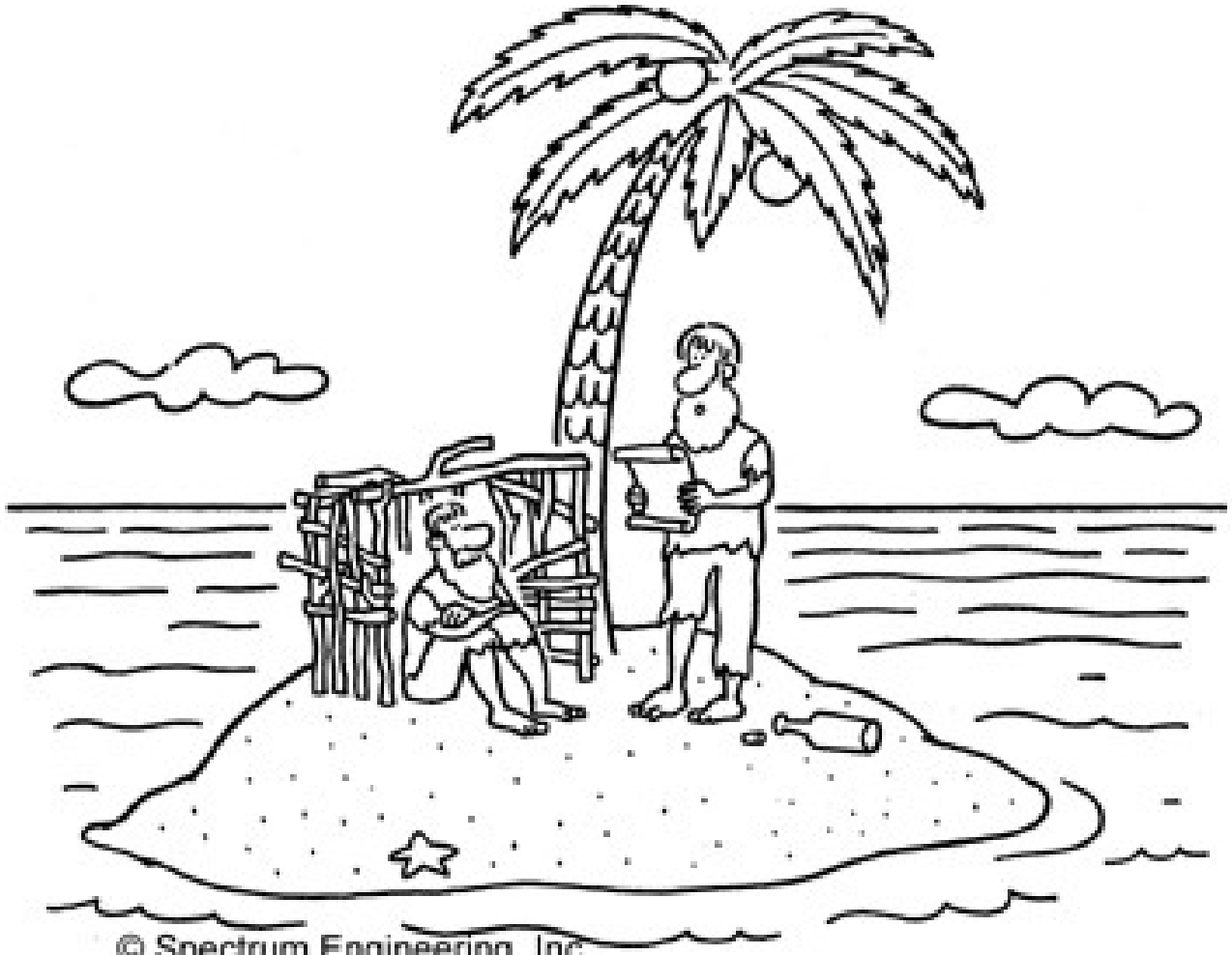
31st Annual State Construction Conference

March 22nd, 2012

2012 NC Mechanical, Plumbing and Fuel Gas Code Updates



"IT'S FROM THE BUILDING DEPARTMENT. WE HAVE A CODE VIOLATION."

2012 NC Mechanical, Plumbing and Fuel Gas Codes

Mechanical Reviewers

Tom Galdi – tom.galdi@doa.nc.gov

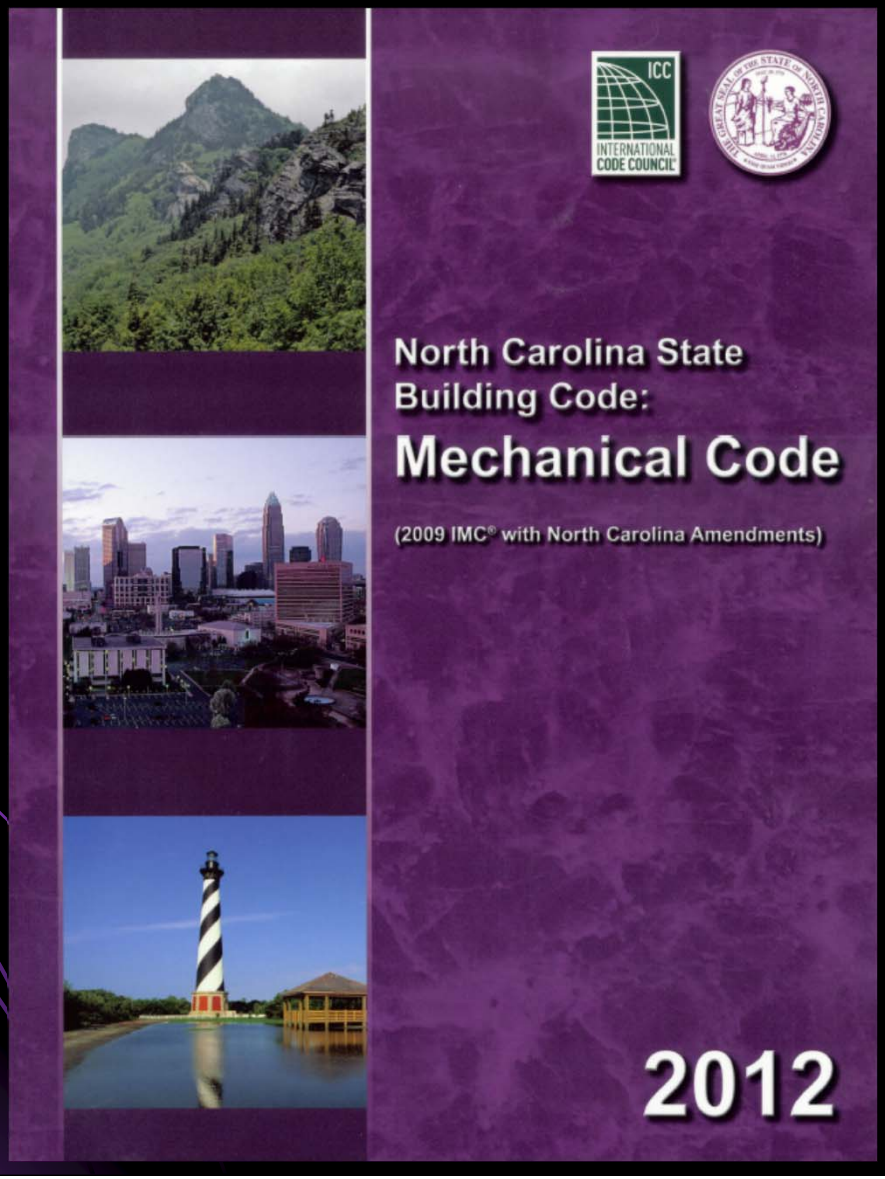
Nader Iskander – nader.iskander@doa.nc.gov

Elizabeth Kotek – elizabeth.kotek@doa.nc.gov

Leonard Thagard – leonard.thagard@doa.nc.gov

2012 NC Mechanical, Plumbing and Fuel Gas Codes

2012 Mechanical Code



2012 Mechanical Code

304.11

[B] 304.11 Guards. Guards shall be provided where appliances, *equipment*, fans or other components that require service and roof hatch openings are located within 6 feet (1829 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The guard shall extend not less than 30 inches (762 mm) beyond each end of such appliances, *equipment*, fans, components and roof hatch openings and the top of the guard shall be located not less than 42 inches (1067 mm) above the elevated surface adjacent to the guard. The guard shall be constructed so as to prevent the passage of a 21-inch-diameter (533 mm) sphere and shall comply with the loading requirements for guards specified in the *International Building Code*.

2012 Mechanical Code

304.11 Guards

2012 Mechanical Code

2012 Mechanical Code

401.1

Intake opening location.

Where do you put these things?

2012 Mechanical Code

401.4

401.4 Intake opening location. Air intake openings shall comply with all of the following:

1. Intake openings shall be located a minimum of 10 feet (3048 mm) from lot lines or buildings on the same lot. Where openings front on a street or public way, the distance shall be measured to the centerline of the street or public way.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.2.1.
3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening.
4. Intake openings on structures in flood hazard areas shall be at or above the design flood level.

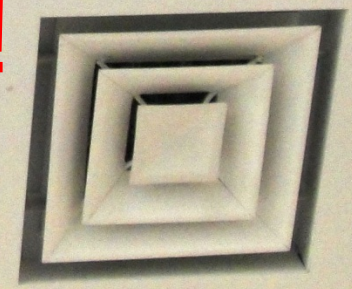
2012 Mechanical Code

2012 Mechanical Code

2012 Mechanical Code

SECTION 403
MECHANICAL VENTILATION

The entire section has been updated!



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403.2.2
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OCCU	OCCUPANCY
Correctiona fa	**Offices**
Cells	Conference rooms
without lu	Office spaces
with pl nb	Reception areas
Dining ha s	Telephone/data en
(see fo l a	Main entry lobbie
Guard sta on	
Day roo	**rivate dwellings, s**
Booking/ ait	Garages, common
	Kitchens[b]
Dry cleane , la	Living areas[c]
Coin-op ated	
Coin-op ated	
Commer al c	
Commer al l	Toilet rooms and
Storage, ick	
Education	**blic spaces**
Auditori ms	Corridors
Corrido (se	Elevator car
Media c ter	Shower room (per
Sports l ker	Smoking lounges[h]
Music/t ater	Toilet rooms – pu
Smokin lour	Places of religious
Day car thr	Courtrooms
Classro s (a	Legislative chamb
Classro s (a	Libraries
Lecture ass	Museums (childre
Lecture all (	Museums/gallerie
Art clas oom	**tail stores, sales**
Science abor	**owroom floors**
Wood/m tal s	Sales (except as b
Comput lab	Dressing rooms
Multius asse	Mall common are
Locker/ essi	Shipping and rece
	Smoking lounges[h]
Food and ever	Storage rooms
Bars, co tail	Warehouses (see
Cafeteri fas	
Dining r oms	**pecialty shops**
Kitchen coc	Automotive moto
	Barber
Hospitals, urs	Beauty and nail s
Autopsy oon	Embalming room
Medical roo	Pet shops (animal
Operatin roc	Supermarkets
Patient r oms	
Physical er	**ports and amusen**
Recovery and	Disco/dance floor
	Bowling alleys (s
Hotels, mo ls,	Game arcades
Multipur se	Ice arenas withou
Bathroom to	Gym, stadium, ar
Bedroom/ vi	Spectator areas
Conferenc m	Swimming pools
Dormitory l	Health club/aerob
Gambling s	Health club/weigh
Lobbies/pr i	

OCCUPAN Y	ZONE AIR DISTR
Storage	**Air Distributi**
Repair garages, nc	Ceiling or floor supply o
Warehouses	Ceiling or floor supply o
Theaters	Ceiling supply of warm a
Auditoriums (e e	Floor supply of warm air
Lobbies	
Stages, studio	Makeup air drawn in on
Ticket booths	rom the exhaust and/or
Transportation	Makeup air drawn in nea
Platforms	cation
Transportatio wait	
Workrooms	r SI: 1 foot = 304.8 mm,
Bank vaults/s e de	°C = [(°F) – 32]/1.8
Darkrooms	"Cool air" is air cooler tha
Copy, printin room	"Warm air" is air warmer
Meat process g[e]	"Ceiling" includes any po
Pharmacy (pr , ar	"Floor" includes any point
Photo studios	"Makeup air" is air supplie
Computer (w out	from the zone by exhaust
	Zone air distribution effect
For SI: 1 cubic f t per	a floor supply of cool air a
C = [(F) 2]/1.8	placement ventilation achi
a. Based upon net occupi	tion.
b. Mechanical exh st re	Zone air distribution effect
c. Spaces unheate r ma	a ceiling supply of warm ai
d. Ventilation syst ns in	15°F above space tempera
e. Rates are per wa r clos	supply air jet reaches to w
facilities. The l r ra	
f. Rates are per ro unle	**403.3.1.3 Zone o**
be permitted wh re the	flow rate (V_{oc}), sh
g. Mechanical exh st is r	Equation 4-2.
sists of not mor than	
h. For nail salons, e req	$V_{oc} = \frac{V_{bz}}{E_z}$
exhausting a mi mum	
i. **Exception:** Eac scho	**Exception:** K-
ventilation or ex aust s	this effectiven
nents (louvers, esh ai	
	403.3.2 System outd
	to be supplied by ea
	mined in accordan
	403.3.2.3 as a functi
	flow rates.
	403.3.2.1 Single
	supplies a mixtur
	air to only one zo
	rate (V_{ot}) shall be
	tion 4-3.
	$V_{ot} = V_{oc}$
	403.3.2.2 100-per
	air handler suppl
	zones, the system
	be determined usi
	$V_{ot} = \sum_{all\ zones} V_{oc}$

$$D = \frac{P_s}{\sum_{all\ zones} P_z} \qquad \text{(Equation 4-7)}$$

where:

P_s = System population: The total number of occupants in the area served by the system. For design purposes, P_s shall be the maximum number of occupants expected to be concurrently in all zones served by the system.

