MECHANICAL TAC
WITH COMMENTS

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Total Mods for report: 31

TAC: Mechanical

Total Mods for **Mechanical** in **Approved as Submitted: 5**

Total Mods for report: 31

Sub Code: Building

M7365

1

Date Submitted	11/20/2018	**Section**	3111	**Proponent**	Bryan Holland
Chapter	31	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No

Alternate Language Yes

Related Modifications

7345, 7347, 7348

Summary of Modification

This proposed modification updates requirement for solar energy systems in the FBC-B.

Rationale

This proposed modification deletes the current requirements in Section 3111 and replaces them with the updated rules in 3111 of the 2018 IBC that have been correlated and harmonized with current industry standards and other applicable references. This change is similar to those proposed under Mods 7345, 7347, and 7348 for inclusion into the FBC-R. This change will also coordinate the FBC-B with the FFPC.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will not impact the local entity relative to code enforcement.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will not change the cost of compliance to building and property owners.

Impact to industry relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact industry.

Impact to small business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification is directly connected to the health, safety, and welfare of the general public by coordinating the FBC-B with the FFPC for life, fire, and property safety related to solar energy system installations.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification improves and strengthens the code by updating the rules for solar energy systems in the FBC-B.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification enhances the effectiveness of the code.

Alternate Language

2nd Comment Period

7365-A2

Proponent Bryan Holland **Submitted** 5/22/2019 **Attachments** Yes

Rationale

This alternative language comment simply corrects a pointer to the applicable section of the FFPC in 3111.3.4 related to access and pathways. "Section 1204" is replaced with "Section 11.12.2.2".

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This alternative language comment will have no impact on the local entity.

Impact to building and property owners relative to cost of compliance with code

This alternative language comment will have no impact on building owners.

Impact to industry relative to the cost of compliance with code

This alternative language comment will have no impact on industry.

Impact to Small Business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This alternative language comment corrects an error in the code which relates directly to the health, safety, and welfare of the public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This alternative language comment improves the code by correcting an error.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This alternative language comment does not discriminate against any materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This alternative language comment enhances the effectiveness of the code by correcting an error.

Alternate Language

2nd Comment Period

7365-A1

Proponent John Hall **Submitted** 5/22/2019 **Attachments** Yes

Rationale

This alternate language does not alter the text of the modification. It only adds references to appropriate code sections to make the modification applicable to the high velocity hurricane zone.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will not impact the local entity relative to code enforcement.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will not change the cost of compliance to building and property owners.

Impact to industry relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact industry.

Impact to Small Business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification is directly connected to the health, safety, and welfare of the general public by coordinating the FBC-B with the FFPC for life, fire and property safety related to solar energy system installations throughout Florida including the HVHZ.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification improves and strengthens the code by updating the rules for solar energy systems in the FBC-B throughout Florida including the HVHZ.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification enhances the effectiveness of the code.

SECTION 3111

SOLAR ENERGY SYSTEMS

3111.1 General. Solar energy systems shall comply with the requirements of this section.

3111.1.1 Wind resistance. Rooftop-mounted photovoltaic panels and modules and solar thermal collectors shall be designed in accordance with Section 1609.

3111.1.2 Roof live load. Roof structures that provide support for solar energy systems shall be designed in accordance with Section 1607.13.5.

3111.2 Solar thermal systems. Solar thermal systems shall be designed and installed in accordance with the Florida Building Code-Plumbing, the Florida Building Code-Mechanical, and the Florida Fire Prevention Code.

3111.2.1 Equipment. Solar thermal systems and components shall be listed and labeled in accordance with ICC 900/SRCC 300 and ICC 901/SRCC 100.

3111.3 Photovoltaic solar energy systems. Photovoltaic solar energy systems shall be designed and installed in accordance with this section, the Florida Fire Prevention Code, NFPA 70 and the manufacturer's installation instructions.

3111.3.1 Equipment. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703. Inverters shall be listed and labeled in accordance with UL 1741. Systems connected to the utility grid shall use inverters listed for utility interaction.

3111.3.2 Fire classification. Rooftop-mounted photovoltaic systems shall have a fire classification in accordance with Section 1505.9. Building-integrated photovoltaic systems shall have a fire classification in accordance with Section 1505.8.

3111.3.3 Building-integrated photovoltaic systems. Building-integrated photovoltaic systems that serve as roof coverings shall be designed and installed in accordance with Section 1507.18.

3111.3.4 Access and pathways. Roof access, pathways and spacing requirements shall be provided in accordance with Section ~~1204~~ 11.12.2.2 of the Florida Fire Prevention Code.

3111.3.5 Ground-mounted photovoltaic systems. Ground-mounted photovoltaic systems shall be designed and installed in accordance with Chapter 16 and the Florida Fire Prevention Code.

3111.3.5.1 Fire separation distances. Ground-mounted photovoltaic systems shall be subject to the fire separation distance requirements determined by the local jurisdiction.

~~SECTION 3111~~

~~PHOTOVOLTAIC PANELS AND MODULES~~

~~3111.1 General. Photovoltaic panels and modules shall comply with the requirements of this code and the Florida Fire Prevention Code.~~

~~3111.1.1 Rooftop-mounted photovoltaic panels and modules. Photovoltaic panels and modules installed on a roof or as an integral part of a roof assembly shall comply with the requirements of Chapter 15 and the Florida Fire Prevention Code.~~

SECTION 3111

SOLAR ENERGY SYSTEMS

3111.1 General. Solar energy systems shall comply with the requirements of this section.

3111.1.1 Wind resistance. Rooftop-mounted photovoltaic panels and modules and solar thermal collectors shall be designed in accordance with Section 1609. For buildings and structures located within the high-velocity hurricane zone refer to Section 1620.

3111.1.2 Roof live load. Roof structures that provide support for solar energy systems shall be designed in accordance with Section 1607.13.5.

3111.2 Solar thermal systems. Solar thermal systems shall be designed and installed in accordance with the Florida Building Code-Plumbing, the Florida Building Code-Mechanical, and the Florida Fire Prevention Code.

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3111.3.2 Fire classification. Rooftop-mounted photovoltaic systems shall have a fire classification in accordance with Section 1505.9. Building-integrated photovoltaic systems shall have a fire classification in accordance with Section 1505.8. For buildings and structures located within the high-velocity hurricane zone refer to Section 1516.

3111.3.3 Building-integrated photovoltaic systems. Building-integrated photovoltaic systems that serve as roof coverings shall be designed and installed in accordance with Section 1507.18. For buildings and structures located within the high-velocity hurricane zone refer to Section 1518.11.

3111.3.4 Access and pathways. Roof access, pathways and spacing requirements shall be provided in accordance with Section 1204 of the Florida Fire Prevention Code.

3111.3.5 Ground-mounted photovoltaic systems. Ground-mounted photovoltaic systems shall be designed and installed in accordance with Chapter 16 and the Florida Fire Prevention Code.

3111.3.5.1 Fire separation distances. Ground-mounted photovoltaic systems shall be subject to the fire separation distance requirements determined by the local jurisdiction.

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SOLAR ENERGY SYSTEMS

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3111.1.2 Roof live load. Roof structures that provide support for solar energy systems shall be designed in accordance with Section 1607.13.5.

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3111.3.3 Building-integrated photovoltaic systems. Building-integrated photovoltaic systems that serve as roof coverings shall be designed and installed in accordance with Section 1507.18.

3111.3.4 Access and pathways. Roof access, pathways and spacing requirements shall be provided in accordance with Section 1204 of the Florida Fire Prevention Code.

3111.3.5 Ground-mounted photovoltaic systems. Ground-mounted photovoltaic systems shall be designed and installed in accordance with Chapter 16 and the Florida Fire Prevention Code.

3111.3.5.1 Fire separation distances. Ground-mounted photovoltaic systems shall be subject to the fire separation distance requirements determined by the local jurisdiction.

~~SECTION 3111~~

~~PHOTOVOLTAIC PANELS AND MODULES~~

~~3111.1 General. Photovoltaic panels and modules shall comply with the requirements of this code and the Florida Fire Prevention Code.~~

~~3111.1.1 Rooftop-mounted photovoltaic panels and modules. Photovoltaic panels and modules installed on a roof or as an integral part of a roof assembly shall comply with the requirements of Chapter 15 and the Florida Fire Prevention Code.~~

SECTION 3111

SOLAR ENERGY SYSTEMS

3111.1 General. Solar energy systems shall comply with the requirements of this section.

3111.1.1 Wind resistance. Rooftop-mounted photovoltaic panels and modules and solar thermal collectors shall be designed in accordance with Section 1609. For buildings and structures located within the high-velocity hurricane zone refer to Section 1620.

3111.1.2 Roof live load. Roof structures that provide support for solar energy systems shall be designed in accordance with Section 1607.13.5.

3111.2 Solar thermal systems. Solar thermal systems shall be designed and installed in accordance with the Florida Building Code-Plumbing, the Florida Building Code-Mechanical, and the Florida Fire Prevention Code.

3111.2.1 Equipment. Solar thermal systems and components shall be listed and labeled in accordance with ICC 900/SRCC 300 and ICC 901/SRCC 100.

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3111.3.1 Equipment. Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703. Inverters shall be listed and

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3111.3.2 Fire classification. Rooftop-mounted photovoltaic systems shall have a fire classification in accordance with Section 1505.9. Building-integrated photovoltaic systems shall have a fire classification in accordance with Section 1505.8. For buildings and structures located within the high-velocity hurricane zone refer to Section 1516.

3111.3.3 Building-integrated photovoltaic systems. Building-integrated photovoltaic systems that serve as roof coverings shall be designed and installed in accordance with Section 1507.18. For buildings and structures located within the high-velocity hurricane zone refer to Section 1518.11.

3111.3.4 Access and pathways. Roof access, pathways and spacing requirements shall be provided in accordance with Section 1204 of the Florida Fire Prevention Code.

3111.3.5 Ground-mounted photovoltaic systems. Ground-mounted photovoltaic systems shall be designed and installed in accordance with Chapter 16 and the Florida Fire Prevention Code.

3111.3.5.1 Fire separation distances. Ground-mounted photovoltaic systems shall be subject to the fire separation distance requirements determined by the local jurisdiction.

Sub Code: Mechanical

M7289

2

Date Submitted	11/16/2018	**Section**	404.1	**Proponent**	James Bickford
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No

Alternate Language Yes

Related Modifications

Summary of Modification

Adds UL 2075-13 standard

Rationale

This proposal clarifies that the detectors required by this section must be listed to UL 2075 and installed in accordance with their listing.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Will provide nationally recognized standard for enforcement

Impact to building and property owners relative to cost of compliance with code

Will increase the cost of construction
Listed UL 2075 detectors might be marginally more expensive than non-listed detectors.

Impact to industry relative to the cost of compliance with code

Will increase the cost of construction
Listed UL 2075 detectors might be marginally more expensive than non-listed detectors.

Impact to small business relative to the cost of compliance with code

Will increase the cost of construction
Listed UL 2075 detectors might be marginally more expensive than non-listed detectors.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Will provide nationally recognized standard for enforcement

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Will provide nationally recognized standard for enforcement

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Will provide nationally recognized standard for enforcement

Does not degrade the effectiveness of the code

Will provide nationally recognized standard for enforcement

2nd Comment Period

7289-A7

Proponent William Sudah **Submitted** 5/14/2019 **Attachments** Yes

Rationale

See the first attachment for rational followed by supporting documents.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Will provide local recognized standard for enforcement.

Impact to building and property owners relative to cost of compliance with code

No impact. Having two detectors versus one with two sensing elements would have almost the same service cost since combo detectors are priced similar to two individual detectors.

Impact to industry relative to the cost of compliance with code

If code is modified at this point, no impact. If modified in the future with the rise of combo units, there will be installation impact (only) but they are very minimum. However public safety and health are paramount.

Impact to Small Business relative to the cost of compliance with code

Will increase the cost of construction
Listed UL 2075 detectors might be marginally more expensive than non-listed detectors.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Yes, allowing NO2 gas to migrate from ceiling level to the 5 foot level before being exhausted risks public health and safety. NO2 is extremely toxic as per the supporting documents and the American Cancer Association. This also risks the gas migrating inside buildings.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Yes this improves the code since it closes the loophole manufacturers' use to justify their actions. Installing detectors where gases migrate will speed up detection and exhaust toxic fumes.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The combo manufacturer is able provide two separate detectors as an alternative to ensure the public health safety.

Does not degrade the effectiveness of the code

No, it does not.

M7289 -A7 Text Modification

404.1 Enclose parking garages: Where mechanical ventilation systems for enclosed parking garages operate intermittently, such operation shall be automatic by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Carbon monoxide detectors shall be installed three to five feet above floor level and nitrogen dioxide detectors shall be installed one foot below ceiling level. Such detectors shall be listed in accordance with UL 2075 and installed in accordance with their listing and the manufacturers' instructions.

404.1 Enclosed parking garages. Where mechanical ventilation systems for enclosed parking garages operate intermittently, such operation shall be automatic by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Such detectors shall be listed in accordance with UL 2075 and installed in accordance with their listing and the manufacturers' ~~recommendations~~ instructions.

Diesel Exhaust

What is diesel exhaust?

Diesel is a type of fuel derived from crude oil. Large engines, including those used in many trucks, buses, trains, construction and farm equipment, generators, ships, and in some cars, run on diesel fuel.

The exhaust from diesel engines is made up of 2 main parts: gases and soot. Each of these, in turn, is made up of many different substances.

- The gas portion of diesel exhaust is mostly carbon dioxide, carbon monoxide, nitric oxide, nitrogen dioxide, sulfur oxides, and hydrocarbons, including polycyclic aromatic hydrocarbons (PAHs).
- The soot (particulate) portion of diesel exhaust is made up of particles such as carbon, organic materials (including PAHs), and traces of metallic compounds.

Both the gases and the soot of diesel exhaust contain PAHs.

Exposure to diesel exhaust is widespread in the modern world. Exhaust from diesel engines brings a complex mixture of soot and gases to roadways, cities, farms, and other places. Health concerns about diesel exhaust relate not only to cancer, but also to other health problems such as lung and heart diseases.

How are people exposed to diesel exhaust?

People are exposed to diesel exhaust mainly by breathing in the soot and gases, which then enter the lungs. The amount of diesel exhaust people are exposed to varies greatly. Measuring these exposures is not easy because diesel exhaust is chemically complex and many parts of it are also found in a lot of other sources. This has been, and remains, a major challenge when trying to study the health effects of diesel exhaust.

People may be exposed to diesel exhaust at work, around the home, or while traveling.

At work

People with the some of highest exposures at work include truck drivers, toll booth workers, miners, forklift drivers and other heavy machinery operators, railroad and dock workers, and garage workers and mechanics. Some farm workers may also spend a lot of time around diesel exhaust.

Where you live and play

People can also be exposed to diesel exhaust in areas where they live and play, although this is typically at lower levels than in the workplace. Exposures are highest where diesel traffic is heaviest, such as along major highways and in cities.

While traveling

Exposure to diesel exhaust may be higher when in a vehicle, especially when traveling on roads with heavier truck or bus traffic. Commuting to and from work is a potential source of diesel exhaust exposure for many people. One particular area of concern is children's exposures to diesel exhaust and other pollutants while riding in school buses, as the buses themselves typically run on diesel fuel.

Does diesel exhaust cause cancer?

Researchers use 2 main types of studies to try to determine if a substance or exposure causes cancer. (A substance that causes cancer or helps cancer grow is called a *carcinogen*.)

In studies done in the lab, animals are exposed to a substance (often in very large doses) to see if it causes tumors or other health problems. Researchers may also expose normal cells in a lab dish to the substance to see if it causes the types of changes that are seen in cancer cells. But it's not always clear if the results from these types of studies will apply to humans.

Another type of study looks at cancer rates in different groups of people. Such a study might compare the cancer rate in a group exposed to a substance versus either the cancer rate in a group not exposed to it, or the cancer rate in the general population. But studies in people can sometimes be hard to interpret, because there may be other factors affecting the results that are hard to account for.

In most cases neither type of study provides definitive evidence on its own, so researchers usually look at both lab -based and human studies if they are available.

Studying a substance like diesel exhaust can be even more complicated because it is actually a mixture of many chemicals. Therefore, researchers have to look at studies of the parts of diesel exhaust, such as soot and PAHs, as well as studies of diesel exhaust itself.

On top of this, changes in diesel technology in recent decades have resulted in lower levels of soot (particles) in diesel exhaust. Studying diesel exhaust exposure from decades ago may not be the same as studying current exposures.

Studies done in the lab

In studies of cells done in lab dishes, diesel exhaust (as soot or chemical extracts) can cause changes in the cells' DNA. These types of changes are usually needed for cancer to develop, although not all substances that cause DNA changes also cause cancer.

Several studies have found that long-term, heavy exposure to diesel exhaust can cause lung cancer in lab animals such as rats.

Studies in people

It is not easy to study the possible health effects of diesel exhaust in people. First, it is often very hard to correctly define and measure the level of exposure. It can also be hard to account for the other cancer risk factors that people exposed to diesel exhaust might have, such as smoking.

Lung cancer

Lung cancer is the major cancer thought to be linked to diesel exhaust. Several studies of workers exposed to diesel exhaust have shown small but significant increases in risk of lung cancer. Men with the heaviest and most prolonged exposures, such as railroad workers, heavy equipment operators, miners, and truck drivers, have been found to have higher lung cancer death rates than unexposed workers. Although most studies have found a link between diesel exhaust exposure and lung cancer, some have not. Still, based on the number of people exposed at work, diesel exhaust may pose a substantial health risk.

The possible link between lung cancer and exposure to diesel exhaust outside of the workplace has not been studied extensively.

Other cancers

Several studies have looked for possible links between diesel exhaust and other cancers, including cancers of the larynx (voice box), esophagus, stomach, and bladder. Studies have also looked for links to blood system cancers such as lymphomas and leukemias (including childhood leukemia). While some studies have found possible links, others have not. More research is needed to show if diesel exhaust exposure is linked to any of these other cancers.

What expert agencies say

Several national and international agencies study substances in the environment to determine if they can cause cancer. The American Cancer Society looks to these organizations to evaluate the risks based on evidence from laboratory, animal, and human research studies.

Some of these expert agencies have classified diesel exhaust as to whether it can cause cancer, based largely on the possible link to lung cancer.

The **International Agency for Research on Cancer (IARC)** is part of the World Health Organization (WHO). Its major goal is to identify causes of cancer. IARC classifies diesel engine exhaust as "carcinogenic to humans," based on sufficient evidence that it is linked to an increased risk of lung cancer, as well as limited evidence linking it to an increased risk of bladder cancer.

The **National Toxicology Program (NTP)** is formed from parts of several different US government agencies, including the National Institutes of Health (NIH), the Centers for Disease Control and Prevention (CDC), and the Food and Drug Administration (FDA). The NTP has classified exposure to diesel exhaust particulates as "reasonably anticipated to be a human carcinogen," based on limited evidence from studies in humans and supporting evidence from lab studies.

The US **Environmental Protection Agency (EPA)** maintains the Integrated Risk Information System (IRIS), an electronic database that contains information on human health effects from exposure to various substances in the environment. The EPA classifies diesel exhaust as "likely to be carcinogenic to humans."

The **National Institute for Occupational Safety and Health (NIOSH)** is part of the CDC that studies exposures in the workplace. NIOSH has determined that diesel exhaust is a "potential occupational carcinogen."

(For more information on the classification systems used by these agencies, see our document, ***Known and Probable Human Carcinogens***.)

Does diesel exhaust cause any other health problems?

Diesel exhaust is a major part of outdoor air pollution. Diesel exhaust is believed to play a role in other health problems, such as eye irritation, headache, asthma and other lung diseases, heart disease, and possibly immune system problems.

Can I reduce my exposure to diesel exhaust?

Diesel exhaust can cause several health problems and can most likely increase the risk of lung cancer (and possibly other cancers), so it makes sense to lower your exposure to it whenever possible. However, since most people's exposure comes from exhaust near highways and other roads, government regulations may be more effective in limiting exposure than individual choices.

At work

If you are exposed to diesel exhaust at work, there are ways to reduce or prevent exposures. Some of these measures can also help protect you from other chemical exposures that are likely to happen in the workplace.

If you work in or around vehicles that run on diesel fuel, you might be able to limit the amount of time you spend near engines while they are running. Limiting the time spent near idling engines may help lower your exposure to fumes.

Talk with your employer to be sure that you are protected adequately. Personal protective equipment, such as respirators, may be a key part of a workplace protective program. If needed, engineering changes, such as ventilating the exhaust away from where you breathe, can also be important.

For more information on preventing or reducing workplace exposures at your job, consult your company's safety and health manager. If needed, you can get additional assistance from the Occupational Safety & Health Administration (OSHA), the government agency responsible for enforcing workplace safety.

Where you live and play

If you are exposed to diesel exhaust fumes in your environment, you can take some of the same precautions. For example, try to avoid or limit spending time near large sources of diesel exhaust, such as near trucks and buses. Commuting to and from work is a potential source of diesel exhaust exposure for many people, whether using a car or some type of public transportation. For some people, working from home (telecommuting or teleworking) may be an option to lower their exposure, as well as to save money on commuting expenses.

On a governmental level, regulations such as the Clean Air Act and programs such as the EPA's National Clean Diesel Campaign are designed to reduce diesel emissions from trucks and other large engines, lowering public exposure to diesel exhaust.

Another important program is Clean School Bus USA. Children can be exposed to diesel exhaust during school bus travel or when standing near running school buses outside of school. Clean School Bus USA brings together partners from business, education, transportation, and public-health organizations to reduce children's exposure to bus-related air pollutants by aiming to:

- Reduce unnecessary school bus idling
- Replace older buses with newer, less-polluting buses
- Upgrade existing buses with technologies to reduce their emissions

Additional resources

More information from your American Cancer Society

We have some related information that may also be helpful to you. These materials may be ordered from our toll-free number, 1-800-227-2345.

Does This Cause Cancer?

Known and Probable Human Carcinogens

National organizations and Web sites

In addition to the American Cancer Society, other sources of information and support include*:

Environmental Protection Agency (EPA)
Web site: **www.epa.gov**
Clean School Bus USA: **www.epa.gov/cleanschoolbus**
National Clean Diesel Campaign: **www.epa.gov/otaq/diesel/index.htm**

National Cancer Institute (NCI)
Toll-free number: 1-800-422-6237 (1-800-4-CANCER)
Web site: **www.cancer.gov**

National Institute for Occupational Safety and Health (NIOSH)
Toll-free number: 1-800-232-4636 (1-800-CDC-INFO)
Web site: **www.cdc.gov/niosh**

Occupational Safety & Health Administration (OSHA)
Toll-free number: 1-800-321-6742 (1-800-321-OSHA)
Web site: **www.osha.gov**
Safety and health topics: Diesel exhaust: **www.osha.gov/SLTC/dieselexhaust/index.html**

**Inclusion on this list does not imply endorsement by the American Cancer Society.*

No matter who you are, we can help. Contact us anytime, day or night, for information and support. Call us at 1-800-227-2345 or visit **www.cancer.org**.

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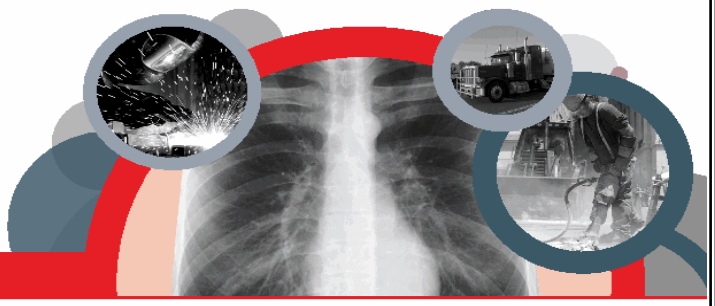
CAREX CANADA

Surveillance of environmental and occupational exposures for cancer prevention



Lung Carcinogens

Occupational Exposure Summary Package

This package serves as a summary of CAREX Canada's results on priority exposures to known or suspected lung carcinogens in Canada. Assembling various CAREX Canada data, tools, and resources, it provides an overview of the most prevalent exposures that are linked to lung cancer, including diesel engine exhaust, crystalline silica, asbestos, nickel compounds, and hexavalent chromium. Our aim is to provide a useful guide for those looking to better understand – and help reduce or eliminate – common carcinogenic exposures associated with lung cancer.

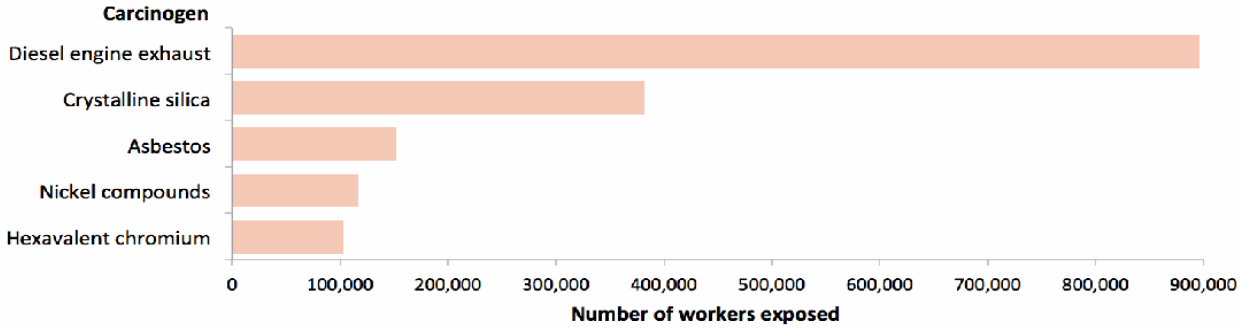
Lung cancer in Canada

Lung cancer is the second most common type of cancer among Canadians behind breast cancer in women and prostate cancer in men (this excludes non-melanoma skin cancers). According to the Canadian Cancer Statistics, an estimated 25,500 Canadians were diagnosed with lung cancer and approximately 20,200 Canadians died of the disease in 2013. Lung cancer is the leading cause of cancer mortality in Canada, resulting in approximately 27% of all cancer deaths. The 5-year relative survival rate for lung cancer is 17%.

