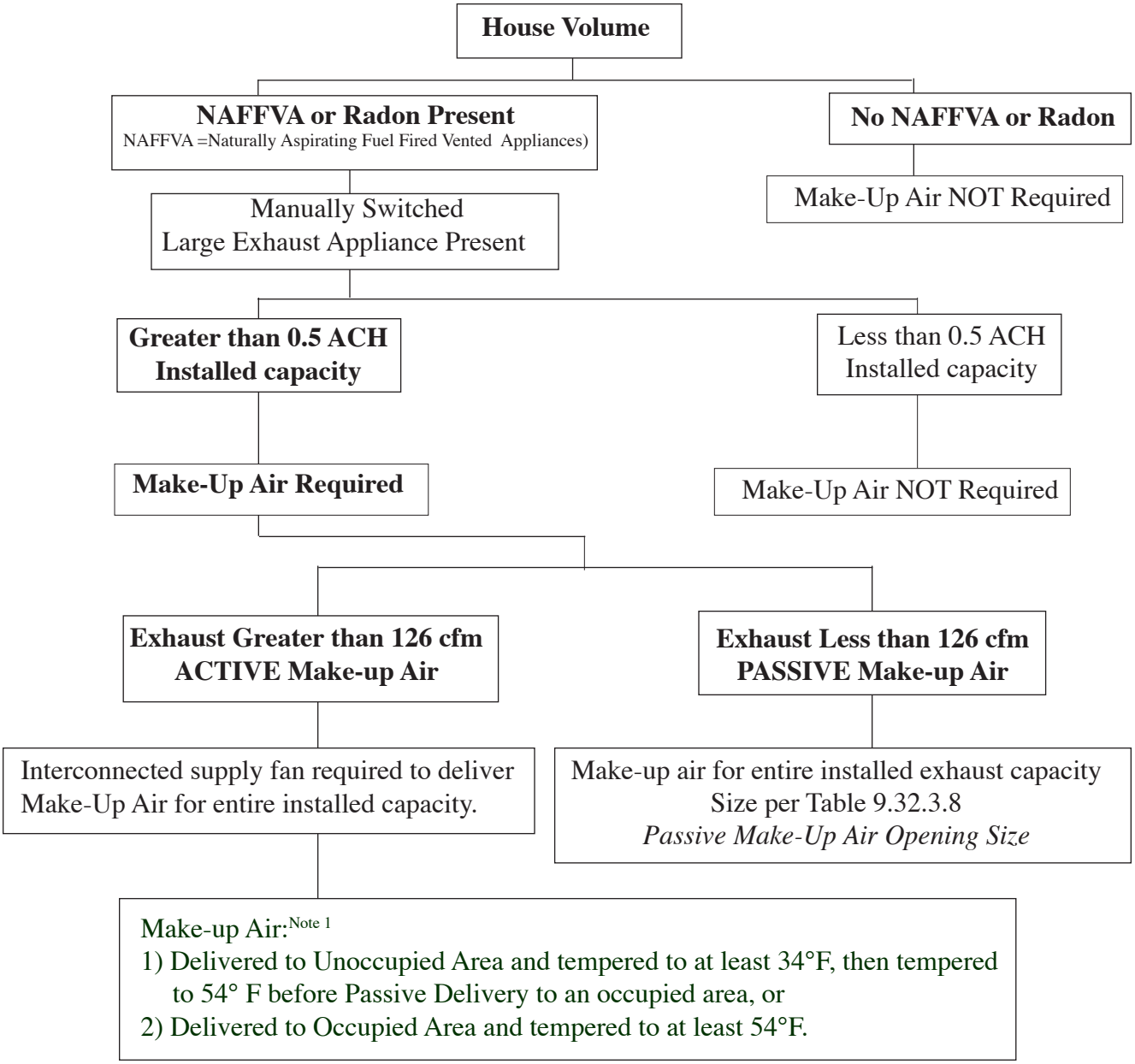
Make-Up Air For Other Exhaust Appliances