403.3.2.3.4 Outdoor air intake flow rate. The outdoor air intake flow rate (V_{ot}) shall be determined in accordance with Equation 4-8.

$$V_{ot} = \frac{V_{oz}}{E_v} \qquad \text{(Equation 4-8)}$$

Exception: K-12 schools shall be exempt from use of this effectiveness factor ($V_{ot} = V_{oz}$).

4 .4 Exhaust ventilation. Exhaust airflow rate shall be pro- ed in accordance with the requirements in Table 403.3. E aust *makeup air* shall be permitted to be any combination o utdoor air, recirculated air and transfer air, except as limited in ccordance with Section 403.2.

4 .5 System operation. The minimum flow rate of outdoor air that the ventilation system must be capable of supplying du ng its operation shall be permitted to be based on the rate pe person indicated in Table 403.3 and the actual number of oc upants present.

4 .6 Variable air volume system control. Variable air vol- u air distribution systems, other than those designed to sup- pl only 100-percent outdoor air, shall be provided with co trols to regulate the flow of outdoor air. Such control system sh ll be designed to maintain the flow rate of outdoor air at a ra of not less than that required by Section 403.3 over the en re range of supply air operating rates.

4 .7 Balancing. The *ventilation air* distribution system shall be provided with means to adjust the system to achieve at least th minimum ventilation airflow rate as required by Sections 4 .3 and 403.4. Ventilation systems shall be balanced by an *a proved* method. Such balancing shall verify that the ventila- ti n system is capable of supplying and exhausting the airflow ra s required by Sections 403.3 and 403.4.

SECTION 404
ENCLOSED PARKING GARAGES

4 4.1 Enclosed parking garages. Mechanical ventilation s stems for enclosed parking garages shall be permitted to o erate intermittently where the system is arranged to operate a tomatically upon detection of vehicle operation or the pres- nce of occupants by *approved* automatic detection devices.

4 4.2 Minimum ventilation. Automatic operation of the sys- em shall not reduce the ventilation airflow rate below 0.05 cfm p r square foot (0.00025 $m^3/s \cdot m^2$) of the floor area and the sys- em shall be capable of producing a ventilation airflow rate of 0.75 cfm per square foot (0.0038 $m^3/s \cdot m^2$) of floor area.

404.3 Occupied spaces accessory to public garages. Connecting offices, waiting rooms, ticket booths and similar uses that are accessory to a public garage shall be maintained at a positive pressure and shall be provided with ventilation in accordance with Section 403.3.

SECTION 405
SYSTEMS CONTROL

405.1 General. Mechanical ventilation systems shall be provided with manual or automatic controls that will operate such systems whenever the spaces are occupied. Air-conditioning systems that supply required *ventilation air* shall be provided with controls designed to automatically maintain the required outdoor air supply rate during occupancy.

405.2 Fan shutdown controls. In Group I-2 and I-3 occupancies, each air distribution system shall be equipped with a manual emergency control to stop supply and return air in an emergency. The control device shall be mounted in a readily accessible location and be identified.

Exception: Air-handling equipment serving a single space.

SECTION 406
VENTILATION OF UNINHABITED SPACES

406.1 General. Uninhabited spaces, such as crawl spaces and attics, shall be provided with *natural ventilation* openings as required by the *International Building Code* or shall be provided with a mechanical exhaust and supply air system. The mechanical exhaust rate shall be not less than 0.02 cfm per square foot (0.00001 $m^3/s \cdot m^2$) of horizontal area and shall be automatically controlled to operate when the relative humidity in the space served exceeds 60 percent.

Exception: As otherwise permitted in the *North Carolina Building Code*.

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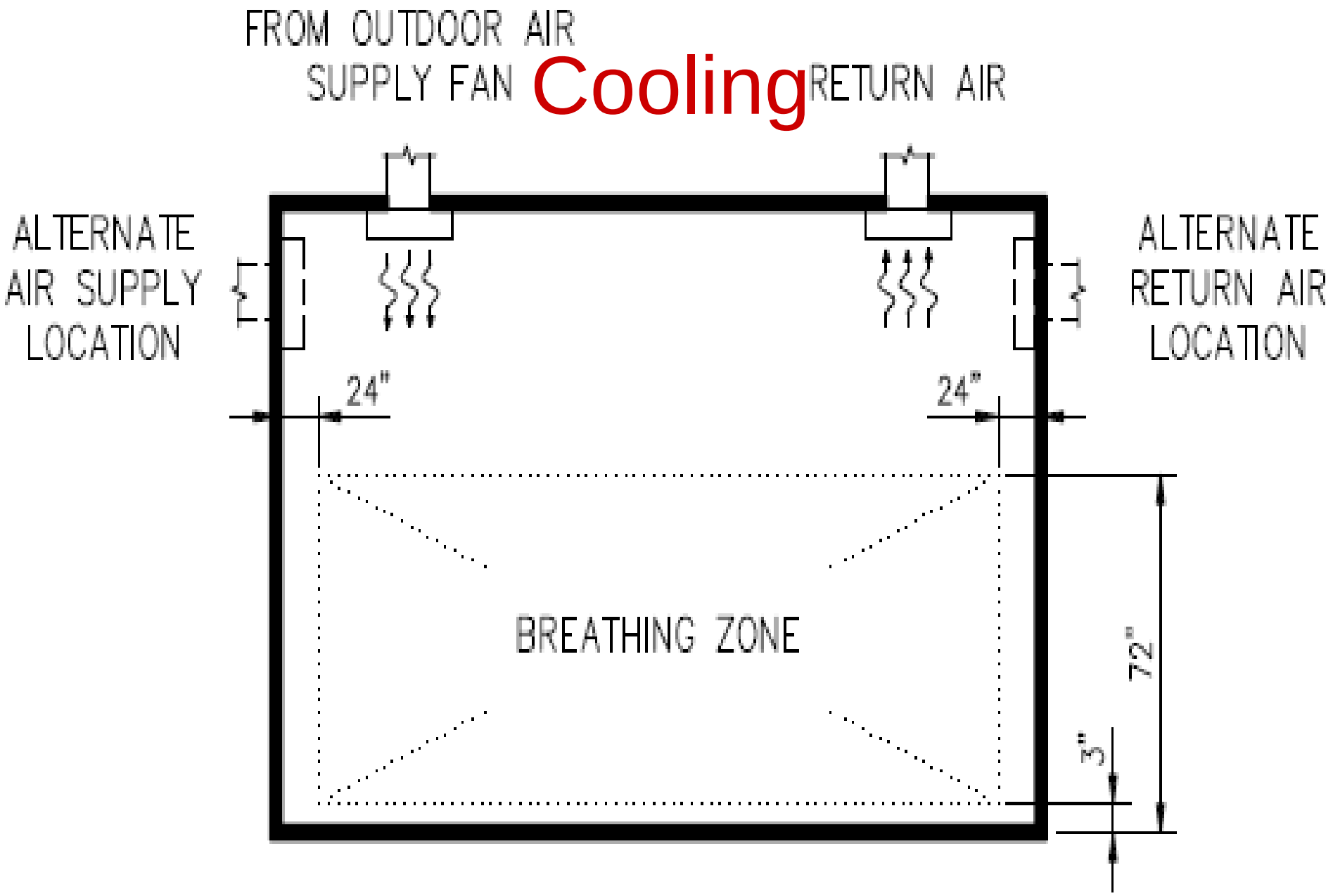
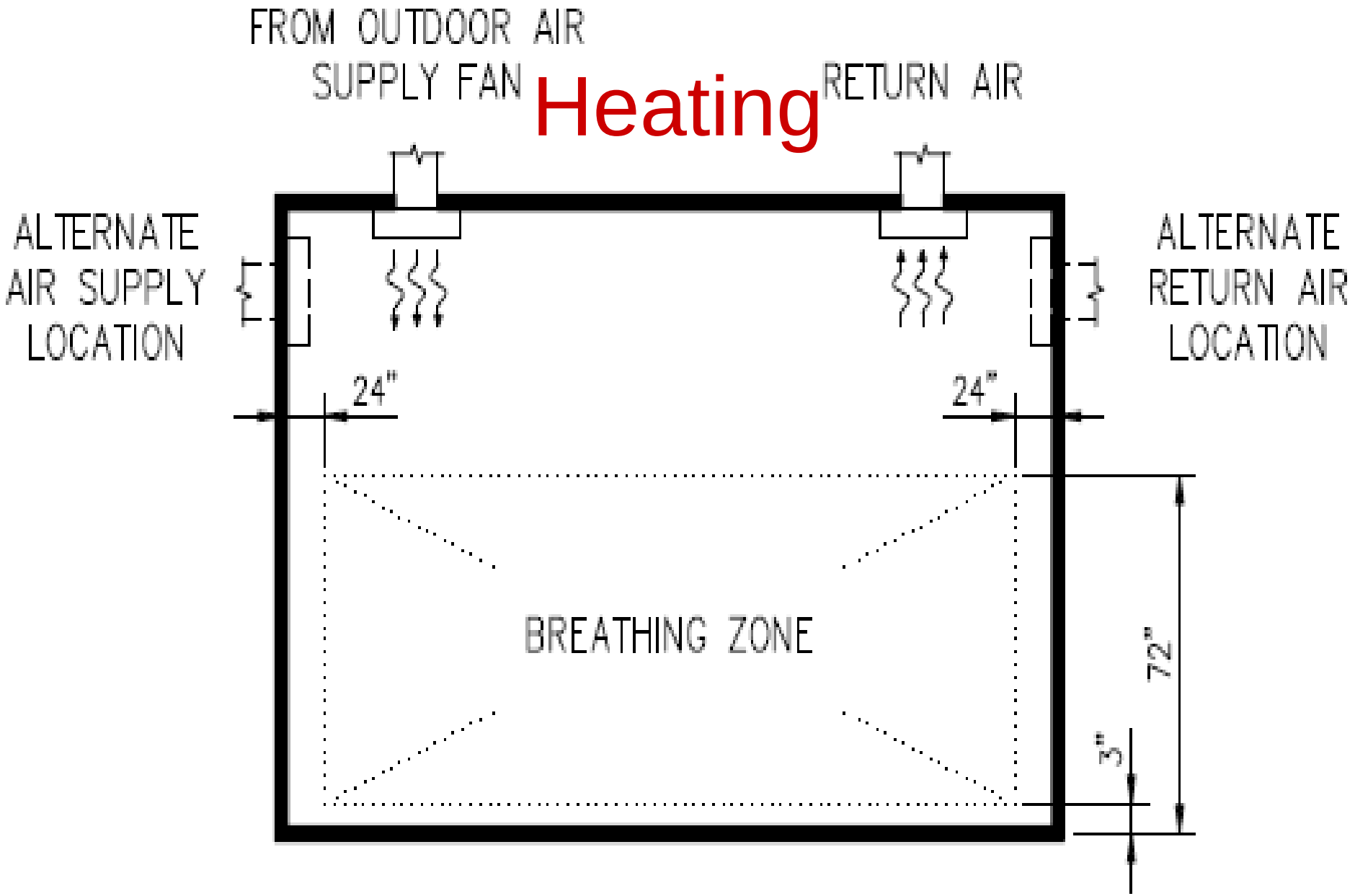
2012 Mechanical Code



