C.R. File 176-4-31

APPENDIX 4 TO MAIN REPORT

STUDY OF APPLE HILL
ENERGY EFFICIENT HOMES

TASK E - AIR CHANGE TESTS

PREPARED FOR:

The Policy Development and Research Sector

CANADA MORTGAGE AND HOUSING CORPORATION

BY:

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1.0 INTRODUCTION

Convective heat loss, that is energy loss through infiltration of cold outside air and direct exfiltration of heated inside air, accounts for a major proportion of the heat load in new houses. In the quest for energy efficient housing, builders have attempted to reduce this mechanism of heat loss by construction of air tight houses. This is accomplished through the installation of a continuous polyethelene air vapour barrier, and extensive sealing around doors and windows. In order to evaluate the effectiveness of these measures, special tests have been developed and proposed to measure the natural infiltration rates.

The most commonly used technique is the tracer gas decay method, wherein a readily detectable, non-toxic gas is injected into a test space and measured, over time, to determine infiltration levels. Some of the tracer gases used in the past include carbon dioxide (CO_2), methane (CH_4), propane (C_3H_8) and nitrous dioxide (N_2O). The most popular tracer gas presently being used in sulphur hexaflouride (SF_6). SF_6 is slightly heavier than air, which creates some mixing problems. However, it is an inert gas, is easily detected, and has no known sources in the house. These properties make it a suitable traces gas for air change testing. This type of test provides a spot measurement, of "grab sample" of the air infiltration rate under the operating and climatic conditions of the test.

A second type of air change test is the time averaged measurement. This involves emitting a tracer gas at a known rate over a long period of time. Instead of grab samples, passive sampling devices are used. These absorb the tracer gas at rates which are proportional to its concentration in the house. At the end of the monitoring period, the sampler is analysed to determine the average concentration of the tracer gas over the period. Comparison of the average concentration to the source rates provides a measure of the air change rates within the house. This measurement is useful because it provides average air change rates over typical operating conditions and average climatic conditions, which occur over the monitoring period. It is not sensitive to sudden or short term changes in these conditions, as is the case with grab samples.

Time averaged air change tests were conducted on seven Apple Hill homes, using a technique developed by Brookhaven National Laboratories. This technique uses perflourocarbon tracer gas sources (PFT's), and capillary absorption tube samplers (CAT's).

This report presents an evaluation of both the SF 6 and PFT air change measuring techniques. The results of testing Apple Hill homes using these two techniques is presented here. Conclusions and recommendations are made concerning the test procedures, and concerning the measured air change levels in the Apple Hill Houses.

2.0 OBJECTIVES

2.1 To evaluate an air change measurement technique using SF 6 as a tracer gas.

2.2 To evaluate a time averaged air change technique developed by Brookhaven National Laboratories.

2.3 To use these measuring techniques in order to determine actual infiltration rates in Apple Hill homes under various climatic and operating conditions.

3.0 METHODOLOGY

Detailed procedures for both air change measurements using SF 6, and time averaged air change measurements using the Bookhaven National Laboratories perflourocarbon tracer technique, are presented in Appendix 4-A. They are discussed here only in general terms.

3.1 SF 6 Tracer Technique

This test requires about two hours to complete on each house. During the test, all doors and windows are closed, all vents are turned off, the furnace is off, but the furnace fan runs continuously to ensure adequate mixing of the tracer gas. Minute quantities of the SF 6 are injected into the cold air return plenum of the heating system After allowing about 30 minutes for the SF 6 to be distributed thoughout the house, air samples are taken from the return air plenum at regular intervals. These samples are shipped to a laboratory for analysis to determine the concentration of SF 6. The results are plotted against time, and the exponential decay rate provides a measure of the air change rate to the house.

This air change test was conducted during each of the four test phases of the Apple Hill Study, on each of the houses.

3.2 Time Averaged Air Change Measurements using PFT Technique

Time averaged air change measurements were conducted on seven houses over six two-week measurement periods. One of each of the seven Apple Hill house models was selected. Five perflourocarbon tracer sources (PFT's) were placed in each of the seven houses. These sources remained in the houses throughout the six measurement periods. Five capillary absorption tube samplers (CAT's) were also placed in each of the houses. The CAT's were changed at two week intervals. The CAT's which were removed from the houses, were sent to Brookhaven National Laboratories for analysis. At the end of the six measurement periods, the PFT sources were also removed and returned to Brookhaven for recalibration of the tracer emission rate.

4.0 Results of Air Change Tests Using SF 6

Four sets of air change test were conducted using the SF 6 tracer gas technique. Each set, or phase, of testing coincided with one of the four seasons. A summary of the results for each model type, during each phase of testing, is shown in Table 4.1. A detailed summary, and the test reporting sheets for each house, are presented in Appendix 4-B. The air change rates range form 0.15 to 0.83 for gas heated houses, and from 0.09 to 0.37 for electrically heated houses. Analysis of the results from individual houses does not reveal a strong correlation with the obvious driving forces of wind and temperature differential. Factors such as wind shielding, house orientation, air tightness, predicting air change rates.

In order to extract some useful information from the air change results, a statistical summary of the results was completed. The air change rates were reduced to one significant figure: and a frequency distribution was plotted. The air change rates were divided into three categories: low stack effect (Tio<10 C), medium stack effect (10 C< Tio<20 C), and high stack effect (Tio>20 C). The results are presented in Figure 4.1 for gas heated houses.

The average wind speed for each air change category is also specified. The average air change rate for all houses under the various temperature conditions is as follows:

Temperature Differential	Gas Heated		Electrically Heated	
	ACPH	Wind	ACPH	Wind
<10 C	0.28	11.2	0.12	16
10 C< T 20	0.31	13.4	0.21	17
<20 C	0.38	14.0	0.22	22

This analysis shows an overall increase in air change rates relative to increased temperature differentials. There also appears to be a correlation with wind speed, as indicated in these results.

The lack of a clear correlation between air change rates and the measured parameters, such as airtightness, is probably due to the operation of the furnace fan during testing. The furnace fan is required to ensure adequate distribution and mixing of the SF 6.

One drawback to this, in the Apple Hill Homes, is that the fresh air supply is connected directly to the return air plenum. Thus, by operating the furnace fan, fresh air was drawn into the house continually during the test. Air change rates measured under the test condition may be higher than under average occupancy conditions. This is because the furnace fan is on the 100% of the test time and obviously draws in fresh air through the plenum. Normally the fan would be only on during the usual furnace cycle time.

Additionally, the measured air change rates can be considered low in terms of providing adequate fresh air to maintain air quality standards. Current recommendations for minimum ventilation, being considered for the 1985 revision of the National Building Code, require minimum air change rates of 0.5 acph.

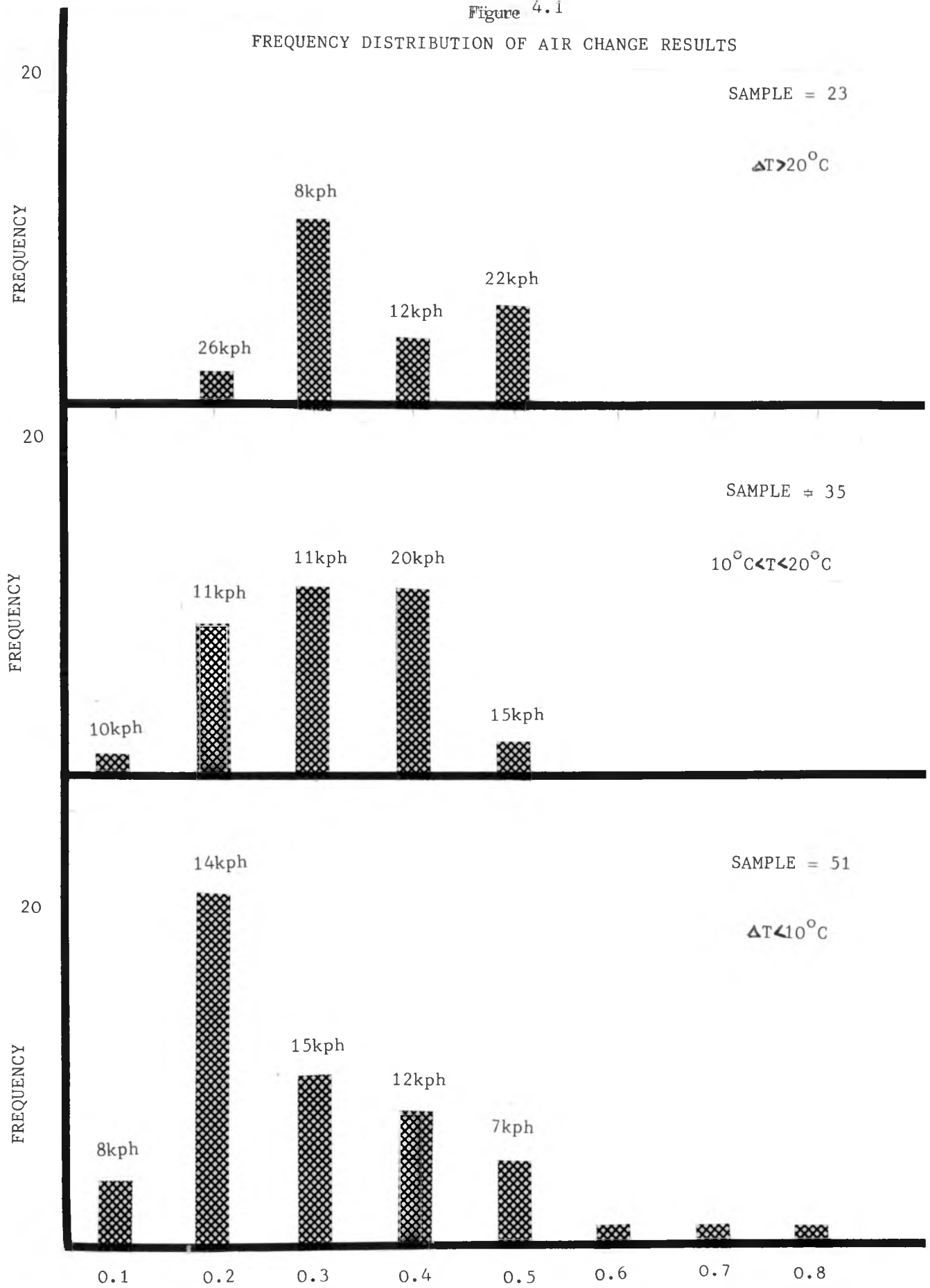
TABLE 4.1

SUMMARY OF AIR CHANGE RESULTS

MODEL	PHASE 1			PHASE 2			PHASE 3			PHASE 4		
	ΔT	WIND	ACPH	ΔT	WIND	ACPH	ΔT	WIND	ACPH	ΔT	WIND	ACPH
REGENT	15.2	20.1	0.39	2.9	11.4	0.38	5.5	12.9	0.37	27.1	14.6	0.37
RUSSET	13.5	11.3	0.34	1.2	15.6	0.34	9.3	11.4	0.19	28.5	14.3	0.30
CORTLAND	17.9	12.5	0.30	1.4	16.9	0.21	5.8	7.0	0.16	24.3	14.6	0.27
WILLOW	13.6	10.0	0.27	1.2	11.5	0.33	6.4	20.3	0.27	35.0	16.8	0.39
YORK	16.7	19.0	0.44	-0.3	15.0	0.40	3.0	17.0	0.39	27.9	9.0	0.38
FIRESIDE	17.85	24.0	0.39	4.2	22.5	0.38	7.7	7.5	0.22	25.5	15.5	0.32
WESTFIELD	16.2	7.0	0.27	0.9	19.0	0.43	10.2	19.0	0.25	21.2	11.0	0.27
BALDWIN	25.3	15.0	0.35	1.3	12.0	0.21	5.0	11.0	0.20	20.6	3.0	0.33
50				2.0	12.0		18.0	7.0	0.09	17.7	7.0	0.22
51							7.0	5.0	0.09	26.7	22.0	0.20
ELECTRICS												
#15, 17, 23, 31	16.2	14.5	0.22	-1.12	20.5	0.14	11.25	18.3	0.18	27.3	19.8	0.19

Figure 4.1

FREQUENCY DISTRIBUTION OF AIR CHANGE RESULTS



5.0 EVALUATION OF SF 6 TRACER GAS TECHNIQUE

Infiltration rates in Apple Hill houses, as measured by the SF 6 tracer gas technique, are of dubious validity. If it is assumed that wind and stack effects cause most of the air movement though the envelope, then overall average results reflect this tendency, many of the house test results did not bear out this trend. The infiltration rate grab samples may be an indicator of order of magnitude, but seem untrustworthy beyond one significant figure. There is no clear cause for this unreliability. In each test, five to seven samples were used to establish the SF 6 concentration decay.

Generally, a good fit by linear regression was possible on these points. The problem seems to lie with what concentration is actually being measured. As all samples were taken from the cold air return near the furnace (or furnace room), with proper mixing, the concentration should be that of all the house air circulating through the HVAC system. In contrast, some stratification of SF 6 was noted on different floors. This data is presented in Table 5.1. Rooms at the ends of heating duct lines, the second floor for example, may have served as traps. The absense of cold air returns on the second floor isolated sections of the house. An example of this tendency was the basement area. The short ductwork, compounded by the characteristic settling of SF 6, lead to elevated levels of SF 6. This was substantiated in some spot checks, and is presented in Table 5.1.

In most of the homes studied, the fresh air intakes, and leaky furnace rooms have been found to be possible contributors to inaccuracy in the test results. The use of the furnace circulating fan to mix house air may have created a much greater air change rate.

6.0 RESULTS OF TIME AVERAGED AIR CHANGE TESTS

The results for the time averaged air change measurements are summarized in Table 6.1. Detailed summaries and data sheets are presented in Appendix 4-C. Table 6.2 shows the weather conditions for the test periods. The first three periods of testing took place in colder conditions, in which open windows would be less likely to affect the natural house air change rates. All seven houses show air change rates that parellel the changes in driving forces.

The value of these results as absolute air change rates is questionable due to the absense of full basement inclusion in the study. House 20, a bungalow with a full basement, had CATS and sources upstairs only.

If the measured infiltration rate of 137m 3 /h in the first period is divided by the upstairs volume only, the air change rate increases to 0.41 air changes/hour. The choice is between using BNL results to calculate only an upstairs change rate; or using full house volume including basement to compare resutls with the SF 6 tests. Some further tests were performed. Additional CATS were placed in the basements of houses 10, 20, 28, and 34; and additional sources were placed in houses 10 and 28. The results from this limited testing show that the basement concentrations equals upper house concentration in house 10 (April 20 - May 17). This data would support the use of total house volumes (including basement volume) to calculate air change rates.

In other houses, the mixing of upstairs air with basement air was less than complete. The use of total house volumes tends to understimate air change rates in these cases. In house 10, a source of a different perflourocarbon (PMCH) was place in the basement. The concentration of this source was measured in the basement CATS, as well as the upstairs CATS. This multi-zone approach helps to isolate the air change rates in various parts of the house that may normally have little interaction.

Attempts were made to correlate the time averaged air change rates with SF 6 decay air change rates in periods of similar weather. No correlation was possible based on the limited amount of BNL data. Again, no definite correlation was found. This could be due to the uncertainty of absolute air change rates using the BNL techniques and no basement monitoring.

7.0 EVALUATION OF PFT TECHNIQUE

Testing using the BNL sources and CATS was simple and quick. Though the manual specifies that sources should not be taped, the presence of small children and pets made secure taping mandatory for both sources and CATS.

All results are for air change rates determined using total house volume, including basements. Due to the unfamiliarity of BNL with the Apple Hill houses, and the late arrival of the installation manual, there were no sources or CATS specified for the basements. Dr. Dietz of BNL, suggested that limited use of additional sources and CATS showed that the mixing of upstairs air with basement air ranged from complete (house 10) to near zero (house 28).

The variations in concentration are illustrated in Figure 7.1. As an example, the PFT concentration absorbed by the CAT in the child's bedroom is considerably higher than the CATS located elsewhere. This implies a much lower air change rate than the downstairs area. The door to that room is frequently closed. The relative standard deviations in all test ranged from about 4-62%, with a mean of 27%. There were few anomalies.

Care must be taken in shipping and storage of the devices. THe CATS for the last period, plus the removed sources, were shipped in separate packages. The post office, alertly noticing the same destination, banded the packages together. The ensuing contamination of the CATS ruined results for the period of May 17-31.

8.0 CONCLUSIONS

8.1 Air change rates, as determine by the SF 6 tracer gas decay technique, range from 0.15 to 0.83 air changes per hour (acph) for gas heated houses; and from 0.09 to 0.37 acph for electrically heated house.

8.2 Time average air change rates, as determined by the perflourocarbon tracer technique, range form 0.10 to 0.39 acph.

8.3 In most cases, air change rates are less than the 0.5 acph currently being considered for inclusion in the 1985 National Building Code.

8.4 There appears to be some slight correlation between infiltration rates and the natural driving forces of temperature and wind. However, the forced ventilation created by the furnace fan, and the fresh air intake, seem to be overriding these driving forces, especially during the SF 6 tracer gas decay tests.

8.5 SF 6 Tracer Gas Decay Technique: There is a degree of unreliability in the infiltration rates determined using this technique. Spot tests have shown significant stratification of SF 6 in the house.

8.6 No correlation was found between time average infiltration rates and SF 6 decay rates.

8.7 No correlation was found between measured infiltration rates and those predicted by Lawrence Berkely Labortory models based on fan depressurization data.

9.0 RECOMMENDATIONS

SF 6 Tracer Gas Techique:

Much or the SF 6 tracer gas techniques has consisted of the correlation of air change rates with driving forces, and house tightness. As this is an essential path in the development of air change and airtightness models, it is suggested that more work is still required in order to understand the behaviour of the tracer gas itself. Based on the experience of the Apple Hill Project, some recommended areas of study might be:

1) SF 6 stratification tests on a variety of houses, and HVAC systems resulting in:
2) A guideline to technicians to ensure proper SF 6 mixing and sampling. If on-site concentration analysis is not being used, these guidelines would probably indicate the proportion fo registers and cold air returns necessary; if supplementary mixing are required, the guidelines would indicate the most appropriate sampling sites.
3) A comparison of grab sample SF 6 results, and other tests (i.e. time averaged perflourocabon testing) on a variety of houses.

