



**MECKLENBURG COUNTY**  
**Land Use and Environmental Services Agency**  
**Code Enforcement**

# Memo

**Date:** April 20, 2010

**TO:** all contractors  
**From:** Jim Bartl  
**RE:** Code Compliance Report

For over twelve years, the Department has collected data on inspection failures, based on a system of defect codes, which are recorded at the time of inspection. Those reports are summarized for presentation to the Building Development Commission on a quarterly basis.

Attached is a copy of the most recent Code Compliance Report Data Summary for the period January 1, 2010 to March 31, 2010. This report highlights the most frequent code defects sighted in each of the trades.

Since July 1, 2001, detailed contractor code defect data has been available on the Department web site (go to the contractor's tool box at [www.meckpermit.com](http://www.meckpermit.com)). Questions on the data may be directed to Kathleen Batey (704-336-3545) or your project specific Code Enforcement Manager.

Prior to July 1, 2002, we also held hard copies of individual contractor defect reports at the Building Development Center front desk for contractor pickup. Given the huge amount of paper involved, and the fact that the vast majority of these reports were not picked up, this service was discontinued. However, Hal Marshal administrative support staff will provide assistance to contractors on downloading their reports over the counter or by phone (call 704-336-3830).

January 1, 2010 through March 31, 2010  
 Mecklenburg County Code Enforcement Department

# Code Compliance Report

## Data Summary

### 1. Building Inspections Top Fifteen Code Defects

task	item #	item	# defects	% of total
mono slab	108	need soil compaction test	403	8.53%
framing	111	fire stopping/draftstopping	221	4.68%
footing	108	need soil compaction test	210	4.44%
framing	197	other defects listed on job	148	3.13%
final	197	other defects listed on job	98	2.07%
frame	131	engineered roof design	83	1.76%
frame	105	call clerk or check meckpermit	80	1.70%
final	105	call clerk or check meckpermit	78	1.65%
frame	195	previous list incomplete	72	1.52%
frame	109	foundation anchors	69	1.46%
final	118	handrail construction	67	1.42%
frame	136	ledger/hangers	61	1.29%
frame	121	engineered floordesign	60	1.27%
frame	104	not ready for inspection	51	1.08%
final	121	insulation missing	51	1.08%
TOTAL			1752/4725	37.08%

Note 1: all 04 (incomplete not ready for inspection) total 154 or 3.26% of total bldg code defects noted

Note 2: Rough O2's = 35.3% of total; Final O2's = 19.74% of total

### 2. Electrical Inspections Top Fifteen Code Defects

task	item #	item	# defects	% of total
final	30	improper wiring method	136	4.33%
final	25	improper overcurrent protection	132	4.20%
final	9	grounding	123	3.92%
final	W8	defects created by others	116	3.69%
final	19	label panel	91	2.90%
final	65	AFCI defect	86	2.74%
final	55	GFCI defect general	62	1.98%
final	5	too many defects to list	62	1.98%
final	22	cover missing	58	1.85%
final	31	cables subject to damage	57	1.82%
final	10	bonding	53	1.69%
rough	W8	defects created by others	51	1.63%
final	6	defect not corrected	50	1.59%
final	4	job not ready	46	1.47%
final	41	improper joint termination	44	1.40%
TOTAL			1167/3138	37.19%

Note 1: all 04 (incomplete not ready) total 106 or 3.38% of total electrical code defects noted

Note 2: Rough O2's = 17.27% of total; Final O2's = 64.63% of total

### 3. Mechanical Inspections Top Fifteen Code Defects

task	item #	item	# defects	% of total
final	Z99	other or no defect code applies	91	6.05%
final	H01	damage caused by others	84	5.58%
final	G03	test not to code or bad gauge	62	4.12%
final	Z96	approval withheld for other trades	60	3.99%
final	P1	primary/secondary drain missing	50	3.32%
gas test	G03	test not to code or bad gauge	42	2.80%
final	A13	need ladder	38	2.53%
final	4	not ready for inspection	35	2.33%
final	F6	flue termination	35	2.33%
rough	D6	duct damaged	31	2.06%
rough	H01	damage caused by others	31	2.06%
final	F2	flue material	29	1.93%
final	E8	equipment instalation	25	1.66%
final	F01	flue clearance	24	1.59%
final	E4	eqpt access incorrect	23	1.53%
TOTAL			660/1505	43.80%

Note 1: all 04 (not ready for inspection) total 63 or 4.18% of total mechanical code defects noted

Note 2: Rough O2's = 22.65% of total; Final O2's = 67.5% of total

### 4. Plumbing Inspections Top Fifteen Code Defects

task	item #	item	# defects	% of total
rough	B31	pipng test missing/incorrect	95	9.98%
final	H01	damage by others	46	4.83%
wtr distr	B31	pipng test missing/incorrect	41	4.30%
final	D31	T&P drain missing or incorrect	37	3.89%
rough	C31	pipe fitting incorrect	28	2.94%
final	E31	handicapped regulation missing	26	2.73%
final	E71	fixture installed incorrect	22	2.31%
final	E81	backflow requirement	22	2.31%
rough	B81	vent pipe incorrect	22	2.31%
wtr distr	C21	pipng insulat'n missing/incorrect	21	2.20%
final	J21	equipment inaccessible	21	2.20%
final	J41	existing condition not to code	20	2.10%
final	C21	pipng insulat'n missing/incorrect	19	1.99%
slab	B31	pipng test missing/incorrect	18	189.00%
rough	B51	pipng support missing/incorrect	18	1.89%
TOTAL			456/952	47.90%

Note 1: all 04 (not ready for inspection) total 48 or 5.04% of total plumbing code defects noted

Note 2: Rough O2's = 27.4% of total; Final O2's = 41.38% of total




# **Building Consistency Meeting**

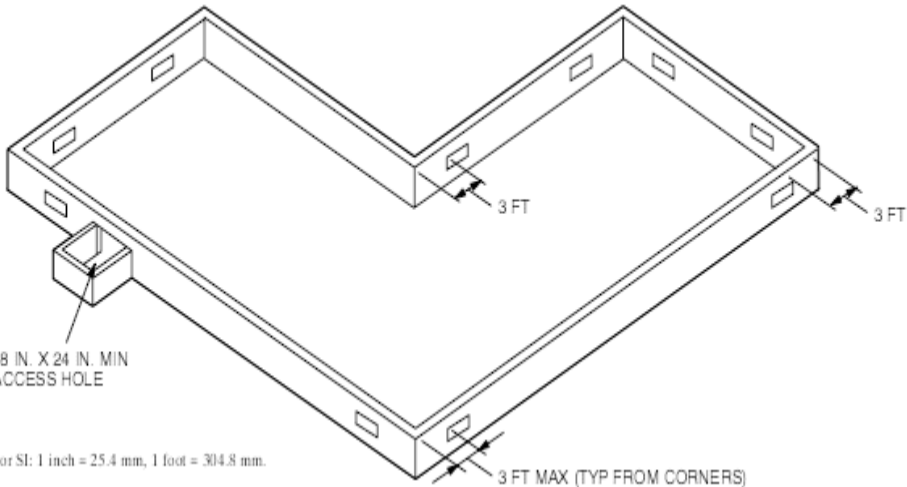
Residential


Date: 1/6/10 Recorder and minutes prepared by: Danny Wooten/Jeff Griffin

**Staff present:** Danny Wooten, Morton Robins, Gene Morton, Steve Kellen, George Rogers, Steve Pearson, Rob Bock, Ron Dishman, Tim Taylor, Randy Newman, Walt Nash, Don Sprinkle, Mike Creech, Barry Human, Billy Yandle, Patrick Bidy, Darrell McAllister, Gerald Barnes, Dave Ries, Ron Dishman, Ron Featherstone, Andrew DeMaury, TW Anthony, Russ Fischer, Steve Lineberger, Greg Walsh.

**Public present:** Greg Sloan (**Ryland Homes**); Wayne Carter (**J&B Development**); Jason Whitener (**Southern Tradition Homes**); Daniel McBride (**Cunnane Group**); Kenneth Rampersad (**Soto Construction**); Terry Cleary (**Meeting Street Homes**); Marcel Papineau (**Intelligent Design Engineering**); Darren Price (**M/I Homes**); Joe Stewart (**Builders 1<sup>st</sup> Source**); David R. Schwieman (**D.R. Schwieman, Inc.**); Michael Johnson (**City of Charlotte**); Kevin Ratliff (**Griffin Masonry**); Matthew Klapheke (**L&M Homes**).

Topics/Subject	Decisions/Conclusions/Actions
<b>Old Business</b>	
Smoke detector status	No change on remodeling issue to use battery only, currently still reads any work that requires a building permit will trigger a smoke detector upgrade and they have to be hardwired and interconnected. Still waiting on final approval from the rules review committee and when approved we allow the change to battery only. This was discussed with DOI and they are projecting final approval late February or early March.
<b>New Business</b>	
Cold Weather protection	Handout in regards to cold weather protection was distributed among the group due to recent weather and the requirements for this to be on site at time of concrete inspection (ACI318). Attached to the minutes is a copy of the requirements and when this condition is determined to exist.
Hinge points in wall construction	<p>Issue brought up concern wall that are stacked upon each other not at a point of ceiling diaphragm and this application creates a hinge point in the wall and there is no allowance under the Code for this application. Some minor applications have been allowed where in a small foyer area with an abutting porch roof line that strengthens the hinge connection. Typically these area should be designed if constructed in the fashion as illustrated below:</p> 

<p>Use of not ready code #104</p>	<p>The department is attempting to determine an effective response to help reduce failures associated with the internal task code of “not ready”. This typically has been one of the top 5 reasons why inspections across all trades have failed. What was discussed among the group are way that public can receive training on the requirements for jobs to be ready. Some of the measures discussed where placing automatic prompts on the electronic inspection request line that would review as request is being made what needs to be ready such as a recording for a frame inspection that stated: “You have requested a frame inspection in order to ensure that this inspection can be conducted the follow items must be complete at this time: all rough trades as needed are installed, roofed over structures are dried in and required plans are on site for field inspector’s review”. Similar types of prompts were also discussed for those contractors that use the Web to request inspections. Information discussed will be shared with the BDC and IT staff to consider implementing these measures.</p>
<p>Absence list posting</p>	<p>Questions related to the re-org and the help list posting each morning for contractor access. Although there are some areas that still need to be worked out the current expectation is that this will remain the same for the time being. Intent is to have this information available each morning between 7-7:30, so a contractor will know who is out and the back up inspector covering their jobs that day. Automated number is 432-1000 for daily inspector help list.</p>
<p>Re-inspection fee program</p>	<p>There is an effort to exam the re-inspection fee program based upon the changes in the construction market. The Code Compliance task force will start to meet again (1 meeting has already taken place) to look at the fee structure, rebates and performance incentives. There may be some public meetings to discuss these issues and dates will be announced.</p>
<p>Foundation vent placement</p>	<p>Question was asked about minimum foundation ventilation requirements for wall vented crawl space. There is a requirement that allows for reduction from 1/150 to 1/1500 square feet if you have cross ventilation, vents are still required to be 3’ off corners and full poly vapor barrier is required regardless throughout crawl (see section R408.1.1 &amp; R408.1.2).</p>  <p>18 IN. X 24 IN. MIN ACCESS HOLE</p> <p>For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.</p> <p>3 FT MAX (TYP FROM CORNERS)</p>
<p>Screw jack supports</p>	<p>Question was asked about the use of screw jack support post and if they could be used. As long as the loads on the jack (adjustable column) don’t exceed the tested value of the column it is allowed as long as once in the intended position the adjustment handle is disabled or secured against movement.</p>

Future consistency meetings	Question asked about changes to the consistency meeting under the new re-org, currently options are being look at but we believe that the residential portion of the consistency meeting will remain on the first Wednesday of every month 8:00am in the same room. What may change in future meetings is that after the residential meeting a commercial meeting may take place, however this is to be announced.
Stair tread uniformity	<p>Issue came up on several sites and in plan review with a tread that has an angled return to the wall as shown below. The issue shown in the picture is that if you approach the step from the side at the turn there is a section of tread (measure at right angle to the nosing) that would be deeper to the next riser than portions of same tread; this creates a non-uniformed stair tread and will not conform to the code. An option that some builders have done is to extend the handrail/guard straight down so that the flair is used more as a plant shelf than a tread.</p> 

# ACI 318

## COLD WEATHER CONCRETE PROTECTION

### **Cold Weather (defined)**

A period of 3 consecutive days when the average temperature is below 40 degrees and not above 50 degrees for more than half of any one of those 3 days. A cold weather situation is based solely upon previous temperature, and not upon forecasted temperatures.