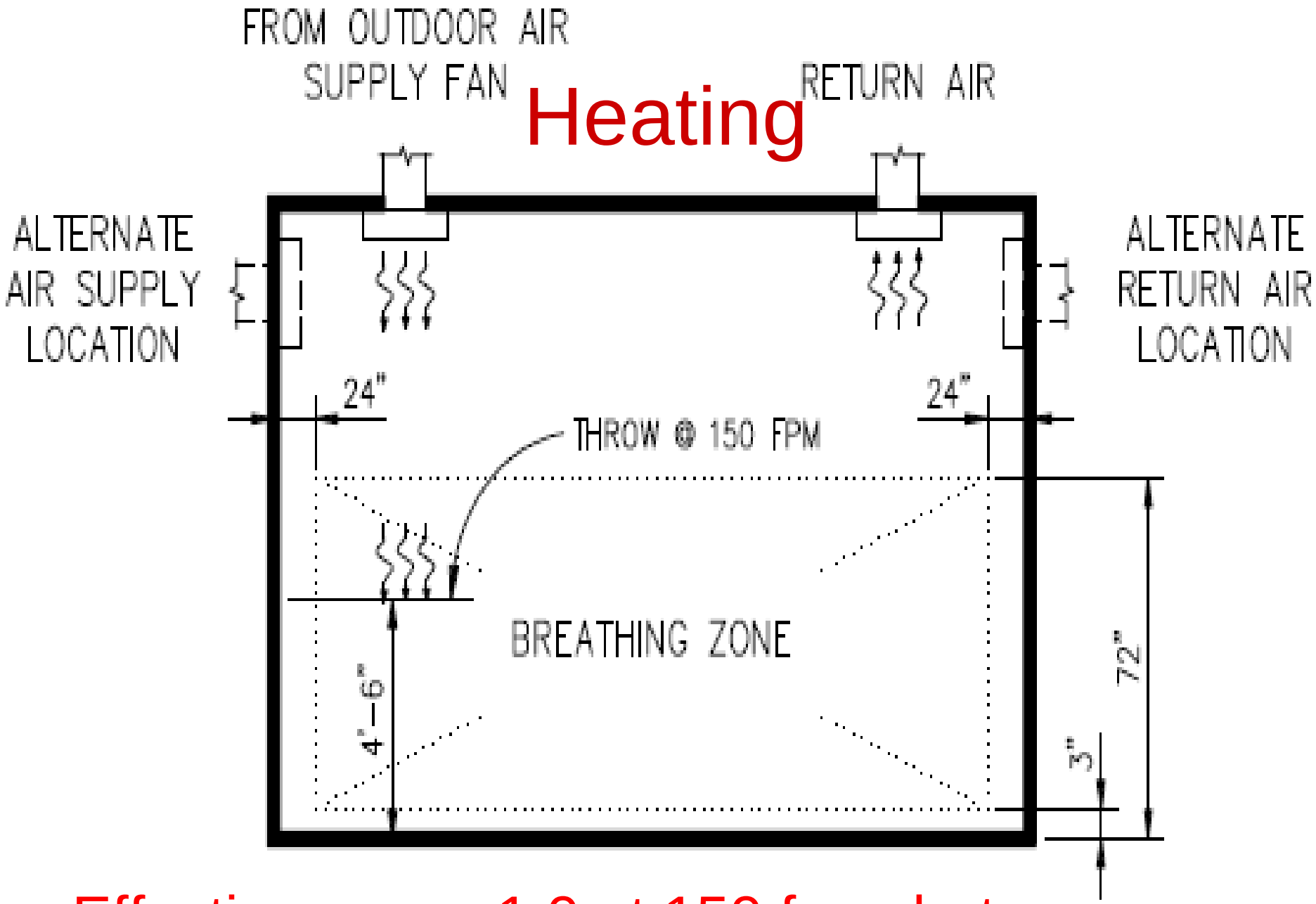
Effectiveness = 1.0

Heating



Effectiveness = 0.8

Heating



Effectiveness = 1.0 at 150 fpm, but…

TABLE 19—OCCUPIED ZONE ROOM AIR VELOCITIES

2012 Mechanical Code

ROOM AIR VELOCITY (fpm)	REACTION	RECOMMENDED APPLICATION
0-16	Complaints about stagnant air	none
25	Ideal design—favorable	all commercial applications
25-50	Probably favorable but 50 fpm is approaching maximum tolerable velocity for seated persons	all commercial applications
65	Unfavorable—light papers are blown off a desk	
75	Upper limit for people moving about slowly—favorable	retail and dept. store
75-300	Some factory air conditioning installations—favorable	factory air conditioning higher velocities for spot cooling


2012 Mechanical Code
SCO Conference 2012

2012 Mechanical Code

Table 403.3

Public spaces				
Corridors	—	0.06	—	—
Elevator car	—	—	—	1.0
Shower room (per shower head)[g]	—	—	—	50/20[f]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Toilet rooms – public[g]	—	—	—	50/70[e]
[illegible]	5	0.06	120	[illegible]
Courtrooms	5	0.06	70	—
Legislative chambers	5	0.06	50	—
Libraries	5	0.12	10	—
Museums (children's)	7.5	0.12	40	—
Museums/galleries	7.5	0.06	40	—

2012 Mechanical Code

Table 403.3

Public Toilet exhaust reduced

- 2009: 75 cfm per flushing fixture
- 2012: 50 cfm to 70 cfm per flushing fixture

2012 Mechanical Code

9 Water Closets

2009

Exhaust = 9 wcs X 75 cfm/wc = 675 cfm

2012

Exhaust = 9 wcs X 50 cfm/wc = 450 cfm

33% Reduction

2012 Mechanical Code

506.3.10.2

Field-applied grease duct enclosure.

- “Such systems shall be installed in accordance with the listing and the manufacturer’s installation instructions.”

2012 Mechanical Code

506.3.10.2 Field-applied grease duct enclosure. Commercial kitchen grease ducts constructed in accordance with Section 506.3.1 shall be enclosed by a field-applied grease duct enclosure that is a *listed* and *labeled* material, system, product or method of construction specifically evaluated for such purpose in accordance with ASTM E 2336. The surface of the duct shall be continuously covered on all sides from the point at which the duct originates to the outlet terminal. Duct penetrations shall be protected with a through-penetration firestop system classified in accordance with ASTM E 814 or UL 1479 and having an "F" and "T" rating equal to the fire-resistance rating of the assembly being penetrated. Such systems shall be installed in accordance with the listing and the manufacturer's installation instructions. Exposed duct wrap systems shall be protected where subject to physical damage.

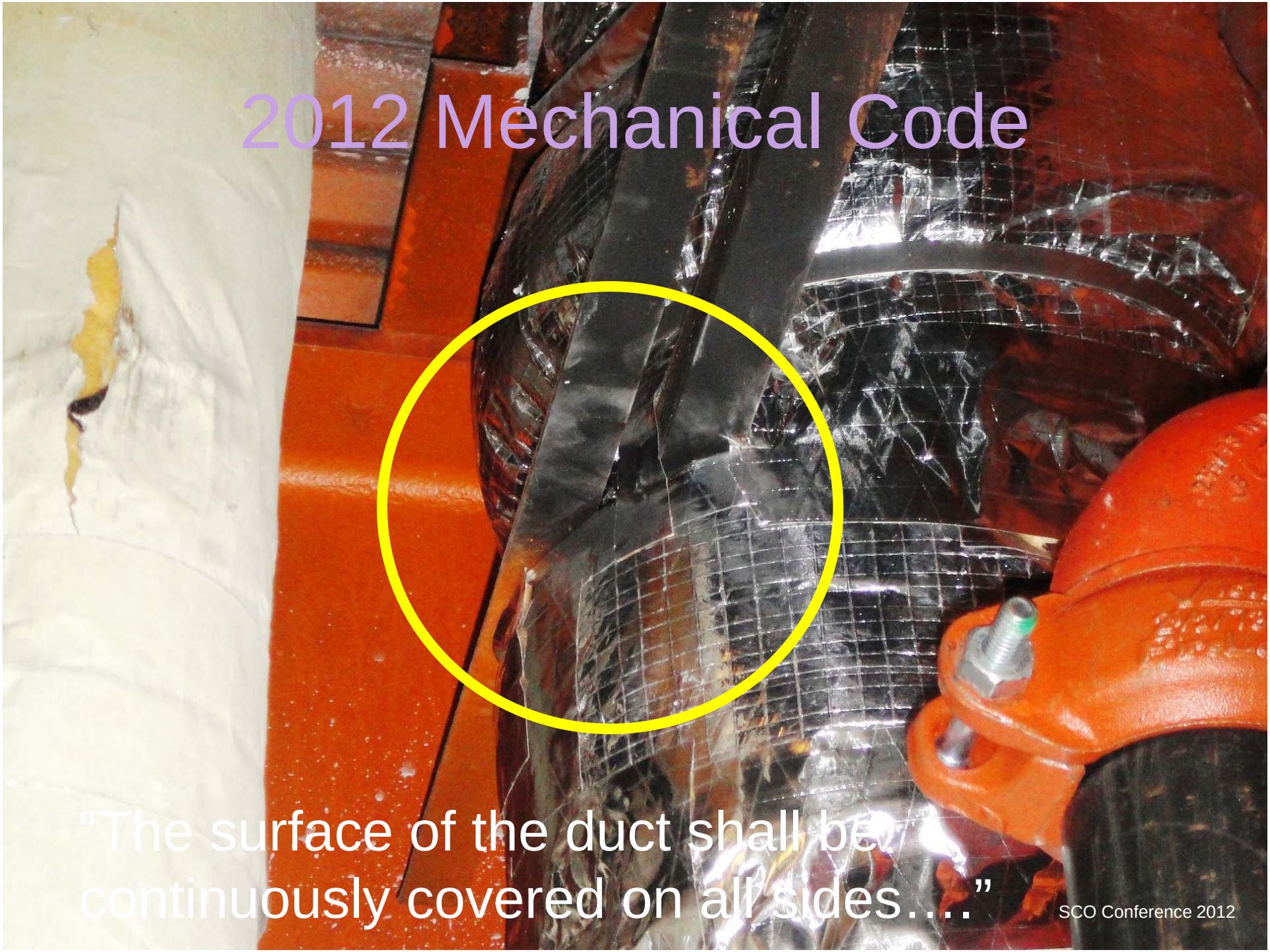
2012 Mechanical Code

2012 Mechanical Code

2012 Mechanical Code

Duct penetrations shall be protected with a through-penetration firestop system…

2012 Mechanical Code



"The surface of the duct shall be continuously covered on all sides…"

2012 Mechanical Code

SECTION 507

COMMERCIAL KITCHEN HOODS

2012 Mechanical Code

2012 Mechanical Code

507.16.2 Certification.

507.16.2 Certification. These tests shall be witnessed by the code official, or at the code official's option, by a professional engineer who shall provide certification of performance to the code official.

2012 Mechanical Code

SCO Conference 2012

2012 Mechanical Code

2012 Mechanical Code

607

DUCT AND TRANSFER OPENINGS

2012 Mechanical Code

607.4

ACCESS AND IDENTIFICATION

2012 Mechanical Code

607.4

607.4 Access and identification. Fire and smoke dampers shall be provided with an *approved* means of access, large enough to permit inspection and maintenance of the damper and its operating parts. The access shall not affect the integrity of fire-resistance-rated assemblies. The access openings shall not reduce the fire-resistance rating of the assembly. Access points shall be permanently identified on the exterior by a label having letters not less than 0.5 inch (12.7 mm) in height reading: FIRE/SMOKE DAMPER, SMOKE DAMPER or FIRE DAMPER. Access doors in ducts shall be tight fitting and suitable for the required duct construction.

