EVALUATION OF THE POTENTIAL FOR FUEL-FIRED APPLIANCE BACKDRAFT IN TEN HOUSES EQUIPPED WITH WHOLE-HOUSE EXHAUST FANS.

A Report

Submitted to

Canada Mortgage and Housing Corporation

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Submitted by

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EXECUTIVE SUMMARY

Buchan, Lawton, Parent Ltd., under contract to Canada Mortgage and Housing Corporation, evaluated the safety of operating combustion devices in ten homes in Nova Scotia. As the project was conceived, all houses selected for study were thought to have whole-house ventilation systems in place. There were no whole-house exhaust systems installed in two of the ten houses at the time of testing. Such exhaust fans are gaining increasing popularity and there is concern that the depressurization they create could increase the risk of backdrafting of combustion devices in homes.

The houses studied in this project were evaluated using several tests. A fan depressurization test (CGSB Standard CAN 2 149.10 M86) was used to evaluate the air leakage characteristics of the building envelope. The CMHC Combustion Safety Backdraft Checklist (December, 1984 version) was used to estimate the depressurization levels in the vicinity of the combustion devices in the homes, as well as determining whether or not combustion devices were, indeed, backdrafted by installed fan power in the home. The depressurization levels obtained were compared to CMHC's house depressurization limits (HDL's) to formulate conclusions on the combustion systems in the homes. With the depressurization fan door the house was also systematically depressurized to actually cause a backdraft to occur in the combustion systems. In this way, it was possible to comment on the house depressurization limits for various combustion devices.

Aside from the testing mentioned above, the houses were also visually inspected to determine if, indeed, they required exhaust fans as a means of moisture control. Signs of high internal humidities, moisture damage, evidence of condensation, etc., were noted such that a determination of a need for whole-house ventilation could be made. These findings were also utilized in determining appropriate strategies for ensuring adequate supplies of combustion air to all appliances in the home.

Of the ten houses tested, five were capable of obtaining depressurization levels in excess of HDL's under the unlikely scenario of all fans operating at the same time. Under the far more likely scenario of the whole house fan operating in conjunction with one other fan, three houses still exceeded the HDL. Remedial action was suggested in these three houses.

At a minimum, the home occupants should be informed of this problem and the exhaust fans labelled indicating that the operation of the whole-house exhaust fan in conjunction with one other fan could cause backdrafting of

the woodstove. The installation of a make-up air inlet to limit house pressures or interlocking the wiring of the fans, such that only one fan can be operated at any one time, would be more foolproof solutions.

Of the ten houses tested, only two houses had installed fan capacity capable of backdrafting the combustion device at the time of testing. From research on a broad base of houses, this test appears to be a far less reliable indicator than measuring house pressures. The chances of being on-site at a time when a house is most vulnerable to backdrafting is quite low so the comparison of results from this test are quite unreliable.

Only one house in the sample of houses tested had widespread moisture damage and actually appeared to require ventilation for moisture control purposes. Pressures in this house (House 3) would exceed HDL's with just the whole-house fan and the range fan operating. Anticipating some use of the whole-house fan, it is recommended that this house be equipped with a properly sized make-up air duct or a fan control interlock (such that the range and whole-house fans cannot operate simultaneously) to control house pressures.

If there is a desire to operate fans in the other houses where depressurization may be a problem, similar consideration should be given to the need to limit pressures and/or provide combustion air to the woodstoves and naturally-aspirated furnaces.

ACKNOWLEDGMENTS

We would like to extend our thanks to local housing agents and CMHC officials for their cooperation throughout this project. Their help in making site visit arrangements with home occupants/owners greatly assisted those carrying out the field work for this project.

1.0 INTRODUCTION

This report presents the findings of a project designed to evaluate the backdraft potential of fuel-fired appliances caused by house exhaust fan systems. When the project was conceived, all houses chosen for the study were thought to have central fan exhaust systems in place for moisture control. The houses were selected for the study by CMHC Halifax branch. Of the houses CMHC Halifax branch selected, two did not have whole-house fans installed. Nevertheless, other exhaust fans were in place, so these houses were included in the study.

Tests were performed to determine house characteristics as they related to the use of exhaust fans and their impact on the potential for backdrafting of combustion devices. This report summarizes the findings of the testing and inspection of a total of ten houses in various locations in Nova Scotia.

All houses tested were of wood frame construction and from two to three years old. Table I provides a brief description of the units and lists their heating systems and exhaust systems. The in-house locations of these systems are included in Appendix A.

Field testing was performed by Gary O'Connor, P.Eng., of Buchan, Lawton, Parent Ltd. (assisted by a technician). The test work was done between January 27 and February 2, 1986. In several instances, local housing authorities were present during the tests.

Table I HOUSE DESCRIPTIONS

House No.	Occupant	House ^I Type	Floor Area (m ²)	Space ² Heating	Exhaust ³ System
t	Turner	В	147	E + W	A + CD
2	Sherrard	В	131	E + W	Α
3	Cochrane	В	143	E + W	Α
4	McCarthy	В	144	E + W	Α
5	MacDonald	В	162	FA	A + FB
6	Deveau	В	149	E + W	A + CD
7	Melanson	1 1/2	107	E + W	A + CD
8	Ambrose	1 1/2	107	E + W	A + CD
9	Titus	В	146	E + W	CD
10	Logan	В	132	FA+ W	FB

Notes:

- 1 B = Bungalow, 1 1/2 = Storey and one-half
- 2 E = Electric Baseboard, FA = Forced Air (Oil), W = Woodstove
- 3 All units have an electric range fan and a bathroom fan; listed are the additional exhaust systems.

A = Aston Fan CD = Clothes Dryer FB = Furnace Blower

2.0 METHODOLOGY

All houses in the sample were assessed in the following manner:

- 1. A depressurization test was performed to determine the air leakage characteristics of the building envelope.
- 2. A backdraft test was used to examine the interaction between the installed exhaust fan capacity and combustion devices in the home.
- 3. A visual inspection was performed to assess the need for central house exhaust fans as a means of moisture control.

Each assessment was performed using the protocol detailed below.

2.1 Fan Depressurization Tests

The fan depressurization tests were performed in accordance with the CGSB Draft Standard CAN 2-149.10-M86 (11th. draft), Determination of Air-Tightness of Buildings by the Fan Depressurization Method. The field notes from the testing can be found in Appendix B.

The fan unit used for the fan depressurization tests was a Retrotec model RDF 501 depressurization door fan. The unit was last calibrated in the summer of 1985.

The records of the climatic conditions during the testing, necessary for the calculations or for the interpretation of test data, were obtained from weather stations in the vicinity of the test sites.

The CGSB Standard recommends that testing not be performed under windspeeds greater than 20 km/h. The windspeed at the house location was checked at the time of testing.

2.2 Backdraft Tests

Backdraft testing was performed using CMHC's Combustion Safety Backdraft Checklist (December 1984 version). The five part procedure is outlined briefly on the following page. Additional testing was done in parts 2 and 5 of the procedure to determine the amount of depressurization caused by the individual exhaust systems, and to measure the backdraft pressures of cold and warm flues.

Part I - Chimney Inspection

Each chimney and appliance was inspected in order to identify any malfunctions caused by wear or poor maintenance which could affect the backdraft test results and to determine if the installations conformed to the code.

Part 2 - Furnace Room Vent/Pressure Test

This test was performed in the two houses which had forced-air furnaces. An inclined manometer pressure gauge measured the extent of house depressurization when all the exhaust systems were operating. The manometer was placed close to the fuel-fired appliance being tested and outside pressures were averaged by placing taps on all four walls of the units. House depressurization pressures were then compared to the accepted levels given by the procedure. From this information, a judgement could be made as to whether the exhaust systems were capable of backdrafting the forced-air furnaces (ie., whether the depressurization exceeded the house depressurization limits HDL's).

With the additional tests, the amount of depressurization caused by each individual exhaust system was measured, and by using the depressurization door fan, it was possible to measure the pressure required to backdraft the cold and hot flues of combustion devices in the home. This data was useful in judging the extent to which given exhaust systems were likely to backdraft cold flues and the individual "worst case" senarios.

Part 3 - Heat Exchanger Leakage

In this test the two forced-air furnaces were checked with an air current tester (smoke pencil) to determine if there was any leakage across the heat exchanger walls.

Part 4 - Furnace Room Spillage

With all the exhaust systems in the house operating, the forced-air furnaces were checked to see if combustion products spilled into the house through the barometric damper on startup. If so, the amount of time required to reverse the flow (i.e., back to a normal operating mode) was measured.

Part 5 - Fireplace Vent/Pressure Test

The procedure was the same as for Part 2 except that the house depressurization pressures were measured in the same rooms as the woodstoves. This test was performed in the nine units which had woodstoves. When verifying how much pressure was required to backdraft a hot flue, a propane stovetop unit was used to heat the woodstove flue.

2.3 Building Inspections

Prior to the testing, the buildings were inspected in order to prepare intentional openings for the fan depressurization and backdraft testing.

During the building inspection, areas of moisture damage were documented and photographs were taken. In addition, all building exhaust and heating systems were identified and sketched onto building floor plans. The floor plans are included in Appendix A.

3.0 RESULTS

The field work for this project was performed in a ten-day period in early 1986. Attempts were made to perform all tests under appropriate or optimum conditions, however, conditions for some of the field tests were less than ideal. Factors such as wind pressures and gusts had influences on the reliability of some of the field tests. Where appropriate, suspicious data has been noted.

3.1 Fan Depressurization Tests

The leakage through envelopes, characterized using the fan depressurization test, are presented in Table 3.1. The test results are summarized in terms of the air change rates per hour (AC/h) at 50 pascals pressure difference and the Equivalent Leakage Area (ELA).

Houses in the sample ranged from 3.9 to 6.0 AC/h at 50 Pa. However, the ELA is perhaps a better indication of a house's ability to tolerate exhaust fan operation without creating excessive pressure differences. The results, expressed in terms of ELA, indicate the sample of houses ranged from a low of 0.041 m² of ELA to a high of 0.088 m².

3.2 Backdraft Checks

Several backdraft checks were performed on the houses. These included a measurement of house pressures (from the CMHC Combustion Safety Checklist), a check of whether combustion systems backdrafted with all exhaust fans operating and a measurement of pressures causing cold and warm flue backdraft using the depressurization door fan.

3.2.1 House Pressures

Figure 3.2.1 lists the results of the vent pressure tests detailed in Parts 2 and 5 of CMHC's Combustion Safety Backdraft Checklist. The figure also indicates the individual contribution of each fan to house pressures over and above wind and stack effect. It can be seen that the contribution of the whole-house exhaust fans and range fans were particularly variable.

Table 3.1 AIR-TIGHTNESS TEST RESULTS

House No.	e C	n	AC/h @ 50 PA	ELA (m ²)	Correlation
ı	17.1	108.0	3.9	0.043	. 994
2	22.4	0.811	5.9	0.058	.9 95
3	21.7	0.740	4.0	0.049	. 998
4	27.7	0.798	5.4	0.066	. 995
5	22.9	0.787	4.4	0.059	•998
6	43.7	0.679	6.0	0.088	₊ 997
7.	15.4	0.811	4.5	0.041	. 999
8	18.2	0.831	5.7	0.051	. 998
9	17.5	0.795	3.9	0.045	.999
10	19.6	0.812	5.1	0.054	. 998
mean		0.787	4.9	0.055	
stando deviat		0.042	0.81	0.013	

3.2.2 Homeowner Check

Table 3.2.2 lists the results of the so-called "homeowner check" (ie: whether the cold flue was backdrafted when all of the exhaust systems were operating).

Interestingly, several houses which exceeded the HDL's did not backdraft. (Houses 1, 3, 6, and 9 fall into this category). Of course, exterior wind and temperature conditions may have increased the ability of flues in these houses to resist backdrafting. This is discussed later in this report. It is noted here because the homeowner check is more sensitive to weather conditions and it may tend to not indicate a problem when house pressures would indicate otherwise.

Table 3.2.2 BACKDRAFT CHECKLIST RESULTS

House	Temperature	Wind	Backdraft of Cold Flue
No.	(°C)	(kmh)	Exhaust Systems Operating
1	14	2 8	20
1			no
2	9	55	no
3	3	35	no
4	- 7	30	no
5	- 7	5	yes
6	- 6	13	no
7	- 5	12	no
8	- 3	12	yes
9	-4	0	no
10	-12	24	no

The higher wind conditions present when testing houses 2, 3 and 4 likely increased the flue draft.

3.2.3 Backdraft Pressures

Because the depressurization fan door was available, there was the opportunity to try to backdraft the combustion devices with the door fan. The house pressure was systematically increased until backdrafting occurred. The backdraft pressure was noted and the results are presented in Table 3.2.3.

Table 3.2.3 PRESSURE REQUIRED TO BACKDRAFT

House No.	Cold Flue (Pa)	Warm Flue (Pa)	Temp (°C)	Wind km/h
1			14	28
2	12		9	55
3	30		3	40
4	10	17	- 7	30
5	3	*	- 7	5
6	5	15	- 6	13
7 ·	3	8	- 5	12
8	low	7	- 3	12
9	9	14	- 4	0
10	9	*	-12	24

^{*}oil furnace - warm flue not tested

The higher wind conditions present when testing houses 2, 3 and 4 likely increased the flue draft.

The reasons for houses 5 and 8 failing the Backdraft Checklist can be seen in the fact that the combustion devices in both houses backdrafted at very low pressures. The winds were also relatively calm so little contribution was gained from wind induced flue draft.

3.3 Building Inspections

As the final part of the field work, the houses studied were inspected to see if whole-house exhaust (Aston type) fans were really required for moisture control. Some specific construction details appeared to have caused problems in the houses, such as the buildup of mold and mildew, but in general, problems were minimal. Homeowners had been instructed by CMHC not to use their whole-house exhaust fans pending the results of Buchan, Lawton, Parent Ltd's investigation. In view of the fact that only minimal moisture problems were encountered, it can be stated that in general, whole-house ventilation systems did not seem to be required in the houses considered. These findings are important in that switching off the whole-house exhaust fan could have a significant effect on house pressures (see Figure 3.2.1) and their proximity to the HDL.

In one house, number 3, some means of controlling moisture buildup would appear to be appropriate. Moisture problems were quite widespread in this house.

The home heating systems were also examined while in the houses. The heating system inspection revealed problems due to the improper installation of equipment. In houses 7, 8, and 10, the required 46 cm (18") of clearance had not been left between the stovepipes of the woodstoves and the combustible wall material. In house 10, the woodstove was connected to the same flue as the oil furnace. These problems all represent infractions of the building code.

Construction deficiencies also had an effect on the moisture problems which were noted. Poor attic ventilation can be seen to be responsible for much of the water damage to the ceilings in the houses studied. House 6 has no eave venting and house 10 requires additional eave venting. Houses 7 and 8 are storey and a half units, which require some ridge or roof venting in addition to end venting which is already in place. In house 3, because the ceiling is damaged directly beneath the exhaust vent of the Aston fan, it is possible to assume that this duct was, at some point, disconnected from the fan and that the fan exhausted its moist air into the attic.