Estimates of prevalent exposures

CAREX Canada estimates of the number of Canadians exposed to lung carcinogens at work are summarized in Figure 1. They include **diesel engine exhaust, crystalline silica, asbestos, nickel, and hexavalent chromium**. Exposure level estimates, where available, are summarized in the Carcinogen Profiles below.

Figure 1: Top 5 prevalent lung carcinogen exposures for workplaces in Canada, CAREX Canada Database, 2006



Note: High prevalence does not necessarily indicate a high cancer risk. For more information or assistance interpreting the data in this table, please contact us at info@carexcanada.ca.

Radon, the second leading cause of lung cancer in Canada, is an important occupational exposure that has not yet been characterized in Canada. For this reason, it is not included in Figure 1. For more information on radon, please see the profile below.

We classify carcinogens based on evaluations made by the International Agency for Research on Cancer (IARC). Most of the agents listed in Figure 1 are classified as known carcinogens (IARC 1), where there is sufficient evidence linking the agent with cancer in humans.

Exploring the CAREX Canada estimates

Our eWORK Tool allows users to explore CAREX exposure data by carcinogen, sector, occupation, province, sex, and exposure level. We offer two versions of the eWORK Tool: eWORK Excel and eWORK Online. eWORK Excel uses a Microsoft Excel PowerPivot interface that allows users to search for – and visualize – exposures of interest. eWORK Online is for users who prefer quick, accessible, yet high-quality statistics on occupational exposures to various carcinogens.

eWORK Excel and eWORK Online are available under the Tools tab of our website.

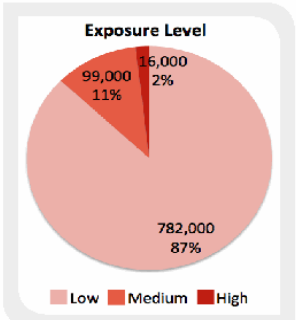
Carcinogen profiles

The CAREX Canada website contains detailed information on use, production and trade, exposure routes, and health effects for the top five lung carcinogens listed above. A sample of these are summarized below.

More information, including regulations and guidelines for each agent, methods for calculating exposure level estimates, and a list of references, is available under the Profiles and Estimates tab of our website.

Diesel Engine Exhaust

Known Carcinogen (IARC) 1)



What is diesel engine exhaust?

The combustion of diesel fuel in engines produces diesel engine exhaust, a **complex mixture of gases and particulates** that can contain other known and suspected carcinogens such as benzene, polycyclic aromatic hydrocarbons (PAHs), metals, and particulate matter. The composition of the mixture depends on a number of factors including the type of engine (heavy or light duty), the type of fuel and oil, sulphur levels, speed and load of operation, and emission control systems.

Occupational exposure to diesel engine exhaust

Inhalation is the most common route of exposure. Assessing exposures to diesel engine exhaust is complex due to difficulty separating diesel exhaust exposure from other air contaminants with similar characteristics, in addition to controversies in the best practices for measuring exposure.

Of those exposed to diesel engine exhaust, the **transportation and warehousing, construction, and manufacturing sectors** have the largest number of exposed workers in Canada. Occupations with the largest number of exposed workers include **truck drivers, heavy equipment operators, and transit operators**.

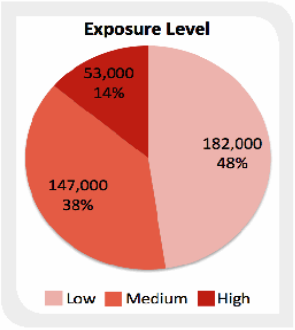
What are its health effects?

Cancer:
There is sufficient evidence linking diesel engine exhaust to **lung cancer**, and limited evidence for bladder cancer in humans.

Non-cancer:
Short-term exposure to diesel engine exhaust can irritate the eyes, throat, and bronchi, and cause light-headedness, nausea, and respiratory symptoms such as cough and phlegm. Diesel exhaust may initiate allergic reactions or increase immunological response to other allergens.

Crystalline Silica

Known Carcinogen (IARC 1)



What is silica?

Silica is **one of the most common minerals on earth** and is a basic component of soil, sand, and rocks including granite and quartzite. It exists in both crystalline and amorphous (non-crystalline) forms, and can convert from amorphous to crystalline forms at high heat. Quartz is the most common form of crystalline silica and the most commonly used industrially. Quebec, Ontario, and Alberta are the primary silica producers in Canada, followed by Saskatchewan, British Columbia, and Nova Scotia.

What are the main uses of silica?

Crystalline silica is used in foundry castings, abrasives and sandblasting materials, hydraulic fracturing, silicon and ferrosilicon metal production, and as a filter for large volumes of water (i.e. in municipal water and sewage treatment plants). Very fine grades of crystalline silica called flours are used in the ceramic and pottery industry, in manufacturing chrysotile cement, as filler in rubber and paints, and as an abrasive in soaps and cleaners.

Occupational exposure to silica

Health concerns arise when silica-containing products are disturbed by grinding, cutting, drilling or chipping, which creates respirable particles. Inhalation is therefore the most important route of occupational exposure.

Of those exposed to crystalline silica in Canada, the **construction sector** has the largest group of exposed workers. Occupations with the largest number of exposed workers include **construction trades helpers and labourers, heavy equipment operators, as well as plasterers, drywall installers and finishers, and lathers**.

What are its health effects?

Cancer:
Epidemiological studies show a relationship between occupational exposure to crystalline silica and increased risk of **lung cancer**, with the strongest link in quarry and granite workers and workers involved in ceramic, pottery, refractory brick and diatomaceous earth industries.

Non-cancer:
Silicosis, a non-reversible fibrotic lung disease, is caused by inhaling crystalline silica particles. Occupational silica exposure has also been linked to pulmonary tuberculosis, chronic obstructive pulmonary disease, and autoimmune disease (rheumatoid arthritis).

Asbestos

Known Carcinogen (IARC 1)

Exposure level

Occupational exposure to asbestos has changed over the past 40 years in Canada, making it challenging to assess exposure levels using historical data. Research on current exposure levels is ongoing.

What is asbestos?

Asbestos is a general term for **a group of naturally occurring, fibrous silicate minerals**. There are two main classes of asbestos: serpentine and amphibole. The only serpentine variety, chrysotile is the most abundant form and is the most common asbestos fibre used commercially. The five amphibole varieties include amosite, crocidolite, actinolite, tremolite, and anthophyllite.

What are the main uses of asbestos?

The **manufacturing and use of asbestos-containing products is banned or severely restricted in most western countries**, including Canada. Asbestos has historically been useful for many commercial applications because of its heat resistance, tensile strength, insulating and friction characteristics, as well as its ability to be woven. It is found primarily in roofing, thermal and electrical insulation, cement pipe and sheets, flooring, gaskets, friction materials, coatings, plastics, textiles, paper, and other products.

Occupational exposure to asbestos

Inhalation is the most important route of occupational exposure. Asbestos fibers vary in length, diameter, and chemical composition, which impacts their ability to enter the body and influences the body's ability to clear the substance.

Workers exposed to asbestos may be involved in mining asbestos-contaminated minerals, manufacturing or using asbestos-containing products, maintaining and repairing brakes, maintaining or demolishing buildings, and asbestos abatement. Of those exposed to asbestos in Canada, the **construction sector** has the largest group of exposed workers. Occupations with the largest number of exposed workers include **carpenters, construction trades helpers and labourers, and electricians**.

What are its health effects?

Cancer:
Asbestos has well-established links to **mesothelioma**, a cancer of the protective lining that covers many of the internal organs of the body, and to **lung cancer**. A strong synergistic effect exists between tobacco use and asbestos exposure, further increasing the risk of lung cancer. There is also sufficient evidence in humans for laryngeal and ovarian cancer.

Non-cancer:
Asbestosis, a disease characterized by scar tissue in the lungs and in the pleural membrane, is caused by exposure to high concentrations of asbestos. Symptoms include difficulty breathing, coughing, and in severe cases, heart enlargement, disability, and death.

Nickel and Nickel Compounds

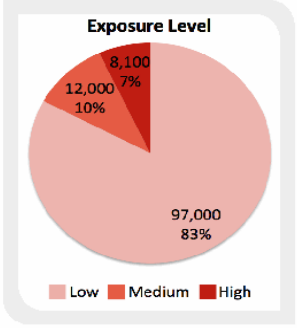
Multiple Classifications (Nickel Compounds: IARC 1 (Known Carcinogen), Metallic Nickel: IARC 2B (Possible Carcinogen))

What is nickel?

Metallic nickel is a **silvery, hard metal or a gray powder** not commonly found in nature. It typically exists as a trace constituent in minerals, particularly those containing magnesium and iron. Nickel's properties of corrosion, heat resistance, hardness, and strength make it an ideal component of alloys.

What are the main uses of nickel?

Nickel is largely used to produce stainless steel, nickel-based alloys, electroplating, casting and alloy steels. Pure nickel is used as a catalyst and is also used in magnets, electrical contacts and electrodes, spark plugs, machinery parts, and surgical and dental prostheses.



Occupational exposure to nickel

Occupational nickel exposure occurs when nickel particles and fumes are inhaled or contact the skin. Of those exposed to nickel in Canada, the **manufacturing sector** has the largest group of exposed workers. Occupations with the largest number of exposed workers include **welders and related machine operators, machining tool operators, and construction millwrights and industrial mechanics**.

What are its health effects?

Cancer:
There is a definite link between exposure to nickel compounds and human **lung, nasal, and paranasal cancer**. Animal studies also show metallic nickel causes lung cancer and local sarcomas, but there is insufficient epidemiological evidence for this link in humans.

Non-cancer:
Working with nickel (e.g. in nickel refining or welding) can cause chronic bronchitis and decreased lung function, and have immunological and kidney effects. Nickel exposure is also a common cause of allergic contact dermatitis. Those who are sensitized to nickel may have asthma related to their exposure.

Hexavalent Chromium Compounds

Known Carcinogen (IARC 1)

What are hexavalent chromium compounds?

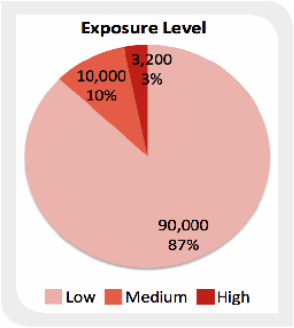
Hexavalent chromium compounds are most often **products of industrial processes**. Canada has not mined chromium ores since the early 1900s, although there are deposits across the country. Recent exploration has taken place in Ontario, Manitoba, Quebec, and Newfoundland.

What are the main uses of hexavalent chromium?

Hexavalent chromium is used to manufacture stainless steel and other alloys, pigments, wood preservatives, and to tan leather and finish metal (chrome plating). Chromated copper arsenate (CCA) is a widely used wood preservative that contains hexavalent chromium. The use of CCA-treated wood for residential purposes was voluntarily phased out at the end of 2003, however CCA is still used for wood preservation in industrial applications such as utility poles, pilings, and highway construction.

(continued on page 6)

Hexavalent chromium continued...



Occupational exposure to hexavalent chromium compounds

Inhalation and dermal contact are the most important routes of occupational exposure to hexavalent chromium. Of those exposed to hexavalent chromium in Canada, the **manufacturing sector** has the largest group of exposed workers. Occupations with the highest prevalence of exposure include **welders and related machine operators, printing press operators, and construction millwrights and industrial mechanics**.

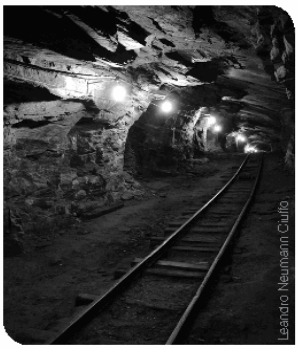
What are its health effects?

Cancer:
There is a well-established link between hexavalent chromium and **lung cancer**. Several epidemiological studies have also found increased risks of cancer in the nasal region.

Non-cancer:
Acute inhalation exposure to hexavalent chromium may cause irritation and damage to the nose, throat, and lungs. Dermal exposure may also cause allergic contact dermatitis and skin sensitization.

Radon

Known Carcinogen (IARC 1)



Exposure level

Occupational exposure to radon has not yet been characterized in Canada, but research is ongoing.

What is radon?

Radon is a **naturally occurring radioactive gas** found in several isotopic forms. It is produced from the natural breakdown of uranium in soils and rocks and is colorless, tasteless, and odourless.

Occupational exposure to radon

Inhalation is the most important route of occupational exposure. Radon in groundwater, soil, or building materials may enter the working environment and then decay, emitting ionizing radiation. Levels of radon in confined spaces or underground are often significantly higher than outdoor air levels.

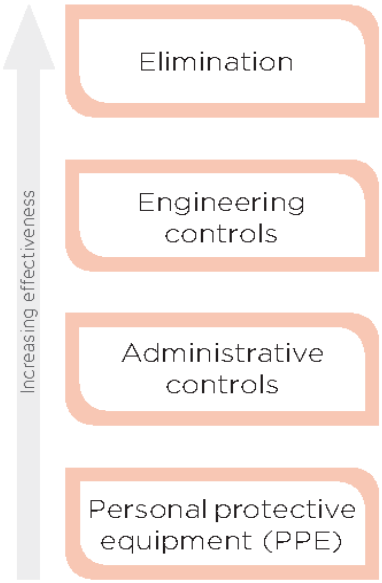
The workers with the highest risk of exposure are those involved in **underground mining**, especially for uranium. Other **workers who spend time underground** (i.e. subway and utility tunnel workers) are also at increased risk in areas where radon is present. **Indoor workers** of any type may also be exposed, especially if they work in areas and rooms with higher concentrations of radon (e.g. basements).

What are its health effects?

Cancer:
There is a well-established link between exposure to radon gas and **lung cancer**, with concurrent exposure to radon and cigarette smoke showing a synergistic effect on the development of lung cancer. In Canada, radon is estimated to account for ~16% of lung cancer deaths every year.

Exposure reduction strategies

As outlined by the **Canadian Centre for Occupational Health and Safety** (CCOHS), a variety of strategies can help protect workers from exposures to harmful substances such as carcinogens. These strategies are listed in order of effectiveness in controlling a risk.



Elimination is the most effective way to control a risk; it involves removing the hazard from the workplace. This process may also involve substitution.
- *An example of substitution is using lead-free paints and glazes instead of those that contain lead.*

Engineering controls minimize risk of exposure through strategic designs or modifications, which include process controls, enclosure/isolation of the source, and ventilation.
- *An example of a process control is using wet methods instead of dry when grinding or drilling to reduce dust.*

Administrative controls alter the way the work is done through rules or policies.
- *An example of an administrative control is shorter work times in areas where exposure may occur.*

Personal protective equipment (PPE) provides a barrier between the worker and the hazard.
- *Examples of PPE include respirators, eye protection, face shields, gloves, and footwear.*

For more information on these strategies and which one is appropriate for a situation, please visit the hazard control page of the CCOHS website.

Quitting smoking or minimizing exposure to second-hand smoke can also reduce the risk of lung cancer in workers. Concurrent exposure to certain lung carcinogens and tobacco smoke has a synergistic effect on the development of lung cancer. For example, studies on radon and asbestos exposure have shown a much higher risk of lung cancer in those also exposed to tobacco smoke.

A compilation of exposure reduction resources, including the Canadian Partnership Against Cancer's Prevention Policies Directory and the Canadian Cancer Society's Cancer Information portal, is available on our website.

Methods

The goal of the CAREX Canada project is to estimate Canadians' potential exposures to known and suspected carcinogens in the workplace, prioritizing agents that are most relevant to Canadians. Estimates of the numbers of workers exposed to these agents are calculated by sector, occupation, province and sex for 2006 (using the 2006 Census of Population, the most recent census that includes detailed information on sector and occupation). Where data are available, levels of exposure expected in Canadian workplaces are also estimated. CAREX Canada's general approach to producing occupational prevalence and exposure level estimates is summarized in Figure 2.

More information on our methods is available under the Profile and Estimates tab on our website.

Data sources

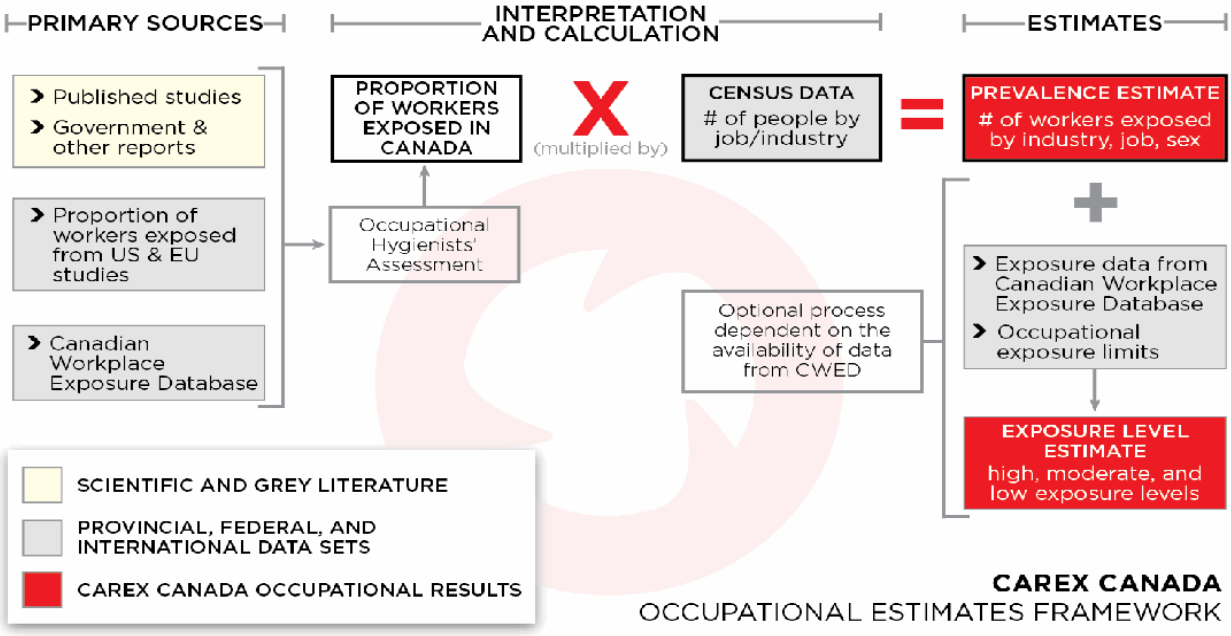
Data used in developing the occupational estimates for crystalline silica, asbestos, nickel compounds, and hexavalent chromium were collected from several sources, including the **Canadian Workplace Exposure Database** (CWED), which contains approximately 7,600 measurements for crystalline silica exposure,

Data sources continued...

6,700 measurements for asbestos exposure, 4,800 measurements for nickel exposure, and 4,400 measurements for hexavalent chromium exposure. These measurements were collected between 1981 and 2004 in Ontario and British Columbia workplaces. Data for occupational exposures to diesel engine exhaust, crystalline silica, asbestos, nickel compounds, and hexavalent chromium was also collected from scientific peer reviewed publications that addressed exposure in Canada and the United States, as well as technical reports from governments and international bodies.

More information on data sources is available under the Data Sources and Methods tab for each carcinogen on our website.

Figure 2: CAREX Canada's general approach to identifying occupational exposure level and prevalence estimates



Strengths and limitations

One of the key strengths of CAREX Canada's approach is the **transparent, systematic, and scientifically rigorous methods** used to develop the estimates of occupational carcinogen exposure. A challenge that we face is a general lack of current occupational exposure data. Since the 1990s, regulatory agencies across Canada have significantly decreased workplace exposure sampling. Varied record retention and archiving policies, as well as reduced accessibility to non-electronic data also limit what is available to CAREX Canada. This lack of data may affect both our estimates of prevalence and levels of exposure, especially when the use of a substance has changed substantially since the 1990s. Another limitation is the lack of information about particular work environments, which can make it difficult to determine appropriate exposure proportions for some occupations and industries. These instances are noted in our documentation.

Where can you learn more?

Visit our website at www.carexcanada.ca

Follow us on Twitter @CAREXCanada

Email us at info@carexcanada.ca

Lung Carcinogens
Occupational Exposures

Relevant publications and reports

CAREX Canada's priority carcinogens – Lung cancer
CAREX Canada Website, 2013.

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Field RW, Withers BL. Clin Chest Med. 2012;33(4):681-703.

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Exposure-response estimates for diesel engine exhaust and lung cancer mortality based on data from three occupational cohorts
Vermeulen R, Silverman DT, Garshick E, Vlaanderen J, Portengen L, Steenland K. Environ Health Perspect. 2014;122(2):172-177.

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CAREX Canada is funded by the Canadian Partnership Against Cancer

CANADIAN PARTNERSHIP AGAINST CANCER | PARTENARIAT CANADIEN CONTRE LE CANCER

CAREX
CANADA
June 2015

Ontario Cancer Facts

January 2015

Diesel engine exhaust causes almost 200 work-related lung cancers annually in Ontario

Each year in Ontario, approximately 186 cases of lung cancer are estimated* to be caused by exposure to diesel engine exhaust in the workplace. These are cancers that can be prevented with exposure reduction strategies and regulations to protect workers.

Occupational diesel engine exhaust exposure mostly affects males, accounting for an estimated 178 new cases (4.2%) of lung cancer among Ontario men in 2011, compared to eight new cases (0.2%) of lung cancer among Ontario women. This reflects the historically lower number of women in jobs with diesel exhaust exposure.

After silica, diesel engine exhaust is the most common occupational lung carcinogen, with CAREX Canada estimating that 300,000 Ontario workers are currently exposed.[1] Exposure occurs when working with or near diesel-powered engines, vehicles or equipment. Levels can be especially high in enclosed or semi-enclosed areas, such as underground mines or garages and tunnels.

The four occupations that contribute to the majority of lung cancer cases are mining and quarrying workers, truck drivers, diesel engine mechanics and repairers, and material handlers. Diesel exhaust exposure also occurs among protective service workers (from diesel ambulances and fire trucks), railway conductors and engineers, and forestry and logging workers.

Estimated number of diesel-related occupational lung cancers in Ontario, by occupation

Occupation	Number of lung cancers
Mining & quarrying workers	85 (46%)
Motor transport operators	61 (33%)
Mechanics and repairers	17 (9%)
Material handlers	14 (8%)
Other occupations	10 (5%)
TOTAL	**186 (100%)**

- Diesel engine exhaust is a prevalent lung carcinogen, causing almost 200 cases of lung cancer annually in Ontario.
- Reducing exposure to diesel exhaust will lead to fewer lung cancers.
- Further regulation is needed to effectively protect workers from this exposure.

Diesel engine exhaust is a human lung carcinogen, as classified by the International Agency for Research on Cancer.[2] It is a complex mixture of gases (including carbon dioxide, sulphur and nitrogen oxides) and particulates (including elemental carbon, and carcinogens such as polycyclic aromatic hydrocarbons and trace metals). The elemental carbon, due to its small particle size, carries carcinogenic components deep into the lungs, which is how diesel exhaust causes lung cancer.

Unlike many other carcinogens, there is no exposure limit in any Canadian jurisdiction for diesel engine exhaust in workplaces, other than mines. In a report to the Ontario Ministry of Labour, the Occupational Cancer Research Centre recommended implementing a diesel engine exhaust exposure limit for general workplaces, and lowering the exposure limit in underground mines.[3] Exposure reduction strategies that can be employed are use of fuel alternatives, use of engines with new diesel

filtration technologies, regular engine maintenance, minimizing idling time, and running engines outdoors or in a well-ventilated area.[4]

An increased risk of lung cancer is present even at very low levels of exposure. For example, in non-occupational settings, diesel exhaust causes an estimated 4.8% of lung cancers simply through its presence in general air pollution.[5] The risk of lung cancer is greater for those who both smoke and are exposed to diesel exhaust than for those who are in contact with either exposure alone.[2]

As a component of air pollution, diesel exhaust has also been associated with cardiovascular disease and it is a respiratory irritant, with short-term effects including irritation of the eyes and throat, cough, phlegm, light-headedness and nausea. There is limited evidence that diesel exhaust causes bladder cancer.[2]

**These initial estimates are part of the Burden of Occupational Cancer Study, funded by the Canadian Cancer Society, which seeks to estimate the total number of work-related cancers in Canada. For more information about the project, visit http://occupationalcancer.ca, or view our previous cancer fact:*

- *Canadian team working to identify the most important workplace carcinogens (December 2013). Available at http://www.cancercare.on.ca/cancerfacts/.*

For more information about CAREX Canada and their work on national occupational carcinogen surveillance, visit http://www.carexcanada.ca/.

