COFFMAN ENGINEERS

APPEAL NO. 03-27
UMC ITEM #107 and #109

October 6, 2025

Mr. Hugo Aguilar
Sr. VP of Codes and Standards
4755 E. Philadelphia St.
Ontario, Ca. 91761

Subject: Opposition to Code Changes 107 and 109

Dear Hugo:

Please allow this letter to note my opposition to the aforementioned Code Changes. Some of my reasons for this opposition include:

- There will be a considerable increase in the amount of energy used as a result of ducted systems which is in complete violation of the State of California energy Codes along with ASHRAE Standards.
- This would be a significant disagreement with ASHRAE's decarbonization goals and Standard 90.1.
- There would be significant increases in cost of HVAC installed system along with increases in shafts, usable space, etc. and may cause complete system retrofits rather than traditional tenant improvements.
- There is no published research nor data that supports any claim that concealed spaces utilizing standard drywall pose any health or safety risks.
- ASHRAE Standards 62.1, 62.2, 90.1 and 90.2 all permit return plenums as well as California energy Codes Title 24.
- Disallowance of return air plenums utilizing gypsum duct construction or plenums eliminate a long standing design practice without offering viable alternatives.
- There are multiple benefits when utilizing return air plenums including the ease of air balancing and maintenance of proper airflow along with acoustic benefits in office and healthcare settings.

Respectfully submitted

Phillip M. Trafton
Mechanical Code Committee Member
818-266-5742
Coffman Engineers
Phil.trafton@coffman.com

Item #:	Code Number:	Section Number:
107	2024 UMC	602.1, 602.2

SUBMITTER:	Organization Name:	Organization Representation:
Christopher Ruch	NEMI	

RECOMMENDATION:
Revise text

APPEAL NO. 03-27
UMC ITEM #107

Proposed Text :

602.0 Material.
602.1 General. Materials used for duct systems shall comply with Section 602.2 through Section 602.7 as applicable.
Concealed building spaces or independent construction within buildings shall not be permitted to be used as ducts or plenums. ~~Gypsum board shall not be used for positive pressure ducts.~~
~~**Exception:** In healthcare facilities, concealed spaces shall not be permitted to be used as ducts or plenums.~~
602.2 Combustibles Within Ducts or Plenums. Materials exposed within ducts or plenums shall be noncombustible or shall have a flame spread index not to exceed 25 and a smoke-developed index not to exceed 50, where tested as a composite product in accordance with ASTM E84 or UL 723. Plastic piping installed in plenums shall be tested in accordance with all requirements of ASTM E84 or UL 723. Mounting methods, supports and sample sizes of materials for testing that are not specified in ASTM E84 or UL 723 shall be prohibited.
Exceptions:
(1) Return-air and outside-air ducts, plenums, or concealed spaces that serve ~~a dwelling unit~~single-family residential occupancies.
(2)-(9) (remaining text unchanged)

SUBSTANTIATION:
In 2024, the UMC Technical Committee approved amendments to Section 602.1 of the Uniform Mechanical Code. This decision followed the IAPMO Board of Directors' review of Standards Council Decision Docket #09-24, UMC Item #138 Public Comment 1. The focus of the Standards Council decision was on Section 602.2 (Combustibles within Ducts or Plenums), specifically exception 1, which previously exempted concealed spaces in dwelling units from the requirements for combustibles within ducts or plenums.

This exemption raised concerns about potential confusion and contradictory directives in enforcing the UMC, specifically regarding the use of concealed spaces as ducts or plenums. Consequently, the Board recognized an extraordinary circumstance necessitating action to resolve this conflict within the code. Their resolution was to maintain the current state of Section 602.1, effectively not incorporating the proposed changes.

The proposal removes the recognized conflict within the code. Additionally, the proposal addresses the unsubstantiated exception applicable to all dwellings. The revised proposal eliminates the term 'dwelling' and instead provides a specific exemption for single-family residential occupancies. While removing an exemption for single-family residential occupancies could be overburdensome, continuing to expand this exception to other types of buildings would not be appropriate.

[Supporting documentation is provided in KAVI for TC review]

Committee Action:
Accept As Submitted

TOTAL ELIGIBLE TO VOTE:
28

AFFIRMATIVE:	NEGATIVE:	ABSTAIN:	NOT RETURNED:
25	2	1	0

EXPLANATION OF NEGATIVE:
KOERBER: I do not agree with the TC action for Item #107 and believe it throws out the use of concealed spaces as ducts in the guise of removing gypsum materials. What about concealed spaces lined with non-combustible materials such as metal? Other acceptable materials also could be affected.

In addition, it appears that the TC is sending a conflicting message based on the action taken in Item #107 (striking wording that gypsum shall not be used for positive pressure ducts) versus the action taken in Item #110 (which retains language that gypsum material shall not be exposed in supply ducts). In my opinion, this proposal should not have been accepted as submitted and it will only create confusion in the UMC.

WHITE: There is no substantiation for this change other than changing established code language to push forth an agenda.

EXPLANATION OF ABSTAIN:
TERZIGNI: This might be too general and wide sweeping. So, no return plenums are allowed at all?

Comment 1

Item #:	Code Number:	Sections(s):
107	2024 UMC	206.0, 602.1

Submitter Name:	Organization Name:	Organization Representation:
Austin Jones	Chair, UMC Code Change Review Task Group	

Recommendation:
Accept the Proposal as Modified

Proposed Text:

Request to accept the code change proposal **as modified** by this public comment.

602.0 Material.
602.1 General. Materials used for duct systems, including plenums, shall comply with Section 602.2 through Section 602.6 as applicable. Concealed ~~building~~ spaces ~~or independent construction~~ within buildings shall not be permitted to be used as ducts or plenums. Ductwork shall be permitted to be installed in concealed spaces.

206.0 - D -
Ductwork. A system or network of ducts.

Substantiation:
Although plenums are included within the broader scope of duct systems, plenums are distinct elements within these systems and need to be specified in Section 602.1 (General). The inclusion of plenums removes ambiguity and ensures that they are constructed using the approved materials in Section 602.2 through Section 602.6.

The second sentence, which prohibits the use of concealed spaces as ducts or plenums, is being revised to eliminate unnecessary or unclear terms, such as the undefined phrase “independent construction.”

The last sentence is intended to emphasize a key distinction for ductwork installations and concealed spaces. While it is acceptable to install ductwork within concealed spaces, these concealed spaces themselves cannot be used as ducts or plenums. This means that air cannot be directly conveyed through the concealed spaces without the presence of a dedicated, properly constructed duct system.

[2024 UMC ROP Preprint]
Duct System. *A continuous passageway for the transmission of air and vapors that, in addition to the containment components themselves, might include duct fittings, dampers, plenums, and/or other items or air-handling equipment. [NFPA 96:3.3.20]*

[Supporting documentation is provided in KAVI for TC review]

Committee Action:
Accept As Submitted

TOTAL ELIGIBLE TO VOTE:
28

AFFIRMATIVE:	NEGATIVE:	ABSTAIN:	NOT RETURNED:
22	5	1	0

EXPLANATION OF NEGATIVE:
BOLOUS: I believe open plenums should be allowed for certain occupancies/uses, such as office spaces. This should be discussed further and broken down to list specific spaces where this would be allowed and not allowed.

KOERBER: I disagree with the TC as I believe there are valid circumstances where concealed spaces should be allowed as ducts or plenums. In addition, this comment/proposal only stands to make the language for ducts and plenums confusing.