PFT Technique:

Due to the simplicity of the perflourocarbon tracer technique, and its apparent accuracy in paralleling driving forces, further testing is indicated.

Such tests include:

1) Field comparisons of SF 6 vs. PFT tests on a variety of building configurations and HVAC systems.

2) Zone testing by PFT's in multi-storey houses to determine mixing requirements, localized air change rates, etc.

3) Futher research into determining the minimum number of sources and CATS required for accuracy, and the preferred placement (i.e. on CAT only in the cold air return).

APPENDIX 4-A

TEST PROCEDURES

TASK E - PROCEDURES FOR AIR CHANGE TESTING

Determination of Air Change in house using SF 6 as a Tracer Gas

The time required on site for this test is approximately 2 hours, in the following stages:

Start	0.25 hrs
Injecting and Mixing	0.50 hrs
Sampling	1.0 hrs
Finish	0.25 hrs

Description of these stages are followed by an explanation of the calculation procedure, a description of the equipment required and sources of supply.

PREPARATION

A) Furnace Controls

1. Turn burner off by turning thermostat to lowest setting
2. Set fan to continuous operation by switching to "Manual" operation

B) Access Hole

1. With hammer and punch make an access hole in the centre of the main cold air return ducting, near to the furnace (and outside the furnace room if one exists.

B) 2. If a fresh air intake exists, locate the hole away from where the intake enters the plenum. If another plenum exists use that line. If this is not possible, alternatives include; locating the hole upstream of the intake or a far down stream as possible to allow adequate mixing.

C) Syringe Leakage

1. Check needle/syringe joint on both the SF 6 syringe and the sampling syringe for leaks, prior to injecting SF 6.
2. Cap the needle by inserting in a rubber bung and submerging the needle/syringe joinin water, while applying pressure to the plunger.

D) House Volume, SF 6 Volume

1. Calculate interior volume of house, V H , in m 3
2. Calculate colume of SF 6, V SF 6 in such that initial concentration

   in house will be approximately 50 ppb:

   V SF6 = 0.05 V H, with V SF 6 in cc and V H in m 3
3. For example, for a house with volume V H = 574 m 3, V SF 6 = 28.7 cc;

   therefore inject 30 cc of SF 6.

E) House identification and Meterological Data

1. Complete a data collection form so as to fully describe the house and test conditions.

INJECTION:

A) Transfer SF 6 to syringe

1. when first connecting regulator, septum, etc. to lecture bottle, draw off 100 cc to purge system of air;
2. leave SF 6 bottle outside house (e.g., in vehicle);
3. turn valve connected to regulator outlet off;
4. turn regulator valve out, so that it will transfer zero pressure to the output;
5. to reduce loss of SF 6 due to leakage, open lecture bottle valve (regulator input, i.e. high pressure, gauge will indicate bottle pressure), then shut it off;
6. turn regulator valve in until regulator output (low pressure) gauge reads approximately 20 psi;
7. using a syringe (reserved for pure SF 6, to ensure samples are not contaminated) push the plunger all the way in;
8. insert needle through septum;
9. slightly open valve connected to regulator outlet and pressure witll push syringe plunger out. Close valve when desired quantity of SF 6 is in syringe;
10. remove syringe and cap needle with rubber bung;
11. turn valve connected to regulator outlet off, and turn regulator valve out.

B) Inject SF 6

1. take SF 6 syringe immediately to basement, remove bung and insert needle into duct through access hole,
2. slowly push syringe plunger fully in. Draw back to 50 cc and push plunger fully in again (to flush most fo SF 6 from syringe),
3. remove syringe from duct and cap needle with bung,
4. record the time of injection.

SAMPLING

1. obtain 5 samples, at 15 minute intervals, beginning 25 minutes after the time of injection of SF 6;
2. use a syringe reserved for sampling only, to ensure samples are not contaminated by pure SF 6;
3. remove cap from needle of sampling syring and insert needle through septum of sampling extension tube;
4. insert sampling extension tube into duct through access hole, so that its end is at approximately the centre of the duct;
5. draw 60 cc into syringe and expel it back into the duct to flush syringe and sampling extension;
6. at the appropriate sampling time; slowly draw 60 cc into syringe, wait until plunger is no longer drawn back into syringe and then push the plunger in to 50cc;
7. remove extension tube from duct and the needle from the septum;

8. insert needle into vacutainer. Punger will be drawn into syringe to approximately 35 cc; if not, the vacutainer is faulty: use another vacutainer;
9. after plunger stops, slowly push plunger to 5 cc and hold it there approximately 15 seconds;
10. holding plunger at 5 cc, remove needle from vacutainer and replace cap on needle;
11. label vacutainer with address, date and time or a suitable coding system which can be related to this information. If the sample is not taken within 30 seconds the intended time, record the actual sampling time.

COMPLETION:

1. plug access hole with screw;
2. return fan switch to original setting;
3. return thermostat to original setting;
4. have vacutainer contests analyzed for concentration of SF 6 within 1 week of sampling; Provide the laboratory with the sample measuring procedure outlined below.

CALCULTION OF AIR CHANGES PER HOUR (ACPH):

A) Theroy:

The concentration fo SF 6 is diluted by the air infiltrating and exfiltrating the house. The dilution of SF 6 over time provides a direct measurement of the rate of air change. The relationship is of the form:

$$C_{SF6} = B\, e^{-ACPH \times t}$$

where C SF 6 is the concentration of SF 6, B is a constant, ACPH is the air change rate in units of house volumes of air per hour, and it is the time in hours. If the 5 samples are taken at 15 minutes intervals, the times will be 0.00, 0.25, 0.50, 0.75 and 1.00 hour.

B) Calculation:

Determine ACPH using either of the following procedures:

(a) plot the sample points on log paper (with C SF 6 on the logarithmic scale) and determine the slope which equals -ACPH;or

(b) use a calculator to determine a best fit exponential curve, and determine the exponent which equals -ACPH. The latter method is preferable since it will also yield the correlation, (i.e. a measure of how well the sample points fit to an exponential curve.)

For example if the 5 samples at 15 minute intervals yield concentrations of 12.1, 11.3, 10.5, 9.87 and 9.36 ppb, the corresponding air change rate is 0.2595 house volumes per hour and the correlation is 0.9982.

EQUIPMENT

1. Lecture bottle of SF 6, containing 0.227 kg (o.51b) of sulphur hexaflouride, commercial purity, or approximately 35 letres SF 6 at S.T.P. from Matheson Gases, Whitby, Ontario ($70.00 plus shipping)

2. Lecture bottle regulator (Fisher Scientific Cat No. 10-569, $116.25 plus taxes and transportation) plus adaptor to connect lecture bottle to regulator input (Fisher Scientific Cat. No. 10-596-10, $1.95 plus tax and transportation)

3. Miscellaneous pieces to permit sampling SF 6 from regulator: adaptor to connect regulator output to 6 mm tubing, short length of 6mm Tygon tubing and septum (a self sealing membrane through which samples of pure SF 6 are drawn into a syringe) connected to tubing with copper wire wrapped and twisted.

4. Sampling extension tube: 150 mm length of 2 mm copper or stainless steel tubing, with adaptor to septum on one end (to permit samples to be drawn from the centre of the cold air return duct.)

5. Two of plastipak 50 cc disposable syringe No. 5663 by Becton Dickinson 3454 South Sheridan Way, Mississauga, L5J 2M8 with Yale needle No. 5145 by Becton Dickinson, with one exlusively for pure SF 6, the other for air samples from the home.

6. For each test, 5 vacutainers, evacuated glass tubes with a septum on one end ($.35 each) (20 ml Vacutainer Brand Evacuated Blood collection tube No. 6433 by Becton Dickinson.)

7. Access hole Kit: Hammer, Nail set punch, #14 sheet metal screws (for holing duct and then filling hole.)

5.7 SAMPLE MEASURING PROCEDURE FOR USE BY LABORATORY

1. Ensure that the sampling valve knob on the chromatograph is in the counter-clockwise position.

PROCEDURE FOR TIME AVERAGED AIR CHANGE MEASUREMENTS

USING THE PERFLOUROCARBON TRACER TECHIQUE (PFT)

The purpose of this manual is to describe the procedure to be followed by the homeowner of field researcher for deploying the sources and the samplers. Brief descriptions of the source and the sampler are slso provided as well as precautions to be observed in order to maintain the intergrity of the measurement.

Tracer Source

The PFT source is simply a small metal shell containing some liquid PFT and sealed with a rubber plug (cf. Figure 1). The PFT permeates through the rubber plug at a rate which is somewhat dependent on the room temperature. At 75 F (24 C), the emission rate is about 12 to 14 nL/min.

Some precautions. The rate of emission is primarily determined by gravimetric measurements (weight loss) with time and therefore the sources must be returned following their use. In addition, nothing should be done to the source which might alter its weight. For example, do not tape the source during deployment since residual adhesive might affect the weighings.

Secondly, the source should be deployed at a location which avoids both cold drafts (e.g., avoid placing near windows) and heated air (e.g., avoid the vicinity of hot air ducts. radiators, stoves etc.) because of the temperature dependence.

Tracer Sampler

The 4 mm-ID CATS device is a passive sampler which, when one cap is removed, samples PFTs from air with an equivalent air pumping rate of about 0.14 mL/min. The PFT diffuses through the stagnant column of air at a rate which is essentially independent of temperature.

Some precautions. Only one cap should be removed during depolyment of the sampler in order to prevent direct flow through the tube. To prevent accidential breakage (e.g., from rolling onto the floor) it is permissible to tape the tube in its location at the end with the cap remaining.

Secondly, the sampler should be located at least 5 ft. away from the source which is located in the same room.

Special Precaution Shipping and Storage

The sampling rate of the CATS devices are significantly reduced when both caps are in place--but the rate does not go to zero. Thus, under no circumstances should the sources and the samplers be shipped in the same container. It is also not prudent to store the sources and samplers for any extended time in the same room: storage in different rooms in the same building for more than one weeknight also cause sampler contamination.

Home Infiltration Test Procedure

The procedure for making the infiltration test involves deploying the sources on a given day and then the samplers at 8 hours later. This allow time for the tracer gas to mix uniformly throughout the house before the sampling begins.

Step 1

Plan to use on PFT source for each 500 sq. ft. of living space. For a home with 2000 sq. ft. of heated living space, four sources should be used. The number of sources also depends somewhat on the layout of the home. A range style home might require one source for the living-dining-kitchen area, on for the family room, and one for the bedroom area: a four-bedroom ranch would require a fourth source in another bedroom: a finished heated basement would also justify another source.

The number of samplers and their distribution is probably the same as that for the sources. However, no more than four samplers and their distribution is probably the same as that for the sources. However, no more than four samplers per home should be needed since the concentration is generally uniform throughout.

Step 2

Deliver the appropriate number of sources and samplers to the home, typically four of each. Set the samplers aside. Place one source in each major area of the home, near an outside wall but away from any window or direct heat force. For example, the source could be placed on an end table or coffee table, but not on a window sill.

Futhermore, the rubber plug end of the souce extending over the edge of the table will improve the flow of air and hence the mixing of the tracer within the room.

Record the source number, location and any other comments on the data sheet such as that in Table 1. Also check the description of the house on the data sheet and estimate thee living area of the home and the average expected daytime and nightime indoor temperatures.

During this test it is preferable that doors to bedrooms and other heated areas left open if otherwise, for example, a heated finished basement, make a in the comments.

Step 3

About 8 hours after deploying the source or perhaps even the next day, set the sampling tubes in various locations, generally in the same major areas of the house to the sources but closer to inside walls of the rooms. With the sources near the outside walls, the tracer will be mixed convectively upwards since the heating (e.g.., baseboard or hot air) is generally situated near the outside walls. Air will then flow inside walls where it will contact the samplers. This procedure guarantees that the tracer in the air will be will mixed before it reaches the sampler.

Remove the cap from one end of the sampler only, the end that has the sampler number scribed on the glass. This is important for two reason--removing two caps would double the samping rate and during analysis the PFT would be forced to traverse the entire adsorption bed, reducing the sample recovery somewhat. Record the sampler number, location (room and item of furniture placed on) and any other comments. Also record the date and time the cap was removed.

Step 4

No other procedures are required to secure the infiltration rate. However, to compare the results form one month to the next, it would be desirable to record the outside daily temperature (high, low, and time-weighted average) and the mean wind speed an direction. Also a qualitative estimate of the extent of sheltering of the house from winds would be useful.

Step 5

After the designated period, for example, 2 weeks up to 8 weeks, place the cap back on the individual samplers and record the time and the date.

If additional infiltration data are to be collected, another set of samplers can be used. Remove one cap from the numbered end of each of the new samplers and record the pretinent data on a second sampler deployment data sheet.

Mail or deliver the samplers and a copy of the data sheets back to central laboratory, where samplers from other homes are being received. The combined quantity of samplers and data sheets from a large number of homes can then be collectively mailed back to Brookhaven, making certain they are packaged not to break.

Step 6

Collect the sources after the last test with the samplers has been completed. Record the date and time the sources were removed and place a check mark in the "Source Collected " column for each source recovered.

APPENDIX 4-B

DETAILED SUMMARY OF SF 6 TEST RESULTS

TABLE 8.1
SUMMARY OF AIR CHANGE MEASUREMENTS

HOUSE NO	PHASE 1 TIN	PHASE 1 TOUT	PHASE 1 WIND(KPH)	PHASE 1 ACPH	PHASE 2 TIN	PHASE 2 TOUT	PHASE 2 WIND(KPH)	PHASE 2 ACPH	PHASE 3 TIN	PHASE 3 TOUT	PHASE 3 WIND(KPH)	PHASE 3 ACPH	PHASE 4 TIN	PHASE 4 TOUT	PHASE 4 WIND(KPH)	PHASE 4 ACPH
1	20.90	3.30	17.00NW	0.32	23.00	24.00	19.00S	0.19	24.00	20.00	11.00SW	0.13	18.50	3.20	4.00SE	0.22
2	20.40	5.00	33.00W	0.49	24.00	22.00	20.00W	0.69	24.90	25.00	14.00SW	0.38	22.00	-14.00	15.00SW	0.45
3	20.90	6.00	17.00E	0.35	23.30	19.00	19.00S	0.29	21.00	14.00	17.00NW	0.39	17.00	-18.00	33.00NW	0.54
4	20.10	5.00	9.00S	0.45	23.50	20.00	0.00	0.20	20.00	16.00	9.00W	0.17	20.00	-11.00	10.00W	0.27
5	20.00	0.40	30.00ENE	0.38	19.00	14.00	10.00S	0.37	20.00	7.00	7.00E	0.38	16.40	-13.00	6.00WSW	0.39
6	19.00	6.00	20.00E	0.45	23.90	18.00	5.00SE	0.50	22.00	17.00	15.00SE	0.83	18.00	-18.00	17.00E	0.38
7	15.90	4.60	7.00NW	0.39	21.00	20.50	7.00N	0.45	18.40	12.00	10.00SE	0.45	17.00	-9.00	15.00NW	0.46
8									21.00	16.00	20.00NW	0.21	20.30	4.00	17.00S	0.25
MEAN	19.60	4.36	20.14	0.39	22.53	19.64	11.43	0.38	21.41	15.00	12.00	0.37	18.65	-8.48	14.63	0.37
10					20.00	20.00	7.00S	0.45	22.00	16.00	18.00SW	0.31	22.90	-15.00	13.00W	0.29
11	17.90	6.50	20.00W	0.30	22.20	24.00	13.00S	0.31	20.40	2.00	13.00N	0.20	18.00	2.00	20.00SW	0.33
12	20.60	2.50	10.00W	0.37	23.00	17.10	26.00NW	0.34	18.00	7.50	9.00W	0.18	19.00	-14.00	18.00NW	0.31
13	22.40	5.30	7.00E	0.26	23.00	22.40	10.00S	0.50	21.30	11.00	12.00SW	0.24	20.00	0.00	18.00E	0.24
14	19.10	-0.60	7.00NW	0.81	22.70	20.90	18.00SW	0.27	21.00	10.00	20.00E	0.14	18.90	-19.00	17.00NW	0.30
E15	21.50	-4.00	17.00E	0.26	28.50	30.00	30.00SW	0.15	20.00	10.90	4.00SW	0.08	19.00	-17.00	26.00NW	0.31
16	20.00	0.30	28.00NE	0.36	21.00	19.00	9.00NW	0.29					17.40	-19.00	4.00W	0.38
E17	18.60	6.30	17.00NW	0.14	21.00	24.60	7.00SE	0.12	18.00	11.00	10.00NW	0.12	17.00	6.00	10.00N	0.14
18	20.00	10.00	7.00SE	0.28	27.70	29.60	26.00SW	0.24	20.00	11.00	8.00SW	0.24	19.50	1.00	10.00SW	0.25
MEAN	17.26	3.71	11.29	0.34	22.91	21.73	15.57	0.34	17.53	8.21	11.43	0.19	19.39	-9.14	14.29	0.30
20	22.60	2.60	8.00SW	0.34	20.00	14.00	7.00W	0.21					18.20	1.00	0.00	0.26
21	19.90	2.60	15.00SW	0.22	20.50	20.50	19.00S	0.23	19.00	11.00	7.00S	0.21	19.00	1.00	20.00SW	0.27
22	18.50	2.60	20.00E	0.46	21.00	21.40	30.00SW	0.22	19.00	13.00	7.00NW	0.12	17.20	-18.00	20.00NE	0.40
E23	22.50	7.40	13.00NE	0.12	21.00	19.00	22.00W	0.89	18.10	3.00	11.00NE	0.14	14.00	-22.00	24.00NW	0.09
24	20.90	2.70	7.00E	0.18	25.00	24.20	15.00W	0.26	19.00	11.00	6.00SE	0.19	17.50	-1.00	20.00E	0.18
25					18.70	18.00	7.00W	0.18	20.00	19.00	8.00W	0.13	17.00	-14.00	13.00E	0.26
MEAN	20.48	2.63	12.50	0.30	21.36	19.69	16.51	0.21	19.25	13.50	7.00	0.16	17.94	-6.36	14.60	0.27
27	20.60	7.40	13.00NE	0.28	23.00	20.00	5.00E	0.46	16.90	6.70	30.00SW	0.38	17.00	-15.00	26.00NW	0.20
28					19.00	17.90	15.00W	0.39	20.00	14.00	28.00NW	0.24	18.50	-14.00	2.00NW	0.33
29	21.00	7.00	7.00S	0.26	20.20	21.00	7.00SW	0.28	18.00	16.00	15.00NE	0.26	18.60	-22.00	11.00E	0.54
30					24.00	22.70	19.00SW	0.17	18.00	10.50	0.00	0.19	17.60	-17.20	28.00W	0.48
MEAN	21.20	7.60	10.00	0.27	21.55	20.40	11.50	0.33	18.23	11.80	20.25	0.27	17.93	-17.05	16.75	0.39
E31	19.80	7.80	11.00E	0.37	21.40	23.00	15.00E	0.18	19.00	6.00	48.00NW	0.36	20.00	-6.00	19.00E	0.22
32	19.30	2.60	19.00E	0.44	23.00	23.30	15.00S	4.00	22.00	19.00	17.00E	0.39	20.90	-7.00	9.00SE	0.38
MEAN	19.30	2.60	19.00	0.44	23.00	23.30	15.00	4.00	22.00	19.00	17.00	0.39	20.90	-7.00	9.00	0.38
34	18.00	-4.60	31.00NW	0.51	21.00	16.00	17.00NW	0.61	20.00	15.00	15.00SW	0.22	17.70	-15.00	20.00NE	0.34
35	15.60	3.30	17.00NW	0.26	24.50	21.10	28.00SW	0.15	21.40	11.00	0.00	0.21	19.00	0.70	11.00SE	0.29
MEAN	17.20	-0.65	24.00	0.39	22.75	18.55	22.50	0.38	20.70	13.00	7.50	0.22	18.35	-7.15	15.50	0.32
37	21.50	5.30	7.00E	0.27	22.90	22.00	19.00SE	0.43	22.00	12.20	19.00NE	0.25	19.50	-1.70	11.00W	0.27
39	21.30	-4.00	15.00E	0.35	17.00	15.70	12.00SW	0.21	18.00	13.00	11.00NE	0.20	19.60	-1.00	3.00NW	0.33
50					29.00	27.00	12.00NW		19.00	1.00	7.00S	0.09	18.70	1.00	7.00S	0.22
51									19.00	12.00	5.00NE	0.09	16.70	-10.00	22.00NW	0.20
ELECTRIC	20.60	4.38	14.50	0.22	22.98	24.10	20.50	0.14	18.98	7.73	18.25	0.18	17.50	-9.75	19.75	0.19
GAS	19.73	2.69	14.87	0.34	21.75	20.13	15.44	0.78	19.89	13.32	13.26	0.26	19.03	-7.23	12.35	0.33