Per Code Section 9.32.4: Additional Protection Against Depressurization*

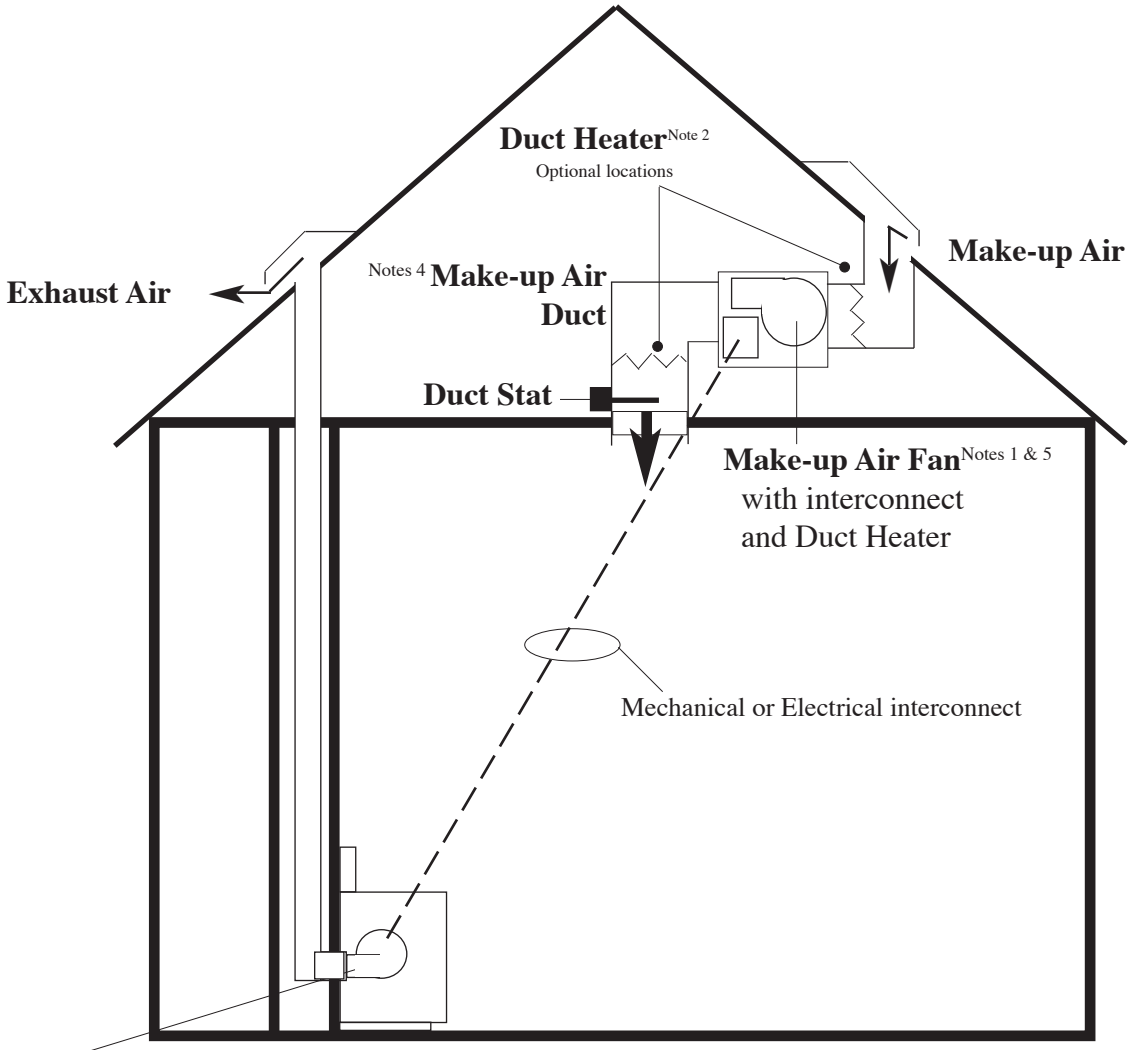
BC Building Code ERRATUM:
Section 9.32.4 Sentence 1 refers to a Sentence 8 exception. However, Sentence 8 has been removed from the Code. The Building Policy Branch has informed us the Sec 9.32.4 requirement for make-up air now applies to **solid fuel fired appliances**, formerly exempted from this requirement by Sentence 8.