Are you a healthcare professional concerned about your patients' workplace exposures? Encourage them to talk to their Health and Safety representative, supervisor or manager about exposure reduction strategies. For additional resources and more information about their rights as workers, refer them to the Ministry of Labour (http://www.labour.gov.on.ca) or Work Smart Ontario (http://www.worksmartontario.gov.on.ca/).

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To receive Ontario Cancer Facts by email, go to http://www.cancercare.on.ca/newsletter/One.aspx?objectId=100303&contextId=668&action=subscribe, provide email address and check the box for the 'Ontario Cancer Facts' Newsletter box.

This Ontario Cancer Fact was prepared by staff in Prevention and Cancer Control.

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DIESEL EXHAUST GASES

WHAT IS DIESEL EXHAUST?

Diesel exhaust is composed of a mixture of many different toxic chemicals. Diesel engines rely on heat, generated during the compression cycle, for ignition rather than an electrical spark as in gasoline engines. Because of this needed compression, diesel engines are heavier and bulkier than gasoline engines. They operate with less highly refined fuel and consume less fuel per horsepower per hour. Gasoline engines emit fewer particulates in their exhaust than diesel engines, so the exhaust looks "cleaner." However, gasoline engines still emit toxic chemicals similar to those in diesel exhaust, but in different concentrations.

WHAT TOXIC CHEMICALS ARE IN DIESEL EXHAUST?

The toxic chemicals of most concern in diesel exhaust are the oxides of nitrogen (nitric oxide, nitrogen dioxide), sulfur dioxide, aldehydes, primarily formaldehyde, acetaldehyde and acrolein, and various hydrocarbons particles. Carbon monoxide is also present. The higher average temperature of combustion of diesel engines generates more oxides of nitrogen than gasoline engines.

WHAT ARE THE HEALTH EFFECTS OF DIESEL EXHAUST?

These toxic chemicals can cause health effects, some of which are immediate and others which take years of exposure. High concentrations of the oxides of nitrogen can cause headache, dizziness and loss of consciousness as well as respiratory irritation. Sulfur dioxide, a pungent gas, may cause immediate respiratory distress. The aldehydes are also pungent and cause eye, nose and throat irritation. Prolonged exposure to diesel exhaust can increase the risk of cardiovascular, cardiopulmonary and respiratory disease and lung cancer. In June, 2012, the International Agency for Cancer Research (IARC) classified diesel exhaust (including diesel particulate matter) as a known human carcinogen (Group 1).

ARE THERE LEGAL STANDARDS REGULATING DIESEL EXHAUST?

Although there is no single standard regulating employee exposure to diesel exhaust, the individual chemicals are regulated by exposure limits. For General Industry, the primary limit is a Time-Weighted Average (TWA). Other limits are a Short Term Exposure Limit (STEL) and a Ceiling 8 limit.(See R 325.51101 - R 325.51108.) For Construction, the primary limit is the Maximum Allowable Concentration (MAC).
(See R 325.2411 - R 325.2413). The exposure limits for diesel exhaust chemicals are listed in the Table below. Formaldehyde is an expanded standard and the TWA and STEL apply to both general industry and construction.

TABLE 1
(ppm is parts of chemical per million parts air)

	General Industry			Construction
	TWA	STEL	C	MAC
Acetaldehyde	100 ppm	150 ppm	---	200 ppm
Acrolein	0.1 ppm	0.3 ppm	---	0.1 ppm
Carbon monoxide	35 ppm	---	200 ppm	50 ppm
Formaldehyde*	0.75 ppm	2 ppm	---	---
Nitric oxide	25 ppm	---	---	25 ppm
Nitrogen dioxide	---	1 ppm	---	5 ppm
Sulfur dioxide	2 ppm	5 ppm	---	5 ppm

* Also applies to construction.

Specific sampling equipment is necessary to test the air and determine an employee's exposure to these chemicals. Concentrations of nitric oxide, nitrogen dioxide, sulfur dioxide and formaldehyde can also be measured by using detector tubes.

WHAT IF SAMPLING ANALYSES SHOW EXPOSURE CONCENTRATIONS ABOVE THE LEGAL EXPOSURE LIMITS?

The exposure limits listed above must not be exceeded. If they are exceeded, control measures must be implemented to reduce employee exposure. Although not typically feasible, a solution is replacing diesel engines with electric motors or other fuel powered engines that don't exceed limits. However, a well tuned diesel engine will produce a minimal amount of toxic chemicals, thus reducing employee exposures. Adequate general or local exhaust ventilation in the work place should minimize employee exposure.

If you have additional questions or concerns on diesel exhaust, contact MIOSHA, Consultation Education and Training Division, 7150 Harris Drive, P.O. Box 30643, Lansing, Michigan 48909-8143 or call (517) 322-1809.

Version 2.0

Diesel Exhaust:

it takes your breath away

Considered a significant threat to worker and public health, diesel exhaust can literally *take your breath away.* Coughing, wheezing and shortness of breath are just a few of the symptoms those exposed might experience.

Though, exposure can also lead to a range of chronic illnesses including cancer. In fact, the International Agency for Research on Cancer (IARC) has reclassified diesel engine exhaust from a probable human carcinogen (Group 2A) to a definite human carcinogen (Group 1)—a classification that includes asbestos, silica and tobacco smoke.

What is diesel exhaust?

Diesel powered trucks, buses, locomotives, ships and other heavy equipment are all major sources of diesel exhaust. Other sources can include stationary diesel engines such as generators as well as gas and oil production facilities and electrical utilities.

Diesel exhaust is a complex mixture of hundreds of different compounds found as particulates or gases. The specific chemical composition and particulate sizes of diesel exhaust differs depending on quality of fuel, engine type, fuel pump setting, workload demand, engine temperature and maintenance and emission control system.

Particulates:
The primary components of diesel particulate matter include elemental carbon, organic compounds including polycyclic aromatic hydrocarbons (PAHs), sulfate, nitrate and many other trace metals. Most diesel exhaust particles are tiny enough to be inhaled deep into the lungs where they pose significant risk to health.

Gases:
Gaseous compounds can include carbon monoxide, carbon dioxide, sulfur and nitrogen oxides, aldehydes (formaldehyde, acetaldehyde, acrolein), benzene and polyaromatic hydrocarbons (PAHs). Similar to diesel particulates, gases can be inhaled deep into the lungs.

Who is at risk?

According to CAREX Canada, 800,000 Canadians are exposed to diesel exhaust as a result of work. Here in Ontario, more than 275,000 workers are exposed including truckers, bus drivers, heavy equipment and farm tractor operators, miners, landscaping labourers and maintenance workers.

As mentioned, diesel exhaust is also a significant threat to public health. With vehicles being a major source of diesel exhaust, anyone living, playing, working and going to school near busy highways and roads is at risk.

For those already exposed at work, other environmental exposures add to the risk of developing both acute and chronic health impacts.

Children are also especially vulnerable to air polluted with diesel exhaust. They generally spend a lot of time outside actively playing and inhale proportionally more air than adults. Many are transported to school in diesel-fueled school buses adding to their exposure burden (and that of the bus drivers). With their organs and body systems still developing, they are particularly sensitive to diesel exhaust and other toxins. This can affect both their short and long term health.

The elderly and those already suffering with compromised immune systems and other pre-existing medical conditions are also vulnerable.

What are the health effects?

According to CAREX Canada and many other experts there is no safe level of exposure for diesel exhaust.

Those exposed can suffer acute health effects including irritation of the eyes, nose, throat and lungs. Coughing, phlegm production, wheezing, chest tightness, nausea and headache are just a few of the symptoms they may experience.

Exposure can also lead to chronic health effects including respiratory illnesses. Examples include reduced lung function, chronic bronchitis, respiratory infection, chronic obstructive pulmonary disease (COPD), emphysema and asthma.

Diesel exhaust has also been found to aggravate existing respiratory and cardiovascular (heart and blood circulation) diseases. For asthma, even short periods of exposure can increase the severity and duration of attacks. This is of particular concern with more than three million Canadians suffering with this illness.

There is evidence diesel exhaust can damage the immune system. And as discussed IARC has determined there is sufficient evidence linking exposure with both an increased risk for lung and bladder cancer.

Researchers and public health authorities report thousands of Canadians will suffer premature death annually because of exposure to diesel exhaust.

Are there regulations governing exposure?

Ontario and other jurisdictions in Canada have no legal occupational exposure limits for whole diesel exhaust or diesel particulate matter.

Though, Ontario has established allowable exposure limits for many of the gaseous compounds in diesel exhaust including carbon monoxide, carbon dioxide, benzene, and PAHs. These limits are outlined in the regulation respecting the Control of Exposure to Chemical and Biological Agents (O. Reg. 833).

Ontario Regulation 854 governing mines and mining plants mandate some requirements relating to the control of diesel exhaust. For instance, Section 183 of the *Mines and Mining Plants Regulation* outlines requirements for air flow in order to reduce the concentrations of toxic substances in diesel exhaust emissions. Regulations governing construction projects (O. Reg. 213), industrial establishments (O. Reg. 851) and health care and residential facilities (O. Reg. 67) rely on general requirements for vehicle emissions and/or ventilation as it relates to vehicle emissions.

Many communities have or plan to undertake anti-idling public awareness campaigns as they seek to reduce harmful vehicle emissions, including diesel exhaust. Others have taken efforts even further by introducing idling control by-laws.

Toronto, for instance, passed the first stand-alone idling by-law in 1996. This by-law now prohibits idling for more than one minute in any 60-minute period. More than 20 Ontario communities now have some form of idling control by-law.

Regulations under the *Canadian Environmental Protection Act* are also in place aimed at limiting harmful emissions relating to diesel fuel and diesel engines.

These include:

- *Sulphur in Diesel Fuel Regulations;*
- *On-Road Vehicle and Engine Emission Regulations;*
- *Off-Road Small Spark-Ignition Engine Emission Regulations;*
- *Off-Road Compression-Ignition Engine Emission Regulations; and,*
- *Marine Spark-Ignition Engine, Vessel and Off-Road Recreational Vehicle Emission Regulations.*

Workers Health & Safety Centre

Information Bulletins for health, safety and environmental representatives

RESOURCE LINES

Ontario's Environmental Protection Act prohibits the alteration or removal of emission control equipment. The *Act* also prohibits excessive visible exhaust emissions. All vehicles on provincial highways are subject to this *Act* whether they are registered in Ontario or not.

Ontario's *Occupational Health & Safety Act* also imposes a duty on Ontario employers to take every precaution reasonable in the circumstances for the protection of a worker. The following are just some examples of reasonable precautions workplaces can implement to eliminate and/or reduce exposure.

How can exposure be eliminated or controlled?

Cleaner Burning Diesel Engines

The Canadian government regulates emissions for most diesel engines including those in heavy-duty trucks, buses, marine vessels along with "off-road" engines. In part to meet these standards, diesel engine technology continues to improve leading to new low-emission engines that burn fuel more efficiently. Emission control systems are thus also making important advances.

When purchasing new vehicles, generators or other diesel-fueled equipment many workplaces are ensuring they are equipped with the most advanced emission control system(s). Meantime, some workplaces have purchased or are exploring the option of buses, street sweepers, garbage trucks and many other heavy and light duty vehicles powered by cleaner fuels.

Cleaner Fuel and Power Sources

Canada's *Sulphur in Diesel Fuel Regulations* mandates the use of cleaner burning diesel fuel in on- and off-road vehicles, vessels, locomotives and both large and small stationary diesel engines. The point of this regulation is to ensure the effective operation of advanced emission control technologies installed on vehicles and engines (post 2007 models) which will lead to lower harmful emissions and improved air quality for all Canadians. Much of this Regulation is now in force including the use of ultra-low-sulphur diesel (ULSD) in on-road vehicles and off-road engines.

Many other options exist to replace or limit the use of diesel. This includes the replacement of older diesel engine buses and other heavy and light duty trucks and equipment with those powered by compressed natural gas, diesel-electric hybrid engines and engines powered with biodiesel and reformulated diesel. The City of Ottawa uses more than 150 diesel-electric hybrid buses. Diesel-electric hybrid engines use less diesel fuel as they rely on electric power generated by the braking system.

Blending biodiesel fuels with ULSD fuel can lead to less particulate emission, carbon monoxide and hydrocarbons (though, it can increase the production of nitrogen oxides).

The City of Brampton was the first municipality in Canada to use biodiesel fuel in its fleet of vehicles and equipment in 2003-04.

According to the City, cost savings can be as high as 25 per cent per litre.

Compressed natural gas (CNG) powered heavy-duty vehicles and buses can be purchased new or older technology diesel engines can be converted to run on CNG. The City of Hamilton has more than 90 CNG buses in its fleet.

Hydrogen fuel cell technology is also a clean(er) option. British Columbia Transit in Vancouver has acquired and is operating the 20 hydrogen fuel cell buses (and fueling systems) used in Whistler during the 2010 Olympic and Paralympic Games.

The use of diesel-powered trains is also a significant source of harmful emissions. Since 2001, Calgary Transit's light rail line has been powered entirely by electricity generated from 12 wind turbines. Passenger rail service is set to expand in Toronto soon including a new Pearson Airport rail service. The agency overseeing this expansion is proposing the use of diesel powered trains. Citizens, community coalitions and others are pressing for the cleaner option—an electric train system.

Cleaner energy sources can also be tapped to replace stationary diesel engines, including generators. Solar, wind and hydroelectric power are a few examples. Hybrid battery banks are another option. They are used to capture and store excess energy produced by diesel generators. Depending on the energy needs, this excess can then be used without the operation of a diesel generator.

Retrofit Technology

Diesel engines are designed to last. For this reason many older engines remain in use on our roads, in our workplaces and in our communities. The following are examples of available retrofits aimed at reducing emissions from these older engines into the environment and/or directly into the vehicle, cab or direct vicinity of workers:

- diesel oxidation catalyst;
- diesel particulate filters;
- closed crankcase filters (helps prevent emissions from entering the vehicle);
- diesel multi-stage filters;
- exhaust extenders that re-direct emissions away from workers and others; and,
- use of idle stop technology.

Workplace policies and practices

When the elimination of diesel exhaust cannot be achieved, safe work practices and policies can help limit emissions in the workplace and community. Training workers, supervisors, joint health and safety committee members and representatives to understand the hazardous potential of diesel exhaust and the safe work practices and policies is essential.

The following are just a few exposure prevention strategies:

- turn off engine when not in use;
- use of auxiliary power units and generator sets;
- operation of diesel engines outdoors when possible and away from air intake for nearby buildings;
- both general and local exhaust ventilation where operation required indoors;
- climate-controlled pressurized cab equipped with HEPA filters;
- regular inspection and testing to ensure operators and other workers aren't being exposed;
- regular inspection and maintenance of engines and vehicles (must include particulate filters and other retrofits); and,
- respirators used as a temporary control measure only (and must follow an effective respiratory protection program including fit-testing and worker training).

Exposure to diesel exhaust at work and in the community is leading to the premature death of thousands of Canadians annually. Though many have committed to the efforts needed to eliminate or reduce this preventable exposure, much work remains. With prevention efforts in your workplace and/or community, workers, children and others will breathe a little easier.

NOTE: CAREX Canada is a multi-institution research project that combines academic expertise and government resources to generate an evidence-based national carcinogen surveillance program. Visit CAREX Canada at:www.carexcanada.ca

Workers Health & Safety Centre

RESOURCE LINES

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cope:343

German carmakers under fire for research

People, monkeys were exposed to exhaust fumes, nitrogen dioxide in studies

RICK NOACK
THE WASHINGTON POST

BERLIN—When German carmaker Volkswagen acknowledged last year that it was guilty of cheating on diesel emissions tests, the fallout cost the company over $25 billion (U.S.). But the full extent of the company's willingness to sideline ethics concerns to increase profits is still emerging. Three German carmakers appear to have commissioned or supported a study in 2014 which exposed monkeys and humans to exhaust fumes and nitrogen dioxide, according to German media reports on Monday.

The study by the European Research Group on Environment and Health in the Transport Sector was never published and the research institute overseeing it has since been dissolved. All three carmakers involved in the study — Daimler, BMW and Volkswagen — distanced themselves from the research over the weekend.

"We are shocked by the extent and application of the studies . . . We condemn the experiments in the strongest terms," carmaker Daimler wrote. The statement, released at a time when only experiments with monkeys but not humans were publicly known, accused the researchers of having violated ethics rules and company values, even though an ethics commission had approved the study. Daimler and BMW said they had no knowledge of the Volkswagen-led study.

Meanwhile, Volkswagen blamed the "mistakes and misjudgments of individuals."

In one of the experiments, monkeys were forced to inhale exhaust fumes from a Volkswagen Beetle car and an older pickup truck for several hours, in an attempt to prove the Beetle's clean emission standards. The monkey experiments were first reported by the New York Times last week and are shown as a re-enactment in the new Netflix series *Dirty Money*.

Plans to also carry out the exhaust fumes experiments with humans were initially scrapped.

Human test subjects were still involved in a separate emissions study which also appears to have been encouraged by the three German carmakers, however. Germany's Sueddeutsche Zeitung and Stuttgarter Zeitung newspapers reported on Monday that healthy test subjects were asked to inhale nitrogen dioxide (NO_2), a gas that is primarily emitted through traffic. Even short-term inhaling of the gas can have serious health repercussions, according to the Environmental Protection Agency.

The human experiments appear to have been conducted between 2012 and 2015 and there were no reports of subsequent injuries related to them. A researcher involved in the study acknowledged the experiments' existence on Monday but cautioned that the deployed nitrogen dioxide levels resembled those found in normal work spaces. He added that the three carmakers were aware of the human experiments but had no say over them.

But the research institute behind the controversial tests was founded by Daimler, BMW, Volkswagen and automotive components supplier Bosch.

Industry Stand on NO2

In regards to placement of NO2 sensors in parking structures, loading docks, and indoor vehicle facilities; there are no national codes are currently in place, final placements of the NO2 is up to the gas detector manufacturer and the installer. But knowing the facts will help you make a sound and safe decision:

- FACT – Diesel exhaust vapors are known to contain carcinogens
- FACT – NO2 is a by-product of Diesel exhaust vapors
- FACT – Typical exhaust temperatures ranging from 350F to 620F
- FACT – Hot air rises

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Diesel Exhaust Temperature

Temperature in relation to air density

Physical Properties of Air (p = 101.13 kPa)

F temperature (Fahrenheit); T temperature (Kelvin); ρ density

F = Temp (F)	T = Temp (K)	p = density	Notes
80	300	1.161	*Normal condition*
170	350	0.995	*Normal condition*
260	400	0.871	
350	450	0.774	*Diesel Exhaust*
440	500	0.696	*Diesel Exhaust*
620	600	0.580	*Diesel Exhaust*
980	800	0.435	

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References

- http://www.fs.fed.us/eng/pubs/pdf/08511816.pdf, Table 1 – *Average maximum temperatures along the exhaust system.*
- https://www.dieselnet.com Table 1 – Physical Properties of Air (p = 101.13 kPa)
- https://www.mathesongas.com/pdfs/msds/MAT16630.pdf, NO2 MSDS – Matheson Tri-Gas, Inc.
- Excerpt from Citgo MSDS – "No. 2 Diesel Fuel, Low Sulfur, All Grades":

Diesel exhaust particulate: Lung tumor and lymphomas were identified in rats and mice exposed to unfiltered diesel fuel exhaust in chronic inhalation studies. Further, epidemiological studies have identified increase incidences of lung cancer in US railroad workers and bladder cancer in bus and truck drivers possibly associated with exposure to diesel engine exhaust. NTP has determined that exposure to diesel exhaust particulates, a complex mixture of combustion products of diesel fuel, is reasonably anticipated to be a human carcinogen. In addition, NIOSH has identified complete diesel exhaust as a potential carcinogen.

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Height of Detectors

The density of the gas threat in a given environment determines where gas detectors should be placed.

One foot below ceiling level:

For Gases Lighter than air

Three to Five feet above ground:

For Gases Equivalent to air density

One foot above floor level:

For Gases Heavier than air

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Detector Height

- Carbon Monoxide (CO): 3 - 5 feet above floor level
- Nitrogen Dioxide (NO2): 1 foot below ceiling level
- Methane (CH4): 1 foot below ceiling level
- Propane (C3H8): 1 foot above floor level
- Refrigerants: 1 foot above floor level
- Hydrogen (H2): 1 foot below ceiling level

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5

Diesel exhaust can cause cancer, WHO group finds

Unanimous report puts fumes on same level as asbestos or mustard gas

REUTERS

LONDON—Diesel engine exhaust fumes can cause cancer in humans and belong in the same potentially deadly category as asbestos, arsenic and mustard gas, World Health Organization experts said on Tuesday.

In an announcement that caused consternation among car and truck makers, the International Agency for Research on Cancer, a France-based part of the WHO, reclassified diesel exhausts from its group 2A of probable carcinogens to its group 1 of substances that have definite links to cancer.

The IARC experts, who said their decision was unanimous and based on "compelling" scientific evidence, urged people across the world to reduce exposure to diesel fumes as much as possible.

"The (expert) working group found that diesel exhaust is a cause of lung cancer and also noted a positive association with an increased risk of bladder cancer," it said in a statement.

The decision is a result of a week-long meeting of independent experts who assessed the latest scientific evidence on the cancer-causing potential of diesel and gasoline exhausts.

IARC said gasoline exhaust fumes should be classified as "probably carcinogenic to humans," a finding that was unchanged from its previous assessment in 1989.

It puts diesel fumes in the same risk category as noxious substances such as asbestos, arsenic, mustard gas, alcohol and tobacco.

Diesel cars are popular in western Europe, where tax advantages have encouraged technological advances and a boom in demand.

Outside of Europe and India, diesel engines are mostly confined to commercial vehicles.

About 5.5 per cent of new autos, including light-duty pickup trucks, sold in the United States run on diesel and that figure is expected to rise to 8 or 9 per cent by 2015.

For about 20 years, diesel engine exhaust was defined by IARC as probably carcinogenic to humans — group 2A — but an IARC advisory group has repeatedly recommended diesel engine exhaust as a high priority for re-evaluation.

The global auto industry had argued diesel fumes should be given a less high-risk rating to reflect tighter emissions standards.

General Motors Co. said in a statement: "We will continue with our plans to introduce new fuel saving technologies and engines that run on alternate fuels, including diesel."

GM said diesel engines being made today have lower sulphur content and emit much less particulate matter than engines from a few years ago.

TORONTO STAR JUNE 14, 2012

Proposed modifications to 404.1:

404.1 Enclose parking garages: Where mechanical ventilation systems for enclosed parking garages operate intermittently, such operation shall be automatic by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Carbon monoxide detectors shall be installed three to five feet above floor level and nitrogen dioxide detectors shall be installed one foot below ceiling level. Such detectors shall be listed in accordance with UL 2075 and installed in accordance with their listing and the manufacturers' instructions.

Rational:

Recently, engineers have been asking questions about the combo gas detector for CO and NO2 used in enclosed parking garages and whether it is proper to have a combined gas detector since each gas behaves differently. Fire Marshals are also concerned and have many questions. For many years the code always relied on the gas detection manufacturer to determine at what height to install gas detectors. Our code says "follow manufacturer's recommendation" and for many years CO detectors are always installed 3 to 5 feet above finished floor in parking garages and NO2 detectors (for diesel emissions) are installed one foot below ceiling level and all manufactures agreed with the NO2 placement. This is because diesel exhaust is superheated and hot air rises, so all manufacturers agree that NO2 detectors must be installed one foot below ceiling level.

Determining where detectors are installed will depend on whether the gas is heavier than air, equivalent to air or lighter than air (by comparing it's density compared to air density which is 1). Gas density less than one is lighter than air, and more than one is heavier than air. CO is equivalent to air, therefore, 3 to 5 feet above the ground is where we install CO detectors, and NO2 is lighter than air when coming out of the exhaust system and therefore, it is installed one foot below ceiling.

But when it became mandatory to also provide NO2 detectors in parking garages due to the rise of diesel engines (and as part of energy saving) and in addition to the historic CO detector requirement, a few gas detection manufactures started producing a combo CO and NO2 detectors and compromising on the height requirements for each gas. They used the code to their advantage and made it hard for the specifying engineer to reject them. Many engineers will not specify a combo detectors due to safety concerns, but some contractors have been challenging them based on what the code says "follow manufacturer's recommendations". A few others (engineers) are not aware of how each gas behaves and have been accepting it. Luckily, in Florida this has not been widely accepted but many are asking for code officials to help with this matter and stop the spread of combo detectors before it fills our cities. Just recently a consulting firm was unable to reject a submittal for the second time because the contractor fought hard and quoted to the engineer "follow manufacturer's recommendations" when it comes to determining the height of the detector. The consulting engineer reached out to the company with the combo detectors asking for a rational explanation as to why they combined two separate gases that behave differently. Their answer was NO2 will eventually reach the 5 foot level where the CO/NO2 combo detector is installed. Other manufacturers online claiming that NO2 is heavier than air, and while it is true when it's cold, it is not the case coming out very hot from the diesel exhaust. It is also important to remember that NO2 is exhausted with a mixture of other toxic gases at very high temperatures and low density (therefore lighter than air) and therefore, it will rise up. This fact cannot be disputed and was tested according to the following "Government Temperature Test of Diesel Exhaust": https://www.fs.fed.us/eng/pubs/pdf/08511816.pdf . the first attachment included here will

also show a summary table of all diesel exhaust density (2nd page) with their relative average exhaust temperatures.