APPENDIX 4-C

DETAILED SUMMARIES OF

TIME AVERAGED AIR CHANGE RESULTS

LOCATION OF CAT SAMPLERS FOR TIME AVERAGED AIR CHANGE MEASUREMENTS

HOUSE # 8:

LOCATION	ITEM	FEB15–FEB28	FEB28–MAR15	MAR15–MAR30	APR19–APR29	APR29–MAY17	MAY17–MAY31
LIVING ROOM	SHELF UNIT	648	659	338	645	653	519
FAMILY ROOM	TOP OF BOOKSHELF	626	667	113	577	548	213
MASTER BEDROOM	TOP OF BATHROOM DOOR FRAME	647	663	36	652	667	724
BABY ROOM	DOOR STOP	649	656	118	566	661	518

HOUSE # 10:

LOCATION	ITEM	FEB15–FEB28	FEB28–MAR15	MAR15–MAR30	APR15–APR29	APR29–MAY17	MAY17–MAY3
LIVING ROOM	SHELF UNIT	621	657	116	621	664	714
FAMILY ROOM	PICTURE	619	662	339	580	557	967
MASTER BEDROOM	DRESSER	651	661	114	655	545	689
CHILDS ROOM	DOOR FRAME	645	660	334	–	–	–
SPARE BEDROOM	DRESSER	–	–	–	573	551	691
BASEMENT	LAUNDRY SHELF	–	–	–	576	627	956

HOUSE # 20:

LOCATION	ITEM	FEB15–FEB28	FEB28–MAR15	MAR15–APR15	APR15–APR29	APR29–MAY17	MAY17–MAY31
LIVING ROOM	BANNISTER	616	637	161	568	563	730
FAMILY ROOM	SHELF UNIT	620	628	122	582	564	452
MASTER BEDROOM	DRESSER	623	640	338	654	552	513
BASEMENT	2 x 4 BRACE	–	–	–	584	549	95

HOUSE # 28

LOCATION	ITEM	FEB15–FEB28	FEB28–MAR15	MAR15–MAR30	APR19–APR29	APR29–MAY31
DINING ROOM	PLANT STAND	654	642	120	650*	650*
FAMILY ROOM	PLANT POT	650	639	175	581	553
MASTER BEDROOM	SIDE OF DRESSER	643	653	136	626	559
SPARE BEDROOM	DRESSER	646	658	134	791	547
BASEMENT	JOIST	–	–	–	786	556

HOUSE # 32

LOCATION	ITEM	FEB15–FEB28	FEB28–MAR15	MAR15–MAR30	APR19–APR29	APR29–MAY31
DINING ROOM	CHINA CABINET	655	666	286	585	555
DEN	BOOKSHELF	652	665	117	649	660
BEDROOM	DRESSER	633	664	332	646	554

HOUSE # 34

LOCATION	ITEM	FEB15–FEB28	FEB28–MAR15	MAR15–MAR30	APR15–MAY17	MAY17–MAY31
LIVING ROOM	BOOKSHELF	617	636	340	661	748
FAMILY ROOM	PLANT HANGER	618	641	135	648	520
MASTER BEDROOM	DRESSER PLANT	622	635	138	633	719
SPARE BEDROOM	UNDER TABLE	625	627	137	578	558
BASEMENT	LOW BEAM	–	–	–	575	894

* NOTE: 650 remained April 19 - May 31

HOUSE # 39:

LOCATION	ITEM	FEB15–FEB28	FEB28–MAR15	MAR15–APR19	APR19–APR29	APR29–MAY17	MAY17–MAY31
LIVING ROOM	COUCH	630	632	313*	583	544	727
DEN AREA	FILING CABINET	624	634	133	565	638	516
MASTER BEDROOM	DRESSER LEDGE	631	638	132	574	636	514
SPARE BEDROOM	CLOSET SHELF	629	644	358	572	561	521

* NOTE: Moved to stereo across room approximately March 21 - April 19.

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:29 HOUSE: P008
DATES SAMPLED 031583-033083 DATE ANAL.: 4/21/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
730	66.0	30.2	131	0.18	41.4

CATS NO.	TRACER CONC.
335	21.21
113	25.52
36	48.66
118	25.25

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P008
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
730	66.0	43.8	91	0.12	44.1

CATS NO.	TRACER CONC.
577	28.25
645	34.51
652	40.60
566	71.73

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P008
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
730	66.0	34.5	115	0.16	17.9

CATS NO.	TRACER CONC.
577	28.25
645	34.51
652	40.60
~~566~~	~~71.73~~

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:46 HOUSE: P008
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
730	66.0	46.9	85	0.12	52.7

CATS NO.	TRACER CONC.
548	36.26
653	33.92
667	33.38
661	83.85

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:29 HOUSE: P010
DATES SAMPLED 031583-033083 DATE ANAL.: 4/21/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
625	66.0	46.3	86	0.14	17.5

CATS NO.	TRACER CONC.
116	42.56
339	38.25
114	47.17
334	57.09

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P010
DATES SAMPLED 041583-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
625	66.0	56.1	71	0.11	8.2

CATS NO.	TRACER CONC.
621	55.06
580	50.41
655	61.46
573	57.28

BNL-AIMS

ACCOUNT: PAR HOUSE:P010 #ZONES:2 FILE: 46
DATES SAMPLED: 042983-051783 DATE ANAL: 5/26/83

ZONE	VOL (M^3)	SOURCE TYPE	SOURCE RATE (mL/hr)	AVG. TRACER CONC. (pL/L) PDCH	PMCH		EXFILT. RATE (M^3/hr)	EXFILT. ACPH	INFILT. RATE (M^3/hr)	INFILT. ACPH
1	410.0	PDCH	3967	60.2	14.4	0.0	50	0.12	66	0.16
2	215.0	PMCH	1827	62.5	72.1	0.0	15	0.07	-1	-0.01

ZONE-ZONE	RATE(M^3/hr.)	CATS#	CONC.(pL/L) PDCB	PMCH	PDCH
1-2	33.1	664	0.000	19.796	60.391
2-1	16.6	557	0.000	13.688	55.492
		545	0.023	13.284	66.597
		551	0.022	11.024	58.455
		627	0.024	72.143	62.475

ZONE 1 IS BSMNT
ZONE 2 IS UPPER LEVEL

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P020
DATES SAMPLED 031583-041983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	15.9	187	0.28	7.9

CATS NO.	TRACER CONC.
161	14.83
122	17.27
338	15.59

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P20A
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	29.0	103	0.16	46.4

CATS NO.	TRACER CONC.
568	41.40
582	29.46
654	34.79
584	10.16

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P20A
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE mL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	35.2	84	0.13	17.0

CATS NO.	TRACER CONC.
568	41.40
582	29.46
654	34.79
~~584~~	~~10.16~~

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:47 HOUSE: P020
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	37.5	79	0.12	73.9

CATS NO.	TRACER CONC.
563	75.10
564	23.98
552	39.87
549	11.04

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:47 HOUSE: P020
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	25.0	119	0.18	57.9

CATS NO.	TRACER CONC.
~~563~~	~~75.10~~
564	23.98
552	39.87
549	11.04

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:47 HOUSE: P020
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	31.9	93	0.14	35.2

CATS NO.	TRACER CONC.
~~563~~	~~75.10~~
564	23.98
552	39.87
~~549~~	~~11.04~~

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:47 HOUSE: P020
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	17.5	170	0.26	52.3

CATS NO.	TRACER CONC.
~~563~~	~~75.10~~
564	23.98
~~552~~	~~39.87~~
549	11.04

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:29 HOUSE: P028
DATES SAMPLED 031583-033083 DATE ANAL.: 4/21/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
789	66.0	39.8	100	0.13	42.5

CATS NO.	TRACER CONC.
120	32.88
175	28.16
136	33.16
134	64.85

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P028
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
789	66.0	12.7	313	0.40	126.1

CATS NO.	TRACER CONC.
581	34.94
626	13.46
791	1.21
786	1.01

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P028
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
789	66.0	24.2	164	0.21	62.9

CATS NO.	TRACER CONC.
581	34.94
626	13.46
~~791~~	~~1.21~~
~~786~~	~~1.01~~

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:29 HOUSE: P032
DATES SAMPLED 031583-033083 DATE ANAL.: 4/21/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
455	49.5	17.0	175	0.38	25.7

CATS NO.	TRACER CONC.
286	15.20
117	13.86
332	22.01

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:40 HOUSE: P032
DATES SAMPLED 041983-042983 DATE ANAL.: 5/11/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
455	49.5	16.7	178	0.39	17.7

CATS NO.	TRACER CONC.
585	13.44
646	19.18
649	17.48

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:29 HOUSE: P034
DATES SAMPLED 031583-033083 DATE ANAL.: 4/21/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
930	66.0	29.5	134	0.14	21.9

CATS NO.	TRACER CONC.
340	24.72
135	23.63
137	37.15
139	32.64

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:46 HOUSE: P034
DATES SAMPLED 041583-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
930	66.0	31.6	125	0.13	43.0

CATS NO.	TRACER CONC.
648	26.67
633	34.62
678	48.64
675	16.43

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:40 HOUSE: P039
DATES SAMPLED 031583-041983 DATE ANAL.: 5/11/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
731	66.0	26.9	147	0.20	21.2

CATS NO.	TRACER CONC.
313	22.67
133	22.56
358	34.63
132	27.85

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:40 HOUSE: P39A
DATES SAMPLED 041983-042983 DATE ANAL.: 5/11/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
731	66.0	34.3	116	0.16	61.7

CATS NO.	TRACER CONC.
565	21.22
583	22.33
572	65.71
574	27.85

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:47 HOUSE: P039
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE mL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
731	66.0	29.4	135	0.18	27.8

CATS NO.	TRACER CONC.
544	27.34
638	19.85
636	30.66
561	39.56

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:29 HOUSE: P008
DATES SAMPLED 031583-033083 DATE ANAL.: 4/21/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
730	66.0	30.2	131	0.18	41.4

CATS NO.	TRACER CONC.
335	21.21
113	25.52
36	48.66
118	25.25

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P008
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
730	66.0	43.8	91	0.12	44.1

CATS NO.	TRACER CONC.
577	28.25
645	34.51
652	40.60
566	71.73

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P008
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
730	66.0	34.5	115	0.16	17.9

CATS NO.	TRACER CONC.
577	28.25
645	34.51
652	40.60
~~566~~	~~71.73~~

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:46 HOUSE: P008
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
730	66.0	46.9	85	0.12	52.7

CATS NO.	TRACER CONC.
548	36.26
653	33.92
667	33.38
661	83.85

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:29 HOUSE: P010
DATES SAMPLED 031583-033083 DATE ANAL.: 4/21/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
625	66.0	46.3	86	0.14	17.5

CATS NO.	TRACER CONC.
116	42.56
339	38.25
114	47.17
334	57.09

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P010
DATES SAMPLED 041583-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
625	66.0	56.1	71	0.11	8.2

CATS NO.	TRACER CONC.
621	55.06
580	58.41
655	61.46
573	57.28

BNL-AIMS

ACCOUNT: PAR HOUSE:P010 #ZONES:2 FILE: 46
DATES SAMPLED: 042983-051783 DATE ANAL: 5/26/83

ZONE	VOL (M^3)	SOURCE TYPE	SOURCE RATE (nL/hr)	AVG. TRACER CONC. (pL/L) PDCH	AVG. TRACER CONC. (pL/L) PMCH	EXFILT. RATE (M^3/hr)	EXFILT. ACPH	INFILT. RATE (M^3/hr)	INFILT. ACPH
1	410.0	PDCH	3967	60.2	14.4	0.0	50	0.12	66	0.16
2	215.0	PMCH	1827	62.5	72.1	0.0	15	0.07	-1	-0.01

ZONE-ZONE	RATE(M^3/hr.)	CATS#	CONC.(pL/L) PDCB	CONC.(pL/L) PMCH	CONC.(pL/L) PDCH
1-2	33.1	664	0.000	19.796	60.391
2-1	16.6	557	0.000	13.688	55.492
		545	0.023	13.284	66.597
		551	0.022	11.024	58.455
		627	0.024	72.143	62.475

ZONE 1 IS BSMNT
ZONE 2 IS UPPER LEVEL

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P020
DATES SAMPLED 031583-041983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	15.9	187	0.28	7.9

CATS NO.	TRACER CONC.
161	14.83
122	17.27
338	15.59

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P20A
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	29.0	103	0.16	46.4

CATS NO.	TRACER CONC.
568	41.40
582	29.46
654	34.79
584	10.16

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P20A
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	35.2	84	0.13	17.0

CATS NO.	TRACER CONC.
568	41.40
582	29.46
654	34.79
~~584~~	~~10.16~~

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:47 HOUSE: P020
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	37.5	79	0.12	73.9

CATS NO.	TRACER CONC.
563	75.10
564	23.98
552	39.87
549	11.04

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:47 HOUSE: P020
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	25.0	119	0.18	57.9

CATS NO.	TRACER CONC.
~~563~~	~~75.10~~
564	23.98
552	39.87
549	11.04

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:47 HOUSE: P020
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	31.9	93	0.14	35.2

CATS NO.	TRACER CONC.
~~563~~	~~75.10~~
564	23.98
552	39.87
~~549~~	~~11.04~~

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:47 HOUSE: P020
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
660	49.5	17.5	170	0.26	52.3

CATS NO.	TRACER CONC.
~~563~~	~~75.10~~
564	23.98
~~552~~	~~39.87~~
549	11.04

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:29 HOUSE: P028
DATES SAMPLED 031583-033083 DATE ANAL.: 4/21/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
789	66.0	39.8	100	0.13	42.5

CATS NO.	TRACER CONC.
120	32.88
175	28.16
136	33.16
134	64.85

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P028
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
789	66.0	12.7	313	0.40	126.1

CATS NO.	TRACER CONC.
581	34.94
626	13.46
791	1.21
786	1.01

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:39 HOUSE: P028
DATES SAMPLED 041983-042983 DATE ANAL.: 5/19/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
789	66.0	24.2	164	0.21	62.8

CATS NO.	TRACER CONC.
581	34.94
626	13.46
~~791~~	~~1.21~~
~~786~~	~~1.01~~

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:29 HOUSE: P032
DATES SAMPLED 031583-033083 DATE ANAL.: 4/21/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
455	49.5	17.0	175	0.38	25.7

CATS NO.	TRACER CONC.
286	15.20
117	13.86
332	22.01

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:40 HOUSE: P032
DATES SAMPLED 041983-042983 DATE ANAL.: 5/11/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
455	49.5	16.7	178	0.39	17.7

CATS NO.	TRACER CONC.
585	13.44
646	19.18
649	17.48

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:29 HOUSE: P034
DATES SAMPLED 031583-033083 DATE ANAL.: 4/21/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
930	66.0	29.5	134	0.14	21.9

CATS NO.	TRACER CONC.
348	24.72
135	23.63
137	37.15
138	32.64

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:46 HOUSE: P034
DATES SAMPLED 041583-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
930	66.0	31.6	125	0.13	43.0

CATS NO.	TRACER CONC.
648	26.67
633	34.62
678	48.64
675	16.43

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:40 HOUSE: P039
DATES SAMPLED 031583-041983 DATE ANAL.: 5/11/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
731	66.0	26.9	147	0.20	21.2

CATS NO.	TRACER CONC.
313	22.67
133	22.56
358	34.63
132	27.85

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:40 HOUSE: P39A
DATES SAMPLED 041983-042983 DATE ANAL.: 5/11/83

HOUSE VOLUME M^3	SOURCE RATE nL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
731	66.0	34.3	116	0.16	61.7