Note 1: Tempering requirement of this air may in many coastal climate applications unnecessarily increase installation costs with little benefit to the occupants.

***9.32.4.2: Carbon Monoxide Alarms.** New requirements for CO detectors in *all* dwellings that contain a fuel burning appliance or a storage garage are also included in this section. Typically electricians will be installing this equipment, but may need contractor input. See Appendix Page 54-A for code wording.

Example: Active Make-up Air System



1. Select Make-up Air Fan so when installed it will equal the exhaust appliance's actual installed exhaust rate, per 9.32.4.2.(b). Interconnect with supply fan, per 9.32.4.3.
   See *Appendix: Duct Sizing for Larger Fans* for make-up air system design considerations.

2. Deliver supply make-up air to an unoccupied area of dwelling and temper to required minimum of 34°F with further tempering to 54°F before passive delivery to occupied area, or deliver directly to occupied area and temper to required minimum of 54°F, per 9.32.4.4.(a) & (b).
   See *Appendix: Duct Heater Sizing*

3. Applies to conventional overhead range hoods, down-draft cook tops and any other exhaust appliance (dryer, exhausting vacuum system, etc.) with an installed capacity exceeding 0.5 ACH when make-up air required due to Radon Gas or NAFFVA appliance present).

4. See *Appendix*: *Duct Sizing for Larger Fans* to size ducts for Make-up Air Fans.

5. Per BCBC Section 2.5 Equivalents, Sentence 2.5.1.2 (1) states: "Any person desirous of providing an equivalent to satisfy one or more of the requirements of this Code shall submit sufficient evidence to demonstrate that the proposed equivalent will provide the level of performance required by this Code." See *Appendix*: *Depressurization Test for Larger Fans*

A Mechanical Ventilation Checklist A — Non-Distributed

Use this checklist with **Non-Distributed Systems** such as those usually found in dwellings with **electric or hot water radiant or baseboard heating systems or** where duct systems do not distribute ventilation air.

Civic Address_____ Permit No._____

Number of Bedrooms		(A)	A bedroom is a room with an openable window (minimum dimensions apply), a closet and a closing interior door.
Total Interior Volume of Dwelling	ft^3		Total volume includes heated interior joist spaces and heated crawlspaces.
.5 ACH (air changes/hr) = Volume x 0.5 ÷ 60 =	cfm	(B)	Exhaust appliances exceeding .5 ACH may require make-up air.

1. Principal Fan

a) Exhaust Rate: Use the bedroom count from Box (A) above and Table 9.32.3.3.A. to determine Minimum Rate. Maximum Rate of 110 cfm if NAFFVA/Radon present.

The Principal Exhaust Fan will be controlled automatically with an interval timer OR run continuously.

Minimum required rate: **Interval Timer** **Continuous**

cfm (C) cfm (D)

b) Principal Fan CFM & Sone Rating:

Make_____ Model_____

cfm (E)

Box E Maximum allowed is **110 cfm** if Make-up Air Required in Step 4.

Sones: Interval _____ Continuous _____
Maximum rating: Interval Timer 1.5 Sones Continuous 1 Sone

Fan Location: _____

c) Principal Fan Duct Size: Use actual fan cfm in Box E above and Table 9.32.3.9.

Fan Duct size: _____ inches. Duct type: ___Smooth ___Flex

2. Required Kitchen and Bathroom Exhaust Fans:

Room	Fan Make & Model	Fan CFM		Duct Diameter (in) Table 9.32.3.9*	
		Code Req'd Min. @.2"W.C. per Table 9.32.3.3.B	actual Fan CFM @.2"W.C. per Manf. Rating	Smooth	Flex

* For fan capacities **exceeding** Table 9.32.3.9, follow manufacturer's installation instructions or use good engineering practice to size duct. See *Ventilation Guidelines* Appendix page 24-A.