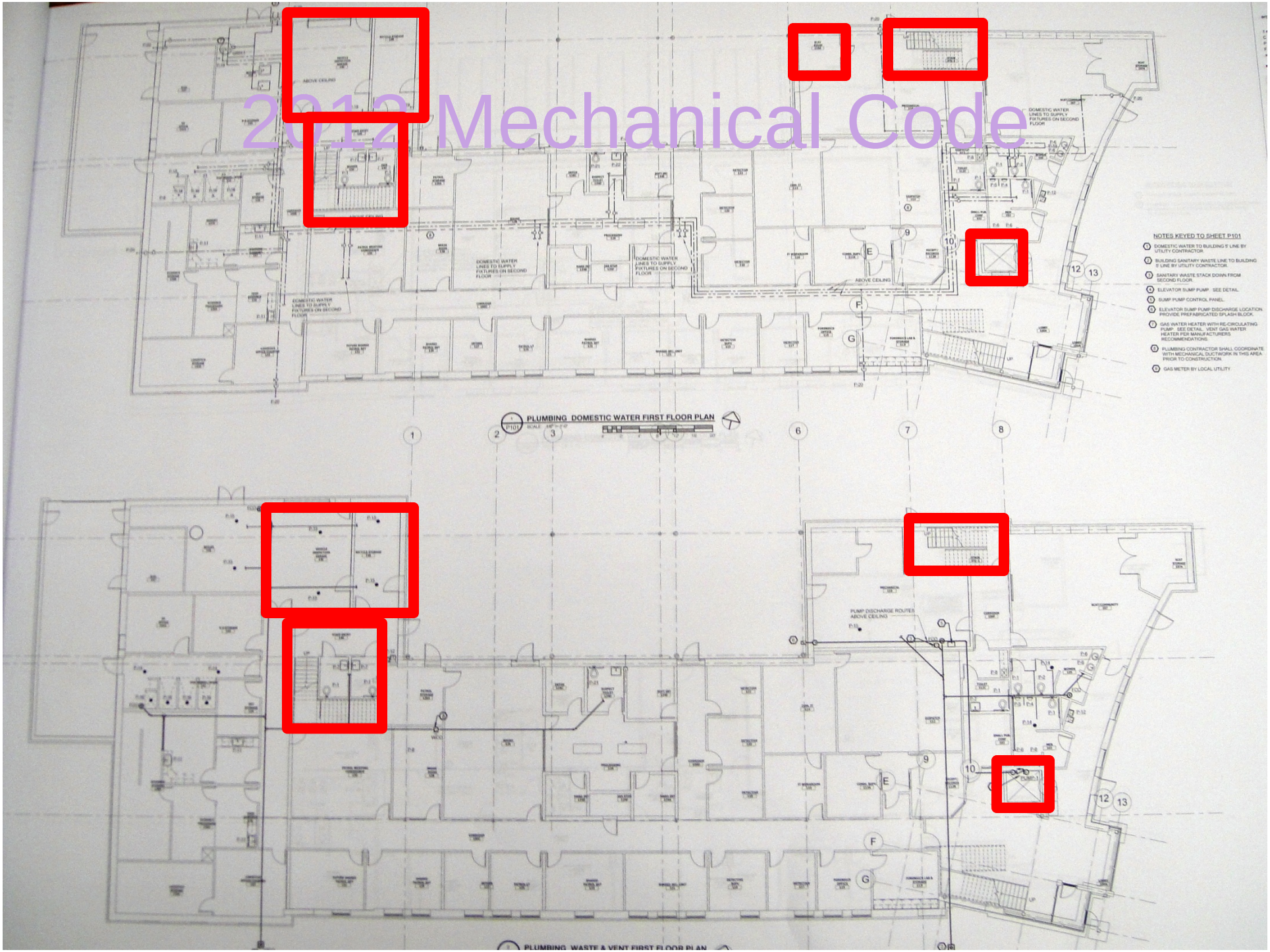

2012 Mechanical Code
607.4
SCO Conference 2012

2012 Mechanical Code

607.5

Location and installation.

607.5 Location and installation. Fire dampers, smoke dampers and combination fire/smoke dampers shall be provided at the locations prescribed in Sections 607.5.1 through 607.5.7 and shall be shown and identified on the building plans by the designer. Where an assembly is required to have both fire dampers and smoke dampers, combination fire/smoke dampers or a fire damper and smoke damper shall be required.


2012 Mechanical Code
PLUMBING DOMESTIC WATER FIRST FLOOR PLAN
NOTES KEYED TO SHEET P101
PLUMBING WASTE & VENT FIRST FLOOR PLAN

2012 Mechanical Code

607.5
Location and Installation.

607.5.2 Fire barriers. Ducts and air transfer openings that penetrate fire barriers shall be protected with *listed* fire dampers installed in accordance with their listing. Ducts and air transfer openings shall not penetrate exit enclosures and exit passageways except as permitted by Sections 1022.4 and 1023.6, respectively, of the *International Building Code*.

2012 Mechanical Code

607.5

Location and Installation.

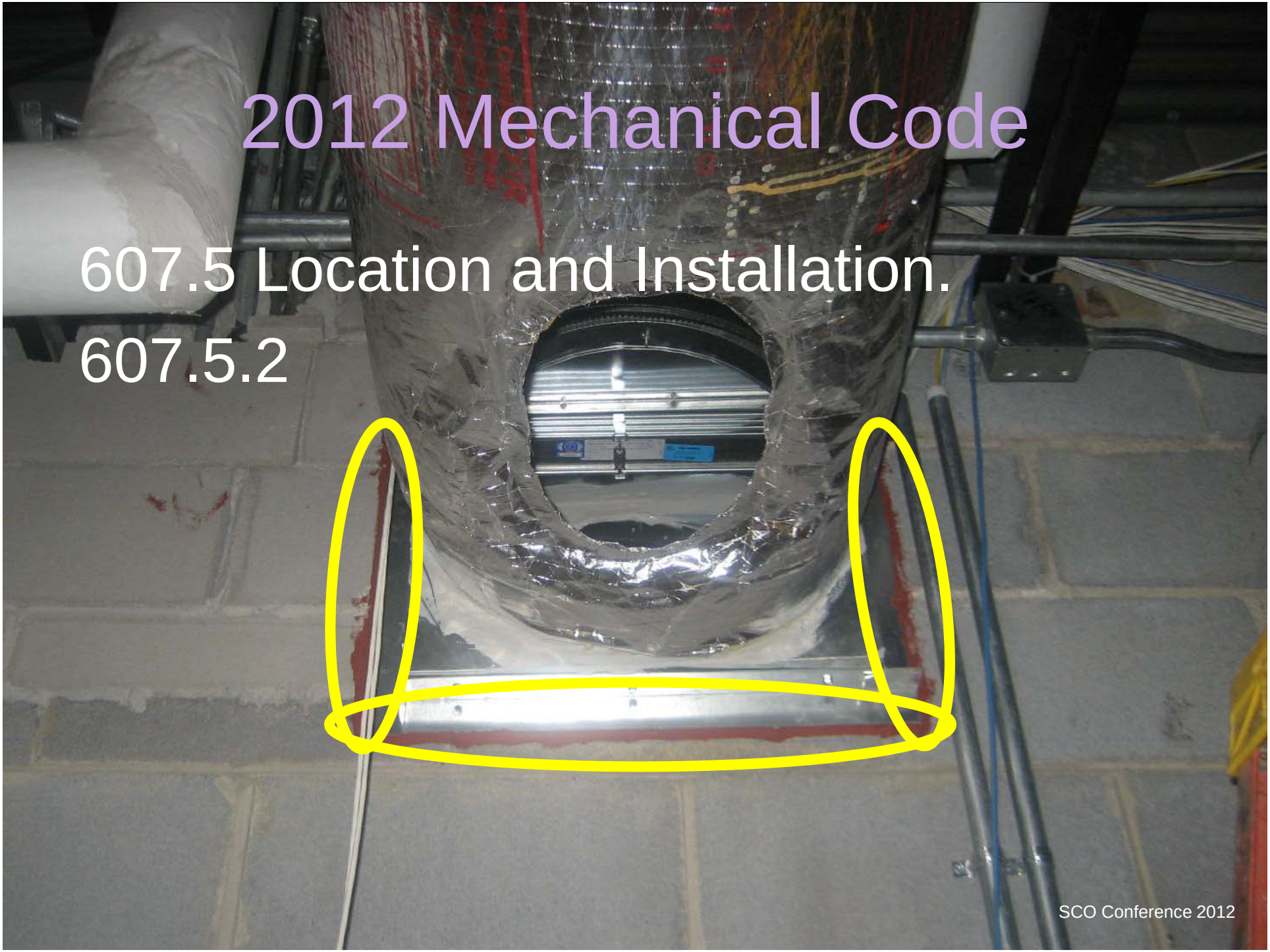
607.5.2

“installed in accordance with their listing.”

2012 Mechanical Code

607.5 Location and Installation.

607.5.2



2012 Mechanical Code

607.5.3 Fire Partitions

2012 Mechanical Code

2012 Mechanical Code

CHAPTER 7

COMBUSTION AIR

- The entire chapter has been condensed to one section, 701.1.
- Gas fire appliance combustion air requirements are in accordance with the 2012 NC Fuel Gas Code.

2012 Mechanical Code

CHAPTER 7

COMBUSTION AIR

SECTION 701
GENERAL

701.1 Scope. Solid fuel-burning *appliances* shall be provided with *combustion air* in accordance with the appliance manufacturer's installation instructions. Oil-fired *appliances* shall be provided with *combustion air* in accordance with NFPA 31. The methods of providing *combustion air* in this chapter do not apply to fireplaces, fireplace stoves and direct-vent *appliances*. The requirements for combustion and dilution air for gas-fired *appliances* shall be in accordance with the *International Fuel Gas Code*.

Reference:

2012 NC Fuel Gas Code

SECTION 304

COMBUSTION, VENTILATION AND DILUTION AIR

2012 Mechanical Code

BOILER CONTROLS

Although not part of the 2012 NC Mechanical Code….

2012 Mechanical Code

UNIFORM BOILER AND PRESSURE VESSEL ACT OF NORTH CAROLINA

North Carolina General Statutes
Chapter 95, Article 7A

AND

ADMINISTRATIVE RULES

North Carolina Administrative Code
Title 13, Chapter 13

Revised as of August 1, 2011

2012 Mechanical Code

13 NCAC 13 .0420 FIRING MECHANISM CONTROLS

(a) Automatically fired boilers and pressure vessels shall be provided with firing mechanism controls.

(b) Oil, gas-fired, and electrically heated boilers shall be equipped with primary (flame safeguard) safety controls, safety limit switches, and burners or electric elements that are listed and labeled with a testing laboratory recognized by the Occupational Safety and Health Administration as a nationally recognized testing laboratory (NRTL) pursuant to 29 CFR 1910.7.

(c) Automatically fired boilers installed after January 1, 2007, shall be provided with a remote emergency fuel shut-off switch marked for easy identification. The remote shut-off switch shall be located outside each door of the room in which the boiler is located. Alternatively, the shut-off switch may be located just inside the entrance door(s) where the equipment is located. If there is more than one door to the boiler room, there shall be a switch located at each door designed for primary emergency egress from the boiler room.

(d) For installations which are gas-fired, the burners used shall conform to the North Carolina Fuel Gas Code in effect at the time of installation.

2012 Mechanical Code

2012 Mechanical Code

1103

REFRIGERANT SYSTEM CLASSIFICATION

Refrigerant quantities have increase to match ASHRAE 34-2004

2012 Mechanical Code

1103

SECTION 1103
REFRIGERATION SYSTEM CLASSIFICATION

1103.1 Refrigerant classification. Refrigerants shall be classified in accordance with ASHRAE 34 as listed in Table 1103.1.

2012 Mechanical Code

TABLE 1103.1

REFRIGERANT CLASSIFICATION, AMOUNT AND OEL

- R410A was 10 lbs/1000cu. ft.
- R410A now 25 lbs/1000 cu. ft.

[F] TABLE 1103.1—continued
REFRIGERANT CLASSIFICATION, AMOUNT AND TLV-TWA

REFRIGERANT	CHEMICAL FORMULA	CHEMICAL NAME OR BLEND	HAZARD CATEGORIES[a]	REFRIGERANT CLASSIFICATION	DEGREES OF HAZARD[b]	[M] AMOUNT OF REFRIGERANT PER OCCUPIED SPACE			
						Pounds per 1,000 cubic feet	ppm	g/m³	TLV-TWA[f] (ppm)
R-403A	zeotrope	R-290/22/218 (5/75/20)	CG,OHH	A1	2-0-0[c]	—	—	—	—
R-403B	zeotrope	R-290/22/218 (5/56/39)	CG,OHH	A1	2-0-0[c]	—	—	—	—
R-404A	zeotrope	R-125/143a/134a (44/52/4)	CG,OHH	A1	2-0-0[c]	17	69,000	280	—
R-407A	zeotrope	R-32/125/134a (20/40/40)	CG,OHH	A1	2-0-0[c]	16	69,000	260	—
R-407B	zeotrope	R-32/125/134a (10/70/20)	CG,OHH	A1	2-0-0[c]	18	69,000	290	—
R-407C	zeotrope	R-32/125/134a (23/25/52)	CG,OHH	A1	2-0-0[c]	15	69,000	240	—
R-407D	zeotrope	R-32/125/134a (15/15/70)	CG,OHH	A1	2-0-0[c]	15	65,000	240	—
R-407E	zeotrope	R-32/125/134a (25/15/60)	CG,OHH	A1	2-0-0[c]	15	69,000	240	—
R-408A	zeotrope	R-125/143a/22 (7/46/47)	CG,OHH	A1	2-0-0[c]	10	47,000	170	—
R-409A	zeotrope	R-22/124/142b (60/25/15)	CG,OHH	A1	2-0-0[c]	4.9	20,000	79	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.9	[illegible]	78	—
R410A	zeotrope	R-32/125 (50/50)	CG,OHH	A1	2-0-0	10	[illegible],000	160	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
R-411A	zeotrope	R-127/22/152a (1.5/87.5/11.0)	CG,F,OHH	A2	—	—	—	—	—
R-411B	zeotrope	R-1270/22/152a (3/94/3)	CG,F,OHH	A2	—	—	—	—	—
R-507A	azeotrope	R-125/143a (50/50)	CG,OHH	A1	2-0-0[c]	17	69,000	280	—
R-508A	azeotrope	R-23/116 (39/61)	CG,OHH	A1	2-0-0[c]	14	55,000	220	—
R-508B	azeotrope	R-23/116 (46/54)	CG,OHH	A1	2-0-0[c]	13	52,000	200	—
R-509A	zeotrope	R-22/218 (44/56)	CG,OHH	A1	2-0-0[c]	12	38,000	190	—
R-600	$CH_3CH_2CH_2CH_3$	Butane	CG,F,OHH	A3	1-4-0	—	—	—	—
R-600a	$CH(CH_3)_2$-CH_3	Isobutane (2-methyl propane)	CG,F,OHH	A3	2-4-0	0.51	2,500	6.0	800