CATS NO.	TRACER CONC.
565	21.22
583	22.33
572	65.71
574	27.85

BNL-AIMS ANALYSIS

ACCOUNT: PAR TRACER: PDCH FILE:47 HOUSE: P039
DATES SAMPLED 042983-051783 DATE ANAL.: 5/26/83

HOUSE VOLUME M^3	SOURCE RATE mL/min	AVG. CONCENT pL/L	INFILT. RATE M^3/hr.	AVG.AIR CHANGE per hr	REL.STD. DEV. %
731	66.0	29.4	135	0.18	27.8

CATS NO.	TRACER CONC.
544	27.34
638	19.85
636	30.66
561	39.56

APPENDIX 4-D

SF_6 DATA SHEETS

176 Bronson Ave.
Ottawa, Ontario
K1R 6H4
(613) 234-3280

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 1
DATE SEPT. 14/82
MODEL REGENT
TECHNICIAN FUGLER/PASQUINI
HEATING SYSTEM GAS
INTERIOR VOLUME 330 m3

TEST CONDITIONS

OUTDOOR TEMP 20°C
WIND SPEED 11 KPH
WIND DIRECTION SW
BAROMETER PRESS 101.8 KPA
RELATIVE HUMIDITY 78%

TEST RESULTS

INJECTION TIME 8:35
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
820914-A-1	9:00	23.23
-A-2	9:15	21.38
-A-3	9:30	21.01
-A-4	9:45	20.79
-A-5	10:00	19.96

ACPH 0.1326 CORRELATION 0.9372

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON) SUSPECT MALFUNTIONING FAN. ON RETEST, IT SHUT ITSELF OFF SPONTANEOUSLY	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	24	
RELATIVE HUM.	60%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	NONE 1 2 3 4 5	

176 Bronson Ave.
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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 1
DATE FEB. 3/83
MODEL REGENT
TECHNICIAN ENGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 330m3

TEST CONDITIONS

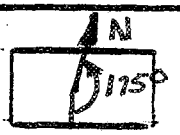
OUTDOOR TEMP 3.2°C
WIND SPEED 4 KPH
WIND DIRECTION S.E.
BAROMETER PRESS 98.9 KPA
RELATIVE HUMIDITY 93%

TEST RESULTS

INJECTION TIME 9:15
THEORETICAL INITIAL CONCENTRATION 48. ppb

SAMPLE	TIME	CONCENTRATION
830203-A-1	9:40	17.24
-A-2	9:50	16.53
-A-3	10:00	15.92
-A-4	10:10	15.12
-A-5	10:20	14.92
-A-6	10:30	14.10
-A-7	10:40	13.95

ACPH 0.2182 CORRELATION 0.9910



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	18.5°C	
RELATIVE HUM.	42%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

176 Bronson Ave.
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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 2
DATE June 16/82
MODEL Regent
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

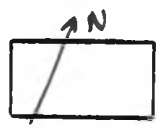
OUTDOOR TEMP 22 °C
WIND SPEED 20 KPH
WIND DIRECTION West
BAROMETER PRESS 100.6 KPA
RELATIVE HUMIDITY 53 %

TEST RESULTS

INJECTION TIME 35 cc @ 15:00
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
820616-B-1	15:25	5.38
B-2	15:40	4.55
B-3	15:55	3.75
B-4	16:10	3.30
B-5	16:25	2.71

ACPH 0.6771 CORRELATION 0.9984



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	24 °C	
RELATIVE HUM.	66 %	
NUMBER OF ENTRANCES INTO TEST SPACE	1 2 3 4 (5)	

176 Bronson Ave.
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of ____

Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 2
DATE Sept 14/82
MODEL Regent
TECHNICIAN Don Fulger
HEATING SYSTEM Gas
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

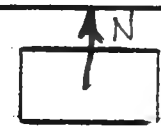
OUTDOOR TEMP 25°C
WIND SPEED 14 KPH
WIND DIRECTION SW
BAROMETER PRESS 101.7 KPA
RELATIVE HUMIDITY 65%

TEST RESULTS

INJECTION TIME 12:10
THEORETICAL INITIAL CONCENTRATION 48ppb

SAMPLE	TIME	CONCENTRATION
820914-B-1	12:35	21.72
B-2	12:51	19.36
B-3	13:05	17.25
B-4	13:20	17.06
B-5	13:35	14.40

ACPH 0.3821 CORRELATION 0.9768



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) (3) 4 5	
TEMPERATURE INDOORS	24.9	
RELATIVE HUM.	70%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

176 Bronson Ave.
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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 2
DATE JAN 20-83
MODEL REGENT
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

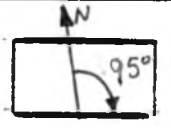
OUTDOOR TEMP -14.0°C
WIND SPEED 15 KPH
WIND DIRECTION SW
BAROMETER PRESS 103.7 KPA
RELATIVE HUMIDITY 46%

TEST RESULTS

INJECTION TIME 11:53
THEORETICAL INITIAL CONCENTRATION 48 PPB

SAMPLE	TIME	CONCENTRATION
830120-A-1	12:20	16.03
-A-2	12:30	15.14
-A-3	12:40	14.04
-A-4	12:50	13.07
-A-5	13:00	12.38
-A-6	13:10	10.96
-A-7	13:20	10.25

ACPH 0.4530 CORRELATION 0.9952



ERONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	22°C	
RELATIVE HUM.	27%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

176 Bronson Ave.
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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 3
DATE June 15/82
MODEL Regent
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 230 m^3

TEST CONDITIONS

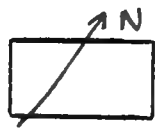
OUTDOOR TEMP 19 °C
WIND SPEED 9 KPH
WIND DIRECTION South
BAROMETER PRESS 101.0 KPA
RELATIVE HUMIDITY _____

TEST RESULTS

INJECTION TIME 35 cc @ 3:20
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
820615-C-1	15:45	6.06
C-2	16:00	5.68
C-3	16:15	5.12
C-4	16:30	4.79
C-5	16:45	4.59

ACPH 0.2904 CORRELATION 0.9908



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	23.3°C	
RELATIVE HUM.	57 %	
NUMBER OF ENTRANCES INTO TEST SPACE	1 2 3 4 5 (6)	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 3
DATE Oct 4/82
MODEL REGENT
TECHNICIAN Eugles
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

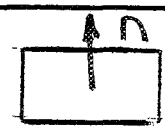
OUTDOOR TEMP 14°C
WIND SPEED 17 Km/hr
WIND DIRECTION NNW
BAROMETER PRESS 102.1 KPA
RELATIVE HUMIDITY 59%

TEST RESULTS

INJECTION TIME 12:25
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
821004-B-1	13:00	17.86
-B-2	13:15	15.59
-B-3	13:30	14.39
-B-4	13:45	13.14
-B-5	14:00	11.97

ACPH 0.3885 CORRELATION 0.9957



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	21°C	
RELATIVE HUM.	55%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(NONE) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 3
DATE DEC 09-82
MODEL REGENT
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 730m³

TEST CONDITIONS

OUTDOOR TEMP -18°C
WIND SPEED 33 KPH
WIND DIRECTION N.W
BAROMETER PRESS 104.0 KPA
RELATIVE HUMIDITY 50%

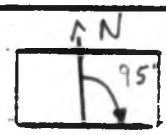
TEST RESULTS

INJECTION TIME 08:30
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
821209-A-1	08:55	17.28
-A-2	09:05	N.A.
-A-3	09:15	16.75
-A-4	09:25	13.63
-A-5	09:35	12.17
-A-6	09:45	11.12
-A-7	09:55	10.39

Points A-1 and A-3 not used

ACPH 0.5429 CORRELATION 0.9938



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	17°C	
RELATIVE HUM.	30%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 4
DATE June 29/82
MODEL Regent
TECHNICIAN Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

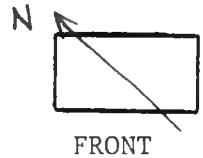
OUTDOOR TEMP 20°C
WIND SPEED calm
WIND DIRECTION —
BAROMETER PRESS 100.6 KPa
RELATIVE HUMIDITY 78%

TEST RESULTS

INJECTION TIME 35 cc @ 9:10
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
820629-A-1	9:35	10.1
A-2	9:50	9.47
A-3	10:05	8.90
A-4	10:20	8.74
A-5	10:35	8.22

ACPH 0.1969 CORRELATION 0.9874



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	23.5°C	
RELATIVE HUM.	69%	
NUMBER OF ENTRANCES INTO TEST SPACE	(1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 4
DATE OCT. 5/82
MODEL REGENT
TECHNICIAN Fugler/Pasquini
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

OUTDOOR TEMP 16°C
WIND SPEED 9Km/hr
WIND DIRECTION W
BAROMETER PRESS 102.3KPa
RELATIVE HUMIDITY 59%

TEST RESULTS

INJECTION TIME 12:15
THEORETICAL INITIAL CONCENTRATION 48ppb

SAMPLE	TIME	CONCENTRATION
821005-B-1	12:40	19.23
-B-2	12:55	17.91
-B-3	13:10	17.25
-B-4	13:25	16.97
-B-5	13:40	15.97

ACPH 0.1702 CORRELATION 0.9793

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	20°C	
RELATIVE HUM.	70%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(NONE) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 4
DATE JAN. 20/83
MODEL REGENT
TECHNICIAN EUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m3

TEST CONDITIONS

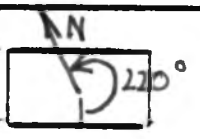
OUTDOOR TEMP -11.0°C
WIND SPEED 10 KPH
WIND DIRECTION W
BAROMETER PRESS 103.6 KPA
RELATIVE HUMIDITY 40%

TEST RESULTS

INJECTION TIME 15:30
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
830120-B-1	15:55	18.32
-B-2	16:05	17.09
-B-3	16:15	16.78
-B-4	16:25	16.10
-B-5	16:35	15.14
-B-6	16:45	14.64
-B-7	16:55	13.78

ACPH 0.2715 CORRELATION 0.9938



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN) *	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	20°C	
RELATIVE HUM.	40%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

* NOTE: BASEMENT DOOR CLOSED DURING TEST DUE TO YOUNG CHILD. ONE BEDROOM DOOR CLOSED IN TEST

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 5
DATE June 4/82
MODEL Regent
TECHNICIAN Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

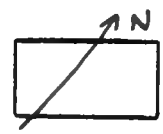
OUTDOOR TEMP 14 °C
WIND SPEED 10 KPH
WIND DIRECTION South
BAROMETER PRESS 102.4 KPa
RELATIVE HUMIDITY 63 %

TEST RESULTS

INJECTION TIME 35cc @ 11:02
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
820604-A-1	11:27	13.5
A-2	11:42	12.5
A-3	11:57	11.8
A-4	12:12	10.4
A-5	12:27	9.4

ACPH 0.3674 CORRELATION 0.9906



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	19 °C	
RELATIVE HUM.	58 %	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 5
DATE OCT. 5/82
MODEL REGENT
TECHNICIAN Eugler
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

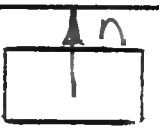
OUTDOOR TEMP 7°C
WIND SPEED 7 Km/hr
WIND DIRECTION E
BAROMETER PRESS 102.3 kPa
RELATIVE HUMIDITY 93%

TEST RESULTS

INJECTION TIME 8:10
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
821005-A-1	8:35	22.66
-A-2	8:56	20.15
-A3	9:05	18.21
-A-4	9:20	17.25
-A-5	9:35	15.25

ACPH 0.3790 CORRELATION 0.9938



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ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	20°C	
RELATIVE HUM.	65%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(NONE) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 5
DATE JAN 27-83
MODEL REGENT
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m3

TEST CONDITIONS

OUTDOOR TEMP -13°C
WIND SPEED 6 KPH
WIND DIRECTION WSW
BAROMETER PRESS 102.8 KPA
RELATIVE HUMIDITY 85%

TEST RESULTS

INJECTION TIME 08:27
THEORETICAL INITIAL CONCENTRATION 48 PPB

SAMPLE	TIME	CONCENTRATION
830127-A-1	08:55	18.31
-A-2	09:05	17.03
-A-3	09:15	15.95
-A-4	09:25	14.78
-A-5	09:35	13.88
-A-6	09:45	13.08
-A-7	09:55	12.46

ACPH 0.3904 CORRELATION 0.9981

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	16.4°C	
RELATIVE HUM.	35%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE: 6
DATE: June 17/82
MODEL: Regent
TECHNICIAN: Seton
HEATING SYSTEM: Gas
INTERIOR VOLUME: 730 m^3

TEST CONDITIONS

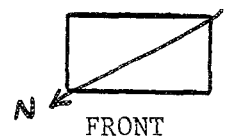
OUTDOOR TEMP: 18°C
WIND SPEED: 5 KPH
WIND DIRECTION: SE
BAROMETER PRESS: 101.0 KPA
RELATIVE HUMIDITY: 59%

TEST RESULTS

INJECTION TIME: 35 cc @ 10:52
THEORETICAL INITIAL CONCENTRATION: 48 ppb

SAMPLE	TIME	CONCENTRATION
820617-A-1	11:17	4.98
A-2	11:32	4.11
A-3	11:47	3.95
A-4	12:02	3.33
A-5	12:17	-0-

ACPH: 0.4988 CORRELATION: 0.9745



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	23.9°C	
RELATIVE HUM.	59%	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

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Retrospectors

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AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 6
DATE SEPT. 20/82
MODEL REGENT
TECHNICIAN Fugler / Pasquini
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m³

TEST CONDITIONS

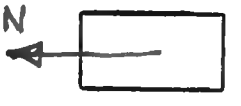
OUTDOOR TEMP 17 °C
WIND SPEED 15 Km/hr
WIND DIRECTION SE
BAROMETER PRESS 101.3 kPa
RELATIVE HUMIDITY 59%

TEST RESULTS

INJECTION TIME 13:00
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
820920-A-1	13:25	16.49
-A-2	13:40	13.98
-A-3	13:55	11:05
-A-4	14:10	9:12
-A-5	14:25	7:21

ACPH 0.8327 CORRELATION 0.9985



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	22°C	
RELATIVE HUM.	60%	
NUMBER OF ENTRANCES INTO TEST SPACE	1 (2) 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE: 6
DATE: JAN 10-83
MODEL: REGENT
TECHNICIAN: FUGLER/SINHA
HEATING SYSTEM: GAS
INTERIOR VOLUME: 730 m³

TEST CONDITIONS

OUTDOOR TEMP: -10.0°C
WIND SPEED: 17 KPH
WIND DIRECTION: EAST
BAROMETER PRESS: 102.5 KPA
RELATIVE HUMIDITY: 67%

TEST RESULTS

INJECTION TIME: 08:20
THEORETICAL INITIAL CONCENTRATION: 48 PPB

SAMPLE	TIME	CONCENTRATION
830110-A-1	08:45	16.4
-A-2	08:55	14.8
-A-3	09:05	14.4
-A-4	09:15	13.1
-A-5	09:25	12.4
-A-6	09:35	12.0
-A-7	09:45	10.9

ACPH: 0.3846 CORRELATION: 0.9918

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	18.0°C	
RELATIVE HUM.	30%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 7
DATE June 8/82
MODEL Regent
TECHNICIAN Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 330 m^3

TEST CONDITIONS

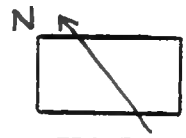
OUTDOOR TEMP 20.5 °C
WIND SPEED 7 KPH
WIND DIRECTION North
BAROMETER PRESS 101.7 KPa
RELATIVE HUMIDITY 50%

TEST RESULTS

INJECTION TIME 35cc @ 10:35
THEORETICAL INITIAL CONCENTRATION 48 ppb

SAMPLE	TIME	CONCENTRATION
820608-A-1	11:00	14.7
A-2	11:15	12.6
A-3	11:30	11.3
A-4	11:45	10.2
A-5	12:00	9.3

ACPH 0.4507 CORRELATION 0.9947



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	21°C	
RELATIVE HUM.	57%	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

Note: Fresh air intake blocked

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 7
DATE October 20-82
MODEL REGENT
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m³

TEST CONDITIONS

OUTDOOR TEMP 12°C
WIND SPEED 10 KPH
WIND DIRECTION SE
BAROMETER PRESS 101.8 KPA
RELATIVE HUMIDITY 67%

TEST RESULTS

INJECTION TIME 08:40
THEORETICAL INITIAL CONCENTRATION 48 PPB

SAMPLE	TIME	CONCENTRATION
821020-A-1	09:05	22.25
-A-2	09:15	19.87
-A-3	09:25	18.31
-A-4	09:35	17.08
-A-5	09:45	15.83
-A-6	09:55	14.73
-A-7	10:05	14.05

ACPH 0.4547 CORRELATION 0.9945

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	18.4°C	
RELATIVE HUM.	56%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 7
DATE JAN 27-83
MODEL REGENT
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m3

TEST CONDITIONS

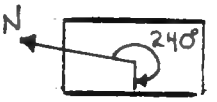
OUTDOOR TEMP -9°C
WIND SPEED 15 KPH
WIND DIRECTION NW
BAROMETER PRESS 102.8 KPA
RELATIVE HUMIDITY 62%

TEST RESULTS

INJECTION TIME 11:47
THEORETICAL INITIAL CONCENTRATION 48PPB

SAMPLE	TIME	CONCENTRATION
830127-B-1	12:15	17.96
-B-2	12:25	16.29
-B-3	12:35	14.95
-B-4	12:45	13.89
-B-5	12:55	12.95
-B-6	13:05	11.74
-B-7	13:15	11.39

ACPH 0.4640 CORRELATION 0.9952



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	17.0°C	
RELATIVE HUM.	32%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 8
DATE SEPT. 28/82
MODEL REGENT
TECHNICIAN Fugler
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

OUTDOOR TEMP 16°C
WIND SPEED 20 KPH
WIND DIRECTION NW
BAROMETER PRESS 102.2 KPA
RELATIVE HUMIDITY 82%

TEST RESULTS

INJECTION TIME 13:30
THEORETICAL INITIAL CONCENTRATION 48 PPB

SAMPLE	TIME	CONCENTRATION
820928-B-1	13:55	18.96
-B-2	14:10	17.63
-B-3	14:25	17.39
-B-4	14:40	16.27
-B-5	14:55	15.21

ACPH 0.2084 CORRELATION 0.9844

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	21.0°C	
RELATIVE HUM.	70%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(◎) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE	8
DATE	JAN 11-83
MODEL	REGENT
TECHNICIAN	FUGLER/SINHA
HEATING SYSTEM	GAS
INTERIOR VOLUME	730 m^3

