APPENDIX E (IFGC)

WORKSHEET E-1

Residential Combustion Air Calculation Method
(for Furnace, Boiler, and/or Water Heater in the Same Space)

Step 1: Complete vented combustion appliance information.

Furnace/Boiler:

_____ Draft Hood (Not fan assisted) _____ Fan Assisted & Power Vent _____ Direct Vent Input: _____ Btu/hr

Water Heater:

_____ Draft Hood (Not fan assisted) _____ Fan Assisted & Power Vent _____ Direct Vent Input: _____ Btu/hr

Step 2: Calculate the volume of the Combustion Appliance Space (CAS) containing combustion appliances.

The CAS includes all spaces connected to one another by code compliant openings. CAS volume: _____ ft^3

Step 3: Determine Air Changes per Hour (ACH)[1]

Default ACH values have been incorporated into Table E-1 for use with Method 4b (KAIR Method). If the year of construction or ACH is not known, use Method 4a (Standard Method).

Step 4: Determine Required Volume for Combustion Air.

4a. Standard Method.

Total Btu/hr input of all combustion appliances (DO NOT COUNT DIRECT VENT APPLIANCES) Input: _____ Btu/hr

Use Standard Method column in Table E-1 to find Total Required Volume (TRV) TRV: _____ ft^3

If CAS Volume (from Step 2) ***is greater than*** TRV then no outdoor openings are needed.

If CAS Volume (from Step 2) ***is less than*** TRV then go to **STEP 5.**

4b. Known Air Infiltration Rate (KAIR) Method.

Total Btu/hr input of all fan-assisted and power vent appliances (DO NOT COUNT DIRECT VENT APPLIANCES) Input: _____ Btu/hr

Use Fan-Assisted Appliances column in Table E-1 to find Required Volume Fan Assisted (RVFA) RVFA: _____ ft^3

Total Btu/hr of all Non-Fan-Assisted Appliances Input: _____ Btu/hr

Use Non-Fan-Assisted Appliances column in Table E-1 to find Required Volume Non-Fan-Assisted (RVNFA) RVNFA: _____ ft^3

Total Required Volume (TRV) = RVFA + RVNFA RV = _____ + _____ = _____ ft^3

If CAS Volume (from Step 2) ***is greater than*** TRV then no outdoor openings are needed.

If CAS Volume (from Step 2) ***is less than*** TRV then go to STEP 5.

(continued)

WORKSHEET E-1—(continued)

Residential Combustion Air Calculation Method
(for Furnace, Boiler, and/or Water Heater in the Same Space)

Step 5: Calculate the ratio of available interior volume to the total required volume.

Ratio = CAS Volume (from Step 2) ***divided by*** TRV (from Step 4a or Step 4b) — Ratio = _____ / _____ = _____

Step 6: Calculate Reduction Factor (RF).

RF = 1 ***minus*** Ratio — RF = 1 – _____ = _____

Step 7: Calculate single outdoor opening as if all combustion air is from outside.

Total Btu/hr input of all Combustion Appliances in the same CAS (EXCEPT DIRECT VENT) — Input: _____ Btu/hr

Combustion Air Opening Area (CAOA):

Total Btu/hr ***divided by*** 3000 Btu/hr per in^2 — CAOA = _____ / 3000 Btu/hr per in^2 = _____ in^2

Step 8: Calculate Minimum CAOA.

Minimum CAOA = CAOA ***multiplied by*** RF — Minimum CAOA = _____ × _____ = _____ in^2

Step 9: Calculate Combustion Air Opening Diameter (CAOD).

CAOD = 1.13 ***multiplied by the square root of*** Minimum CAOA — CAOD = 1.13 Minimum CAOA = _____ in

[1]If desired, ACH can be determined using ASHRAE calculation or blower door test. Follow procedures in Section G304.