(continued)

[F] TABLE 1103.1
REFRIGERANT CLASSIFICATION, AMOUNT AND OEL

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT CLASSIFICATION	DEGREES OF HAZARD[a]	[M] AMOUNT OF REFRIGERANT PER OCCUPIED SPACE			
					Pounds per 1,000 cubic feet	ppm	g/m³	OEL[e]
R400[d]	zeotrope	R-12/114 (50/50)	A1	2-0-0[b]	10	28,000	160	1,000
R-400[d]	zeotrope	R-12/114 (60/40)	A1	2-0-0[b]	11	30,000	170	1,000
R-401A	zeotrope	R-22/152a/124 (53/13/34)	A1	2-0-0[b]	6.6	27,000	110	1,000
R-401B	zeotrope	R-22/152a/124 (61/11/28)	A1	2-0-0[b]	7.2	30,000	120	1,000
R-401C	zeotrope	R-22/152a/124 (33/15/52)	A1	2-0-0[b]	5.2	20,000	84	1,000
R-402A	zeotrope	R-125/290/22 (60/2/38)	A1	2-0-0[b]	8.5	33,000	140	1,000
R-402B	zeotrope	R-125/290/22 (38/2/60)	A1	2-0-0[b]	15	63,000	240	1,000
R-403A	zeotrope	R-290/22/218 (5/75/20)	A1	2-0-0[b]	7.6	33,000	120	1,000
R-403B	zeotrope	R-290/22/218 (5/56/39)	A1	2-0-0[b]	18	70,000	290	1,000
R-404A	zeotrope	R-125/143a/134a (44/52/4)	A1	2-0-0[b]	31	130,000	500	1,000
R-405A	zeotrope	R-22/152a/142b/C318 (45.0/7.0/5.5/2.5)	—	—	16	57,000	260	1,000
R-406A	zeotrope	R-22/600a/142b (55/4/41)	A2	—	4.7	21,000	25	1,000
R-407A	zeotrope	R-32/125/134a (20/40/40)	A1	2-0-0[b]	18	78,000	290	1,000
R-407B	zeotrope	R-32/125/134a (10/70/20)	A1	2-0-0[b]	20	77,000	320	1,000
R-407C	zeotrope	R-32/125/134a (23/25/52)	A1	2-0-0[b]	17	76,000	270	1,000
R-407D	zeotrope	R-32/125/134a (15/15/70)	A1	2-0-0[b]	15	65,000	240	1,000
R-407E	zeotrope	R-32/125/134a (25/15/60)	A1	2-0-0[b]	16	75,000	260	1,000
R-408A	zeotrope	R-125/143a/22 (7/46/47)	A1	2-0-0[b]	21	95,000	340	1,000
R-409A	zeotrope	R-22/124/142b (60/25/15)	A1	2-0-0[b]	7.1	29,000	110	1,000
R-409B	zeotrope	R-22/124/142b (65/25/10)	A1	2-0-0[b]	7.3	30,000	120	1,000
R-410A	zeotrope	R-32/125 (50/50)	A1	2-0-0[b]	25	130,000	390	1,000
R-410B	zeotrope	R-32/125 (45/55)	A1	2-0-0[b]	24	130,000	390	1,000
R-411A	zeotrope	R-127/22/152a (1.5/87.5/11.0)	A2	—	2.9	14,000	46	990
R-411B	zeotrope	R-1270/22/152a (3/94/3)	A2	—	2.8	13,000	45	980
R-412A	zeotrope	R-22/318/142b (70/5/25)	A2	—	5.1	22,000	82	1,000
R-413A	zeotrope	R-218/134a/600a (9/88/3)	A2	—	5.8	22,000	94	1,000
R-414A	zeotrope	R-22/124/600a/142b (51/28.5/4/16.5)	A1	—	6.4	26,000	100	1,000
R-414B	zeotrope	R-22/124/600a/142b (50/39/1.5/9.5)	A1	—	6	23,000	95	1,000

(continued)

2012 Mechanical Code

TABLE 1103.1

REFRIGERANT CLASSIFICAITON, AMOUNT AND OEL

What does the increase in allowable refrigerant quantities gain us?

2012 Mechanical Code

SCO Conference 2012

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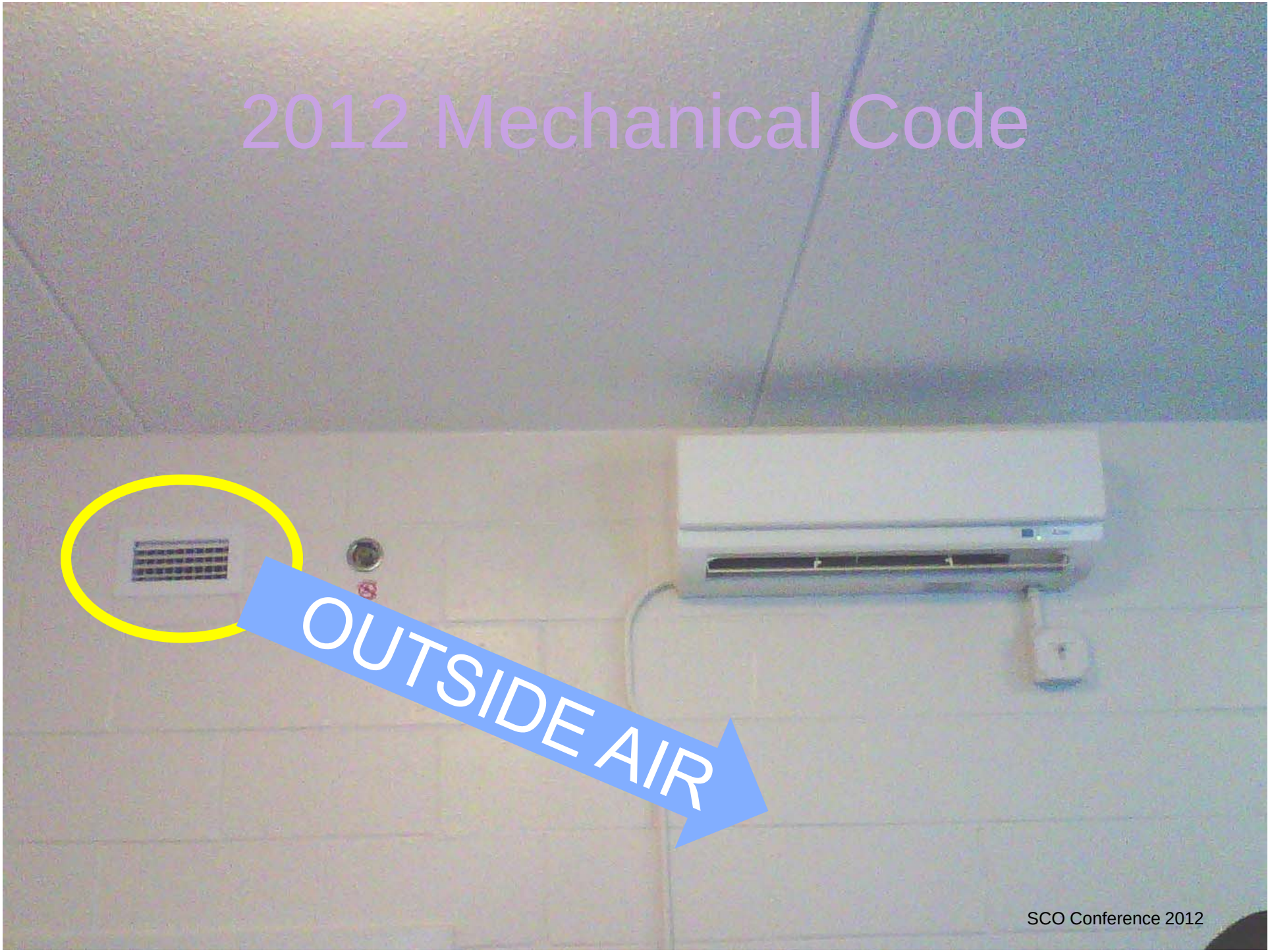
2012 Mechanical Code

2012 Mechanical Code



2012 Mechanical Code

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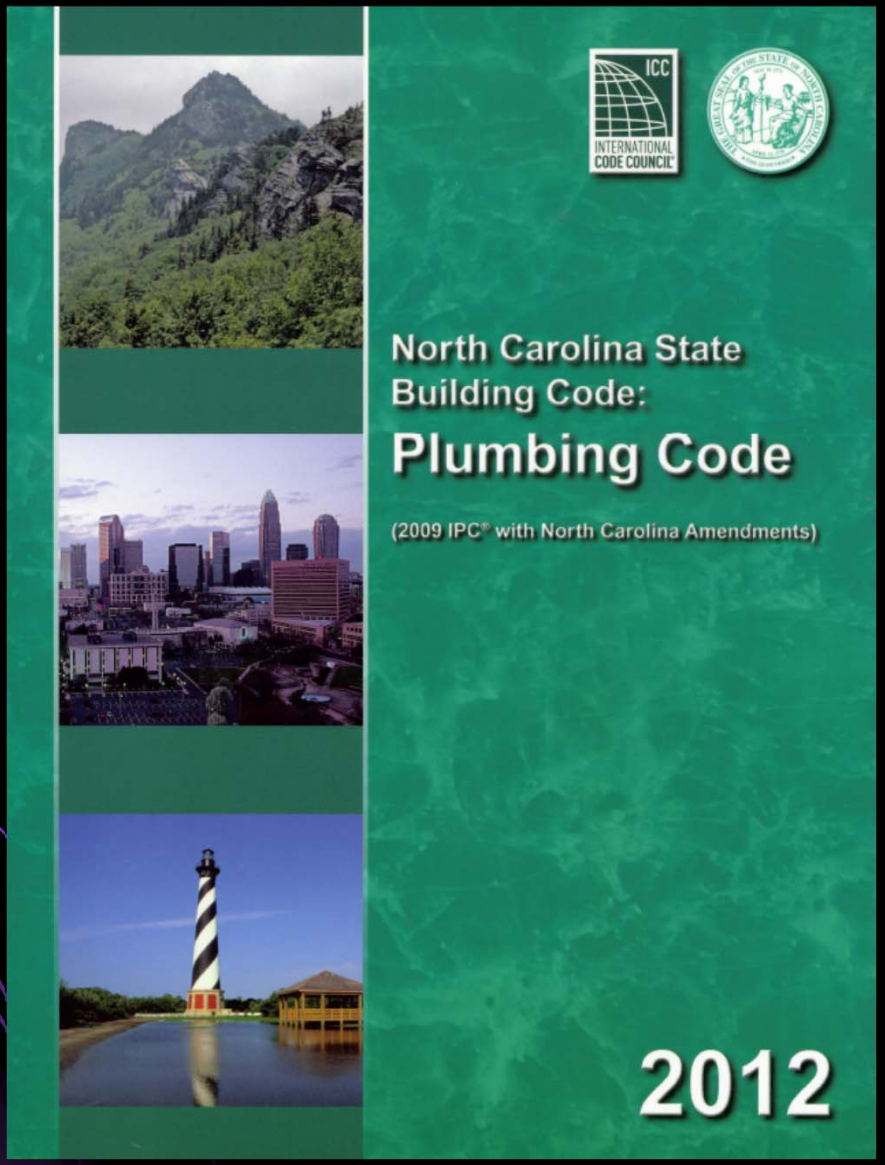
2012 Plumbing Code



2012 Plumbing Code

604.4.1

Lavatory faucets.

604.4.1 Lavatory faucets. Lavatory faucets shall be of the metering type when located in the following public restrooms:

1. In all occupancies in restrooms which have six or more lavatories.
2. In school occupancies in student-use restrooms.
3. In assembly occupancies in all customer or public-use restrooms.

2012 Plumbing Code

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2012 Plumbing Code

2012 Plumbing Code

608.7

Valves and outlets prohibited below grade.

