AIA AND CODE ENFORCEMENT CONNECT

Patrick G. Granson
Director of Code Enforcement
Mecklenburg County

May 8, 2019
1. Introductions

2. Agenda Overview
   a. AIA and Code Enforcement Opening
   b. Code Enforcement Departmental Work
   c. Inspections Update and Reorganization
   d. Technology Update
   e. Code Changes and Challenges
   f. Q&A

3. Adjourn
AIA AND CODE ENFORCEMENT OPENING

VISION STATEMENT

Partnering with our customers to efficiently, effectively and collaboratively build a safe and thriving community.
Roles and Responsibilities of Code Enforcement

- The **Code Enforcement** business unit, provides services for a safe, healthy environment to live and work. It protects life and property, it promotes health, safety, and welfare through the administration and enforcement of the N.C. State Building Code and local ordinances.

- LUESA Code Enforcement is a **Continuous Development Organization**; always looking for new ways to streamline services to enhance the customer experience.

- The Building Development Commission (BDC) is made up of 14 industry members who meet monthly to review overall **operations and community feedback**.
AIA AND CODE ENFORCEMENT OPENING

The Building Development Commission (BDC) and what they do for Code Enforcement.

<table>
<thead>
<tr>
<th>BDC Members</th>
<th>Representing Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaron Moody, BDC Chair</td>
<td>Charlotte Chamber</td>
</tr>
<tr>
<td>John Taylor, Vice-Chair</td>
<td>Associated Builders and Contractors, Inc.</td>
</tr>
<tr>
<td>Zeke Acosta</td>
<td>Charlotte Heating &amp; Air Contractors Assoc.</td>
</tr>
<tr>
<td>Glenn Berry</td>
<td>AIA</td>
</tr>
<tr>
<td>Tom Brasse</td>
<td>Home Builders Association of Charlotte</td>
</tr>
<tr>
<td>*Brandon Brown</td>
<td>Public Representative</td>
</tr>
<tr>
<td>*Vince Busby</td>
<td>NARI</td>
</tr>
<tr>
<td>Melanie Coyne</td>
<td>Public Representative</td>
</tr>
<tr>
<td>*Elizabeth Frere</td>
<td>NC Chapter of the American Society of Landscape Architects</td>
</tr>
<tr>
<td>Andrew Kennedy</td>
<td>PENC</td>
</tr>
<tr>
<td>Rodney Kiser</td>
<td>Charlotte Area Association of Electrical Contractors</td>
</tr>
<tr>
<td>Terry Knotts</td>
<td>Charlotte Chamber - Small Business</td>
</tr>
<tr>
<td>Paul Stefano</td>
<td>Charlotte Plumbing, Heating &amp; Cooling Association</td>
</tr>
<tr>
<td>Michael Stephenson</td>
<td>Greater Charlotte Apartment Association</td>
</tr>
</tbody>
</table>

*indicates new member
FY18 Volume of Work Performed
- 306,000 inspections performed
- 106,000 permits issued
- TIP permitting issued approx. 30,000 permits
- Plan Review met goals of 5 - 15 - 20
- Phone call answer rates at or above 90%
- Expenses were 40%
- Revenue was 10%
CODE ENFORCEMENT DEPARTMENTAL WORK

**FY20 BUDGET**

- $33.7 million
- 278 FTEs
- Heavy in technology
- EPS/EPR replacement
- Health study
- Re-organization of service delivery
- Capital expenditures (vehicles and hardware)
- No permit fee increase - (7 years)
FUTURE STATE
- Core service appears to be strong in all areas.
- Maintain growth and development strategies for in-house training.
- Focus on service delivery in Commercial and Residential to meet inspection response times (IRT), plan review, and customer service goals.

VARIABLES
- Building Code Council - (Code Changes)
- Legislation
- Legislation (different type experience)

  - HB 858 - Designer Bill
  - HB 675 - Building Code Regulation Reform
  - HB 873 - System Development Fee
  - SB 355 - Land - Use Regulation Changes
  - SB 566 - Fireworks
  - HB 730 - Trash Bill
  - SB 638 - DOA / DOI Fire Inspection for Public Owned Buildings
  - HB 448 - Reorganize, consolidate, and modernize local planning and development regulations
• Other items of interest:
  • UDSC Work
  • Affordable Housing
  • Web Site Design

• Today’s theme:
  • Directly or indirectly relating to all projects
  • All linked to code compliance
INSPECTIONS UPDATE AND REORGANIZATION

DAVID A. GIESER, AIA
DIRECTOR OF INSPECTIONS
MECKLENBURG COUNTY
CODE ENFORCEMENT DEPARTMENTAL WORK

INSPECTIONS UPDATES

- Inspections Volume
- New Team – Residential Multi-Trade
  - New Management
- Changes to Inspections Priorities
- Special Projects
- Mecklenburg County Fire Marshal
- Issues/Challenges
INSPECTIONS UPDATE AND REORGANIZATION