### **Standards of Protection**

Surface concrete temperatures must be maintained at 55 degrees for 3 days. Curing time may be reduced to 2 days if cement content is increased by 100 pounds per cubic yard, or type 3 Portland cement is used or approved accelerator is employed.

### **Methods of Protection**

- Footings may be covered with 6 inches of straw. Straw should be held in place with tarps or plastic.
- For foundation walls insulated blankets may be used.
- After initial curing, recommendation is to keep concrete dry for 2-3 more days before exposure

### **Inspection Requirements**

When cold weather exists, inspection requirements are as follows:

- Cold weather protection materials must be on site to pass inspection.
- If subgrade is frozen the inspection will not be passed.
- When placing conventional concrete during “non-cold weather” conditions, protection from freezing shall be maintained for at least 24 hours.
- If the inspector believes any of the required procedures have not been followed he may require testing or concrete batch tickets, or both.



# **Building Consistency Meeting**

Residential

Date: 2/3/10 Recorder and minutes prepared by: Danny Wooten/Jeff Griffin

**Staff present:** Danny Wooten, Morton Robins, Gene Morton, Steve Kellen, George Rogers, Steve Pearson, Rob Bock, Ron Dishman, Tim Taylor, Randy Newman, Walt Nash, Don Sprinkle, Mike Creech, Barry Human, Billy Yandle, Patrick Bidy, Darrell McAllister, Gerald Barnes, Dave Ries, Andrew DeMaury, TW Anthony, Russ Fischer, Steve Lineberger, Greg Walsh, Mike Jackson, David Williams, Ken Turull, Rob Ellis, Harold Sinclair, Mike Kale.

**Public present:** Bob Mckee (**Ryan Homes**); Greg Sloan/Hans Kasak (**Ryland Homes**); Jason Whitener (**Southern Tradition Homes**); Daniel McBride (**Cunnane Group**); Kenneth Rampersad (**Soto Construction**); Dave Reynolds (**Builders 1<sup>st</sup> Source**); David R. Schwieman (**D.R. Schwieman, Inc.**); Rob Merrell/Kevin Ratliff (**Griffin Masonry**); Matthew Klapheke (**L&M Homes**); John Nicholls (**JT Nicholls Homes**).

Topics/Subject	Decisions/Conclusions/Actions
<b>Old Business</b>	
Smoke detector status	No change on remodeling issue to use battery only, currently still reads any work that requires a building permit will trigger a smoke detector upgrade and they have to be hardwired and interconnected. Still waiting on final approval from the rules review committee and when approved we allow the change to battery only. This was discussed with DOI and they are projecting final approval late February or early March.
<b>New Business</b>	
NC2012 Code	At the March 2010 meeting of the NC Building Code Council all codes will be introduced for the 2012 and a request to accept should be given. This will start the process of public review and comment on coming changes with the next code. There are several items to watch including the proposal to move forward on sprinklers for townhouse but in single family residences, also the complete revision of chapter 11 of the code. Builders are encourage to review information on changes recommend (a final copy will be sent for the consistency team to review after last meeting of the Ad Hoc committee on Feb 11 <sup>th</sup> ). At that stage if you would like to make a comment or voice a concern you can direct those to Barry Gupton with the NC Department of Insurance so that can be seen and addressed by Council.
Chapter 11 of the 2012 Code	This meeting focused on the changes proposed in the 2012 code related to chapter 11 and how they impact construction. Changes are based upon the mandate to improved the energy efficiency in our buildings by 30% and in order to do so all aspects were looked at an modified, in zone 3 (Mecklenburg) the following changes were discussed: <ul style="list-style-type: none"> <li>• Ceiling insulation goes to R42</li> <li>• Wall insulation goes to R19</li> <li>• Floors stay the same at R19</li> <li>• Perimeter slab insulation comes back into the code at R5</li> </ul>



- Basement insulation come back at R10
- Attic access doors required to be R10 and weatherstripped
- Pull down stairs required to be R5 and weatherstripped
- 75% of fixed light fixtures to be high efficiency
- SGHC on glazing will go up to .25

In addition 3 certifications will be required to be on site at final in addition to possible an insulation installer certification there are:

- Builders certificate of insulation used and fenestration (information request on this certificate has been increased and sample will be provided in new appendix E)
- Building air leakage certification which will be either by a prescriptive self certification method or a tested (blower door) performance based method. Required forms can be found in the appendix E.
- Duct leakage certification-This will typically be done by the mechanical contractor and specific method for testing is listed within the text of the code in addition the sample certification form can be found in the new appendix E. The new language for all chapter 11 related items was sent out prior to the meeting and was passed out last week at the HBA meeting for builder review.



# **Building Consistency Meeting**

Residential

Date: 3/3/10 Recorder and minutes prepared by: Danny Wooten/Jeff Griffin

**Staff present:** Danny Wooten, Steve Kellen, Steve Pearson, Rob Bock, Ron Dishman, Tim Taylor, Walt Nash, Don Sprinkle, Mike Creech, Barry Human, Patrick Bidy, Darrell McAllister, Gerald Barnes, Andrew DeMaury, TW Anthony, Russ Fischer, Mike Jackson, David Williams, Rob Ellis, Harold Sinclair, Ron Featherstone, Billy Yandle, Robert Richardson.

**Public present:** Greg Sloan/Hans Kasak (**Ryland Homes**); Daniel McBride (**Cunnane Group**); Kenneth Rampersad (**Soto Construction**); David R. Schwieman (**D.R. Schwieman, Inc.**); Rob Merrell/Kevin Ratliff (**Griffin Masonry**); Darren Price (**M/I Homes**); Wayne Carter (**Lifestyle Homes**); Ben Brookhart (**Timberline Homes**); Terry Cleary (**Meeting Street Homes**).

Topics/Subject	Decisions/Conclusions/Actions
<b>Old Business</b>	
Smoke detector status	<p>Update on changes related to smoke detectors.</p> <p><i><b>R313: Building Code Council - The Commission objected to this rule based on ambiguity. In R313.1.1, it is not clear what amounts to "immediate vicinity." Is this six inches, six feet, six yards or what?</b></i></p> <p>The comments above are taken out of the rules review commission minutes and this matter has been moved to next month and will be considered again. Because the current language reads the same it is believed there will just be an explanation of what is meant by "immediate vicinity". We will follow up with the minutes from the April meeting to verify that this passes in April.</p>
<b>New Business</b>	
Energy Star Homes	<p>Issue brought up as to how inspections are to be conducted on homes that have certain areas sealed with insulation in place potentially at a framing inspection. The framing in these areas will need to be inspected prior to insulation installation and interior air barrier. This inspection can be performed along with a sheathing inspection and the builder should notify either by a note in the system on the inspection request or a phone call that this is also an energy star inspection, so these areas can be viewed. The insulation does not have to be seen behind these spaces (tubs, fireplaces, chases and the like) because the home has either a thermal camera check or a third party certifier is used. The remainder of the home must have an insulation inspection but verification of these small areas can be done through the certification process.</p>
Re-org update	<p>Due to an announced reduction in force again for this year similar to last the Department's re-org has been postponed until May 5<sup>th</sup> which is the</p>

	official start date for the new teams. On that date inspectors will receive their new parcel assignments and some builders will see different inspectors on their projects.
Slab sub base fill levels	Issue came up in regards as to what level of fill that can be placed under a slab, the code is verify specific in section R506.2.1 and states “shall not exceed 24 inches for clean sand or gravel and 8 inches for earth”. At issue is the application of #57 stone in a porch or garage application. Areas that are bigger than just a stoop will be looked at the same as a garage slab application. In reviewing the issue with local engineering firms most agree that 4’ of stone in a garage is an allowable level (without engineering) of stone fill but beyond that the condition of the soil should be checked before stone is placed to make sure that it will support the weight of the stone. A small area up against a foundation wall, at deeper levels, used to allow a person access for waterproofing is permissible without triggering the need for engineering.

# **Commercial Plan Review**

Land Use and Environmental Service Agency  
(Code Enforcement)

## **Building Q&A 2010**

First Quarter 2010

### **General:**

1. *(Q) The reference to reach ranges in 309 and 308.2 with 34" maximum height conflicts with the Fair Housing Design Manual for counter heights and locations of outlets and switches. Is this a mistake?*

(A) Sections 1003.9 and 1004.9 by their reference to the building block sections in 308.3.2 do literally limit the height of the obstruction to 34" with a depth of 24" maximum. The ICC/ANSI A117.1 Committee was made aware of this situation during the code change process and has made a specific exception to this for kitchens and bathrooms in Type B dwelling units. This revised text will be in the 2009 A117.1. The Adhoc Committee (John Hitch) decided to recommend to the North Carolina Building Code Council to accept the changes that are being implemented by ICC.

2. *(Q) How is the occupant count calculated for: a. fixed seats, b. fixed seats plus employees and c. waiting area?*

(A) It is up to the Designer to define what the occupant load he designed for and the number of toilet rooms needed. This will need to be looked at on a case by case basis. Loose seats in the waiting area can be calculated at 15. Dryers, hair washing sinks with chairs, pedicure chairs, barber chairs, etc., will need an employee/customer determination from the Designer.

3. *(Q) The riser height for spiral stairs is allowed to be 9.5"; can spiral stairs have open risers?*

(A) Per a verbal response from Barry Gupton, DOI, to Gene Morton, Director of Inspections, you can have open risers where allowed as long as a 4" sphere cannot pass through the opening. Gene has created a formal County interpretation to this. A space limiter can be used and most spiral stairs have a space limiter available.