Fact: "The requirement for a floor to ceiling clearance of seven feet in vehicle and pedestrian traffic areas is specified by the IBC for several reasons. Based on a review of the 2006 *International Building Code Commentary*, one of the reasons for a minimum ceiling height is to allow smoke and hot gases to accumulate above building occupants." If the purpose of the ceiling height by the IBC is for hot gases to accumulate above building occupants, then we should not allow for NO2 detectors to be installed other than one foot below ceiling level.

Fact: Diesel exhaust contains other harmful and toxic gases that must be exhausted right away and NO2 as part of the mixture is the only means to exhaust these toxic gases and therefore, must be exhausted immediately and not be allowed to accumulate.

NO2 alarm level is 0.72 parts per million (PPM) and some manufacturers have it at 1ppm as a first alarm level. It is extremely low because it is extremely toxic and contains carcinogens which causes cancer. There are also many articles and studies that relate lung cancer in many patients to NO2 emissions due to diesel exhaust (see attached). This is why as a society we always want to exhaust it ASAP and not let it accumulate in the parking garage or any other space.

By allowing CO and NO2 to be installed at the same height we are compromising on public health and safety. At the 5 foot level (where the combo unit is being installed) we are filling the space with toxic diesel fumes until it hits the 5 foot level to be exhausted. Most people are taller than 5 feet which means they will be breathing diesel fumes and all the other toxic chemicals before it is exhausted. Accepting a combo detector for CO and NO2 is like agreeing to lower your smoke detector at home and saying the smoke will accumulate and eventually get to the 5 foot level where the detector will detect it. Obviously we don't accept this because smoke rises and we want to detect it immediately. It is the same case for diesel exhaust, we want to detect it quickly and exhaust it and not let accumulate and breath it before it's exhausted. This can also lead to toxic gas migrating into elevators and office buildings through doors where there is no NO2 protection inside buildings.

M8325

Date Submitted	12/15/2018	**Section**	601.5	**Proponent**	Joseph Lstiburek
Chapter	6	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No

Alternate Language Yes

Related Modifications

Summary of Modification

Allows return air in bathrooms.

Rationale

Just providing supply air to bathrooms results in the bathrooms becoming too cold leading to increased relative humidity and mold in bathrooms. Allowing return air to be taken from a bathroom prevents excessive cooling and allows moisture to be removed by the air conditioning cooling coil. Relying only on an exhaust fan is unreliable and increases part load humidity issues in the remainder of the house by inducing the infiltration of hot humid air.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Reduces mold and indoor air quality problems.

Impact to building and property owners relative to cost of compliance with code

Reduces mold and indoor air quality problems.

Impact to industry relative to the cost of compliance with code

Negligible cost - allows the option of adding one return.

Impact to small business relative to the cost of compliance with code

Negligible cost - allows the option of adding one return.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Reduces mold and indoor air quality problems.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Reduces mold and indoor air quality problems.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not impact any other materials, products, methods or systems.

Does not degrade the effectiveness of the code

Improves the effectiveness of the code by reducing mold and indoor air quality problems.

Alternate Language

2nd Comment Period

8325-A2

Proponent Oscar Calleja **Submitted** 5/26/2019 **Attachments** Yes

Rationale

Clarifies that the Code prohibition on return from Bathrooms only applies to returns directly ducted to the Air Conditioning system return. Therefore transfer ducts in bathrooms allow for warmer air to come in to the bathroom and also allows the make-up air necessary for proper Exhaust Fan operation. This can prevent condensation in bathroom ceilings which can lead to mold growth.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact to local entity enforcing Code.

Impact to building and property owners relative to cost of compliance with code

Improves the options for prevention of mold in Bathrooms.

Impact to industry relative to the cost of compliance with code

No impact to industry relative to cost of compliance, since this is an optional method.

Impact to Small Business relative to the cost of compliance with code

Negligible cost - allows the option of adding one return.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Provides an Optional method to prevent mold in bathrooms and improve health and welfare of homeowners and occupants.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens the Code by providing optional method of controlling moisture problems in bathrooms.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against any method or product.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the Code.

1st Comment Period History

M8325-G1

Proponent pete quintela **Submitted** 1/14/2019 **Attachments** No

Comment:

Proposed mod is in conflict with FMC 2018, Section 601.5, item #2

1st Comment Period History

M8325-G2

Proponent pete quintela **Submitted** 1/16/2019 **Attachments** No

Comment:

Correction to my previous comment, change FMC 2018 to FMC 2017

601.5
Return air openings.
Return air openings for heating, ventilation and air-conditioning systems shall comply with all of the following:

7. Ducted system ~~R~~ return air shall not be taken from a closet, **bathroom**, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic. Bathroom air transfer to adjacent areas may be installed provided the transfer/return grille in Bathroom is not ducted or connected to the central Air Conditioning duct system.

601.5
Return air openings.
Return air openings for heating, ventilation and air-conditioning systems shall comply with all of the following:

7. Return air shall not be taken from a closet, ~~bathroom,~~toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.

M7655

4

Date Submitted	12/3/2018	**Section**	408.3	**Proponent**	Ann Russo8
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

RB187-16

Summary of Modification

This change adds an option for dehumidification for unvented crawl spaces.

Rationale

Typical conditioning measures involve supplying conditioned air from the occupied (conditioned) space of the building or exhausting air from the crawl space with make up air provided from the occupied (conditioned) space of the building. This code change allows another means of conditioning and controlling moisture, specifically dehumidification. Dehumidification is a proven technology.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Adding optional method only. No impact on code enforcement.

Impact to building and property owners relative to cost of compliance with code

This change will not increase the cost of construction as it is only adding an optional method for treatment of unvented crawl spaces.

Impact to industry relative to the cost of compliance with code

This change will not increase the cost of construction as it is only adding an optional method for treatment of unvented crawl spaces.

Impact to small business relative to the cost of compliance with code

This change will not increase the cost of construction as it is only adding an optional method for treatment of unvented crawl spaces.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This change is only adding an optional method for treatment of unvented crawl spaces so will not effect the code requirements or enforcement.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This change is only adding an optional method for treatment of unvented crawl spaces so will not effect the code requirements or enforcement.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This change is only adding an optional method for treatment of unvented crawl spaces so will not effect the code requirements or enforcement. Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

This change is only adding an optional method for treatment of unvented crawl spaces so will not effect the code requirements or enforcement. Does not degrade the effectiveness of the code.

2nd Comment Period

M7655-G1

Proponent Borrone Jeanette **Submitted** 5/21/2019 **Attachments** No

Comment:

I agree with the proposed revision.

Revise as follows:

- **R408.3 Unvented crawl space. Ventilation openings in under-floor spaces specified in Sections R408.1 and R408.2 shall not be required where the following items are provided:**

1. Exposed earth is covered with a continuous Class I vapor retarder. Joints of the vapor retarder shall overlap by 6 inches (152 mm) and shall be sealed or taped. The edges of the vapor retarder shall extend not less than 6 inches (152 mm) up the stem wall and shall be attached and sealed to the stem wall or insulation.

2. One of the following is provided for the under-floor space:

2.1. Continuously operated mechanical exhaust ventilation at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m_2) of crawl space floor area, including an air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with the Florida Building Code, Energy Conservation.

2.2. *Conditioned air* supply sized to deliver at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m_2) of under-floor area, including a return air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with the Florida Building Code, Energy Conservation.

2.3. Plenum in existing structures complying with Section M1601.5, if under-floor space is used as a plenum.

2.4. Dehumidification sized to provide 70 pints (33 liters) of moisture removal per day

for every 1,000 ft2 (93 m2) of crawl space floor area.

M7800

Date Submitted	12/9/2018	**Section**	1602.2	**Proponent**	Mo Madani
Chapter	16	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation Approved as Submitted
Commission Action Pending Review

Comments

General Comments No

Alternate Language Yes

Related Modifications

None

Summary of Modification

Incorporating Commission's declaratory statements as required by 553.73(7)(d), Florida Statutes. DS2016-100

Rationale

To clarify that dedicated, independent dehumidifiers may pull air from closets and bathrooms where it would be introduced back into the house.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

There is no fiscal impact on the local entity relative to enforcement.

The code change provides clarification to the code

Impact to building and property owners relative to cost of compliance with code

There is no fiscal impact to building and property owners relative to the cost of compliance.

The code change provides clarification to the code

Impact to industry relative to the cost of compliance with code

There is no fiscal impact to industry relative to the cost of compliance.

The code change provides clarification to the code

Impact to small business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

The code change provides clarification to the code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has a reasonable and substantial connection with the health and safety and welfare of the general public.

The code change provides needed clarification

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens or improves the code by making the code requirements clearer to the user.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems of construction.

The proposed code change provides for clarification to the code

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

The proposed code change improves on the code by providing clarification to the code

Alternate Language

2nd Comment Period

7800-A3

Proponent Oscar Calleja **Submitted** 5/26/2019 **Attachments** Yes

Rationale

This wording was submitted in mod M8320 by mistake into Mechanical Code. It was agreed by proponent that it should only apply in Residential Buildings. Therefore, it logically falls along with the exception that was incorporated from the DEC Statement. It deals with the same topic of allowing returns from closets to avoid humidity problems due to lack of air movement and cold surfaces in closet ceilings.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact to local entity enforcing the Code.

Impact to building and property owners relative to cost of compliance with code

Minor additional cost for adding returns in large closets. Less than $100. This would not be required but an optional improvement.

Impact to industry relative to the cost of compliance with code

Minor additional cost of adding returns would be Optional not required by Code.

Impact to Small Business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

The code change provides clarification to the code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Provides an Option to prevent mold in closets.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens the Code by allowing better practices and methods of construction.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate against materials, products, methods, or systems.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the Code.

Alternate Language

2nd Comment Period

7800-A2

Proponent Joseph Belcher **Submitted** 5/25/2019 **Attachments** Yes

Rationale

Alternate Language A-2 is intended to be taken with Alternate Language A-1. Just providing supply air to bathrooms results in the bathrooms becoming too cold leading to increased relative humidity and mold in bathrooms. Allowing return air to be taken from a bathroom prevents excessive cooling and allows moisture to be removed by the air conditioning cooling coil. Relying only on an exhaust fan is unreliable and increases part load humidity issues in the remainder of the house by inducing the infiltration of hot humid air. The proposed change is identical to language recommended for approval in the Florida Building Code-Mechanical. (Mod M8325) The language accomplishes the intent of the Declaratory Statement and is less complicated and easier for the builder and the code enforcer. This method has been successfully used in Southeast Florida to correct moisture and mold problems.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact on the enforcement of the code.

Impact to building and property owners relative to cost of compliance with code

The estimated cost is less than $50 if the allowed option of adding one return is taken.

Impact to industry relative to the cost of compliance with code

The estimated cost is less than $50 if the allowed option of adding one return is taken.

Impact to Small Business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

The code change provides clarification to the code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The provision when used will have a positive impact on the health, safety, and welfare of the general public by improving indoor air quality and reducing mold and moisture problems.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The change improves the code by allowing an option for improving indoor air quality and reducing mold and moisture problems.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The change does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

The proposed change does not degrade the effectiveness of the code.

Alternate Language

2nd Comment Period

7800-A1

Proponent Joseph Belcher **Submitted** 5/25/2019 **Attachments** Yes

Rationale

Closets are becoming too cold due to increased attic thermal resistance resulting in mold at closet ceilings. Providing air change via return air warms closets and reduces relative humidity reducing the potential for mold. The proposed change is identical to language recommended for approval in the Florida Building Code-Mechanical. (Mods M8320 and M8325) The language accomplishes the intent of the Declaratory Statement and is less complicated and easier for the builder and the code enforcer. This method has been successfully used in Southeast Florida to correct moisture and mold problems. Just providing supply air to bathrooms results in the bathrooms becoming too cold leading to increased relative humidity and mold in bathrooms. Allowing return air to be taken from a bathroom prevents excessive cooling and allows moisture to be removed by the air conditioning cooling coil. Relying only on an exhaust fan is unreliable and increases part load humidity issues in the remainder of the house by inducing the infiltration of hot humid air. The changes are made to the Florida Building Code-Mechanical to remove a conflict between the codes.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact on the enforcement of the code. Reduces mold and indoor air quality problems.

Impact to building and property owners relative to cost of compliance with code

No impact because this is an option and is not required. Should a builder elect to use the provisions for closets the cost is less than $150 - assuming three closets needing returns - 4-inch flex duct to each closet. There is no cost for the provision related to bathrooms.

Impact to industry relative to the cost of compliance with code

No impact because this is an option and is not required. Should a builder elect to use the provisions for closets the cost is less than $150 - assuming three closets needing returns - 4-inch flex duct to each closet. There is no cost for the provision related to bathrooms.

Impact to Small Business relative to the cost of compliance with code

There is no fiscal impact to small business relative to the cost of compliance.

The code change provides clarification to the code

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The provision when used will have a positive impact on the health, safety, and welfare of the general public by improving indoor air quality and reducing mold and moisture problems.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The change improves the code by improving indoor air quality and reducing mold and moisture problems.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The change does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

The proposed change does not degrade the effectiveness of the code and increases the effectiveness of the code by addressing a problem caused by current provisions of the code.

Revise section M1602.2 as follows:

M1602.2 Return air openings.

Return air openings for heating, ventilation and air conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.

2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.

3. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturers' installation instructions, Manual D or the design of the registered design professional.

4. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking appliances.

2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage

3. Dedicated independent dehumidification systems shall be allowed to take return air from spaces such as closets and bathrooms and discharge the air back into the spaces provided that the air be filtered and dehumidified prior to the air being reintroduced back into the spaces.

~~(Remaining text unchanged~~

4. Taking return air from a closet is not prohibited where such return air taken from closets shall serve only the closet and may be taken from closets that have no dedicated supply duct. Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, and shall

not require a dedicated supply duct. Where return air is taken from a closet smaller than 30 ft2 (2.8 m2) the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 inch2 (194 cm2).

(Remaining text unchanged)

M1602.2 Return air openings. Return air openings for heating, ventilation and air conditioning systems shall comply

with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.

2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.

3. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturers' installation instructions, Manual D or the design of the registered design professional.

4. Return air shall not be taken from a closet, ~~**bathroom,**~~ toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking appliances.

2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

5. Taking return air from an unconditioned crawl space shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the crawl space enclosure shall not be prohibited. 6. Return air from one dwelling unit shall not be discharged into another dwelling unit.

6. Return air from one dwelling unit shall not be discharged into another dwelling unit.

M1602.2 Return air openings. Return air openings for heating, ventilation and air conditioning systems shall comply

with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.

2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.

3. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturers' installation instructions, Manual D or the design of the registered design professional.

4. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking appliances.

Florida Building Code-Mechanical:

601.5 Return air openings. Return air openings for heating, ventilation and air-conditioning systems shall comply with all of the following:

1. Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.

2. Return air shall not be taken from a hazardous or ~~i~~ unsanitary location or a refrigeration room as defined in this code.

3. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.

4. Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturer's installation instructions, ACCA Manual D or the design of the registered design professional.

5. Return air taken from one dwelling unit shall not be discharged into another dwelling unit.

6. Taking return air from a crawl space shall not be accomplished through a direct connection to the return side of a forced air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.

7. Return air shall not be taken from a closet, ~~bathroom~~, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen and bare located not less than 10 feet (3048 mm) from the cooking appliances.

2. Dedicated forced air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage.

3. Taking return air from a closet is not prohibited where such return air taken from closets shall serve only the closet and may be taken from closets that have no dedicated supply duct. Where return air is taken from a closet smaller than 30 ft^2 (2.8 m^2) the return air shall be no more than 30 cfm (15 l/s), shall serve only the closet, and shall not require a dedicated supply duct. Where return air is taken from a closet smaller than 30 ft^2 (2.8 m^2) the closet door shall be undercut a minimum of 1.5 inches (38 mm) or the closet shall include a louvered door or transfer grille with a minimum net free area of 30 $inch^2$ (194 cm^2).

5. Taking return air from an unconditioned crawl space shall not be accomplished through a direct connection to the return side of a forced-air furnace. Transfer openings in the crawl space enclosure shall not be prohibited.
6. Return air from one dwelling unit shall not be discharged into another dwelling unit.

Revise section M1602.2 as follows:

M1602.2 Return air openings.

Return air openings for heating, ventilation and air conditioning systems shall comply with all of the following:

1.Openings shall not be located less than 10 feet (3048 mm) measured in any direction from an open combustion chamber or draft hood of another appliance located in the same room or space.

2. The amount of return air taken from any room or space shall be not greater than the flow rate of supply air delivered to such room or space.

3 .Return and transfer openings shall be sized in accordance with the appliance or equipment manufacturers' installation instructions, Manual D or the design of the registered design professional.

4. Return air shall not be taken from a closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, furnace room or unconditioned attic.

Exceptions:

1. Taking return air from a kitchen is not prohibited where such return air openings serve the kitchen only, and are located not less than 10 feet (3048 mm) from the cooking appliances.

2. Dedicated forced-air systems serving only the garage shall not be prohibited from obtaining return air from the garage

3. Dedicated independent dehumidification systems shall be allowed to take return air from spaces such as closets and bathrooms and discharge the air back into the spaces provided that the air be filtered and dehumidified prior to the air being reintroduced back into the spaces.

(Remaining text unchanged)

STATE OF FLORIDA
BUILDING COMMISSION

In the Matter of

WCI COMMUNITIES, INCORPORATED

Petitioner.
_____/

DS 2016-100

DECLARATORY STATEMENT

The foregoing proceeding came before the Florida Building Commission (Commission) by a Petition submitted by Vince Veccharella for WCI Communities, Inc. (Petitioner) that was received December 27, 2016. Based on the statements in the petition, the material subsequently submitted and the subsequent request by the Petitioner, the Commission states the following:

Findings of Fact

1. The petition is filed pursuant to, and must conform to the requirements of, Florida Administrative Code Rule 28-105.002.

2. Petitioner is in the process of designing and installing supplemental dehumidification systems in homes across a number of single-family projects and subdivisions in Parkland, Florida.

3. Petitioner provides that each supplemental dehumidification system consists of a dehumidifier, humidity controls, and air circulation ducts. Petitioner further provides that each proposed system is designed to draw small amounts of air from high humidity areas such as bathrooms and closets and run that air through the dehumidifier, where the air will be filtered and dehumidified before it is discharged to the air conditioner's supply duct.

4. Petitioner asserts that supplemental dehumidification systems become crucial during times of year when air conditioners operate for limited periods of time or not at all, where the systems are able to remove moisture from homes to relieve and prevent high relative humidity conditions.

5. Petitioner seeks clarification of Sections M1507.2 and M1602.2.4 of the Florida Building Code, Residential, 5th Edition (2014) as to whether dedicated, independent dehumidifiers may be used in new and existing residential dwellings to pull air from closets and bathrooms where it would be introduced back into the house.

6. Specifically, the Petitioner requests answers to the following questions:

For New homes or homes under construction:

1. In New Residential dwellings, can a dedicated, independent Dehumidifier draw or transfer air from a Closet to be filtered, dehumidified and introduced back into the house?

2. Likewise, can a dedicated, independent Dehumidifier draw or transfer air from a Bathroom, provided that the bathroom contains an enclosed toilet area and the air is being drawn from outside the toilet area. The air to be filtered and introduced back into the house?

3. Likewise, can a dedicated, independent Dehumidifier draw or transfer air from a Bathroom that includes a toilet, to be filtered, dehumidified and introduced back into the house?

For Existing occupied homes:

4. In Existing Residential dwellings, can a dedicated, independent Dehumidifier draw or transfer air from a Closet to be filtered, dehumidified and introduced back into the house?

5. Likewise, can a dedicated, independent Dehumidifier draw or transfer air from a Bathroom, provided that the bathroom contains an enclosed toilet area and the air is being drawn from outside the toilet area. The air to be filtered, dehumidified and introduced back into the house?

6. Likewise, can a dedicated, independent Dehumidifier draw or transfer air from a Bathroom that includes a toilet, to be filtered, dehumidified and introduced back into the house?

Conclusions of Law

7. The Commission has the specific statutory authority pursuant to Section 553.775(3)(a), Florida Statutes (2016) to interpret the provisions of the Florida Building Code by entering a declaratory statement.

8. In response to Petitioner's question 1, the answer is yes.

9. In response to Petitioner's question 2, the answer is yes.

10. In response to Petitioner's question 3, the answer is yes.

11. In response to Petitioner's question 4, the answer is yes.

12. In response to Petitioner's question 5, the answer is yes.

13. In response to Petitioner's question 6, the answer is yes.

DONE AND ORDERED this 24th day of February, 2017, in Jacksonville, Duval County, State of Florida.

Richard S. Browdy
RICHARD S. BROWDY
Chairman, Florida Building Commission

NOTICE OF RIGHT TO APPEAL

Petitioner and all other interested parties are hereby advised of their right to seek judicial review of this Order in accordance with Section 120.68(2)(a), Florida Statutes (2016), and Florida Rules of Appellate Procedure 9.110(a) and 9.030(b)(1)(C). To initiate an appeal, a Notice of Appeal must be filed with the Agency Clerk, Department of Business and Professional Regulation, 2601 Blair Stone Road, Tallahassee, Florida 32399-2203 and with the appropriate District Court of Appeal not later than thirty (30) days after this Order is filed with the Clerk of the Department of Business and Professional Regulation. A Notice of Appeal filed with the District Court of Appeal shall be accompanied by the filing fee specified by Section 35.22(3), Florida Statutes (2016).

CERTIFICATE OF FILING AND SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing order has been filed with the undersigned and furnished by U. S. Mail to the persons listed below this 24th day of February, 2017.

Brenda M. Nicklas

Agency Clerk's Office
Department of Business and Professional Regulation
& Florida Building Commission
2601 Blair Stone Road
Tallahassee, Florida 32399-2203

Via U.S. Mail

WCI Communities, Inc.
Attn: Vince Veccharella
24301 Walden Center Drive
Bonita Springs, Florida 34134

Via Inter-Office or Email Delivery

Mo Madani, Planning Manager
Codes and Standards Section
Department of Business and Professional Regulation
2601 Blair Stone Road
Tallahassee, Florida 32399
Mo.Madani@myfloridalicense.com

Marjorie Holladay
Joint Administrative Procedures Committee
Pepper Building, Room 680
Tallahassee, Florida 32399-1300

PETITION FOR DECLARATORY STATEMENT BEFORE THE FLORIDA BUILDING COMMISSION

Company: WCI Communities. INC
Address: 24301 Walden Center Drive
Bonita Springs, Florida 34134

Name: Vince Veccharella
Title: Vice President of Construction
Telephone: 954-340-2679
E-Mail: vinceveccharella@WCICommunities.com

DS 2016-100

Project Information:

This petition applies to WCI Communities' various projects or subdivisions in Parkland, Florida. Some of these are already completed, some are under construction and some are in the pre-construction stage.

Heron Bay > 300 homes with some completed subdivisions and others under construction.
Parkland Bay 522 homes in the pre-construction, permitting stage.

Code Section(s) on which the Declaratory Statement is sought:

Florida Residential Code M1602.2.4
Florida Residential Code M1507.2

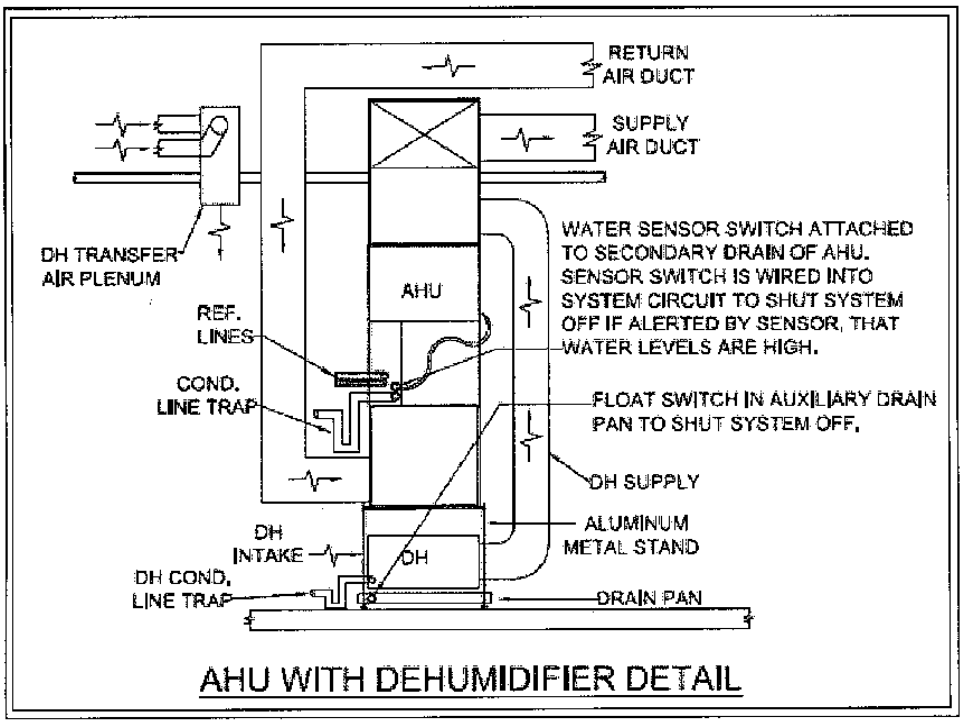
Background:
Petitioner is a Residential Home Builder currently engaged in a number of single-family projects and subdivisions in Parkland, Broward County, Florida. In the interest of providing the best indoor air quality and humidity control inside their homes, the Petitioner is in the process of designing and installing a Supplemental Dehumidification System in some of these homes. To achieve the most efficient and effective system possible the Petitioner has engaged a number of experts that have been measuring and recording temperatures, moisture levels, pressures and airflows. The result from these studies show that to achieve the desired goals the most effective method is to install a Dedicated Dehumidifier operating independently of the Central Air Conditioning System along with other measures that include attic venting strategies. This is especially important during the "shoulder season" when AC systems do not run long enough to remove building humidity and when the worst humidity problems have historically occurred.