Inspections Volume

- Inspections/Month
- Inspections Per Year

Mecklenburg County NC.gov
INSPECTIONS UPDATE AND REORGANIZATION

Clay Goodman

Jimmy Kluttz
INVESTIGATIONS UPDATE AND REORGANIZATION

Mecklenburg County
Land Use and Environmental Services
2145 Suttle Avenue
Charlotte, NC 28208
(980) 314-CODE (2633)

Building Permit
One/Two Family

Inspection Team

Your project has been assigned to the Residential Inspection Team.
Your assigned Project Manager: Griffin, Jeff

The Residential Team management also includes the following Inspection Supervisors:

Building Supervisor: Burgin, Brandon
Electrical Supervisor: Kale, Michael
Mechanical Supervisor: Barrett, Dave
Plumbing Supervisor: Barrett, Dave

To contact your project manager, inspection supervisor or obtain inspection assistance with your project, call 980-314-3134.
INSPECTIONS UPDATE AND REORGANIZATION

409

Please post this sign on a window so that it is visible from the street. Failure to do so may delay inspections. For inspections call (704) 336-8000

Mecklenburg County
Building Document

Inspection Approvals
Inspector Signature and Date of Approval where applicable
This page is for one and two family projects only including townhouses
Page must be posted on site and accessible

Building
B3502047
Detached Garage
FT: _____ SL: _____ FR: _____ FI: _____
FD: _____ MS: _____ IN: _____

Electrical
E3502451
Detached Garage
SS: _____ SL: _____ RF: _____ SP: _____
TP: _____ FI: _____

Contractor should always verify each required inspection result from their dashboard before proceeding, for more information on your project, scan the respective QR code above.
INSPECTIONS

Special Projects Team
Mecklenburg County Fire Marshal
• Cover 6 Towns and VFD’s
• Recurring Inspections
• Construction Inspections
• Education
• Fire Investigations
CHALLENGES

• Inspections Volume
• Recruitment
• Legislative Changes
Fire Marshal changes

Load Balancing for Inspectors
QR code on permit

Code year on CO

DOI Framing Report

RDP Inspections
Transaction code creation
Rough Inspections

Email notifications to owners
EPM changes
LUESA Groundwater
LUESA Land Development
LUESA Storm water
LUESA Water Quality
Mint Hill Planning
CMUD Backflow Prevention
CLT Water Donated Projects

EHS Private Wells & Wastewater
County Storm Water Land Development
County Storm Water Floodplain
County Storm Water Quality Buffer
Mint Hill Zoning/ Planning
CLTWTR Backflow Prevention
CLTWTR IDS
TECHNOLOGY UPDATE
SIGN PERMIT AUTOMATION
TECHNOLOGY UPDATE
HUNTERSVILLE CHANGES

Huntersville Planning Department
704-875-7000

https://www.Huntersville.org/228/Planning-Department
Customer determines which stream they will enter and packages accordingly.

EPM
- Scheduling/Controlling
- Plan Review
- Agency Reviews
- Permitting

Winchester
- Facilitation/Controlling
- Plan Review
- Agency Reviews

Permits Issued
- On Schedule
- CTAC
- Residential
- Townhomes
- Special Projects
- Mega M Family

Submittal will be evaluated for completeness and be routed to appropriate team for scheduling/plan review.

Plan Review performed – mechanics of plan review should be the same in each process.
TECHNOLOGY UPDATE
ACCELA

Key Milestones:

2017
Documentation of Current State, desired Future State

Spring 2018
Transition team worked to develop high level design of system and identify key touchpoints

Fall 2018
Small team group teams worked to define the high level design with detailed process requirements

Winter 2019
ACCELA and Mecklenburg County met to determine how the software would address the needs of the business.
TECHNOLOGY UPDATE
ACCELA

- Review Business Process
- Solution Approval
- Application Overlay
- Gap Defined
- Solution Defined
Gaps have been identified, timelines to be developed, programming will begin

Work with ITS and ACCELA as workflows are programmed into the system

As modules are complete, begin testing by staff and developing training guides

Industry training to be held
Staff training to continue

Celebrate!
CODE CHANGES AND CHALLENGES

JEFF D. VERNON
BUILDING CODE ADMINISTRATOR
MECKLENBURG COUNTY
CODE CHANGES AND CHALLENGES
CODE ISSUES OF MAJOR IMPACT

2018 NC Building Code
1. Major Building Code impact issues:
   a. Appendix B
      1. Life Safety plan
      2. Minimum Submittal Guidelines
   b. Energy Code changes
   c. Special Inspections
2018 APPENDIX B

- Why is it called Appendix B?
- Mandatory for all jurisdictions
- Cannot be changed without permission from the Building Code Council
- Reduced down to nine sheets instead of twelve
  - Assumes the “missing” information will be supplied on other plan sheets
  - Requires more communication through other means now

HTTPS://CODES.ICCSAFE.ORG/CONTENT/NCAPC2018
WHERE CAN I FIND A COPY?