TERZIGNI: I agree with the other negative comments provided.

TRAFTON, P: This appears to be a bad idea and is opposed by many contractors, ASHRAE members, and SMACNA members. Many share my belief that it would increase energy use, add to the carbon footprint, and raise first costs enough to shift some designs toward less sheet metal intensive systems.

WHITE: The definition for “ductwork” is unnecessary and poorly written. There is no need to say that ducts can be installed in concealed spaces, that is obvious. Otherwise, there would only be exposed ducts.

EXPLANATION OF AFFIRMATIVE:
ZEEDYK: Why we should remove gypsum as a duct material and utilize ducted returns as a safer and smarter alternative to open plenums:

1. Health and Safety: Mold Growth Risks with Gypsum
● A 2025 University of Toronto study highlights health risks from mold growth on gypsum used in HVAC return air systems.
● Gypsum's organic paper facing supports mold, which thrives in typical return air temps (71°F–84°F) and high humidity (80–90% RH), even without condensation.
● Open plenums expose gypsum surfaces to unregulated moisture, yet UMC 602.5.2 only limits temperature, not humidity.
● ASHRAE 62.1 requires mold-resistance testing (UL 181, ASTM C1338, D3273), but gypsum return air materials are not subject to these standards.

2. Open Plenums = Airborne Contaminant Risks
● Gypsum deterioration releases dust, mold spores, and microbial particles directly into the return air stream.
● Common field findings include: Rodent droppings, fiberglass fibers, spray foam debris, asbestos-containing materials, and fire-proofing materials.
● Filtration: Return plenums with deteriorating gypsum surfaces expose air to microbial contamination that standard HVAC filters can't remove — a risk magnified in open plenums where debris and mold particles freely accumulate and recirculate (University of Toronto, 2025).

3. Installation Costs Are a Weak Argument Against Health
● The UMC Purpose (101.3) is to provide "minimum requirements and standards for the protection of the public health, safety, and welfare." It is not to reduce costs at the expense of occupant health and safety.
● Similar arguments were made against 25/50 plenum ratings back in 1973 — safety standards won then, too.
● BIM coordination today allows proper planning for ducted systems with minimal extra cost.

4. Ducts Can Be Cleaned. Open Plenums Can't.
● Return ducts: cleanable and disinfectable per NADCA ACR Standard & ASHRAE RP-759.
● Open plenums: contain uncleanable ceiling tiles, framing, wiring, insulation and other porous surfaces.
● Once contaminated, replacement is often the only option.

5. Open Plenums Amplify Noise
● No acoustic separation → sound easily transmits between rooms.
● Hospitals, clinics, and office occupants prefer ducted returns for acoustic control.

6. No Conflict with ASHRAE Standards
● ASHRAE 62.1, 90.1, and 90.2 do not require open plenums.
● Allowing gypsum plenums violates ASHRAE Duct Systems Design Guide: No UL 181 listing. No published roughness factors (ASHRAE 120). No recognized construction standard.

7. Mold-Resistant Coatings Are Not a Long-Term Solution
● "Mold-resistant" labels are not standardized or independently verified.
● Coatings degrade over time due to heat, moisture, and mechanical damage, such as vibration.
● Field application often leaves trapped organic materials that fuel mold growth.
● Coatings cannot guarantee long-term protection for building occupants.

8. Open Plenums Have Been Used for Decades - But Not Without Problems
● The “decades of use” argument was reviewed and rejected by the UMC Technical Committee and IAPMO Standards Council
● Longevity doesn’t equal safety.

9. AHJ Already Has Flexibility for Existing Buildings
● UMC already gives AHJs tools to deal with special cases:
Section 103.0 – AHJ authority
Section 302.1.3 – Existing buildings flexibility
Sections 302.2 & 302.3 – Alternatives allowed if proven equivalent

10. The “Positive Pressure” Theory Is Not Common Practice
● If an open return plenum operates at a negative pressure (even for short periods of time) relative to the outdoors, it can draw in unconditioned air, increasing energy consumption and operating costs.
● No UMC or ASHRAE 36 requirement exists to maintain slight positive pressure in open return plenums, and pressure controls are neitherrequired nor commonly installed - a fact confirmed by field technicians and commissioning agents.
● Pressure sensors or control logic used to maintain positive pressure in open return plenums are neither typically installed nor required.
● Technicians and commissioning agents can confirm this is not common practice.

11. Energy Efficiency Claims Are Unsupported
● Bahnfleth & McWhirter (2008) found no empirical evidence that open plenums save fan energy - assumptions were based on intuition, not data.
● Infiltration from outdoor air during heating/cooling increases energy use, accounting for 13% of heating load (Emmerich & Persily, 1998).

12. Open Plenums Complicate Air Balancing
● Open plenums create wild systems — no control of return airflow.
● UC Davis WCEC (2025): Door positions caused return flow to swing ±130%. Ducted return airflows stayed stable.
● Field technicians can’t balance airflow or control space pressures reliably in open systems.

13. No Gypsum Duct Construction Standard Exists
● Confirmed via direct correspondence with the Gypsum Association (GA) and United States Gypsum Corp (USG).
● No installation standard exists for gypsum ductwork - nor do they plan to create one.

This is not a ban on gypsum use everywhere. The UMC "plenum" definition specifically excludes occupiable spaces. This only applies to gypsum used as ductwork or as part of concealed primary air paths.

EXPLANATION OF ABSTAIN:
WINSTEAD: I am abstaining due to the range of technical considerations and differing viewpoints presented throughout the comment process. While the proposal seeks to address code clarity, the issue involves multiple factors related to design practice, system performance, and construction impacts that present differing perspectives within the industry.

Comment 2

Item #:	Code Number:	Sections(s):
107	2024 UMC	602.1

Submitter Name:	Organization Name:	Organization Representation:
Brian Sybesma (Western Allied Corporation), Duncan Green (Western Allied Corporation), Todd Gotshall (Western Allied Corporation), Brian Coday (Critchfield Mechanical)	Multiple Submitters	

Recommendation:
Accept the Proposal as Modified

Proposed Text:

Request to accept the code change proposal **as modified** by this public comment.

602.0 Material.
602.1 General. Materials used for duct systems shall comply with Section 602.2 through Section 602.6 as applicable. Concealed building spaces or independent construction within buildings shall ~~not~~ be permitted to be used as ducts or plenums.

Substantiation:
Brian Sybesma (Western Allied Corporation):
The substantiation for the revision of Section 602.1 provides no published research or even anecdotal data todescribe, let alone quantify, how prohibiting the use of concealed spaces as plenums would improve the "protection of the public health, safety, and welfare"—the stated purpose of the Uniform Mechanical Code in Section 101.3. Concealed building spaces or independent construction within buildings are used routinely as return air ducts orplenums significantly increasing system performance, efficiency and minimizing cost. This return air path is thebasis for most commercial HVAC systems.

Please see supporting material including:

1. "Return Air Systems" from the ASHRAE Journal
2. "Building Cavities Used as Ducts: Air Leakage Characteristics and Impacts in Light Commercial Buildings" from the Florida Solar Energy Center
3. "Impact of Air Return Strategy on Building Energy Consumption And Indoor Air Quality" REPORT NCEMBT-081010

In conclusion, this change proposal to disallow the use of concealed architectural spaces as air plenums has notbeen justified based on health and safety reasons yet there is substantial evidence that this change will increaseenergy usage and installation costs.