4. *(Q) Are we requiring a detail for the intersection of a rated floor/ceiling assembly at a rated wall assembly?*

(A) This situation needs to be looked at in plan review. The Designer needs to show how the ratings will be maintained at the joint intersection. There is not a UL design for this that we know of when drywall is used. There is a UL detail when shaft wall

is used. We need a detail at plan review from the Designer showing how they plan for the rating to be maintained, whether it is fire caulking the joint, if the joint is small enough that fire caulk can be used, or if the joint is to be filled with Rock Wool and covered with fire caulk. The fix is not stuffing with fiber glass insulation.

5. *(Q) Are non load bearing partition walls required to be rated or constructed of heavy timber in Type IV construction?*

(A) From Carl Martin, DOI, received 11/12/09, the Code is very clear that it intends for nonbearing partitions to be 1-hour fire resistant rated if they are not constructed as otherwise described in 602.4.6 (ref. 2009 NCBC Table 601, page 83). It is not clear on the rating of penetrations through those partitions. Rated wall penetrations are used in the Code to complete rated walls that compartmentalize spaces or that separate an exit or exit passageway to provide additional safety for persons exiting a building or emergency personnel responding to an event. In paragraph 602.4.6 the intent seems to be to reduce the rate at which the structure of the partition burns. Paragraph 602.4.6 also does not describe the partition as a “fire wall”, “fire barrier”, “fire partition” or “smoke barrier”. The intent of the Code is that as long as the structure of the partition is 1-hour protected, the penetrations are not required to be rated. That is, fire dampers and UL listed penetrations are not required if the structure at the penetration remains 1-hour protected.

6. *(Q) Are walls required in a storage room when it is used as a required exit in a mercantile occupancy?*

(A) Per 1014.2, #2, Exception 2, #2.4 there is to be a demarcated minimum 44” wide aisle defined by full or partial height walls or similar construction that will maintain the required width and lead directly from the retail area to the exit without obstruction. A barrier that will meet these requirements such as a shelf with a back, which would prevent stock from blocking the aisle, would be acceptable.

7. *(Q) Are Coverlight recessed emergency lights acceptable?*

(A) Yes, our inspectors are already accepting them in the field.

8. *(Q) Does Code require a hashed path in a parking lot to the dumpster recycle area?*

(A) No.

9. *(Q) Is ANSI A117.1-03 being taught in the Standard North Carolina Code classes?*

(A) Per a memo from Celestine Phil, with DOI, to Standard Code Instructors received March 5, 2010, ANSI A117.1-03 is a reference document and is not being taught in the Standard Code classes and is not part of the State Inspector exams. However, per 1101.2, the 2003 edition of ANSI 117.1 is part of the Code and will be enforced in Plan Review and in the Field.

10. *(Q) If you have the required accessible fixtures in the toilet rooms and have a sink or sinks outside the toilet room, are they required to be accessible?*

(A) Per an email received from Laurel Wright, DOI, on March 5, 2010: There is no distinction between the lavatories in the restroom and the sinks in the outer area whether the doors are provided or not. 1109.2 addresses the restroom lavatories, 1109.3 addresses the sinks. 1102.1 contains a definition of Accessible as a site, building, facility, or portion thereof that complies with this chapter. The fact that the lavatories in the restroom are accessible does not negate the fact that there is still a requirement to comply with the requirement fewer than 1109.3. There is no applicable exception under 1109.3 that applies to this situation.

11. *(Q) When you have an accessory Assembly area, such as a conference room or board room, with an occupant load of 50 or more per 1008.1.9 panic hardware is required on the exit doors from the room. Do you need panic hardware all the way to the exits from this building whose main occupancy is Business?*

(A) It is not necessary to provide panic hardware beyond the room when you are exiting 50 people or more, into Business occupancy.

12. *(Q) When an instant water heater is installed under an accessible lavatory is a baffle required to protect users from sharp or rough edges?*

(A) Yes.

13. *(Q) Can oversize toilet paper dispensers be installed in accessible toilet stalls?*

(A) No. Per an email from Laurel Wright, DOI, the use of the oversize toilet paper dispenser in the accessible stall is not acceptable because, 1, it is not within the reach ranges, 2, the dispenser placement interferes with the clear use of the grab bar, and 3, the width of the dispenser interferes with the clear floor area required at the water closet in the area between the water closet and the grab bar.



**MECKLENBURG COUNTY**  
Land Use and Environmental Service Agency  
Code Enforcement

**1/13/10 ELECTRICAL CONSISTENCY MEETING**

**Code Consistency Questions**

**1. What is required to meet NEC 695.4 (B) (2) (4)?**

That portion of the code remains unchanged HOWEVER per NCDOT, NEC 695.4(A) is applicable to the disconnect at the generator that feeds the fire pump. It has to be in a separate enclosure but does not have to be sufficiently remote. This is considered a direct connection. Any other breakers allowed in that fire pump circuit will have to be sufficiently remote which we for consistency consider 6'.

**2. NEC Section 250.64(B) states where exposed and on a surface, a grounding electrode conductor should be protected. If I sleeve an 8 AWG GEC in rigid nonmetallic conduit from the service panel to the crawl, do I have to protect the GEC in the crawl, or is it ok to run the GEC on the bottom of the floor joists without protection to the water pipe? It's a 100-amp service with 2 AWG copper. Does that last sentence apply to the whole length by 250.64? I don't think it is subject to being physically damaged in the crawl. The crawl is a little less than 3' high.**

The last sentence of 250.64(B) requires an 8 AWG copper grounding electrode conductor to be protected from physical damage by installing it in rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, electrical metallic tubing, or cable armor, and no exceptions to this requirement. If the conductor is a 6 AWG, it could be judged as not subject to physical damage in the installation described in the question. The solutions are to either size up to 6 AWG or protect it with one of the methods specified in 250.64(B).

**3. Is the use of breakers that are not listed on the panelboard data sheet allowable? Some of these panels have not been made in twenty years and the company is out of business. I generally find surplus breakers on the internet. Some electricians try to get by with breakers that physically fit and if those are**

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rejected, they might get a “classified” breaker. My understanding is that the “classified” breakers are listed for use in specific panels (which is not disclosed in the marketing literature). Am I correct in believing that unless the breaker is listed for use in the specific panel that it is to be used in, it does not meet the code requirement of listed and labeled?

It is imperative to note that it is not a good practice to use “surplus breakers” or “breakers that physically fit.” Doing so could create a potentially unsafe condition. Obviously, it is difficult to determine the operating condition of a surplus circuit breaker, and simply because a circuit breaker fits in a panelboard does not make it correct for installation and use. Since safety is paramount in any electrical installation, the installation and use of appropriate equipment is necessary!

Classified circuit breakers are intended for installation and use in specific panelboards. Such circuit breakers should be marked or information should be provided to indicate the specific panelboards in which they can be installed. If the circuit breaker is not marked or the information is not provided, it is necessary to contact the circuit-breaker manufacturer. The manufacturer should be able to provide such information and it should be readily available.

As a general note, be aware that some circuit breakers are classified only and others are listed and classified. Generally, classified-only circuit breakers are limited to 15- and 20-amperes, 120/240-volts, and a maximum 10,000-ampere short-circuit current rating; they are intended for use in panelboards with a maximum 225-ampere rating. Although not obvious, there is a difference between listed and classified products.

An article in Underwriters Laboratories The Code Authority, 2007 Issue 1, “Molded Case Circuit Breakers,” written by Warren Shilling, provides a good explanation for listed and classified circuit breakers. The article can be viewed at:  
[http://www.ul.com/tca/issues/tca\\_issue\\_1\\_2007.pdf](http://www.ul.com/tca/issues/tca_issue_1_2007.pdf).

#### **4. Article 250.92(A)(2) of NEC requires bonding between service enclosures.**

**I have a meter base can with the grounding electrode conductor connected to the neutral lug going to the grounding electrode. I have a single-phase three-wire**

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service conductor system feeding from the meter can to the service-disconnect panel. The meter base can and the service-disconnect panel is connected by PVC pipe, not metal pipe.

**As I see it, Article 250.92(B)(1) allows bonding equipment (the service-disconnect panel) to the grounded service conductor neutral bar (in the service-disconnect panel). Is this correct, or is an additional bare copper bonding wire jumper required to be connected from the service-disconnect panel neutral bar to the meter base can neutral bar?**

This question deals with use of the grounded conductor for grounding and bonding on the supply side of the service disconnecting means. The stated understanding is correct. The grounding conductor is permitted to be used for grounding and bonding on the supply side of the service disconnecting means. The grounded (neutral) conductor is required to be routed between enclosures and bonded to both, and this is common practice. The supporting NEC references are 250.92(B)(1) and 250.142(A)(1). An additional equipment bonding jumper between the meter socket enclosure and the service disconnecting means enclosure is not required for bonding the enclosures together based on the information provided in the question.

Note that on the load side of the service, disconnecting means (service disconnecting means overcurrent device), separation between the grounded (neutral) conductor is required in accordance with 250.24(A)(5). The grounding electrode conductor connection to the grounding electrode is permitted to be made in either the meter socket enclosure or the service disconnecting means enclosure in accordance with 250.24(A)(1).

Note that some utilities do not permit this connection in the meter socket enclosure by local regulations because of customer accessibility issues.

**5. For a 200-amp load center used for feeding charging equipment that is approximately 400 ft from main switchboard, what size of bonding wire is required?**

The question appears to deal with a voltage-drop situation, but information is missing. To answer the question we are inserting the minimum necessary information. The first item to clarify is the terminology. If we presume the question refers to the size of the equipment grounding conductor with the feeder and not a bonding wire which is undefined by the NEC.

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The next bit of information needed is the size of the ungrounded phase conductors intended to be installed for this feeder. Note: if a voltage-drop calculation is performed for this 400-ft feeder, then the system voltage and phase configuration of the feeder are necessary for the voltage-drop calculation. First we will answer the question without the voltage-drop calculation information since this information is missing.

First, the question is restructured as follows: What is the minimum size equipment grounding conductor required for a feeder (400 feet in length) supplying a panelboard for charging equipment?

For a 200-ampere feeder, a 3/0 copper conductor is generally required by the minimum requirements of the NEC. The minimum size equipment grounding conductor required for a 200-ampere feeder is not less than 6 AWG copper (see 250.122 and Table 250.122). Now if the feeder ungrounded conductors have been increased in size from 3/0 copper to 250 kcmil copper (for example) for voltage drop reasons, then the required equipment grounding conductor must also be increased in size proportionately [see 250.122(B)]. This is done as follows using Table 8, chapter 9 of the NEC:

Using Table 8, Chapter 9

Required size 3/0 AWG = 167,800 cm

Adjusted size 250 kcmil = 250,000 cm

Adjusted size phase conductor ÷ Required phase conductor size =  $250,000 \div 167,800 = 1.49$

The multiplier is 1.49. The size of the ungrounded circuit conductors has been increased 149%; therefore, the equipment grounding conductors must be increased 149% as well, per 250.122(B).