- **Office of State Fire Marshal**
  - OSFM / Engineering and Codes Division / Code Enforcement Resources / Design Tools
  - OSFM / Engineering and Codes Division / State Building Codes / Resources / codes.iccsafe.map / NC / 2018 NCACAP

- **Mecklenburg County Code Enforcement**
  - Mecklenburg County NC / LUESA / Code Enforcement / Customer Tools / Forms
Some Areas Have Been Expanded While Others Have Been Greatly Reduced

<table>
<thead>
<tr>
<th>2018 NC BUILDING CODE:</th>
<th>☐ New Building</th>
<th>☐ Addition</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018 NC EXISTING BUILDING CODE:</td>
<td></td>
<td></td>
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<tr>
<td>(check all that apply)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSTRUCTED: (date)</td>
<td></td>
<td>CURRENT USE(S) (Ch. 3):</td>
</tr>
<tr>
<td>RENOVATED: (date)</td>
<td></td>
<td>PROPOSED USE(S) (Ch. 3):</td>
</tr>
<tr>
<td>OCCUPANCY CATEGORY (Table 1604.5):</td>
<td>Current:</td>
<td>Proposed:</td>
</tr>
</tbody>
</table>

- Shell/Core
- 1st Time Interior Completions
- Phased Construction—Shell Core
- Prescriptive
- Alteration Level I
- Historic Property
- Repair
- Alteration Level II
- Alteration Level III
- Chapter 14
- Change of Use
- Alteration Level IV

<table>
<thead>
<tr>
<th>BASIC BUILDING DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Type:</td>
</tr>
<tr>
<td>(check all that apply)</td>
</tr>
<tr>
<td>Sprinklers:</td>
</tr>
<tr>
<td>Standpipes:</td>
</tr>
<tr>
<td>Primary Fire District:</td>
</tr>
<tr>
<td>Special Inspections Required:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flood Hazard Area:</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ No</td>
</tr>
</tbody>
</table>
MUST BE FILLED OUT COMPLETELY!

LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: _______________________

☐ Fire and/or smoke rated wall locations (Chapter 7)
☐ Assumed and real property line locations (if not on the site plan)
☐ Exterior wall opening area with respect to distance to assumed property lines (705.8)
☐ Occupancy Use for each area as it relates to occupant load calculation (Table 1004.1.2)
☐ Occupant loads for each area
☐ Exit access travel distances (1017)
☐ Common path of travel distances [Tables 1006.2.1 & 1006.3.2(1)]
☐ Dead end lengths (1020.4)
☐ Clear exit widths for each exit door
☐ Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.3)
☐ Actual occupant load for each exit door
☐ A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
☐ Location of doors with panic hardware (1010.1.10)
☐ Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
☐ Location of doors with electromagnetic egress locks (1010.1.9.9)
☐ Location of doors equipped with hold-open devices
☐ Location of emergency escape windows (1030)
☐ The square footage of each fire area (202)
☐ The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
☐ Note any code exceptions or table notes that may have been utilized regarding the items above

MUST BE FILLED OUT COMPLETELY!
LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: L-1

- Fire and/or smoke rated wall locations (Chapter 7)
- Assumed and real property line locations
- Existing structures within 30’ of the proposed building (see Note 1 below)
- Occupancy types for each area as it relates to occupant load calculation (Table 1004.1.1)
- Occupant loads for each area
- Exit access travel distances (1016)
- Common path of travel distances (1014.3 & 1028.8)
- Dead end lengths (1018.4)
- Clear exit widths for each exit door
- Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.1)
- Actual occupant load for each exit door
- A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation (N/A)
- Location of doors with panic hardware (1008.1.10) (N/A)
- Location of doors with delayed egress locks and the amount of delay (1008.1.9.7) (N/A)
- Location of doors equipped with hold-open devices
- Location of emergency escape windows (1029) (N/A)
- The square footage of each fire area (902)
- Note any code exceptions or table notes that may have been utilized regarding the items above (N/A)

Note 1: There are no structures within 30’ of this building.

Just add a note under the table: “Not Applicable” is an acceptable answer.
Plans Submittal Requirements for Commercial Projects
ENERGY SUMMARY

ENERGY REQUIREMENTS:
The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Existing building envelope complies with code: Select one

Exempt Building: Select one Provide code or statutory reference:

Climate Zone: Select one

Method of Compliance: Select one
(If “Other” specify source here)

THERMAL ENVELOPE (Prescriptive method only)

Roof/ceiling Assembly (each assembly)
  Description of assembly: __________________________
  U-Value of total assembly: __________
  R-Value of insulation: __________
  Skylights in each assembly: __________
    U-Value of skylight: __________
    total square footage of skylights in each assembly: __________

Exterior Walls (each assembly)
  Description of assembly: __________________________
  U-Value of total assembly: __________
  R-Value of insulation: __________
  Openings (windows or doors with glazing)
ENERGY CODE CHANGES

What changes have been made to the book?
What happened to ComCheck and ReCheck?
What are the paths to code compliance under this code cycle?