The moisture inspection revealed high humidity levels within several of the houses. While the moist eastern climate is a factor behind these high humidities, in several cases, the activities of house occupants contributed significantly to the excess moisture. Clothes dryers were often vented indoors and firewood was often dried in the basement area. A summary of inspection findings is presented in Table 3.3.

While the house occupants were aware that the exhaust fan operation will help control moisture in the house, the venting of indoor moisture can only be effective if outdoor absolute humidities are lower than indoor absolute humidities. Venting to reduce moisture levels should be done when the outside air is relatively cold or dry. Few attempts appeared to have been made to confine fan operation to dry days.

Conversations with occupants indicated that several of the occupants had little understanding of the operation of the dehumidistats which control the exhaust fans. Also, in many cases, occupants did not want to operate the fans because the basement exhaust vent was located directly above their woodstove. The occupants were concerned that heated air was being directed outside before it could be utilized for space heating purposes.

Table 3.3 MOISTURE INSPECTION RESULTS

House No.	Clothes Dryer Vented Indoors	Firewood Stored Indoors	Locations of Mildew	Other Comments
t .			 Ist floor windows around attic hatch corner of bedrm 2 ceiling & floor 	·
2	×		- corner of bedrm l at ceiling	-
3	x	×	 lst floor windows corner of bedrm 1, bedrm 2 & living room at ceiling & floor 	 kitchen ceiling damaged by water; attic insulation is wet at this location
4			 Ist floor windows corner of bedrm 2 at ceiling 	 wood sill of living room window stained by water
5				
6		x	:	 roof plywood is wet large puddles of wate on basement floor water damage to ceil in bedrm 1 & living
7			 corner of bedrm 2 at floor level 	- roof plywood is damp
8			 on utility rm wall behind well water tank 	- roof plywood is damp
9		x		- light frost building up on roof plywood
10		×	 Ist floor windows corner of bedrm I at floor closet wall of bedrm I 	- water damage on bathroom ceiling

4.0 DISCUSSION OF RESULTS

The information provided by the field testing of the ten houses in this study allows several significant observations to be made.

4.1 Characteristics of the Houses

Firstly, it did not appear that any exceptional measures had been taken to air-tighten these houses. Of the houses tested, the most air-tight (in terms of ELA) had an ELA of 0.041 m². Therefore the houses had a significant ability for the house envelope to provide make-up air when exhaust fans were operating such that excessive pressures would not be created across the building envelope.

Early versions of the Combustion Safety Backdraft Checklist, produced by CMHC, suggested that very low pressures were tolerable across the building envelope. Under those versions, more than half of the houses in this study would have failed. These house depressurization limits (HDL's) have since been revised to less conservative (more realistic) allowable house pressures.

For the houses in this study, the appropriate house depressurization limits are indicated in Table 4.1. CMHC's house depressurization limits, however, specify limits for air-tight woodstoves and for fireplaces only. In most of the houses in this study the limiting combustion device was a non-air-tight woodstove, so the house depressurization limit cited in Table 4.1 is the limit of 5 Pa currently being used in CSA Draft Standard F326 - Requirements for Residential Ventilation.

If the flow coefficients from the fan depressurization tests are used, it is possible to calculate a theoretic exhaust which will cause the house depressurization limit pressure to be exceeded. This value has been included in Table 4.1 and listed as the "Theoretical Exhaust Limit". It can be seen from the table that the theoretical exhaust limits appropriate for houses in this study range from 57 L/s to 134 L/s of exhaust flow.

Table 4.1 HOUSE DEPRESSURIZATION LIMITS FOR THE HOUSES IN THIS STUDY

House No.	Limiting Combustion Device	House Depressurization Limit (Pa)	Theoretical Exhaust Limit* (L/s)
i	Woodstove	5	63
2	Woodstove	5	83
3	Woodstove	5	71
4	Woodstove	5	100
5	Oil Furnace	4	68
6	Woodstove	5	134
7	Woodstove	5	57
8	Woodstove	5	69
9	Woodstove	5	63
10	Oil Furnace	4	60

* calculated using the flow equation Q = C P^n where Q = flow in L/s

C = coefficients determined for the fan depressurization test N =

P = pressure difference from HDL's (House Depressurization Limits)

4.2 Characteristics of the Exhaust Devices in the Houses

Section 3.2 indicated the pressures created by operating each of the various exhaust devices in the houses. Again, if the flow coefficients from the fan depressurization test are used, it is possible to calculate the approximate exhaust flows which cause these pressure differentials. It should be noted, however, that these calculated flows are only approximations, and are prone to considerable error because the accuracy of the pressure measurements was of the same order of magnitude as the actual measurement. Caution must be used in interpreting these results.

It can be seen from the calculated flows, however, that none of the devices which were operated alone would exceed the theoretical exhaust limit (Table 4.2) for any of the houses. At the outset of the project it was speculated that significant exhaust flows could be generated by the whole-house ventilation system. A significant finding from the field test results is that flows generated by the whole-house exhaust fan were of the same order of magnitude as those generated by a range hood, for example.

Considerable variability was found in the results, however it is likely that the resistance created by exhaust ducting on the whole-house ventilation fan limited exhaust air flows to values of well below those auoted in the manufacturer's literature.

It must be stated that there is something unique about the control strategy for the whole-house exhaust fan systems operating in these houses. The system is triggered by a humidistat controller and therefore will be operated at times of high humidities (eg., while cooking, after showers). There is a likelihood that other exhaust fans in the bathroom and kitchen will be operated at the same time. Therefore, if the operation of the whole-house exhaust system and a range hood or bathroom fan are considered for example, a worst case scenario for house pressures can be developed.

In houses 1, 3 and 5 the operation of the Aston fan and the range hood will cause exhaust flows to be relatively close to the theoretical exhaust limit beyond which backdrafting is a possibility. The operation of both the whole-house exhaust fan and the range hood at the same time in these houses would be of concern because the operation of these fans in combination with small house pressures would cause the house pressures to exceed the HDL's.

Table 4.2 FLOWS THROUGH EXHAUST FANS LOCATED IN THE HOUSES STUDIED

House No.	С	alculated Ex	haust Flow	s* (L/:	s)
140.	Wind & Stack Effect	Whole House Exhaust	Range Fan	Dryer	Bathroom Fan
1	36	17	40	18	17
2	3 9	23	7		7
3	2 9	31	21		5
4	16	12	11		0
5	47	21	44		12
6	94	11	20	19	18
7	21	11	0	10	5
8	45	12	12	11	16
9	18		12	23	10
10	34		14		13
Average	37	17	19	16	10

^{*} Calculated from the measured stack effect/wind pressures, the house pressures (Figure 3.2.1) and flow coefficients determined from the fan depressurization test.

There is also the likelihood that the whole-house exhaust fan, operated in combination with a clothes dryer, could create significant exhaust pressures in house I. In view of the fact that the clothes dryer is vented to the exterior of the building, however, the likelihood of both the whole-house exhaust fan and the dryer being on at the same time, a time when the woodstove is vulnerable to backdrafts, is quite low.

4.3 Requirements for Exhaust Fans -Alternatives for Controlling Backdraft

It should also be restated that an inspection of the houses in this study indicated that, for the most part, the whole-house exhaust fans were not necessary. Significant control of moisture could be obtained through other measures such as venting dryers outdoors and drying wood outdoors. Thus, one alternative for controlling house pressures is to disconnect the whole-house exhaust fans entirely. It should be recognized though, that home occupants may be dissatisfied with this alternative; house 3 particularly appears to require some means of moisture control (ie., significant use of the whole-house fan).

Another alternative may be to simply label both the whole-house exhaust and the range fan with a warning that states that operation of the whole-house exhaust fan in combination with the range hood in houses 1, 3 and 5 may adversely effect the operation of the woodstove and/or furnace. This may be sufficient for a well-informed home occupant.

A third alternative is to put a make-up air inlet in the building such that excessive house pressures will not be developed.

A final alternative might be to place a switch or a relay in the range fan and whole-house exhaust fan circuits to ensure that these devices cannot be operated simultaneously. This would preclude the possibility of homeowner error in operating these devices.

It is recommended that homeowners be furnished with information on the pros and cons of each alternative and an appropriate choice be made in consultation with the local CMHC Branch.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The general conclusion from the field measurements is that the whole-house exhaust fan did not produce flows which were significantly different than those produced by conventional rangehood fans and dryers. The whole-house exhaust fans were limited in flow by the resistance provided by an extensive network of ducts.

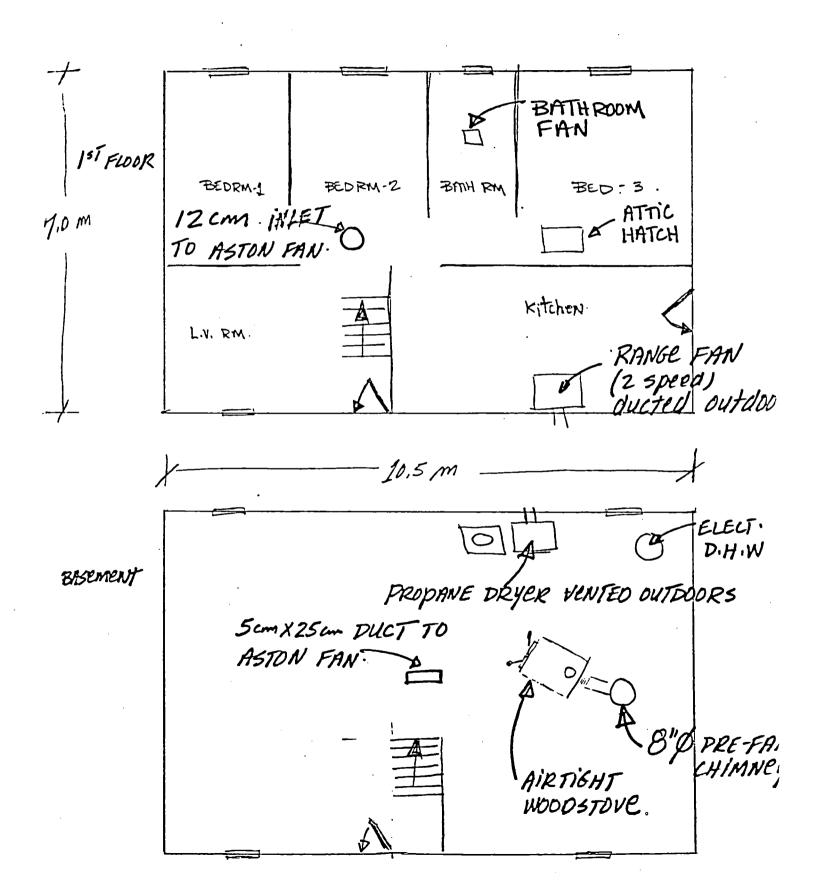
There is a likely scenario in which fans used to control humidity (eg., kitchen and bathroom fans) would operate simultaneously with those triggered by a humidistat (eg., whole-house exhaust fans). Comparing the theoretical exhaust limits for each of the houses to exhaust flows when the whole-house exhaust and range fans were operated simultaneously, it was found that this scenario could cause excessive depressurization in houses 1, 3 and 5. Some remedial measures would be appropriate for these houses. House 3 appeared to require the operation of the whole-house fan for moisture control. Remedial measures appropriate for this house should anticipate significant use of the whole-house fan for moisture control, (ie., the whole house fan should not be disconnected).

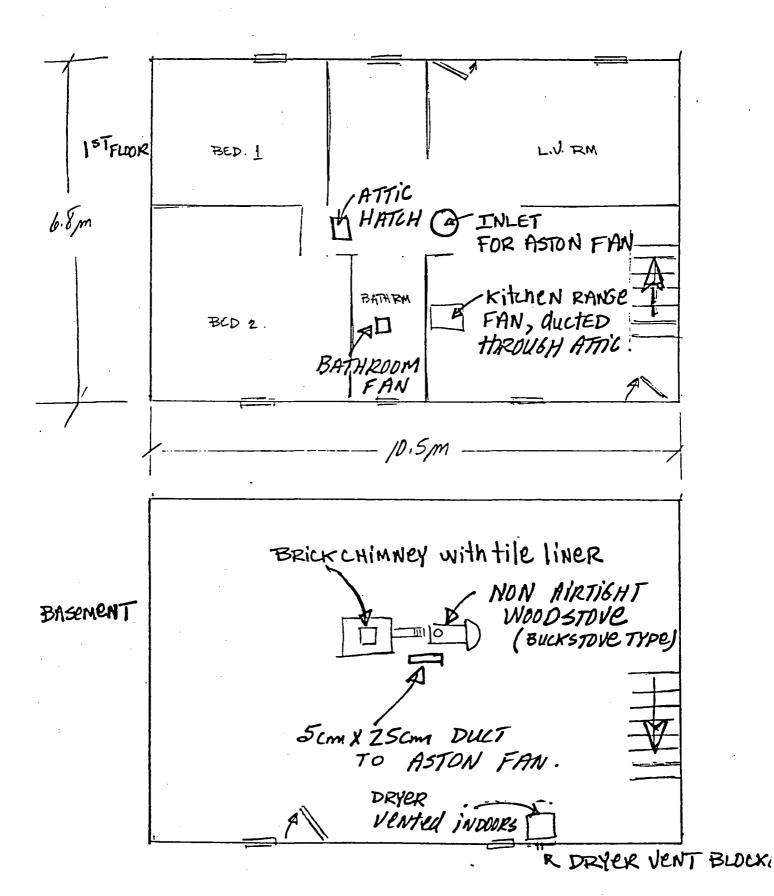
The possible alternatives include labelling the whole-house exhaust and range fans with a warning of the problem, placing a make-up air inlet in the house to allow additional air leakage when needed, placing an interlock in the wiring between the range fan and the whole-house exhaust fan such that neither device can be operated simultaneously, or disconnecting the whole-house exhaust fan entirely.

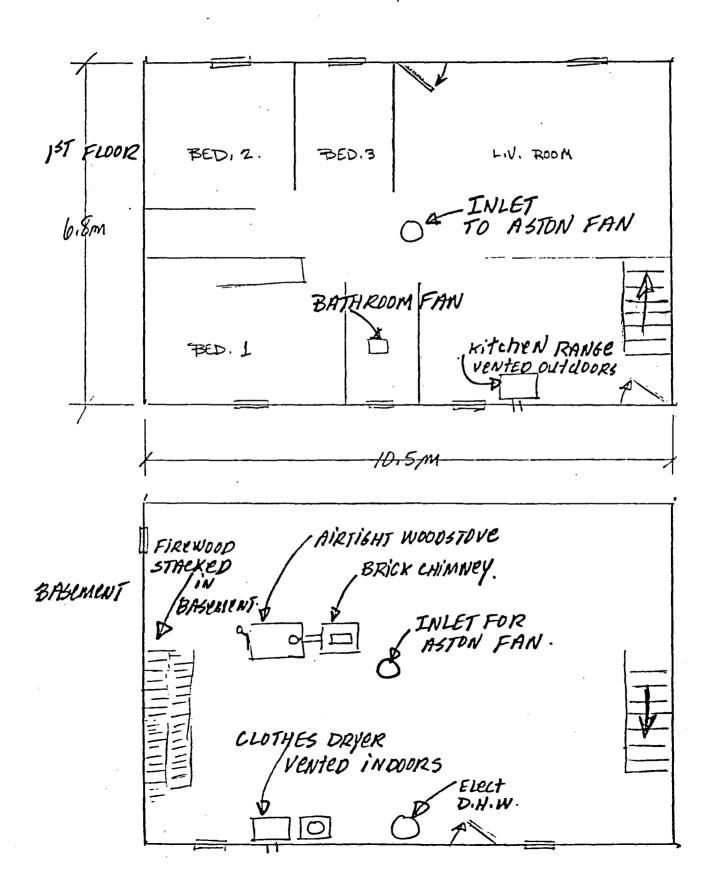
In view of the fact that, for the most part moisture problems were minimal, and given that other recommendations such as venting the dryer to the exterior of the building and drying wood outdoors are possible, the use of the whole-house exhaust fans in most of the houses considered may not be required.