TEST CONDITIONS

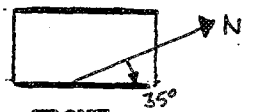
OUTDOOR TEMP	+4.0°C
WIND SPEED	17 KPH
WIND DIRECTION	South
BAROMETER PRESS	99.5 KPA
RELATIVE HUMIDITY	93%

TEST RESULTS

INJECTION TIME	12:50
THEORETICAL INITIAL CONCENTRATION	48 PPB

SAMPLE	TIME	CONCENTRATION
830111-A-1	13:15	17.5
-A-2	13:25	16.6
-A-3	13:35	15.6
-A-4	13:45	15.2
-A-5	13:55	14.8
-A-6	14:05	14.2
-A-7	14:15	13.5

ACPH 0.2451 CORRELATION 0.9920



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	20.3°C	
RELATIVE HUM.	41%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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page ____
of ____

Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 10
DATE June 15/82
MODEL Russet
TECHNICIAN Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

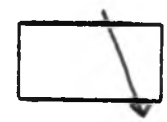
OUTDOOR TEMP 20 °C
WIND SPEED 7 KPH
WIND DIRECTION South
BAROMETER PRESS 101.2
RELATIVE HUMIDITY ____

TEST RESULTS

INJECTION TIME 35 cc @ 11:05
THEORETICAL INITIAL CONCENTRATION 56 ppb

SAMPLE	TIME	CONCENTRATION
820615-B-1	11:30	6.15
B-2	11:45	5.52
B-3	12:00	4.96
B-4	12:15	4.56
B-5	12:30	3.86

ACPH 0.4490 CORRELATION 0.9938



ORIENTATION OF HOUSE

inject in hot-air plenum, sample in cold

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	(1) 2 3 4 5	
TEMPERATURE INDOORS	20°C	
RELATIVE HUM.	64 %	
NUMBER OF ENTRANCES INTO TEST SPACE	(1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 10
DATE OCTOBER 19-82
MODEL RUSSET
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 625m³

TEST CONDITIONS

OUTDOOR TEMP 16°C
WIND SPEED 18 KPH
WIND DIRECTION SW
BAROMETER PRESS 102.3 KPA
RELATIVE HUMIDITY 55%

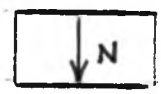
TEST RESULTS

INJECTION TIME 12:25
THEORETICAL INITIAL CONCENTRATION 56.0PPB

SAMPLE	TIME	CONCENTRATION
821019-B-1	13:00	19.70
B-2	13:10	15.93
B-3	13:20	18.07
B-4	13:30	17.11
B-5	13:40	16.86
B-6	13:50	15.42
B-7	14:00	14.76

First 2 points not used

ACPH 0.3051 CORRELATION 0.9812



ERONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 5 (6)	
TEMPERATURE INDOORS	22°C	
RELATIVE HUM.	62%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 10
DATE JAN. 26/83
MODEL RUSSET
TECHNICIAN SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 625 m³

TEST CONDITIONS

OUTDOOR TEMP -16.°C
WIND SPEED 13KPH
WIND DIRECTION W
BAROMETER PRESS 102.4KPA
RELATIVE HUMIDITY 46%

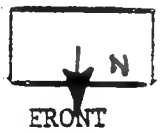
TEST RESULTS

INJECTION TIME 11:48
THEORETICAL INITIAL CONCENTRATION 56.ppb

SAMPLE	TIME	CONCENTRATION
830126-B-1	12:15	18.99
-B-2	12:25	16.84
-B-3	12:35	15.83
-B-4	12:45	14.96
-B-5	12:55	14.47
-B-6	13:05	13.52
-B-7	13:15	13.31

POINT B-1 NOT USED

ACPH 0.2885 CORRELATION 0.9903



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	23°C	
RELATIVE HUM.	35%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 11
DATE June 10/82
MODEL Russet
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 625 m³

TEST CONDITIONS

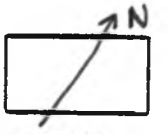
OUTDOOR TEMP 24 °C
WIND SPEED 13 KPH
WIND DIRECTION South
BAROMETER PRESS 101.3 KPA
RELATIVE HUMIDITY 38 %

TEST RESULTS

INJECTION TIME 30 cc @ 15:05
THEORETICAL INITIAL CONCENTRATION 56 ppb

SAMPLE	TIME	CONCENTRATION
820610-B-1	15:30	13.5
B-2	15:45	12.6
B-3	16:00	11.7
B-4	16:15	10.7
B-5	16:30	9.97

ACPH 0.3078 CORRELATION 0.9991



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	(1) 2 3 4 5	
TEMPERATURE INDOORS	22.2°C	
RELATIVE HUM.	62 %	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 11
DATE OCTOBER 22-82
MODEL RUSSET
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 625 m3

TEST CONDITIONS

OUTDOOR TEMP 2°C
WIND SPEED 13 KPH
WIND DIRECTION N
BAROMETER PRESS 102.9 KPA
RELATIVE HUMIDITY 50%

TEST RESULTS

INJECTION TIME 08:05
THEORETICAL INITIAL CONCENTRATION 5.6 PPB

SAMPLE	TIME	CONCENTRATION
821022-A-1	08:30	21.38
A-2	08:40	20.99
A-3	08:50	20.41
A-4	09:00	19.29
A-5	09:10	18.74
A-6	09:20	18.44
A-7	09:30	17.52

ACPH 0.2016 CORRELATION 0.9908

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	(1) 2 3 4 5	
TEMPERATURE INDOORS	20.4°C	
RELATIVE HUM.	50%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE: 11
DATE: DEC 07-82
MODEL: Russett
TECHNICIAN: SINHA/FUGLER
HEATING SYSTEM: GAS
INTERIOR VOLUME: 625 m³

TEST CONDITIONS

OUTDOOR TEMP: 2°C
WIND SPEED: 20 KPH
WIND DIRECTION: SW
BAROMETER PRESS: 100.7 KPA
RELATIVE HUMIDITY: 69%

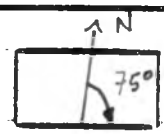
TEST RESULTS

INJECTION TIME: 08:05
THEORETICAL INITIAL CONCENTRATION: 56 ppb

SAMPLE	TIME	CONCENTRATION
821207-A-1	08:30	17.45
-A-2	08:40	17.41
-A-3	08:50	15.57
-A-4	09:00	16.01
-A-5	09:10	15.46
-A-6	09:20	13.94
-A-7	09:30	13.37

Points A-1 and A-3 not used

ACPH: 0.3262 CORRELATION: 0.9818



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	18°C	
RELATIVE HUM.	60%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

Fresh air intake sealed

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 12
DATE June 2/82
MODEL Russet
TECHNICIAN Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

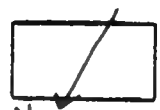
OUTDOOR TEMP 17.1 °C
WIND SPEED 26 KPH
WIND DIRECTION NW
BAROMETER PRESS 101.0 Kpa
RELATIVE HUMIDITY 45%

TEST RESULTS

INJECTION TIME 30 cc @ 11:20
THEORETICAL INITIAL CONCENTRATION 56 ppb

SAMPLE	TIME	CONCENTRATION
820602-A-1	11:45	10.9
A-2	12:00	9.95
A-3	12:15	8.87
A-4	12:30	8.27
A-5	12:45	7.78

ACPH 0.3437 CORRELATION 0.9939



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	23°C	
RELATIVE HUM.	64 %	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 12
DATE SEPT. 17/82
MODEL RUSSET
TECHNICIAN FUGLER/PASQ.
HEATING SYSTEM GAS
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

OUTDOOR TEMP 7.5°C
WIND SPEED 9 KPH
WIND DIRECTION W
BAROMETER PRESS 102.1 KPA
RELATIVE HUMIDITY 81%

TEST RESULTS

INJECTION TIME 08:10
THEORETICAL INITIAL CONCENTRATION 560 PPB

SAMPLE	TIME	CONCENTRATION
820917-A-1	08:40	19.69
-A-2	08:55	19.13
-A-3	09:10	17.95
-A-4	09:25	17.46
-A-5	09:40	16.44

ACPH 0.1809 CORRELATION 0.9921

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	18°C	
RELATIVE HUM.	60%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	1 2 3 (4) 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 12
DATE JAN 21-83
MODEL RUSSET
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 625 m³

TEST CONDITIONS

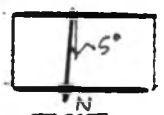
OUTDOOR TEMP -14°C
WIND SPEED 10 KPH
WIND DIRECTION NW
BAROMETER PRESS 103.5KPA
RELATIVE HUMIDITY 66%

TEST RESULTS

INJECTION TIME 08:18
THEORETICAL INITIAL CONCENTRATION 56 PPB

SAMPLE	TIME	CONCENTRATION
830121-A-1	08:45	18.31
-A-2	08:55	17.38
-A-3	09:05	16.46
-A-4	09:15	15.67
-A-5	09:25	14.70
-A-6	09:35	14.09
-A-7	09:45	13.44

ACPH 0.3149 CORRELATION 0.9994



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	19°C	
RELATIVE HUM.	35%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(◎)1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 13
DATE May 31/82
MODEL Russet
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

OUTDOOR TEMP 22.4 °C
WIND SPEED 10 KPH
WIND DIRECTION South
BAROMETER PRESS 100.7 KPa
RELATIVE HUMIDITY 78 %

TEST RESULTS

INJECTION TIME 30cc @ 10:55
THEORETICAL INITIAL CONCENTRATION 56 ppb

SAMPLE	TIME	CONCENTRATION
820531-A-1	11:20	19.6
A-2	11:35	12.0
A-3	11:50	12.2
A-4	12:05	11.2
A-5	12:20	10.9

ACPH 0.4970 CORRELATION 0.8164

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	23 °C	
RELATIVE HUM.	74 %	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 13
DATE OCTOBER 19-82
MODEL RUSSET
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 625 m³

TEST CONDITIONS

OUTDOOR TEMP 11°C
WIND SPEED 12 KPH
WIND DIRECTION SW
BAROMETER PRESS 102.4 KPA
RELATIVE HUMIDITY 66%

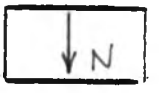
TEST RESULTS

INJECTION TIME 10:00
THEORETICAL INITIAL CONCENTRATION 56 PPB

SAMPLE	TIME	CONCENTRATION
821019-A-1	10:25	19.94
-A-2	10:35	18.68
-A-3	10:45	17.70
-A-4	10:55	18.37
-A-5	11:05	17.17
-A-6	11:15	15.56
A-7	11:25	15.56

4th point not used

ACPH 0.2441 CORRELATION 0.9730



FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	21.3°C	
RELATIVE HUM.	67%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 13
DATE JAN07-83
MODEL RUSSET
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 625m³

TEST CONDITIONS

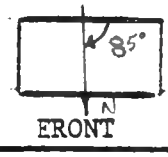
OUTDOOR TEMP 0.0°C
WIND SPEED 18 KPH
WIND DIRECTION EAST
BAROMETER PRESS 100.0 KPA
RELATIVE HUMIDITY 93%

TEST RESULTS

INJECTION TIME 11:20
THEORETICAL INITIAL CONCENTRATION 56 PPB

SAMPLE	TIME	CONCENTRATION
830107-B-1	11:45	18.0
-B-2	11:55	17.5
-B-3	12:05	17.1
-B-4	12:15	16.8
-B-5	12:25	15.6
-B-6	12:35	14.9
-B-7	12:45	14.2

ACPH 0.2411 CORRELATION 0.9802



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	20°C	
RELATIVE HUM.	55%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 14
DATE May 28/82
MODEL Russett
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

OUTDOOR TEMP 20 °C
WIND SPEED 18 KPH
WIND DIRECTION SW
BAROMETER PRESS 101.6 KPa
RELATIVE HUMIDITY 68 %

TEST RESULTS

INJECTION TIME 30 cc @ 12:45
THEORETICAL INITIAL CONCENTRATION 56 ppb

SAMPLE	TIME	CONCENTRATION
820528-B-1	13:10	13.6
B-2	13:25	12.0
B-3	13:40	11.4
B-4	13:55	10.8
B-5	14:10	10.2

ACPH 0.2723 CORRELATION 0.9776

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	22.7 °C	
RELATIVE HUM.	61 %	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 14
DATE OCT 7/82
MODEL RUSSET
TECHNICIAN Fugler
HEATING SYSTEM GAS
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

OUTDOOR TEMP 10°C
WIND SPEED 20 KPH
WIND DIRECTION E
BAROMETER PRESS 102.2 KPA
RELATIVE HUMIDITY 82%

TEST RESULTS

INJECTION TIME 7:55
THEORETICAL INITIAL CONCENTRATION 56.0 PPB

SAMPLE	TIME	CONCENTRATION
821007-A-1	08:20	N/A
-A-2	08:35	19.80
-A-3	08:50	19.09
-A-4	09:05	18.58
-A-5	09:20	17.78

ACPH 0.1400 CORRELATION 0.9960

FRONT

ORIENTATION OF HOUSE

N.B - air combustion opening closed by homeowner

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	21.0°C	
RELATIVE HUM.	65%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 14
DATE JAN.26/83
MODEL RUSSET
TECHNICIAN FUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 625 m3

TEST CONDITIONS

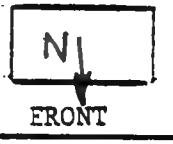
OUTDOOR TEMP -19.°C
WIND SPEED 17 KPH
WIND DIRECTION N.W.
BAROMETER PRESS 102.5 KPA
RELATIVE HUMIDITY 65%

TEST RESULTS

INJECTION TIME 8:05
THEORETICAL INITIAL CONCENTRATION 56 ppb

SAMPLE	TIME	CONCENTRATION
830126-A-1	8:30	17.93
-A-2	8:40	17.18
-A-3	8:50	16.37
-A-4	9:00	15.66
-A-5	9:10	15.54
-A-6	9:20	13.88
-A-7	9:30	13.23

ACPH 0.2980 CORRELATION 0.9804



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	19.°C	
RELATIVE HUM.	34%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

NOTE: VENTILATION INLET TO FURNACE ROOM SEALED BY OWNER

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 15
DATE July 7/82
MODEL Russet
TECHNICIAN Seton
HEATING SYSTEM Elect.
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

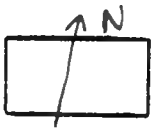
OUTDOOR TEMP 30.8°C
WIND SPEED 28-48 KPH
WIND DIRECTION S.W
BAROMETER PRESS 100.9 KPA
RELATIVE HUMIDITY 59%

TEST RESULTS

INJECTION TIME 30 cc @ 15:19
THEORETICAL INITIAL CONCENTRATION 56.0 ppb

SAMPLE	TIME	CONCENTRATION
820707-C-1	15:44	10.7
C-2	15:59	10.4
C-3	16:14	9.76
C-4	16:29	9.48
C-5	16:44	9.34

ACPH 0.1458 CORRELATION 0.9972



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	28.5°C	
RELATIVE HUM.	65%	
NUMBER OF ENTRANCES INTO TEST SPACE	(1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 15
DATE SEPT. 16\82
MODEL RUSSET
TECHNICIAN Fugler/Pasquini
HEATING SYSTEM ELECTRIC
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

OUTDOOR TEMP 10.9°C
WIND SPEED 4 KPH
WIND DIRECTION SW
BAROMETER PRESS 101.3 KPA
RELATIVE HUMIDITY 94%

* N.B- Low Correlation.