Note: 2018 NC Energy Conservation Code does not apply to buildings with a primary occupancy of F, S or U
2018 NC ECC

The book is split into two parts. The first half is dedicated to commercial buildings in general, (pgs. C-1 – C-92) whereas the second half covers residential structures (pgs. R-1 – R-76)

Reminder - The 2018 NC Energy Conservation Code does not apply to buildings with a primary occupancy of F, S or U
STRUCTURE OF THE 2018 NCECC

Commercial Section
Ch. 1 Scope and Application / Admin & Enforcement
Ch. 2 Definitions
Ch. 3 General Requirements
Ch. 4 Commercial Energy Efficiency
Ch. 5 Existing Buildings – NEW
Ch. 6 Referenced Standards
Appendices
Index

Residential Section
Ch. 1 Scope and Application / Admin & Enforcement
Ch. 2 Definitions
Ch. 3 General Requirements
Ch. 4 Residential Energy Efficiency
Ch. 5 Existing Buildings – NEW
Ch. 6 Referenced Standards
Appendices
Index
CHAPTER 4 COMMERCIAL ENERGY EFFICIENCY

As written in the 2018 NCECC:

• **C401.2 Application.**
  Commercial buildings shall comply with one of the following:

1. The requirements of ANSI/ASHRAE/IESNA 90.1-2013.
2. The requirements of Sections C402 through C405. In addition,
   • commercial buildings shall comply with Section C406 and
   • tenant spaces shall comply with Section C406.1.1.
3. The requirements of Sections C402.5, C403.2, C404, C405.2, C405.3, C405.5, C405.6 and C407.
   • The building energy cost shall be equal to or less than 85 percent of the standard reference design building.

• **North Carolina specific COMcheck or ASHRAE 90.1-2013 COMcheck shall be permitted to demonstrate compliance with this code.**
North Carolina Specific

HOWEREVER,
APPROVED PATHS TO COMPLIANCE

Commercial Provisions
- ASHRAE 90.1 – 2013
  - Must be followed for all systems
- Prescriptive Code
  - Sections C402 – C405
- Performance - AMM
  - Energy Cost Modeling (Section C407)
- ComCheck
  - ASHRAE 90.1-13, or
  - 2015 IECC only
  - There will be no ComCheck version for the 2018 NCECC

Residential Provisions
- Energy Rating Index (ERI)
  - Section R406
    - ANSI RESNET ICC Std. 301-2014
- Prescriptive Code
  - Sections R401 – R404
- Performance - AMM
  - Section R405 & Mandatory provisions of R401 – R404
- ResCheck
  - 2015 IECC only
  - There will be no ResCheck version for the 2018 NCECC
CHAPTER 4 COMMERCIAL ENERGY EFFICIENCY

ASHRAE 90.1 - Prescriptive

1. ASHRAE 90.1-2013

2. 2018 NCECC - Prescriptive
   - C402 - Envelope
   - C403 - Mechanical
   - C404 - SWH
   - C405 - Lighting
   - Pick One
     - C406.2 – Eff. HVAC Performance
     - OR
     - C406.3 – Reduced Lighting Power Density
     - OR
     - C406.4 – Enhanced Lighting Controls
     - OR
     - C406.5 – On-Site Supply of Renewable energy
     - OR
     - C406.7 – High Eff. Service Water Heating

3. 2018 NCECC - Performance
   - C407 – Total Building Performance
   - C402.5 – Air Leakage
   - C403.2 – Provisions applicable to all mechanical systems
   - C404 – Serv Wtr Htng
   - C405 - Lighting - Mandatory Sections
     - C405.2
     - C405.3
     - C405.4
     - C405.6
   - Building energy cost to be ≤ 85% of standard reference design building
COMPLIANCE OPTIONS

- **Meet all of the Prescriptive and Required items of the 2018 NCECC** and note upon plan submittal.

- **ASHRAE 90.1-2013** Prescriptive performance or full building energy model demonstrating compliance with the entire code.
  - There is an option to choose this code within COMcheck

- **IECC 2015 COMcheck** model using a non-NC specific code version will most likely comply. This method was recently approved by NCDOI.
  - 2015 IECC is more restrictive than the 2018 NCECC

- **Other approved model or prescriptive checklist** (including Total Building Performance aka Energy Cost Modeling (C407)) as approved by code official in local Authority Having Jurisdiction
C408.1 General.
This section covers the commissioning of the building mechanical systems in Section C403, service water heating systems in Section C404, and electrical power and lighting systems in Section C405. Buildings less than or equal to 10,000 square feet of conditioned floor area are exempt from commissioning requirements. Prior to the issuance of Certificate of Occupancy, a registered design professional shall provide a statement of system commissioning to the code official and facility owner in accordance with the provisions of this section (See Appendix 1). Items identified as deferred tests, including tests that cannot be performed because of climatic conditions, or other noted deficiencies associated with commissioning in Appendix 1 shall not prevent a CO from being issued.