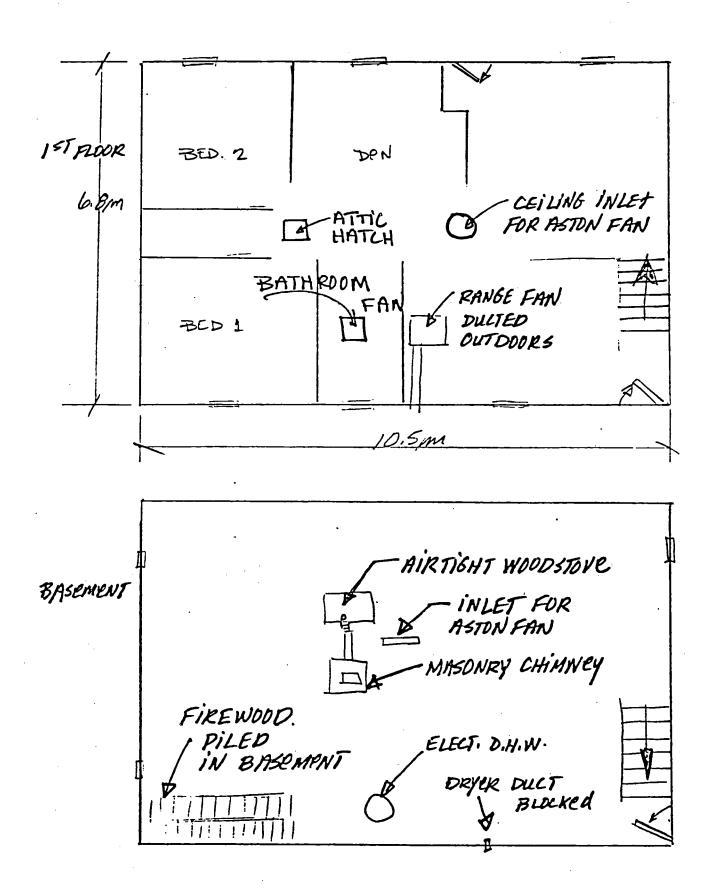
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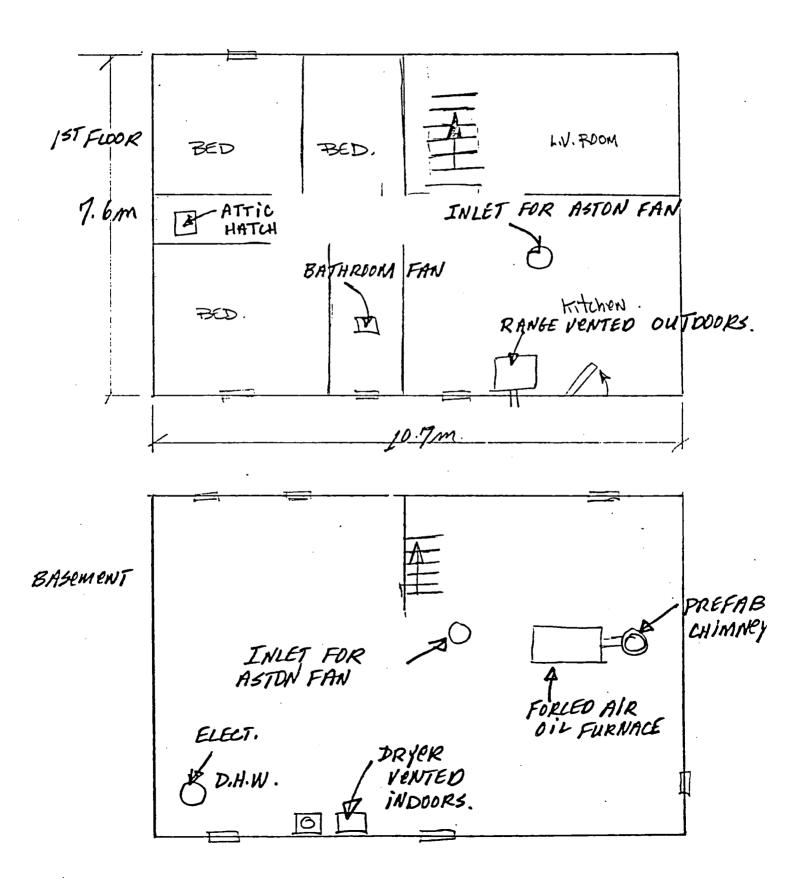
HOUSE 1.

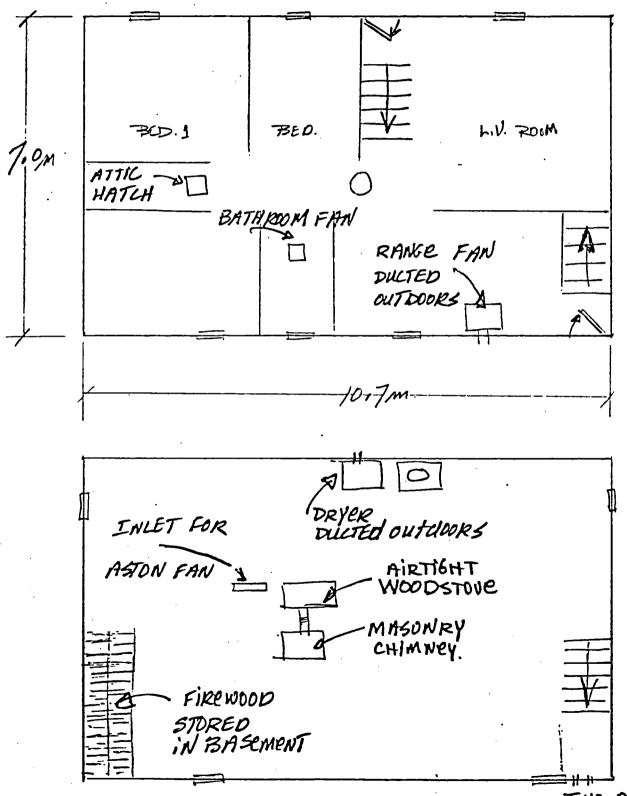




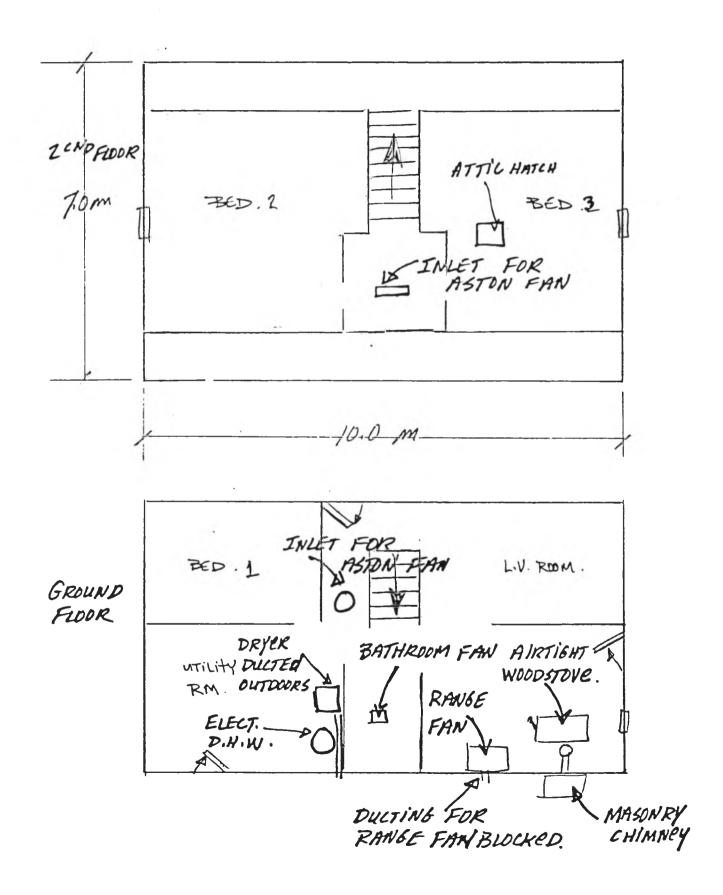


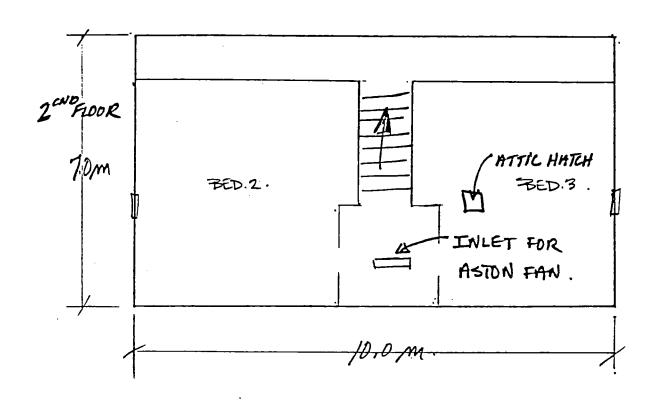


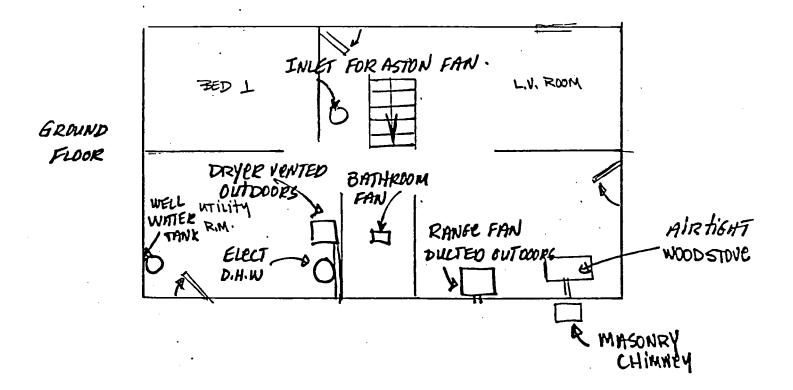


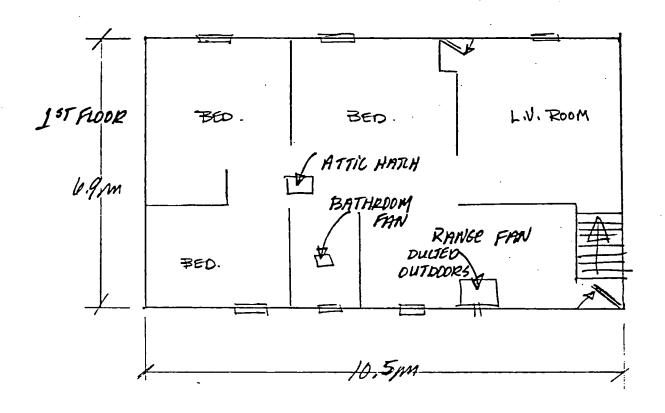


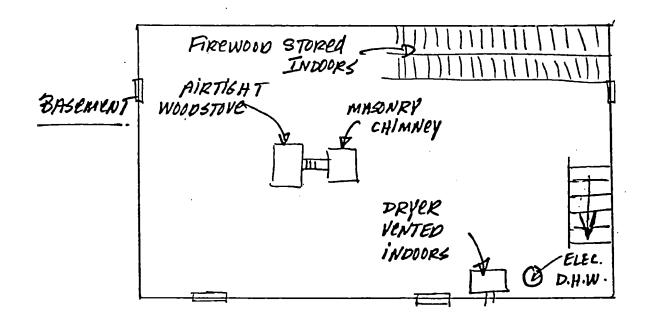
TWO AIR INL to cool storm

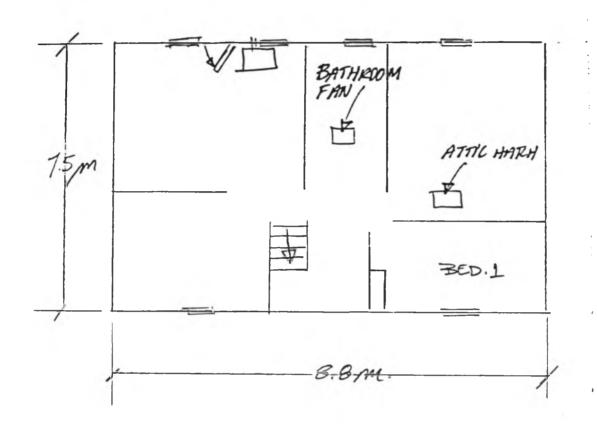


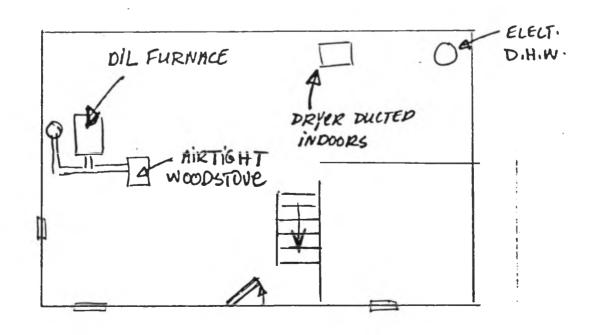


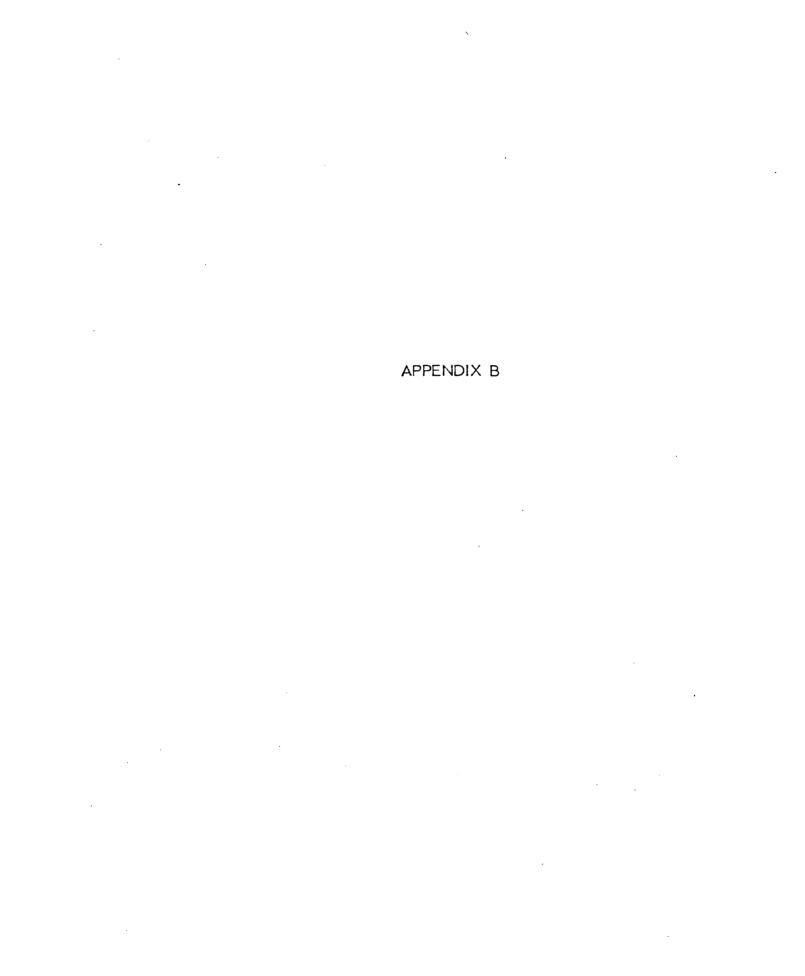












```
ENERCARE
  AIR LEAKAGE TEST
* * * * * * *
CMHC 2277
R TURNER
JAN 27/86
TEST NO. 1
BAROMETRIC 100.
OUTDOOR TEMP 14.(C)
WIND SPEED 28(KPH)
VOLUME: 367. M3
* * * * * * * *
PA DATA TPIN FLOW ERR
  (12) (C) L/S
18 16
          21 179
                    3
23
     19
          21 196
                   -7
 33
     41
          21
              293
                    7,
     56
 43
          21
              345
 53
     81
          21
              418
 63 100
          21
              467
* * * * *
EXPONENT (N)=
CONSTANT (C)= 17.100
CORRELATION = 99.447
STND. ERROR =
              4.707
* * * * * * *
EQUIVALENT LEAKAGE AREA:
   ELA M2 =
               0.043
   ELA FT2 =
               0.469
```