Required equipment grounding conductor = 6 AWG copper (Table 250.122 based on 200 ampere overcurrent protection for the feeder)

Using Table 8, Chapter 9

6 AWG =  $26,240 \text{ cm} \times 1.49 = 39,097.6 \text{ cm}$

According to Table 8, a 4 AWG copper is required = 41,740 cm

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The minimum size equipment grounding conductor for this 200-ampere feeder is a 4 AWG copper conductor. The answer is based on NEC-2008, Sections 250.122, Table 250.122, and Chapter 9, Table 8 (conductor properties).

**6. When using a 90°C single conductor in an ambient temperature of 81°C – 89°C, what is the correction factor for this application? It is presumed once the temperature reaches 90°C the conductor has met or exceeded its rating. Is there ampacity present in this conductor at 85°C, however minimal it may be?**

There is no clarification or note in the *NEC* to address this issue. Since the table stops at 80°C, the 9-degree temperature omission is left up to inspectors and contractors to interpret and to argue this issue in the field. This issue has arisen due to photovoltaic module installation. The modules are sold with factory installed 90°C USE-2 or RHHW-2 single insulated conductors. These modules are sometimes installed close to roof surfaces with little airflow (building integrated photovoltaics), trapping heat under the module where the conductors are located. Therefore, the conductor may be exposed to ambient temperatures in excess of 80°C. Article 690 doesn't address this issue either. Table 310.16 has the same issue, although it is for cables or conductors installed in raceways.

As the question states there are no correction factors in 81–90 degree column; this is a good place for a code change.

The code issue here is NEC 310.10 that states, “No conductor shall be used in such a manner that its operating temperature exceeds that designed for the type of insulated conductor involved. In no case shall conductors be associated together in such, with respect to the type of circuit, the wiring method employed, or the number of conductors, that the limiting temperature of any conductors, that the limiting temperature of any conductor is exceeded.”

The problem here is that some people want to use the highest temperature the conductor will ever see for the correction factor when you only need to use the average high-ambient temperature depending on what climate you are in. Some average outdoor ambient temperatures for selected cities during the period of June to August are shown below. These temperatures are based on ASHRAE *Handbook of Fundamentals* 2 percent design temperatures and are measured in the shade, not in the sun.

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**City Average high ambient:**

Phoenix, AZ 109.5°F  
 Bakersfield, CA 102.7°F  
 Los Angeles, CA 78.6° F  
 Long Beach, CA 86.9°F  
 Palm Springs, CA 110.9°F

We all realize that the solar equipment is in the sun, hopefully. This may add to the actual temperature as it did for raceways on roofs exposed to direct rays of the sun. NEC-2008 had a proposal with two code cycles of testing substantiations that was accepted to have a correction adder for raceways in direct rays of the sun on a roof [310.15(B)(2)(c)]. Panel 6 has seen no testing, or request for conductors, or for solar equipment, or ampacity correction in direct rays of the sun for solar to have an adder to the correction factors. Panel 6 will need true documented testing photos, etc., before the panel will act.

At this time, we can only require the average high temperature for our calculations.

For example, Palm Springs has an average high temperature of 110.9°F. For single conductors we are allowed to use Table 310.17 for the allowable ampacities. Using a 90 degree, 10 AWG rated at 55 amps x .87 at 110 degrees = 47 allowable amps.

The higher temperatures are not prolonged, they may be for a few hours a day and probably periodic through the year. Section 310.10 FPN No.1 explains. “The temperature rating of a conductor [see Table 310.13 and Table 310.61] is the maximum temperature, at any location along its length that the conductor can withstand over a prolonged time period without serious degradation. The allowable ampacity tables, the ampacity tables of Article 310 and the ampacity tables of Annex B, the correction factors at the bottom of these tables, and the notes to the tables provide guidance for coordinating conductor sizes, types, allowable ampacities, ampacities, ambient temperatures, and number of associated conductors.”

Some examples of the affect on conductor ampacity when temperature adders for conductors in raceways in direct sunlight on rooftops are applied are shown below.

*Example 1:*

12 AWG THHW-2 in 1/2 in. RNC or EMT installed with the bottom of the RNC or EMT 1/2 in. or less above the rooftop (most severe condition)

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Table 310.16 90°C ampacity = 30 amps @ ambient temperature of 30°C.  
Temperature adder from Table 310.15(8)(2)(c) for raceway location = 33°C.  
Adjusted ambient temperature = 63°C (30°C + 33°C).  
Table 310.16 correction factor for 63°C ambient, 90°C conductor = 0.58.  
Adjusted ampacity (30 amps x 0.58) = 17 amps.  
240.2 overcurrent protection limitation = 20 amps.  
Since the adjusted ampacity is 17 amps, the standard fuse or circuit breaker rating would be 20 amps [see 240.2(8)].

#### Example 2:

3/C 500 kcmil THHW-2 in 2 1/2 in. RNC or EMT (NEC Table C.I) installed with the bottom of the RNC or EMT 3 1/2 in. to 12 in. above the rooftop.

Table 310.16 90°C ampacity = 430 amps @ ambient temperature of 30°C.  
Temperature adder from Table 310.15(8)(2)(c) for raceway location = 17°C.  
Adjusted ambient temperature = 47°C (30°C + 17°C).  
Table 310.16 correction factor for 47°C ambient, 90°C conductor = 0.82.  
Adjusted ampacity (430 amps x 0.82) = 353 amps.  
Comparison: Table 310.16 75°C ampacity = 380 amps @ ambient temperature of 30°C

As readily seen above, the further from the roof, the more circulation is available. However, this Code change was for raceways and there were no proposals for solar conductors, unless they are in a raceway on the roof.

### **7. Is pull out disconnect covered under 404.8(A). If so does exception #2 apply to a water heater?**

Yes exception 2 would apply to a water heater. The exception is allowable only if the appliance is located in an elevated position so that the disconnect needs to be elevated to assure it is in sight when the unit is being serviced or replaced.

## EVENTS & UPDATES

- 1) NCBCC Update
- 2) Re-org update
- 3) Focus on inspections called in when not ready
- 4) CE credits



**MECKLENBURG COUNTY**  
Land Use and Environmental Service Agency  
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**2/10/10 ELECTRICAL CONSISTENCY MEETING**

**Code Consistency Questions**

**1. We are connecting 2 x 4 lay-in fluorescent fixtures in a suspended ceiling, and I am being told that you cannot daisy chain the connections to fixtures. I am using type MC cable with a ground and the lengths in some cases do exceed 6'. Am I in code violation and what code would reference this?**

2 x 4 lay-in style fluorescent luminaires are permitted to be wired with any branch circuit wiring method in chapter 3 of the NEC, depending on the type of building construction it is being installed in. The question indicated that the luminaires are being wired using MC cable that is run from one luminaire to the next, using the ballast compartment as a junction box. As long as the luminaire is listed for this connection to the branch circuit, there is no Code requirement that would prohibit this installation. There is no length limitation in the NEC for MC cable that is installed as a branch circuit.

Going a step further for clarification, if we are talking about  $\frac{3}{8}$  in. fixture whips that include 18 AWG fixture wire, these are limited for use in 6 foot lengths to connect to a full size branch circuit in junction box typically located above the luminaire in a ceiling access space. The section that permits the use of these fixture whips (fixture tap conductors) is 210.19(A)(4), Exception 1(b) that refers to 410.117(C). This section permits the tap conductors in lengths not less than 18 inches and not longer than 6 feet, to connect to the branch circuit conductors. That being said, if the MC cable referred to in the question are factory whips that contain only tap conductors (18 AWG), then the installation described in the question is in violation of the NEC.

The next 6-foot restriction is in 250.118(5) and restricts flexible metal conduit from being used as an equipment grounding conductor in lengths exceeding 6 feet. Where an equipment grounding conductor is provided in flexible metal conduit, this length restriction is not applicable. There is no length limitation for flexible metal conduit unless it is  $\frac{3}{8}$  in. size and used for fixture tap conductor connections, once again the reference in 348.20(A)(2)(c) points to 410.117(C). However, the question does not deal with flexible metal conduit; it deals with MC cable installed as a branch circuit.

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Article 330 covers MC cable and 330.10(A) provides the general uses for MC cable. Section 330.10(A)(1) indicates that MC cable can be used for branch circuits (without length limitations). Section 330.12, Uses Not Permitted, does not indicate that MC cable cannot be used in lengths longer than 6 feet. Type MC cable is recognized as providing equipment grounding conductor path when it meets the provisions in 250.118(10). There is no length limitation here either.

As long as the 2 x 4 lay-in luminaires are connected to the full size branch circuit (MC cable) conductors (usually 12 AWG with equipment grounding conductor), and the luminaire includes a junction box (ballast compartment) that is recognized for use as a junction point for branch circuit conductors), then the installation as described would meet the minimum requirements in the NEC. If the question is, Can I daisy chain the luminaires with the  $\frac{3}{8}$  in. flexible metal conduit whips that typically are provided with the luminaires, the answer is no because these conductors are only tap conductors (usually 18 AWG) and not full size branch circuit conductors. See the information and Code sections provided in the first paragraph.

## **2. What's the correct application of NEC 300.4(F)? If a 4 AWG or larger conductor is being installed in EMT with an insulated throated connector, would an insulated bushing be required?**

NEC Section 300.4(G) says: "...the conductors shall be protected by a substantial fitting providing a smoothly rounded insulating surface..." and does not specifically require a bushing. The bushing is only mentioned in the second paragraph in regard to a different requirement of 300.4(G).

The idea is to have an insulated surface contacting the conductor, and an insulated throat connector accomplishes this.

## **3. Does the NEC require a ground rod in addition to an equipment-grounding conductor run with the branch-circuit conductors to each metal lighting pole in a parking lot? The ampere rating of the branch circuit is 50 amperes.**

Each metal lighting pole must be grounded to comply with Section 250.96 and 250.110.

Grounding of the metal lighting poles is required by Part V of Article 410. The equipment-grounding conductor must be of the type specified in Section 250.118 and sized to comply with Section 250.122. According to Section 250.122, the minimum size equipment-grounding

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conductor cannot be smaller than 10 AWG copper or 8 AWG aluminum.

Where a separate equipment-grounding conductor and ground rod at each pole is specified, it must be provided in addition to the grounding required by Article 250. This additional grounding of each lighting pole is probably provided to limit damage should any lighting pole be struck by lightning.

The grounding electrode should be at least 8 feet long and 0.5 inch in diameter. The grounding conductor should be at least 10 AWG copper but 6 is usually the minimum specified. The ground rod should be driven to the surface or below the surface of the earth.

It is noted that a 50-ampere branch circuit is used for these luminaires. Where 50-ampere circuits are used, mogul base screw-shell lampholders are required by Section 410.62(C)(2).

#### **4. Does the NEC allow more than one nonmetallic cable entry in a single knockout in a one-, two- or three-gang outlet box?**

For a single-gang box, this information is furnished from the Guide Information for Electrical Equipment Directory published by Underwriters Laboratories Inc.: “A box nominally 2.25 by 4 inch or smaller is intended for one or more nonmetallic sheathed cables to enter through a single or multiple stage knockout opening.” For boxes marked “Nonmetallic Sheathed Cable Only,” clamps have been tested for securing only one cable per clamp, except multiple section clamps are considered suitable for securing one cable under each section of the clamp, each entering a separate knockout.