Exception: The mechanical, electrical or plumbing contractor will be allowed to prepare the statement of system commissioning when a building permit is issued for a project without the seal of a licensed design professional as allowed by an exemption under North Carolina State Building Administrative Code and Policies: Section 204.3.5.
APPENDIX C1

STATEMENT OF SYSTEM COMMISSIONING

Part 1: Mechanical

Project Name: ________________________________________________________

Project Location: ______________________________________________________

In my professional opinion, the HVAC systems have been installed in substantial compliance with the intent of the approved project plans and specifications based on a site observation performed and upon review of the following:

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>NOT REQUIRED</th>
<th>ITEMS</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Testing and Balance Reports</td>
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<td></td>
<td>Operations and Maintenance Manuals for HVAC</td>
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<td>HVAC Equipment</td>
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<td></td>
<td>HVAC Controls and Operational Sequences</td>
<td></td>
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</tbody>
</table>
SPECIAL INSPECTIONS

- When do Special Inspections apply?
- Are there any new Special Inspections?
- Who is an “Approved Agency”? 
1705.1.2 Specific elements always requiring special inspections. *Special inspections* in accordance with Sections 1704 and 1705 are required for the following elements only, regardless of the building or structure that they are in:

1. Piles, piers and special foundations in accordance with Sections 1705.7, 1705.8, 1705.9, 1810.3.5.2.4 and 1810.3.5.2.5;
2. Sprayed fire-resistant materials in accordance with Section 1705.14;
3. Mastic and intumescent fire-resistant coatings in accordance with Section 1705.15;
4. Smoke control and smoke exhaust systems in accordance with Sections 1705.18;
5. Retaining walls and retaining systems exceeding 5 feet (1524 mm) of unbalanced backfill height in accordance with Section 1807.2.

*Special inspections* are not required for other elements unless the building or structure is one identified in Section 1705.1.3.

1705.1.3 Structures requiring special inspections. *Special inspections* in accordance with Sections 1704 and 1705 are required for the building, building components or other structures according to the following:

1. Buildings or other structures listed in Table 1604.5 in Risk Category II if:
   1.1. Building height exceeds 45 feet (13.7 m) or three stories; or
   1.2. The building is an underground building in accordance with Section 405.1.
2. Buildings or other structures listed in Table 1604.5 in Risk Categories III or IV.
ADDITIONAL QUALIFIERS FOR SI

1705.11 Wind Resistance –

- Unless exempted by the exceptions to 1704.2, special inspections for Wind-resistance are only required for buildings and structures:

- In wind exposure category B, where $V_{\text{asd}}$ as determined in accordance with Section 1609.3.1 is 120 mph or greater;

- In wind exposure category C or D, where $V_{\text{asd}}$ as determined in accordance with Section 1609.3.1 is 110 mph or greater.

https://www.youtube.com/watch?v=xS4kTWDpHfY
1705.12 & 1705.13 Seismic force-resisting systems

- **Seismic Design Categories B, C, D, E or F:**
  - Structural steel
  - Structural steel elements other than those in 1705.12.1.1
  - Seismic isolation systems
  - Nondestructive testing of structural steel
  - Nondestructive testing of structural steel elements other than those in 1705.13.1.1

- **Seismic Design Categories C, D, E or F:**
  - Designated seismic systems
  - Anchorage of electrical equipment for emergency and standby power
  - Installation and anchorage of piping systems for Hazardous materials and associated mechanical units

- **Seismic Design Categories D, E or F:**
  - Installation and anchorage of ductwork for Hazardous materials
  - Installation and anchorage of vibration isolation systems where the required clearance is $\leq 1/4"$
  - Anchorage of other electrical equipment

- **Seismic Design Categories E or F:**
  - Architectural components
  - Access floors
  - Storage racks $\geq 8'$ in height
  - Cold-formed steel special bolted moment frames

**NOTE:** THIS BULLETED LIST IS A SUMMATION OF THESE CODE SECTIONS
[BF] 1705.17 Fire-resistant penetrations and joints. In high-rise buildings or in buildings assigned to Risk Category III or IV, special inspections for through-penetrations, membrane penetration firestops, fire-resistant joint systems and perimeter fire barrier systems that are tested and listed in accordance with Sections 714.3.1.2, 714.4.2, 715.3 and 715.4 shall be in accordance with Section 1705.17.1 or 1705.17.2.

[BF] 1705.17.1 Penetration firestops. Inspections of penetration firestop systems that are tested and listed in accordance with Sections 714.3.1.2 and 714.4.2 shall be conducted by an approved agency in accordance with ASTM E2174.

[BF] 1705.17.2 Fire-resistant joint systems. Inspection of fire-resistant joint systems that are tested and listed in accordance with Sections 715.3 and 715.4 shall be conducted by an approved agency in accordance with ASTM E2393.
1703.1 Approved agency. An approved agency shall provide all information as necessary for the building official to determine that the agency meets the applicable requirements specified in Sections 1703.1.1 through 1703.1.3.

- This section specifies the information that an approved agency must provide to the building official to enable him or her to determine whether the agency and its personnel have the requisite qualifications to provide adequate quality control.

1703.1.1 Independence. An approved agency shall be objective, competent and independent from the contractor responsible for the work being inspected. The agency shall also disclose to the building official and the registered design professional in responsible charge possible conflicts of interest so that objectivity can be confirmed.

- As part of the basis for a building official’s approval of a particular inspection agency, the agency must demonstrate its competence and objectivity. The competence of the agency is judged by its experience and organization, and the experience of its personnel. To

[A] APPROVED AGENCY. An established and recognized agency that is regularly engaged in conducting tests or furnishing inspection services, where such agency has been approved by the building official.