Duncan Green (Western Allied Corporation):
There is no justification for the removal of concealed building spaces or independent construction within buildings being prohibited from being used as return plenums. There is no published research or data to prove that removal of concealed building space plenums would improve the “protection of the public health, safety, and welfare” as stated for the purpose of the code in UMC. Most large buildings and new construction are made of concrete and steel and use the concealed space above the ceiling as a return, by eliminating this option there is a large first cost increase with no potential payback because it also increases energy usage by requiring more fan energy any time the building is operating. This will result in larger fans, larger shafts creating less usable space within buildings, and an overall increase in materials used for construction.

This revision also does not include any exceptions for existing buildings using plenums currently. Any tenant improvements or retrofits would require a ducted return system be installed in buildings that were not designed for them. Buildings currently using return plenums could require additional shafts impacting spaces that are not on the floor or in the scope of work. A small tenant improvement could require an entire building to be gutted to satisfy this new requirement because depending on the system you cannot add a single ducted return to a plenum system and existing space constraints will not allow for the large required return duct. In conclusion, this change proposal to remove return plenums has not been justified as a health and safety improvement. This change will greatly increase the first cost and overall energy usage in new buildings, while also significantly increasing the cost, energy, and impact of any changes to existing buildings.

Brian Coday (Critchfield Mechanical):
As we have learned from lab and healthcare spaces, adding ductwork to ceiling spaces must increase floor-to-floor heights due to the congestion caused by this additional utility. In adding this word to the code, essentially all future projects will need to grow in height to accommodate. The architectural and structural ripple effect will impact the capabilities of developers to provide their real estate goals. Taylor Engineering has produced the LACK of benefit from a design standpoint. The comment here is intended to identify the cost impact to overall projects in a market that is already hindered by other cost factors.

Todd Gottshall (Western Allied Corporation):
<u>Proposed Language:</u>
1. Proposal eliminates use of architectural plenums for return air
2. The proposal negatively impacts commercial buildings, increasing energy use and construction costs

<u>Current Industry Practice:</u>
1. Widespread use of plenum returns in commercial buildings
2. Proven use without health and safety issues for multiple decades

<u>Concerns with Proposal:</u>
1. Eliminates concealed spaces for return air, leaving fully ducted systems as primary alternative
2. Fully ducted systems are more expensive and energy-intensive

<u>Benefits of Plenum Return Systems:</u>
1. Reduced fan energy costs (20-30%)
2. Lower HVAC system costs ($3 to $5 per square foot; 10-20% of total HVAC system cost)

<u>Potential Issues Addressed by using Plenum Return Systems:</u>
1. Humidity: Prevents negative pressurization relative to outdoors
2. Dust/Particles within building: All building air is filtered at air handler

Supporting Research for Plenum Return System benefits:
1. ASHRAE Journal: Compares architectural return air plenums to ducted systems
2. Florida Solar Energy Center: Neutral pressure design minimizes duct leakage
3. Energy Consumption Study: Ducted return systems use 7.5% more fan energy

Conclusion:
1. No health and safety benefits provided by the proposal
2. Substantial evidence of increased energy use and costs with the proposed change
3. Conflicts with ASHRAE Standard 62.1-2022 allowing plenum systems

[Supporting documentation is provided in KAVI for TC review]

Committee Action:
Reject

Committee Statement:
The assertion that open return plenums have been used for decades with acceptable performance has been previously considered and not adopted. While historical usage provides context, it does not address documented challenges related to air infiltration, filtration consistency, and long-term maintenance. Concerns regarding the impact on existing buildings are addressed through the existing provisions in Chapter 1 (Administration) and Chapter 3 (General Regulations) which grant the Authority Having Jurisdiction flexibility to approve alternative methods or apply modifications where appropriate. Clarifying that only approved duct materials are acceptable for primary air conveyance supports consistent enforcement and promotes system designs that reflect practical field conditions.

TOTAL ELIGIBLE TO VOTE:
28

AFFIRMATIVE:	NEGATIVE:	ABSTAIN:	NOT RETURNED:
22	5	1	0

EXPLANATION OF NEGATIVE:
BOLOUS: See my comment under Item #107 PC 01.

KOERBER: I disagree with the TC as I believe there are valid circumstances where concealed spaces should be allowed as ducts or plenums.

TERZIGNI: I agree with the other negative comments and the submitter's substantiation.

TRAFTON, P: See my comment under Item #107 PC 01. As noted, this would increase energy use, add to the carbon footprint, and raise first costs enough to shift some designs toward less sheet metal intensive systems.

WHITE: There are many arguments put forth as to the horrible issues with plenum returns and gypsum. If these were correct, buildings would be failing everywhere, systems would not work, utility costs would skyrocket, and no one would do this. Are there bad installations? Yes. Are those bad installations code compliant? Probably not. This is an overreach and puts the UMC at a disadvantage.

EXPLANATION OF AFFIRMATIVE:
ZEEDYK: See my comment under Item #107 PC 01.

EXPLANATION OF ABSTAIN:
WINSTEAD: I am abstaining due to the range of technical considerations and differing viewpoints presented throughout the comment process. While the proposal seeks to address code clarity, the issue involves multiple factors related to design practice, system performance, and construction impacts that present differing perspectives within the industry.

Comment 3

Item #:	**Code Number:**	**Sections(s):**
107	2024 UMC	602.1

Submitter Name:	**Organization Name:**	**Organization Representation:**
Craig Silvey	ACCO Engineered Systems	

Recommendation:
Accept the Proposal as Modified

Proposed Text:

Request to accept the code change proposal **as modified** by this public comment.

602.0 Material.
602.1 General. Materials used for duct systems shall comply with Section 602.2 through Section 602.6 as applicable. Concealed building spaces or independent construction within buildings shall ~~not~~ be permitted to be used as ducts or plenums. Gypsum board shall not be used for positive pressure ducts.

Substantiation:
Using concealed building spaces as a plenum (e.g. return air plenum) is a well-established, efficient method of conveying air through a building for several reasons:

1. It saves energy by reducing fan system pressure requirements.
2. It saves owner's cost by avoiding unnecessary ductwork.
3. It reduces ceiling 'congestion' and simplifies coordination between trades. It also allows for taller ceilings.
4. It simplifies air balancing.

In a properly designed building, a return air plenum will still be positively pressurized relative to outdoors thereby eliminating any outdoor air infiltration concerns. Concealed building spaces should continue to be permitted to be used as ducts or plenums.

Committee Action:
Reject

Committee Statement:
The assertion that open return plenums have been used for decades with acceptable performance has been previously considered and not adopted. While historical usage provides context, it does not address documented challenges related to air infiltration, filtration consistency, and long-term maintenance. Concerns regarding the impact on existing buildings are addressed through the existing provisions in Chapter 1 (Administration) and Chapter 3 (General Regulations) which grant the Authority Having Jurisdiction flexibility to approve alternative methods or apply modifications where appropriate. Clarifying that only approved duct materials are acceptable for primary air conveyance supports consistent enforcement and promotes system designs that reflect practical field conditions.

TOTAL ELIGIBLE TO VOTE:
28

AFFIRMATIVE:	NEGATIVE:	ABSTAIN:	NOT RETURNED:
22	5	1	0

EXPLANATION OF NEGATIVE:
BOLOUS: See my comment under Item #107 PC 01.