An exception to Section 314.17(C) permits multiple cable entries through a single knockout for boxes not larger than 2.25-by-4 inches. It is not necessary to secure the cable to the box where the cable is secured within 8 inches of the box and the cable sheath extends at least 0.25-inch into the box.

The last sentence in Section 314.17(C) requires that nonmetallic sheathed cable be secured to the box except for the single gang box covered by the exception.

#### **5. Is it permissible to terminate 12 AWG nonmetallic cable Type NM-B on a 15-ampere overcurrent device? The homeowner supplies 12 AWG copper conductors and 15-ampere overcurrent devices for branch-circuit protection. The language in Sections 240.3 and 310.15 recommends protection at the assigned capacities.**

Yes, this is permissible. In fact it is often required to comply with the NEC. For example,

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where there are seven current-carrying conductors in a single raceway, the ampacity of a 12 AWG copper conductor is reduced to 14 amperes (0.70 20), and 15-ampere overcurrent protection is required. Where compensating for voltage drop, larger size wires are selected and overcurrent protection is based on the load served. Fine Print Note No. 4 in Section 210.19(A)(1) recommends a maximum voltage drop of not more than 5 percent for feeders and branch circuits to provide reasonable efficiency of operation. A similar Fine Print Note No. 2 appears in Section 215.2(A)(3). Both FPNs recommend a total voltage drop on branch circuits and feeders of not more than 5 percent. This will require oversize conductors on some branch circuits.

## **6. Does the NEC require marking of GFCI-protected receptacles connected downstream of a GFCI-protected branch circuit?**

All 15- and 20-ampere receptacles installed in dwelling units at these locations must have GFCIs for the receptacles: bathrooms, garages, outdoors, crawl spaces, unfinished basements, kitchens, laundry, utility and wet bar sinks, and boathouses. These requirements apply to new construction and are in Section 210.8(A).

In existing dwelling units, replacement receptacles can be grounding- or nongrounding-type receptacles to comply with Section 406.3(D). Part (2) of this section requires GFCI-protected receptacles where other parts of the NEC require them. Where there is no equipment-grounding conductor in the receptacle box, a nongrounding-type receptacle is permitted.

Where a nongrounding receptacle is being replaced at a location that requires a GFCI-protected receptacle and an equipment-grounding conductor is not in the receptacle box, the GFCI receptacle must be marked “No Equipment Ground” to comply with Section 406.3(D)(3)(b).

Grounding-type receptacles may be used as replacements for nongrounding receptacles on GFCI-protected branch circuits where the receptacles are marked “GFCI Protected” and “No Equipment Ground.” See part (C) of Section 406.3(D)(3)(c).

## **7. Can Type NM cable be used as an exposed wiring method for 277V high-bay fixtures in a warehouse?**

No, Type NM cable is permitted to be installed in other than dwelling-type occupancies that are of Types III, IV and V construction. However, in accordance with 334.10(3) in these occupancies, Type NM cable must be concealed within walls, floors or ceilings that provide a thermal barrier that have a 15-minute finish rating. The voltage rating is not the problem. Type NM cable is rated for use at 600 volts.

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## 8. May nonmetallic outlet boxes be used with metal raceways?

Although not permitted by the basic requirements in Section 314.3, two exceptions allow their use where bonding can be provided between all metal raceways and metal armored cable entries. Here is what the exceptions say: “Exception No. 1: Where internal bonding means are provided between all entries, nonmetallic boxes shall be permitted to be used with metal raceways or metal-armored cables.” Exception No. 2 also allows nonmetallic boxes: “Where internal bonding means with a provision for attaching an equipment bonding jumper inside the box are provided between all threaded entries in nonmetallic boxes listed for the purpose, nonmetallic boxes shall be permitted to be used with metal raceways or metal-armored cables.”

## 9. A manufactured wiring system uses Type MC Cable. Does this wiring method need to be secured in accordance with the requirements in Article 330, or is it exempt from these requirements because it is part of a manufactured wiring system?

Securing and supporting of Type MC cable must comply with the rules in Article 330. Section 604.7 reads: “Installation. Manufactured wiring systems shall be secured and supported in accordance with the applicable cable or conduit article for the cable or conduit type involved.”

Type MC cable must be secured every 6 feet unless the cable contains four or fewer conductors not larger than 10 AWG; then, the cable must be secured within 12 inches of every box, cabinet, fitting or other cable termination. Unsupported cables are permitted where fished or run between luminaires in accessible ceilings.

## 10. I currently have a retirement home with a 2,500-amp, 480-volt, three-phase service. It has an emergency generator for some of its emergency lighting, and other parts of the facility have battery-backup exit signs and bug eyes. The facility wants to install a new 500-kW backup generator for the whole facility. They want to interrupt the line between the main disconnect switch and the main distribution panel to install a transfer switch, which would provide power to the whole facility if they lose their permanent power. My concern with this is that all of the power, both emergency and normal building power, would transfer at the same time. Is this allowed by Code? If it is allowed, I would think the automatic transfer switch would need to be 2,500 amps to match the main disconnect switch. I look forward to your comments on this.

A single transfer switch cannot be used to transfer the total load to the emergency system. The

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2008 edition of the NEC in Section 700.6(D) requires a transfer switch that supplies emergency loads only. This transfer switch must be listed for emergency system use by part (C) of Section 700.6.

Where a legally required standby system also is necessary, a separate transfer switch listed for legally required standby systems or emergency systems must be provided to comply with Section 701.7(C). The legally required standby system may also supply the optional standby system with load shedding as permitted by Section 701.6. If preferred, a transfer switch (manual or automatic) may be provided for the optional standby loads (see Sections 702.5 and 702.6).

Since the 500-kW generator probably cannot provide power to all of the remaining load that is not part of the emergency or legally required standby loads, a manual transfer switch should be provided for the optional loads so that these loads can be selected to prevent overloading of the generator while it is delivering power to the emergency and legally required loads.

**11. We installed a new transfer switch for an emergency system in a three-story commercial building. The electrical inspector has rejected this installation because the transfer switch is not marked for “emergency systems.” Is there a special marking for transfer switches that are marked “emergency systems?”**

Yes, there are differences in transfer switches and those that are acceptable for use in emergency systems are marked “Automatic Transfer Switch for Emergency Systems.” This information is obtained from the 2008 edition of the directory for Guide Information for Electrical Equipment (White Book) published by Underwriters Laboratories Inc.

There are a number of different types of transfer switches, and some are not suitable for installation on emergency systems. For this reason, a sentence was added to Section 700.6(C) in the 2008 NEC that reads: “Automatic transfer switches rated 600V AC and below, shall be listed for emergency system use.”

**12. Is nonmetallic sheathed cable an acceptable wiring method for a three-unit apartment building that is being constructed as a Type II building even though the building code permits Type III construction?**

Where Type III construction is permitted but not used, Section 334.10(2) allows the use of nonmetallic sheathed cable as the wiring method. Under item (2) nonmetallic sheathed cable is allowed in multifamily dwellings permitted to be of Types III, IV and V construction, and the question indicates that Type III construction is permitted but the owner has decided to use Type

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II construction on the building.

**13. What is the hazardous area classification for a quick oil-change building? Is any area in the building classified as a Division 1 or 2 location?**

The requirements in Article 511, Commercial Garages, Repair and Storage, were rewritten in the 2008 edition of the NEC. This material was extracted from NFPA 30A-2008, Code for Motor Fuel Dispensing Facilities and Repair Garages.

Garages are classified as major or minor repair facilities with definitions for each in Section 511.2. The oil change building would be classified as a minor repair garage if services are limited to lubrication, inspection and minor automotive repair work, such as engine tune ups; parts replacement; fluid changes that include oil, antifreeze, transmission fluid, brake fluid and air conditioning refrigerants; brake system repairs; tire rotation; and similar routine maintenance work. Also included are associated floor space used for offices, parking or showrooms.

Any pit, below-grade work area or subfloor work area is a Class 1 Division 2 location that extends up to the floor level, where ventilation is not provided. For the area to be unclassified, ventilation of at least 1 cubic foot per minute of the below-grade floor area must be provided during the time the building is occupied or when vehicles are parked in or over this area. The air intake for the below-grade work area must be within 12 inches of the subfloor work area.

Unclassified areas include those adjacent to classified areas, such as stock rooms, switchboard rooms and other similar locations in which flammable liquids or vapors are not likely to be released.

**14. When do porches have to be wired using UF cable and not Romex?**

Article 334.12(B)(4) states Nonmetallic Sheathed Cable shall not be used In Wet or Damp Locations.

Nonmetallic Sheathed Cable maybe used in locations where the cable is enclosed within the walls, ceilings or floors of a structure that is not subject to the weather. The Nonmetallic Sheathed Cable must terminate in an approved box that is covered with an approved fixture, device or cover that is approved for a Wet or damp location.

**15. Is CAFCI protection required in a closet that only has access through a**

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**bathroom?**

Yes, per 210.12(B)

**16. Is a pantry part of the kitchen or is it considered a closet that requires AFCI protection?**

If the pantry is in the kitchen then 210.52 (B) requirements apply.  
If the pantry is not in the kitchen then it's a closet and 210.12(B) requirements apply.

**EVENTS & UPDATES**

- 1) AFCI Update
- 2) Modular Metering Update
- 2) Re-org Update



**MECKLENBURG COUNTY**  
Land Use and Environmental Service Agency  
Code Enforcement

**3/10/10 ELECTRICAL CONSISTENCY MEETING**

**Code Consistency Questions**

**1. Can you splice copper clad aluminum and copper conductors under the same lug?**

**UL 486C.**

10.4 A connector that accommodates a single conductor in an opening shall be marked with the following or equivalent wording, as applicable:

- a) "CU" for copper conductor only;
- b) "AL" for aluminum conductor only;
- c) "AL-CU" or "CU-AL" for aluminum, copper-clad aluminum, and copper conductor;
- d) for an insulated connector, the marked voltage rating shall be: "300 volts maximum", "600 volts maximum", or "600 volts maximum, building wiring; 1000 volts maximum, signs or luminaires". The marking may be on the unit container or on an information sheet packed in the unit container; and
- e) with the operating temperature rating for which the insulated connector has been found capable of being used. See also [10.14](#) d).

10.5 **The unit container or an information sheet packed in the unit container of a connector that accommodates two or more conductors in the same opening shall be marked with the following or equivalent wording, as applicable:**

- a) "CU " for copper conductor only;
- b) "AL " for aluminum conductor only;
- c) "AL-CU " or "CU-AL " for copper to copper, or copper-clad aluminum to copper-clad aluminum, or aluminum to aluminum conductor, but not intermixed;
- d) **"AL-CU (intermixed - dry locations)" or "CU-AL (intermixed - dry locations)" for copper to aluminum conductor; for copper-clad aluminum to copper; and for copper-clad aluminum to aluminum.**
- e) for an insulated connector, the marked voltage rating shall be: "300 volts maximum", "600 volts maximum", or "600 volts maximum, building wiring; 1000 volts maximum, signs or luminaires". The marking may be on the unit container or on an information sheet packed in the unit container;
- f) with the operating temperature rating for which the insulated connector has been found capable of being used. See also [10.14](#) d); and

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g) with the complete or a partial list of intended conductor combinations.