TEST RESULTS

INJECTION TIME 08:00
THEORETICAL INITIAL CONCENTRATION 56.0 PPB

SAMPLE	TIME	CONCENTRATION
820916-A-1	08:25	23.41
-A-2	08:40	22.15
-A-3	08:55	22.13
-A-4	09:10	21.07
-A-5	09:25	21.84

ACPH 0.0755 CORRELATION 0.7881*

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	20°C	
RELATIVE HUM.	60%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

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AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 15
DATE FEB.9/83
MODEL RUSSET
TECHNICIAN SINHA
HEATING SYSTEM ELECTRIC
INTERIOR VOLUME 625 m3

TEST CONDITIONS

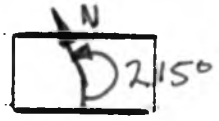
OUTDOOR TEMP -17.°C
WIND SPEED 26 KPH
WIND DIRECTION N.W.
BAROMETER PRESS 102.3 KPA
RELATIVE HUMIDITY 55%

TEST RESULTS

INJECTION TIME 8:18
THEORETICAL INITIAL CONCENTRATION 56.0 ppb

SAMPLE	TIME	CONCENTRATION
830209-A-1	8:45	16.85
-A-2	8:55	15.63
-A-3	9:05	15.14
-A-4	9:15	14.46
-A-5	9:25	13.62
-A-6*	9:36	12.83
-A-7	9:45	12.21

ACPH 0.3144 CORRELATION 0.9970



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	19°C	
RELATIVE HUM.	42%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 16
DATE June 24
MODEL Russet
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

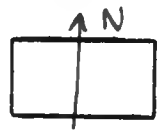
OUTDOOR TEMP 19 °C
WIND SPEED 9 KPH
WIND DIRECTION WNW
BAROMETER PRESS 101.8 KPA
RELATIVE HUMIDITY 52 %

TEST RESULTS

INJECTION TIME 30cc @ 11:20
THEORETICAL INITIAL CONCENTRATION 56.0 ppb

SAMPLE	TIME	CONCENTRATION
820624-C-1	11:45	6.44
C-2	12:00	5.79
C-3	12:15	5.31
C-4	12:30	5.21
C-5	12:45	4.73

ACPH 0.2891 CORRELATION 0.9812



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	21.8 °C	
RELATIVE HUM.	64 %	
NUMBER OF ENTRANCES INTO TEST SPACE	1 (2) 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 16
DATE JAN 13-83
MODEL RUSSET
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 625 m³

TEST CONDITIONS

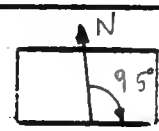
OUTDOOR TEMP -19.0°C
WIND SPEED 4 KPH
WIND DIRECTION WEST
BAROMETER PRESS 102.2 KPA
RELATIVE HUMIDITY 70%

TEST RESULTS

INJECTION TIME 0818
THEORETICAL INITIAL CONCENTRATION 56.0 PPB

SAMPLE	TIME	CONCENTRATION
830113-A-1	08:45	18.7
-A-2	08:55	17.6
-A-3	09:05	16.8
-A-4	09:15	15.4
-A-5	09:25	13.7
-A-6	09:35	13.5
-A-7	09:45	13.2

ACPH 0.3814 CORRELATION 0.9795



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 5	
TEMPERATURE INDOORS	17.4°C	
RELATIVE HUM.	33%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 17
DATE June 8/82
MODEL Russett
TECHNICIAN Fugler
HEATING SYSTEM Elect.
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

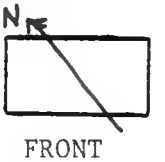
OUTDOOR TEMP 24.6 °C
WIND SPEED 7 KPH
WIND DIRECTION SE
BAROMETER PRESS 101.5 KPa
RELATIVE HUMIDITY 30%

TEST RESULTS

INJECTION TIME 30 cc @ 13:55
THEORETICAL INITIAL CONCENTRATION 560 ppb

SAMPLE	TIME	CONCENTRATION
820608-B-1	14:20	13.4
B-2	14:35	12.8
B-3	14:50	12.8
B-4	15:05	11.9
B-5	15:20	11.9

ACPH 0.1242 CORRELATION 0.9474



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	21°C	
RELATIVE HUM.	57%	
NUMBER OF ENTRANCES INTO TEST SPACE	1 2 3 4 5 (9)	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 17
DATE OCT. 4\82
MODEL RUSSET
TECHNICIAN FUGLER
HEATING SYSTEM ELECTRIC
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

OUTDOOR TEMP 11°C
WIND SPEED 10 KPH
WIND DIRECTION NNW
BAROMETER PRESS 102.0 KPA
RELATIVE HUMIDITY 71%

TEST RESULTS

INJECTION TIME 8:20
THEORETICAL INITIAL CONCENTRATION 56.0 PPB

SAMPLE	TIME	CONCENTRATION
821004-A-1	08:45	20.75
A-2	09:00	20.10
A-3	09:15	19.29
A-4	09:30	18.81
A-5	09:45	18.30

ACPH 0.1270 CORRELATION 0.9963

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	18°C	
RELATIVE HUM.	70%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 17
DATE FEB.18/83
MODEL RUSSET
TECHNICIAN FUGLER
HEATING SYSTEM ELECTRIC
INTERIOR VOLUME 625 m3

TEST CONDITIONS

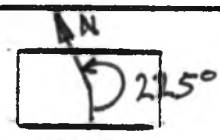
OUTDOOR TEMP 6.°C
WIND SPEED 10 KPH
WIND DIRECTION N
BAROMETER PRESS 102.4 KPA
RELATIVE HUMIDITY 60%

TEST RESULTS

INJECTION TIME 45ml @ 8:35
THEORETICAL INITIAL CONCENTRATION 72 ppb

SAMPLE	TIME	CONCENTRATION
830218-A-1	9:00	24.00
-A-2	9:10	24.09
-A-3	9:20	23.21
-A-4	9:30	22.32
-A-5	9:40	22.04
-A-6	9:50	21.47
-A-7	10:00	21.24

ACPH 0.1390 CORRELATION 0.9791



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	17.°C	
RELATIVE HUM.	46%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 18
DATE July 7/82
MODEL Russet
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

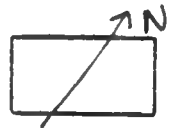
OUTDOOR TEMP 29.6 °C
WIND SPEED 26 KPH
WIND DIRECTION SSW
BAROMETER PRESS 101.1 KPA
RELATIVE HUMIDITY 59 %

TEST RESULTS

INJECTION TIME 30 cc @ 12:10
THEORETICAL INITIAL CONCENTRATION 56.0 ppb

SAMPLE	TIME	CONCENTRATION
820707-B-1	12:35	9.78
B-2	12:50	9.24
B-3	13:05	8.61
B-4	13:20	7.75
B-5	13:35	7.72

ACPH 0.2596 CORRELATION 0.9766



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	27.7°C	
RELATIVE HUM.	66%	
NUMBER OF ENTRANCES INTO TEST SPACE	1 2 3 4 (5)	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 18
DATE OCT. 6/82
MODEL RUSSET
TECHNICIAN Fugler
HEATING SYSTEM GAS
INTERIOR VOLUME 625 m^3

TEST CONDITIONS

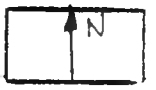
OUTDOOR TEMP 11°C
WIND SPEED 8 KPH
WIND DIRECTION SW
BAROMETER PRESS 102.4 KPA
RELATIVE HUMIDITY 88%

TEST RESULTS

INJECTION TIME 8:25
THEORETICAL INITIAL CONCENTRATION 56.0 PPB

SAMPLE	TIME	CONCENTRATION
821006-A1	08:50	19.89
-A-2	09:05	18.29
-A-3	09:20	17.62
-A-4	09:35	16.58
-A-5	09:50	15.55

ACPH 0.2362 CORRELATION 0.9946



FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	20.0°C	
RELATIVE HUM.	60%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE: 18
DATE: JAN 31-83
MODEL: RUSSET
TECHNICIAN: FUGLER/SINHA
HEATING SYSTEM: GAS
INTERIOR VOLUME: 625 m³

TEST CONDITIONS

OUTDOOR TEMP: 1.8°C
WIND SPEED: 18 KPH
WIND DIRECTION: SW
BAROMETER PRESS: 101.1 KPA
RELATIVE HUMIDITY: 80%

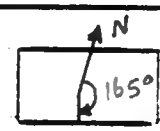
TEST RESULTS

INJECTION TIME: 10:20
THEORETICAL INITIAL CONCENTRATION: 56.0 PPB

SAMPLE	TIME	CONCENTRATION
830131-A-1	10:45	6.77
-A-2	10:55	16.57
-A-3	11:05	15.79
-A-4	11:15	15.46
-A-5	11:25	14.72
-A-6	11:35	13.87
-A-7	11:45	13.53

POINT A-1 NOT USED

ACPH: 0.2489 CORRELATION: 0.9929



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	19.5°C	
RELATIVE HUM.	42%	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

DURING TEST PERIOD COMBUSTION INLET PARTIALLY STUFFED WITH INSULATION

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 20
DATE June 22/82
MODEL Cortland
TECHNICIAN W.Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 660 m^2

TEST CONDITIONS

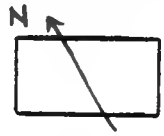
OUTDOOR TEMP 14 °C
WIND SPEED 7 KPH
WIND DIRECTION WEST
BAROMETER PRESS 101.1 KPA
RELATIVE HUMIDITY 76 %

TEST RESULTS

INJECTION TIME 30 cc @ 8:09
THEORETICAL INITIAL CONCENTRATION 53 ppb

SAMPLE	TIME	CONCENTRATION
820622-A-1	8:34	5.90
A-2	8:49	5.50
A-3	9:04	5.22
A-4	9:19	4.92
A-5	9:34	4.83

ACPH 0.2047 CORRELATION 0.9852



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	20.8 °C	
RELATIVE HUM.	68 %	
NUMBER OF ENTRANCES INTO TEST SPACE	1 (2) 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 20
DATE JAN 06-83
MODEL CORTLAND
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 660 m3

TEST CONDITIONS

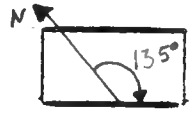
OUTDOOR TEMP +1.0°C
WIND SPEED CALM
WIND DIRECTION -
BAROMETER PRESS 101.6 KPA
RELATIVE HUMIDITY 75%

TEST RESULTS

INJECTION TIME 12:00
THEORETICAL INITIAL CONCENTRATION 53 PPB

SAMPLE	TIME	CONCENTRATION
830106-B-1	12:25	21.0
-B-2	12:35	20.0
-B-3	12:45	18.8
-B-4	12:55	18.1
-B-5	13:05	17.2
-B-6	13:15	16.9
-B-7	13:25	16.1

ACPH 0.2621 CORRELATION 0.9931



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	18.2°C	
RELATIVE HUM.	33%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE	21
DATE	July 5/82
MODEL	Cortland
TECHNICIAN	Fugler
HEATING SYSTEM	Gas
INTERIOR VOLUME	660 m^3

TEST CONDITIONS

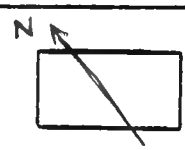
OUTDOOR TEMP	20.5 °C
WIND SPEED	19 Kph
WIND DIRECTION	South
BAROMETER PRESS	101.9 KPa
RELATIVE HUMIDITY	36 %

TEST RESULTS

INJECTION TIME	35cc @ 13:00
THEORETICAL INITIAL CONCENTRATION	53 ppb

SAMPLE	TIME	CONCENTRATION
820705-A-1	13:25	11.5
A-2	13:40	10.7
A-3	13:55	10.3
A-4	14:10	9.65
A-5	14:25	9.11

ACPH 0.2277 CORRELATION 0.9969



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	20.5 °C	
RELATIVE HUM.	60 %	
NUMBER OF ENTRANCES INTO TEST SPACE	1 (2) 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 21
DATE OCT. 29/82
MODEL CORTLAND
TECHNICIAN FUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 660 m³

TEST CONDITIONS

OUTDOOR TEMP 11.0°C
WIND SPEED 7 KPH
WIND DIRECTION SOUTH
BAROMETER PRESS 101.9 KPA
RELATIVE HUMIDITY 66%

TEST RESULTS

INJECTION TIME 9:05
THEORETICAL INITIAL CONCENTRATION 53 ppb

SAMPLE	TIME	CONCENTRATION
*21029-A-1	9:30	24.46
-A-2	9:40	23.39
-A-3	9:50	22.69
-A-4	10:00	21.85
-A-5	10:10	21.00
-A-6	10:20	20.29
-A-7	10:30	19.77

ACPH 0.2142 CORRELATION 0.9984

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	19.0°C	
RELATIVE HUM.	58%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(NONE) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 21
DATE JAN.25/83
MODEL CORTLAND
TECHNICIAN FUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 660 m³

TEST CONDITIONS

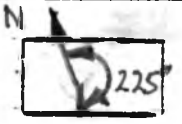
OUTDOOR TEMP 1°C
WIND SPEED 20 KPH
WIND DIRECTION SW
BAROMETER PRESS 100.7
RELATIVE HUMIDITY 86%

TEST RESULTS

INJECTION TIME 10:10
THEORETICAL INITIAL CONCENTRATION 53 ppb

SAMPLE	TIME	CONCENTRATION
830125-A-1	10:35	21.16
-A-2	10:45	20.34
-A-3	10:55	19.47
-A-4	11:05	18.59
-A-5	11:15	17.49
-A-6	11:25	16.80
-A-7	11:35	16.31

ACPH 0.2723 CORRELATION 0.9972



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	20°C	
RELATIVE HUM.	53%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(1) 2 3 4 5	

NOTE: ONE LONG DOOR OPENING BETWEEN A-6 and A-7
ON-SITE WIND DROPPED AFTER A-2

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 22
DATE July 12/82
MODEL Cortland
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 660 m^3

TEST CONDITIONS

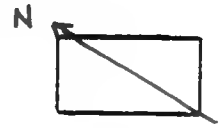
OUTDOOR TEMP 21.4 °C
WIND SPEED 22-39 KPH
WIND DIRECTION SW
BAROMETER PRESS 100.9 KPa
RELATIVE HUMIDITY 60%

TEST RESULTS

INJECTION TIME 35 cc @ 12:05
THEORETICAL INITIAL CONCENTRATION 53 ppb

SAMPLE	TIME	CONCENTRATION
820712-B-1	12:30	10.70
B-2	12:45	9.96
B-3	13:00	9.78
B-4	13:15	9.09
B-5	13:30	8.56

ACPH 0.2151 CORRELATION 0.9885



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	21 °C	
RELATIVE HUM.	68 %	
NUMBER OF ENTRANCES INTO TEST SPACE	1 2 3 (4) 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 22
DATE SEPT 28/82
MODEL CORTLAND
TECHNICIAN FUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 660 m^3

TEST CONDITIONS

OUTDOOR TEMP 13°C
WIND SPEED 7 KPH
WIND DIRECTION NW
BAROMETER PRESS 101.8 KPA
RELATIVE HUMIDITY 100%

TEST RESULTS

INJECTION TIME 7:50
THEORETICAL INITIAL CONCENTRATION 53 PPB

SAMPLE	TIME	CONCENTRATION
820928-A-1	08:15	20.19
-A-2	08:30	19.36
-A-3	08:45	18.98
-A-4	09:00	18.03
-A-5	09:15	17.91

ACPH 0.1243 CORRELATION 0.9799

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	19.0°C	
RELATIVE HUM.	70%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	1 2 (3) 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 22
DATE FEB.11/83
MODEL CORTLAND
TECHNICIAN FUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 660 m³

TEST CONDITIONS

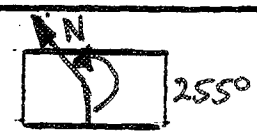
OUTDOOR TEMP -18.°C
WIND SPEED 20 KPH
WIND DIRECTION N.E.
BAROMETER PRESS 103.6 KPA
RELATIVE HUMIDITY 50%

TEST RESULTS

INJECTION TIME 9:15
THEORETICAL INITIAL CONCENTRATION 53 ppb

SAMPLE	TIME	CONCENTRATION
830211-A-1	9:40	17.67
-A-2	9:50	16.34
-A-3	10:00	15.40
-A-4	10:10	14.41
-A-5	10:20	13.36
-A-6	10:30	12.68
-A-7	10:40	11.75

ACPH 0.4015 CORRELATION 0.9993



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	17.°C	
RELATIVE HUM.	29%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 23
DATE June 11/82
MODEL Cortland
TECHNICIAN Seton
HEATING SYSTEM Elect.
INTERIOR VOLUME 660 m^3

TEST CONDITIONS

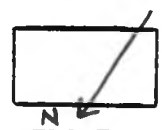
OUTDOOR TEMP 18 °C
WIND SPEED 22KPH
WIND DIRECTION West
BAROMETER PRESS 101.7 KPA
RELATIVE HUMIDITY 64 %

TEST RESULTS

INJECTION TIME 35 cc @ 10:55
THEORETICAL INITIAL CONCENTRATION 53 ppb

SAMPLE	TIME	CONCENTRATION
820611-A-1	11:20	14.7
A-2	11:35	14.5
A-3	11:50	14.0
A-4	12:05	13.8
A-5	12:20	13.4

ACPH 0.0938 CORRELATION 0.9911



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	21 °C	
RELATIVE HUM.	70 %	
NUMBER OF ENTRANCES INTO TEST SPACE	0 (1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 23
DATE OCTOBER 22-82
MODEL CORTLAND
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM ELECTRIC
INTERIOR VOLUME 660 m³

TEST CONDITIONS

OUTDOOR TEMP 3°C
WIND SPEED 11 KPH
WIND DIRECTION NE
BAROMETER PRESS 102.9 KPA
RELATIVE HUMIDITY 56%

TEST RESULTS

INJECTION TIME 10:30
THEORETICAL INITIAL CONCENTRATION 53 PPB

SAMPLE	TIME	CONCENTRATION
821022-B-1	10:55	24.60
-B-2	11:06	23.36
-B-3	11:15	22.85
-B-4	11:25	22.44
-B-5	11:35	21.96
-B-6	11:45	21.65
-B-7	11:55	21.03

ACPH 0.1430 CORRELATION 0.9834

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	(1) 2 3 4 5	
TEMPERATURE INDOORS	18.1°C	
RELATIVE HUM.	63%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 23
DATE JAN 19/83
MODEL CORTLAND
TECHNICIAN SINHA
HEATING SYSTEM ELECTRIC
INTERIOR VOLUME 660m3

TEST CONDITIONS

OUTDOOR TEMP -22°C
WIND SPEED 24 KPH
WIND DIRECTION N.W.
BAROMETER PRESS 102.8KPA
RELATIVE HUMIDITY 58%

TEST RESULTS

INJECTION TIME 8:00
THEORETICAL INITIAL CONCENTRATION 53 ppb

SAMPLE	TIME	CONCENTRATION
830119-A1	8:25	23.7
-A2	8:40	22.5
A-3	8:55	22.4
A-4	9:10	22.4
-A5	9:25	21.3
-A6	9:40	20.9
-A7	9:55	20.5

Point A-4 not used

ACPH 0.0904 CORRELATION 0.9842

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	14.0°C	
RELATIVE HUM.	45%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	1 2 (3) 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 24
DATE July 8/82
MODEL Cortland
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 660 m^3

TEST CONDITIONS

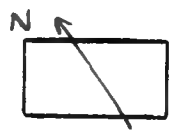
OUTDOOR TEMP 24.2°C
WIND SPEED 15 KPH
WIND DIRECTION WEST
BAROMETER PRESS 101.2 KPA
RELATIVE HUMIDITY 61%

TEST RESULTS

INJECTION TIME 35 cc @ 8:25
THEORETICAL INITIAL CONCENTRATION 53 ppb

SAMPLE	TIME	CONCENTRATION
820708-A-1	8:50	11.8
A-2	9:05	11.2
A-3	9:20	10.3
A-4	9:35	9.93
A-5	9:50	9.74

ACPH 0.2016 CORRELATION 0.9750



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	25.8°C	
RELATIVE HUM.	69%	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 24
DATE SEPT. 21/82
MODEL CORTLAND
TECHNICIAN Fugler
HEATING SYSTEM GAS
INTERIOR VOLUME 660 m^3

TEST CONDITIONS

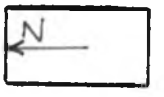
OUTDOOR TEMP 11°C
WIND SPEED 6 km/hr
WIND DIRECTION SE
BAROMETER PRESS 101.7 kPa
RELATIVE HUMIDITY 100%