Checklist A1

3. NAFFVA (Naturally Aspirated Fuel Fired Vented Appliance) **and/or Radon Gas present in dwelling unit?**

☐ **Yes, Proceed to Step 4 & 5** ☐ **No**, Omit Steps 4 to 7.

4. Passive Make-Up Air Duct for Principal Fan: Use the Box E installed cfm and Table 9.32.3.8.

Make-up air duct diameter_____inches. Location _____

5. Exhaust Appliance present which exceeds Box B 0.5 ACH:

☐ **Yes, Proceed to Step 6.** ☐ **No** such appliance. Omit Steps 6 to 7.

6. Use **Passive Make-up Air** for Exhaust Appliance with actual installed exhaust rate of **126 cfm or less:**

Appliance Cfm _____ **Passive Make-up Air Duct** Sized to Table 9.32.3.8: _____inches

7. Use **Active Make-up Air** for Exhaust Appliance with actual installed exhaust rate of **more than 126 cfm.**

Make-up Air Fan required: ***Exhaust Appliance Cfm** _____

Fan Make _____ Model _____ **Fan Cfm** _____

*Must equal actual installed exhaust rate of appliance.

Duct diameter _____inches

Fan Location _____ Fan ducted to _____

A) Active Make-up Air delivered to an Unoccupied Area (not directly to room containing the appliance).

Tempering Required per 9.32.4.1.(4)(a):

Show calculation & describe how make-up air will be tempered to at least 34°F (1°C) before entering unoccupied area.

_____

Transfer Grill Required: Size to Table 9.32.3.8 (or 1 sq in of gross area per 2 cfm):

Transfer grill size _____ sq. in. Location _____

Additional Tempering Required per 9.32.4.1.(4)(b) before transfer to occupied area: Show calculation and describe how make-up air will be further tempered to at least 54°F (12°C).

_____

B) Active Make-up Air delivered to an Occupied Area: Tempering Required. Show calculation and describe how make-up air will be tempered to at least 54°F (12°C).

_____

_____

Installer Certification: Date _____

I hereby certify that the design and installation of the ventilation system complies with the 2006 B.C. Building Code.

Print Name_____ **2006 TECA Ventilation Certification Stamp**

Signature_____

Company_____

Phone _____

Checklist A2

B

Mechanical Ventilation Checklist B—Distributed

Previously Checklist C (per former 1998 BCBC)

This Checklist is for use with **forced air heating systems** where the heating duct system distributes ventilation air.

Civic Address_____ Permit No._____

Number of Bedrooms		(A)	A bedroom is a room with an openable window (minimum dimensions apply), a closet and a closing interior door.
Total Interior Volume of Dwelling	ft^3		Total volume includes heated interior joist spaces and heated crawlspaces.
.5 ACH (air changes/hr) = Volume x 0.5 ÷ 60 =	cfm	(B)	Exhaust appliances exceeding .5 ACH may require make-up air.

1. Principal Fan

a) Exhaust Rate: Use the bedroom count from Box (A) above and Table 9.32.3.3.A. to determine Minimum Rate. (Maximum Rate of 110 cfm if NAFFVA/Radon present.)

Minimum required rate: **Interval Timer** **Continuous**

cfm (C) cfm (D)

b) Principal Fan CFM & Sone Rating:

Make_____ Model_____

cfm (E)

Box E Maximum allowed is **110 cfm** if Make-up Air Required in Step 4.

Sones: Interval _____ Continuous _____

Maximum allowed: Interval timer 1.5 sones Continuous 1 sone

Fan Location: _____

c) Principal Fan Duct Size: Use actual fan cfm in Box E above and Table 9.32.3.9 for Duct.

Fan Duct size: _____ inches. Duct type:___Smooth___Flex

2. Required Kitchen and Bathroom Exhaust Fans:

Room	Fan Make & Model	Fan CFM		Duct Diameter (in) Table 9.32.3.9*	
		Code Req'd Min. @.2"W.C. per Table 9.32.3.3.B	actual Fan CFM @.2"W.C. per Manf. Rating	Smooth	Flex

* For fan capacities **exceeding** Table 9.32.3.9, follow manufacturer's installation instructions or use good engineering practice to size duct. See *Ventilation Guidelines* Appendix page 24-A.

