



European Radon Solutions Database

Prepared by
: *ERRICCA 2 European Radon Research and Industry Collaboration Concerted Action*
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Existing Buildings

Generic Solution

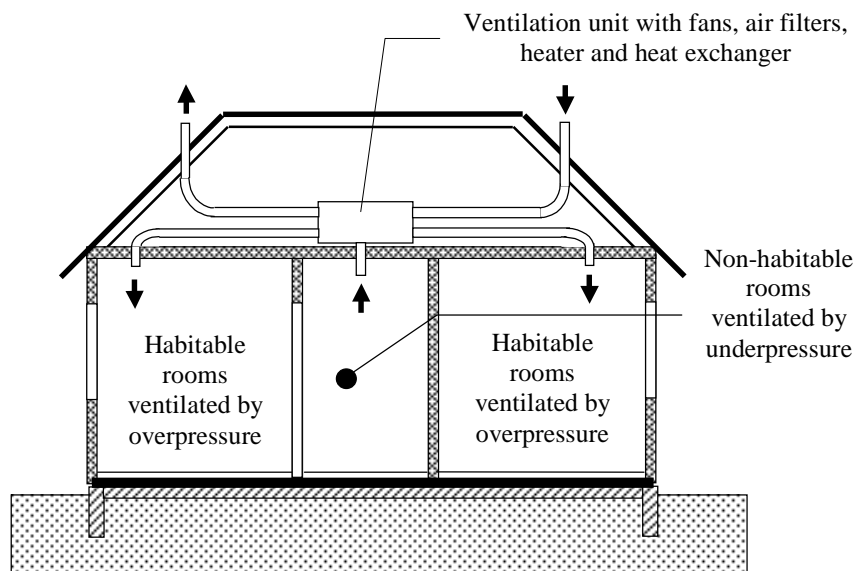
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CZ/GS/09

Type **MECHANICAL SUPPLY AND EXHAUST AIR VENTILATION**

Country **Czech Republic**

Illustration



Description

This solution is designed to increase the indoor-outdoor air exchange rate and to create a slight overpressure within the habitable rooms. The overpressure eliminates the underpressure within these rooms and thus decreases the radon supply rate from the soil into the house. Therefore in most cases it is sufficient to increase the air exchange rate to only 0,8 – 1,0 changes per hour. The advantage of this solution is that it ensures higher quality of indoor air.

Ventilation unit

Ventilation units are sold as complete units ready to install either on the floor, ceiling or wall. The most commonly used types of ventilation units consist of a heater, heat exchanger, filters and two fans – one for supply air and one for exhaust air. These fans should have a flow rate from 180 m³/h to 480 m³/h and power consumption between 40 and 140 W. Both exhaust and supply air are filtered. Heat from the exhaust air is transferred to the supply air by means of the plate heat exchanger with the efficiency at least 60 %. In cold seasons heaters can be used for preheating of the supply air. To minimise negative effects the ventilation should be automatically controlled and switched to intermittent mode according to indoor radon concentration.

To avoid disturbing noise effects the unit should be installed away from the occupied rooms, i.e. in cellars or in the roof space. The inlet should be located well away from the outlet.

Pipework

Air conduits can be made either of gypsum plasterboard, or of PVC-U pipes usually with the rectangular cross-section.

When to use the system

This form of radon mitigation is convenient for houses, where radon problem is caused by radon from either building materials or from the soil. The system can be used in houses built on soils with very low permeability.

Pre-installation Diagnosis

To find source rooms (radon entry routes) and to prepare information for the effective design of the remedial measure, these parameters must be measured:

- Radon concentration in all habitable rooms performed at least by one weak measurements under conservative conditions (lower ventilation and good condition for radon entry into the house),
- Air exchange rate in all habitable rooms,
- Radon supply rate into all habitable rooms.

Typical radon reductions achieved

The effectiveness of such systems varies between 50 and 80 %, which means that indoor radon concentration decreases to 50 % up to 20 % of the initial values. The effectiveness is mainly influenced by the fans power and by the air tightness of the building envelope.

Limitations

Among the disadvantages of this solution belong obstructions in the living space of the house, higher installation costs and increased heat losses. The system demands also regular cleaning and maintenance. To ensure that this system will perform satisfactorily, the building must be relatively airtight.

Common failure modes

The system can fail only in these situations:

- ventilation unit with inadequate pressure/flow rate characteristic is used,
- air leakage through the building envelope is high,
- house owner switches off the system.

System enhancements

The intermittent operation of the unit is recommended. The merits are: savings in operation costs, prolonged life of fans and reduced negative effects (heat losses etc.). Operating periods of the fan should be adjusted according to continuous measurements of indoor radon concentration.

Further Information

More detailed information can be found in the Czech Standard CSN 730601 "Protection of houses against radon from the soil", in detailed guides published by State Office for Nuclear Safety and on website www.suro.cz. All these information are in Czech language.

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