KOERBER: I disagree with the TC as I believe there are valid circumstances where concealed spaces should be allowed as ducts or plenums.

TERZIGNI: This represents a significant change in building requirements, yet no justification has been provided. It would also increase costs, reduce efficiency, and make it more difficult, if not impossible, to comply with decarbonization and heat pump/electrification initiatives.

TRAFTON, P: See my comment under Item #107 PC 01. As noted, this would increase energy use, add to the carbon footprint, and raise first costs enough to shift some designs toward less sheet metal intensive systems.

WHITE: There are many arguments put forth as to the horrible issues with plenum returns and gypsum. If these were correct, buildings would be failing everywhere, systems would not work, utility costs would skyrocket, and no one would do this. Are there bad installations? Yes. Are those bad installations code compliant? Probably not. This is an overreach and puts the UMC at a disadvantage.

EXPLANATION OF AFFIRMATIVE:
ZEEDYK: See my comment under Item #107 PC 01.

EXPLANATION OF ABSTAIN:
WINSTEAD: I am abstaining due to the range of technical considerations and differing viewpoints presented throughout the comment process. While the proposal seeks to address code clarity, the issue involves multiple factors related to design practice, system performance, and construction impacts that present differing perspectives within the industry.

Comment 4

Item #:	Code Number:	Sections(s):
107	2024 UMC	602.1

Submitter Name:	Organization Name:	Organization Representation:
Elizabeth Becker	Silicon Valley Mechanical, Inc.	Compliance Specialist

Recommendation:
Accept the Proposal as Modified

Proposed Text:

Request to accept the code change proposal **as modified** by this public comment.

602.0 Material.
602.1 General. Materials used for duct systems shall comply with Section 602.2 through Section 602.6 as applicable. Concealed building spaces or independent construction within buildings shall ~~not~~ be permitted to be used as ducts or plenums. Gypsum board shall not be used for positive pressure ducts.
Exception: In healthcare facilities, concealed spaces shall not be permitted to be used as ducts or plenums.

Substantiation:
Prohibiting the use of concealed building spaces for ducts or plenums (henceforth referred to as 'CBSDP') deliberately ignores detrimental impacts over a building's lifespan, including reduced energy efficiency, increased carbon footprint, decreased space pressurization control, and noise amplification.

Efficiency: The prohibition of CBSDP conflicts with current energy efficiency goals and is a major step backwards after years of forward progress on the energy efficiency front. By minimizing pressure drops compared to complex ductwork systems, they reduce the workload on HVAC fans. ASHRAE 90.1 emphasizes that efficient airflow pathways are critical to minimizing energy use in HVAC systems and this change alone could wipe out gains from an entire cycle of ASHRAE 90.1 updates.

Embodied Carbon: Prohibition of CBSDP will require significant increases in floor-to-floor height for an equivalent space. Increasing a building's size or complexity sharply increases the carbon footprint of a building over its lifecycle due to several interconnected factors including a surge in the required building materials such as steel and concrete, greater energy demand during construction, increased operational energy consumption, increased maintenance over time, and additional waste generation during construction, renovations, and retrofits.

Space Pressurization Control: When properly designed, concealed plenums can improve the efficiency of airflow distribution and maintain proper pressure balance within a building. These plenums allow air to return to the HVAC system from multiple rooms or spaces without requiring individual returns in each room, which can be beneficial in large open-plan areas. ASHRAE's Standard 62.1 - Ventilation for Acceptable Indoor Air Quality outlines that maintaining a balanced air pressure system is critical for effective ventilation, which can be facilitated by concealed plenums (ASHRAE, 2022).

Noise Reduction: Concealed plenums can minimize operational noise compared to traditional ducted systems. This is advantageous in settings where acoustic comfort is a priority, such as offices and multifamily residential buildings.

Retaining CBSPD spaces as a viable design option is essential for maintaining cost-effective, energy-efficient, and flexible HVAC solutions. It is advisable to advocate for further improving plenum design and management, which are already robustly defined in the code, rather than outright elimination.

Committee Action:
Reject

Committee Statement:
The assertion that open return plenums have been used for decades with acceptable performance has been previously considered and not adopted. While historical usage provides context, it does not address documented challenges related to air infiltration, filtration consistency, and long-term maintenance. Concerns regarding the impact on existing buildings are addressed through the existing provisions in Chapter 1 (Administration) and Chapter 3 (General Regulations) which grant the Authority Having Jurisdiction flexibility to approve alternative methods or apply modifications where appropriate. Clarifying that only approved duct materials are acceptable for primary air conveyance supports consistent enforcement and promotes system designs that reflect practical field conditions.

TOTAL ELIGIBLE TO VOTE:
28

AFFIRMATIVE:	NEGATIVE:	ABSTAIN:	NOT RETURNED:
22	5	1	0

EXPLANATION OF NEGATIVE:
BOLOUS: See my comment under Item #107 PC 01.

KOERBER: I disagree with the TC as I believe there are valid circumstances where concealed spaces should be allowed as ducts or plenums.

TERZIGNI: See my comments under Item #107 PC 01 through PC 03.

TRAFTON, P: See my comment under Item #107 PC 01. As noted, this would increase energy use, add to the carbon footprint, and raise first costs enough to shift some designs toward less sheet metal intensive systems.

WHITE: There are many arguments put forth as to the horrible issues with plenum returns and gypsum. If these were correct, buildings would be failing everywhere, systems would not work, utility costs would skyrocket, and no one would do this. Are there bad installations? Yes. Are those bad installations code compliant? Probably not. This is an overreach and puts the UMC at a disadvantage.

EXPLANATION OF AFFIRMATIVE:
ZEEDYK: See my comment under Item #107 PC 01.

EXPLANATION OF ABSTAIN:
WINSTEAD: I am abstaining due to the range of technical considerations and differing viewpoints presented throughout the comment process. While the proposal seeks to address code clarity, the issue involves multiple factors related to design practice, system performance, and construction impacts that present differing perspectives within the industry.

Comment 5

Item #:
107

Code Number:
2024 UMC

Sections(s):
602.1, 602.2

Submitter Name:
Nate Dison (Gensler), Jackson Aplanalp (Western Allied Corporation), Chad Herrick (Western Allied Corporation), Mark Terzigni (SMACNA SOCAL), Bryan Boyce (Energy Solutions, The Statewide CASE Team)

Organization Name:
Multiple Submitters

Organization Representation:

Recommendation:
Reject the Code Change Proposal

Proposed Text:

Request to **reject** the code change proposal by this public comment.

Substantiation:
Nate Dison (Gensler):
The proposed code change appears to no longer allow the use of architectural plenums for return air. This would change how many buildings are designed and constructed and increase costs for owners and users. However, this change does not come with any value to end users. Please do not adopt this code change at this time without substantiated evidence of a current detriment to occupants, or substantiated evidence of a benefit to occupants that would result from this change.

Jackson Aplanalp (Western Allied Corporation):
The substantiation for the revision of Section 602.1 provides no published research or even anecdotal data to describe, let alone quantify, how prohibiting the use of concealed spaces as plenums would improve the “protection of the public health, safety, and welfare”—the stated purpose of the Uniform Mechanical Code in Section 101.3.