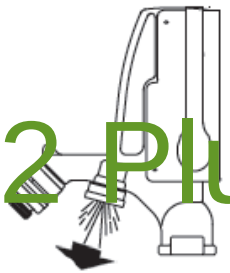
608.7 Valves and outlets prohibited below grade. Potable water outlets and combination stop-and-waste valves shall not be installed underground or below grade. Freezeproof yard hydrants that drain the riser into the ground are considered to be stop-and-waste valves.

2012 Plumbing Code

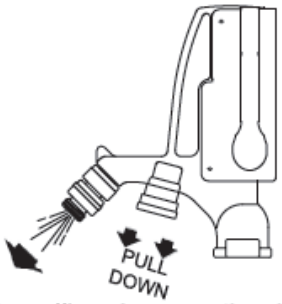
2012 Plumbing Code

2012 Plumbing Code

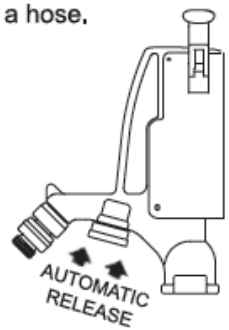
Sanitary Yard Hydrant - ASSE 1052 Approved



When the hydrant is opened to an ON position, water will flow through the diverter spout.



By pulling down on the diverter sleeve during flow, water will be diverted through the backflow preventer (BFP), and allow use with a hose.



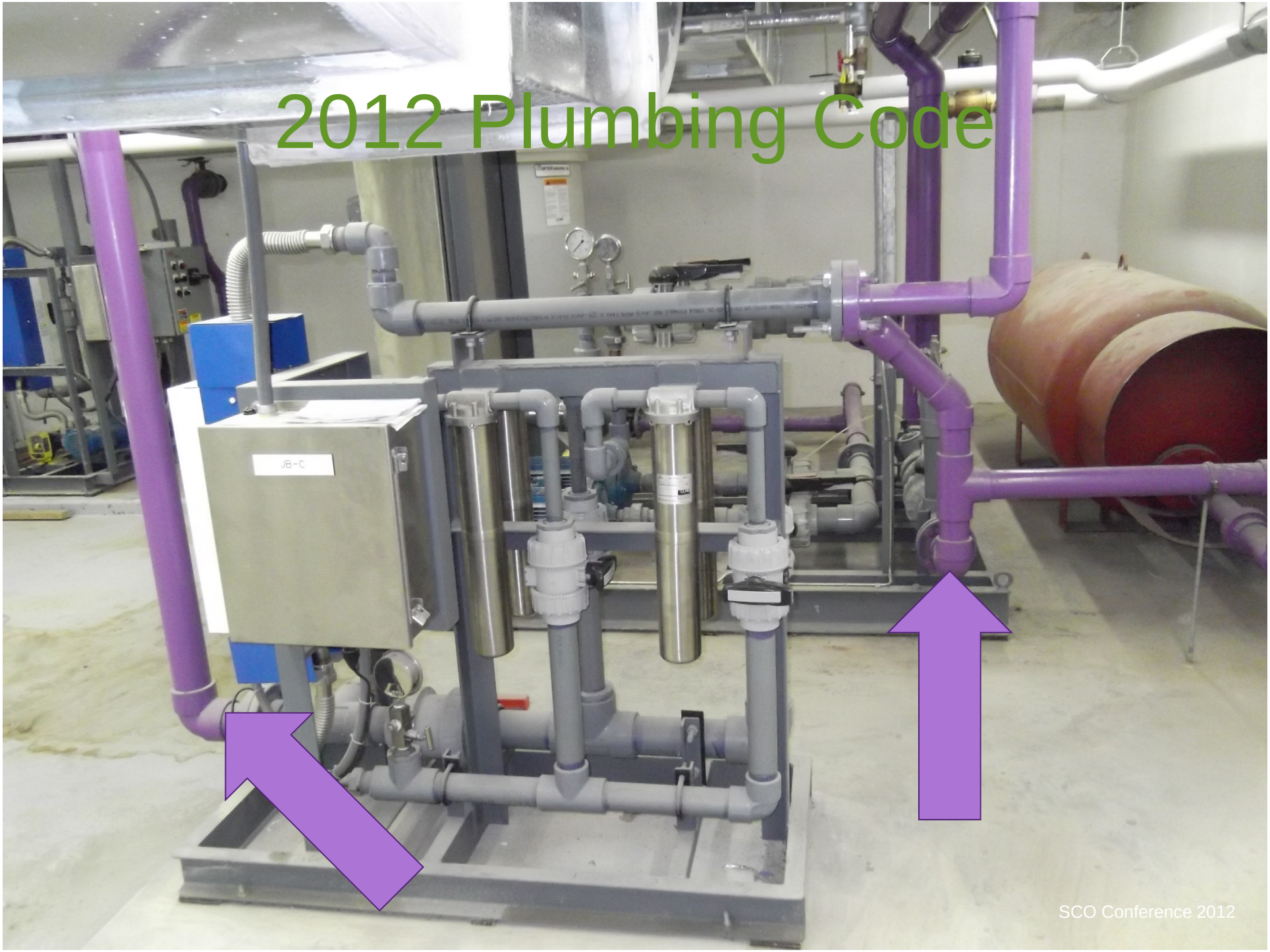
When the hydrant is closed to an OFF position, the diverter will automatically release, allowing the hydrant to drain into the reservoir. The hydrant will drain even if a pressurized or non pressurized hose is attached.

2012 Plumbing Code

608.8.2
Color.

608.8.2 Color. The color of the pipe identification shall be discernable and consistent throughout the building. The color purple shall be used to identify reclaimed, rain and gray water distribution systems.

2012 Plumbing Code



2012 Plumbing Code

2012 Plumbing Code

608.14.2

608.14.2 Protection of backflow preventers. Backflow preventers shall not be located in areas subject to freezing except where they can be removed by means of unions or are protected from freezing by heat, insulation or both.

608.14.2.1 Relief port piping. The termination of the piping from the relief port or *air gap* fitting of a backflow preventer shall discharge to an *approved* indirect waste receptor or to the outdoors where it will not cause damage or create a nuisance.

2012 Plumbing Code

SCO Conference 2012

2012 Plumbing Code

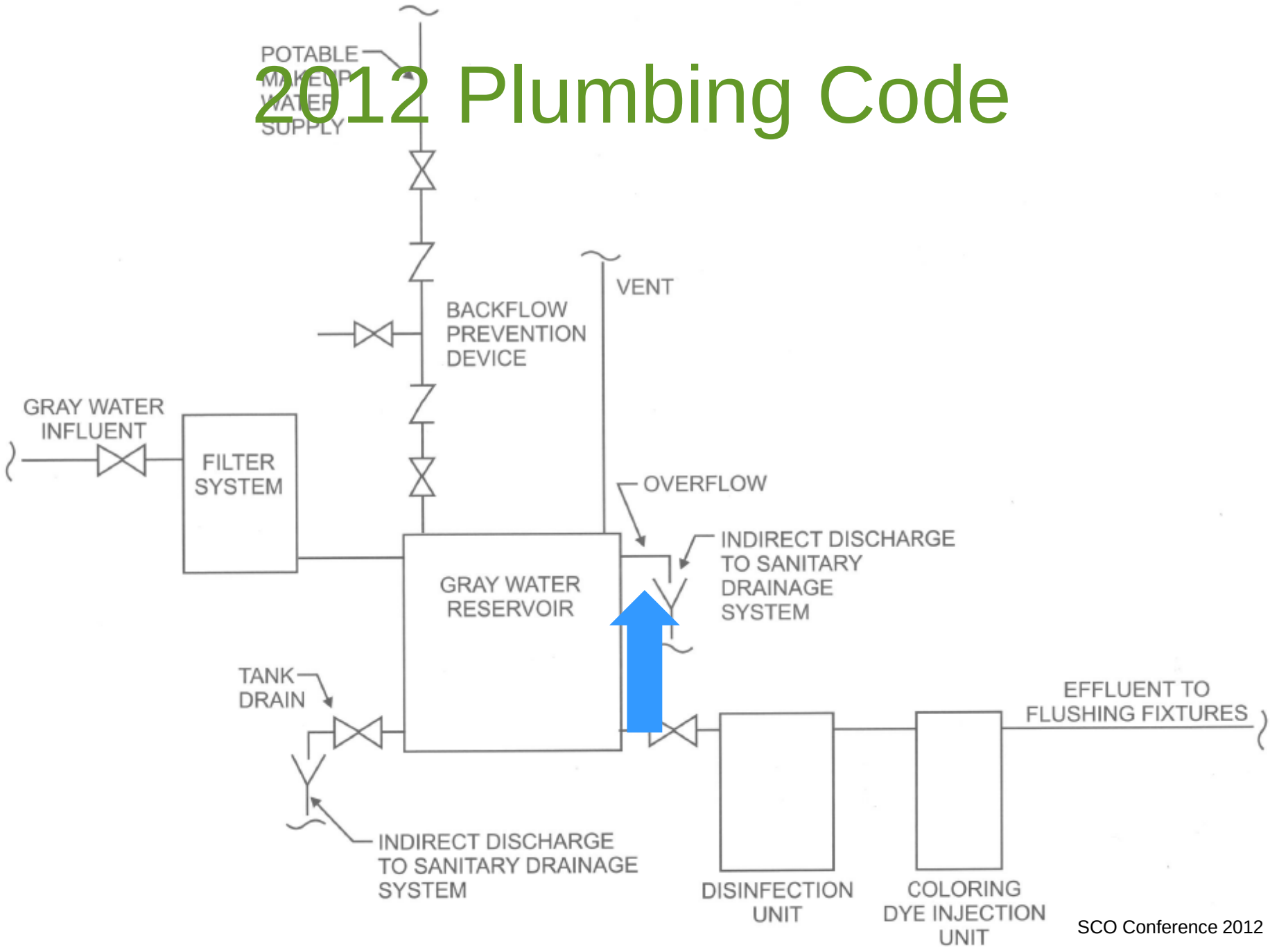
SCO Conference 2012

2012 Plumbing Code

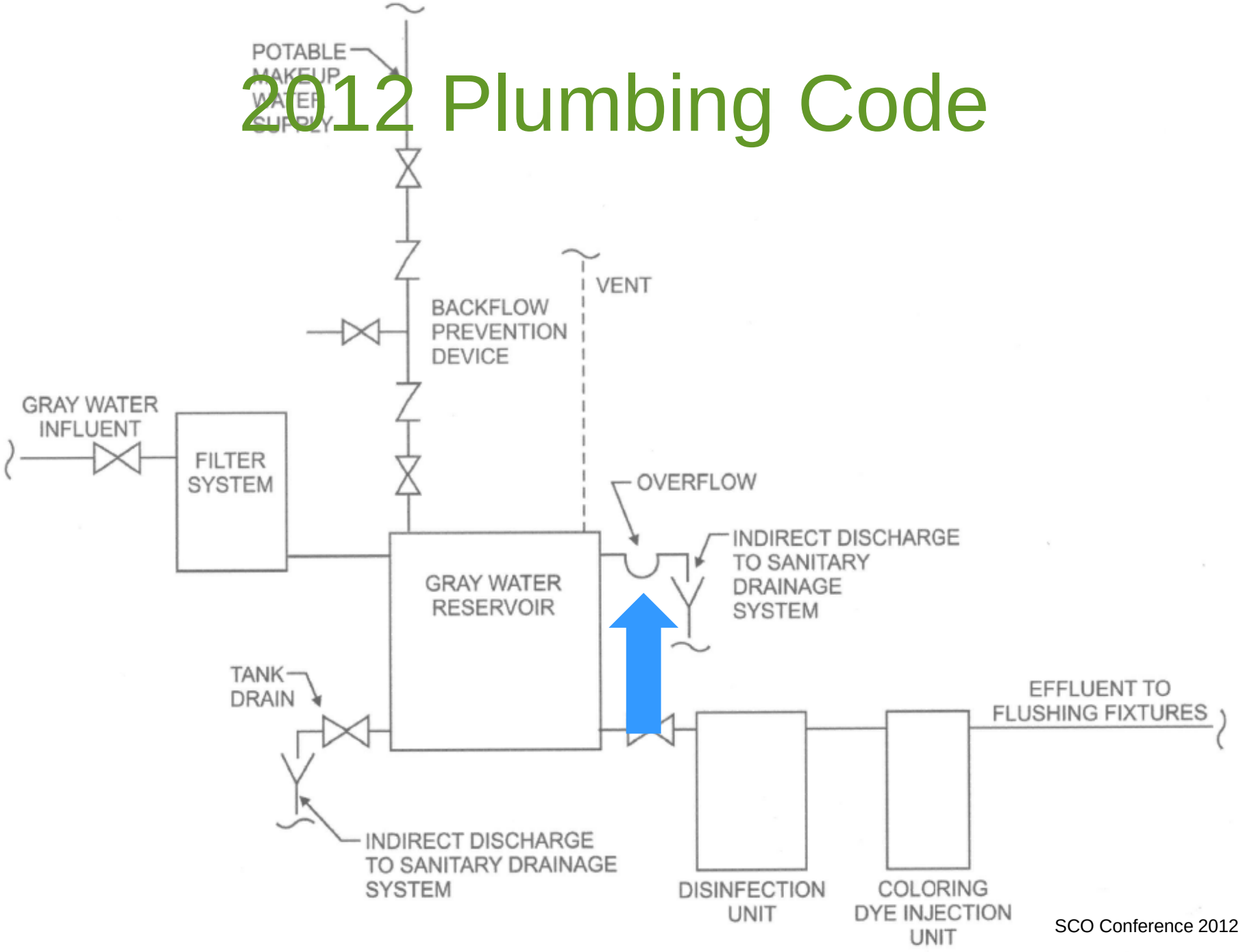
APPENDIX C
GRAY WATER RECYCLING SYSTEMS
C101.12 Overflow.