The 09 UL White Book Category RTRT (receptacles) and WJQR (snap switches) has the information for the marking required for the use of copper-clad aluminum and aluminum conductors.

#### RECEPTACLES FOR PLUGS AND ATTACHMENT PLUGS (RTRT)

##### TERMINALS

Terminals of 15 and 20 A receptacles not marked "CO/ALR" are for use with copper and copper-clad aluminum conductors only. Terminals marked "CO/ALR" are for use with aluminum, copper and copper-clad aluminum conductors.

Terminals of receptacles rated 30 A and above not marked "AL-CU" are for use with copper conductors only. Terminals of receptacles rated 30 A and above marked "AL-CU" are for use with aluminum, copper and copper-clad aluminum conductors.

##### SNAP SWITCHES (WJQR)

Terminals of 15 A and 20 A switches not marked "CO/ALR" are intended for use with copper and copper-clad aluminum conductors only. Terminals marked "CO/ALR" are for use with aluminum, copper and copper-clad aluminum conductors.

Screwless pressure terminal connectors of the conductor push-in type are intended for use only with copper and copper-clad aluminum conductors.

Terminals of switches rated 30 A and above not marked "AL-CU" are intended for use with copper conductors only. Terminals of switches rated 30 A and above marked "AL-CU" are for use with aluminum, copper and copper-clad aluminum conductors.

## 2. What are the electrical requirements for bathroom remodel jobs?

The existing policy reads as follows:

Receptacles in existing bathroom remodels, where not reasonably accessible, will be allowed to remain on existing circuit and GFCI protection will be added.

## 3. What do I need to do to get my sign inspected when it's going to be installed on the side of a high rise building?

It is an expectation that prior to the installation of electrical equipment in virtually impossible

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areas to get to, the inspector is to be called before the equipment is installed (while on the ground); then after the actual installation in the difficult to reach area. This not only pertains to signs but other electrical equipment.

**4. Can I run type S O cord as a fixture whip to a track light? How about to an electric discharge luminaire?**

No.

410.151(A) Lighting Track. Lighting track shall be permanently installed and permanently connected to a branch circuit. Only lighting track fittings shall be installed on lighting track. Lighting track fittings shall not be equipped with general-purpose receptacles.

400.7 Uses Permitted.

(A) Uses. Flexible cords and cables shall be used only for the following:

- (1) Pendants
- (2) Wiring of luminaires
- (3) Connection of portable luminaires, portable and mobile signs, or appliances
- (4) Elevator cables
- (5) Wiring of cranes and hoists
- (6) Connection of utilization equipment to facilitate frequent interchange
- (7) Prevention of the transmission of noise or vibration
- (8) Appliances where the fastening means and mechanical connections are specifically designed to permit ready removal for maintenance and repair, and the appliance is intended or identified for flexible cord connection
- (9) Connection of moving parts
- (10) Where specifically permitted elsewhere in this Code

(B) Attachment Plugs. Where used as permitted in 400.7(A)(3), (A)(6), and (A)(8), each flexible cord shall be equipped with an attachment plug and shall be energized from a receptacle outlet.

Exception: As permitted in 368.56.

400.8 Uses Not Permitted.

Unless specifically permitted in 400.7, flexible cords and cables shall not be used for the following:

- (1) As a substitute for the fixed wiring of a structure

Yes, and Maybe.

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410.62(C) Electric-Discharge Luminaires.

(1) Cord-Connected Installation. A luminaire or a listed assembly shall be permitted to be cord connected if the following conditions apply:

- (1) The luminaire is located directly below the outlet or busway.
- (2) The flexible cord meets all the following:
  - a. Is visible for its entire length outside the luminaire
  - b. Is not subject to strain or physical damage
  - c. Is terminated in a grounding-type attachment plug cap or busway plug, or is a part of a listed assembly incorporating a manufactured wiring system connector in accordance with 604.6(C), or has a luminaire assembly with a strain relief and canopy having a maximum 152 mm (6 in.) long section of raceway for attachment to an outlet box above a suspended ceiling

Can't be done if in a place of assembly.

**5. When adding a smoke alarm in an existing dwelling that is wired with a non-grounded two wire system, does the box need to be grounded when fed from the existing system?**

Yes, Since it's a new circuit it will have to meet current code and be installed according to 250.130 ( C)

**6. In dwellings that have been designed for a stackable washer and dryer that is supplied by a 30 amp 240 volt circuit, do I have to install an additional 20 amp 120 volt circuit?**

Yes, per 210.11 (C) (2) and 210.52 (F) at least one 20 amp receptacle shall be installed.

**7. I installed a 120 volt electric baseboard heater in an existing bedroom; does this have to be AFCI protected?**

Yes, 210.12(B) states: All 120-volt, single phase, 15- and 20-ampere branch circuits supplying outlets installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas shall be protected by a listed arc-fault circuit interrupter, combination-type, installed to provide protection of the branch circuit.

This has been confirmed with NCDOI

**8. A grounding electrode conductor is installed to the first five feet of the water pipe grounding electrode. We are cutting loose the metal water pipe and abandoning it. It will be replaced with**

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**plastic pipe system. We left the GEC connected to the metal pipe system. The inspector is requiring me to drive a 2 ground rods, is he correct?**

The inspector is correct. If the metal water pipe has been disconnected then it no longer serves as the grounding electrode thus requiring 2 rods to be driven.

**9. If I use one of the new energy efficient florescent light bulbs in an incandescent fixture does the screw in” florescent bulb have to be covered with a glass globe if it is in a clothes closet? How far does the fixture have to be from the storage area in the closet?**

Yes it must have a glass globe.

It has to meet the space requirements for an incandescent luminaire found in 410.16 (C).

## **EVENTS & UPDATES**

- 1) April 6 & 7 NC Electrical Institute
- 2) Re-Org Update
- 3) Infloor heating systems
- 4) Industrial Machinery
- 5) CAECA's Mtg March 18, Selective OCP
- 6) Paperless

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# **Commercial Plan Review**

Land Use and Environmental Service Agency  
(Code Enforcement)

## **Electrical Q&A 2010**

**First Quarter 2010**

### **General:**

1. *(Q) When can flexible cord be used as a wiring method to supply a feeder to a panel?*  

(A) When one of the conditions listed in NEC 400.7 (A) are specifically met and none of the conditions listed in NEC 400.8 apply.
2. *(Q) In banks or office buildings receptacle loads are based on either 220.14(K)(1), the calculated load from 220.14(I), or 220.14(K)(2), 1-va per square foot, based on whichever is the largest load. Is it additionally allowed to apply either Table 220.42 or Table 220.44 to either load determined by 220.14(K)?*  

(A) No, because in Table 220.42 there is no demand for Banks and Offices. Yes, because in Table 220.44 with either 220.14(K) (1) or (2) or 220.14(I) if your load is over 10k you take a 50% demand.
3. *(Q) How do you determine if a Health Care Facility is required to meet the requirements of NEC as described in Article 517?*  

(A) If a project is for work done in any health care facility and/or appears to have a Patient Care Area; Code Enforcement will inquire how the project meets the requirements of National Electrical Code (NEC) Article 517 if the requirements are not already found in the permitting and plans submittal documents.

Patient Care Areas are defined as any portion of a health care facility wherein patients are intended to be examined or treated. Areas of a health care facility in which patient care is administered are classified as general care areas or critical care areas. The governing body of the facility designates these areas in accordance with the type of patient care anticipated and with the definitions of the area classification.

The Fine Print Note (FPN) in the NEC indicates that business offices, corridors, lounges, day rooms, dining rooms, or similar areas typically are not classified as Patient Care Areas.

For a Health Care Facility to be exempt from the Patient Care Area requirements, the owner or governing body of the facility needs to submit a letter stating that the facility at the said location will not examine or treat patients as defined by the NEC.

4. *(Q) A Health Care Facility with two operating rooms and two recovery rooms is located in a medical office building.*

*(a) Should the essential electrical system be installed per NEC 517.30 through 517.35, or by NEC 517.40 through 517.44 or by NEC 517.45?*

*(b) An air condition unit for the critical care areas is powered from the critical branch of the emergency electrical system. Does this violate the requirements of NEC 517?*

(A) (a) The NEC Code references are 517.30 Hospitals, 517.40 Nursing Homes and Limited Care Facilities, 517.45 Other Health Care Facilities. In section 517.45 (C) it indicates that where critical care areas are present, the essential electrical distribution system shall be as described in 517.30 through 517.35. In 517.31 it refers to this as the emergency system divided into two mandatory branches: the life safety branch and the critical branch.

(b) The issue is can an air conditioning unit for the critical care area be powered from the critical branch, or does it go on the equipment branch? 517.33 (A) gives a check list of what can go on the critical branch. Item (9) says selected power circuits needed for effective hospital operation. This would be determined by the Medical Authority (not the Designer). If the Medical Authority determines that the A/C unit is essential to the life safety of the patient and needs to be on the critical branch then it shall be required. However, the Plans Examiner may ask for a letter of documentation for our records and attach a copy to the field and office drawings for equipment that would seem questionable. This would be on a case by case basis and left to the discretion of the Plans Examiner.

5. *(Q) What is the definition of a battery room?*

(A) An area where battery storage occurs, not necessarily a room. In most cases the building HVAC will provide adequate ventilation. If additional is required and the battery capacity is 50 gallons or less, then the venting requirements would be subject to the NC Mechanical Code. If the battery capacity is more than 50 gallons, then the venting requirements would be subject to the NC Mechanical Code and the NC Fire Code.

In the NEC, 480.1 scope states: "THE PROVISIONS OF THIS ARTICLE SHALL APPLY TO ALL STATIONARY INSTALLATIONS OF STORAGE BATTERIES." Hydrogen gas can be explosive in heavy concentrations. Most storage battery locations would not be considered as classified, which would require compliance with Article 501. In most cases, installation of required ventilation in accordance with Section 480.9 would be sufficient. Classification of areas depends upon a number of factors - in this case, the quantity and type of batteries installed, the amount of hydrogen gas given off by the batteries, the size of the area or room, the design engineering, the manufacturer's instructions, and the work or other activities taking place in the area.

# Mechanical Q&A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## General:

- 1) *(Q) Do contractors have to perform load calculations on HVAC exact equipment replacement?*

**(A) We as a department would not require a load calculation on exact equipment replacement provided we didn't see anything that looked out of place. However, the Licensing Board has recently ruled that they will be requiring the calculation on ALL jobs including exact equipment replacement.**

- 2) *(Q) Do contractors have to install zone systems on new structures?*

**(A) The Mechanical Code, section 312 points to ASHRAE (ACCA for residential) for calculating a structures heating and cooling loads. The State Board of Examiners rules state: (newsletter)**

**21 NCAC 50 .0505 GENERAL SUPERVISION AND STANDARD OF COMPETENCE**

(d) Every newly installed residential heating system, air conditioning system or both shall be designed and installed to maintain a maximum temperature differential of 4 degrees Fahrenheit room-to-room and floor to floor. On multilevel structures, contractors are required to either provide a separate HVAC system for each floor or to install automatically controlled zoning equipment for each level with individual thermostats on each level to control the temperature for that level. The seasonal adjustment needed to maintain the **4 degree** Fahrenheit room-to-room and floor-to-floor maximum temperature differential shall not be accomplished through the use of manual dampers.