Checklist B1

3. NAFFVA (Naturally Aspirated Fuel Fired Vented Appliance) **and/or Radon Gas present in dwelling unit?**

☐ **Yes, Proceed to Step 4 & 5** ☐ **No**, Omit Steps 4 to 7.

4. Active Make-Up Air Duct for Principal Fan: Per Sec 9.32.3.8. (2) (b) (ii & iii) Install a 4"Ø outdoor air duct into the furnace return air plenum not more than 15ft (unless a flow control device is used) or less than 10ft from the furnace cabinet. In locations with winter design temperature less than –10° C, this duct must have a motorized damper interconnected with principal ventilation air fan. **Interconnect in place:** Prinicipal Fan & Furnace Blower ☐ Yes

Damper make _____ Voltage_____ & Damper (if present) ☐ Yes

5. Exhaust Appliance present which exceeds Box B 0.5 ACH:

☐ **Yes, Proceed to Step 6.** ☐ **No** such appliance. Omit Steps 6 to 7.

6. Use **Passive Make-up Air** for Exhaust Appliance with actual installed exhaust rate of **126 cfm or less:**

Appliance Cfm _____ **Passive Make-up Air Duct** Sized to Table 9.32.3.8: _____inches

7. Use **Active Make-up Air** for Exhaust Appliance with actual installed exhaust rate of **more than 126 cfm.**

Make-up Air Fan required: ***Exhaust Appliance Cfm** _____

Fan Make _____ Model _____ **Fan Cfm** _____

*must equal actual installed exhaust rate of appliance.

Duct diameter _____inches

Fan Location _____ Fan ducted to _____

a) Active Make-up Air delivered to an Unoccupied Area (not directly to room containing the appliance).

i) Tempering Required per 9.32.4.1.(4)(a):

Show calculation & describe how make-up air will be tempered to at least 34°F (1°C) before entering unoccupied area.

_____

ii) **Transfer Grill Required:** Size to Table 9.32.3.8 (or 1 sq in of gross area per 2 cfm):

Transfer grill size _____ sq. in. Location _____

iii) **Additional Tempering Required per 9.32.4.1.(4)(b) before transfer to occupied area:** Show calculation and describe how make-up air will be further tempered to at least 54°F (12°C).

_____

OR b) Active Make-up Air delivered to an Occupied Area: Tempering Required. Show calculation and describe how make-up air will be tempered to at least 54°F (12°C).

_____

_____

Installer Certification: Date _____

I hereby certify that the design and installation of the ventilation system complies with the 2006 B.C. Building Code.

Print Name_____ **2006 TECA Ventilation Certification Stamp**

Signature_____

Company_____

Phone _____

Checklist B2

C Mechanical Ventilation Checklist C—Distributed or Non-Distributed

Use this checklist when a centrally ducted exhaust ventilation systems such as an HRV (heat recovery ventilator or a CEV (central exhaust ventilator) is used to meet principal fan requirements.

Civic Address_____ Permit No._____

Number of Bedrooms		(A)	A bedroom is a room with an openable window (minimum dimensions apply), a closet and a closing interior door.
Total Interior Volume of Dwelling	ft^3		Total volume includes heated interior joist spaces and heated crawlspaces.
.5 ACH (air changes/hr) = Volume x 0.5 ÷ 60 =	cfm	(B)	Exhaust appliances exceeding .5 ACH may require make-up air.

1. Use the bedroom count from Box (A) above and Table 9.32.3.3.A. to determine the minimum Principal Exhaust Rate provided by the system.

Minimum Required Rate: cfm (C)

2. HRV or CEV **Equipment**: Make_____ Model _____

3A. HRV Capacity: CFM @.4"W.C. Box D must meet Box C Minimum Requirement. cfm (D)

3B. CEV Capacity: CFM @.4"W.C. Box E must meet Box C Minimum Requirement. cfm (E)

a) The fan must be controlled either with an interval timer or run continuously:

☐ Continuous Operation ☐ Intermittent Operation

b) The Principal Fan Rate may be set lower than its full Box E Capacity if installation is in a NAFFVA home where the principal fan cfm rate must not exceed 110 cfm per 9.32.3.3.(2). If this applies, indicate fan cfm setting in Box F.