- Third-party testing or inspections may be needed for elements within the built environment. The basis for the building official’s approval of any agency for a particular activity may include, but is not necessarily limited to, the capacity and capability of the agency to perform the work in accordance with Section 1705 and other applicable sections. This is typically done through a review of the résumés and references of the agency and its personnel. For this code, the building official is identified as the person responsible for approval.
CODE CHANGES AND CHALLENGES

TOMMY D. ROWLAND
MECHANICAL/PLUMBING CODE ADMINISTRATOR
MECKLENBURG COUNTY
CODE CHANGES AND CHALLENGES
MECHANICAL AND PLUMBING

Items to discuss

• Ventilation
• Shafts / Fire and smoke dampers
• Restaurants hoods, grease duct
• Fixture counts
• Penetrations protection
401.2 Ventilation required. Every occupied space shall be ventilated by natural means in accordance with Section 402 or by mechanical means in accordance with Section 403.

401.3 When required. Ventilation shall be provided during the periods that the room or space is occupied.
Natural Ventilation
• 4 percent of the floor area being ventilated
• Adjoining Spaces
  • Unobstructed opening not less than 8 percent of the floor area
    • Not less than 25 sq ft
• openable area to the outdoors shall be based on the total floor area being ventilated
403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or exhaust air. The amount of supply air shall be approximately equal to the amount of return and exhaust air. The system shall not be prohibited from producing negative or positive pressure. The system to convey ventilation air shall be designed and installed in accordance with Chapter 6.

403.2 Outdoor air required. The minimum outdoor airflow rate shall be determined in accordance with Section 403.3. Ventilation supply systems shall be designed to deliver the required rate of outdoor airflow to the breathing zone within each occupiable space.
CODE CHANGES AND CHALLENGES
VENTILATION

403.2.1 Recirculation of air. The air required by Section 403.3 shall not be recirculated. Air in excess of that required by Section 403.3 shall not be prohibited from being recirculated as a component of supply air to building spaces.

403.2.2 Transfer air. Except where recirculation from such spaces is prohibited by Table 403.3, air transferred from occupiable spaces is not prohibited from serving as makeup air for required exhaust systems in such spaces as kitchens, baths, toilet rooms, elevators and smoking lounges. The amount of transfer air and exhaust air shall be sufficient to provide the flow rates as specified in Section 403.3. The required outdoor airflow rates specified in Table 403.3 shall be introduced directly into such spaces or into the occupied spaces from which air is transferred or a combination of both.
# Code Changes and Challenges

## Ventilation

**Table 403.3.1.1**

**Minimum Ventilation Rates**

<table>
<thead>
<tr>
<th>Occupancy Classification</th>
<th>Occupant Density #/1000 ft²</th>
<th>People Outdoor Airflow Rate in Breathing Zone, RP CFM/Person</th>
<th>Area Outdoor Airflow Rate in Breathing Zone, RA CFM/ft²</th>
<th>Exhaust Airflow Rate CFM/ft²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correctional facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Booking/waiting</td>
<td>50</td>
<td>7.5</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Cells</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without plumbing fixtures</td>
<td>25</td>
<td>5</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>with plumbing fixtures</td>
<td>25</td>
<td>5</td>
<td>0.12</td>
<td>1.0</td>
</tr>
<tr>
<td>Day room</td>
<td>30</td>
<td>5</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Dining halls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(see food and beverage service)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Guard stations</td>
<td>15</td>
<td>5</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Food and beverage service</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bars, cocktail lounges</td>
<td>100</td>
<td>7.5</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>Cafeteria, fast food</td>
<td>100</td>
<td>7.5</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>Dining rooms</td>
<td>70</td>
<td>7.5</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>Kitchens (cooking)</td>
<td></td>
<td></td>
<td></td>
<td>0.7</td>
</tr>
</tbody>
</table>
## CODE CHANGES AND CHALLENGES

### VENTILATION

**TABLE 403.3.1.1.1.2**

ZONE AIR DISTRIBUTION EFFECTIVENESS

<table>
<thead>
<tr>
<th>AIR DISTRIBUTION CONFIGURATION</th>
<th>$E_z$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling or floor supply of cool air</td>
<td>$1.0^e$</td>
</tr>
<tr>
<td>Ceiling or floor supply of warm air and floor return</td>
<td>$1.0$</td>
</tr>
<tr>
<td>Ceiling supply of warm air and ceiling return</td>
<td>$0.8^f$</td>
</tr>
<tr>
<td>Floor supply of warm air and ceiling return</td>
<td>$0.7$</td>
</tr>
<tr>
<td>Makeup air drawn in on the opposite side of the room from the exhaust and/or return</td>
<td>$0.8$</td>
</tr>
<tr>
<td>Makeup air drawn in near to the exhaust and/or return location</td>
<td>$0.5$</td>
</tr>
</tbody>
</table>
404.1 **Enclosed parking garages.** Where mechanical ventilation systems for enclosed parking garages operate intermittently, such operation shall be automatic by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Such detectors shall be installed in accordance with their manufacturers’ recommendations.