FORCED AIR CHANGE/HOUR: ACH 350 PA = 3.860 * * * * * * * *

, just

Chick Const

71: 90a

R-2000 SUPER ENERGY EFFICIENT HOME PROGRAM STANDARD AIRTIGHTNESS TEST REPORT

. Line of Builder OWNER	MR & MRS RALPH TURNER	
Address of Build	Phone No. 1-902-662-20	
Address of Building	DEBERT, Colchester Co, N.S.	
Name of Test Technician	GARY O'CONNOR	
Name of Testing Firm*	Buchan, Lawton, Parent Ltd.	
Address of Testing Firm	5370 Canotek Road Ottawa, Ontario Klj 8X7 Phone No. (613) 748-3762	
Date of Test	JAN. 21/86 Time of Test 12:00 NOON	
Date of Report	(Signature - Technician)*	
	WEATHER DATA TRUPO- WPATHER OFFICE 893-2279	
	BIBLE HILL	
Outdoor Temperature + 14	C Barometric Pressure 100.04 kF	
Wind Speed 28	Km/h Wind Direction	
nd Variability Gusts To	55 KM/h. (RAIN)	
	EQUIPMENT USED	
Manufacturer	Retrotec	
Type	Model 501 Serial No. 141	
Flow Measuring Technique	Nozzle x Fan Speed Orifice	
Calibration Range of Flow Meas	suring DeviceL/s toL/s	
Type of Outdoor Pressure Tap S	System Used: Four Wall Remote	
Does equipment automatically o	calculate "Corrected" Data? Yes No	
, BI	JILDING UNDER TEST	
2 x (7.0x 10.5) = Floor area (including basement	2 2/75	
rioor area (including basement	t) 147 m Volume 367.5 (From HOTCAN Data Shee	
Type of House (Puncalous tri	level, two storey, etc.) with Split LEVEL En	
RASOMENTINSULATED. WITH ASTON FAN IN ATTIC.		
* Firms must be listed wit	h HUDAC in order to perform this test	

```
ENERCARE
    AIR LEAKAGE TEST
 CMHC 2277
 R SHERRARD
 JAN 28/86
 TEST NO. BACKDRA
 BAROMETRIA 98.5
 OUTDOOR TEMP 9.(C)
 WIND SPEED 55(KPH)
 VOLUME: 327.M3
 * * * * * *
 PA DATA TPIN FLOW ERR
    (12) (C) L/S
  14
      29
           22 199
  17
       22
            21
               210
  21
       32
                255
                     -3
  27
       56
            21
               342
                      5
               432
  39
       88
            21
                     -6
  47
      122
            21
               513
                      Ũ:
  56 155
                581
 EXPONENT (N)=
                A.811
 CONSTANT (C)= 22.390
 CORRELATION = 99.550
 STND. ERROR =
 * * * * * *
 EQUIVALENT LEAKAGE ARFA:
     ELA M2 =
                 0.058
     ELA FT2 =
                 0.629
f FORCED AIR CHANGE/HOUR:
```

ACH 950 PA = 5.886

Revised 23-08-83

Name of Builder	MR & Mrs. RiCHARD SHERRARD.
Address of Builder	FALMOUTH, HANTS CO N. Sphone No. 1-902-198-550:
Address of Building	
Name of Test Technician	GARY D'CONNOR.
Name of Testing Firm*	Buchan, Lawton, Parent Ltd.
Address of Testing Firm	5370 Canotek Road Ottawa. Ontario Klj 8X7 Phone No. (613) 748-3762
Date of Test	JAN 28/86 Time of Test 1:00 P; mm
Date of Report	
	(Signature - Technician)*
(CFB GREENWOOD.; FAR.	WEATHER DATA DATA TEAM CFB GREENWOOD 902-165-339/
• • • •	C Barometric Pressure 985.2 kPa
Wind Speed 5	0-61 Km/h Wind Direction
nd Variability	32 KNOTS GUSTING TO 42 LNOTS.
	EQUIPMENT USED
Manufacturer	Retrotec
Type	Model 501 Serial No. 141
Flow Measuring Technique	Nozzle x Fan Speed Orifice
Calibration Range of Flo	w Measuring DeviceL/s toL/s
Type of Outdoor Pressure	Tap System Used: Four Wall Remote
Does equipment automatic	ally calculate "Corrected" Data? Yes No
2x (10.33x 6133)	BUILDING UNDER TEST (10.33 × 4.33 × 5.0) M 3
Floor area (including ba	BUILDING UNDER TEST (10.33 × 4.33 × 5.0) M 3 seement) 130.8 m Volume 327. m (From HOTCAN Data Sheet)
Type of House Bungalow,	tri-level, two storey, etc.)
Special Features (Cathed	ral ceiling, crawlspaces, etc.) - HAS ASTOI
central vinh Lations	YDE FAN
* Firms must be liste	d with HUDAC in order to perform this test

```
ENERCARE
    AIR LEAKAGE TEST
 CMHC 2277
 M COCHRANE
 JAN 29/86
 TEST NO. BACKTRA
 BAROMETRIC 99.4
 OUTDOOR TEMP 3.(C)
 WIND SPEED 22
 VOLUME: 357.M3
 * * * * * * *
 PA DATA TPIN FLOW ERR
    (12) (C) L/S
  17
      17
           20 179
  22
       23
           19
               210
                    -2
           19
  32
       40
               280
  42
      64
               358
  52
       83
           19
               410
           19
  62 100
               452
 EXPONENT (N)=
                9.748
 CONSTANT (C)= 21.762
 CORRELATION = 99.827
 STND. ERROR =
                2.475
 * * * *
. EQUIVALENT LEAKAGE AREA:
     ELA #2 =
                0.049
     ELA FT2 =
                0.528
```

FORCED AIR CHANGE/HOUR: ACH 050 PA = 3.980

the state

Care Care

Design

D.30

Revised 23-08-83

Name of Builder	MR & MRS MARTIN COCHRANE
ddress of Builder	Phone No. 902-751-2693
Address of Building	NEWPORT, HANTS CO, NOVA ScotiA. (MOT
Name of Test Technician	GARY O'CONNOR
lame of Testing Firm*	Buchan, Lawton, Parent Ltd.
Address of Testing Firm	5370 Canotek Road Ottawa, Ontario Klj 8X7 Phone No. (613) 748-3762
Date of Test	JAN 28/86 Time of Test 6:00 pim.
; Date of Report	(Signature - Technician)*
	WEATHER DATA DATA FROM CFB GREENWOOD. 902-765-3391
Outdoor Temperature 13	C, Barometric Pressure 99.4. kPa
Wind Speed 4 Kill 22 (3	Barometric Pressure 99.4. kPa KNOWN Wind Direction KOM 220° 5.W'
nd Variability 64575 +C	2 KNOTS
·	EQUIPMENT USED
Manufacturer	Retrotec
Туре	Model 501 Serial No. 141
Flow Measuring Technique	Nozzle x Fan Speed Orifice
Calibration Range of Flow Meas	suring DeviceL/s toL/s
	System Used: Four Wall Remote
	calculate "Corrected" Data? Yes No No
(2 x 10.45 x 6.84) m ² Floor area (including basemen	t) 143 m Volume 351, 4 m (From HOTCAN Data Sheet
Type of House (Bungalow, tri-	level, two storey, etc.)/
Special Features (Cathedral co	eiling, crawlspaces, etc.) HAS ASTON.
CENTRAL VENT	h HUDAC in order to perform this test
TITUS MUSC DE 112660 MIC	ii nonwe in order to bettorm tule test

```
. ENERCARE
. AIR LEAKAGE TEST
* * * * * * *
CMHC 2227
J MCCARTHY
JAN 29/86
TEST NO. RACKTRA
BAROMETRIC 100.8
OUTDOOR TEMP -7.(C)
WIND SPEED 30(KPH)
VOLUME: 360.M3
* * * * * * * *
PA DATA TPIN FLOW ERR
   (12) (0) L/S
 13
     19
          17 182
 18
     38
          17
              262
          17 355
 28
     68
 38
     105
          17
              445
              511
 48
     137
              590
 58 180
          17
* * * * *
EXPONENT (N)=
              0.758
CONSTANT (C)= 27.725
CORRELATION = 99.571
STND. ERROR =
              4.662
* * * * * * * *
EQUIVALENT LEAKAGE AREA:
 . ELA M2 = 0.066
    ELA FT2 =
               0.718
```

FORCED AIR CHANGE/HOUR: ACH 050 PA = 5.385

Nume of Buildor .	Ms Julie McCARthy
.ddress of Builder	Phone No. 902-198-47
Address of Building	FALMOUTH, HANTS CO., NOVA SCOTIA
Name of Test Technician	GARY O'CONNOR
Name of Testing Firm*	Buchan, Lawton, Parent Ltd.
Address of Testing Firm	5370 Canotek Road Ottawa, Ontario Klj 8X7 Phone No. (613) 748-3762
Date of Test	JAN. 29/86 Time of Test 9:30 A:m.
Date of Report	(Signature - Technician)*
* A HOUSE WIND IS CALM) -DATA FOR 9:00 A:m) Outdoor Temperature	WEATHER DATA 1 RUM C.F. B. 6 REEN WOOD 0 902-765-3391 C Barometric Pressure 100.8 kPa
Wind Speed 26-3	2 Km/h Wind Direction from 280°
and Variability	(50 km south west of FALMOUSE
	EQUIPMENT USED 07 101
Manufacturer	Retrotec
Туре	Model 501 Serial No. 141
Flow Measuring Technique	Nozzle x Fan Speed V Orifice
Calibration Range of Flow Mea	suring DeviceL/s toL/s
Type of Outdoor Pressure Tap	System Used: Four Wall V Remote
	calculate "Corrected" Data? Yes No
(2x6.81x/0,41 m²) E Floor area (including basemen	SUILDING UNDER TEST $(6.81 \times 10.47)(5.0) \text{ m}^{3}$ Out) 144 m Volume 360 m (From HOTCAN Data Sheet
Type of House (Bungalow) tri-	level, two storey, etc.)
Special Features (Cathedral o	ceiling, crawlspaces, etc.) MAS ASTON .
CENTRAL	VENTILATION FAW
 Firms must be listed wit 	h HUDAC in order to perform this test

```
* * * * * *
  ENERCARE
  MIR LEAKAGE TEST
CMHC 2227
S MCDONALD
JAN 29/86
TEST NO. PACTIPAR
BAROMETRIC 100.8
OUTDOOR TEMP -7.(0)
WIND SPEED LIGHT(KPH)
VOLUME: 407.M3
* * * * * * *
PA DATA TRIN FLOW ERR
  (12) (C) L/S
 12
     14
          17 155
 17
     27
          17 219
 27
     54
          17
              315
 37
     86
          17 491
 47
    118
          17 473
                   -\bar{\omega}
 57 (50)
          17 536
                   -3
EXPONENT (N)=
              0.787
CONSTANT (C)= 22.9%5
CORPELATION = 99.807
STND. ERROR =
              3,355
* * * * * * * *
EQUIVALENT LEAKAGE AREA:
   [ELA M2 =
               0.059
   ELA FT2 =
               0.635
FORCED AIR CHANGE/HOUR:
```

FORCED AIR CHANGE/HOUR: ACH 050 PA = 4.415 * * * * * * * *

Parionale.