This revision should be rejected, because it does not provide a single compelling argument supporting the change and would have significant negative effects on building energy efficiency and construction costs. This proposal would effectively eliminate the use of architectural plenums for return air. In commercial applications with steel and concrete structures, plenum returns are by far the norm and they have been used without any known health and safety issue for multiple decades. Unducted return air systems can use ceiling plenums (i.e. a concealed space) or occupied space (i.e. an unconcealed space) to return air to a central air handling unit.

This proposal eliminates the use of concealed spaces for return air; using occupied spaces to create a return path is still possible. In most applications in commercial buildings, this requires the use of corridors to connect multiple spaces, but corridors shall not be used as return ducts per UMC Section 602.7. This leaves no other option than a fully ducted return system in most cases. There is unlikely to be more than a handful of large commercial buildings with fully ducted return systems in the entire country. In all cases, fully ducted return systems use more energy and

are more expensive to construct compared to unducted plenum returns. Therefore, this proposal would increase energy use and installation costs for a substantial percentage of commercial buildings with no known health or safety benefit by disallowing the use of plenums for return air.

The ASHRAE Journal article, "Return Air Systems" compares architectural return air plenums to ducted return systems. The relevant benefits of using a plenum return air system are:

> 1) reduced fan energy costs of about 20% to 30% due to the much lower pressure drop of the plenum return system, and reduced fan energy in systems with outdoor air or relief fans in lieu of less efficient return fans, which are generally required when return air is fully ducted, and
>
> 2) reduced HVAC system costs of about $3 to $5 per square foot [in 2015 dollars], about 10% to 20% of the total HVAC system cost. This article also addresses potential indoor air quality issues related to humidity and dust/particles in the plenum.

Per the article, issues with humidity "can be avoided by simply not allowing the architectural plenums to become negatively pressurized relative to outdoors" which is easily achievable during design and implementation with modern building automation systems. The article also notes that "a ceiling return air plenum that has been used for a few years could have substantial dust accumulation on plenum surfaces. But return air ducts could have a similar or even thicker layer of dust. The dust "challenge" for both are particles drawn from the conditioned space and the source strength of these particles is the same whether the return air is ducted or an architectural plenum. In both cases, the air will be filtered at the air handler before the recirculated air is supplied to the space, so in both cases, this is generally a non-issue from an indoor air quality perspective. Particle challenges from outdoor ventilation air are usually much greater."

Another paper, "Building Cavities Used as Ducts: Air Leakage Characteristics and Impacts in Light Commercial Buildings" from the Florida Solar Energy Center found that positively pressurized building cavities had a negative impact on air leakage and efficiency, but they conclude that: "… building cavities should not, as a general rule, be used as a part of the air distribution system. The exception is use of ceiling space return plenums. Ceiling plenums can be designed to operate at near neutral pressure with respect to outdoors and therefore can experience little or no duct leakage." Note that Section 602.1 already disallows positively pressurized gypsum board ducts.

Another paper, "Impact of Air Return Strategy on Building Energy Consumption And Indoor Air Quality" found that ducted return "consumed on average roughly 7.5%" more fan energy than plenum return systems and detailed modeling and field testing refuted the notion that indoor air quality was negatively affected by use of return air plenums. In conclusion, this change proposal to disallow the use of concealed architectural spaces as air plenums has not been justified based on health and safety reasons yet there is substantial evidence that this change will increase energy usage and installation costs.

Mark Terzigni (SMACNA SOCAL):
The proposed change as submitted would eliminate all return plenums. After consulting with a number of design-build contractors it was evident that the consensus is that there are scenarios where a ducted return is simply not applicable or is not the ideal solution. It is also likely that by not permitting return plenums there would be an increase in energy consumption for many of the applications. In other words it would take more fan power to move the air. If there are specific scenarios the original proponent wants to exclude then I would suggest more specific language. This proposal completely removes a common and longstanding approach to HVAC design. There are valid cases for not allowing return plenums, but the original language already addressed that by having an exception for healthcare.

Chad Herrick (Western Allied Corporation):
Eliminating plenums will require ducted return in most commercial applications. This will add cost and energy consumption too ALL or most jobs with no known benefit.

Bryan Boyce (Energy Solutions, The Statewide CASE Team):
The California Statewide Utility Codes and Standards Enhancement (CASE) Team appreciates the opportunity to submit comments to the International Association of Pluming and Mechanical Officials (IAPMO) regarding 2027 updates to the Uniform Mechanical Code (UMC). The CASE initiative presents recommendations in support of the CEC's efforts to update the Energy Code with new or updated requirements for various technologies. The three California Investor-Owned Utilities (IOUs) — Pacific Gas and Electric Company, San Diego Gas and Electric, and Southern California Edison — and two Publicly Owned Utilities — Los Angeles Department of Water and Power and Sacramento Municipal Utility District— sponsored this effort. The program goal is to submit proposals that result in cost-effective enhancements to improve energy efficiency, energy performance, and GHG emissions reductions in California buildings.

The UMC is an important element of the California building code since Title 24 Part 4 (the mechanical code) is based on the UMC. The Statewide CASE Team opposes the proposed updates contained within Item Number 107. It is our view that this new requirement would increase costs and decrease the energy efficiency performance of HVAC systems that would be impacted by the change. The substantiation for the revision of Section 602.1 provides no published research or even anecdotal data to describe, let alone quantify, how prohibiting the use of concealed spaces as plenums would improve the "protection of the public health, safety, and welfare"—the stated purpose of the Uniform Mechanical Code in Section 101.3.

This proposal would effectively eliminate the use of architectural plenums for return air. In commercial applications with steel and concrete structures, plenum returns are by far the norm and they have been used without any known health and safety issue for multiple decades. Unducted return air systems can use ceiling plenums (i.e. a concealed space) or occupied space (i.e. an unconcealed space) to return air to a central air handling unit. This proposal eliminates the use of concealed spaces for return air; using occupied spaces to create a return path is still possible. In most applications in commercial buildings, this requires the use of corridors to connect multiple spaces, but corridors shall not be used as return ducts per UMC Section 602.7. This leaves no other option than a fully ducted return system in most cases. There is unlikely to be more than a handful of large commercial buildings with fully ducted return systems in the entire country.

In all cases, fully ducted return systems use more energy and are more expensive to construct compared to unducted plenum returns. Therefore, this proposal would increase energy use and installation costs for a substantial percentage of commercial buildings with no known health or safety benefit by disallowing the use of plenums for return air. The attached ASHRAE Journal article, "Return Air Systems" compares architectural return air plenums to ducted return systems.

As the article outlines, the relevant benefits of using a plenum return air system are:

> 1) reduced fan energy costs of about 20% to 30% due to the much lower pressure drop of the plenum return system, and reduced fan energy in systems with outdoor air or relief fans in lieu of less efficient return fans, which are generally required when return air is fully ducted, and
>
> 2) reduced HVAC system costs of about $3 to $5 per square foot [in 2015 dollars], about 10% to 20% of the total HVAC system cost.

This article also addresses potential indoor air quality issues related to humidity and dust/particles in the plenum. Per the article, issues with humidity “can be avoided by simply not allowing the architectural plenums to become negatively pressurized relative to outdoors” which is easily achievable during design and implementation with modern building automation systems.

The article also notes that “a ceiling return air plenum that has been used for a few years could have substantial dust accumulation on plenum surfaces. But return air ducts could have a similar or even thicker layer of dust. The dust “challenge” for both are particles drawn from the conditioned space and the source strength of these particles is the same whether the return air is ducted or an architectural plenum. In both cases, the air will be filtered at the air handler before the recirculated air is supplied to the space, so in both cases, this is generally a non-issue from an indoor air quality perspective. Particle challenges from outdoor ventilation air are usually much greater.”