404.2 **Minimum ventilation.** Automatic operation of the system shall not reduce the ventilation airflow rate below 0.05 cfm per square foot (0.00025 m3/s · m2) of the floor area and the system shall be capable of producing a ventilation airflow rate of 0.75 cfm per square foot (0.0038 m3/s · m2) of floor area.
607.5.5 Shaft enclosures. Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with approved fire and smoke dampers installed in accordance with their listing.
CODE CHANGES AND CHALLENGES
SHAFTS – FIRE/SMOKE DAMPERS

Exceptions:

1. Fire dampers are not required at penetrations of shafts where any of the following apply:
   1.1. Steel exhaust subducts extend not less than 22 inches (559 mm) vertically in exhaust shafts provided that there is a continuous airflow upward to the outdoors.
   1.2. Penetrations are tested in accordance with ASTM E119 or UL 263 as part of the fire resistance rated assembly.
   1.3. Ducts are used as part of an approved smoke control system in accordance with Section 909 of the International Building Code, and where the fire damper will interfere with the operation of the smoke control system.
   1.4. The penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.
Exceptions:

2. In Group B and R occupancies equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of the International Building Code, smoke dampers are not required at penetrations of shafts where kitchen, clothes dryer, bathroom and toilet room exhaust openings with steel exhaust subducts, having a minimum thickness of 0.0187 inch (0.4712 mm) (No. 26 gage), extend not less than 22 inches (559 mm) vertically and the exhaust fan at the upper terminus is powered continuously in accordance with the provisions of Section 909.11 of the International Building Code, and maintains airflow upward to the outdoors.
Exceptions:

3. Smoke dampers are not required at penetrations of exhaust or supply shafts in parking garages that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.
Exceptions:

4. Smoke dampers are not required at penetrations of shafts where ducts are used as part of an approved mechanical smoke control system designed in accordance with Section 909 of the International Building Code and where the smoke damper will interfere with the operation of the smoke control system.

5. Fire dampers and combination fire/smoke dampers are not required in kitchen and clothes dryer exhaust systems installed in accordance with this code.
CODE CHANGES AND CHALLENGES
RESTAURANT HOODS/GREASE DUCT

506.3.7.1 Grease duct reservoirs. Grease duct reservoirs shall:
1. Be constructed as required for the grease duct they serve.
2. Be located on the bottom of the horizontal duct or the bottommost section of the duct riser.
3. Extend across the full width of the duct and have a length of not less than 12 inches (305 mm).
4. Have a depth of not less than 1 inch (25 mm).
5. Have a bottom that slopes to a drain.
6. Be provided with a cleanout opening constructed in accordance with Section 506.3.8 and installed to provide direct access to the reservoir. The cleanout opening shall be located on a side or on top of the duct so as to permit cleaning of the reservoir.
7. Be installed in accordance with the manufacturer’s instructions where manufactured devices are utilized.
506.3.8 Grease duct cleanouts and openings. Grease duct cleanouts and openings shall comply with all of the following:

1. Grease ducts shall not have openings except where required for the operation and maintenance of the system.

2. Sections of grease ducts that are inaccessible from the hood or discharge openings shall be provided with cleanout openings spaced not more than 20 feet (6096 mm) apart and not more than 10 feet (3048 mm) from changes in direction greater than 45 degrees (0.79 rad).
506.5.1.2 In-line fan location. Where enclosed duct systems are connected to in-line fans not protected by fire-rated enclosures or field-applied grease duct enclosure, and not located outdoors, then the fan shall be located in a room or space having the same fire-resistance rating as the duct enclosure. Access shall be provided for servicing and cleaning of fan components. Such rooms or spaces shall be ventilated in accordance with the fan manufacturer’s installation instructions.
506.5.3 Exhaust fan mounting. Up-blast fans serving Type I hoods and installed in a vertical or horizontal position shall be hinged, supplied with a flexible weatherproof electrical cable to permit inspection and cleaning and shall be equipped with a means of restraint to limit the swing of the fan on its hinge. The ductwork shall extend not less than 18 inches (457 mm) above the roof surface.
507.1 General. Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or II and shall be designed to capture and confine cooking vapors and residues. A Type I or Type II hood shall be installed at or above all commercial cooking appliances in accordance with Sections 507.2 and 507.3. Where any cooking appliance under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. Where a Type I hood is installed, the installation of the entire system, including the hood, ducts, exhaust equipment and makeup air system shall comply with the requirements of Sections 506, 507, 508 and 509.
508.1.2 Air balance. Design plans for a facility with a commercial kitchen ventilation system shall include a schedule or diagram indicating the design outdoor air balance. The design outdoor air balance shall indicate all exhaust and replacement air for the facility, plus the net exfiltration if applicable. The total replacement air airflow rate shall equal the total exhaust airflow rate plus the net exfiltration.
403.1 Minimum number of fixtures. In new construction or building additions and in changes of occupancy as defined in the North Carolina Building Code, plumbing fixtures shall be provided for the type of occupancy and in the minimum number shown in Table 403.1 based on the actual use of the building or space. Uses not shown in Table 403.1 shall be considered individually by the code official. The number of occupants shall be determined by the International Building Code. Occupancy classification shall be determined in accordance with the International Building Code.
### CODE CHANGES AND CHALLENGES