There are two different applications being proposed:

1. Installation of the Dehumidification System in New Homes not yet started or already under construction.
2. Installation of the Dehumidification System in Existing Homes already finished and now occupied.

Dehumidification System:

This Dehumidifying System consists of a Dehumidifier, Humidity Controls and Air Circulation Ducts. From past experience the experts have determined that the most common places where high humidity and mold growth occurs in a home are in Bathrooms and in Closets. This is due to high moisture sources (Bathrooms) or lack of air movement (Closets). Thus the Dehumidifying System is designed to draw small amounts of air from such high humidity areas and have the air run through the Dehumidifier, which filters and dehumidifies it before inserting it back into the house. The system would be controlled and operated strictly on keeping Relative Humidity within normal limits, independently of whether the AC system runs or not. **(See typical diagram)**



AHU WITH DEHUMIDIFIER DETAIL

The Dehumidifier is installed in the Mechanical Equipment Room (MER) under the AHU and under its' sealed return plenum. The DH's intake is open to the MER and creates a negative pressure in the room that draws air from the open duct in the ceiling. This duct is connected to various rooms according to the particular house model. The DH's discharge duct is connected to the AC supply duct to help distribution of the dehumidified air. There is a backdraft damper at the supply duct connection to prevent air from the AC to flow back into the DH whenever the AHU fan is running.
This becomes crucial in the "shoulder season" when the AC operates for a limited period or not at all, and the Dehumidifier is able to remove moisture from the house and prevent high Relative Humidity conditions. The DH fan is also programmed to run so as to maintain some air movement in closets or bathrooms where stagnant conditions can lead to mold growth.

Code Sections:

Florida Residential Code ***M1602 Return Air****. Return air shall be taken from inside the dwelling. Dilution of return air with outdoor air shall be permitted.*

Florida Residential Code ***M1602.2 Prohibited Sources.*** *Outdoor and return air for a* ***forced air heating or cooling system*** *shall not be taken from the following locations:*
1, 2, 3 not pertinent
4. A closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room, unconditioned attic or other dwelling unit.

Florida Residential Code ***M1507.2 Recirculation of air. Exhaust*** *air from bathrooms and toilet rooms shall not be recirculated within a residence or to another dwelling unit and shall be* ***exhausted*** *directly to the outdoors.* ***Exhaust air*** *from bathrooms and toilet rooms shall not discharge into an attic, crawl space or other areas inside the building.*
(Bold letters to show relevance)

Rationale:

The Petitioner believes that the Florida Residential Code in describing **"Return Air"** and in listing the Prohibited Sources is referring to those having to do with a **Central Air Conditioning and/or Heating System** with a large volume of airflow but do not apply to an independent Dehumidification System which uses very small airflow volume to treat the air. The Dehumidification Systems are exclusively designed and controlled for achieving desired humidity levels with the added benefit of enhanced air filtration (MERV>14) and have a very limited and small air volume of air circulation. As a matter of fact, the Florida Residential Code does not address or even recognize the existence of these Dehumidification systems at present.
The prohibition of "Return Air " sources stems from occupant health concerns and the application of this Code Section to an Indoor Air Quality dedicated System, such as a Dehumidifier does not seem relevant.
The second Section regarding Bathroom **Exhaust** is addressing the discharge of Bathroom Exhaust Fans which do not treat or filter the air and therefore should not be allowed back inside the house. This is not the case with a Dehumidifier.

Given the seriousness of the potential hazard to occupant health caused by mold and humidity as well as the damage to property, the Dehumidifying System should be allowed to draw small amounts of air from bathrooms and after filtering and drying be able to reintroduce it into the inside of the home. The same applies to Closets which usually have very little airflow from the Central AC and that for parts of the year don't have any airflow whatsoever. Being able to draw small amounts of air from those closets into the Dehumidifier helps remove humidity as well as create some air movement.
The Petitioner has installed these systems in unoccupied "Test" houses equipped with Temperature and Humidity sensors throughout and achieved excellent results in keeping Relative Humidity below 55%.

Attachment A

We are attaching a letter from one of the most renowned experts in the field, Dr. Joseph Lstiburek, who makes the case for air to be drawn from Bathrooms and Closets. **Please take note that we are not advocating in this Petition for directly returning air to the Air Conditioning System, as Dr. Lstiburek proposes. That would require a change to the Code as is presently written.** The point he makes about avoiding mold issues in Bathrooms and Closets and why air movement in those rooms is important nevertheless confirms that portion of our design.

The arguments he makes are based on solid science and actual field tests he has conducted in the South Florida area. We have taken his knowledge and experience to apply it to the Dehumidification System.

Conclusion
The Petitioner wishes to offer these systems for their new homes in Parkland, Florida, as an Owner's Option as well as to be able to install the Option in existing Owner-occupied homes. To be able to install these systems the Petitioner would like to have the Florida Building Commission's affirmative answer to the Code compliance questions that might arise due to interpretation of the Sections cited above. The questions we believe need answering are below.

Questions:

For New homes or homes under construction:

1. In New Residential dwellings, can a dedicated, independent Dehumidifier draw or transfer air from a Closet to be filtered, dehumidified and introduced back into the house?

2. Likewise, can a dedicated, independent Dehumidifier draw or transfer air from a Bathroom, provided that the bathroom contains an enclosed toilet area and the air is being drawn from outside the toilet area. The air to be filtered, dehumidified and introduced back into the house?

3. Likewise, can a dedicated, independent Dehumidifier draw or transfer air from a Bathroom that includes a toilet, to be filtered, dehumidified and introduced back into the house?

For Existing occupied homes:

4. In Existing Residential dwellings, can a dedicated, independent Dehumidifier draw or transfer air from a Closet to be filtered, dehumidified and introduced back into the house?

5. Likewise, can a dedicated, independent Dehumidifier draw or transfer air from a Bathroom, provided that the bathroom contains an enclosed toilet area and the air is being drawn from outside the toilet area. The air to be filtered, dehumidified and introduced back into the house?

6. Likewise, can a dedicated, independent Dehumidifier draw or transfer air from a Bathroom that includes a toilet, to be filtered, dehumidified and introduced back into the house?

Summary:
The Petitioner respectfully believes that the answer to all of the above questions is **YES**. It is the petitioner's desire that the Florida Building Commission expresses, through the vehicle of a Declaratory Statement, that Residential Dehumidification Systems, independent of the AC or Heating System, are able to draw small amount of air from bathrooms and closets where the biggest occupant concern is to control high humidity and avoid potential mold growth which can affect their health and cause property damage.

Respectfully Submitted,
WCI Communities, Inc.

Vincent Veccarella

Vince Veccharella
Vice President of Construction

Building Science Corporation

December 21, 2016

Vince Veccharella
Vice President of Construction
WCI Communities
24301 Walden Center Drive.
Bonita Springs, FL 34134
239.498.8233

Re: Petition for Declaratory Statement Before the Florida Building Commission

Dear Mr. Veccharella:

The existing Florida Building Code is causing problems relating to mold in closets and bathrooms when builders install R-38 attic insulation and the existing Florida Building Code is standing in the way of easy engineering solutions to the very problems that it is causing.

In vented attics increasing the thermal resistance from R-30 to R-38 when coupled with tile roofs lead to significantly colder gypsum board ceilings that are located under the attic insulation. This reduction in ceiling temperature is leading to an increase in the relative humidity of the air adjacent the ceiling leading to mold. The problem is manifesting itself in closet ceilings and bathroom ceilings.

Closets have no thermal load and therefore have no need of conditioning and therefore have no air change and therefore have no mechanism of removing moisture. Providing supply air to closets makes the problems worse as it makes the closets colder leading to more mold.

Bathrooms have higher levels of moisture and also have inadequate moisture removal. Exhaust ventilation does not remove enough moisture and leads to an overall increase in moisture in the residence as a result of inducing the infiltration of exterior hot humid air. Exhaust ventilation addresses moisture issues in cold climates in bathrooms but does not address moisture issues in hot humid climates. Providing increased supply air to bathrooms makes the problems worse as it makes the bathrooms colder leading to more mold.

The easy engineering solution for closets is to elevate the temperature of the closet ceilings by providing return air in the closets. Providing a return duct at the ceiling of closets pulls warm air into the closet elevating the temperature of the gypsum board ceilings lowering relative humidity.

The easy engineering solution for bathrooms is to elevate the temperature of the bathroom ceilings by providing return air in the bathrooms. Providing a return duct at the ceiling of bathrooms pulls warm air into the bathroom elevating the temperature of the gypsum board ceilings lowering relative humidity.

Florida Residential Code M1602.2 prohibits return air for a forced air heating or cooling system to be taken from closets and bathrooms. The original reasons for this prohibition were based on reasonable historic practice.

Prohibiting return air from being taken from closets prevented builders from hiding unsightly return ducts in closets. Taking all of the return air from closets would prevent the forced air systems from functioning adequately. However, limiting the total amount of return air taken from closets to 10 percent of the total return flow would not affect the performance of the forced air systems and allow a small amount of return air to be pulled from closets addressing the mold problems in closet ceilings.

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Prohibiting return air from being taken from bathrooms was intended to prevent odors and moisture from bathrooms to be transferred to the rest of the residence. Note that this prohibition is no longer effective. Building enclosures are now constructed tight – a Florida Building Code requirement. Supply air is allowed to be provided to bathrooms. This supply air pushes air from the bathroom back into the residence. The supply air does not pass through the bathroom walls and ceiling to the exterior. Supplying 100 cfm of air from the air conditioning system to a bathroom results in close to 100 cfm of air being pushed back into the residence. The air change in the bathroom with the rest of the residence is approximately 100 cfm. Installing a return in the ceiling of the bathroom that also extracts 100 cfm does not change this air change. However, it has a large impact on reducing moisture levels at the bathroom ceilings and increases the temperature in the bathroom.

The odor issue in bathrooms is best addressed by exhaust fans located in toilet rooms. These exhaust fans are best run intermittently – 10 to 15 minutes when lights in toilet rooms are turned on – as is now common practice in hotels.

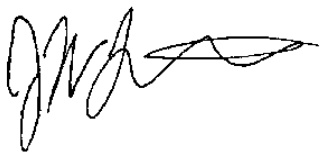
The Florida Building Code should allow return air to be taken from bathrooms that also contain toilet rooms where the toilet rooms also have exhaust ventilation to the exterior.

Two simple straightforward changes to the Florida Building Code will address the majority of the mold problems caused by going from R-30 ceiling insulation to R-38 ceiling insulation when coupled with tile roofs.

First. Allow return air to be taken from closets but limit the total amount of return air taken from closets to no more than 10 percent of the total return air flow.

Second. Allow return air to be taken from bathrooms that also contain toilet rooms where the toilet rooms also have exhaust ventilation to the exterior.

Yours truly,



Joseph Lstiburek, Ph.D., P.Eng.
Principal, Building Science Corporation

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TAC: Mechanical

Total Mods for **Mechanical** in **No Affirmative Recommendation: 26**

Total Mods for report: 31

Sub Code: Building

M7383

6

Date Submitted	11/21/2018	**Section**	915	**Proponent**	Bryan Holland
Chapter	9	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation

Commission Action Pending Review

Comments

General Comments Yes

Alternate Language Yes

Related Modifications

Summary of Modification

This proposed modification deletes all the CO alarm requirements in Section 908.8 and adds all the current CO alarm requirements of the 2018 IBC into an expanded Section 915.

Rationale

This proposed modification aligns the FBC-B with the 2018 IBC/IRC, NFPA 72/720, FBC-R, and manufacturer's installation instructions with regard to CO alarm requirements. The proposed language is much more complete, comprehensive, and includes all prescriptive details needed to properly locate CO alarms. The Section also includes criteria for CO detection systems as an alternative compliance method.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will not impact the local entity relative to code enforcement.

Impact to building and property owners relative to cost of compliance with code

This proposed modification simply clarifies and outlines the rules for CO alarms and detection systems that are already required by industry standards and other related codes and should not result in a change in cost of compliance.

Impact to industry relative to the cost of compliance with code

This proposed modification simply clarifies and outlines the rules for CO alarms and detection systems that are already required by industry standards and other related codes and should not result in a change in cost of compliance.

Impact to small business relative to the cost of compliance with code

This proposed modification simply clarifies and outlines the rules for CO alarms and detection systems that are already required by industry standards and other related codes and should not result in a change in cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification is directly connected to the health, safety, and welfare of the general public by proving the most comprehensive and complete list of CO alarm and detection system requirements to the code to help mitigate the serious hazard associated with CO poisoning.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification improves and strengthens the code by adding all the prescriptive requirements for CO alarms and detection systems into one place in FBC-B.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification enhances the effectiveness of the code.

Alternate Language

2nd Comment Period

7383-A3

Proponent Bryan Holland **Submitted** 5/21/2019 **Attachments** Yes

Rationale

This alternative language comment simply moves the CO protection requirements from 908.8 of the FBC-B to its own section in 915 but does not change any of the language or requirements of the section to remain fully harmonized with F.S. 553.885

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This alternative language comment has no impact on the local entity.

Impact to building and property owners relative to cost of compliance with code

This alternative language comment has no impact on the building owner.

Impact to industry relative to the cost of compliance with code

This alternative language comment has no impact on industry.

Impact to Small Business relative to the cost of compliance with code

This proposed modification simply clarifies and outlines the rules for CO alarms and detection systems that are already required by industry standards and other related codes and should not result in a change in cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This alternative language comment is connected to the health, safety, and welfare of the general public by placing CO protection requirements in a more suitable location within the code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This alternative language comment improves the code by placing CO protection requirements in a more suitable location within the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This alternative language comment does not discriminate against any materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This alternative language comment enhances the usability, enforcement, and effectiveness of the code.

Alternate Language

1st Comment Period History

7383-A2

Proponent Bryan Holland **Submitted** 2/1/2019 **Attachments** Yes

Rationale

This alternative language comment includes minor editorial revisions to the proposed modification to add clarity. This comment also adds a definition for "carbon monoxide source" and CO detection requirements into certain Group A, B and M occupancies with attached private garages.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This comment will not have a fiscal impact on the local code enforcement entity.

Impact to building and property owners relative to cost of compliance with code

This comment could increase the cost of compliance where the Group A, B, or M occupancy has an attached private garage and would now require CO detection.

Impact to industry relative to the cost of compliance with code

This comment adds cost to certain Group A, B, or M occupancies with an attached private garage.

Impact to Small Business relative to the cost of compliance with code

This proposed modification simply clarifies and outlines the rules for CO alarms and detection systems that are already required by industry standards and other related codes and should not result in a change in cost of compliance.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This comment will enhance the health, safety, and welfare of the general public by protecting occupants from the hazards of CO poisoning where a CO source exists.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This comment improves the code with more concise information and expanded requirements for CO detection where a CO hazard could exist.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This comment does not discriminate against materials, products, methods, or systems.

Does not degrade the effectiveness of the code

This comment enhances the code.

2nd Comment Period

M7383-G2

Proponent	Jennifer Privateer	Submitted	5/22/2019	Attachments	No

Comment:
I agree with modification proposed

2nd Comment Period

M7383-G3

Proponent	Harold Barrineau	Submitted	5/25/2019	Attachments	No

Comment:
I agree with the alternate language

1st Comment Period History

M7383-G1

Proponent	Mo Madani	Submitted	1/27/2019	Attachments	No

Comment:
Carbon monoxide provisions of the 2017 FBC are consistent with section 553.885 FS.

~~908.8 Carbon monoxide protection. Every separate building or an addition to an existing building for which a permit for new construction is issued and having a fossil-fuel-burning heater or appliance, a fireplace, an attached garage, or other feature, fixture, or element that emits carbon monoxide as a byproduct of combustion shall have an operational carbon monoxide alarm installed within 10 feet (3050 mm) of each room used for sleeping purposes in the new building or addition, or at such other locations as required by this code.~~

~~Exceptions:~~

~~1. An approved operational carbon monoxide detector shall only be required to be installed inside or directly outside of each room or area where a fossilfuel burning heater, engine or appliance is located within a hospital, inpatient hospice facility or skilled nursing home facility licensed by the Agency for Health Care Administration, or a new state correctional institution. The carbon monoxide detector shall be connected to the fire-alarm system of the hospital, inpatient hospice facility or nursing home facility as a supervisory signal.~~

~~2. This section shall not apply to existing buildings that are undergoing alterations or repairs unless the alteration is an addition as defined in Section 908.7.3.~~

~~908.8.1 Carbon monoxide alarm. The requirements of Section 908.8 shall be satisfied by providing for one of the following alarm installations:~~

~~1. A hard-wired carbon monoxide alarm.~~

~~2. A battery-powered carbon monoxide alarm.~~

~~3. A hard-wired combination carbon monoxide and smoke alarm.~~

~~4. A battery-powered combination carbon monoxide and smoke alarm.~~

~~908.8.2 Combination alarms. Combination smoke/carbon monoxide alarms shall be listed and labeled by a nationally recognized testing laboratory.~~

~~908.8.3 Addition shall mean an extension or increase in floor area, number of stories or height of a building or structure.S~~

~~ECTION 915~~

~~CARBON MONOXIDE DETECTION~~

~~RESERVED~~

SECTION 915

CARBON MONOXIDE PROTECTION

915.1 Carbon monoxide protection.

Every separate building or an addition to an existing building for which a permit for new construction is issued and having a fossil-fuel-burning heater or appliance, a fireplace, an attached garage, or other feature, fixture, or element that emits carbon monoxide as a byproduct of combustion shall have an operational carbon monoxide alarm installed within 10 feet (3050 mm) of each room used for sleeping purposes in the new building or addition, or at such other locations as required by this code.

Exceptions:

1. An approved operational carbon monoxide detector shall only be required to be installed inside or directly outside of each room or area where a fossil fuel burning heater, engine or appliance is located within a hospital, inpatient hospice facility or skilled nursing home facility licensed by the Agency for Health Care Administration, or a new state correctional institution. The carbon monoxide detector shall be connected to the fire-alarm system of the hospital, inpatient hospice facility or nursing home facility as a supervisory signal.
2. This section shall not apply to existing buildings that are undergoing alterations or repairs unless the alteration is an addition as defined in Section 908.7.3.

915.1.1 Carbon monoxide alarm.

The requirements of Section 908.8 shall be satisfied by providing for one of the following alarm installations:

1. A hard-wired carbon monoxide alarm.
2. A battery-powered carbon monoxide alarm.
3. A hard-wired combination carbon monoxide and smoke alarm.
4. A battery-powered combination carbon monoxide and smoke alarm.

915.1.2 Combination alarms.

Combination smoke/carbon monoxide alarms shall be listed and labeled by a nationally recognized testing laboratory.

915.1.3

Addition shall mean an extension or increase in floor area, number of stories or height of a building or structure.

SECTION 915

CARBON MONOXIDE DETECTION

[F] 915.1 General. Carbon monoxide detection shall be installed in new buildings in accordance with Sections 915.1.1 through 915.6. Carbon monoxide detection shall be installed in existing buildings in accordance with the Florida Fire Prevention Code.

[F] 915.1.1 Where required. Carbon monoxide detection shall be provided in Group I-1, I-2, I-4 and R occupancies and in classrooms in Group E occupancies in the locations specified in Section 915.2 where any of the conditions in Sections 915.1.2 through 915.1.6 exist. Carbon monoxide detection shall be provided in Group A, B and M occupancies as required by Section 915.2.4 in locations specified in Section 915.2.4.1.

[F] 915.1.2 Fuel-burning appliances and fuel-burning fireplaces. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms that contain a fuel-burning appliance or a fuel-burning fireplace.

[F] 915.1.3 Forced-air furnaces. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms served by a fuel-burning, forced-air furnace.

Exception: Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms if carbon monoxide detection is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.

[F] 915.1.4 Fuel-burning appliances outside of dwelling units, sleeping units and classrooms. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms located in buildings that contain fuel-burning appliances or fuel-burning fireplaces.

Exceptions:

1. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms where there are no communicating openings between the fuel-burning appliance or fuel-burning fireplace and the dwelling unit, sleeping unit or classroom.

2. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms where carbon monoxide detection is provided in one of the following locations:

2.1. In an approved location between the fuel-burning appliance or fuel-burning fireplace and the dwelling unit, sleeping unit or classroom.

2.2. On the ceiling of the room containing the fuel-burning appliance or fuel-burning fireplace.

[F] 915.1.5 Private garages. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms in buildings with attached private garages.

Exceptions:

1. Carbon monoxide detection shall not be required where there are no communicating openings between the private garage and the dwelling unit, sleeping unit or classroom.

2. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms located more than one story above or below a private garage.

3. Carbon monoxide detection shall not be required where the private garage connects to the building through an open-ended corridor.

4. Where carbon monoxide detection is provided in an approved location between openings to a private garage and dwelling units, sleeping units or classrooms, carbon monoxide detection shall not be required in the dwelling units, sleeping units or classrooms.

[F] 915.1.6 Exempt garages. For determining compliance with Section 915.1.5, an open parking garage complying with Section 406.5 or an enclosed parking garage complying with Section 406.6 shall not be considered a private garage.

[F] 915.2 Locations. Where required by Section 915.1.1, carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.3.

[F] 915.2.1 Dwelling units. Carbon monoxide detection shall be installed in dwelling units outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning appliance is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

[F] 915.2.2 Sleeping units. Carbon monoxide detection shall be installed in sleeping units.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the sleeping unit where the sleeping unit or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced air furnace.

[F] 915.2.3 Group E occupancies. Carbon monoxide detection shall be installed in classrooms in Group E occupancies. Carbon monoxide alarm signals shall be automatically transmitted to an on-site location that is staffed by school personnel.

Exception: Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an occupant load of 30 or less.

[F] 915.2.4 Group A, B and M occupancies. Carbon monoxide detectors shall be installed in Group A, Group B and Group M occupancies that contain a carbon monoxide source.

Exceptions:

1. Carbon monoxide detection is not required in Group A occupancies with an occupant load of less than 300.

2. Carbon monoxide detection is not required in Group B occupancies with an occupant load of less than 500.

3. Carbon monoxide detection is not required in Group M occupancies with an occupant load of less than 500.

[F] 915.2.4.1 Installation Location.

915.2.4.1.1 Carbon monoxide detectors shall be installed on the ceiling in the same room as a permanently installed carbon monoxide source or in an approved location adjacent to the fuel-burning appliance.

915.2.4.1.2 Carbon monoxide detectors shall be installed in each room or area served by a forced-air furnace that relies on the combustion of a fossil fuel and re-circulates air.

Exception: Carbon monoxide detectors shall not be required in each room or area provided that a detector is installed in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.

915.2.4.1.3 Carbon monoxide detectors shall be provided in buildings classified as Group A, B or M occupancies with attached private garages.

Exceptions:

1. Carbon monoxide detectors shall not be required where there are no communicating openings between the public parking garage and the building.

2. Carbon monoxide detectors shall not be required in the building located more than one story above or below a public parking garage.

3. Carbon monoxide detectors shall not be required where the public parking garage connects to the building through an open-ended corridor.

4. Where carbon monoxide detectors are provided in an approved location between openings to a public parking garage and the building, carbon monoxide detection shall not be required in the building.

915.2.4.1.4 Exempt garages. For determining compliance with Section 915.1.5, an open parking garage complying with Section 406.5 of the Florida Building Code, Building or an enclosed parking garage complying with Section 406.6 of the Florida Building Code, Building shall not be considered a private garage.

[F] 915.3 Detection equipment. Carbon monoxide detection required by Sections 915.1 through 915.2.3 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5. Carbon monoxide detection required by Section 915.2.4 shall be provided by carbon monoxide detectors or combination detectors complying with Section 915.5.

[F] 915.4 Carbon monoxide alarms. Carbon monoxide alarms shall comply with Sections 915.4.1 through 915.4.3.

[F] 915.4.1 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception: Where installed in buildings without commercial power, battery-powered carbon monoxide alarms shall be an acceptable alternative.

[F] 915.4.2 Listings. Carbon monoxide alarms shall be listed in accordance with ANSI/UL 2034.

[F] 915.4.3 Combination alarms. Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be listed in accordance with ANSI/UL 2034 and ANSI/UL 217.

[F] 915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

[F] 915.5.1 General. Carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be listed in accordance with ANSI/UL 2075.

[F] 915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 720.