TEST RESULTS

INJECTION TIME 8:00
THEORETICAL INITIAL CONCENTRATION 53 PPB

SAMPLE	TIME	CONCENTRATION
820921-A-1	08:25	25.86
-A-2	08:40	24.57
-A-3	08:55	23.37
-A-4	09:10	22.46
-A-5	09:25	21.42

ACPH 0.1866 CORRELATION 0.9991



FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	(1) 2 3 4 5	
TEMPERATURE INDOORS	19°C	
RELATIVE HUM.	72%	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE	24
DATE	JAN 07-83
MODEL	CORTLAND
TECHNICIAN	FUGLER/SINHA
HEATING SYSTEM	GAS
INTERIOR VOLUME	660 m^3

TEST CONDITIONS

OUTDOOR TEMP	-1.0°C
WIND SPEED	20 KPH
WIND DIRECTION	EAST
BAROMETER PRESS	100.3 KPA
RELATIVE HUMIDITY	93%

TEST RESULTS

INJECTION TIME	07:55
THEORETICAL INITIAL CONCENTRATION	53 PPB

SAMPLE	TIME	CONCENTRATION
830107-A-1	08:20	20.4
-A-2	08:30	20.6
-A-3	08:40	19.4
-A-4	08:50	19.0
-A-5	09:00	18.3
-A-6	09:10	17.7
-A-7	09:20	17.4

ACPH 0.1798 CORRELATION 0.9811

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	17.5°C	
RELATIVE HUM.	44%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 25
DATE June 18/82
MODEL Cortland
TECHNICIAN Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 660 m^3

TEST CONDITIONS

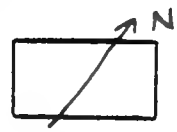
OUTDOOR TEMP 18 °C
WIND SPEED 7 KmH
WIND DIRECTION West
BAROMETER PRESS 101.4 KPA
RELATIVE HUMIDITY 59%

TEST RESULTS

INJECTION TIME 35cc @ 9:06
THEORETICAL INITIAL CONCENTRATION 53 ppb

SAMPLE	TIME	CONCENTRATION
820618-A-1	9:31	6.52
A-2	9:46	6.44
A-3	10:01	5.99
A-4	10:16	5.76
A-5	10:31	5.50

ACPH 0.1807 CORRELATION 0.9851



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	18.7 °C	
RELATIVE HUM.	75%	
NUMBER OF ENTRANCES INTO TEST SPACE	1 (2) 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 25
DATE OCT. 6/82
MODEL CORTLAND
TECHNICIAN Eugler
HEATING SYSTEM GAS
INTERIOR VOLUME 660 m^3

TEST CONDITIONS

OUTDOOR TEMP 19°C
WIND SPEED 8 KPH
WIND DIRECTION W
BAROMETER PRESS 102.4 KPA
RELATIVE HUMIDITY 60%

TEST RESULTS

INJECTION TIME 12:05
THEORETICAL INITIAL CONCENTRATION 53 PPB

SAMPLE	TIME	CONCENTRATION
821006-B1	12:30	22.00
-B2	12:45	20.99
-B3	13:00	20.59
-B4	13:15	19.84
-B5	13:30	19.22

ACPH 0.1306 CORRELATION 0.9940

ERONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	20°C	
RELATIVE HUM.	75%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 25
DATE DEC. 10/82
MODEL CORTLAND
TECHNICIAN SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 660 m³

TEST CONDITIONS

OUTDOOR TEMP -15 °C
WIND SPEED 13KPH
WIND DIRECTION EAST
BAROMETER PRESS 100.8 KPH
RELATIVE HUMIDITY 66%

TEST RESULTS

INJECTION TIME 8:45
THEORETICAL INITIAL CONCENTRATION 53 ppb

SAMPLE	TIME	CONCENTRATION
821210-A-1	9:10	19.39
-A-2	9:20	18.82
-A-3	9:30	17.74
-A-4	9:40	16.92
-A-5	9:56	17.01
-A-6	10:00	15.36
-A-7	10:00	15.19

Point A-5 not used

ACPH 0.2621 CORRELATION 0.9928

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	17	
RELATIVE HUM.	52%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 27
DATE June 29/82
MODEL Willow
TECHNICIAN Fugler / Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 790 m^3

TEST CONDITIONS

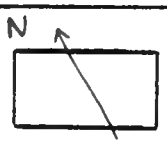
OUTDOOR TEMP 20°C
WIND SPEED 5 KPH
WIND DIRECTION East
BAROMETER PRESS 100.5 KPa
RELATIVE HUMIDITY 83 %

TEST RESULTS

INJECTION TIME 35 cc @ 12:30
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
820629-B-1	12:55	8.17
B-2	13:10	7.16
B-3	13:25	6.45
B-4	13:40	6.45
B-5	13:55	6.02

ACPH 0.4629 CORRELATION 0.9895



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	23°C	
RELATIVE HUM.	73 %	
NUMBER OF ENTRANCES INTO TEST SPACE	(1) 2 3 4 5	

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of _____

Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 27
DATE OCTOBER 21-82
MODEL Willow
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 790 m³

TEST CONDITIONS

OUTDOOR TEMP 6.7°C
WIND SPEED 30-46 KPH
WIND DIRECTION SW
BAROMETER PRESS 101.4 KPA
RELATIVE HUMIDITY 57%

TEST RESULTS

INJECTION TIME 08:15
THEORETICAL INITIAL CONCENTRATION 44 PPB

SAMPLE	TIME	CONCENTRATION
821021-A-1	08:40	17.88
-A-2	08:50	16.27
-A-3	09:00	15.05
-A-4	09:10	14.16
-A-5	09:20	13.86
-A-6	09:30	12.71
-A-7	09:40	11.99

ACPH 0.3801 CORRELATION 0.9912

ERONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	16.9°C	
RELATIVE HUM.	56%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 27
DATE FEB 9/83
MODEL WILLOW
TECHNICIAN FUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 790 m³

TEST CONDITIONS

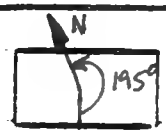
OUTDOOR TEMP −15°C
WIND SPEED 26 KPH
WIND DIRECTION NW.
BAROMETER PRESS 102.3 KPA
RELATIVE HUMIDITY 42%

TEST RESULTS

INJECTION TIME 12:10
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
830209-B-1	12:35	13.55
-B-2	12:45	13.06
-B-3	12:55	12.53
-B-4	13:05	12.21
-B-5	13:15	11.77
-B-6	13:25	11.40
-B-7	13:35	11.06

ACPH 0.2022 CORRELATION 0.9987



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	17°C	
RELATIVE HUM.	36%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 28
DATE May 25/82
MODEL Willow
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 790 m^3

TEST CONDITIONS

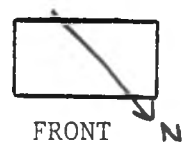
OUTDOOR TEMP 17.9 °C
WIND SPEED 15 KPH
WIND DIRECTION West
BAROMETER PRESS 101.5 KPa
RELATIVE HUMIDITY 64 %

TEST RESULTS

INJECTION TIME 35 cc @ 16:30
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
820525-C-1	16:55	5.49
C-2	17:10	4.89
C-3	17:25	4.31
C-4	17:40	3.58
C-5	17:55	3.70

ACPH 0.3938 CORRELATION 0.9922



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	19 °C	
RELATIVE HUM.	N/A	
NUMBER OF ENTRANCES INTO TEST SPACE	1 (2) 3 4 5	

2 doors not properly closed

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 28
DATE SEPT. 28/82
MODEL WILLOW
TECHNICIAN Fugler
HEATING SYSTEM GAS
INTERIOR VOLUME 790 m^3

TEST CONDITIONS

OUTDOOR TEMP 14°C
WIND SPEED 28 km/hr
WIND DIRECTION NW
BAROMETER PRESS 102.2 kPa
RELATIVE HUMIDITY 88%

TEST RESULTS

INJECTION TIME 12:40
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
820929-A-1	13:05	17.89
A-2	13:20	16.73
A-3	13:35	15.38
A-4	13:50	14.86
A-5	14:05	14.09

ACPH 0.2384 CORRELATION 0.9904

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	20.0°C	
RELATIVE HUM.	70%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	1 (2) 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 28
DATE JAN. 13/83
MODEL WILLOW
TECHNICIAN SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 790 m3

TEST CONDITIONS

OUTDOOR TEMP -14.0°C
WIND SPEED 2 KPH
WIND DIRECTION N.W.
BAROMETER PRESS 102.2 KPH
RELATIVE HUMIDITY 51%

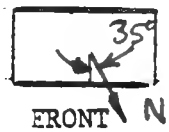
TEST RESULTS

INJECTION TIME 12:00
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
830113-B-1	12:25	17.0
-B-2	12:35	15.4
-B-3	12:45	15.8
-B-4	12:55	13.9
-B-5	13:05	13.3
-B-6	13:15	12.5
-B-7	13:25	12.2

Point B-3 not used

ACPH 0.3267 CORRELATION 0.9896



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	19°C	
RELATIVE HUM.	37%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	0 1 (2) 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 29
DATE May 27/82
MODEL Willow
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 790 m^3

TEST CONDITIONS

OUTDOOR TEMP 21°C
WIND SPEED 7 KPH
WIND DIRECTION SW
BAROMETER PRESS 101.5 KPa
RELATIVE HUMIDITY 60%

TEST RESULTS

INJECTION TIME 35 cc @ 9:20
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
820527-A-1	9:45	6.09
A-2	10:00	5.44
A-3	10:15	5.40
A-4	10:30	4.90
A-5	10:45	4.62

ACPH 0.2818 CORRELATION 0.9955

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	(1) 2 3 4 5	
TEMPERATURE INDOORS	20.2°C	
RELATIVE HUM.	61%	
NUMBER OF ENTRANCES INTO TEST SPACE	(1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 29
DATE SEPT. 22/82
MODEL WILLOW
TECHNICIAN Fugler/Pasquini
HEATING SYSTEM GAS
INTERIOR VOLUME 790 m^3

TEST CONDITIONS

OUTDOOR TEMP 16 °C
WIND SPEED 15 KPH
WIND DIRECTION NE
BAROMETER PRESS 102.1 kPa
RELATIVE HUMIDITY 82%

TEST RESULTS

INJECTION TIME 10:00
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
820922-A-1	10:25	19.17
A-2	10:40	17.94
A-3	10:55	16.35
A-4	11:10	16.20
A-5	11:25	14.53

ACPH 0.2625 CORRELATION 0.9801

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	18°C	
RELATIVE HUM.	60%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 29
DATE JAN 4/83
MODEL WILLOW
TECHNICIAN FUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 790 m³

TEST CONDITIONS

OUTDOOR TEMP -22°C
WIND SPEED 11 KPH
WIND DIRECTION E
BAROMETER PRESS 104.1 KPA
RELATIVE HUMIDITY 53%

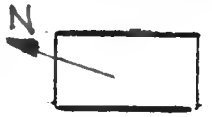
TEST RESULTS

INJECTION TIME 8:30
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
830104-A-1	8:55	14.9
-A-2	9:05	13.5
-A-3	9:15	11.2
-A-4	9:25	12.3
-A-5	9:35	9.78
-A-6	9:45	9.48
-A-7	9:55	8.48

Point A-4 not used

ACPH 0.5430 CORRELATION 0.9814



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	18°C	
RELATIVE HUM.	28%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 30
DATE July 7/82
MODEL Willow
TECHNICIAN Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 790 m^3

TEST CONDITIONS

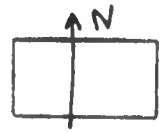
OUTDOOR TEMP 22.7 °C
WIND SPEED 19 KPH
WIND DIRECTION SW
BAROMETER PRESS 101.3 KPA
RELATIVE HUMIDITY 65%

TEST RESULTS

INJECTION TIME 35cc @ 8:21
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
820707-A-1	8:46	—
A-2	9:01	8.17
A-3	9:16	7.77
A-4	9:31	7.57
A-5	9:46	7.13

ACPH 0.1738 CORRELATION 0.9900



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	24°C	
RELATIVE HUM.	72%	
NUMBER OF ENTRANCES INTO TEST SPACE	(1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 30
DATE Sept 30/82
MODEL Willow
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 790 m3

TEST CONDITIONS

OUTDOOR TEMP 10.5°C
WIND SPEED No Wind
WIND DIRECTION N/A
BAROMETER PRESS 101.3 kPa
RELATIVE HUMIDITY 94%

TEST RESULTS

INJECTION TIME 8:35
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
820930-A-1	09:00	16.24
A-2	09:15	15.78
A-3	09:30	15.07
A-4	09:45	14.33
A-5	10:00	13.64

ACPH 0.1781 CORRELATION 0.9954

ERONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	18.0°C	
RELATIVE HUM.	71%	
NUMBER OF ENTRANCES	(1) 2 3 4 5	
INTO TEST SPACE	@ 9:22	
DURING TEST PERIOD		

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 30
DATE JAN. 17/83
MODEL WILLOW
TECHNICIAN FUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 790 m³

TEST CONDITIONS

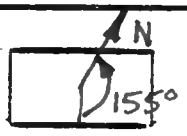
OUTDOOR TEMP -17.0°C
WIND SPEED 28 KPH
WIND DIRECTION W
BAROMETER PRESS 100.6 KPA
RELATIVE HUMIDITY 65%

TEST RESULTS

INJECTION TIME 9:47
THEORETICAL INITIAL CONCENTRATION 44 ppb

SAMPLE	TIME	CONCENTRATION
830117-A-1	10:15	14.9
-A-2	10:25	14.1
-A-3	10:35	12.7
-A-4	10:45	11.7
-A-5	10:55	10.6
-A-6	11:05	10.0
-A-7	11:15	9.37

ACPH 0.4842 CORRELATION 0.9966



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	EXCEPT: BASEMENT DOOR CLOSED DUE TO SMALL CHILDREN	CLOSED
WINDOWS	OPEN		(CLOSED)
HVAC SYSTEM	ON		(OFF)
VENT FAN	ON		(OFF)
CIRCULATING FAN	(ON)		OFF
PEOPLE PRESENT	1 2 3 4 (5)		
TEMPERATURE INDOORS	18°C		
RELATIVE HUM.	33%		
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	0 1 (2) 3 4 5		

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 31
DATE June 7/82
MODEL York
TECHNICIAN Fugler
HEATING SYSTEM Elect.
INTERIOR VOLUME 454 m^3

TEST CONDITIONS

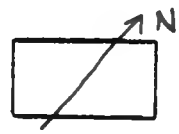
OUTDOOR TEMP 23 °C
WIND SPEED 15 KpH
WIND DIRECTION East
BAROMETER PRESS 101.8 KPA
RELATIVE HUMIDITY 29%

TEST RESULTS

INJECTION TIME 25cc @ 15:25
THEORETICAL INITIAL CONCENTRATION 55 ppb

SAMPLE	TIME	CONCENTRATION
820607-B1	15:50	14.0
B-2	16:05	13.4
B-3	16:20	12.6
B-4	16:35	12.2
B-5	16:50	11.9

ACPH 0.1670 CORRELATION 0.9873



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	21.4 °C	
RELATIVE HUM.	60%	
NUMBER OF ENTRANCES INTO TEST SPACE	(1) 2 3 4 5	

Note: Fresh air intake blocked

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 31
DATE Oct 21/82
MODEL York
TECHNICIAN Fugler/Bimha
HEATING SYSTEM Electric
INTERIOR VOLUME 454m³

TEST CONDITIONS

OUTDOOR TEMP 6°C
WIND SPEED 32 to 50 km/hr
WIND DIRECTION WNW
BAROMETER PRESS 101.8 kPa
RELATIVE HUMIDITY 49%

TEST RESULTS

INJECTION TIME 13:00
THEORETICAL INITIAL CONCENTRATION 66.1 ppb

SAMPLE	TIME	CONCENTRATION
821021-B-1	13:25	25.17
B-2	13:35	22.62
B-3	13:45	21.82
B-4	13:55	20.74
B-5	14:05	19.46
B-6	14:15	18.13
B-7	14:25	17.34

ACPH 0.3587 CORRELATION 0.9937

ERONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	19.8°C	
RELATIVE HUM.	58%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 31
DATE JAN 10-83
MODEL YORK
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM ELECTRIC
INTERIOR VOLUME 454 m³

TEST CONDITIONS

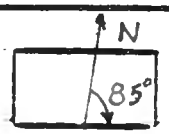
OUTDOOR TEMP -6.0°C
WIND SPEED 19 KPH
WIND DIRECTION EAST
BAROMETER PRESS 102.1 KPA
RELATIVE HUMIDITY 86%

TEST RESULTS

INJECTION TIME 12:00
THEORETICAL INITIAL CONCENTRATION 55.1 ppb

SAMPLE	TIME	CONCENTRATION
830110-B-1	12:25	20.9
-B-2	12:35	20.4
-B-3	12:45	19.5
-B-4	12:55	18.7
-B-5	13:05	18.2
-B-6	13:15	17.5
-B-7	13:25	16.7

ACPH 0.2247 CORRELATION 0.9976



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	20°C	
RELATIVE HUM.	51%	
NUMBER OF ENTRANCES	0 1 (2) 3 4 5	
INTO TEST SPACE	1 at 12:39	
DURING TEST PERIOD	1 at 12:44	

N.B: Fresh air intake sealed by owner

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 32
DATE May 31/82
MODEL York
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 454 m^3

TEST CONDITIONS

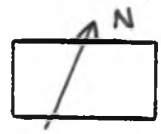
OUTDOOR TEMP 23.3 °C
WIND SPEED 15 KPH
WIND DIRECTION South
BAROMETER PRESS 100.7 KPa
RELATIVE HUMIDITY 73%

TEST RESULTS

INJECTION TIME 25cc @ 12:25
THEORETICAL INITIAL CONCENTRATION 55 ppb

SAMPLE	TIME	CONCENTRATION
820531-B-1	13:00	13.22
B-2	13:15	11.6
B-3	13:30	10.5
B-4	13:45	9.28
B-5	14:00	8.95

ACPH 0.4013 CORRELATION 0.9870



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	23 °C	
RELATIVE HUM.	72 %	
NUMBER OF ENTRANCES INTO TEST SPACE	1 (2) 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 32
DATE SEPT. 22/82
MODEL YORK
TECHNICIAN Fugler / Pasquini
HEATING SYSTEM GAS
INTERIOR VOLUME 454 m^3