(e) All licensed HVAC contractors are required to perform a thorough room-by-room load calculation for all new residential structures prior to installing heating systems, air conditioning systems, or both which calculations shall be specific to the location and orientation where the HVAC system or equipment is to be installed. A written record of the system and equipment sizing information shall be provided to the owner or general contractor upon request and a copy shall be maintained in the job file of the licensee for a minimum of six (6) years.

(f) When either a furnace, condenser, or air handler in an existing residential heating or air conditioning system is replaced, the licensed HVAC contractor is required to perform a minimum of a whole house block load calculation. When a furnace, condenser or air handler in a residential heating or air conditioning system is replaced, it is the responsibility of the licensee to ensure that all systems and equipment are properly sized. The licensee may utilize industry standards, reference materials, evaluation of the structure, and load calculations. A written record of the system and equipment sizing information shall be provided to the homeowner, owner or general contractor upon request and a copy shall be maintained in the job file of the licensee for a minimum of six (6) years. If a load calculation was not performed or if a load calculation was performed and it is later determined by the Board that the

# Mechanical Q&A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## General continues:

- unit installed was undersized or oversized, the installation will be considered as evidence of incompetence.
- 2) (Q) *Do the installation of zone systems require an electrical permit?*  
(A) The installation of low and line voltage wiring and components typically found in HVAC systems are required to be permitted by an electrical contractor and inspected.
  - 3) (Q) *Do fire logs have to be complete on a final inspection?*  
(A) Everything but the ceramic logs must be complete.
  - 4) (Q) *Do condensate lines installed in unconditioned space require insulation?*  
(A) The traps would require insulation of R6.5 but not the pipe.
  - 5) (Q) *Where does the zone damper motor have to be placed?*  
(A) Wherever the manufacturer requires. It still must be accessible.
  - 6)✓ (Q) *May flue condensate discharge indirectly into a water heater safety pan drain?*  
(A) No
  - 7)✓ (Q) *May a single hvac system supply conditioned ari to more than one tenant space?*  
(A) Yes provided that the system is zoned such that each space may controlled from within the tenant space or the spaces are controlled by a energy management system by the building owner.
  - 8)✓ (Q) *Is equipment installed outside a structure subject to Zoning set back requirements?*  
(A) Yes
  - 9)✓ (Q) *Does the equipment (i.e. coil /condensing unit) have to match when replacing one part of the system?*  
(A) The replacement of one of the components with a unit having a higher sear rating has to be supported by the equipment manufacturer. The older component cannot cause the replacement to operate at a reduced efficiency.
  - 10)✓ (Q) *Can a contractor call in and have the department create an RQ (request for service) to investigate work performed without permits?*  
(A) We will create RQ's and investigate complaints where perpetrators are still on the site installing equipment. Complaints of work done long past will be routed to the NC Board of Examiners. A homeowner may still file a complaint about work performed in their home.

# Mechanical Q&A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## Ventilation:

- 1) *(Q) May you use CO<sup>2</sup> detectors to reduce the ventilation air requirements found in Chapter 4?*  
**(A)** The rates established in table 403.3 shall be provided unless statistical data supports alternate anticipated occupant density. However, the use of CO<sup>2</sup> detectors, placed 5 to 6 feet above the finish floor in the return air path may be used to operate a variable speed system. The designer shall submit his/her proposal for consideration. The Code Official will determine the acceptable minimum ventilation rate taking into consideration the building equipment makeup air requirements.
- 2) *(Q) Are there any ventilation requirements on lead acid battery backup systems of less than 50 gallon capacity?*  
**(A)** Yes, section 502.4.1 of the NCMC requires that the concentration of hydrogen be limited to less than 1% of the room volume. If the designer can show that the capacity of the batteries is less than 50 gallons and the hydrogen generated WILL NOT reach the listed threshold, then the normal ventilation required by table 403.3 will be sufficient.

1<sup>st</sup>



# Mechanical Q&A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## Duct:

- 1) *(Q) How close may an HVAC return be placed to a fireplace?*  
**(A) The information found in Mechanical Code, Section 918.6 is not clear and seems to contradict itself. We have taken the stance that the return cannot be placed within 10 feet of a fireplace.**
- 2)✓ *(Q) Is manufactured grease duct exempt from the slope requirements of section 506.3.7?*  
**(A) No.**

1<sup>st</sup>

Land Use and Environmental Service Agency  
(Code Enforcement)

# Mechanical Q&A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## Gas Pining:

- 1)✓ (Q) Does ALL CSST gas piping require an electrical bond?  
(A) Yes

1<sup>st</sup>



**MECKLENBURG COUNTY**  
Land Use and Environmental Services Agency  
Code Enforcement

**CODE  
INTERPRETATION**

## Mechanical/Plumbing

**Code Volume Reference:** NC Plumbing Code (2009)

**Code Chapter Reference:** 1003.4

**Subject:** Approved Separators

**Effective Date:** January 1, 1998

**Prepared/Revision Date:** April 2009

**CODE:**

*1003.4 Oil separators required. At repair garages, carwashing facilities with engine or under-carriage cleaning capability and at factories where oily and flammable liquid wastes are produced, separators shall be installed into which all oil-bearing, grease-bearing or flammable wastes shall be discharged before emptying in the building drainage system or other point of disposal.*

**INTERPRETATION:**

Floor drains are not required in garages or similar establishments. Owners may elect to pick up spilled oil by means of a commercial absorbent which would be disposed/processed by manufacturer's recommendations and County Environmental regulations.

However, if floor drains are desired, the drainage system shall be protected by an oil water separator with the capability of limiting oily discharge to 15 ppm. All oil water separators shall be protected from granular debris by means of a sand interceptor unless other means/methods are recommended by the manufacturer. Oil storage tanks shall be equipped level sensors and audible alarms to alert owner maximum storage capacity has been reached. Separators installed in driveways or vehicle storage areas must be rated for traffic. Floor drains in garage type facilities connected to septic systems shall be piped/pumped to an above ground holding tank for off site treatment (see Environmental Health Regulations)

Continued:

Oil separators complete with storage, shall be required in **ALL** establishments that: change oil or oil filters, make engine repairs, commercial vehicle spray/wash facilities (automated are exempt), and apartment or condominium complexes where vehicle washing is centrally located; and shall not exclude other facilities when, in the opinion of the Plumbing Official, there is the possibility of flammable materials/liquids introduction into the drainage system.

Oil separators shall be selected from the following “approved list”. These manufacturers have provided evidence that their product/s are capable of limiting oily discharge to 15 ppm when properly sized and maintained.

**APPROVED SEPARATORS:**

- |  |                       |
|--|-----------------------|
| 1) <b>Rockford</b>                           | <b>(815) 229-5077</b> |
| • <b>OST</b>                                 |                       |
| 2) <b>Highland Tank</b>                      | <b>(814) 893-5701</b> |
| 3) <b>Xerxes</b>                             | <b>(612) 887-1890</b> |
| 4) <b>Hoover</b>                             | <b>(800) 777-2823</b> |
| 5) <b>McTighe</b>                            | <b>(605) 996-1162</b> |
| 6) <b>Afl Industries</b>                     | <b>(407) 844-5200</b> |
| 7) <b>WaterMaze</b>                          | <b>(800) 535-0941</b> |
| • <b>(above ground)</b>                      |                       |
| 8) <b>Schier</b>                             | <b>(704) 553-0379</b> |
| 9) <b>Mifab</b>                              | <b>(905) 673-1343</b> |
| 10) <b>Hydro Flo</b>                         | <b>(630)462-7550</b>  |
| • <b>Totlsep-T, EconoSep</b>                 |                       |
| 11) <b>Environmental Process Systems</b>     | <b>(704)827-0740</b>  |
| • <b>EPS 500/1000 Series</b>                 |                       |
| 12) <b>Proceptor</b>                         | <b>(877)428-8187</b>  |
| 13) <b>Containment Solutions</b>             | <b>(877)274-8265</b>  |
| 14) <b>Town &amp; Country Plastics</b>       | <b>(704)588-6262</b>  |
| 15) <b>Zurn</b>                              | <b>(704)588-6262</b>  |
| • <b>model # Z-1186</b>                      |                       |
| 16) <b>Jay R. Smith</b>                      | <b>(713)723-5735</b>  |
| • <b>Ultracept model # 8602-03S</b>          |                       |
| 17) <b>Josam</b>                             | <b>(215)339-5370</b>  |
| • <b>Series 60500B</b>                       |                       |
| • <b>Series 60610</b>                        |                       |
| • <b>Series 60810</b>                        |                       |
| 18) <b>Hydro Quip</b>                        | <b>(910)791-1855</b>  |
| • <b>All Equipment</b>                       |                       |
| 19) <b>Geomat Recovery System</b>            | <b>(813)936-7992</b>  |
| <b>(small single car wash applications)</b>  |                       |
| 20) <b>Watts OI &amp; OI-K Oil Separator</b> | <b>(800)338-2581</b>  |
| 21) <b>Freylit USA Inc.</b>                  | <b>(888)373-3420</b>  |

Continued:


**Note:**

Manufacturers requesting to be added to the approved list shall provide:

1. A declaration on manufacturer's letterhead (or printed advertisements/ instructions, etc) stating that the model/s listed are capable of limiting the discharge (properly sized/maintained) to 15 ppm. And that the product is NOT fabricated of a porous material (i.e., concrete, etc)
2. Two (2) product manuals with installation instructions.
3. Submit to Philip Edwards, 700 N. Tryon St., Charlotte, NC 28202

Prepared by: **Consistency Team**

Approved by: \_\_\_\_\_

A handwritten signature in black ink that reads "P. Edwards". The signature is written in a cursive style with a large, stylized initial "P".

Philip B. Edwards, *M/P Code Administrator*



# HOOD PERFORMANCE SELF CERTIFICATION

(Requires a PE or certification by AABC, NEBB or NBC)

On \_\_\_\_\_ a performance test was done on the cooking Hood(s) at  
(Date)

\_\_\_\_\_  
(Address) (Permit Number)

to verify hood exhaust performance in compliance with North Carolina Mechanical Code Section 507.17. The following conditions existed during the test: (please check boxes as you complete the items).

- All building exhaust equipment (including restroom exhaust) was energized and operational.
- The cooking equipment located under the hood was up to operational heat levels with food being cooked (or simulated ) to provide sufficient grease and smoke to reflect normal operating conditions.
- All climate conditioning equipment in the affected area was energized and operational.

### THE FOLLOWING RESULTS WERE OBSERVED

- The cooking hood(s) captured all grease and smoke exhaust resulting from cooking during the test.
- The hood(s) captured all T-Puffer (or equal) smoke generated to test for spillage in the kitchen area.
- The hood(s) exhaust readings during the test were \_\_\_\_\_ CFM (actual) (design, approved plans) CFM \_\_\_\_\_.
- The make-up air readings during the test were \_\_\_\_\_ CFM(actual, may come from multiple sources) (design, approved plans) CFM \_\_\_\_\_.
- All equipment supplying make up air for the hood/s have been electrically interlocked.
- Exhaust flues from all gas fired natural draft equipment are exhausting properly.