[F] 915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors installed in carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide detectors, provided they are listed in accordance with ANSI/UL 2075 and ANSI/UL 268.

[F] 915.4 Control Unit. Where carbon monoxide detectors are installed in accordance with the Code, they shall be connected to a control unit in accordance with NFPA 720 and NFPA 72.

[F] 915.5 Power Source. Combination smoke/carbon monoxide detectors shall receive their power source in accordance with NFPA 72.

[F] 915.6 Maintenance. Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with the Florida Fire Prevention Code.

SECTION 202 DEFINITIONS

CARBON MONOXIDE SOURCE. Carbon monoxide source means any machine or equipment that operates through the combustion of fossil fuel, a fireplace or an attached, enclosed garage.

~~908.8 Carbon monoxide protection. Every separate building or an addition to an existing building for which a permit for new construction is issued and having a fossil-fuel-burning heater or appliance, a fireplace, an attached garage, or other feature, fixture, or element that emits carbon monoxide as a byproduct of combustion shall have an operational carbon monoxide alarm installed within 10 feet (3050 mm) of each room used for sleeping purposes in the new building or addition, or at such other locations as required by this code.~~

~~Exceptions:~~

~~1. An approved operational carbon monoxide detector shall only be required to be installed inside or directly outside of each room or area where a fossilfuel burning heater, engine or appliance is located within a hospital, inpatient hospice facility or skilled nursing home facility licensed by the Agency for Health Care Administration, or a new state correctional institution. The carbon monoxide detector shall be connected to the fire-alarm system of the hospital, inpatient hospice facility or nursing home facility as a supervisory signal.~~

~~2. This section shall not apply to existing buildings that are undergoing alterations or repairs unless the alteration is an addition as defined in Section 908.7.3.~~

~~908.8.1 Carbon monoxide alarm. The requirements of Section 908.8 shall be satisfied by providing for one of the following alarm installations:~~

~~1. A hard-wired carbon monoxide alarm.~~

~~2. A battery-powered carbon monoxide alarm.~~

~~3. A hard-wired combination carbon monoxide and smoke alarm.~~

~~4. A battery-powered combination carbon monoxide and smoke alarm.~~

~~908.8.2 Combination alarms. Combination smoke/carbon monoxide alarms shall be listed and labeled by a nationally recognized testing laboratory.~~

~~908.8.3 Addition shall mean an extension or increase in floor area, number of stories or height of a building or structure.SECTION 915~~

~~CARBON MONOXIDE DETECTION~~

~~RESERVED~~

SECTION 915

CARBON MONOXIDE DETECTION

[F] 915.1 General. Carbon monoxide detection shall be installed in new buildings in accordance with Sections 915.1.1 through 915.6. Carbon monoxide detection shall be installed in existing buildings in accordance with The Florida Fire Prevention Code.

[F] 915.1.1 Where required. Carbon monoxide detection shall be provided in Group I-1, I-2, I-4 and R occupancies and in classrooms in Group E occupancies in the locations specified in Section 915.2 where any of the conditions in Sections 915.1.2 through 915.1.6 exist.

[F] 915.1.2 Fuel-burning appliances and fuel-burning fireplaces. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms that contain a fuel-burning appliance or a fuel-burning fireplace.

[F] 915.1.3 Fuel burning, forced-air furnaces. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms served by a fuel-burning, forced-air furnace.

Exception: Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms if a carbon monoxide detector is provided in the first room or area served by each main duct leaving the furnace, and the carbon monoxide alarm signals are automatically transmitted to an approved location.

[F] 915.1.4 Fuel-burning appliances outside of dwelling units, sleeping units and classrooms. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms located in buildings that contain fuel-burning appliances or fuel-burning fireplaces.

Exceptions:

1. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms without communicating openings between the fuel-burning appliance or fuel-burning fireplace and the dwelling unit, sleeping unit or classroom.

2. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms where a carbon monoxide detector is provided in one of the following locations:

2.1. In an approved location between the fuel-burning appliance or fuel-burning fire-place and the dwelling unit, sleeping unit or classroom.

2.2. On the ceiling of the room containing the fuel-burning appliance or fuel-burning fireplace.

[F] 915.1.5 Private garages. Carbon monoxide detection shall be provided in dwelling units, sleeping units and classrooms in buildings with attached private garages.

Exceptions:

1. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms without communicating openings between the private garage and the dwelling unit, sleeping unit or classroom.

2. Carbon monoxide detection shall not be required in dwelling units, sleeping units and classrooms located more than one story above or below a private garage.

3. Carbon monoxide detection shall not be required where the private garage connects to the building through an open-ended corridor.

4. Where a carbon monoxide detector is provided in an approved location between openings to a private garage and dwelling units, sleeping units or classrooms.

[F] 915.1.6 Exempt garages. For determining compliance with Section 915.1.5, an open parking garage complying with Section 406.5 or an enclosed parking garage complying with Section 406.6 shall not be considered a private garage.

[F] 915.2 Locations. Where required by Section 915.1.1, carbon monoxide detection shall be installed in the locations specified in Sections 915.2.1 through 915.2.3.

[F] 915.2.1 Dwelling units. Carbon monoxide detection shall be installed in dwelling units outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning appliance is located within a bedroom or its attached bathroom, carbon monoxide detection shall be installed within the bedroom.

[F] 915.2.2 Sleeping units. Carbon monoxide detection shall be installed in sleeping units.

Exception: Carbon monoxide detection shall be allowed to be installed outside of each separate sleeping area in the immediate vicinity of the sleeping unit where the sleeping unit or its attached bathroom does not contain a fuel-burning appliance and is not served by a forced air furnace.

[F] 915.2.3 Group E occupancies. Carbon monoxide detectors shall be installed in classrooms in Group E occupancies. Carbon monoxide alarm signals shall be automatically transmitted to an on-site location that is staffed by school personnel.

Exception: Carbon monoxide alarm signals shall not be required to be automatically transmitted to an on-site location that is staffed by school personnel in Group E occupancies with an occupant load of 30 or less.

[F] 915.3 Carbon monoxide detection. Carbon monoxide detection required by Sections 915.1 through 915.2.3 shall be provided by carbon monoxide alarms complying with Section 915.4 or carbon monoxide detection systems complying with Section 915.5.

[F] 915.4 Carbon monoxide alarms. Carbon monoxide alarms shall comply with Sections 915.4.1 through 915.4.4.

[F] 915.4.1 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than that required for overcurrent protection.

Exception: Where installed in buildings without commercial power, battery-powered carbon monoxide alarms shall be an acceptable alternative.

[F] 915.4.2 Listings. Carbon monoxide alarms shall be listed in accordance with UL 2034.

[F] 915.4.3 Locations. Carbon monoxide alarms shall only be installed in dwelling units and in sleeping units. They shall not be installed in locations where the code requires carbon monoxide detectors to be used.

[F] 915.4.4 Combination alarms. Combination carbon monoxide/smoke alarms shall be an acceptable alternative to carbon monoxide alarms. Combination carbon monoxide/smoke alarms shall be listed in accordance with UL 2034 and UL 217.

[F] 915.5 Carbon monoxide detection systems. Carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide alarms and shall comply with Sections 915.5.1 through 915.5.3.

[F] 915.5.1 General. Carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be listed in accordance with UL 2075.

[F] 915.5.2 Locations. Carbon monoxide detectors shall be installed in the locations specified in Section 915.2. These locations supersede the locations specified in NFPA 720.

[F] 915.5.3 Combination detectors. Combination carbon monoxide/smoke detectors installed in carbon monoxide detection systems shall be an acceptable alternative to carbon monoxide detectors, provided that they are listed in accordance with UL 2075 and UL 268.

[F] 915.6 Maintenance. Carbon monoxide alarms and carbon monoxide detection systems shall be maintained in accordance with the Florida Fire Prevention Code.

M8347

Date Submitted	12/15/2018	**Section**	1015.6	**Proponent**	Ann Russo2
Chapter	10	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

FBC Section 1015.7 and FMC Section 304.11

Summary of Modification

Modifies requirements for fall arrest anchorage for steep roofs.

Rationale

Section 306.5.1 of the FMC requires work platforms with guards for equipment and appliances installed on roofs with a slope 3 in 12 and greater, thus, the exception to Section 304.11 appears to apply only to roofs that are flat and up to 2 in 12 slope. The problem derives from the language referring to placement of anchors along hip or ridge lines and along roof edges. This language is not necessary for the application of the exception. Each building roof system and the equipment upon that roof system that might require access will be different and the anchors needed along with their locations will differ as well. As presently worded there has been some confusion on application and the location requirements spaced every ten feet require unnecessary expense. This proposal eliminates confusion by deleting the unnecessary language leaving the application of the referenced standard to be applied on a case by case basis to fit the specific activities that may occur on the individual roof.
There is another change from this committee to split FMC 304.11 to make it consistent with the FRC that copies this exception. It is the intent of this committee for these changes to be coordinated.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Will not affect code enforcement.

Impact to building and property owners relative to cost of compliance with code

Will not increase the cost of construction.
This proposal will decrease the cost of construction in those cases where fall arrest anchorage devices would be installed instead of guards by providing increased flexibility in locating the anchors.

Impact to industry relative to the cost of compliance with code

Will not increase the cost of construction.
This proposal will decrease the cost of construction in those cases where fall arrest anchorage devices would be installed instead of guards by providing increased flexibility in locating the anchors.

Impact to small business relative to the cost of compliance with code

Will not increase the cost of construction.
This proposal will decrease the cost of construction in those cases where fall arrest anchorage devices would be installed instead of guards by providing increased flexibility in locating the anchors.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Coordinates and clarifies guarding/fall arrest anchorage requirements.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Coordinates and clarifies guarding/fall arrest anchorage requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Will have no effect on materials or methods.

Does not degrade the effectiveness of the code

Coordinates and clarifies guarding/fall arrest anchorage requirements.

2nd Comment Period

Proponent Michael Savage **Submitted** 5/22/2019 **Attachments** No

M8347-G1

Comment:

I agree with the proposed revision.

2nd Comment Period

M8347-G2

Proponent	Harold Barrineau	Submitted	5/26/2019	Attachments	No

Comment:

I agree with this modification.

1015.6 Mechanical equipment, systems and devices. *Guards* shall be provided where various components that require service are located within 10 feet (3048 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 components. The *guard* shall be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

Exception:*Guards* are not required where permanent fall arrest/restraint anchorage connector devices that comply with ANSI/ASSE Z 359.1 are ~~affixed for use during the entire roof covering lifetime. The devices shall be reevaluated for possible replacement when the entire roof covering is replaced. The devices shall be placed not more than 10 feet (3048 mm) on center along hip and ridge lines and placed not less than 10 feet (3048 mm) from the roof edge or open side of the walking surface~~ installed.

1015.7 Roof access. *Guards* shall be provided where the roof hatch opening is located within 10 feet (3048 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 be constructed so as to prevent the passage of a sphere 21 inches (533 mm) in diameter.

Exception:*Guards* are not required where permanent fall arrest/restraint anchorage connector devices that comply with ANSI/ASSE Z 359.1 are ~~affixed for use during the entire roof covering lifetime. The devices shall be reevaluated for possible replacement when the entire roof covering is replaced. The devices shall be placed not more than 10 feet (3048 mm) on center along hip and ridge lines and placed not less than 10 feet (3048 mm) from the roof edge or open side of the walking surface~~ installed.

Florida Mechanical Code

304.11 Guards. *Guards* shall be provided where various components that require service and roof hatch openings are located within 10 feet (3048 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 components that require service. 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 *Florida Building Code, Building*.

Exception: *Guards* are not required where permanent fall arrest/restraint anchorage connector devices that comply with ANSI/ASSE Z 359.1 are ~~affixed for use during the entire lifetime of the roof covering. The devices shall be re-evaluated for possible replacement when the entire roof covering is replaced. The devices shall be placed not more than 10 feet (3048 mm) on center along hip and ridge lines and placed not less than 10 feet (3048 mm) from roof edges and the open sides of walking surfaces~~ installed.

M7355

8

Date Submitted	11/20/2018	**Section**	402.6	**Proponent**	Bryan Holland
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language Yes

Related Modifications

Summary of Modification

This proposed modification adds CO alarm requirement to the prescriptive compliance method on the FBC-Existing Building.

Rationale

This proposed modification adds requirements for CO alarms in the Florida Existing Building Code to match those already required in the FBC-R and FFPC. This will harmonize the FEBC with the 2018 IEBC.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will not impact the local entity relative to code enforcement.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will not change the cost of compliance to building and property owners.

Impact to industry relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact industry.

Impact to small business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification is directly connected to the health, safety, and welfare of the general public by ensuring CO alarms get installed when dealing with exiting building alterations.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification improves and strengthens the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification enhances the effectiveness of the code.

Alternate Language

2nd Comment Period

7355-A1

Proponent Bryan Holland **Submitted** 5/21/2019 **Attachments** Yes

Rationale

This alternative language comment corrects the original proposed modification that is in conflict with the F.S. 553.885. This new language is only located in the "additions" sections of the FBC-Existing and simply adds a pointer to the applicable sections of the FBC-B, FBC-R, or FFPC, as applicable. This does not add any new requirements above what is currently required by F.S 553.885, FBC-B, or FBC-R.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This alternative language comment will have no impact on the local entity as this requirement is already in F.S. and in the FBC-B and FBC-R, as applicable.

Impact to building and property owners relative to cost of compliance with code

This alternative language comment has no impact on the building owner as this requirement is already in F.S. and in the FBC-B and FBC-R, as applicable.

Impact to industry relative to the cost of compliance with code

This alternative language comment has no impact on industry as this requirement is already in F.S. and in the FBC-B and FBC-R, as applicable.

Impact to Small Business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This alternative language comment ensures the health, safety, and welfare of the public by correctly placing CO protection rules in the applicable sections of the FBC-Existing.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This alternative language comment improves the by correctly placing CO protection rules in the applicable sections of the FBC-Existing.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This alternative language comment does not discriminate against any materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This alternative language comment enhances the effectiveness of the code.

2nd Comment Period

M7355-G2

Proponent Jennifer Privateer **Submitted** 5/22/2019 **Attachments** No

Comment:

I agree

2nd Comment Period

M7355-G3

Proponent Harold Barrineau **Submitted** 5/25/2019 **Attachments** No

Comment:

I agree with the alternate language

1st Comment Period History

M7355-G1

Proponent	Mo Madani	Submitted	1/27/2019	Attachments	No

Comment:

Carbon monoxide provisions of the 2017 FBC are consistent with section 553.885 FS.

~~402.6 Carbon monoxide alarms in existing portions of a building. Where an addition is made to a building or structure of Group I-1, I-2, I-4 or R occupancy, the existing building shall be provided with carbon monoxide alarms in accordance with the Florida Fire Prevention Code or Section R315 of the Florida Building Code-Residential, as applicable.~~

~~Exceptions:~~

~~1. Work involving the exterior surfaces of buildings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of porches or decks.~~

~~2. Installation, alteration or repairs of plumbing or mechanical systems, other than fuel-burning appliances.~~

402.6 Carbon monoxide protection. An addition to an existing building shall be equipped with carbon monoxide alarms in accordance with the Florida Fire Prevention Code, Section 908.8 of the Florida Building Code-Building, or Section R315 of the Florida Building Code-Residential, as applicable.

SECTION 1108
CARBON MONOXIDE PROTECTION

1108.1 Carbon monoxide protection. An addition to an existing building shall be equipped with carbon monoxide alarms in accordance with the Florida Fire Prevention Code, Section 908.8 of the Florida Building Code-Building, or Section R315 of the Florida Building Code-Residential, as applicable.

402.6 Carbon monoxide alarms in existing portions of a building. Where an addition is made to a building or structure of Group I-1, I-2, I-4 or R occupancy, the existing building shall be provided with carbon monoxide alarms in accordance with the Florida Fire Prevention Code or Section R315 of the Florida Building Code-Residential, as applicable.

Exceptions:

1. Work involving the exterior surfaces of buildings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of porches or decks.

2. Installation, alteration or repairs of plumbing or mechanical systems, other than fuel-burning appliances.

M7357

Date Submitted	11/20/2018	**Section**	403.13	**Proponent**	Bryan Holland
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

7355

Summary of Modification

This proposed modification adds CO alarm requirement to the prescriptive compliance method on the FBC-Existing Building.

Rationale

This proposed modification adds requirements for CO alarms in the Florida Existing Building Code to match those already required in the FBC-R and FFPC. This will harmonize the FEBC with the 2018 IEBC.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will not impact the local entity relative to code enforcement.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will not change the cost of compliance to building and property owners.

Impact to industry relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact industry.

Impact to small business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification is directly connected to the health, safety, and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification improves and strengthens the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification enhances the effectiveness of the code.

2nd Comment Period

M7357-G2

Proponent Jennifer Privateer **Submitted** 5/22/2019 **Attachments** No

Comment:

agree

2nd Comment Period

M7357-G3

Proponent Harold Barrineau **Submitted** 5/25/2019 **Attachments** No

Comment:

I agree with this modification

1st Comment Period History

M7357-G1

Proponent	Mo Madani	Submitted	1/27/2019	Attachments	No

Comment:

Carbon monoxide provisions of the 2017 FBC are consistent with section 553.885 FS.

403.13 Carbon monoxide alarms. Carbon monoxide alarms shall be provided to protect sleeping units and dwelling units in Group I-1, I-2, I-4 and R occupancies in accordance with the Florida Fire Prevention Code or Section R315 of the Florida Building Code-Residential, as applicable.

Exceptions:

1. Work involving the exterior surfaces of buildings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of porches or decks.

2. Installation, alteration or repairs of plumbing or mechanical systems, other than fuel-burning appliances.

M8388

Date Submitted	12/15/2018	**Section**	601.2	**Proponent**	Ann Russo8
Chapter	6	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

EB52-15
608.1

Summary of Modification

The current text talks about the condition "before the repair was undertaken." This means the damaged condition. What these provisions intend is to restore the condition that existed before the damage, not before the repair.

Rationale

The current text talks about the condition "before the repair was undertaken." This means the damaged condition. What these provisions intend is to restore the condition that existed before the damage, not before the repair.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Corrects code language to enhance the interpretation and enforcement of the code.

Impact to building and property owners relative to cost of compliance with code

Corrects code language to enhance the interpretation and enforcement of the code. There is no impact on the cost of construction.

Impact to industry relative to the cost of compliance with code

Corrects code language to enhance the interpretation and enforcement of the code. There is no impact on the cost of construction.

Impact to small business relative to the cost of compliance with code

Corrects code language to enhance the interpretation and enforcement of the code. There is no impact on the cost of construction.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Corrects code language to enhance the interpretation and enforcement of the code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Corrects code language to enhance the interpretation and enforcement of the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Corrects code language to enhance the interpretation and enforcement of the code. Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

Corrects code language to enhance the interpretation and enforcement of the code. Does not degrade the effectiveness of the code.

2nd Comment Period

M8388-G1

Proponent Borrone Jeanette **Submitted** 5/21/2019 **Attachments** No

Comment:

I agree with the proposed revision.

2nd Comment Period

M8388-G2

Proponent Jennifer Privateer **Submitted** 5/23/2019 **Attachments** No

Comment:

I agree with this change

2nd Comment Period

M8388-G3

Proponent	Harold Barrineau	Submitted	5/25/2019	Attachments	No

Comment:

I agree with this modification

Section: 601.2, 608.1

Revise as follows:

601.2 Conformance. The work shall not make the building less conforming than it was before the ~~*repair* was undertaken~~ damage occurred.

608.1 General. Existing mechanical systems undergoing *repair* shall not make the building less conforming than it was before the ~~*repair* was undertaken~~ damage occurred

M7358

Date Submitted	11/20/2018	**Section**	804.4.4	**Proponent**	Bryan Holland
Chapter	8	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

7355, 7357

Summary of Modification

This proposed modification adds CO alarm requirement to the "Level 2 Alteration" requirements of the FBC-Existing Building.

Rationale

This proposed modification adds requirements for CO alarms in the Florida Existing Building Code to match those already required in the FBC-R and FFPC. This will harmonize the FEBC with the 2018 IEBC.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will not impact the local entity relative to code enforcement.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will not change the cost of compliance to building and property owners.

Impact to industry relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact industry.

Impact to small business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification is directly connected to the health, safety, and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification improves and strengthens the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification enhances the effectiveness of the code.

Alternate Language

1st Comment Period History

7358-A1

Proponent Bryan Holland **Submitted** 1/8/2019 **Attachments** Yes

Rationale

This comment adds requirements for CO alarms into Chapter 11 of the Florida Existing Building Code to match those already required in the FBC-R and FFPC. This will harmonize the FEBC with the 2018 IEBC. This proposed language was originally included in Mod F7359 which was lost in a system glitch.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This comment will not impact the local entity relative to code enforcement.

Impact to building and property owners relative to cost of compliance with code

This comment will not change the cost of compliance to building and property owners.

Impact to industry relative to the cost of compliance with code

This comment will not change the cost of compliance or impact industry.

Impact to Small Business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This comment is directly connected to the health, safety, and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This comment improves and strengthens the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This comment does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This comment enhances the effectiveness of the code.

2nd Comment Period

M7358-G2

Proponent Gregory Young **Submitted** 5/15/2019 **Attachments** No

Comment:
I support the alternative language for the proposed modification.

2nd Comment Period

M7358-G3

Proponent Jennifer Privateer **Submitted** 5/22/2019 **Attachments** No

Comment:
I agree

2nd Comment Period

M7358-G4

Proponent Harold Barrineau **Submitted** 5/25/2019 **Attachments** No

Comment:
I think this is a good modification.

2nd Comment Period

M7358-G5

Proponent Robert Couch **Submitted** 5/26/2019 **Attachments** No

Comment:
This modification will improve safety

1st Comment Period History

M7358-G1

Proponent Mo Madani **Submitted** 1/27/2019 **Attachments** No

Comment:
Carbon monoxide provisions of the 2017 FBC are consistent with section 553.885 FS.

804.4.4 Carbon monoxide alarms. Any work area in Group I-1, I-2, I-4 and R occupancies shall be equipped with carbon monoxide alarms in accordance with the Florida Fire Prevention Code or Section R315 of the Florida Building Code-Residential, as applicable.

Exceptions:

1. Work involving the exterior surfaces of buildings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of porches or decks.

2. Installation, alteration or repairs of plumbing or mechanical systems, other than fuel-burning appliances.

SECTION 1108

CARBON MONOXIDE ALARMS IN GROUPS I-1, I-2, I-4 AND R

1108.1 Carbon monoxide alarms in existing portions of a building. Where an addition is made to a building or structure of a Group I-1, I-2, I-4 or R occupancy, the existing building shall be equipped with carbon monoxide alarms in accordance with the Florida Fire Prevention Code or Section R315 of the Florida Building Code-Residential, as applicable.

804.4.4 Carbon monoxide alarms. Any work area in Group I-1, I-2, I-4 and R occupancies shall be equipped with carbon monoxide alarms in accordance with the Florida Fire Prevention Code or Section R315 of the Florida Building Code-Residential, as applicable.

Exceptions:

1. Work involving the exterior surfaces of buildings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of porches or decks.

2. Installation, alteration or repairs of plumbing or mechanical systems, other than fuel-burning appliances.

M7273

12

Date Submitted	11/15/2018	**Section**	202	**Proponent**	James Bickford
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

This proposal simply updates a definition to indicate what organization is responsible for WEEL values, which has no impact on construction cost.

Rationale

The WEEL values were previously issued by the American Industrial Hygiene Association. These values are now issued by the Toxicology Excellence for Risk Assessment (TERA) Occupational Alliance for Risk Science (OARS).
Please visit this website to view the WEEL database: http://www.tera.org/OARS/WEEL.html
This change is consistent with addendum d to ASHRAE Standard 34-2013 which can be found here:
https://www.ashrae.org/standards-research--technology/standards-addenda

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

Will not increase the cost of construction
This proposal simply updates a definition to indicate what organization is responsible for WEEL values, which has no impact on construction cost.

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposal simply updates a definition to indicate what organization is responsible for WEEL values

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Provides direction on who is responsible for WEEL values

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Has no impact on all of the above

Does not degrade the effectiveness of the code

Improves effectiveness of the code.

2nd Comment Period

M7273-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

This proposal, approved for inclusion into the 2018 IMC, does not impose any new requirements or cost impact. It simply updates the existing definition in order to reflect which organization is now responsible for WEEL values. Moving forward, it is critical that the FBC strives to maintain continuity and consistency with the latest ICC changes to the extent possible, especially those that are non-controversial and address updates in industry terminology and standards.

OCCUPATIONAL EXPOSURE LIMIT (OEL). The ~~timeweighted~~ time-weighted average (TWA) concentration for a normal ~~eighthour~~ eight-hour workday and a 40-hour workweek to which nearly all workers can be repeatedly exposed without adverse effect, based on the OSHA PEL, ACGIH TLV- TWA, ~~AIHA~~ TERA OARS WEEL, or consistent value.

M7274

Date Submitted	11/15/2018	**Section**	202	**Proponent**	James Bickford
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

Changes text of definitions “ACCESS (TO)” and “READY ACCESS (TO).