TEST CONDITIONS

OUTDOOR TEMP 19 °C
WIND SPEED E17 KPH
WIND DIRECTION E
BAROMETER PRESS 101.9 KPA
RELATIVE HUMIDITY 56%

TEST RESULTS

INJECTION TIME 12:30
THEORETICAL INITIAL CONCENTRATION 55.1 ppb

SAMPLE	TIME	CONCENTRATION
820922-B-1	12:55	21.48
820922-B-2	13:10	18.88
820922-B-3	13:25	17.28
820922-B-4	13:40	16.14
820922-B-5	13:55	14.31

ACPH 0.3877 CORRELATION 0.9947

ERONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	22°C	
RELATIVE HUM.	60%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 32
DATE Dec 03-82
MODEL York
TECHNICIAN Fugler/Sinha
HEATING SYSTEM GAS
INTERIOR VOLUME 454 m³

TEST CONDITIONS

OUTDOOR TEMP 7°C
WIND SPEED 9 KPH
WIND DIRECTION SE
BAROMETER PRESS 102.0 KPA
RELATIVE HUMIDITY 100%

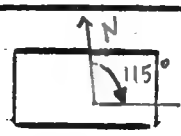
TEST RESULTS

INJECTION TIME 09:00
THEORETICAL INITIAL CONCENTRATION 55.1 ppb

SAMPLE	TIME	CONCENTRATION
821203-A-1	09:25	18.18
-A-2	09:35	15.87
-A-3	09:45	15.21
-A-4	09:55	13.82
-A-5	10:05	N.A.
-A-6	10:15	12.30
-A-7	10:25	11.66

Point A-1 not used

ACPH 0.3819 CORRELATION 0.9958



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	20.9°C	
RELATIVE HUM.	54%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 34
DATE June 24
MODEL Fireside
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 930 m^3

TEST CONDITIONS

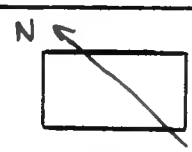
OUTDOOR TEMP 16°C
WIND SPEED 17 KPH
WIND DIRECTION WNW
BAROMETER PRESS 101.8 KPA
RELATIVE HUMIDITY 63 %

TEST RESULTS

INJECTION TIME 35 cc @ 9:15
THEORETICAL INITIAL CONCENTRATION 38 ppb

SAMPLE	TIME	CONCENTRATION
820624-A-1	9:40	5.41
A-2	9:55	4.00
A-3	10:10	3.77
A-4	10:25	3.32
A-5	10:40	~~0~~

ACPH 0.6096 CORRELATION 0.9503



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	21 °C	
RELATIVE HUM.	63 %	
NUMBER OF ENTRANCES INTO TEST SPACE	(1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 34
DATE OCT. 1/82
MODEL FIRESIDE
TECHNICIAN Fusler
HEATING SYSTEM GAS
INTERIOR VOLUME 930 m^3

TEST CONDITIONS

OUTDOOR TEMP 15°C
WIND SPEED 15 KPH
WIND DIRECTION SW
BAROMETER PRESS 101.3 KPA
RELATIVE HUMIDITY 88%

TEST RESULTS

INJECTION TIME 8:45
THEORETICAL INITIAL CONCENTRATION 43ppb

SAMPLE	TIME	CONCENTRATION
821001-A-1	9:10	18.55
-A-2	9:25	17.87
-A-3	9:40	16.97
-A-4	9:55	15.97
-A-5	10:10	15.06

ACPH 0.2117 CORRELATION 0.9961

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	20°C	
RELATIVE HUM.	70%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	1 2 3 4 (5) Quick	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 34
DATE FEB 11-83
MODEL FIRESIDE
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 930 m^3

TEST CONDITIONS

OUTDOOR TEMP -15°C
WIND SPEED 20 KPH
WIND DIRECTION N.E
BAROMETER PRESS 103.4 KPA
RELATIVE HUMIDITY 42%

TEST RESULTS

INJECTION TIME 12:20
THEORETICAL INITIAL CONCENTRATION 43 PPB

SAMPLE	TIME	CONCENTRATION
830211-B-1	12:45	16.29
-B-2	12:55	15.07
-B-3	13:05	14.19
-B-4	13:15	13.54
-B-5	13:25	12.76
-B-6	13:35	12.15
-B-7	13:45	11.47

ACPH 0.3406 CORRELATION 0.9978

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 5 (6)	
TEMPERATURE INDOORS	17.7	
RELATIVE HUM.	40%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 35
DATE July 12/82
MODEL Fireside
TECHNICIAN Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 930 m^3

TEST CONDITIONS

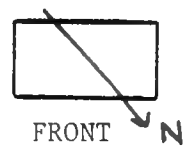
OUTDOOR TEMP 21.1°C
WIND SPEED 17-40 KPH
WIND DIRECTION SW
BAROMETER PRESS 100.9 KPa
RELATIVE HUMIDITY 64 %

TEST RESULTS

INJECTION TIME 40cc @ 8:57
THEORETICAL INITIAL CONCENTRATION 43 ppb

SAMPLE	TIME	CONCENTRATION
820712-A-1	9:22	9.58
A-2	9:37	9.24
A-3	9:52	8.87
A-4	10:07	8.57
A-5	10:22	8.22

ACPH 0.1526 CORRELATION 0.9996



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	24.5°C	
RELATIVE HUM.	72 %	
NUMBER OF ENTRANCES INTO TEST SPACE	(1) 2 3 4 5	

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Retrospectors

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AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 35
DATE OCT.8/82
MODEL FIRESIDE
TECHNICIAN Fugler
HEATING SYSTEM GAS
INTERIOR VOLUME 930 m^3

TEST CONDITIONS

OUTDOOR TEMP 11°C
WIND SPEED 0 km/hr
WIND DIRECTION N/A
BAROMETER PRESS 101.5 kPa
RELATIVE HUMIDITY 100%

TEST RESULTS

INJECTION TIME 8:35
THEORETICAL INITIAL CONCENTRATION 43ppb

SAMPLE	TIME	CONCENTRATION
821008-A-1	09:00	17.62
A-2	09:15	17.79
A-3	09:30	16.84
A-4	09:45	15.94
A-5	10:00	15.27

ACPH 0.2053* CORRELATION 0.9984*
*For last four points only.

FRONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	21.4°C	
RELATIVE HUM.	75%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 35
DATE JAN. 24/83
MODEL FIRESIDE
TECHNICIAN SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 930 m3

TEST CONDITIONS

OUTDOOR TEMP 0.7°C
WIND SPEED 11 KPH
WIND DIRECTION S.W.
BAROMETER PRESS 100.4KPA
RELATIVE HUMIDITY 86%

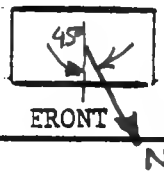
TEST RESULTS

INJECTION TIME 13:00
THEORETICAL INITIAL CONCENTRATION 43 ppb

SAMPLE	TIME	CONCENTRATION
830124-B-1	13:25	17.21
-B-2	13:35	16.33
-B-3	13:45	15.33
-B-4	13:55	14.98
-B-5	14:05	14.41
-B-6	14:15	13.34
-B-7	14:25	13.67

POINT B-7 NOT USED

ACPH 0.2867 CORRELATION 0.9900



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	19.0°C	
RELATIVE HUM.	37%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	0 (1) 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 37
DATE May 28/82
MODEL Westfield
TECHNICIAN Seton
HEATING SYSTEM Gas
INTERIOR VOLUME 635 m^3

TEST CONDITIONS

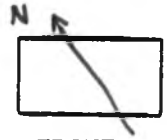
OUTDOOR TEMP 22 °C
WIND SPEED 19 KPH
WIND DIRECTION SE
BAROMETER PRESS 101.5 KPA
RELATIVE HUMIDITY 69 %

TEST RESULTS

INJECTION TIME 30 cc @ 11:03
THEORETICAL INITIAL CONCENTRATION 47 ppb

SAMPLE	TIME	CONCENTRATION
820528-A-1	11:28	12.7
A-2	11:43	10.4
A-3	11:58	9.48
A-4	12:13	8.83
A-5	12:28	8.01

ACPH 0.4342 CORRELATION 0.9776



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	22.9 °C	
RELATIVE HUM.	64 %	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 37
DATE Sept 15/82
MODEL Westfield
TECHNICIAN Fugler / Pasquini
HEATING SYSTEM Gas
INTERIOR VOLUME 635 m^3

TEST CONDITIONS

OUTDOOR TEMP 12.2°C
WIND SPEED 19 km/hr
WIND DIRECTION NE
BAROMETER PRESS 102.0 kPa
RELATIVE HUMIDITY 88%

TEST RESULTS

INJECTION TIME 13:15
THEORETICAL INITIAL CONCENTRATION 47 ppb

SAMPLE	TIME	CONCENTRATION
820915-A-1	13:40	22.64
A-2	13:55	21.78
A-3	14:10	20.11
A-4	14:25	18.61
A-5	14:40	18.03

ACPH 0.2451 CORRELATION 0.9898

ERONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	22.0°C	
RELATIVE HUM.	65%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	1 (2) 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 37
DATE JAN.24/83
MODEL WESTFIELD
TECHNICIAN FUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 635m3

TEST CONDITIONS

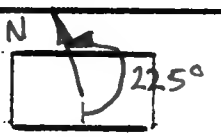
OUTDOOR TEMP -1.7°C
WIND SPEED 11KPH
WIND DIRECTION W.
BAROMETER PRESS 100.4KPA
RELATIVE HUMIDITY 86%

TEST RESULTS

INJECTION TIME 9:15
THEORETICAL INITIAL CONCENTRATION 47 ppb

SAMPLE	TIME	CONCENTRATION
830124-A-1	9:40	17.89
-A-2	9:50	17.59
-A-3	10:00	16.67
-A-4	10:10	15.88
-A-5	10:20	14.96
-A-6	10:30	14.52
-A-7	10:40	13.73

ACPH 0.2738 CORRELATION 0.9939



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 4 (5)	
TEMPERATURE INDOORS	19.5°C	
RELATIVE HUM.	46%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	1 2 (3) 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 39
DATE May 25/82
MODEL Baldwin
TECHNICIAN Fugler
HEATING SYSTEM Gas
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

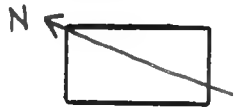
OUTDOOR TEMP 15.7 °C
WIND SPEED 12 KPH
WIND DIRECTION SW
BAROMETER PRESS 101.7 KPA
RELATIVE HUMIDITY 68 %

TEST RESULTS

INJECTION TIME 40 cc @ 11:15
THEORETICAL INITIAL CONCENTRATION 55 ppb

SAMPLE	TIME	CONCENTRATION
820525-A-1	11:40	8.66
A-2	11:55	8.20
A-3	12:10	—
A-4	12:26	7.29
A-5	12:40	7.11

ACPH 0.2048 CORRELATION 0.9931



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	(1) 2 3 4 5	
TEMPERATURE INDOORS	17°C	
RELATIVE HUM.	N/A	
NUMBER OF ENTRANCES INTO TEST SPACE	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 39
DATE SEPT. 23/82
MODEL BALDWIN
TECHNICIAN Eugler
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m^3

TEST CONDITIONS

OUTDOOR TEMP 13°C
WIND SPEED 11 Km/hs
WIND DIRECTION NE
BAROMETER PRESS 101.1 kPA
RELATIVE HUMIDITY 82%

TEST RESULTS

INJECTION TIME 13:25
THEORETICAL INITIAL CONCENTRATION 55 ppb

SAMPLE	TIME	CONCENTRATION
820923-B-1	13:50	25.22
B-2	14:05	24.39
B-3	14:20	23.00
B-4	14:35	22.22
B-5	14:50	20.56

ACPH 0.2007 CORRELATION 0.9898

ERONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	18°C	
RELATIVE HUM.	60%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 39
DATE JAN 06-83
MODEL BALDWIN
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 730 m³

TEST CONDITIONS

OUTDOOR TEMP -1.0°C
WIND SPEED 3.0 KPH
WIND DIRECTION North West
BAROMETER PRESS 101.8 KPA
RELATIVE HUMIDITY 93%

TEST RESULTS

INJECTION TIME 08:30
THEORETICAL INITIAL CONCENTRATION 55 PPB

SAMPLE	TIME	CONCENTRATION
830106-A-1	08:55	21.0
-A-2	09:05	19.6
-A-3	09:15	18.4
-A-4	09:25	17.6
-A-5	09:35	16.6
-A-6	09:45	16.1
-A-7	09:55	15.2

ACPH 0.3142 CORRELATION 0.9956

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	19.6°C	
RELATIVE HUM.	44%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(0) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 50
DATE July 19/82
MODEL Urbandale
TECHNICIAN Fugler / Seton
HEATING SYSTEM Elect
INTERIOR VOLUME 923.7 m^3

TEST CONDITIONS

OUTDOOR TEMP 27°C
WIND SPEED 12 KPH
WIND DIRECTION NW
BAROMETER PRESS 100.8
RELATIVE HUMIDITY 39 %

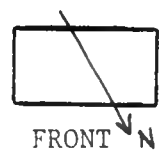
TEST RESULTS

INJECTION TIME 60 cc @ 6:35
THEORETICAL INITIAL CONCENTRATION 65 ppb

SAMPLE	TIME	CONCENTRATION
820719-A-1	19:00	13.08
A-2	19:15	12.48
A-3	19:30	11.72
A-4	19:45	11.79
A-5	20:00	11.53

3RD PT. OUT ✓

ACPH 0.1237 CORRELATION 0.9914



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF

PEOPLE PRESENT 1 2 (3) 4 5

TEMPERATURE INDOORS 29.0°C

RELATIVE HUM. 65 %

NUMBER OF ENTRANCES INTO TEST SPACE (0) 1 2 3 4 5

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 50
DATE OCT. 28/82
MODEL URBANDALE
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM ELECTRIC
INTERIOR VOLUME 923 m³

TEST CONDITIONS

OUTDOOR TEMP 1.°C
WIND SPEED 7 KPH
WIND DIRECTION SOUTH
BAROMETER PRESS 102.5 KPA
RELATIVE HUMIDITY 100%

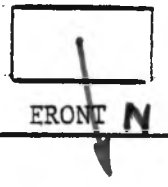
TEST RESULTS

INJECTION TIME 8:35
THEORETICAL INITIAL CONCENTRATION 54.2 ppb

SAMPLE	TIME	CONCENTRATION
821028-A-1	9:00	24.23
-A-2	9:10	23.65
-A-3	9:20	23.49
-A-4	9:30	23.09
-A-5	9:40	22.63
-A-6	9:50	22.52
-A-7	10:00	6.79

Last point not used

ACPH 0.0882 CORRELATION 0.9869



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 3 (4) 5	
TEMPERATURE INDOORS	19.°C	
RELATIVE HUM.	66%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	1 (2) 3 4 5	

176 Bronson Ave.
Ottawa, Ontario
K1R 6H4
(613) 234-3280

Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 50
DATE JAN. 28/83
MODEL SPECIAL
TECHNICIAN SINHA
HEATING SYSTEM ELECTRIC
INTERIOR VOLUME 923m³

TEST CONDITIONS

OUTDOOR TEMP -13.0°C
WIND SPEED 12 KPH
WIND DIRECTION N.E.
BAROMETER PRESS 102.8 KPA
RELATIVE HUMIDITY 78%

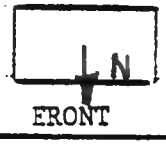
TEST RESULTS

INJECTION TIME 8:39
THEORETICAL INITIAL CONCENTRATION 38ppb

SAMPLE	TIME	CONCENTRATION
830128-A-1	9:05	15.64
-A-2	9:15	14.88
-A-3	9:25	14.35
-A-4	9:35	14.76
-A-5	9:45	13.16
-A-6	9:55	12.85
-A-7	10:05	12.56

POINT A-4 NOT USED

ACPH 0.2224 CORRELATION 0.9937



ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	18.5°C	
RELATIVE HUM.	52%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	1 (2) 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 51
DATE NOV.1/82
MODEL URBANDALE
TECHNICIAN FUGLER
HEATING SYSTEM GAS
INTERIOR VOLUME 922m³

TEST CONDITIONS

OUTDOOR TEMP 12°C
WIND SPEED 5 KPH
WIND DIRECTION N.E.
BAROMETER PRESS 101.8KPA
RELATIVE HUMIDITY 54%

TEST RESULTS

INJECTION TIME 8:55
THEORETICAL INITIAL CONCENTRATION 54.2ppb

SAMPLE	TIME	CONCENTRATION
821101-A-1	9:20	26.51
-A-2	9:30	26.55
-A-3	9:40	25.76
-A-4	9:50	25.32
-A-5	10:00	25.07
-A-6	10:10	24.92
-A-7	10:20	24.43

ACPH 0.0854 CORRELATION 0.9777

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 (2) 3 4 5	
TEMPERATURE INDOORS	19°C	
RELATIVE HUM.	63%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	(NONE) 1 2 3 4 5	

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Retrospectors

AIR CHANGE TEST REPORT

IDENTIFICATION

TEST HOUSE 51
DATE FEB 08-83
MODEL URBANDALE
TECHNICIAN FUGLER/SINHA
HEATING SYSTEM GAS
INTERIOR VOLUME 922 m³

TEST CONDITIONS

OUTDOOR TEMP -10°C
WIND SPEED 26 KPH
WIND DIRECTION NW
BAROMETER PRESS 101.3 KPA
RELATIVE HUMIDITY 79%

TEST RESULTS

INJECTION TIME 09:04
THEORETICAL INITIAL CONCENTRATION 47.7 PPB

SAMPLE	TIME	CONCENTRATION
830208-A-1	9:30	18.54
-A-2	9:40	18.06
-A-3	9:50	17.50
-A-4	10:00	16.35
-A-5	10:10	16.16
-A-6	10:20:30	15.73
-A-7	10:30	15.28

ACPH 0.2006 CORRELATION 0.9867

ERONT

ORIENTATION OF HOUSE

HOUSE CONDITIONS

PARTITION DOORS	(OPEN)	CLOSED
WINDOWS	OPEN	(CLOSED)
HVAC SYSTEM	ON	(OFF)
VENT FAN	ON	(OFF)
CIRCULATING FAN	(ON)	OFF
PEOPLE PRESENT	1 2 (3) 4 5	
TEMPERATURE INDOORS	16.7°C	
RELATIVE HUM.	36%	
NUMBER OF ENTRANCES INTO TEST SPACE DURING TEST PERIOD	0 1 (2) 3 4 5	