In cold climates living inside the heated space requires considerable amounts of heat. With the intention to decrease the heating demand, people are insulating their homes and make them more air tight. With the natural infiltration being brought close to zero there has been an increase of a new problem which is poor indoor air quality (IAQ). During summer 2012 four student homes were built in Fairbanks, Alaska as a part of Sustainable Village project. The aim of this project is to promote sustainable ways of living in the Arctic and to study new technologies and their applicability in the cold north. This paper presents the results of an IAQ survey performed in the homes during two weeks in December 2012. During this survey the air temperature, relative humidity (RH) and CO2 concentration were measured in all occupied bedrooms along with monitoring of the ventilation units. The results have shown noticeable differences in IAQ between the four houses caused by different technical solutions. The ventilation rates were reduced by occupants or by frost protecting strategy of the ventilation units and the RH inside the living space was often very low. It is assumed that by introducing more advanced controls of the HVAC systems, better defrosting strategy and moisture recovery from the exhaust air the IAQ can be improved with minimum extra energy demand.