Rationale

The term "door" has caused confusion because one must pass through one or more egress doors before reaching any object inside of a building. For example, if an emergency control must be readily accessed, personnel would likely pass through one or more egress/ingress doors before reaching the emergency control, and that is the reality of the situation. The term "door" as used in the definitions was referring to "access doors" similar to panels. The term "access door" might be an alternative to the term "door"

because "access door" clearly differentiates between access doors/panels and egress doors. This proposal intends to distinguish egress doors from cabinet doors, access doors and alcove doors and intends to prevent these definitions from being misinterpreted as prohibiting room and closet doors.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Clarifies definition making enforcement easier

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

none

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Improves enforcement of the code

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Makes code easier to understand

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not prohibit materials or products

Does not degrade the effectiveness of the code

Improves code

2nd Comment Period

M7274-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

This is a simple change to existing definitions that was approved for inclusion into the 2018 IMC. The FBC should strive for consistency with the I-Codes wherever possible.

SECTION 202 DEFINITIONS ACCESS (TO). That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel, ~~door~~ or similar obstruction [see also "Ready access (to)"].

READY ACCESS (TO). That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel, ~~door~~ or similar obstruction [see "Access (to)"].

M7275

Date Submitted	11/15/2018	**Section**	202	**Proponent**	James Bickford
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

describes what would be considered as commercial food service establishments

Rationale

1) The current definition is circular in that Chapter 5 uses the term and dictates where a hood is required for such appliances, yet this definition says that a commercial cooking appliance is something that requires a hood (local exhaust system). The current definition is flawed because if Chapter 5 does not require a hood for a particular cooking appliance, then this definition would say that it is no longer a commercial cooking appliance.
2) The laundry list of appliances in this definition is incomplete and is redundant with and overlaps the definitions of light-, medium- and heavy-duty cooking appliances. The overlap among the definitions creates confusion.
3) There is no accepted definition for "commercial" therefore this proposal attempts to reunite the term with its roots.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Will enable better enforcement by making the definition clear

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Clarifies definition

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Clarifies definition

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Clarifies definition

Does not degrade the effectiveness of the code

Clarifies definition

2nd Comment Period

M7275-G3

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

This is an improvement to an existing definition that was approved for inclusion into the 2018 IMC. The FBC should strive for consistency with the I-Codes, especially with changes that do not add new requirements or cost.

1st Comment Period History

M7275-G1

Proponent pete quintela **Submitted** 1/14/2019 **Attachments** No

Comment:

Both industry and enforcement personnel are familiar with enforcing the current definition. I do not agree that there is a need to change this definition.

1st Comment Period History

M7275-G2

Proponent	Mo Madani	Submitted	1/28/2019	Attachments	No

Comment:

Review text of mod for accuracy

COMMERCIAL COOKING APPLIANCES. Appliances used in a commercial food service establishment for heating or cooking food ~~and which produce grease vapors, steam, fumes, smoke or odors that are~~required to be removed through a local exhaust ventilation system. Such appliances include deep fatfryers; upright broilers; griddles; broilers; steam-jacketed kettles; hot-top ranges; under-fired broilers ~~(~~charbroilers); ovens; barbecues; rotisseries; and similar appliances. For the purpose of this definition,**a** commercial ~~food service establishment shall include any building is where food is prepared for sale~~ or ~~is~~prepared on a ~~portion thereof used for the preparation~~ scale that is by volume and ~~serving frequency not~~ representative of ~~food~~ domestic household cooking.

M7278

Date Submitted	11/15/2018	**Section**	202	**Proponent**	James Bickford
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

The proposal removes brass because brass is a copper-alloy and copper-alloy is the term used to identify materials manufactured where copper is the base metal and includes brass and bronze.

Rationale

The proposal removes brass because brass is a copper-alloy and copper-alloy is the term used to identify materials manufactured where copper is the base metal and includes brass and bronze. Copper-alloy tubing is manufactured ASTM B135 & ASTM B251.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This change is only to update the name of a material that is already in the code.

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

This proposal will not increase the cost of construction

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

this change is only to update the name of a material that is already in the code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

this change is only to update the name of a material that is already in the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

this change is only to update the name of a material that is already in the code.

Does not degrade the effectiveness of the code

this change is only to update the name of a material that is already in the code.

2nd Comment Period

M7278-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

The industry no longer recognizes "brass" as proper terminology. Industry now refers to "copper-alloy" instead of "brass." This is reflected in the current IPC and IMC. The Plumbing TAC has approved a similar change. The Mechanical TAC should approved this for consistency with the Plumbing code and with current industry terminology.

PIPING. Where used in this code, “piping” refers to either pipe or tubing, or both.

Pipe. A rigid conduit of iron, steel, copper, ~~brass~~ copper alloy or plastic.

Tubing. Semirigid conduit of copper, copper-alloy aluminum, plastic or steel.

M7279

Date Submitted	11/15/2018	**Section**	202	**Proponent**	James Bickford
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

To replace the term "PRESS" with the industry recognized term "PRESS-CONNECT".

Rationale

The only change in this proposal is to replace the term "PRESS" with the industry recognized term "PRESS-CONNECT".

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

The only change in this proposal is to replace the term "PRESS" with the industry recognized term "PRESS-CONNECT".

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

Will not impact cost of construction

Impact to small business relative to the cost of compliance with code

none

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The only change in this proposal is to replace the term "PRESS" with the industry recognized term "PRESS-CONNECT".

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The only change in this proposal is to replace the term "PRESS" with the industry recognized term "PRESS-CONNECT".

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The only change in this proposal is to replace the term "PRESS" with the industry recognized term "PRESS-CONNECT".

Does not degrade the effectiveness of the code

The only change in this proposal is to replace the term "PRESS" with the industry recognized term "PRESS-CONNECT".

2nd Comment Period

M7279-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

PRESS-CONNECT is the industry-recognized term. The plumbing TAC has approved a similar change. The Mechanical TAC should follow suit for uniformity.

PRESS CONNECT JOINT. (no change to text)A permanent mechanical joint incorporating an elastomeric seal or an elastomeric seal and corrosion-resistant grip ring. The joint is made with a pressing tool and jaw or ring approved by the fitting manufacturer.

M8007

Date Submitted	12/12/2018	**Section**	202	**Proponent**	James Bickford
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

1203.8, 1203.8.3

Summary of Modification

Revises definition “PRESS-CONNECT”. Revises section 1203.8 and 1203.8.3 to reflect this change of Press-connect.

Rationale

Harmonize the designation and definition of PRESS-CONNECT fittings and joints throughout the code.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

None

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This is a definition clarification to harmonize it's use throughout the code.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This is a definition clarification to harmonize it's use throughout the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This is a definition clarification to harmonize it's use throughout the code.

Does not degrade the effectiveness of the code

This is a definition clarification to harmonize it's use throughout the code.

2nd Comment Period

M8007-G1

Proponent	Gary Kozan	**Submitted**	5/8/2019	**Attachments**	No

Comment:

Press-connect is the recognized industry term for this type of joint. The TAC should approve this for consistency with the plumbing code.

Revise as follows:

PRESS-CONNECT JOINT. (No change to text.)

1203.8 Copper or copper-alloy tubing.

Joints between copper or copper-alloy tubing or fittings shall be brazed, mechanical or soldered joints conforming to Section 1203.3, flared joints conforming to Section 1203.8.1, push-fit joints conforming to Section 1203.8.2 or press-connect type joints conforming to Section 1203.8.3.

1203.8.3Press-connect joints.

Press-connect joints shall be installed in accordance with the manufacturer's instructions.

M7283

Date Submitted	11/16/2018	**Section**	305.4	**Proponent**	James Bickford
Chapter	3	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

The horizontal support spacing for both PEX and PE-RT tubing (piping) up to and including 1" size is 32" (2- 2/3Ft) and 48" (4Ft) for sizes 1- 1/4" and larger. These dimensions are consistent with all published PEX literature and manufacture's installation instructions.

Rationale

Brass is a copper alloy and the supporting requirements are covered under the Copper and Copper Alloy Pipe and Tubing line. The 6 foot requirement is to restrictive. The Copper Tubing Handbook written by Copper Development Association recommends horizontal support every 8 feet.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Will not increase the cost of construction
This proposal modifies the spacing for piping material support into the code and thus the code with this proposal added will not cause the cost of construction to increase, and could decrease the cost as less support is required for larger pipe.

Impact to building and property owners relative to cost of compliance with code

Will not increase the cost of construction
This proposal modifies the spacing for piping material support into the code and thus the code with this proposal added will not cause the cost of construction to increase, and could decrease the cost as less support is required for larger pipe.

Impact to industry relative to the cost of compliance with code

Will not increase the cost of construction
This proposal modifies the spacing for piping material support into the code and thus the code with this proposal added will not cause the cost of construction to increase, and could decrease the cost as less support is required for larger pipe.

Impact to small business relative to the cost of compliance with code

Will not increase the cost of construction
This proposal modifies the spacing for piping material support into the code and thus the code with this proposal added will not cause the cost of construction to increase, and could decrease the cost as less support is required for larger pipe.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has no impact on health, safety or welfare.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves code by clarifying spacing for hanging pipe and tubing.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Doe not discriminate.

Does not degrade the effectiveness of the code

Improves code by clarifying spacing requirements for hangers.

2nd Comment Period

M7283-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

Request approval for consistency with the plumbing and residential code

TABLE 305.4
PIPING SUPPORT SPACING[a]

PIPING MATERIAL	MAXIMUMHORIZONTALSPACING (feet)	MAXIMUMVERTICALSPA (feet)
ABS pipe	4	10[c]
Aluminum pipe and tubing	10	15
~~Brass pipe~~	~~10~~	~~10~~
~~Brass tubing, 1¼-inch diameterand smaller~~	~~6~~	~~10~~
~~Brass tubing, 1½-inch diameterand larger~~	~~10~~	~~10~~
Cast-iron pipe[b]	5	15
Copper or copper-alloy pipe	12	10
Copper or copper-alloy tubing,~~1¼-inch diameter and smaller~~	6 8	10
~~Copper or copper-alloy tubing,1½-inch diameter and larger~~	~~10~~	~~10~~
CPVC pipe or tubing, 1 inchand smaller	3	10[c]
CPVC pipe or tubing, 1¼-inchand larger	4	10[c]
Lead pipe	Continuous	4
PB pipe or tubing	2⅔ (32 inches)	4
PE-RT 1 inch and smaller	2⅔ (32 inches)	10[c]
PE-RT 1¼ inches and larger	4	10[c]
PEX tubing	2⅔ (32 inches)	10[c]
~~Polypropylene (PP) pipe ortubing, 1 inch and smaller~~	~~2⅔ (32 inches)~~	~~10[c]~~
Polypropylene (PP) pipe ortubing, 1¼ inches and larger	4	10[c]

PVC pipe	4	10[c]
Steel tubing	8	10
Steel pipe	12	15

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

1. a.See Section 301.18.
2. b.The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.
3. c.Mid-story guide.

M7284

Date Submitted	11/16/2018	**Section**	305.4	**Proponent**	James Bickford
Chapter	3	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

Summary of Modification

Modifies table 305.4

Rationale

Brass is a copper alloy and the supporting requirements are covered under the Copper and Copper Alloy Pipe and Tubing line. The 6 foot requirement is too restrictive. The Copper Tubing Handbook written by Copper Development Association recommends horizontal support every 8 feet.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Will not increase the cost of construction
The proposal will not impact the cost of construction as it is only changing the material terminology and combining it this the copper section of this table.

Impact to building and property owners relative to cost of compliance with code

Will not increase the cost of construction
The proposal will not impact the cost of construction as it is only changing the material terminology and combining it this the copper section of this table.

Impact to industry relative to the cost of compliance with code

Will not increase the cost of construction
The proposal will not impact the cost of construction as it is only changing the material terminology and combining it this the copper section of this table.

Impact to small business relative to the cost of compliance with code

Will not increase the cost of construction
The proposal will not impact the cost of construction as it is only changing the material terminology and combining it this the copper section of this table.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Will not increase the cost of construction
The proposal will not impact the cost of construction as it is only changing the material terminology and combining it this the copper section of this table.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Will not increase the cost of construction
The proposal will not impact the cost of construction as it is only changing the material terminology and combining it this the copper section of this table.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Will not increase the cost of construction
The proposal will not impact the cost of construction as it is only changing the material terminology and combining it this the copper section of this table.

Does not degrade the effectiveness of the code

Will not increase the cost of construction
The proposal will not impact the cost of construction as it is only changing the material terminology and combining it this the copper section of this table.

2nd Comment Period

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

Request approval for consistency with plumbing and residential code

M7284-G1

TABLE 305.4 (305.4) PIPING SUPPORT SPACING[a]

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
ABS pipe	4	10[c]
Aluminum pipe and tubing	10	15
~~Brass pipe~~	~~10~~	~~10~~
~~Brass tubing, 1¼ inch diameter and smaller~~	~~6~~	~~10~~
~~Brass tubing, 1½ inch diameter and larger~~	~~10~~	~~10~~
Cast-iron pipe[b]	5	15
Copper or copper-alloy pipe and tubing	~~12~~ 8	10
~~Copper or copper-alloy tubing, 1¼ inch diameter and smaller~~	~~6~~	~~10~~
~~Copper or copper-alloy tubing, 1½ inch diameter and larger~~	~~10~~	~~10~~
CPVC pipe or tubing, 1 inch and smaller	3	10[c]
CPVC pipe or tubing, 1¼ inch and larger	4	10[c]
Lead pipe	Continuous	4
PB pipe or tubing	2⅔ (32 inches)	4
PE-RT	2⅔ (32 inches)	10[c]
PE-RT > 1¼ inches	4	10[c]
PEX tubing	2⅔ (32 inches)	10[c]
Polypropylene (PP) pipe or tubing, 1 inch or smaller	2⅔ (32 inches)	10[c]
Polypropylene (PP) pipe or tubing, 1¼ inches or larger	4	10[c]
PVC pipe	4	10[c]
Steel tubing	8	10
Steel pipe	12	15

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. See Section301.18.

b. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.

Mid-storyguide

M7285

Date Submitted	11/16/2018	**Section**	306.1.1	**Proponent**	James Bickford
Chapter	3	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

Delete section without substitution

Rationale

This section is antiquated and has apparently lost its purpose. There is no reason to single out central furnaces. Clearances for working spaces are already covered by the manufacturer's instructions and Section 306.1. The requirement for a 3 inch clearance around the sides, back and top has no apparent justification.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

Will not impact enforcement of the code

Impact to building and property owners relative to cost of compliance with code

Will not increase the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code nor are the code requirements made more stringent.

Impact to industry relative to the cost of compliance with code

Will not increase the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code nor are the code requirements made more stringent.

Impact to small business relative to the cost of compliance with code

Will not increase the cost of construction
This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code nor are the code requirements made more stringent.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Deletes obsolete code section

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Deletes obsolete code section

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Deletes obsolete code section

Does not degrade the effectiveness of the code

Deletes obsolete code section

2nd Comment Period

M7285-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

This section is antiquated and requirements are adequately covered by manufacturer's requirements and Section 306.1. Request approval for consistency with 2018 IMC.

306.1.1 Central furnaces. ~~Central furnaces within compartments or alcoves shall have a minimum working space *clearance* of 3 inches (76 mm) along the sides, back and top with a total width of the enclosing space being not less than 12 inches (305 mm) wider than the furnace. Furnaces having a firebox open to the atmosphere shall have not less than 6 inches (152 mm) working space along the front *combustion* chamber side. *Combustion air* openings at the rear or side of the compartment shall comply with the requirements of Chapter 7.~~

Exception: ~~This section shall not apply to replacement appliances installed in existing compartments~~and ~~alcoves where the working space clearances are~~ in accordance with **the** ~~*equipment or appliance manufacturer's installation instructions*~~.

M7286

Date Submitted	11/16/2018	**Section**	307.2.2	**Proponent**	James Bickford
Chapter	3	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

Adds copper alloy to code section

Rationale

Copper alloys fittings and pipe are used regularly in condensate waste disposal systems and were missing from the list of approved materials. As an example, nipples and unions.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal is adding a material use in the field and will not impact the cost of construction.

Impact to building and property owners relative to cost of compliance with code

Will not increase the cost of construction

This proposal is adding a material use in the field and will not impact the cost of construction.

Impact to industry relative to the cost of compliance with code

Will not increase the cost of construction

This proposal is adding a material use in the field and will not impact the cost of construction.

Impact to small business relative to the cost of compliance with code

Will not increase the cost of construction

This proposal is adding a material use in the field and will not impact the cost of construction.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposal is adding a material use in the field and will not impact the cost of construction.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal is adding a material use in the field and will not impact the cost of construction.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal is adding a material use in the field and will not impact the cost of construction.

Does not degrade the effectiveness of the code

This proposal is adding a material use in the field and will not impact the cost of construction.

2nd Comment Period

M7286-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

Request approval for consistency with plumbing and residential code, as well as I-Codes

307.2.2 Drain pipe materials and sizes. Components of the condensate disposal system shall be cast iron, galvanized steel, copper and copper alloy, cross-linked polyethylene, polyethylene, ABS, CPVC, PVC, or polypropylene pipe or tubing. Components shall be selected for the pressure and temperature rating of the installation. Joints and connections shall be made in accordance with the applicable provisions of Chapter 7 of the *International Plumbing Code* relative to the material type. Condensate waste and drain line size shall be not less than 3/4-inch (19.1 mm) internal diameter and shall not decrease in size from the drain pan connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with Table 307.2.2.

M7287

Date Submitted	11/16/2018	**Section**	401.5	**Proponent**	James Bickford
Chapter	4	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

Summary of Modification

Changes text of Table 401.5

Rationale

The current text would not permit slotted louvers and grilles

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact to enforcement

Impact to building and property owners relative to cost of compliance with code

: Will not increase the cost of construction

This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code nor are the code requirements made more stringent.

Impact to industry relative to the cost of compliance with code

: Will not increase the cost of construction

This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code nor are the code requirements made more stringent.

Impact to small business relative to the cost of compliance with code

: Will not increase the cost of construction

This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code nor are the code requirements made more stringent.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code nor are the code requirements made more stringent.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code nor are the code requirements made more stringent.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code nor are the code requirements made more stringent.

Does not degrade the effectiveness of the code

This proposal will not increase the cost of construction because no additional labor, materials, equipment, appliances or devices are mandated beyond what is currently required by the code nor are the code requirements made more stringent.

2nd Comment Period

M7287-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

This is a simple clarification, and was approved for inclusion into the 2018 IMC. Request approval for improved understanding and more consistent enforcement.

TABLE 401.5 (401.5)

OPENING SIZES IN LOUVERS, GRILLES AND SCREENS PROTECTING AIR INTAKE OPENINGS

OUTDOOR OPENING TYPE	MINIMUM AND MAXIMUM OPENING SIZES IN LOUVERS, GRILLES AND SCREENS[a] MEASURED IN ANY DIRECTION
Intake openings in residential occupancies	Not < 1/4 inch and not > 1/2 inch
Intake openings in other than residential occupancies	> 1/4 inch and not > 1 inch

For SI: 1 inch = 25.4 mm.

a. For rectangular openings, the table requirements apply to the shortest side. For round openings, the table requirements apply to the diameter. For square openings, the table requirements apply to anyside.

M7324

Date Submitted	11/19/2018	**Section**	512.2	**Proponent**	James Bickford
Chapter	5	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

Summary of Modification

The proposal removes brass because brass is a copper alloy and reworded the sentence without changing the meaning

Rationale

The proposal removes brass because brass is a copper alloy and reworded the sentence without changing the meaning.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposal will not impact the cost of construction as this is only changing the name of the material.

Impact to building and property owners relative to cost of compliance with code

Will not increase the cost of construction

This proposal will not impact the cost of construction as this is only changing the name of the material.

Impact to industry relative to the cost of compliance with code

Will not increase the cost of construction

This proposal will not impact the cost of construction as this is only changing the name of the material.

Impact to small business relative to the cost of compliance with code

Will not increase the cost of construction

This proposal will not impact the cost of construction as this is only changing the name of the material.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposal will not impact health or safety of construction as this is only changing the name of the material.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Does not strengthen or weaken the code as this is only changing the name of the material.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate, this is only changing the name of the material.

Does not degrade the effectiveness of the code

this is only changing the name of the material.

2nd Comment Period

M7324-G1

Proponent	Gary Kozan	**Submitted**	5/8/2019	**Attachments**	No

Comment:

The proper term is now copper alloy, not brass.

512.2Materials.

Subslab soil exhaust system duct material shall be air duct material *listed* and *labeled* to the requirements of UL 181 for Class 0 air ducts, or any of the following piping materials that comply with the *Florida Building Code, Plumbing* as building sanitary drainage and vent pipe: cast iron; galvanized steel; ~~brass or~~ copper and copper alloy pipe; ~~copper~~ and tube of a weight not less than ~~that of copper drainage tube, Type~~ type DWV; and plastic piping.

M8253

Date Submitted	12/14/2018	**Section**	602.2.1.6	**Proponent**	John Woestman
Chapter	6	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Mod 8251

Summary of Modification

This proposal is intended to revise the requirements for foam plastic in plenums. There is a companion proposal for the Florida Building Code. This code change is intended to not revise technical requirements, but clarifies the code's intent for the use of foam plastic in plenums.

Rationale

This proposal is intended to revise the requirements for foam plastic in plenums. There is a companion proposal for the Florida Building Code. This code change is intended to not revise technical requirements, but clarifies the code's intent for the use of foam plastic in plenums. The following revisions are proposed:
2) The requirements for foam plastic in a plenum (currently 602.2.1.6.2 Approval) are moved to the charging paragraph in proposed Section 2603.7.
3) Not including the last sentence in 602.2.1.6.2 in this re-write of 602.2.1.6 clearly establishes the ASTM E84 performance limits and NFPA 286 with the identified acceptance criteria in IBC Section 803.1.2 as the qualifying tests for use of foam plastics exposed to the airflow in plenums.
4) The use of a thermal barrier (currently Section 602.2.1.6.1 Separation required) separating the foam plastic from the airflow in the plenum is allowed and therefore listed as an exception.
5) The use of an alternate barrier (currently Section 602.2.1.6.3 Covering) separating the foam plastic from the airflow in the plenum is allowed and therefore listed as an exception.
6) A new exception is added to recognize the use of masonry or concrete as a means to separate the foam plastic from the airflow in the plenum. Masonry and concrete, with minimum 1 inch thickness, are approved thermal barriers for foam plastic per IBC Section 2603.4.1.

The changes bring needed clarification regarding the approved barriers and corresponding flame spread and smoke-developed requirements for foam plastic used in plenums.

Cost Impact:
Will not increase the cost of construction No cost increase. This code proposal revises existing requirements without technical changes.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

The revised text should be easier to understand and enforce, and should make code enforcement quicker.

Impact to building and property owners relative to cost of compliance with code

Will not increase the cost of construction. This code proposal revises existing requirements without technical changes.

Impact to industry relative to the cost of compliance with code

Will not increase the cost of construction. This code proposal revises existing requirements without technical changes.

Impact to small business relative to the cost of compliance with code

Will not increase the cost of construction. This code proposal revises existing requirements without technical changes.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Easier to understand and enforce requirements for foam plastic materials in plenums should improve fire safety of plenums.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Improves the code with easier to understand and apply requirements.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate.

Does not degrade the effectiveness of the code

Does not degrade the effectiveness of the code.

2nd Comment Period

M8253-G1

Proponent	Harold Barrineau	Submitted	5/26/2019	Attachments	No

Comment:

I agree with this modification.

Delete and replace as shown:

~~**602.2.1.6 Foam plastic insulation.**~~

~~Foam plastic insulation used in plenums as interior wall or ceiling finish or as interior trim shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 and shall also comply with one or more of Sections 602.2.1.6.1, 602.2.1.6.2 and 602.2.1.6.3.~~

~~**602.2.1.6.1 Separation required.**~~

~~The foam plastic insulation shall be separated from the plenum by a thermal barrier complying with Section 2603.4 of the Florida Building Code, Building and shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the thickness and density intended for use.~~

~~**602.2.1.6.2 Approval.**~~

~~The foam plastic insulation shall exhibit a flame spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E84 or UL 723 at the thickness and density intended for use and shall meet the acceptance criteria of Section 803.1.2 of the Florida Building Code, Building when tested in accordance with NFPA 286.~~

~~The foam plastic insulation shall be approved based on tests conducted in accordance with Section 2603.9 of the Florida Building Code, Building.~~

~~**602.2.1.6.3 Covering.**~~

~~The foam plastic insulation shall be covered by corrosion-resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm) and shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the thickness and density intended for use.~~

-

602.2.1.6 Foam plastic in plenums as interior finish or interior trim. Foam plastic in plenums used as interior wall or ceiling finish or interior trim, shall exhibit a flame spread index of 25 or less and a smoke-developed index of 50 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, and shall be tested in accordance with NFPA 286 and meet the acceptance criteria of Section 803.1.2 of the International Building Code.

Exceptions:

1. Foam plastic in plenums used as interior wall or ceiling finish or interior trim, shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by a thermal barrier complying with Section 2603.4 of the International Building Code.

2. Foam plastic in plenums used as interior wall or ceiling finish or interior trim, shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by corrosion resistant steel having a base metal thickness of not less than 0.0160 inch (0.4 mm).