I hereby certify that to the best of my knowledge the above information is correct and complete (all boxes). I also understand that **falsification** of this information may result in revocation of my **privilege** to self-certify. This information is to be made part of the job’s permit record on file with Mecklenburg County Code Enforcement.

Party certifying \_\_\_\_\_  
Legal signature Date

State of \_\_\_\_\_

County of \_\_\_\_\_

The above named certifying party named herein has personally appeared before me on this day who, being duly sworn, deposes and says that the above statement is true and correct.

(seal)

My commission expires \_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Notary Public



**MECKLENBURG COUNTY**  
Land Use and Environmental Services Agency  
Code Enforcement

**CODE  
INTERPRETATION**

# Mechanical/Plumbing

**Code Volume Reference:** NC Mechanical Code 2009

**Code Chapter Reference:** 507.2.1, 507.2.2

**Subject:** Type II Hood Clarification

**Effective Date:** 12/21/2004

**Prepared/Revision Date:** 2/11/2010

## CODE:

**507.2.1 Type I hoods.** Type I hoods shall be installed where appliances produce grease or smoke, such as occurs with griddles, fryers, broilers, ovens, ranges and wok ranges.

**507.2.2 Type II hoods.** Type II hoods shall be installed where cooking or dishwashing appliances produce heat, steam, or products of combustion and do not produce grease or smoke, such as steamers, kettles, pasta cookers and dishwashing machines.

### Exceptions:

1. Under-counter-type commercial dishwashing machines.
2. A Type II hood is not required for dishwashers and potwashers that are provided with heat and water vapor exhaust systems that are supplied by the appliance manufacturer and are installed in accordance with the manufacturer's instructions.
3. Light-duty electric convection, bread, retherm or microwave The additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.
4. A Type II hood is not required for the following electrically heated appliances: toasters, steam tables, popcorn poppers, hot dog cookers, coffee makers, rice cookers, egg cookers, holding/warming ovens. The additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.
5. Low-temperature [not greater than] 140°F (60°C) commercial chemical-type dishwashers.

**507.2.3 Domestic cooking appliances used for commercial purposes.** Domestic cooking appliances utilized for commercial purposes shall be provided with Type I or Type II hoods as required for the type of appliances and processes in accordance with Sections 507.2, 507.2.] and 507.2.2.

Exception: A maximum of two residential ranges (four burner) installed in dwelling units churches, schools, day care centers, break areas and similar installations

**INTERPRETATION:**

**Definition:**

For purposes of clarification, the cooking equipment referenced in 507.2.1 would involve a “commercial cooking process” where by food is typically prepared and sold to customers. These processes would include culinary schools, public or private schools, hospitals, and large corporate kitchens and similar occupancies.

The exception in 507.2.3 refers to cooking processes that are sporadic and not as intensive as those referred to in 507.2.1 and 507.2.2. These processes could utilize a type II hood due to the limited use and lesser grease accumulation. This would include apartment/condominium clubhouse, appliance sales center or similar.

Prepared by: **Consistency Team**

Approved by: \_\_\_\_\_ 

Philip B. Edwards, *M/P Code Administrator*



# **Commercial Plan Review**

Land Use and Environmental Service Agency  
(Code Enforcement)

## **MECHANICAL Q&A 2010**

**First Quarter 2010**

### **General:**

1. *(Q) Are Kiosk style ductless kitchen exhaust hoods acceptable for Type 1 applications?*

(A) This type of hood has been reviewed and approved on past projects. The criteria for this equipment is that 1) the hood must be used over all electric cooking equipment (no gas), 2) the exhaust air would have to be clean enough to be recirculated (the quantity of units total grease laden discharge shall not exceed 5 mg/m<sup>3</sup> when tested to EPA-202) and 3) the equipment is listed and labeled as being tested in accordance with UL 710B, UL 197 and meets NFPA 96. See the following link for specific information:  
<http://www.halton.com/halton/usa/cms.nsf/pages/A226E6210096C650C225727900512635>

2. *(Q) Are Designers required to comply with 21 NCAC 50.0505 General Supervision and Standard of Competence designing the HVAC system for apartments, townhomes and condominiums?*

(A) This is a matter between the State Board of Examiners and the Mechanical Contractor. Mecklenburg County Plans Examiners are not involved in this issue.

3. *(Q) Does the audio/visual smoke detector alarm signal have to meet any special criteria?*

(A) No. Only that the location and operational sequence comply with NC Mechanical Code 606.4.1, Exception 2. However, refer to the NC Fire Code for any additional requirements.

4. *(Q) How are toilet exhaust fans required to be controlled?*

(A) The NC Mechanical Code 401.3 states: Ventilation shall be provided during the periods that the room or space is occupied. The Mechanical Commentary further elaborates: Ventilation must be provided at all times that the room or space is occupied, but can cease when the room or space is unoccupied. This requires a mechanical ventilation system to be designed with controls that provide for continuous ventilation air movement during the entire time that the building is occupied.

5. *(Q) Can liquefied propane gas (LPG) tanks be located inside a building?*

(A) The NC Fuel Gas Code section 401.2.1 states the Department of Agriculture has the responsibility of enforcing the location of LPG containers. The NC Fire Code section 3804.4 requires the installation of all LPG systems be in accordance with NFPA 58. Section 6.19.7.1 of NFPA 58 prohibits the use of LPG cylinders in classrooms. The Mechanical Plans Examiners will coordinate with the Fire Examiners and let them enforce their requirements.

# Plumbing Q & A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## General:

- 1) *(Q) Who enforces the cutting and notching requirements found in the plumbing code?*  
**(A) The plumbing inspector would question the contractor initially. A building inspector would either take over on the repair or consult with the plumbing inspector how best to correct the issue.**
- 2) *(Q) What type of access cover is required for a C/O placed in a rated wall?*  
**(A) The contractor may choose between a rated plate or a access door. The designer shall stipulate which is appropriate for the wall rating.**

1<sup>st</sup>

# Plumbing Q & A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## Traps & Interceptors:

- 1) *(Q) Do drains in a large walk-in cooler have to discharge their drains through a grease interceptor?*  
**(A) Only if there is grease producing potential (i.e. hanging meats, oil or grease transfers from larger containers, etc.)**

1

# Plumbing Q & A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## Fixtures:

- 1) *(Q) Is the excel fixture calculation spreadsheet provided on the DOI website approved for use by a designer?*  
**(A)** The spreadsheet was developed by the DOI plumbing reviewers for state owned buildings. Designers may use it as a preliminary design tool but they will still be required to provide calculations and explain their design on the submitted drawings.
- 2)✓ *(Q) May an unlicensed tile contractor install a shower pan in structure?*  
**(A)** No. NCDOI states that a permit is required for the installation or replacement of a manufactured shower or the shower pan liner. The State Board of Examiners state that a license is required for anything requiring a permit. The tile contractor would have to be a licensed plumbing contractor.

1st

# Plumbing Q & A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## Water Heaters:

- 1) *(Q) When are safety pans for water heaters required?*  
**(A) The Code requires safety pans when water heaters are placed in remote locations such as an attic, above drop in ceilings typically found in commercial type buildings, above a space that is occupied or unvented crawl spaces. An example would be; a water heater placed in a closet on the second floor of a two story house with a kitchen directly below. This would require a pan because it was above an occupied space. An example of an unoccupied space would be a garage.**
- 2) *(Q) Where does the Code allow a T&P discharge drain to terminate?*  
**(A) The drain shall discharge through an air gap located in the same room as the water heater which shall then terminate over an approved waste receptor, or outdoors.**
- 3) *(Q) does the galvanized nipple that comes installed in most water heaters serve the same purpose as a dielectric union when installing copper water piping systems?*  
**(A) No! The installer must use a dielectric union or a brass fitting to isolate the copper from the water heater.**
- 4)✓ *(Q) May condensate from a water heater flue discharge into a safety pan drain?*  
**(A) No. Acidic flue condensate must discharge into an approved waste receptor.**
- 5)✓ *(Q) What does a contractor use if the water heater manufacturer will void the warranty if dielectric union/s are installed?*  
**(A) Brass coupling or adapter.**
- 6)✓ *(Q) Do expansion tanks require dielectric unions?*  
**(A) Dielectric unions or brass adapters are required anywhere dissimilar materials are jointed.**



Land Use and Environmental Service Agency  
(Code Enforcement)

# Plumbing Q & A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## Venting:

1)✓ (Q) *Are you still allowed to extra distance in table 906.1 by putting a 1 ½ inch trap on a 2 inch fixture branch?*

(A) No. The table has been reformatted to allow the same distance, 8 feet, even with the 2 inch trap. The table is now based on trap size only.

1

# Plumbing Q & A 2010

Attention: ✓ Denotes a new question!

★ Denotes a revised/revisited question.

March 2010

Quarter

## Water Service/Distribution:

- 1)✓ **(Q) What is the proper way to ground a replacement water service?**  
**(A)** When replacing a water service, the plumbing contractor must take care not to interrupt the electrical system's ground. Some older homes used the metallic water distribution system along with the metallic water service as the electrical system ground. Now with the introduction of so many varieties of approved plastic piping materials, other means of grounding are required. When replacing a water distribution system or water service with plastic piping material, a licensed electrical contractor should be contacted to assure that no electrical hazards are inadvertently introduced.

1st

# **Commercial Plan Review**

Land Use and Environmental Service Agency  
(Code Enforcement)

## **PLUMBING Q&A 2010**

**First Quarter 2010**

### **General:**

1. *(Q) Are residential style clothes washers used in commercial occupancies – doctor’s office, daycares, hair salons, etc. – required to discharge through a lint interceptor?*

(A) Occupancies that use commercial tumble machines or coin operated machines would be better defined as a commercial laundry operation and would require a lint interceptor. Occupancies that utilize a residential style washing machine with intermittent use would not be defined as a commercial laundry operation and the filtering designed into the machine would be sufficient.

2. *(Q) Can the core facilities at South Park Mall be used for the individual tenant spaces?*

(A) The original portion of this mall (Circa 1968) does not have enough core toilet fixtures to satisfy the tenant requirements of NC Plumbing Code, 403. Each tenant is responsible for supplying the minimum toilet facilities in their space. The newer mall addition was designed with adequate mall core toilet facilities to support the addition – not the older mall section.

3. *(Q) Are letters requesting adjustments in occupant content required to be notarized?*

(A) No. Section 403.1 in the NC Plumbing Code does not require this document to be notarized. The Plumbing Reviewers are not requiring notarized letters with submittals.

4. *(Q) Can gender biased occupancies – such as Men’s Clubs – utilize section 403.3 to permit an unequal distribution of toilet fixtures?*

(A) This issue must be addressed on a case by case basis and be presented to the Code Administrator for approval.

5. *(Q) Do custom made, in this case granite, lavatories have to comply with the Plumbing Code?*

(A) Yes. This fixture would have to meet one of the standards listed in the NC Plumbing Code section 416.1.