"ame -of-Builder	Miss SARAH MACDONALD
Address of Builder	Phone No. 165-6187
ddress of Building	McGEE DRIVE, KINGSTON, KINGS CO, N.S.
Name of Test Technician	GARY O'CONNOR.
lame of Testing Firm*	Buchan, Lawton, Parent Ltd.
ddress of Testing Firm	5370 Canotek Road Ottawa, Ontario KlJ 8X7 Phone No. (613) 748-3762
Date of Test	TAN. 29/86. Time of Test 2:00 Pinn.
)ate of Report	(Signature - Technician)*
	WEATHER DATA (SATA FROM THIS MORNINGS TEST
Outdoor Temperature	C Barometric Pressure 100.8 kPa
Wind Speed	Km/h Wind Direction
.ind Variability	LIGHT BREETE
	EQUIPMENT USED .
Manufacturer	Retrotec
Type	Model 501 Serial No. 141
Flow Measuring Technique	Nozzle x Fan Speed Orifice
Calibration Range of Flow Mea	suring DeviceL/s toL/s
Type of Outdoor Pressure Tap	System Used: Four Wall Pemote
Does equipment automatically	calculate "Corrected" Data? Yes V No
	tuilding under Test 2 10.69 x 1.60 x 5.0 / 3 11 11 11 12.5 The proof of the control of th
	level, two storey, etc.) Split ENTRY
Special Features (Cathedral o	eiling, crawlspaces, etc.) HAS 19510N
CENTRAL VENTILAI	THON FAN. The HUDAC in order to perform this test
Firms must be listed wit	h HUDAC in order to perform this test

```
ENERCARE
 , AIR LEAKAGE TEST
* * * * * *
CMBC 2227
B DEVEAU
JAN 30/86
TEST NO. BACKDRA
BAROMETRIC 181.9
OUTDOOR TEMP -6.(C)
WIND SPEED 13(KPH)
VOLUME: 373.M3
* * * * * * *
PA DATA TPIN'FLOW ERR
  (12) (C) L/S
17
     48
          20 294
27
     96
          20
             422
    143
          20
              519
 47
    180
              586
          20
    240
              680
 57
          20
EXPONENT (N)=
              Ø.679
CONSTANT (C)= 43.76%
CORRELATION = 99.758
STND. ERROR =
              2.643
* '* * * * * *
EQUIVALENT LEAKAGE ARFA:
  ELA M2 =
               0.688
   ELA FT2 =
               й. 95й
FORCED AIR CHANGEZHOUR:
 ACH 050 PA = 6.035
```

Personal Page 1

7.G

Nume of Builder	MR & MRS BERNARD DEVEAU
ldress of Builder	Phone No.
I ldress of Building	BARTON, N. Scotin.
Name of Test Technician	GARY O'CONNOR
ame of Testing Firm*	Buchan, Lawton, Parent Ltd.
Address of Testing Firm	5370 Canotek Road Ottawa, Ontario Klj 8X7 Phone No. (613) 748-3762
Date of Test	JAN 30 86 Time of Test 10:30 A:M.
ate of Report	(Signature - Technician)*
x	WEATHER DATA DATA FROM C.F.B. CORNWALL'S IN Dighy N 6.902-765-3391
utdoor Temperature	C Barometric Pressure 101.9 kPa
Wind Speed 13	Km/h Wind Direction $E,W,E,170^{2}$
nd Variability <u>600</u>	Km/h Wind Direction E, W.E, 170°C OD. (WHEATHER STA APPROX. 10 miles was house)
	EQUIPMENT USED
lanufacturer	Retrotec
'ype	Model 501 Serial No. 141
Flow Measuring Technique	Nozzle x Fan Speed Orifice
alibration Range of Flow Mea	suring DeviceL/s toL/s
'ype of Outdoor Pressure Tap	System Used: Four Wall Remote
Does equipment automatically	calculate "Corrected" Data? Yes V No
2(6.18 × 10.70)	ot) 149.4 m Volume 373. m (From HOTCAN Data Sheet)
Floor area (including basemer	(From HOTCAN Data Sheet)
Type of House (Bungalow) tri-	-level, two storey, etc.)
	ceiling, crawlspaces, etc.) HAS ASTON
CENTRAL EXHAUST FAN	th HUDAC in order to perform this test

nume of Builder .	R. Melanson
ddress of Builder	Phone No. 902-245-2026
f ddress of Building	BARTON, Digby CO, N.ScotiA
Name of Test Technician	GARY O'LONNOR
ame of Testing Firm*	Buchan, Lawton, Parent Ltd.
, Address of Testing Firm	5370 Canotek Road Ottawa, Ontario Klj 8X7 Phone No. (613) 748-3762
Date of Test	TAN 30/86. Time of Test 2:30 P.M.
)ate of Report	(Signature - Technician)*
	WEATHER DATA DATA FROM C.F.B. CORNWALLIS IN DIGBY, 18.50 FOR 7:00 p:m
Outdoor Temperature 5	
Wind Speed 12	Km/h Wind Direction 040°
nd Variability O:2	·
	EQUIPMENT USED
Manufacturer	Retrotec
Туре	Model 501 Serial No. 141
Flow Measuring Technique	Nozzle x Fan Speed Orifice
Calibration Range of Flow Mea	suring DeviceL/s toL/s
Type of Outdoor Pressure Tap	System Used: Four Wall V Remote
Does equipment automatically	calculate "Corrected" Data? Yes V No
T FLOUR (7.06 11069) +(2.93 × 10.69) E	BUILDING UNDER TEST
754 NO TRAZEMENT Floor area (i ncluding baseme r	ot) 107 m Volume 295 m (From HOTCAN Data Sheet)
Type of House (Bungalow, tri-	level, (two storey,) etc.) NO BASEMENT
	ceiling, crawlspaces, etc.) KNEEWHLLS
-	STOVE, ASTON CENTRAL EXHIGIST FAN
Firms must be listed wit	th HUDAC in order to perform this test 10.59 (2.93 x 1.75) + (2.14 x .1
Volume 131 Floor (7.06x10.69)	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

```
ENERCARE
   AIR LEAKAGE TEST
CMHC 2277
S AMBROSE
JAN 30/86
TEST NO. BACKDRA
BAROMETRIC 101.5
OUTDOOR TEMP -3.(C)
WIND SPEED 12(KPH)
VOLUME: 295.M3
* * * * * * *
PA DATA TPIN FLOW ERR
   (12) (C) L/S
 14
     14
           17 157
      25
 19
           17
              213
 29
      51
           17
              309
 39
      88
           17
               391
 49 109
           17
               459
                    -\mathfrak{B}
    140
           17
               523
                    -3
EXPONENT (N)=
               0.831
CONSTANT (C)= 18.173
CORRELATION = 99.815
STND. ERROR =
               3.202
* * * * * * *
EQUIVALENT LEAKAGE AREA:
    ELA M2 =
                0.051
    ELA FT2 =
                0.555
```

FURCED AIR CHANGE/HOUR: ACH 350 PA = 5.741

une o f Builde r	THE MEMPHOSE S. AMBROSE				
Address of Builder	Phone No.				
Address of Building	North RANGE, Digby Co. N.S.				
Name of Test Technician	GARY O'CONNOR				
Name of Testing Firm*	Buchan, Lawton, Parent Ltd.				
Address of Testing Firm	5370 Canotek Road Ottawa, Ontario Klj 8X7 Phone No. (613) 748-3762				
Date of Test	JAN .30 86 Time of Test 5.45 P.M.				
Date of Report	(Signature - Technician)*				
<u>-3</u>	WEATHER DATA DATA FOR 2:00 P!M fROM C.F.B. CORNWALLS, Digby, W.				
Outdoor Temperature	C Barometric Pressure 101.5 kF.				
Wind Speed 12	Km/h Wind Direction				
nd Variability WINDS LIGHT & CLOSE TO CALM.					
	EQUIPMENT USED				
Manufacturer	Retrotec				
Type	Model 501 Serial No. 141				
Flow Measuring Technique	Nozzle x Fan Speed Orifice				
Calibration Range of Flow Meas	suring DeviceL/s toL/s				
Type of Outdoor Pressure Tap	System Used: Four Wall V Remote				
Does equipment automatically	calculate "Corrected" Data? Yes V No				
В	UILDING UNDER TEST				
Floor area (including basemen	t)m Volume 295 (From HOTCAN Data Shee				
Type of House (Bungalow, tri-	level, (wo storey, etc.) NO BASEMEN'7				
	eiling, crawlspaces, etc.) KNEEWHLLS C, ASTON FAN, EXHAUST FAN.				
•	h HUDAC in order to perform this test				

```
ENERCARE
  AIR LEAKAGE TEST
* * * * * *
CHHC 2277
S TITUS
JAN 31/86
TEST NO. BACKURA
BAROMETRIC 101.
OUTDOOR TEMP -4.(C)
WIND SPEED CALM(KPH)
VOLUME: 364.M3
* * * * * * *
PA DATA TPIN FLOW ERR
   (12) (0) L/S
 12
      9
          20 124
 17
          20
     16
             168
 27
     34
          20
              248
 37
     54
              316
          20
 47
      73
           20
              370
 57
      98
           20
              432
EXPONENT (N)=
               0.795
CONSTANT (C)= 17.572
CORRELATION = 99.915
STND. ERROR =
              2.232
* * * * * * * *
EQUIVALENT LEAKAGE AREA:
  ELA M2 = 0.045
    ELA FT2 =
               9.494
```

FORCED AIR CHANGE/HOUR: ACH 350 PA = 3.909

15.41.51 15.41.51

Nume of_Builder .	5. Titus		
Address of Builder	Phone No. 902-839-248.		
Address of Building	Tiverton, Digby Co, N.S.		
Name of Test Technician	GARY O'CONNOR		
Name of Testing Firm*	Buchan, Lawton, Parent Ltd.		
Address of Testing Firm	5370 Canotek Road Ottawa, Ontario Klj 8X7 Phone No. (613) 748-3762		
Date of Test	JAN. 31/86 Time of Test 11:00 A:M.		
Date of Report	(Signature - Technician)*		
	WEATHER DATA T. implicature measured Bur. Pres. (quesce) sunny & brigi		
Outdoor Temperature -4	C Barometric Pressure 101. kPa		
Wind Speed CALM	Km/h Wind Direction		
nd Variability			
	EQUIPMENT USED		
Manufacturer	Retrotec		
Туре	Model 501 Serial No. 141		
Flow Measuring Technique	Nozzle x Fan Speed Orifice		
Calibration Range of Flow Mea	suring DeviceL/s toL/s		
Type of Outdoor Pressure Tap	System Used: Four Wall Remote		
Does equipment automatically	calculate "Corrected" Data? Yes Vo		
	t) 145.8 m (From HOTCAN Data Sheet		
Type of House (Bungalow, tri-	level, two storey, etc.)		
	eiling, crawlspaces, etc.) -P		
(
Firms must be listed wit	h HUDAC in order to perform this test		

```
* * * * *
  ENERCARE
  AIR LEAKAGE TEST
* * * * * * * *
CMHC 2277
P LUGAN
FEB 1/86
TEST NO. BACKTRA
PAROMETRIC 102.5
OUTDOOR TEMP -12.(0)
WIND SPEED 15KNOTS
YOLUME: 330.M3
* * * * * * * *
PA DATA TPIN FLOW ERP
   (12) (C) L/S
          20 133
11
     11
                  -3
     23
16
          20
             195
 21
             224
     30
          20
                  -3
 31
     63
          28
             330
                   3
 41
     91
          20
             499
 51
    129
          29
             462
 61 170
          20
             554
* * * * *
EXPONENT (N)=
              0.812
CONSTANT (C)= 19.588
CORRELATION = 99.783
STND. ERROR =
             3.773
* * * * * * * *
EQUIVALENT LEAKAGE AREA:
    71A M2 =
               0.054
   ELA FT2 =
               0.585
```

FORCED AIR CHANGE/HOUR: ACH 850 PA = 5.171

ne of Builder .	PETER LOGAN.
Address of Builder	Phone No. 102-885-25
Address of Building	Sheet Hartour, N.S.
Name of Test Technician	GARY O'CONNOR
Name of Testing Firm*	Buchan, Lawton, Parent Ltd.
Address of Testing Firm	5370 Canotek Road Ottawa, Ontario KIJ 8X7 Phone No. (613) 748-376
Date of Test Date of Report 5AC.	FEB, 1/86. Time of Test 12:NOON
	(Signature - Technician)*
	WEATHER DATA FROM. Sheanwaten Wheaten 902-463-5111 ext 409
Outdoor Temperature -12	C Barometric Pressure 1025 ki
Wind Speed 15 KNO	T3. Km/h Wind Direction 300°. HAR BOUR HOUSE WELL SHIELDED, A WINDS 1916.
nd Variability (IN SHEET	HAR BOUR HOUSE WELL SHIELDED, A WINDS PAR
	EQUIPMENT USED
Manufacturer	Retrotec
Type	Model 501 Serial No. 141
Flow Measuring Technique	Nozzle X Fan Speed Orifice
Calibration Range of Flow Mea	suring DeviceL/s toL/s
Type of Outdoor Pressure Tap	System Used: Four Wall V Remote
Does equipment automatically	calculate "Corrected" Data? Yes 🖊 No
2 (1.5 X 8.8) B	UILDING UNDER TEST
Floor area (including basemen	t) 132 m Volume 330 (From HOTCAN Data She
Type of House (Bungalow, tri-	level, Ewo storey, etc.) Split ENTRY
Special Features (Cathedral o	
* Firms must be listed wit	h HUDAC in order to perform this test

APPENDIX C

	COMPUSTION VENTILATION SAFETY CHECK 1.	1
L	Accress Street Municipality Arr. time: Date JAN 27/81 DEBERT, COLCHESTER CO, N.S. Complitions: Refugned FEB 2	15.
1	Results ALL OK NOT DONE MAINTENANCE RECOMMENDED MAINTENANCE REC'S Summary PROPLEMS (Specify A1 A2.etc) WOUDSTOVE'S STOVEDIPS SHOULD BE SELVED WOODSTOVE CONNECTED TO- B INTERIOR PRE-FAB CHINNEY. WITH SHEET METAL SCROWS INSPECTION LIST: (FURNALE A DAY B FIREPLACEC) 1 cap needs repair blining needs repair 11 flue connector corroded 16 Monar construct loss 2 clearance insufficient 7 lining assing (per) 12 deaper imbalanced 17 Lister plugged 3 supports inadequate 8 creosote excessive 13 hond stained or rusted 18 burner dirty or score	<u></u>
L	3 supports inadequate 8 creosote excessive 13 hand stained or rusted 18 burner dirty or scotted 4 hand stained or rusted 19 are supply plugged 5 too socted or stained 10 flue connector loose 15 fuel occurs or sent 20 inlet poorly located 5	
i	FURNACE ROOM VENT/PRESSURE TEST Results ALL OK NOT DONE N/A INITIAL FAILURE Summary Initial Fressure: FANS Dway exhaust blower FIRE sm 1. Reduced Fressure: FANS Dway exhaust blower FIRE sm 1. Relief Measures Taken:	ċ
	CLOSE: ext doors windows int doors lend SAUSE PREPARE SH FPL window coen chisney coen PREPARE SH FPL window coen chisney coen SET UP: twhing gauge bathl bathl bathl bathl chisney coen CLOSE INLETS: furnace ran house firepl vacuum special CLOSE CHIMMEYS: furnal DH fpl caspers RECORD FRESSURES: fans on blower on FAMS OFF & COVERS REMOVED: (Fails? close fireplants) (Fails? inlets open labels applied (Fails? close fireplants coors coen coen	sser apl
	Results ALL DK NOT DONE SLIGHT FAILURE MAJOR FAILURE Summary Describe leakage:	
	CSASI COIL) PREPARATION: pilot light off flue still plugged PREPARE EDUIFMENT: smoke ready light on register open port open smoke candle & lighter ready FREPARE EDUIFMENT: smoke ready port open port open FREPARE EDUIFMENT: smoke ready port open FREPARE EDUIFMENT: smoke ready port open FREPARE EDUIFMENT: smoke ready port open	
	FURNACE ROOM SPILLAGE TEST Results ALL OK SFILL FAILURE OVERFIRING EXCESS CO LOW DRAF Summary Furnace:none temporary(sec) continuous: slight major DHW: none temporary(sec) continuous; slight major Gas Furnace Firing Rate: actual nominal coverfiring CO ppm Bas DHW Firing Rate: actual nominal coverfiring CO ppm Dil Furnace Draft Measurement (Fascals)]
	DESURE CONTINUED OPERATION: fans fireplaces	
	FIREPLACE VENT/PRESSURE TEST ALL OK NOT DONE NOT INITIAL FAILURE Summary SML: (Fa) 9.5: repeated with: inlets open doors shut not get a correct shut not get	IA
	DISTRECTION OFFRATION fans () furnace Inv 1c/se fpl RECORD PRESSURE: (Fails? deteraine best rescoial season relocate indoor tues to furnace re or house passes 1. com any inlets to furnace re or house passes 2. close any fpl doors & relocate tuing passes 1. shut off any other fol passes 2. shut off any other fol passes 2. shut off any other fol passes 3. shut off any other fol 3. shut off any other follows 3. shut off any	t:
1	COMPLETION: ENSURE FLUES OFFM: furnace DHY stove OPEN INLETS: furnace re house crael soci RELET: furnace pilot Othersostat DHY valve CHECK FURNACE OPERATION: full cycle flase colou- fans fireplace daspers	0