**FIXTURE COUNTS**

<table>
<thead>
<tr>
<th>NO.</th>
<th>CLASSIFICATION</th>
<th>OCCUPANCY</th>
<th>DESCRIPTION</th>
<th>WATER CLOSETS (URINALS: SEE SECTION 419.2)</th>
<th>LAVATORIES</th>
<th>BATHTUBS/SHOWERs</th>
<th>DRINKING FOUNTAIN (SEE SECTION 410)</th>
<th>OTHER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Business (see Sections 403.2, 403.3 and 403.3.3.1)</td>
<td>B</td>
<td>Buildings for the transaction of business, professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses</td>
<td>1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50</td>
<td>1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80</td>
<td>—</td>
<td>1 per 100</td>
<td>1 service sink&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>3</td>
<td>Educational&lt;sup&gt;4&lt;/sup&gt;</td>
<td>E&lt;sup&gt;h&lt;/sup&gt;</td>
<td>K–8 9–12 Teacher/staff</td>
<td>1 per 25 1 per 30 1 per 30</td>
<td>1 per 25 1 per 25 1 per 25</td>
<td>1 per 60 1 per 100 1 per 100</td>
<td>—</td>
<td>1 per 100</td>
</tr>
</tbody>
</table>

(continued)
o. For business and mercantile occupancies with an occupant load of 25 or fewer, service sinks shall not be required.
CODE CHANGES AND CHALLENGES
FIXTURE COUNTS

403.2 Separate facilities.

Exception #5
Where the code requires only one toilet facility for each sex, two unisex facilities may be substituted for separate sex facilities.
403.3 Required public toilet facilities

Exception #2
Structures and tenant spaces intended for quick transactions, including takeout, pickup and drop-off, having a public access area less than or equal to 300 square feet (28 m²).
**CODE CHANGES AND CHALLENGES**

**FIXTURE COUNTS**

403.3.6 Door locking. Where a toilet room is provided for the use of multiple occupants, the egress door for the room shall not be lockable from the inside of the room. This section does not apply to family or assisted-use toilet rooms.
403.4.1 **Directional signage.** Directional signage indicating the route to the required public toilet facilities shall be posted in a lobby, corridor, aisle or similar space, such that the sign can be readily seen from the main entrance to the building or tenant space.
607.3.1 Damper testing. Dampers shall be listed and labeled in accordance with the standards in this section. Fire dampers shall comply with the requirements of UL 555. Only fire dampers and ceiling radiation dampers labeled for use in dynamic systems shall be installed in heating, ventilating and air-conditioning systems designed to operate with fans on during a fire. Smoke dampers shall comply with the requirements of UL 555S. Combination fire/smoke dampers shall comply with the requirements of both UL 555 and UL 555S. Ceiling radiation dampers shall comply with the requirements of UL 555C or shall be tested as part of a fire-resistance-rated floor/ceiling or roof/ceiling assembly in accordance with ASTM E119 or UL 263. Corridor dampers shall comply with requirements of both UL 555 and UL 555S. Corridor dampers shall demonstrate acceptable closure performance when subjected to 150 feet per minute (0.76 mps) velocity across the face of the damper using the UL 555 fire exposure test.
MECKLENBURG COUNTY
Land Use and Environmental Services Agency Code Enforcement

CODE CHANGE AND CHALLENGES
PENETRATIONS

MECHANICAL/PLUMBING

Code Chapter Reference: 607.3.1
Subject: Radiation Dampers in Apartments
Effective Date: January 1, 2019
Prepared/Revision Date: August 2018
CODE CHANGES AND CHALLENGES
PENETRATIONS

INTERPRETATION:

After researching the issue and possible solutions to provide an equal level of compliance to Section 607.3.1 of the NC Mechanical Code, any of the following are acceptable:

1. A listed UL 555C dynamic radiation damper with the appropriate rating for the assembly.
2. A static damper with a duct detector on the air handling unit to shut down the unit upon detection of smoke.
3. A static damper with a firestat located below the damper to shut down the air handling unit. The firestat shall have a setting between 160 degrees and 215 degrees, but in no case higher than the damper’s fusible link.

Please Note: The use of a room smoke detector to shut down the air handling unit will no longer be accepted.
607.6.2 Membrane penetrations. Ducts and air transfer openings constructed of approved materials, in accordance with Section 603, that penetrate the ceiling membrane of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with one of the following:

1. A shaft enclosure in accordance with Section 713 of the International Building Code.
2. A listed ceiling radiation damper installed at the ceiling line where a duct penetrates the ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly.
3. A listed ceiling radiation damper installed at the ceiling line where a diffuser with no duct attached penetrates the ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly.
AIA AND CODE ENFORCEMENT
THANK YOU FOR ATTENDING TODAY’S PRESENTATION.