Box F must meet Box C Minimum Requirement. cfm (F)

4. Required Kitchen and Bathroom Exhaust:

ROOM	EXHAUST RATE Required per Table 9.32.3.3.B	EXHAUST EQUIPMENT				
		Additional WALL/CEILING FANS				HRV/CEV
		Make & Model	CFM@.2" Manf. Rated	*Duct Dia (in) smooth	*Duct Dia (in) flex	Exhaust CFM
				TOTAL (Box D or E)		

* Use Table 9.32.3.9. For fan capacities **exceeding** Table 9.32.3.9, follow manufacturer's installation instructions or use good engineering practice to size duct. See *Ventilation Guidelines* Appendix pg 24-A.

Checklist C1

5. NAFFVA (Naturally Aspirated Fuel Fired Vented Appliance) **and/or Radon Gas present in dwelling unit?**

☐ **Yes, Proceed to Step 6 if CEV or Step 7 if HRV.** ☐ **No**, Omit Steps 6 to 9.

6. CEV only—Make-Up Air Duct for Principal Fan: Choose (a) or (b) and proceed to Step 7.

☐ **a) Non-Distributed system—Passive make-up air duct:** Use Box E or F installed cfm and Table 9.32.3.8.

Make-up air duct diameter_____inches. Location _____

☐ **b) Distributed system—Active Make-Up Air Duct for Principal Fan: Per Sec 9.32.3.8. (2) (b) (ii & iii)**
Install a 4"Ø outdoor air duct into the furnace return air plenum not more than 15ft (unless a flow control device is used) or less than 10ft from the furnace cabinet. In locations with winter design temperature less than –10° C, this duct must have a motorized damper interconnected with principal ventilation air fan.

Interconnect in place: Prinicipal Fan & Furnace Blower ☐ Yes
Damper make _____ Voltage_____ & Damper (if present) ☐ Yes

7. Exhaust Appliance present which exceeds Box B —0.5 ACH:

☐ **Yes, Proceed to Step 8.** ☐ **No** such appliance. Omit Steps 8 to 9.

8. Use **Passive Make-up Air** for Exhaust Appliance with actual installed exhaust rate of **126 cfm or less:**

Appliance Cfm _____ **Passive Make-up Air Duct** Sized to Table 9.32.3.8: _____inches

9. Use **Active Make-up Air** for Exhaust Appliance with actual installed exhaust rate of **more than 126 cfm.**

Make-up Air Fan required: ***Exhaust Appliance Cfm** _____
Fan Make _____ Model _____ **Fan Cfm** _____
Duct diameter _____inches
*must equal actual installed exhaust rate of appliance.
Fan Location _____ Fan ducted to _____

a) Active Make-up Air delivered to an Unoccupied Area (not directly to room containing the appliance).

i) **Tempering Required per 9.32.4.1.(4)(a):**
Show calculation & describe how make-up air will be tempered to at least 34°F (1°C) before entering unoccupied area.

_____

ii) **Transfer Grill Required:** Size to Table 9.32.3.8 (or 1 sq in of gross area per 2 cfm):

Transfer grill size _____ sq. in. Location _____

iii) **Additional Tempering Required per 9.32.4.1.(4)(b) before transfer to occupied area:** Show calculation and describe how make-up air will be further tempered to at least 54°F (12°C).

_____

OR b) Active Make-up Air delivered to an Occupied Area: Tempering Required. Show calculation and describe how make-up air will be tempered to at least 54°F (12°C).

Installer Certification: Date _____

I hereby certify that the design and installation of the ventilation system complies with the 2006 B.C. Building Code.

Print Name_____ **2006 TECA Ventilation Certification Stamp**

Signature_____

Company_____

Phone _____

Checklist C2