Additionally, the article highlights adverse impacts on the building design related to the need to increase the space between floors or drop ceilings to accommodate ductwork, not only impacting the costs to the HVAC system but also additional materials (and hence costs) to the building envelope. There is also a potential for impact to the plumbing and sprinkler piping (i.e., an increase in cost and design complexity), and adding the need for balancing contractors.

Another paper, “Building Cavities Used as Ducts: Air Leakage Characteristics and Impacts in Light Commercial Buildings” from the Florida Solar Energy Center found that positively pressurized building cavities had a negative impact on air leakage and efficiency, but they conclude that: “… building cavities should not, as a general rule, be used as a part of the air distribution system. The exception is use of ceiling space return plenums. Ceiling plenums can be designed to operate at near neutral pressure with respect to outdoors and therefore can experience little or no duct leakage.” Note that Section 602.1 already disallows positively pressurized gypsum board ducts.

Another paper, “Impact of Air Return Strategy on Building Energy Consumption And Indoor Air Quality” found that ducted return “consumed on average roughly 7.5%” more fan energy than plenum return systems and detailed modeling and field testing refuted the notion that indoor air quality was negatively affected by use of return air plenums. In conclusion, this change proposal to disallow the use of concealed architectural spaces as air plenums has not been justified based on health and safety reasons yet there is substantial evidence that this change will increase energy usage and installation costs, therefore, we believe the proposed change should be rejected. We would like to again thank IAPMO for the opportunity to comment on this proposed code change.

Committee Action:
Reject

Committee Statement:
Public Comment #5 fails to present new technical evidence or address the issues identified in the original proposal. The claim that open return plenums have a long history of acceptable performance has been previously reviewed and was not adopted. While the comment suggests that infiltration can be mitigated through precise pressure control, real-world conditions often present challenges such as imperfect balancing and variations in building envelope integrity. Additionally, the comparison between dust accumulation in ducts and open plenums does not fully consider that duct systems are designed to be accessible for cleaning, whereas open plenums typically are not.

TOTAL ELIGIBLE TO VOTE:
28

AFFIRMATIVE:	NEGATIVE:	ABSTAIN:	NOT RETURNED:
21	5	1	1

EXPLANATION OF NEGATIVE:
BOLOUS: See my comment under Item #107 PC 01.

KOERBER: I disagree with the TC as I believe there are valid circumstances where concealed spaces should be allowed as ducts or plenums.

TERZIGNI: See my comments under Item #107 PC 01 through PC 03.

TRAFTON, P: See my comment under Item #107 PC 01. As noted, this would increase energy use, add to the carbon footprint, and raise first costs enough to shift some designs toward less sheet metal intensive systems.

WHITE: There are many arguments put forth as to the horrible issues with plenum returns and gypsum. If these were correct, buildings would be failing everywhere, systems would not work, utility costs would skyrocket, and no one would do this. Are there bad installations? Yes. Are those bad installations code compliant? Probably not. This is an overreach and puts the UMC at a disadvantage.

EXPLANATION OF AFFIRMATIVE:
ZEEDYK: See my comment under Item #107 PC 01.

EXPLANATION OF ABSTAIN:
WINSTEAD: I am abstaining due to the range of technical considerations and differing viewpoints presented throughout the comment process. While the proposal seeks to address code clarity, the issue involves multiple factors related to design practice, system performance, and construction impacts that present differing perspectives within the industry.

VOTES NOT RETURNED:
Trevino

Comment 6

Item #:	Code Number:	Sections(s):
107	2024 UMC	602.2, 603.2, 608.1, 608.4

Submitter Name:	Organization Name:	Organization Representation:
Austin Jones	Chair, UMC Code Change Review Task Group	

Recommendation:
Accept the Proposal as Modified

Proposed Text:

Request to accept the code change proposal <u>as modified</u> by this public comment.

602.0 Material.

602.2 Combustibles Within Ducts or Plenums. Materials exposed within ducts or plenums shall be noncombustible or shall have a flame spread index not to exceed 25 and a smoke-developed index not to exceed 50, where tested as a composite product in accordance with ASTM E84 or UL 723. Plastic piping installed in plenums shall be tested in accordance with all requirements of ASTM E84 or UL 723. Mounting methods, supports and sample sizes of materials for testing that are not specified in ASTM E84 or UL 723 shall be prohibited.
Exceptions:
~~(1) Return air and outside air ducts, plenums, or concealed spaces that serve single family residential occupancies.~~
(2)-(10) (remaining text unchanged)

603.0 Installation of Ducts.

603.2 Under-Floor or Crawl Space. Air ducts installed under a floor in a crawl space shall be ~~installed~~ in accordance with the following:
(1) Shall not prevent access to an area of the crawl space.
(2) Where it is required to move under ducts for access to areas of the crawl space, a vertical clearance of not less than 18 inches (457 mm) shall be provided.
(3) Ducts materials shall be in accordance with Section 602.2 through Section 602.4.

608.0 Use of Under-Floor Space as Supply Plenum for Dwelling Units.
608.1 General. An under-floor space shall be permitted to be used as a supply plenum where constructed of materials in accordance with Section 602.2 through Section 602.4.

~~**608.4 Flammable Materials.** The enclosing material of the under-floor space, including the sidewall insulation, shall be not more flammable than 1 inch (25.4 mm) (nominal) wood boards (flame-spread index of 200). Installation of foam plastics is regulated by the building code.~~

(renumber remaining sections)

(shown for information purposes only)

602.2.1 Electrical. Electrical wiring in plenums shall comply with NFPA 70. Electrical wires and cables which are insulated or jacketed, and optical fiber cables which are not enclosed in raceways, shall be listed and labeled for use in plenums and shall have a flame spread distance not exceeding 5 feet (1524 mm), an average optical density not exceeding 0.15, and a peak optical density not exceeding 0.5, where tested in accordance with NFPA 262.
602.2.2 Fire Sprinkler Piping. Nonmetallic fire sprinkler piping in plenums shall be listed and labeled for use in plenums and shall have a flame spread distance not exceeding 5 feet (1524 mm), an average optical density not exceeding 0.15 and, a peak optical density not exceeding 0.5, where tested in accordance with UL 1887.
602.2.3 Pneumatic Tubing. Nonmetallic pneumatic tubing in plenums shall be listed and labeled for use in plenums and shall have a flame spread distance not exceeding 5 feet (1524 mm), an average optical density not exceeding 0.15, and a peak optical density not exceeding 0.5, where tested in accordance with UL 1820.
602.2.4 Discrete Products in Plenums. Discrete products in plenums with exposed combustible material shall be listed and labeled for use in plenums and shall have a peak heat release rate not exceeding 100 kW, a peak optical density not exceeding 0.50, and an average optical density not exceeding 0.15, where tested in accordance with UL 2043.
602.2.5 Interior Finishes. Foam plastics used for interior finishes of plenums shall have a flame spread index not to exceed 25 and a smoke-developed index not to exceed 50, where tested at the thickness and density intended for