C101.12 Overflow. The collection reservoir shall be equipped with an overflow pipe having the same or larger diameter as the influent pipe for the gray water. The overflow pipe shall be trapped and shall be indirectly connected to the sanitary drainage system.

2012 Plumbing Code



2012 Plumbing Code



2012 Plumbing Code

2012 Plumbing Code

APPENDIX C
GRAY WATER RECYCLING SYSTEMS
C102.2 Disinfection.

C102.2 Disinfection. Gray water shall be disinfected by an *approved* method that employs one or more disinfectants such as chlorine, iodine or ozone that are recommended for use with the pipes, fittings and equipment by the manufacturer of the pipes, fittings and equipment.

2012 Plumbing Code

APPENDIX C

GRAY WATER RECYCLING SYSTEMS

- C103 Subsurface Landscape Irrigation Systems

  Note: Not applicable for rain water systems.

Deleted

APPENDIX C

2012 Plumbing Code

with Section 608. There shall be a full-open valve located on the makeup water supply line to the collection reservoir.

C102.4 Coloring. The gray water shall be dyed blue or green with a food grade vegetable dye before such water is supplied to the fixtures.

C102.5 Materials. Distribution piping shall conform to one of the standards listed in Table 605.3.

C102.6 Identification. Distribution piping and reservoirs shall be identified as containing nonpotable water. Piping identification shall be in accordance with Section 608.8.

SECTION C103
SUBSURFACE LANDSCAPE IRRIGATION SYSTEMS

Note: Not applicable for rain water systems.

Deleted

2012 Plumbing Code

APPENDIX C1

RAIN WATER RECYCLING SYSTEMS

The provisions contained in this appendix are adopted as part of this code.
Note: See Section [illegible] for connections to drainage system.

SECTION C1-101
GENERAL

C1-101.1 Scope. The provisions of this appendix shall govern the materials, design, construction and installation of rain water systems for flushing of water closets and urinals.

C1-101.2 Definition. The following term shall have the meaning shown herein.

GRAY WATER. Waste discharge from lavatories, bathtubs, showers, clothes washers and laundry trays.

RAIN WATER. Water collected from the roof of a building or other catchment surface during a rainfall event and stored in a reservoir for nonpotable use.

C1-101.3 Permits. Permits shall be required in accordance with the North Carolina Administrative Code and Policies.

C1-101.4 Installation. In addition to the provisions of Section C1-101, systems for flushing of water closets and urinals shall comply with Section C1-102. Except as provided for in Appendix C1, all systems shall comply with the provisions of the *International Plumbing Code*.

C1-101.5 Materials. Above-ground drain, waste and vent piping for rain water systems shall conform to one of the standards listed in Table 702.1. Rain water underground building drainage and vent pipe shall conform to one of the standards listed in Table 702.2.

C1-101.6 Tests. Drain, waste and vent piping for rain water systems shall be tested in accordance with Section 312.

C1-101.7 Inspections. Rain water systems shall be inspected in accordance with the *North Carolina Administrative Code and Policies*.

C1-101.8 Potable water connections. Only connections in accordance with Section C1-102.3 shall be made between rain water recycling system and a potable water system.

C1-101.9 Rain water connections. Rain water recycling systems shall receive only the water discharge from the roof of buildings or other catchments.

C1-101.10 Collection reservoir. Rain water shall be collected in an approved reservoir constructed of durable, nonabsorbent and corrosion-resistant materials. Access openings shall be provided to allow inspecting and cleaning of the reservoir interior.

C1-101.11 Filtration. Rain water entering the reservoir shall pass through an approved filter strainer, disinfected and colored blue or green.

C1-101.12 Overflow. The collection reservoir shall be equipped with an overflow pipe having the same or larger diameter as the influent pipe for the rain water. The overflow pipe shall discharge to the storm drainage system or to daylight.

SECTION C1-102
SYSTEMS FOR FLUSHING WATER CLOSETS AND URINALS

C1-102.1 Collection reservoir. The holding capacity of the reservoir is not limited.

C1-102.2 Makeup water. An alternative water supply shall be provided as a source of makeup water for the rain water system. An alternative water supply shall be protected against backflow in accordance with Section 608. The alternative water source may be a potable water system or an irrigation well.

C1-102.3 Materials. Distribution piping shall conform to one of the standards listed in Table 605.4. This does not apply to the irrigation portion of the system.

C1-102.4 Identification. Distribution piping (not including irrigation piping) and reservoirs shall be identified as containing nonpotable water. Piping identification shall be in accordance with Section 608.8.

2012 NORTH CAROLINA PLUMBING CODE 109

RAIN[illegible]MS

The p[illegible]endix

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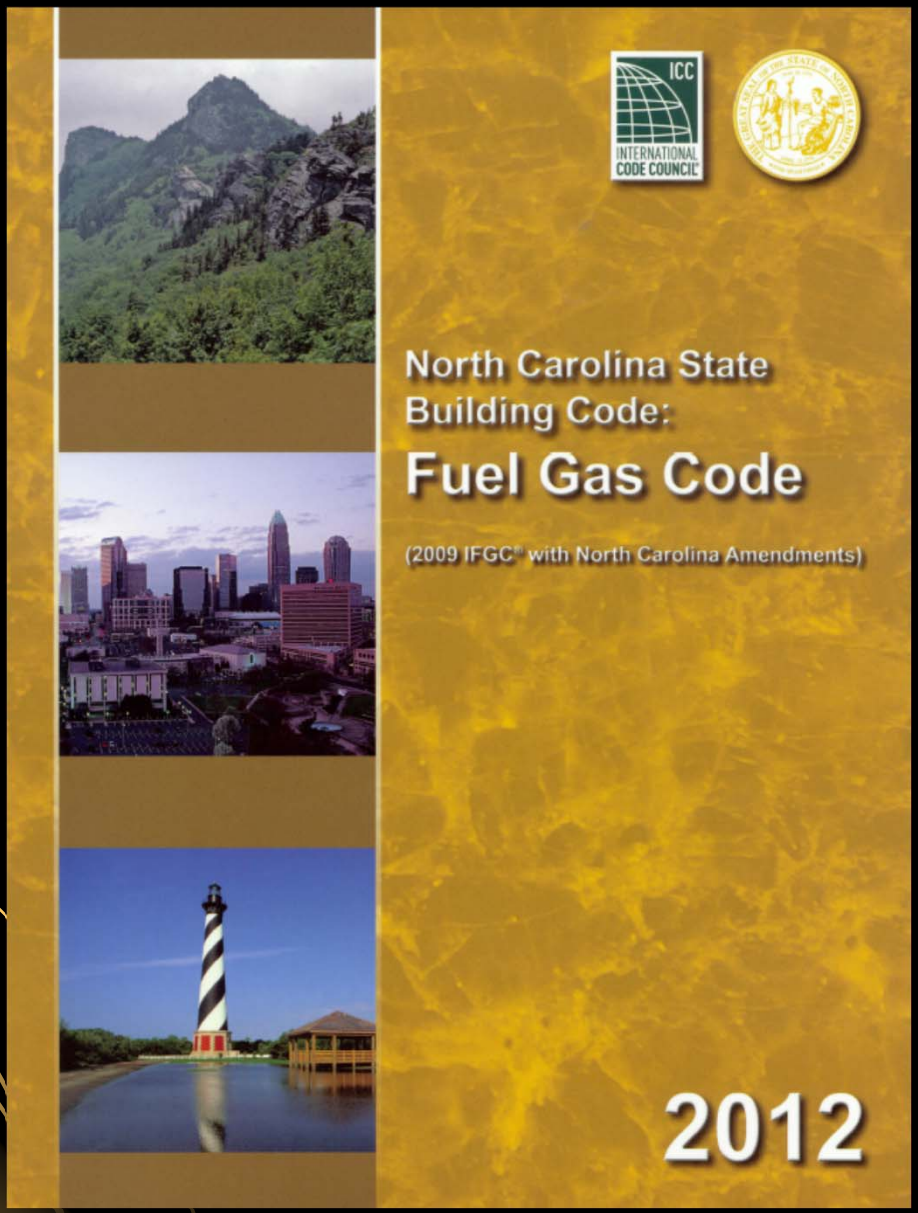
2012 Plumbing Code

2012 Plumbing Code

2012 Fuel Gas Code



2012 Fuel Gas Code

310 ELECTRICAL BONDING

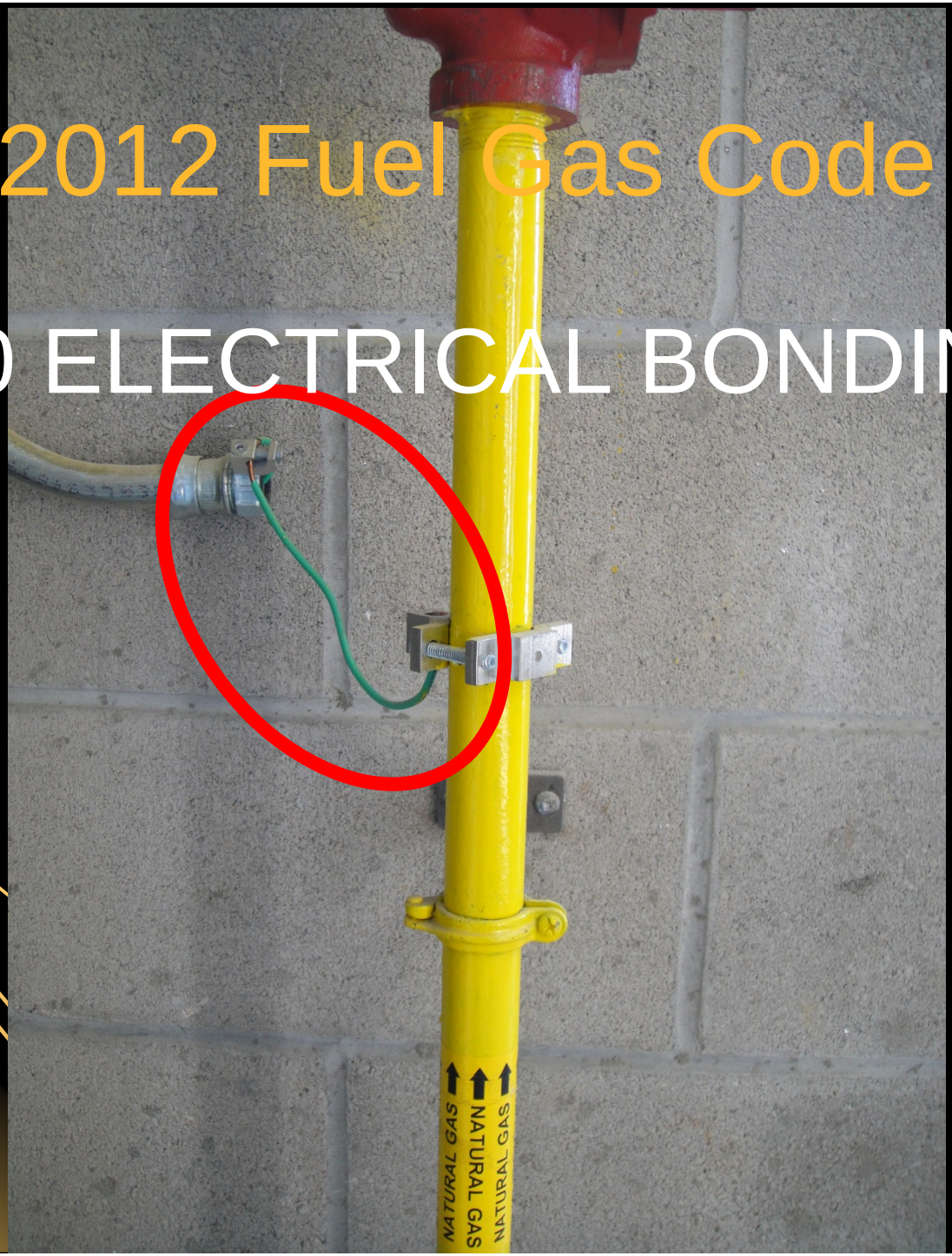
SECTION 310 (IFGS)
ELECTRICAL BONDING

310.1 Pipe and tubing other than CSST. Each above-ground portion of a gas *piping* system other than corrugated stainless steel tubing (CSST) that is likely to become energized shall be electrically continuous and bonded to an effective ground-fault current path. Gas *piping* other than CSST shall be considered to be bonded where it is connected to appliances that are connected to the *equipment* grounding conductor of the circuit supplying that *appliance*.