A RECO	ORD OF REMEDIAL ACTIONS TAKEN:
LARELS AFFLIED ADVICE TO OCCUPANT	Embaust Fan Combustion air Fresh air Blower Sml Fireplace Lge Fireplace Furnace DHW Referral to Location .
	None_Urgent Today Koutine Uptional
$-\mathcal{I}$	HOMEOWNERS DOO NOT USE FANGE FAM, CLOTHES DRYCK OR
TABLE	E 1: SUGGESTED TOOL LIST BATHDOM FAMS (D) NI
multi-scrawdriv	FIREPLACES:

TABLE 2 : MAXIMUM	ALLOWABLE DEP	RESSURIZA	TION (MAD Limit	
AFPLIANCE	IGNITION	DRAFT	TOTAL CHIMNEY HEIGHT (m)	LIMIT (Pa)
Gas-fired DHW	pilot electronic electronic	natural natural induced	NA NA NA	5.0
Oil-fired DHW	electronic	natural	NA	4.0
Sas furnace/boiler	pilot pilot electronic electronic electronic pilot	natural natural natural natural induced forced	4848 	400000
Oil furnace/boiler	electronic pilot	natural forced	NA NA	4.0
Fireplaces	NA	natural	- NA	2.0

Thousand BTU/hr Input = seconds req'd for dial to record 1 ft3 3852

Fercentage Overfiring = actual rate - nominal rate nominal rate **¥** 100

	COMPUS	TION VENTILATION SAFETY CHECK 1.5
	FALMOUTH,	Hourts Co, N.S. Municipality Arr. time : Date VAN 26th / E.
	1 can needs repair 2 clearance insuffi 3 supports inadequa	CHIMNEY INSPECTION ALL OK W NOT DONE MAINTENANCE FECOMMENDED MAINTENANCE FECTO FROBLEMS (Specify Al AC. etc) C-/ NO CHIMNEY CAP WNNUTED TO WINIOF MASONRY CHIMNEY. INSPECTION LIST: (FURNACE=A DHY=B FIREPLACE=C) Ining needs repair 11 flue connector corroded 16 blooms constitutionse cient 7 lining assing (gicl 12 deaper inbalanced 17 litter plugged to 8 crossote excessive 11 band strings or rested 18 burnar dirty or society epair 9 flue wrong size 14 connector design problem 19 air supply plugged ined 10 flue connector loose 15 fuel names present 20 inlet poorly located
	2 Results Summary	FURNACE ROOM VENT/PRESSURE TEST ALL DK NOT DONE N/A INITIAL FAILURE Initial Fressure: FANS Dway exhaust blower FIRE sm 15 Reduced Fressure: FANS Dway exhaust blower FIRE sm 15 Relief Measures Taken:
	TIFN OFF: furnace o	windows int doors PREPARE SM FPLs window open Chismey coem lot Dha stove DPERAM FAMS: range stovetop air supply open firepl coors open bach1 bath2 bath2 dryer bach1 bath2 bath2 dryer stovetop bach1 bath2 bath2 dryer burner high check draft window closes burner high check draft window closes burner high check for if window closes burner high check draft window closes burner high check draft window closes burner high check for if window closes burner high check draft window closes check fpl splicate: (Fails: close fire) check fpl splicate
	3 Results Summary	HEAT EXCHANGER LEAKAGE TEST ALL OK NOT DONE SLIGHT FAILURE MAJOR FAILURE Describe leakage:
	FREFARE EQUIPMENT: SMOKE CHECK PORTS TEST LEAKASE: blos	(SAS) light off flue still plugged PAEPARATION; ensure burner off flue still plugged register open port open sacke candle & lighter ready ITH BLOWER OFF; bottom top FREPARE EQUIPMENT; sacke ready port open SMOKE CHECK PORTS WITH BLOWER OFF; bottom top TEST LEAKABE; plower on repeat sacke check RESET FURNISH: blower off chimney open port closed
	Gas Furna Gas DHW	FURNACE ROOM SPILLAGE TEST ALL OK SFILL FAILUSE OVERFIRING EXCESS CO LOW DRAFT[Furnace:none temporary(sec) continuous: slight major DHW: none temporary(sec) continuous; slight major e Firing Rate: actual nominal nowing continuous Firing Rate: actual nominal nowerfiring CO ppm te Draft Measurement (Pascals)
	FURNACE OPERATION	DDX BAS METER: record seconds cubic feet BTU/HPC coen flues stand aside two it on RECORD FIRING RATES: actual nominal calculation SAMPLE CO IN FLUE BAS: hand pump record ppm DHY OPERATION: turn it on recheck spillage sample CO record CO one
	5 Results Summary	FIREPLACE YENT/PRESSURE TEST ALL OK NOT DONE INITIAL FAILURE SML: (Fa) 15: repeated with: inlets open coors shut, lg fpl off, or relief opening req'd ofmm *mm LGE: (Fa); repeated with: inlets open coors shut, lg fpl off, or relief, opening req'd ofmm *mm
	1 NECULATE INDUCES	ATION: fans [A furnace] DNY] lc/se fpl RECORD FREEDURE:] (Fails? determine test rescoial seasure: USE TO FIREPLACE ROOM: small large 1. coem any inlets to furnace re or nouse passes 2. close any fpl doors & relocate tubing passes losed fireplace doors coem 3. shut off any other fol passes
•		ENEURI FLUES GREN: furnace DHM stove OPEN INLITS: furnace rm house crawl soc RESEL: furnace pilot /thereostat DHM valve CHECK FURNACE GRERATION: full cycle flass colour fans fireplace decores OPEN Valve CHECK FURNACE GRERATION: full cycle flass colour

A RECORD OF REMEDIAL ACTIONS TAKEN: Combustion air Fresh air Flower
Lge Firaplace Furnace DHW
ation Literature Emhaust Fan Combu Sml Fireplace Lge Verbal Emplanation LAFELS APPLIED ADVICE TO OCCUPANT Referral to Koutine__ Optional_ Today__ (Details:) TABLE 1: SUGGESTED TOOL LIST 245 FURNACE OR FIREPLACE J HEAT EXCHANGER: 1 INSFECTION: __ smoke extension kit ROOM TESTING: adj. mirror _____tubing/& connectors _____tubing/& connectors _______ ____balloons & tube A CHIMNEY SPILLAGE: flásh ratchet -- propane stave
_ butane lighter multi-screwdriver tinoculars FIREPLACES: tape measure timepiece
hand pump
CO tubes timepiece propane stovetop butane lighter ÷ an labels inlet labels fireplace labels __ propane cannister __ static pressure tip

TABLE 2 : MAXIMUM	ALLOWABLE DEP	RESSURIZA	TION (MAD Limit	.s) ·
AFPLIANCE	IGNITION	DRAFT	TOTAL CHIMNEY HEIGHT (m)	LIMIT (Pa)
Gas-fired DHW	pilot electronic electronic	natural natural induced	NA NA NA	200
Oil-fired DHW	electronic	natural	NA	4.0
Gas furnace/boiler	pilot pilot electronic electronic electronic pilot	natural natural natural natural induced forced	4848 	000000 41)7)4.06
Oil furnacė/boiler	electronic pilot	natural forced	NA NA	4.0
Fireplaces	NA	natural	- NA	(3.6) 0, K

FIRING RATE CALCULATIONS:

Thousand BTU/hr Input = seconds req'd for dial to record 1 ft3

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COMBUSTION VENTILATION SAFETY CHECK 1.
NEWport, HANTS Co, N.S. Completing Date JAN. 28/8/
CHIMNEY INSPECTION Results ALL OK NOT DONE MAINTENANCE RECOMMENDED MAINTENANCE REC'T Summary PROBLEMS (specify A1 A2.etc) - Puse sale metal specify Specify Pipts: WOUDSTOVE CONNECTED TO INTERIOR MASONRY CHIMNEY INSPECTION LIST: (FURNACE: A DHY: B FIREPLACE: C) 1 can rests repair
FURNACE ROOM VENT/PRESSURE TEST Results ALL OK NOT DONE N/A INITIAL FAILURE Summary Initial Fressure: FANS Tway exhaust blower FIRE sm 12 Reduced Fressure: FANS Tway exhaust blower FIRE sm 12 Relief Measures Taken:
TURN EFF: furnace pilot Disc stove DFERATE FARS: range stovetop air supply open firepl cors open bathl/ Dathl/ Dat
Results ALL OK NOT DONE SLIGHT FAILURE MAJOR FAILURE Summary Describe leakage:
CAS PREPARATION: pilot light off flue still plugged PREPARATION: ensure burner off flue still plugged PREPARE EQUIPMENT: smoke ready light on register open port open smoke candle & lighter ready PREPARE EQUIPMENT: smoke ready port open FREPARE EQUIPMENT: bloker off this new open port closed RESET FURNACE: bloker off this new open port closed
FURNACE ROOM SPILLAGE TEST Results ALL DK SFILL FAILURE OVERFIRING EXCESS CO LOW DRAFT Summary Furnace:none temporary(sec) continuous; slight major DHW: none temporary(sec) continuous; slight major Gas Furnace Firing Rate: actual nominal coverfiring CO ppm Gas DHW Firing Rate: actual nominal coverfiring CO ppm Dil Furnace Draft Measurement (Fascals)
EXSURE CONTINUED OPERATION: fans fireplaces
FIREPLACE VENT/PRESSURE TEST Results ALL OK NOT DONE INITIAL FAILURE WOODSTOVE Summary SML:(Fa) 50: repeated with: inlets open coors snut mm lg fpl off or relief opening req'd of mm x mm LGE:(Fa) repeated with: inlets open coors snut mm lg fpl off or relief, opening req'd of mm x mm lg fpl off or relief, opening req'd of mm x mm lg fpl off or relief, opening req'd of mm x mm lg fpl off or relief, opening req'd of mm x mm
EMERIE CONT. OPERATION: fans furnace DHW lq/sa fpl RECORD PRESSURE: (Fails? dateraine test rescoial assure: RELOCATE INDOM: TUBE ID FIREPLACE ROOM: small large 1. coen any inlets to furnace ra or nouse passes PREPARE SM/LS FIREPLACE: burner off air inlets coen 2. close any fpl doors & relocate tubing passes Chianey dapper closed fireplace doors coen 3. shut off any other fol passes
CDRPLETION: ENSURE FLUES OFEN: furnace DHM stove OPEN INLETS: furnace re house crawl soci RESET: furnace pilot /theraostat DHM valve CHECK FURNACE OPERATION: full cycle flass colour fans fireplace dampers

A RECOR	D OF REMEDIAL ACTIONS TAKEN:
LABELS APPLIED ADVICE TO OCCUPANT	Exhaust Fan Combustion air Fresh air Blower Sml Fireplace Lge Fireplace Furnace DHW Verbal Explanation Literatura
INLET INSTALLED OTHER WORK FOLLOW-UP REDUIRED (Details:)	None_Urgent_ Today_ Koutine_ Uptional_
	1: SUGGESTED TOOL LIST

TABLE 1:	SUGGESTED TOOL LIST	
1 INSFECTION: - adj. mirror - flash - ratchet - multi-scrawdriver - binoculars - tape measurs - fan labels - inlet labels - fireplace labels	2%5 FURNACE OR FIREPLACE ROOM TESTING:	THEAT EXCHANGER: smoke extension kitsmoke pencil THEAT SPILLAGE:propane stovebutane lightertimepiecehand pumpCO tubesstatic pressure tip

Fireplaces	NA	natural	- NA	(5.0)
Oil furnacė/boiler	electronic pilot	natural forced	NA NA	4.0
Gas furnace/boiler	pilot pilot electronic electronic electronic pilot	natural natural natural natural induced forced	4848 1	4.000 4.000 4.66
Oil-fired DHW	electronic	natural	NA	4.0
Gas-fired DHW	pilot electronic electronic	natural natural induced	HEIGHT (m) NA NA NA	(Pa) 3.0 2.0 5.0
AFPLIANCE	IGNITION	DRAFT	TOTAL CHIMNEY	LIMIT
TABLE 2 : MAXIMU	M ALLOWABLE DEF	PRESSURIZA	TION (MAD Limit:	s) ·

Thousand BTU/hr Input = seconds req'd for dial to record 1 ft3 3852

Fercentage Overfiring = actual rate - nominal rate = \$ 100 nominal rate

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C	OMEU	STION	VENTILA				CHECK	1 - 1
F	ALMOUTH,	HANTS CO,	N.S.	DIETY CODSTOVE CO	Compl.t:	me :	Date JAN 2 Aim	29 EL
, K	1 esults ummary	ALL OK I	NSPECTION IN NOT DONE MAI (specify A1 A2	<i>TERIOR MA</i> NTENANCE F	ONRY CH Ecomment	MNEY MAI	PWS SPILIFI	
2	cap needs repaid the clearance insusperts inade brickwork need too sooted or	ir NOCAP 6 lir fficient v 7 lir custe v 8 cri s repair v 9 flu	csote excessive - 13	flue connector c dieper interior hnod eteined or connector design	proded 16	blower coases filter plugge burner dirig arr supply pl inlet poorly	teest leng d or sected ugged	
	2 esults ummary -	ALL DK [Initial F Reduced F	OOM VENT/PRESS NOT DONE ressure: FANS 1 ressure: FANS 1 ressure: Taken:	NA I	aust	FAILURE blower_ blower_	FIRE em_	1 g 1 g
T. 55.	JRN DFF: furnaci IT UP: tubing [.DSE INLETS: fur	mindows interpretation interpretation in the	tove D OPERATE FAMS: bath1/D bath1 firepl	rança 🗍 stovatop 37 bath37 dryam	☐ 2i ☐ 5u CHE (er on ☐ 0F (clied ☐) REC	ir supply coen irner high [] ECK FPL SPILLA R coen window	window coen	can Date Closes Cose fire pl
1	3 esults cummary	ALL OK	HANGER LEAKAGE NOT DONE [] leakage:		AILURE [] MAJOR	FAILURE []
İ			(AS)		(OIL)			,
ST	REPARE EDUIPMEN MOKE CHECK PORT EST LEAKAGE: 61	I: smoke ready □ 1 S WITH BLOWER OFF: ower on □ repeat s	ight on prop probability results on prop probability prop property probability probability property property probability property probability probabil	EPARATION: ensure egister open op p EPARE EDUIPMENT: NOKE CHEEX PORTS N EST LEAKAGE: bloke EET FURNACE: bloke	burner off [ort open [] s sacke ready [ITH BLOVER OF, r on [] repea	moke candle &] port open []: bottom [] t t sacke check	lighter ready [] op [] []	
	4 Results Summary	ALL OK [Furnace: DHW:	ROOM SPILLAGE SFILL FAILU none temporal none temporal	KE [] OVE ry(sec) ry(sec)	continu	ous : s	light∏ mag light∏ mag	jor [
	Gas Furn Gas DHW Dil Furn	ace Firing Firing	Rate: actual Rate: actual easurement (Fa	nomina nomina	i %	overfir overfir	ing Co	S bbw
	UKWATE DPERATU	lle anna divaci ce	fireplaces	מפחתתם ב	IBINS DATES.		tubic faet BTU/HF hal I calculation record ppa x spillage Sample	
	5 Results Summary	ALL OK [SML:(Fa) lg fpl LGE:(Fa)	NOT DONE DONE CONTROL PROPERTY OF THE PROPERTY] INITIAL with: inle lef openin with: inle	g req'd ts open	cf	mm Xmm	٠.
		ERATION: fans	urnace DHY lg/se ROOM: saall large l If air inlets coen l ace doors coen l	_ 2. E15	n any inleis se any fpl do	to furnace ra	mine best resegial or house passes tubing passes ses	s 🔼
		Kiii fun	S OPEN: furnace DHM ace pilot /therasstat place dampers	DHR ASJAC CHEC	NLETS: furnac X FURNACE OPE	a ra house RATIUM: full (] crawl soc cycle flame colou	