installation in accordance with ASTM E84 or UL 723.
Exception: Foam plastics used for interior finishes of plenums shall be permitted to have a flame spread index not to exceed 75 and a smoke-developed index not to exceed 450, where tested at the thickness and density intended for installation in accordance with ASTM E84 or UL 723 and where the interior finish is separated from airflow by one of the following means:
(1) Corrosion resistant steel having a thickness of not less than 0.0160 inch (0.4064 mm).
(2) Masonry or concrete having a thickness of not less than 1 inch (25.4 mm).
(3) An approved thermal barrier in accordance with NFPA 90A or the building code.
602.3 Metallic. Ducts, plenums, or fittings of metal shall comply with SMACNA HVAC Duct Construction Standards – Metal and Flexible. Flexible metallic ducts shall comply with UL 181.
602.4 Nonmetallic Ducts. Nonmetallic ducts shall comply with Section 602.4.1, Section 602.4.2, Section 602.4.3, Section 602.4.4, or Section 602.4.5.
602.4.1 Phenolic. Phenolic duct, plenum, or fitting material shall comply with UL 181. Ducts, plenums, or fittings of phenolic shall be constructed in accordance with SMACNA Phenolic Duct Construction Standards or the conditions of its listing.
602.4.2 Gypsum. Where gypsum products are exposed in ducts or plenums, the air temperature shall be restricted to a range from 50°F (10°C) to 125°F (52°C), and moisture content shall be controlled so that the material is not adversely affected. All gypsum products shall have a mold or mildew resistant surface. For the purpose of this section, gypsum products shall not be exposed in supply ducts. Gypsum products used as a duct, plenum, or fitting shall be listed and labeled. Gypsum products shall be constructed per an adopted duct construction standard.
602.4.3 Air Dispersion Systems. Air dispersion systems shall be listed and labeled in accordance with UL 2518 and installed in accordance with Section 603.11.
602.4.4 Fibrous Glass. Fibrous glass ducts, plenums, or fittings shall be constructed in accordance with SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards. Fibrous glass duct and fitting materials shall comply with UL 181.
602.4.5 Other Materials. Flexible and rigid ducts, plenums, or fittings for use in heating, ventilation, and air conditioning systems of other nonmetallic materials listed and labeled to UL 181 shall be permitted.
Exception: Plastic ducts shall comply with Section 603.4.

Substantiation:
This public comment is needed to resolve conflicting requirements between Section 602.1 (General), Section 602.2 (Combustibles Within Ducts or Plenums), and Section 608.0 (Use of Under-Floor Space as Supply Plenum for Dwelling Units).

During the proposal stage, the requirements for duct systems in Section 602.1 were updated to prohibit the use of concealed spaces as ducts or plenums. However, Section 602.2 currently provides an exception for materials exposed within ducts or plenums and is applicable to concealed spaces in residential occupancies, and Section 608.4 (Flammable Materials) provides material requirements for under-floor spaces in dwelling units used as supply plenums.

Therefore, Section 602.2 Exception (1) and Section 608.4 are being deleted, and Section 608.1 (General) is being revised to reference the existing material requirements for ducts and plenums in Section 602.2 through Section 602.4. Additionally, the Task Group determined that it was necessary to revise Section 603.2 (Under-Floor or Crawl Space) to reference Section 602.2 through Section 602.4 as this would ensure that only approved materials are used as ductwork.

For reference, the 2024 UMC TC approved amendments to Section 602.1 which prohibited the use of concealed spaces as ducts or plenums. [See 2022 UMC ROC Item #138 (Public Comment 1).] This decision followed the IAPMO Board of Directors' review of Standards Council Decision Docket #09-24.

The focus of the Standards Council's decision was on Section 602.2 (Combustibles within Ducts or Plenums), specifically Exception 1, which previously exempted concealed spaces in dwelling units from the requirements for combustibles within ducts or plenums. This exemption raised concerns about potential confusion and contradictory directives in enforcing the UMC, specifically regarding the use of concealed spaces as ducts or plenums.

Consequently, the Board recognized an extraordinary circumstance necessitating action to resolve this conflict within the code. Their resolution was to maintain the current state of Section 602.1, effectively not incorporating the proposed changes.

Committee Action:
Accept As Submitted

TOTAL ELIGIBLE TO VOTE:
28

AFFIRMATIVE:	NEGATIVE:	ABSTAIN:	NOT RETURNED:
21	5	1	1

EXPLANATION OF NEGATIVE:
BOLOUS: See my comment under Item #107 PC 01.

KOERBER: The comment should have been rejected. This proposal puts the UMC widely different from the referenced standards, such as NFPA 90A and NFPA 90B.

TERZIGNI: See my comments under Item #107 PC 01 through PC 03.

TRAFTON, P: See my comment under Item #107 PC 01. As noted, this would increase energy use, add to the carbon footprint, and raise first costs enough to shift some designs toward less sheet metal intensive systems.

WHITE: There are many arguments put forth as to the horrible issues with plenum returns and gypsum. If these were correct, buildings would be failing everywhere, systems would not work, utility costs would skyrocket, and no one would do this. Are there bad installations? Yes. Are those bad installations code compliant? Probably not. This is an overreach and puts the UMC at a disadvantage.

EXPLANATION OF AFFIRMATIVE:
ZEEDYK: See my comment under Item #107 PC 01.

EXPLANATION OF ABSTAIN:
WINSTEAD: I am abstaining due to the range of technical considerations and differing viewpoints presented throughout the comment process. While the proposal seeks to address code clarity, the issue involves multiple factors related to design practice, system performance, and construction impacts that present differing perspectives within the industry.

VOTES NOT RETURNED:
Trevino

Comment 7

Item #:	Code Number:	Sections(s):
107	2024 UMC	205.0, 206.0, 218.0

Submitter Name:	Organization Name:	Organization Representation:
Austin Jones	Chair, UMC Code Change Review Task Group	

Recommendation:
Accept the Proposal as Modified

Proposed Text:

Request to accept the code change proposal as modified by this public comment.

205.0 - C -
Concealed Spaces. That portion(s) of a building behind walls, over suspended ceilings, in pipe chases, attics, and elsewhere whose size might normally range from 1¾ inch (44 mm) stud spaces to 8 foot (2438 mm) interstitial truss spaces and that might contain combustible materials such as building structural members, thermal, electrical insulation, or both, and ducting. ~~Such spaces have sometimes been used as HVAC plenum chambers.~~

206.0 - D -
Duct. A tube or conduit for transmission of air, fumes, vapors, or dust. This definition ~~shall~~does not include:
(1) A vent, vent connector, or chimney connector.
(2) A tube or conduit wherein the pressure of the air exceeds 1 psi (7 kPa).
(3) The air passages of listed self-contained systems.
(4) Occupiable spaces.

218.0 - P -
Plenum. An air compartment or chamber, constructed of duct materials, including uninhabited crawl space areas above a ceiling or below a floor, including air spaces below raised floors of computer/data processing centers or attic spaces, to one or more ducts are connected and that forms part of either the supply-air, return-air, or exhaust-air system, other than the occupiable space being conditioned.

Substantiation:
Occupiable spaces, by definition, are intended for human occupation and activities, not for functioning as conduits for air conveyance. Ducts, on the other hand, are specifically designed and constructed to transport air, fumes, vapors, or dust in a controlled manner as part of an HVAC or ventilation system. As described in the definition for “plenum,” occupiable spaces are not treated as part of the air distribution system but rather as spaces that are served by the system. Therefore, “occupiable spaces” are being added to the list of exclusions for ducts.