310.1.1 CSST. Corrugated stainless steel tubing (CSST) gas *piping* systems shall be bonded to the electrical service grounding electrode system at the point where the gas service enters the building. The bonding jumper shall be not smaller than 6 AWG copper wire or equivalent.

2012 Fuel Gas Code

310 ELECTRICAL BONDING



2012 Fuel Gas Code

404.15.3
Tracer Wire.

404.15.3 Tracer. A yellow insulated copper tracer wire or other *approved* conductor shall be installed adjacent to underground nonmetallic *piping*. *Access* shall be provided to the tracer wire or the tracer wire shall terminate above ground at each end of the nonmetallic *piping*. The tracer wire size shall not be less than 18 AWG and the insulation type shall be suitable for direct burial.


2012 Fuel Gas Code
404.15.3
Tracer Wire
SCO Conference 2012


2012 Fuel Gas Code
406.7 Purging.
SCO Conference 2012

2012 Fuel Gas Code

406.7 Purging.

North Carolina has added technical changes to this section as a result of the explosion at the ConAgra Slim Jim plant in Garner.

2012 Fuel Gas Code

Purg inal pipe nply with gh

406.7 Purging. Purging of 2½ inch (63.5 mm) nominal pipe size or larger shall comply with Sections 406.7.1 through 406.7.4.

406.7.1 Removal from service. Where gas piping is to be opened for servicing, addition or modification, the section to be worked on shall be turned off from the gas supply at the nearest convenient point, and the line pressure vented to the outdoors. The remaining gas in this section of pipe shall be displaced with an inert gas as required by Table 406.7.1.

Exception: If the line pressure cannot be vented to the outdoors; the building an all effected spaces shall be evacuated of personal not involved with purging the gas lines, quantities of flammable gas shall not exceed 25 percent of the lower explosive limit (1.0-percent fuel/air mixture for natural gas or 0.6-percent fuel/air mixture for LP-gas) as measured by a combustible gas detector, all ignition sources shall be eliminated, and adequate ventiliation to prevent accumulation of flammable gases shall be provided.

2012 Fuel Gas Code

406.7.5 Personnel training.

This is a new section!

406.7.5 Personnel training. Personnel performing purging operation shall be trained according to the hazards associated with purging and shall not rely on odor when monitoring the concentration of combustible gas.

2012 Fuel Gas Code

NEW SECTION:

409.6 Shutoff valve for laboratories.

Follows NFPA 54 National Fuel Gas Code

7.9.2.4 Shutoff Valve for Laboratories. Each laboratory space containing two or more gas outlets installed on tables, benches, or in hoods in educational, research, commercial, and industrial occupancies shall have a single shutoff valve through which all such gas outlets are supplied. The shutoff valve shall be accessible, located within the laboratory or adjacent to the laboratory's egress door, and identified.

2012 Fuel Gas Code

409.6

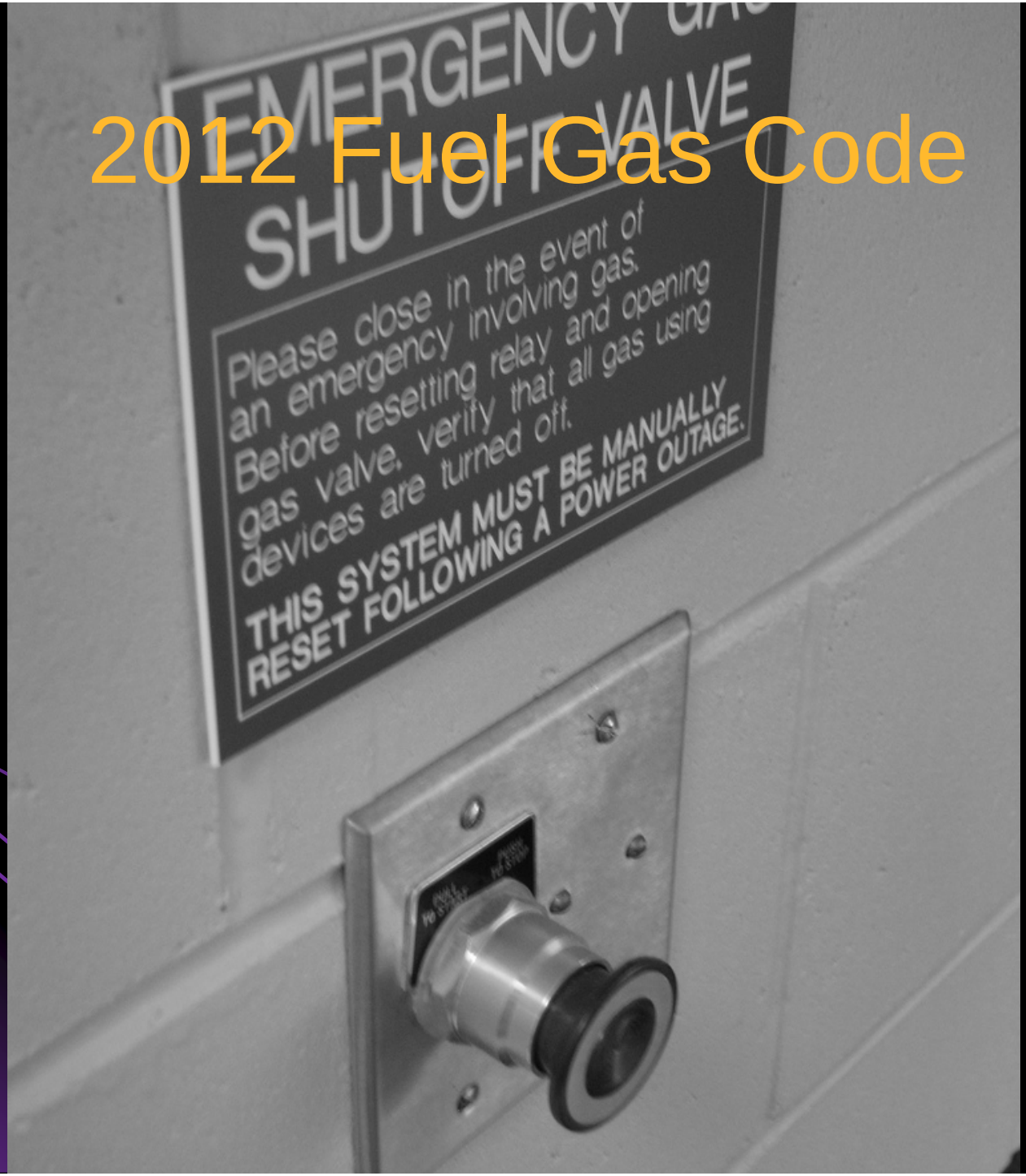
Shutoff valve for laboratories.

409.6 Shutoff valve for laboratories. Where provided with two or more fuel gas outlets, including table-, bench- and hood-mounted outlets, each laboratory space in educational, research, commercial and industrial occupancies shall be provided with a single dedicated shutoff valve through which all such gas outlets shall be supplied. The dedicated shutoff valve shall be readily accessible, located within the laboratory space served, located adjacent to an egress door from the space and shall be identified by *approved* signage stating "Gas Shutoff."

2012 Fuel Gas Code

2012 Fuel Gas Code

2012 Fuel Gas Code



2012 Fuel Gas Code

410.3.1 Vent piping.

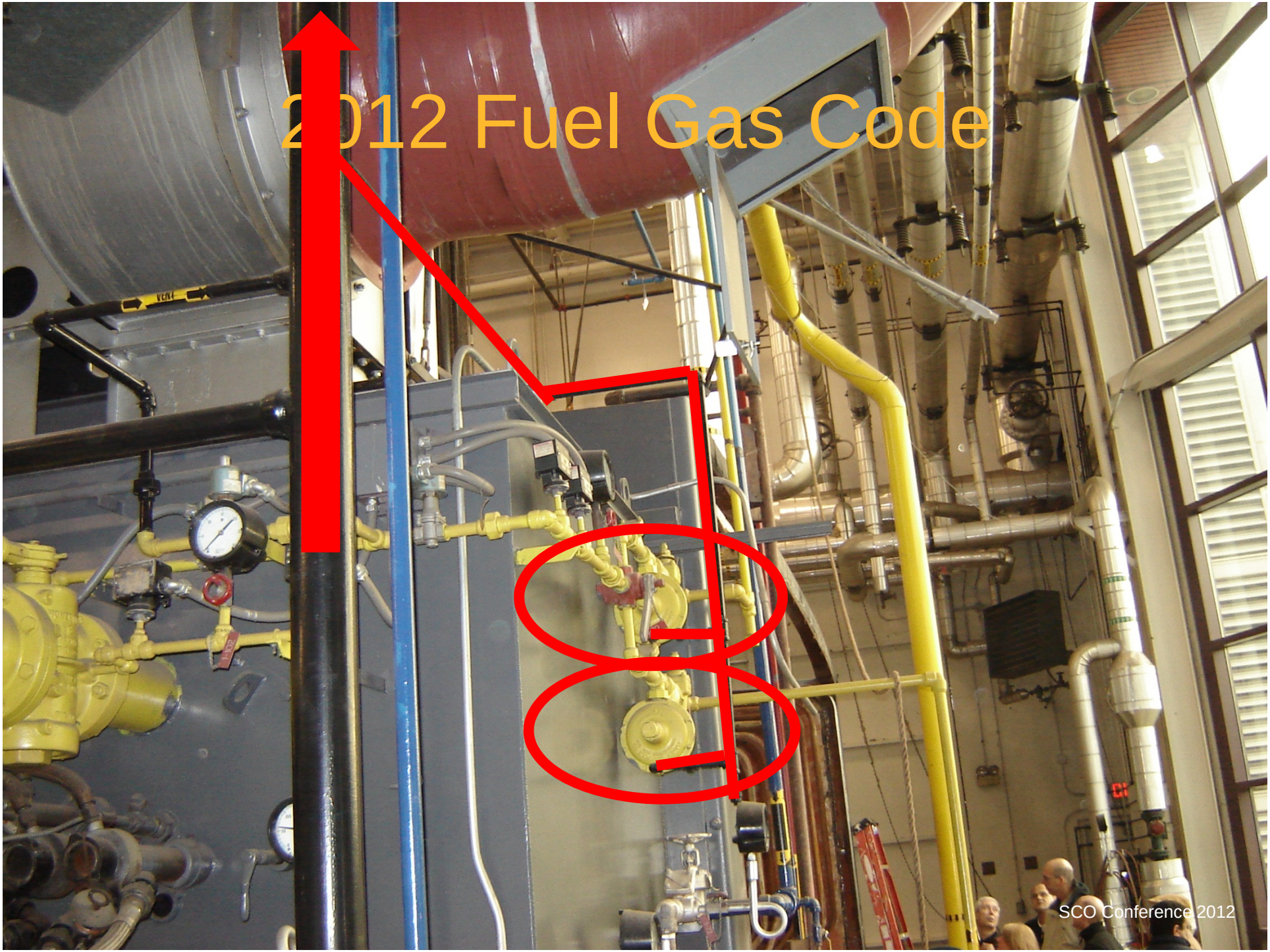
- 2009 Material type was metallic
- 2012 Material type shall comply with Section 403

2012 Fuel Gas Code

410.3.1 Vent piping.

410.3.1 Vent piping. Vent *piping* for relief vents and breather vents shall be constructed of materials allowed for gas *piping* in accordance with Section 403. Vent *piping* shall be not smaller than the vent connection on the pressure regulating device. Vent *piping* serving relief vents and combination relief and breather vents shall be run independently to the outdoors and shall serve only a single device vent. Vent *piping* serving only breather vents is permitted to be connected in a manifold arrangement where sized in accor-

2012 Fuel Gas Code



2012 NC Mechanical, Plumbing and Fuel Gas Codes

Mechanical Reviewers

Tom Galdi – tom.galdi@doa.nc.gov

Nader Iskander – nader.iskander@doa.nc.gov

Elizabeth Kotek – elizabeth.kotek@doa.nc.gov

Leonard Thagard – leonard.thagard@doa.nc.gov

2012 NC Mechanical, Plumbing and Fuel Gas Codes

Thank You!

Questions?

Leonard Thagard, PE

leonard.thagard@doa.nc.gov

919-807-4093

http://www.nc-sco.com/