A RECOR	D OF REMEDIAL ACTIONS TAKEN:
LABELS APPLIED Exhaust Fan Combustion air Fresh air Blower Lge Fireplace Lge Furnace DHW Sml Fireplace Lge Fireplace Furnace DHW None Combustion air Fresh air Blower Lge Fireplace Furnace DHW Referral to Size Location OTHER WORK FOLLOW-UP REDUIRED None Urgent Today Koutine Uptional (Details:) TABLE 1: SUGGESTED TOOL LIST 1 INSFECTION: 2%5 FURNACE OR FIREPLACE 3 HEAT EXCHANGER:	
FOLLOW-UP REDUIRED :	NoneUrgenzToday Koutine Uptional
TABLE	1: SUGGESTED TOOL LIST
I INSFECTION: adj. mirror flash ratchet multi-screwdrive binoculars tape measure fan labels inlet labels fireplace labels	ROOM TESTING:

TABLE 2 : MAXIMUM	ALLOWABLE DEF	RESSURIZA	TION (MAD Limit	3)
AFPLIANCE	IGNITION	DRAFT	TOTAL CHIMNEY HEIGHT (m)	LIMIT (Pa)
Gas-fired DHW	pilot electronic electronic	natural natural induced	NA NA NA NA	3.0° 5.0°
Oil-fired DHW	electronic	natural	NA	4.0
Gas furnace/boiler	pilot pilot electronic electronic electronic pilot	natural natural natural natural induced forced	4848 111 28 1414	4.00 000 000 000 000 000
Oil furnacė/boiler	electronic pilot	natural forced	NA AA	4.0
Fireolaces	NA	natural	-NA	(3.0)

Thousand BTU/hr Input = seconds req'd for dial to record 1 ft3 3852

Percentage Overfiring = actual rate - nominal rate | | | 100 | | |

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Total State

	5.N/185 DAK	TION	VENTIL	ATION	SAF	ETY	CHE		_ =
	MCGEEDOINE,								163
-	Results	ALL DK A NO	SPECTION OIL OT DONE MA	INTENANCE	FISCOMME	70 7"0 NDED M	AINTENA	NCE FIED	9/17.77. D
	1 cap needs repair 2 clearance insuffi 3 supports inadequa 4 brack-ort needs r 5 top spoted or sta	cient 7 lining te 8 creose epilr 9 flue e ined 10 flue c	ON LIST: (FURNACE: needs repair 1 aissing (ges) le excessive le excessive	ll flue connector 12 damper imbalan 13 hood stained o 14 connector desi 15 fuel occurs or	corroded or rusted on problem	.17 filter plu .18 burner dir .19 avr supoly	gged ty or spoted blumped		
	Results Summary	ALL OK [] Initial Fre	OM VENT/PRES NOT DONE DESSURE: FANS PASSURE: FANS	N/A ==:	:haust //	.D blower	- FIS	5 sm	1=_
	TLOSE: HIT COURS IN	Relief Meas	sures Taken:	עפסאונען	OPENED	PREPARE SH FPI	m) kans.	10	Y 10
	They note: furtise of SET UP: tubing (2) ga CLOSE INLETS: furnactions CHINNEYS: furn FAMS OFF & COVERS RE	let	DPERATE FAXS: bath1 bat spl	rance [7] staust	lower on [7]	air supply or burner high CHECK FPL SPIN DR coen wind: RECORD PRESEUL doors [1] and	en firepl check draf LASE: () (F in) apply iii: () (Fail	toors open to mindow and stood to the stood of the stood] closed(irapl
•	Results Summary	ALL OK	NOT DONE Dakage:	SLIGHT I	FAILURE INC. LH	☐ MAJE	OR FAILU	RE	
	PREPARATION: pilot : PREPARE EQUIPMENT: SHOKE CHECK PORTS W TEST LEAKAGE: blower RESET FURNACE: blow	(6AS) light off flue s sacke ready ligh ITH BLOWER OFT: bot r on repeat sack	till plugged F t om . tom top F e checks S en pilot lit 1	REPARATION: ensures the control of t	(OIL) re burner off port open : saoke reac; WITH BLOWER wer on Fere	f [] flue stil] smoke candle y [] port open _Orr: bottom [peat smoke the	l plugoed is l lighter re	eady D D /	K
	Summary Gas Furnac	ALL DK V Furnace:no DHW: no e Firing Ra	OM SPILLAGE SFILL FAILU ne tempora ne tempora te: actual te: actual surement (F:	JREOV ary(sec) ary(sec) nomin	_ contin _ contin al	nuous[]; nuous[]; % overf	slight[==light[irin=	major major CO s	
	EXSURE CONTINUED OP FURNACE OPERATION: OBSERVE & TIME SPIL RECHECK SPILLAGE AR	ERATION: fant 4 open flues stand LASE: port hood TER BLOVER OPERATE	,	ELOCK RECORI SAMPLE NJOSEC, DHY OF	GAS METER: r FIRING RATE CO IN FLUE		cubic feet; namal I ca precord pp neck spillage	Sin/He	J
	Results Summary	ALL DK SML: (Fa) lg fpl of LGE: (Fa) lg fpl of	VENT/PRESSUI NOT DONE [: repeated : or re ; repeated : , or re	INITIAL with: inl lief openi with: inl lief, openi	ets ope ng req' ets ope	n, co d of n .co	ors shu mm X crs shu	mm.	• .
	PREPARE SAILS FIRE	se to pikertate kod Place: became off C	ace DHW 1c/s H: small large D air enlets crent dcors coen D] 1. 0] 2. c	pen any inlei lose any fpl	(Fails? de ts to furnace doors & reloc other fol	rm or nouse (ate tubing [resecial seas	me:
		Rest: fwatce	Elt furnace DHN pilot / therapstat	DAR ASTAS CH	I INLETS: FUR ECK FURNACE	nace re hous GPERATION: ful	r cycle fl	Colowo	

	TABLE 1: SUGGESTED TOOL LIST NSFECTION:
1	Exhaust FanCombustion airFresh airBlowerSml FireplaceFurnaceDHW
	INLET INSTALLED Size Location
	FOLLOW-UP REDUIRED NoneUrgent Today Routine Optional_V (Details:)
	TABLE 1: SUGGESTED TOOL LIST
	adj. mirror ROOM TESTING: smoke extension kit flash manometer smoke pencil ratchet tubing & connectors 4 CHIMNEY SPILLAGE: multi-screwdriver J" masking tape propane stove binoculars balloons & tube butane lighter tape measure FIREPLACES: timepiece band oums

TABLE 2 : MAXIMUM	ALLOWABLE DE	PRESSURIZA	TION (MAD Limit	.s) ·
AFPLIANCE	IGNITION	DRAFT	TOTAL CHIMNEY HEIGHT (m)	LIMIT (Pa)
Gas-fired DHW	pilot electronic electronic	natural natural induced	NA NA NA	(Pa) D.0 D.0 5.0
Dil-fired DHW	electronic	natural	NA	4.0
Gas furnace/boiler	pilot pilot electronic electronic electronic pilot	natural natural natural natural induced forced	4848 111188 11414	4500000
Oil furnacė/boiler	electronic pilot	natural forced	NA NA	4.0
Fireplaces	NA -	natural	NA	3.0

Thousand BTU/hr Input = seconds req'd for dial to record 1 ft3

CUMEUSITUM VENTILATION SAFETY CHECK :
BAPTON, DIGBY CO, Nos, Completing: Arr. time: Dire Vint
CHIMNEY INSPECTION WOODSTOVE CONTRETTED TO INTERIOR MAINTENANCE RECOMMENDED MAINTENANCE RECOMMEND MAINTENANCE RECOMMEND MAINTENANCE RECOMMEND MAINTENANCE RECOMMEND MAINTENANC
IKSPECTION LIST: (FURNACE=A DHX=B FIREPLACE=C) 1 can rests repair NOLAD & lining needs repair 11 flue connector corroded 16 blower compartment loss 2 clerate insufficient 7 lining assing test 12 dasser intrinced 17 filter plugged 3 supports insufacionate B crossote excessive 17 hood stained or rusted 18 burner dirty or scoted 4 brickent needs repair 9 flue wrong size 14 connector design problem 19 air supply plugged 15 too socted or stained 10 flue connector losse 15 just obsure present 20 inlet poorly located
FURNACE ROOM VENT/PRESSURE TEST Results ALL OK NOT DONE N/A INITIAL FAILURE FIRE sm !: Reduced Fressure: FANS Zway exhaust blower FIRE sm !: Reduced Fressure: FANS Zway exhaust blower FIRE sm !: Relief Measures Taker:
TLDSE: est doors mindows int doors lend Save:
Results ALL OK NOT DONE SLIGHT FAILURE MAJOR FAILURE Summary Describe leakage:
CSAS COIL
FURNACE ROOM SPILLAGE TEST Results ALL OK SFILL FAILURE OVERFIRING EXCESS CO LOW DRAFT Summary Furnace:none temporary(sec) continuous: slight major DHW: none temporary(sec) continuous; slight major Gas Furnace Firing Rate: actual nominal coverfiring CO ppm Gas DHW Firing Rate: actual nominal coverfiring CO ppm
Dil Furnace Draft Measurement (Fascals) EXSURE COXINUED OPERATION: fans fireblaces
FIREPLACE VENT/PRESSURE TEST Results ALL DK W NOT DONE INITIAL FAILURE D Summary SML: (Fa) 3.5: repeated with: inlets open coors shut lg fpl off, or relief opening req'd of 50 mm × 900 mm LGE: (Fa); repeated with: inlets open coors shut lg fpl off, or relief, opening req'd ofmm ×mm
DESIRE CONT. GPERATION: fans furnace DNY 1g/ss fpl RECORD PRESSURE: (Fails? deteraine best rescoial asserts: RELOCATE INDOOR TUSE TO FIREPLACE ROOM: saall large 1. coen any inlets to furnace ra or nouse passes PREPARE SAYLS FIREPLACE; burner off air inlets open 2. close any fpl doors & relocate tubing passes Chienesy descert closed fireplace doors coen 3. shut off any other fol casses Chienesy descert closed coen casses Chienesy descert closed casses Chienesy descert closed casses Chienesy descert closed casses Chienesy descert closed casses ca
CORPLETION: ENSURE FLUES OFEN: furnace DNN stove D OPEN INLETS: furnace rem house crawl social section of the content of th

A RECOR	D OF REMEDIAL ACTIONS TAKEN:
LABELS APPLIED ADVICE TO OCCUPANT	Exhaust Fan Combustion air Fresh air Blower Sml Fireplace Lge Fireplace Furnace DHW Verbal Explanation Literature
INLET INSTALLED	Size Location .
FOLLOW-UP REDUIRED (Details:)	None_Urgent_ Today
	3
TABLE	1: SUGGESTED TOOL LIST
1 INSFECTION: - adj. mirror - flash - ratchet - multi-screwdriv - binoculars - tape measure - fan labels - inlet labels - fireplace label	tubing & connectors 4 CHIMNEY SPILLAGE: 2" masking tape — propane stave ballooms & tube — butane lighter FIREPLACES: — timepiece — propane stovetop — hand pump butane lighter — CO tubes

TABLE 2 : MAXIMUM	ALLOWABLE DEF	RESSURIZA	TION (MAD Limits)	
AFPLIANCE	IGNITION	DRAFT	TOTAL CHIMNEY	LIMIT
Gas-fired DHW	pilot electronic electronic	natural natural induced	HEIGHT (m) NA NA NA	(Pa) 5.0 5.0 5.0
Oil-fired DHW	electronic	natural	NA	4.0
Sas furnace/boiler	pilot pilot electronic electronic electronic pilot	natural natural natural natural induced forced	4848 11122 1414	4.00 4.00 4.00 6.00
Oil furnace/boiler	electronic pilot	natural forced	- NA .· NA	4.0
Fireplaces	NA	natural	- NA	(0.5)

