HUGE** impact on the running cost and heating efficiency.

- Correctly sized furnace……**ITS A MUST!** (most are over-sized).
- Ensure the GDH system is the most efficient you can afford.
- Insist on high quality insulated duct / fittings (absolute min. R1). Heat loss from poorly insulated ducting / fittings work can range between 10% - 30%

- Consider the location of thermostats, sensors and intake grille

- Type of diffuser, register, grille to deliver the air

- Air leakage from poor installation (?????%)

**Oversizing a furnace and using incorrect ducting size and minimal duct insulation have implications in many ways -**

- Oversized units have a higher capital cost and increased operating costs.

- Higher temperatures meaning higher duct losses

- Higher airflow and incorrectly sized ducting leads to higher duct losses and leakage

- Oversized units will tend to operate at a lower duty cycle or will reduce their burn rate / fan speed and operate at a lower heat output. It is important they operate efficiently over the whole operating range, not just at the maximum output

# How to Choose a System

When choosing a heating system, think about these things:

- How frequently are you going to use it?
- The size and structure of your home
- Your budget for installation and running costs (higher efficiency heaters can cost more to install but cost less to run)
- Can you zone the areas in your home? If so, what type and where the zones should be
- Can it be thermostatically controlled?
- Is it the appropriate size for the space to be heated?
- How much noise does it make?
- Will I need to add electric cooling to it?
- What are its greenhouse gas emissions?

# Add-on Cooling (Electric)

Not only can your GDH keep you warm in winter, but it can also keep you cool in summer, providing year round comfort. Most manufacturers offer dual combinations which are fully integrated,

utilising the same controls to deliver air conditioning through the same ductwork and outlets.

If you are installing a heating system and plan to install cooling at a later date, then ensure that you advise the contractor so they can size the system and **DUCTWORK** accordingly. Or, when installing a cooling system to an existing GDH, **CARE** must be taken to ensure the duct system is sized and designed correctly.

The cooling systems are specifically designed to match the heating unit, ranging in capacity from 10KW to 20KW. The cooling systems can be installed at the same time as the GDH or at a later date.

Our experience is that the capital cost of a GDH with add-on cooling is higher than a reverse cycle air conditioning system. This is a good option if the **PRIMARY** reason for installation is **HEATING** and you'd like the benefit of some cooling!

## Disclaimer: