1 **COMBUSTION**
VENTILATION
AND
DILUTION AIR
Presented by Anthony F. Gargani

2 **REGULATIONS**
- NJ Administrative Code 5:23 (UCC)
- International Fuel Gas Code (IFGC) All Code Sections are in [brackets]
- International Residential Code NJ
- Manufacturer's Specifications

3 **Responsibility for Combustion Air**
- 5:23-3.4(a) 5 Mechanical Subcode Ch. 7(All):
  Plan Review and Inspection- Fire
- 5:23-3.4(a) 6 One & Two Family Ch. 17(All) and Ch. 24-G2407:
  Plan Review and Inspection- Plumbing
- 5:23-3.4(a) 7 Fuel Gas Subcode Ch. 3- 304:
  Plan Review and Inspection- Fire

4 **APPLIANCES AFFECTED (1)**
[304]

Vented Category I Appliances
Definition: An appliance that operates with a non-positive vent static pressure, and that avoids excessive codensation (moisture) in the vent (this includes draft-hood and fan-assisted appliances)

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5 **APPLIANCES AFFECTED (2)**
[305]
- 2. Appliances listed as requiring combustion air by the conditions of listing and the manufacturer.
  Review the installation manual and check the job for compliance.

6 **Correct Air Supply Will Ensure**

- 1. Complete combustion
- 2. Ventilation of the utility room
- 3. Dilution of the flue gasses
- 4. Draft of chimneys.

All of which are essential to protect
life and property

7 **Incomplete Combustion Danger (1)**
- 1. Life-threatening carbon monoxide poisoning.
- 2. Condensation that will rot vents and cause hazardous toxic products of combustion to enter living areas.

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8 **Incomplete Combustion Danger (2)**
- 3. Malfunctioning appliances

- 4. Void Warrantees
- 5. Excessive heat build-up that will promote Pyrolysis: The thermo-chemical decomposition of organic materials, at elevated temperatures. This can cause fires.

9 **Get the Job Off to a Good Start**

- Get compliance with the regulations with an eraser and a pencil, rather than with a red sticker and a sledge hammer.
- Avoid releasing any applications that could result in a failed inspection.

10 **Get the job off to a good start**

- Avoid misunderstandings.
- Issue permits with clear and compliant plans and specs to protect: life, health and property.
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11 **THERE ARE FIVE BASIC METHODS OF SUPPLYING COMBUSTION AIR (1)**

- 1 The Standard Method
- 2. The Known Air Infiltration Method
- 3. Indoor Air From Adjoining Spaces

12 **Methods of Obtaining Combustion Air (2)**

- 4. Outdoor Air (including mechanical)
- 5. Engineered Air
- These methods may be combined in order to fit job conditions
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13 **STANDARD COMBUSTION AIR METHOD (1)**

For buildings of not unusually tight construction

- 1.For Category I Appliances; or any appliance, which has combustion air requirements specified in the installation book .

14 **Standard Combustion Air Method(2)**

2. If the enclosure has at least 50 Cu. Ft. for every 1,000 BTU input of the appliances in it, it will meet the requirements for combustion air [304.5.1]

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15 **Standard Combustion Air Method(3)**

3. If the enclosure doesn't have enough space, then air must be added. A plan is required for review.

16 **Adding Indoor Combustion Air**
General Conditions (1) [304.5.3.1]

1. It is prohibited to obtain air from bedrooms, a room with a toilet in it, a garage, or a surgical room[303.3]

17 **Adding Indoor Combustion Air**
General Conditions (2)

- 2. The total cu. ft. of the utility room and adjoining spaces--- must equal the space required to provide combustion air.
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18 **Adding Indoor Combustion Air**

General Conditions (3)

3. Two openings are required:
   One commencing within 12" of the ceiling and one commencing within 12" of the floor. In order
   to promote air circulation (aka thermo-siphon airflow).

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19 **Adding Indoor Combustion Air**
General Conditions (4)

- 4. *Each* opening shall provide a *net* open area of 1 sq. in. per 1,000 Btu, or a minimum of 100 net sq. in. (whichever is greater)[304.10]

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20 **Adding Indoor Combustion Air**
General Conditions (5) Louvers

5. The net area of a wood louver is .25 of the gross. The net area of a metal louver is .75 of the gross.
   10x10x.75= 75 sq. in. net

21 **Adding Indoor Combustion Air**
General Conditions (6) Louvers

- 6. On a 6'8" wood louver door; the top louver will not commence within 12" of a 8' ceiling

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22 **Adding Indoor Combustion Air**
General Conditions (7) Louvers

- 7. The minimum dimension of a opening can't be less than 3."
- *A metal louver 3" wide would have to be 48" long.*
  3"x48"x.75=108 net sq. in.

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23 **INDOOR COMBUSTION AIR**
STANDARD METHOD CONDITIONS

- Refer to Section [304] for other options and details. Let the installer select his options. He knows the details of the job and he has to work out the details with his clients.
- Always get the design in writing and review it. Never design anything .

24 **REVIEW AND RELEASE PLANS**
NEVER DESIGN OR APPROVE

- Refer the applicant/installer to IFGC Section 304.
- Let them choose the option that works for their client and the job.
- Review the plan that they submit.

25 **EXAMPLE 1**

A 75,000 BTU boiler and 50,000 BTU water heater are in a 40x22 x 8 foot basement:
75,000 +50,000 =125,000 BTU
125,000/1,000 BTU x 50 cu ft=
6,250 cu ft Required

40'x22'x8'= 7,040 cu ft Available
The enclosure meets the minimums.

26 **EXAMPLE 2**

- A permit application is received to finish the basement in Example 1.
- The finished area is 30'x22'x8'. The utility room is 10'x22'x8' with 1,760 cu ft
- Since 6,250 cu ft is required, air must be added.

27 **Example 2 (continued)**
Indoor air from adjoining spaces

- [304.5.3.1] Air From the Same Story:
- Two openings each with a net area of 1 sq in. per 1,000 BTU are required.
- 125,000 BTU/1,000 sq in = 125 sq in. net is required

28 **Example 2 (continued)**

- 125 sq in net is required
- Two 16"x12" metal louvers are proposed
- 16"x12"x.75=144 net
- Two 16"x12" louvers will be compliant

29 **PROTECT HEALTH AND PROPERTY**
1. Get the permit application right

1. If the initial submittal isn't right, help them to meet the minimums.
2. Issue all inquiries for information, or clarification in writing. Be professional.
3. Avoid "*finger point engineering*" especially over the telephone.
4. Get written revisions, clarification and information on all inquiries

30 **PROTECT HEALTH AND PROPERTY**
2. ISSUE A GOOD PERMIT

- 1. Release plans for construction that are clear and compliant with the regulations
- 2. Require released plans to be on the job (It is easier to sell the red sticker, if you can point out that the job was not built according to the plans released).

31 **PROTECT HEALTH AND PROPERTY**
3. Safety is non-negotiable

- 1. Check the job as built for conformity with the plans released.
- 2. Check for compliance with the codes.
- 3. Check for compliance with the installation manual of the manufacturer. It will have the conditions of listing and critical safety items.
- 4. "Deer in the headlight " excuses are not acceptable. A Heads-Up Handout may help.