Thousand BTU/hr Input = seconds req'd for dial to record 1 ft3 3352

Fercentage Overfiring = actual rate - nominal rate | | 100 | | nominal rate

•	COMBUST	TION VE	ENTILA	TION S	SAFET	Y CHEC	DK 1.:
	BARTON,	DIGBY CO	Municipal N.S	ity Ar Co	r. time	_:_ Dates	JAN. 30/E
	Paculte A	HIMNEY INSPECTION FORLEMS (Specification of the property of th	Done Hain ecify al al. ON NUMBERNIE	TENANCE F.ES etc) Howall (1150)	C-14 FOUTANT	MAINTENAN	NOE RED'D
	2 F Results F Summary :	FURNACE ROOM ALL DK N Initial Fres Reduced Fres Relief Measu	VENT/PRESSU OT DONE Sure:FANS 2w Sure:FANS 2w	RE TEST N/A IN say exhau	ITIAL FAI		E sm1_
•	CLOSE: ext doors x TURN GFF: furnace oil SET UP: tubing pau CLOSE INLETS: furnace CLOSE CHIRNEYS: furn FAMS GFF & COVERS REA	ot	DFEMATE FAMS: ra bath1 bath2 vacuum seeci RECORD PRESEURES	nge stovetop baind dryer al ifans on blower pen labels appli	air su burner CHECK F on C OR coe ed() RECORD	SR FPLs window oper pply open firspl high check draft PL SPILABE: (Fan window) apply 1 PRESSURE: (That!) apply 1 apply	coors open () (
	Results	HEAT EXCHANG ALL OK [] N Describe les	OT DONE		LURE [MAJOR FAILU	F.E.
_	PREPARATION: pilot li PREPARE EDUIFMENT: si SMOKE CHECK PORTS WI TEST LEAKASE: blower RESET FURNACE: blower	acts ready light of the BLOWER OFF: bottom on repeat sects of the chieney open	om	pister coen □ port ARE EDUIFMENT: sa: KE CHECK PORTS WITH I LEAKASE: blower (ET FURNACE: blower	urner off flu t open secte ota ready por H BLDYER Drr; bo on repeat sa:	ottos 🗍 top 🗍	•
	Summary Gas Furnace Gas DHW	FURNACE ROOM ALL OK [] S Furnace:none DHW: none Firing Rate Firing Rate Draft Mease	EFILL FAILUR Temporar temporar a: actual a: actual	E OVERF y(sec)c nominal nominal	continuous continuous . % p	s∏; slight[s∏; slight[verfiring	major major
	FURNACE OPERATION: 6 OBEERVE & TIME SPILL RECHECK SPILLAGE AFT	RATION: fans fire coen flues stand as AEE: port hood s TER PLOWER OPERATES: DRAFT: connect state	ide twrn it on taxaper icins	RECORD FIR SAMPLE CO DHY OPERAT	NINS RATES: actu IN FLUE BAS: ha NIDN: twrn it on	econds cubic feet al nominal I ca nd pump record pp I recheck spillage	lculation;
•	5 Results Summary	SML: (Fa) 25 1g fpl off LGE: (Fa)	ENT/PRESSURE NOT DONE : repeated w : repeated w : repeated w : repeated w	INITIAL For inlet of opening et inlet inlet inlet inlet inlet inlet	s open req'd of s open	doors shu mm X accrs shu	mm m
-	DISURE CONT. OPERAT RELOCATE INDOOR TUE PREPARE SAVES FIRE ENDARRY CARDER CIT				•	-	
-		CORPLETION: EXEURE FLUES OFE	da furnaca DHW D Not Itherapatet 1	Stove CO DPEN INL	is: furnasa ra	house crast so	-

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A RECOF	RD OF REMEDIAL ACTIONS TAKEN:
LABELS APPLIED ADVICE TO OCCUPANT	Exhaust Fan Combustion air Fresh air Blower Sml Fireplace Lge Fireplace Furnace DHW Verbal Explanation Literature Referral to
TANKET THETOLED	None Urgent Today Routine Optional
(Details:)	

TABLE 1: SUGGESTED TOOL LIST 135 FURNACE OR FIREPLACE ROOM TESTING: 3 HEAT EXCHANGER: 1 INSFECTION: __ smoke extension kit adj. mirror ilash -- wandwatst - smoke pencil 4 CHIMNEY SPILLAGE: tubing & connectors J" masking tape balloons & tube FIREPLACES: __ ratchet __ multi-screwdriver -- propane stove -- propane stove -- butane lighter -- timepiece -- hand pump -- CO tubes -- static pressure ti __ binoculars tape measure fan labels inlet labels fireplace labels propane stovetop butane lighter propane cannister

TABLE 2 : MAXIMUM	ALLOWABLE DEP	RESSURIZA	TION (MAD Limits)	
AFPLIANCE	IGNITION	DRAFT	TOTAL CHIMNEY HEIGHT (m)	LIMIT (Fa)
Gas-fired DHW	pilot electronic electronic	natural natural inducad	NA NA NA	(Pa) 3.0 5.0
Oil-fired DHW	electronic	natural	NA	4.0
Gas furnace/boiler	pilot pilot electronic electronic electronic pilot	natural natural natural natural induced forced	4848 	4.000
Oil furnacė/boiler	electronic pilot	natural forced	NA NA	4.0
Fireplaces	NA	natural	- NA -	3.0

FIRING PATE CALCULATIONS:

Thousand BTU/hr Input = seconds req'd for dial to record 1 ft3 3852

Percentage Overfiring = actual rate - nominal rate nominal rate

	COMEUSTION VENTILATION SAFETY CHECK 1.
	PARTON DIGBY CO, N.S. Completion Date NAN. 30 C. Completion Wisher CHIMNEY INSPECTION WISHING CONNECTED TO ONLONG WISHINGLY
1	Results ALL OK W NOT DONE MAINTENANCE RECOMMENDED MAINTENANCE RECOMMEND MAINTENANCE RECOMMENDED MAINTENANCE RECOMMEND MAINTENANCE RECOMMENDED MAINTENANCE RECOMMEND MAINTENANCE RECOMMEND MAINTENANCE RECOMMEND MAINTENANCE RECOMMEND MAINTENANCE RECO
	icab needs repair ADIAD & lining needs repair 11 flue connector corroded 16 blower construent losse 2 clearance insufficient 7 lining asserting test 12 dispar isbelanced 17 tilter plugged 17 tilter plugged 18 brackwork needs retain 9 flue arong size 11 flue connector design problem 19 air supply plugged 14 Connector design problem 19 air supply plugged 15 top spoted or staired 10 flue connector losse 15 top needs or staired 20 inlet poorly located
	FURNACE ROOM VENT/PRESSURE TEST Results ALL OK NOT DONE NA INITIAL FAILURE Summary Initial Fressure: FANS Tway exhaust blower FIRE sm 15 Reduced Fressure: FANS Tway exhaust blower FIRE sm 15 Relief Measures Taken:
	CLOSE: ext doors mindows int doors ZERO BAUGEY PREPARE Sh FPL: window open Thismay ope
	ALL DK NOT DONE SLIGHT FAILURE MAJOR FAILURE Summary Describe leakage:
	(GAS) (DIL)
-	PREPARATION: pilot light off flue still plugged PREPARE EQUIPMENT: sacia ready light on - register open port open sacia candle & lighter ready FREPARE EDUIPMENT: sacia ready PREPARE EDUIPMENT: sacia ready port open sacia candle & lighter ready PREPARE EDUIPMENT: sacia ready port open SHOKE CHECK PORTS WITH ELGWER OFF: bottom top SHOKE CHECK PORTS WITH ELGWER OFF: bottom top TEST LEAKAGE: blower on repeat sacia check RESET FURNACE: blower off chianey open port closed
	FURNACE ROOM SPILLAGE TEST Results ALL OK SFILL FAILURE OVERFIRING EXCESS CD LOW DRAFT Summary Furnace:none temporary(sec) continuous; slight major DHW: none temporary(sec) continuous; slight major Gas Furnace Firing Rate: actual nominal coverfiring CD ppm Gas DHW Firing Rate: actual nominal coverfiring CD ppm
	Dil Furnace Draft Measurement (Pascals) EXSURE COXINUED CFERATION: fans fireplaces
	FIREPLACE VENT/PRESSURE TEST Results ALL OK NOT DONE INITIAL FAILURE SML: (Fa) 45: repeated with: inlets open coors shut lg fpl off, or relief opening req'd of mm * 400 mm LGE: (Fa); repeated with: inlets open coors shut lg fpl off, or relief, opening req'd of mm * mm
(EMEURE CONT. GPERATION: fans furnace DHW 10/se fpl RECORD FREEDURE: (Fails? deteraine best resected seasure: RELOCATE 18000R TOTE TO FIRE ACE ROOM: saall large 1. coen any inless to furnace re or nouse passes 2. close any fpl doors & relocate tubing passes 0. chiangy faater closed fireplace doors open 3. shut off any other fol passes 0. chiangy faater closed fireplace doors open 0. shut off any other fol passes 0. chiangy faater closed
	CORPLETION: ENSURE FLUES OFEN; furnace DHX stove OPEN INLETS; furnace re house crael spc RESET: furnace pilot therapscat DHX valve CHECK FURNACE GPERATION; full cycle flass colour fans fireplace campers

A RECO	RD OF REMEDIAL ACTIONS TAKEN:
LABELS APPLIED	E::haust Fan Combustion air Fresh air Blower Sml Fireplace Lge Fireplace Furnace DHW Verbal E::planation Literature
ADVICE TO OCCUPANT	Verbal Explanation Literature Referral to
INLET INSTALLED	Size Location .
FOLLOW-UP REDUIRED (Details:)	NoneUrgent Today Koutine Uptional

TABLE 1: SUGGESTED TOOL LIST 2%5 FURNACE OR FIREPLACE ROOM TESTING: J HEAT EXCHANGER: 1 INSFECTION: __ smoke extension kit adj. mirror __ manometer A CHIMNEY SPILLAGE: flásh tubing & connectors 3" masking tape balloons & tube ratchet -- propane stove butane lighter multi-screwdriver binoculars timepiece hand pump CO tubes FIREPLACES: tape measure __ propane stovetop butane lighter fan labels inlet labels fireplace labels __ static pressure tip __ propane cannister

TABLE 2 : MAXIMUM	ALLOWABLE DEP	RESSURIZATIO	ON (MAD Limits)	•
AFPLIANCE	IGNITION		TAL CHIMNEY HEIGHT (m)	LIMIT (Fa)
Gas-fired DHW	pilot electronic electronic	natural natural induced	NA NA NA	5.0
Oil-fired DHW	electronic	natural	NA	4.0
Gas furnace/boiler	pilot pilot electronic electronic electronic pilot	natural natural natural natural induced forcad	4848 	4.00 4.00 4.00
Oil furnacė/boiler	electronic pilot	natural - forced	NA NA	4.0 4.0
Fireplaces	NA	natural -	NA	3.0

FIRING RATE CALCULATIONS:

seconds req'd for dial to record 1 ft3 3352 Thousand BTU/hr Input =

actual rate - nominal rate nominal rate **¥ 100** Percentage Overfiring =

COMBUSTION VENTILATION SAFETY CHECK 1.	È
TIVERTON, DIGBY CO, NOS, 1 Completime:	<u>(</u>
CHIMNEY INSPECTION (WOODSTOVE CONNECTED TO INSIDE MASSIVEY CHIMNE) ARESULTS ALL OK NOT DONE MAINTENANCE RECOMMENDED MAINTENANCE RECOMMENDED MAINTENANCE RECOMMENDED FROBLEMS (specify A1 A2, etc.)	/
INSPECTION LIST: (FURNACE=A DHY=B FIREPLACE=C) 1 can needs repair NO CAD & lining needs repair \(\) 11 flue connector corroded 16 blower computation loose 2 clearance insufficient \(7 \) \(\frac{1 \text{lining existing lights}}{2 \text{supports inaccounts}} \) 12 deaper imbalanced \(\frac{17 \text{lilter plugged}}{18 \text{burner dirty or sooted}} \) 3 supports inaccounts \(\frac{8}{2} \) Cressote excessive \(\frac{11}{2} \) 13 hood stained or rusted \(\frac{18}{2} \) 18 hurner dirty or sooted \(\frac{1}{2} \) 10 bracked or stained \(\frac{1}{2} \) 10 flue connector loose \(\frac{15}{2} \) 15 \(\frac{14 \text{connector design problem }{19} \) 20 inlet poorly located	
FURNACE ROOM VENT/PRESSURE TEST Results ALL DK NOT DONE N/A INITIAL FAILURE Initial Fressure: FANS 2 way exhaust blower FIRE sm 1: Reduced Fressure: FANS 2 way exhaust blower FIRE sm 1: Relief Measures Taken:	
CLOSE: ext doors windows int doors ZERO SAUSZ: PREPARE SA FPL: window open chisney coen TURN OFF: furnace cilot Date stove OPERATE FANS: range stovetop air supply open firepl doors open SET UP: tubing gauge bathl bathl bathl dryst CLOSE INLETS: furnace ran house firepl vacuoa special HECK FPL SPILLAGE: (Fails? close firep CLOSE CHINNEYS: forn Date fpl daspers RECORD PRESSURES: fans on blower on OR coen window apply label FANS OFF & COVERS REMOVED: (Fails? inlets open labels applied RECORD PRESSURE: (Fails? close fireplace doors apply labels)	es.
Results ALL OK NOT DONE SLIGHT FAILURE MAJOR FAILURE Summary Describe leakage:	
CSASI COIL	
FURNACE ROOM SPILLAGE TEST Results ALL DK SFILL FAILURE DVERFIRING EXCERS CO LOW DRAFT Summary Furnace:none temporary(sec) continuous; slight major DHW: none temporary(sec) continuous; slight major Gas Furnace Firing Rate: actual nominal powerfiring CO ppm Gas DHW Firing Rate: actual nominal powerfiring CO ppm	
Dil Furnace Draft Measurement (Fascals) DXSURE COXINUED EFERATION: fans fireplaces	
FIREPLACE VENT/PRESSURE TEST Results ALL OK NOT DONE NITTIAL FAILURE Summary SML: (Fa) 4 P8/ repeated with: inlets open coors shut mm lg fpl off prepeated with: inlets open coors shut mm LGE: (Fa) repeated with: inlets open coors shut mm lg fpl off prepeated w	
DESURE CONT. OFFMATION: fans furnace DHY lg/sa fpl RECORD PRESCURE: (Fails? datarains best resected assume: RELOCATE INDOOR THE TO FIRE LACE ROOM: small large 1. com any inlets to furnace re or nouse passes PREPARE SHILS FIRE LACE: burner off air inlets open 2. close any fpl doors & relocate tubing passes Chiangy dasper closed fireplace doors open 3. shot off any other fol passes	:
CAPURE FLUES OF EN: furnace DNN stove DFEN INLES: furnace ram house crawl spc RESE: furnace pilot /therapstat DNN valve CHECK FURNACE OPERATION: full cycle flase colours fans fireplace daspers D	

FIREPLACES:

__ static pressure tip

A RECORD OF REMEDIAL ACTIONS TAKEN: Exhaust Fan Combustion air Fresh air Elower Sml Fireplace Furnace DHW LARELS AFFLIED ADVICE TO OCCUPANT Verbal Explanation Literature Referral to _ Location Today___ Koutine Uptional (Details:) TABLE 1: SUGGESTED TOOL LIST 2%5 FURNACE OR FIREPLACE ROOM TESTING: I HEAT EXCHANGER: 1 INSFECTION: __ smoke extension kit __ smoke pencil 4 CHIMNEY SPILLAGE: __ adj. mirror manometer flásh tubing & connectors " masking tape balloon. & tube ratchet - propane stave butane lighter timepiece hand pump CO tubes static pressur __ multi-screwdriver __ binoculars

__ propane stovetop butane lighter

__ propane cannister

TABLE 2 : MAXIMUM	ALLOWABLE DEP	RESSURIZA	TION (MAD Limits	,	
AFPLIANCE	IGNITION	DRAFT	TOTAL CHIMNEY HEIGHT (m)	LIMIT	
Gas-fired DHW	pilot electronic electronic	natural natural induced	NA NA NA	(Pa) 3.0 2.0 5.0	
Oil-fired DHW	electronic	natural	NA	4.0	-
5as furnace/boiler	pilot pilot electronic electronic electronic pilot	natural natural natural natural induced forcad	4848 	4.0 4.0 4.0 4.0 6.0	
Oil furnacé/boiler	electronic pilot	natural forced	NA NA	4.0 4.0	
Fireolaces	NA	natural	- NA	ತ.0	,

FIRING RATE CALCULATIONS:

tape measure

fan labels inlet labels fireplace labels

Thousand BTU/hr Input = seconds req'd for dial to record 1 ft3 352

actual rate - nominal rate nominal rate **\$ 100** Fercentage Overfiring ≥