

1. Activity Specific Definitions

Thermally efficient ductwork means flexible ductwork that is insulated using bulk insulation that achieves a minimum R value of R1.5 when measured in a flat plate test in accordance with AS/NZS 4859.1:2002

2. Activity Description (Summary)

Replacement of an existing flexible ductwork system for a reverse cycle air-conditioner with a new flexible ductwork system (including all fittings)

3. Activity Eligibility Requirements

1. The space conditioning unit to which the thermally efficient ductwork is to be attached must be located in a residential premises and must be a reverse cycle ducted air conditioner.
2. The relevant ductwork must be flexible ductwork and be installed within a roof space or between a floor and the natural ground.
3. The installation of thermally efficient ductwork must not be otherwise required by law, for example as condition of a development approval under the *Development Act 1993*.
4. Prior to engaging in this activity, the obliged retailer must:
 - a. have provided the Essential Services Commission of South Australia (the Commission) with an application for the approval of:
 - i. a software tool to assess the performance of the pre-existing ductwork system and the replacement ductwork system which verifies a specified percentage reduction in duct losses as outlined in Table 1; and
 - ii. the assessment process for which independent testing will be undertaken on the flexible ductwork system to ensure verifiability; and
 - b. receive the written approval of the Commission to install the flexible ductwork system.

4. Installed Product Requirements

The installed product must :

1. Be thermally efficient ductwork as defined above.
2. Have a thickness of the insulation as installed in the ducting that matches the design insulation thickness as specified by the insulation manufacturer
3. Be certified by an accredited body or approved laboratory as having an insulation conductivity and thickness such that the TRUE radial R value defined by equation 4 in AS 4508-2009, section 3.2.3, is greater than or equal to 1.3 K/W based on a one metre length of 300 mm internal diameter duct (i.e. $r_i = 0.15$ m). Furthermore, all other duct sizes used in the installation shall use the same insulation (conductivity and thickness) as that used in the 300mm internal diameter ducting
4. Be longitudinally labelled at intervals of not more than 1.5 metres, in characters that are clearly legible and at least 18mm high stating:
 - i. the duct manufacturer's or duct assembler's name; and
 - ii. the diameter of the duct core; and
 - iii. the R-value of the bulk insulation; and
 - iv. whether the ductwork complies with AS 4254.1-2012;
5. Use fittings that achieve at least the R-value specified by Table 3.12.5.2 of the Building Code of Australia (BCA2013). All dampers must be positive seal dampers to prevent leakage
6. Have a warranty of at least 20 years.
7. Comply with any product safety or other product performance requirements in a relevant code of practice or other relevant legislation applying to the activity
8. Be fit for the purpose for which it is intended to be used

5. Minimum Installation Requirements

For every installation, the flexible ductwork system must be independently tested using the system and process approved by the Commission prior to the installation being undertaken and again after the installation is completed. This testing must be conducted on site using the actual measurements for the installation and demonstrate a reduction in duct losses of a percentage outlined in Table 1 after the installation is completed compared to before the installation is undertaken.

When installing the flexible ductwork system, the installer shall, at a minimum:

1. Undertake the installation in accordance with manufacturer's instructions

2. Install and support the system in accordance with the requirements set out in AS 4254.1-2012;
3. Use silicone to seal around both the supply and return air starters to the indoor fan coil;
4. Ensure that the fan noise into the house be minimised with either 6 metres of return air duct or 3 metres of acoustically lined duct from the return air box to the indoor fan coil;
5. Mechanically fix the ducting to prevent openings at joins over time;
6. Duct tape the inner liner to the collar and ensure the insulation is pulled up over the collar before the outer is duct taped and mechanically fixed to minimize heat loss at the collar join;
7. Ensure, where possible, that the air flow is balanced by using similar duct runs and bends after Y pieces. If manual damper blades are to be installed, they should be left in the fully open position and only adjusted where necessary, minimizing pressure loss in the system
8. Connect motorised dampers directly to collar Ys with at least 4 screws and duct tape must be placed over the joins, preventing air leakage in the future;
9. Where possible, make the duct runs as short as possible to maximise airflow. There should be no kinks in the flexible duct and all duct should be hung by strapping where needed i.e.: over timbers etc.;
10. Use curved duct supports such as flexright fittings on all outlets where possible, to minimize pressure losses at outlets as well as maximize throw of air; and
11. Tape any small tears/holes in the outer or inner sleeve using foil tape for the outer sleeve and duct tape for the inner sleeve. Taping of any significant tears of more than one quarter of the circumference of the duct may not last and therefore that section of duct is no longer suitable and should be replaced.
12. Ensure the activity is completed and certified in accordance with any relevant code or codes of practice and other relevant legislation applying to the activity, including any licensing, registration, statutory approval, activity certification, health, safety, environmental or waste disposal requirements.

6. Activity energy savings

The normalised energy saved from undertaking this activity is equal to:

Normalised Energy Savings (GJ)= (Savings Factor (as per table below) x The rated output of the space conditioning to which the ductwork is attached in kW*)

Activity	Savings Factor
BCA Zones 4&5 30% min. reduction in duct losses	1.75
BCA Zone 6 30% min. reduction in duct losses	2.45
BCA Zones 4&5 40% min. reduction in duct losses	2.33
BCA Zone 6 40% min. reduction in duct losses	3.26

* In the case of reverse cycle air-conditioners the products rating in heating mode shall be used.