3. Foam plastic in plenums used as interior wall or ceiling finish or interior trim, shall exhibit a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723 at the maximum thickness and density intended for use, where it is separated from the airflow in the plenum by not less than a 1 inch (25mm) thickness of masonry or concrete.

M7492

Date Submitted	11/28/2018	**Section**	1107.5.2	**Proponent**	James Bickford
Chapter	11	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes

Alternate Language No

Related Modifications

Summary of Modification

Modifies Section 1107.5.2 “Copper and copper-alloy pipe.” Removes term brass because brass is a copper alloy

Rationale

The proposal removes brass because brass is a copper alloy

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact on enforcement

Impact to building and property owners relative to cost of compliance with code

Will not increase the cost of construction This proposal is updating the name of the materials used in the field and will not impact the cost of construction.

Impact to industry relative to the cost of compliance with code

Will not increase the cost of construction This proposal is updating the name of the materials used in the field and will not impact the cost of construction.

Impact to small business relative to the cost of compliance with code

Will not increase the cost of construction This proposal is updating the name of the materials used in the field and will not impact the cost of construction.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Will not have any impact

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Adds clarity to the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

This proposal is updating the name of the materials used in the field

2nd Comment Period

M7492-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

Request approval. The correct term is copper alloy, not brass.

1107.5.2 Copper and brass copper-alloy pipe. Standard iron-pipe size, copper and ~~red brass~~ copper alloy (not less than 80-percent copper) shall conform to ASTM B 42 and ASTM B 43.

M8004

Date Submitted	12/12/2018	**Section**	1203.5	**Proponent**	James Bickford
Chapter	12	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

1203.6

Summary of Modification

Deletes section 1203.5 Brass pile and 1203.6 Brass tubing. Brass is a copper allow and is covered by section 1203.7 and 1203.8

Rationale

Brass is a copper allow and is covered by section 1203.7 and 1203.8.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

Will not increase the cost of construction

Impact to industry relative to the cost of compliance with code

Will not increase the cost of construction

Impact to small business relative to the cost of compliance with code

Will not increase the cost of construction

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Has no effect on health, safety or welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Strengthens code by removing unnecessary language.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

Does not discriminate

Does not degrade the effectiveness of the code

Improves code by elimination of unnecessary language.

2nd Comment Period

M8004-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

Brass is a copper alloy and is covered by other sections. Request approval.

Delete without substitution:

~~**1203.5 Brass pipe.** Joints between brass pipe or fittings shall be brazed, mechanical, threaded or welded joints conforming to Section 1203.3.~~

~~**1203.6 Brass tubing.** Joints between brass tubing or fittings shall be brazed, mechanical or soldered joints conforming to Section 1203.3.~~

M8030

Date Submitted	12/12/2018	**Section**	1303.1.1	**Proponent**	James Bickford
Chapter	13	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

Summary of Modification

The proposal removes brass because brass is a copper-alloy and copper-alloy is the term used to identify materials manufactured where copper is the base metal and includes brass and bronze.

Rationale

The proposal removes brass because brass is a copper-alloy and copper-alloy is the term used to identify materials manufactured where copper is the base metal and includes brass and bronze

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

This proposal will not impact the cost of construction, as the change is only to update the name of the material.

Impact to industry relative to the cost of compliance with code

This proposal will not impact the cost of construction, as the change is only to update the name of the material.

Impact to small business relative to the cost of compliance with code

This proposal will not impact the cost of construction, as the change is only to update the name of the material.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The change is only to update the name of the material.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The change is only to update the name of the material.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The change is only to update the name of the material.

Does not degrade the effectiveness of the code

The change is only to update the name of the material.

2nd Comment Period

M8030-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

Brass is now copper alloy. Request approval.

2nd Comment Period

M8030-G2

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

Brass is now copper alloy. Request approval.

1303.1.1 Joints between different piping materials.

Joints between different piping materials shall be made with approved adapter fittings. Joints between different metallic piping materials shall be made with approved dielectric fittings or ~~brass~~ copper-alloy converter fittings.

M8033

Date Submitted	12/12/2018	**Section**	1303.4	**Proponent**	James Bickford
Chapter	13	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

1303.5

Summary of Modification

The proposal removes brass section because brass is a copper-alloy and copper-alloy is used to identify materials manufactured where copper is the base metal including brass and bronze

Rationale

The proposal removes brass section because brass is a copper-alloy and copper-alloy is used to identify materials manufactured where copper is the base metal including brass and bronze. The brass sections are not necessary because the joining types are the same in the copper and copper-alloy pipe and tubing sections.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

none

Impact to building and property owners relative to cost of compliance with code

This proposal will not impact the cost of construction as it is updating the name of the material.

Impact to industry relative to the cost of compliance with code

This proposal will not impact the cost of construction as it is updating the name of the material.

Impact to small business relative to the cost of compliance with code

This proposal will not impact the cost of construction as it is updating the name of the material.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

No impact to health, safety and welfare of the general public

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal is updating the name of the material.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal is updating the name of the material.

Does not degrade the effectiveness of the code

This proposal is updating the name of the material.

2nd Comment Period

M8033-G1

Proponent Gary Kozan **Submitted** 5/8/2019 **Attachments** No

Comment:

Brass is now copper alloy. Request approval.

Delete without substitution:

~~**1303.4 Brass pipe.** Joints between brass pipe or fittings shall be brazed, mechanical, threaded or welded joints complying with Section 1303.3.~~

~~**1303.5 Brass tubing.** Joints between brass tubing or fittings shall be brazed or mechanical joints complying with Section 1303.3.~~

M7361

29

Date Submitted	11/20/2018	**Section**	202	**Proponent**	Bryan Holland
Chapter	2	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

Summary of Modification

This proposed modification revises the current definition of Carbon Monoxide Alarm and adds a definition for Carbon Monoxide Detector.

Rationale

This proposed modification will harmonize the FBC-R with the IRC, NFPA 72/720, and other applicable standards related to CO alarms.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will not impact the local entity relative to code enforcement.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will not change the cost of compliance to building and property owners.

Impact to industry relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact industry.

Impact to small business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification is directly connected to the health, safety, and welfare of the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification improves and strengthens the code.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification enhances the effectiveness of the code.

2nd Comment Period

M7361-G2

Proponent Jennifer Privateer **Submitted** 5/22/2019 **Attachments** No

Comment:

agreed

2nd Comment Period

M7361-G3

Proponent	Harold Barrineau	Submitted	5/25/2019	Attachments	No

Comment:

I like the definition addition and clarity

1st Comment Period History

M7361-G1

Proponent	Mo Madani	Submitted	1/27/2019	Attachments	No

Comment:

Carbon monoxide provisions of the 2017 FBC are consistent with section 553.885 FS.

~~CARBON MONOXIDE ALARM. A device for the purpose of detecting carbon monoxide, that produces a distinct audible alarm, and is listed or labeled with the appropriate standard, either ANSI/UL 2034 Standard for Single and Multiple Station CO Alarms, or UL 2075, Gas and Vapor Detector Sensor, in accordance with its application.~~

CARBON MONOXIDE ALARM. A single- or multiple-station alarm intended to detect carbon monoxide gas and alert occupants by a distinct audible signal. It incorporates a sensor, control components and an alarm notification appliance in a single unit.

CARBON MONOXIDE DETECTOR. A device with an integral sensor to detect carbon monoxide gas and transmit an alarm signal to a connected alarm control unit.

M7339

Date Submitted	11/20/2018	**Section**	315	**Proponent**	Bryan Holland
Chapter	3	**Affects HVHZ**	No	**Attachments**	No

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments Yes **Alternate Language** No

Related Modifications

Summary of Modification

This proposed modification completely replaces the current R315 in the FBC-R related to carbon monoxide alarm requirements with R315 of the 2018 IRC.

Rationale

This proposed modification completely replaces R315 with the most current requirements for CO alarms as found in the 2018 IRC, which has been correlated and harmonized with the NFPA 72, NFPA 720, applicable UL product safety standards, and industry practices. The arrangement and format of the revised section is similar to R314 for smoke alarms.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This proposed modification will not impact the local entity relative to code enforcement.

Impact to building and property owners relative to cost of compliance with code

This proposed modification will not change the cost of compliance to building and property owners.

Impact to industry relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact industry.

Impact to small business relative to the cost of compliance with code

This proposed modification will not change the cost of compliance or impact small business.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

This proposed modification is directly connected to the health, safety, and welfare of the general public by updating the rules for CO alarm installations to the most current industry and product safety standards.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposed modification improves and strengthens the code by harmonizing the rules for CO alarms with those found in related industry standards and manufacturers installation instructions.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposed modification does not discriminate against materials, products, methods, or systems of construction.

Does not degrade the effectiveness of the code

This proposed modification enhances the effectiveness of the code.

2nd Comment Period

M7339-G2

Proponent Jennifer Privateer **Submitted** 5/22/2019 **Attachments** No

Comment:

agree

2nd Comment Period

M7339-G3

Proponent Harold Barrineau **Submitted** 5/25/2019 **Attachments** No

Comment:

I agree with this proposed modification

1st Comment Period History

M7339-G1

Proponent	Mo Madani	Submitted	1/27/2019	Attachments	No

Comment:

CO Provisions of the 2017 FBC, Residential is consistent with section 553.885 FS.

~~SECTION R315~~

~~CARBON MONOXIDE ALARMS~~

~~R315.1 Carbon monoxide protection. Every separate building or an addition to an existing building for which a permit for new construction is issued and having a fossil-fuel-burning heater or appliance, a fireplace, an attached garage, or other feature, fixture, or element that emits carbon monoxide as byproduct of combustion shall have an operational carbon monoxide alarm installed within 10 feet of each room used for sleeping purposes.~~

~~Exception: This section shall not apply to existing buildings that are undergoing alterations or repair unless the alteration is an addition as defined in Section R315.1.3.~~

~~R315.1.1 Carbon monoxide alarm. The requirements of Section R315.1 shall be satisfied by providing for one of the following alarm installations:~~

~~1. A hard-wired carbon monoxide alarm.~~

~~2. A battery-powered carbon monoxide alarm.~~

~~3. A hard-wired combination carbon monoxide and smoke alarm.~~

~~4. A battery-powered combination carbon monoxide and smoke alarm.~~

~~R315.1.2 Combination alarms. Combination smoke/carbon monoxide alarms shall be listed and labeled by a nationally recognized testing laboratory.~~

~~R315.1.3 Addition shall mean. An extension or increase in floor area, number of stories or height of a building or structure.~~

SECTION R315

CARBON MONOXIDE ALARMS

R315.1 General. Carbon monoxide alarms shall comply with Section R315.

R315.1.1 Listings. Carbon monoxide alarms shall be listed in accordance with UL 2034. Combination carbon monoxide and smoke alarms shall be listed in accordance with UL 2034 and UL 217.

R315.2 Where required. Carbon monoxide alarms shall be provided in accordance with Sections R315.2.1 and R315.2.2.

R315.2.1 New construction. For new construction, carbon monoxide alarms shall be provided in dwelling units where either or both of the following conditions exist.

1. The dwelling unit contains a fuel-fired appliance.

2. The dwelling unit has an attached garage with an opening that communicates with the dwelling unit.

R315.2.2 Alterations, repairs and additions. Where alterations, repairs or additions requiring a permit occur, the individual dwelling unit shall be equipped with carbon monoxide alarms located as required for new dwellings.

Exceptions:

1. Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of a porch or deck.

2. Installation, alteration or repairs of plumbing or mechanical systems.

R315.3 Location. Carbon monoxide alarms in dwelling units shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning appliance is located within a bedroom or its attached bathroom, a carbon monoxide alarm shall be installed within the bedroom.

R315.4 Combination alarms. Combination carbon monoxide and smoke alarms shall be permitted to be used in lieu of carbon monoxide alarms.

R315.5 Interconnectivity. Where more than one carbon monoxide alarm is required to be installed within an individual dwelling unit in accordance with Section R315.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit. Physical interconnection of carbon monoxide alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

Exception: Interconnection of carbon monoxide alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for interconnection without the removal of interior finishes.

R315.6 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source and, where primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Exceptions:

1. Carbon monoxide alarms shall be permitted to be battery operated where installed in buildings without commercial power.

2. Carbon monoxide alarms installed in accordance with Section R315.2.2 shall be permitted to be battery powered.

R315.7 Carbon monoxide detection systems. Carbon monoxide detection systems shall be permitted to be used in lieu of carbon monoxide alarms and shall comply with Sections R315.7.1 through R315.7.4.

R315.7.1 General. Household carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be listed in accordance with UL 2075.

R315.7.2 Location. Carbon monoxide detectors shall be installed in the locations specified in Section R315.3. These locations supersede the locations specified in NFPA 720.

R315.7.3 Permanent fixture. Where a household carbon monoxide detection system is installed, it shall become a permanent fixture of the occupancy and owned by the homeowner.

R315.7.4 Combination detectors. Combination carbon monoxide and smoke detectors installed in carbon monoxide detection systems in lieu of carbon monoxide detectors shall be listed in accordance with UL 2075 and UL 268.

M8152

Date Submitted	12/14/2018	**Section**	1507	**Proponent**	Mike Moore
Chapter	15	**Affects HVHZ**	No	**Attachments**	Yes

TAC Recommendation No Affirmative Recommendation
Commission Action Pending Review

Comments

General Comments No

Alternate Language Yes

Related Modifications

Summary of Modification

Reduces ventilation rates, aligns with 2021 IRC.

Rationale

See attached for full rationale and proposal.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

None

Impact to building and property owners relative to cost of compliance with code

Reduced cost based on reduction in ventilation rates and associated energy costs

Impact to industry relative to the cost of compliance with code

None

Impact to small business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Ventilation is a key component of occupant health. Aligning ventilation rates with national codes standards is a prudent move.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

Aligns code with 2021 IRC and provides consumer and builder with options for lower rates.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

No discrimination across materials, products, methods, or systems. Balanced systems are provided a rate reduction, but it is commensurate with their overall performance on producing air changes .

Does not degrade the effectiveness of the code

The code will be more effective at establishing a level playing field and comparable air changes across all system types.

2nd Comment Period

8152-A1

Proponent Joseph Belcher **Submitted** 5/25/2019 **Attachments** Yes

Rationale

The change is intended to incorporate the balanced ventilation provisions approved for the Florida Building Code-Mechanical Section 403.3.2.1 addressing Group R-3 dwellings. The language is slightly different from that approved for the FBC-M because of differences between the two code volumes and a lack of an equation in the current FBC-R. The provisions as proposed are identical to approved language for the 2021 IRC (RM22-18 - AMPC1). Cost statements are based on those of the proponents in RM22-18. The Reason provided by the original proponents, Craig Commer and Joseph Lstiburek.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

No impact on the cost of enforcement of the code.

Impact to building and property owners relative to cost of compliance with code

The code change proposal will decrease the cost of construction. Choosing to use a more effective type of ventilation will result in a lower ventilation rate which could reduce both construction and operating costs.

Impact to industry relative to the cost of compliance with code

The code change proposal will decrease the cost of construction. Choosing to use a more effective type of ventilation will result in a lower ventilation rate which could reduce both construction and operating costs.

Impact to Small Business relative to the cost of compliance with code

None

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

The change positively impacts the health and welfare of the public by allowing better methods of controlling indoor contaminants while reducing construction and operational costs

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

The change improves the code by allowing better methods of controlling indoor contaminants while reducing construction and operational costs.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

The change does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities.

Does not degrade the effectiveness of the code

The proposed change does not degrade the effectiveness of the code and improves the effectiveness of the code.

R202

-

BALANCED VENT ILAT ION. Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10% of the total mechanical supply airflow rate.

Text of Modification [additions underlined; deletions ~~stricken~~]:

M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate of not less than that determined in accordance with Table M1507.3.3(1) or Equation 15-1.

Ventilation rate in cubic feet per minute = (0.01 X total square foot area of house) + 7.5 X number of bedrooms + 1 **(Equation 15-1)**

Exceptions:

1. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25-percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

2. The minimum mechanical ventilation rate determined in accordance with Table M1507.3.3(1) or Equation 15- 1 shall be reduced by 30%, provided that both of the following conditions apply:

2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

2.1.1. Living room.

2.1.2 Dining room.

2.1.3 Kitchen.

2.2. The whole-house ventilation system is a balanced ventilation system.

Add new definition to Section 202 as follows:

BALANCED VENTILATION SYSTEM. A ventilation system where the total supply airflow and total exhaust airflow are simultaneously within 10% of their average. The balanced ventilation system airflow is the average of the supply and exhaust airflows.

Revise Section M1507 as follows:

M1507.1 General. Where local exhaust or whole-house mechanical ventilation is provided, the ~~equipment~~ ventilation system shall be designed in accordance with this section.

M1507.2 Recirculation of air.

Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or to another *dwelling unit* and shall be exhausted directly to the outdoors. Exhaust air from bathrooms and toilet rooms shall not discharge into an *attic*, crawl space or other areas inside the building.

M1507.3 Whole-house mechanical ventilation system.

Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through M1507.3.3.

M1507.3.1 System design.

The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as such a system. Outdoor air ducts connected to the return side of an air handler shall be considered as providing supply ventilation.

M1507.3.2 System controls.

The whole-house mechanical ventilation system shall be provided with controls that enable manual override.

M1507.3.3 Mechanical ventilation rate. The whole house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1507.3.3(1) or not less than that determined by Equation 15-1.

Ventilation rate in cubic feet per minute = (0.01 x total square foot area of house) +

(7.5 x (number of bedrooms + 1)) **(Equation 15-1)**

Exceptions:

1. Ventilation rate credit. Where a whole-house mechanical balanced ventilation system is provided, the whole-house mechanical ventilation system rate shall be permitted to be adjusted by multiplying the ventilation rate determined in accordance with Table M1505.4.3(1) or by Equation 15-1 by 0.7.
2. Programmed intermittent operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1), by Equation 15-1, or by Exception 1 is multiplied by the factor determined in accordance with Table M1507.3.3(2).

Reason from RM22-18 proponents: "This code change credits the better performance of whole-building dilution ventilation systems that are distributed, mixed and balanced.

Distributed, mixed, and balanced ventilation is more effective at controlling indoor contaminants than typical exhaust ventilation that provides no distribution and mixing. Ventilation with effective distribution and mixing prevents or minimizes high levels of contaminant concentration in various spaces within houses, especially rooms where people spend a lot of time with doors closed such as bedrooms. Distribution and mixing homogenize interior conditions reducing potentially harmful high intermittent contaminant concentrations in interior spaces. Complex field testing and contaminate transport software analysis have shown that 70% mixing combined with a 25% reduced balanced ventilation is equally as effective as a typical exhaust ventilation.

This code change does not penalize exhaust ventilation, it justifiably credits balanced ventilation. Exhaust only ventilation should not be given the same indoor air quality credit in energy rating calculations since typical exhaust ventilation systems result in less air change than balanced ventilation systems and do not provide as effective control of contaminants. This code change rectifies that inequity.

Technical justification for this proposed code change can be found in the following links:

https://buildingscience.com/sites/default/files/migrate/pdf/CP-0909_ASHRAE_Calibrated_Multizone_Airflow.pdf

https://buildingscience.com/sites/default/files/migrate/pdf/CP-0908_ASHRAE_Modifying_Ventilation_Airflow.pdf

https://buildingscience.com/sites/default/files/migrate/pdf/CP-0802_Field_Test_Room_to_Room.pdf"

Add new definition as follows:

BALANCED VENTILATION SYSTEM. A ventilation system where the total supply airflow and total exhaust airflow are simultaneously within 10% of their average. The balanced ventilation system airflow is the average of the supply and exhaust airflows.

Revise Section M1507 as follows:

M1507.1 General. Where local exhaust or whole-house mechanical ventilation is provided, the ~~equipment~~ ventilation system shall be designed in accordance with this section.

M1507.2Recirculation of air.

Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or to another *dwelling unit* and shall be exhausted directly to the outdoors. Exhaust air from bathrooms and toilet rooms shall not discharge into an *attic*, crawl space or other areas inside the building.

M1507.3Whole-house mechanical ventilation system.

Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through M1507.3.3.

M1507.3.1System design.

The whole-house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as such a system. Outdoor air ducts connected to the return side of an air handler shall be considered as providing supply ventilation.

M1507.3.2System controls.

The whole-house mechanical ventilation system shall be provided with controls that enable manual override.

M1507.3.3 Mechanical ventilation rate. The whole house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1507.3.3(1) or not less than that determined by Equation 15-1.

Ventilation rate in cubic feet per minute = (0.01 x total square foot area of house) +
(7.5 x (number of bedrooms + 1)) **(Equation 15-1)**

Exceptions:

1. Ventilation rate credit. Where a whole-house mechanical balanced ventilation system is provided, the whole-house mechanical ventilation system rate shall be permitted to be adjusted by multiplying the ventilation rate determined in accordance with Table M1505.4.3(1) or by Equation 15-1 by 0.7.
2. Programmed intermittent operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1), by Equation 15-1, or by Exception 1 is multiplied by the factor determined in accordance with Table M1507.3.3(2).

Reason:

This proposal is on the consent agenda for the 2021 IRC (RM24-18; http://media.iccsafe.org/codes/2018-2019/GroupA/CAH/IRC-M.pdf), so it is very likely to be in the final language of the 2021 International Residential Code. Approval of this language in Florida would have the following benefits:

1. Align Florida with the latest version of the IRC.
2. Give builders more flexibility with calulating the whole house ventilation rate by being able to use an equation instead of a table (potentially reduces required ventilation system capacity, resulting in first-cost savings).

3. Reduce required whole house mechanical ventilation rates for balanced systems, likely to result in first-cost and energy-cost savings while reducing the latent loads introduced by the ventilation system. This will also improve occupant comfort.

Rationale to support a balanced mechanical ventilation system rate reduction:
Balanced mechanical ventilation systems provide superior ventilation to unbalanced systems, and should not be required to provide the same rate as less effective, unbalanced systems to provide equivalent ventilation. The ability to reduce the ventilation rate is especially important in Florida since reducing ventilation rates while maintaining acceptable indoor air quality will also help to reduce the high latent energy loads typical of Florida residences and thereby, improve comfort, increase durability, and reduce energy use.

This proposed credit for balanced ventilation is a simplified version that was derived from ASHRAE 62.2-2016 Equation 4.2 (published in addendum s). The ASHRAE equation adjusts the balanced whole house ventilation flow rate as a function of building air leakage, building height, and weather and shielding factor (which approximates climate zone). To simplify application of the ASHRAE calculation, we developed a one-size-fits-all balanced system factor using the following methodology:

1. Define a typical new, single-family detached home. The home characteristics were as follows: 2600 ft2; 3-bedroom; heights of 8, 17, and 26 feet above grade for one-, two- and three-story versions of the typical home; and leakage rate of 4.5 ACH50 in CZ 1-2 and 2.5 ACH50 in CZ 3-8. Note: Higher values for air leakage provide larger credits for balanced ventilation systems. To be conservative, we assumed that the average home was slightly tighter than the 2018 IECC maximum leakage rates of 5 ACH50 in CZ 1-2 and 3 ACH50 in CZ 3-8 (i.e., 4.5 ACH50 instead of 5 ACH50 in CZ 1-2 and 2.5 ACH50 instead of 3 ACH50 in CZ 3-8).

2. Calculate the average weather and shielding factor across each climate zone using over 1000 weather stations catalogued in Appendix B of ASHRAE 62.2.

3. Calculate the ASHRAE 62.2-2016 flow rates for balanced and unbalanced systems in the one-, two-, and three-story versions of the typical home across all IECC climate zones using Equation 4.2 and the average weather and shielding factors calculated in step 2.

4. Calculate the percent reduction in the balanced system ventilation rate versus the unbalanced systems' ventilation rate for each case. Apply weightings to the percent reductions for one-, two-, and three-story cases in each climate zone based on average U.S. Census Data (i.e., 44% are assumed to be one-story; 52% are assumed to be two-story; 4% are assumed to be 3-story in each climate zone). Sum the weighted percent reductions for the various stories to develop an estimated percent reduction for each climate zone.

Following is a table that summarizes interim and aggregate results of these steps used to calculate the balanced ventilation system multiplier of 0.7. The weighted average percent reduction in flow rate for balanced systems across each climate zone varied from 22% to 41%. The average percent reduction in flow rate for balanced systems across all scenarios for the typical home is ~30%, resulting in a multiplier of 0.7 in this proposal.

Percent Reduction Possible in Ventilation Fan Flow Rate When Specifying Balanced vs. Unbalanced: 4.5 ACH50 in CZ 1-2 & 2.5 ACH50 in CZ 3-8				
	Stories and Distribution			Weighted Average Across All Stories
	44%	52%	4%	
CZ	1-story	2-story	3-story	
1A	31%	42%	50%	38%
2A	30%	41%	49%	37%
2B	34%	46%	55%	41%
3A	18%	25%	29%	22%
3B	20%	27%	32%	24%
3C	21%	28%	34%	25%
4A	20%	27%	32%	24%
4B	24%	33%	39%	29%
4C	23%	31%	36%	27%
5A	23%	31%	37%	28%
5B	24%	33%	39%	29%
6A	25%	34%	40%	30%
6B	27%	37%	44%	33%
7	29%	39%	46%	35%
8	34%	46%	54%	41%
Average of weighted averages				31%

Cost Impact

This proposal may decrease the cost of construction by approving specification of ventilation systems with lower flow rates.