During the proposal stage, requirements for duct systems in Section 602.1 (General) were updated to prohibit the use of concealed spaces as ducts or plenums. To ensure consistency and avoid conflicts with these updates, the definition of “concealed space” is being revised to remove the statement: “Such spaces have sometimes been used as HVAC plenum chambers.”

Furthermore, plenums are now required to be constructed of duct materials in accordance with Section 602.3 (Metallic) and Section 602.4 (Nonmetallic Ducts), and to further clarify this distinction and align with the updates made to Section 602.1, the definition for “plenum” is being revised.

[2024 UMC]
206.0 - D -
Duct System. *A continuous passageway for the transmission of air and vapors that, in addition to the containment components themselves, might include duct fittings, dampers, plenums, other items, and air-handling equipment. [NFPA 96:3.3.20]*

217.0 - P -
Occupiable Space. *An enclosed space intended for human activities, excluding spaces that are intended to be occupied occasionally and for short periods of time, such as storage rooms, equipment rooms, and emergency exitways. [ASHRAE 62.1:3.1]*

Committee Action:
Accept As Submitted

TOTAL ELIGIBLE TO VOTE:
28

AFFIRMATIVE:	NEGATIVE:	ABSTAIN:	NOT RETURNED:
21	5	1	1

EXPLANATION OF NEGATIVE:
BOLOUS: See my comment under Item #107 PC 01.

KOERBER: The comment should have been rejected. The definitions are at odds with those in current standards referenced in the code including, but not limited to, NFPA 90A and NFPA 90B.

TERZIGNI: See my comments under Item #107 PC 01 through PC 03.

TRAFTON, P: See my comment under Item #107 PC 01. As noted, this would increase energy use, add to the carbon footprint, and raise first costs enough to shift some designs toward less sheet metal intensive systems.

WHITE: These changes are unrelated to the original proposal and should not have been considered. The language is poorly written, and replacing "shall" with "does" does not improve the code. Adding the phrase "constructed of duct materials" in reference to crawlspaces is confusing. In fact, the entire definition is confusing and poorly written.

EXPLANATION OF AFFIRMATIVE:
ZEEDYK: See my comment under Item #107 PC 01.

EXPLANATION OF ABSTAIN:
WINSTEAD: I am abstaining due to the range of technical considerations and differing viewpoints presented throughout the comment process. While the proposal seeks to address code clarity, the issue involves multiple factors related to design practice, system performance, and construction impacts that present differing perspectives within the industry.

VOTES NOT RETURNED:
Trevino

Item #:
109

Code Number:
2024 UMC

Section Number:
602.5.2

SUBMITTER:
Robert Kuks

Organization Name:
Sheet Metal Workers Local Union 104

Organization Representation:
Business Representative

RECOMMENDATION:
Revise text

APPEAL NO. 03-27
UMC ITEM #109

Proposed Text :

602.0 Material.

602.5 Nonmetallic Ducts. (remaining text unchanged)

602.5.2 Gypsum. Where gypsum products are exposed in ducts or plenums, the air temperature shall be restricted to a range from 50°F (10°C) to 125°F (52°C), and moisture content shall be controlled so that the material is not adversely affected. All gypsum products shall have a mold or mildew resistant surface. For the purpose of this section, gypsum products shall not be exposed in supply ducts. Gypsum products used as a duct, plenum, or fitting shall be listed and labeled. Gypsum products shall be constructed per an adopted duct construction standard.

SUBSTANTIATION:
According to Section 602.5 (Nonmetallic Ducts), it is required that all nonmetallic ducts must conform to one of the following specific sections: 602.5.1, 602.5.2, 602.5.3, 602.5.4, or 602.5.5. Unlike other nonmetallic ducts under Section 602.5, gypsum is not currently mandated to comply with UL 181, be listed and labeled, or constructed according to a recognized construction standard.

To ensure the safety and suitability of gypsum for use as a nonmetallic duct, it is recommended that gypsum be subjected to the same requirements of compliance, listing and labeling, or conformance to construction standards as other nonmetallic duct materials or systems. If gypsum does not meet these criteria through either compliance, listing and labeling, or conformance to an industry-recognized construction standard, its usage as a nonmetallic duct should be prohibited until such standards are achieved. While Section 602.5.4 (Fibrous Glass Duct) does not require the material to be listed and labeled, it must instead be constructed in accordance with adopted construction standards. Fibrous glass duct and its construction components are listed under UL 181.

Additionally, Section 602.5 concerning gypsum presents an inconsistency when compared to the requirements outlined in Section 603.7.3 (Other Ducts). Specifically, Section 603.7.3 mandates that approved ducts must be supported according to the manufacturer's installation instructions. Section 603.7.3 appears to grant an undocumented exception to Section 603.7 (Support of Ducts) for gypsum due to the absence of documented manufacturer’s installation instructions for use as a duct system, differentiating it from the rules applicable to the other duct materials.

Committee Action:
Accept As Submitted

TOTAL ELIGIBLE TO VOTE:
28

AFFIRMATIVE:	NEGATIVE:	ABSTAIN:	NOT RETURNED:
27	1	0	0

EXPLANATION OF NEGATIVE:
WHITE: I do not agree, particularly on the return air side of systems. What is the difference for gypsum products in a room touching what will be the return air and the gypsum product touching the return air on its way to an air handler? Certainly, there are misapplications of this product just like many other products in use today A gypsum duct from a shower room is not good. Will some inspector claim all gypsum products now have to meet some standard to touch the air in the room? The last sentence now makes all gypsum products meet some duct standard There will be an inspector out there that will cite this as a basis for rejection of interior walls.

EXPLANATION OF AFFIRMATIVE:
KOERBER: I agree with the intent of the proposal and the TC decision to accept it. The goal appears to lead the industry toward the development of standards and installation procedures when gypsum products are used for duct, plenum, or fitting construction.

One minor wording change recommended for the last sentence as follows: replace the word "products" with "ducts, plenums, and fittings" to clarify that it is the ducts, plenums, and fittings intended to be constructed per an adopted standard and not the gypsum board itself. I expect that was the intent.

Comment 1

Item #:	Code Number:	Sections(s):
109	2024 UMC	602.4.2

Submitter Name:	Organization Name:	Organization Representation:
Joe Arnstein	Taylor Engineers	

Recommendation:
Reject the Code Change Proposal

Proposed Text:

Request to **reject** the code change proposal by this public comment.

Substantiation:
This code revision would require gypsum products used as a duct, plenum, or fitting to be "listed and labeled." However, there is no definition of the test method on which these products should be listed. Does this mean that gypsum products tested per ASTM C473 (Standard Test Methods for Physical Testing of Gypsum Panel Products) are acceptable? Or is the intent of the revision to reference a test method that has yet to be developed?

Without precise references to the required test methods, this vague language will create confusion for both designers and AHJs. While the intent may be to push the industry to develop standard test methods, this approach is putting the cart before the horse. A test method should first be developed, at which point it can be adopted into the code.

The same logic applies to the proposed requirement that gypsum products "shall be constructed per an adopted duct construction standard." To which duct construction standard does this language refer? Potentially none. If no such standard exists, one should first be adopted by the UMC before referencing it in the code.

Some may interpret this language as prohibiting gypsum materials until these standards are developed. However, the substantiation does not provide empirical data to justify prohibiting the use of gypsum while a test method for gypsum duct/plenum construction is being developed.

In reality, the use of gypsum as a duct or plenum material is already strictly regulated. Section 602.1 of the 2024 UMC prohibits the use of gypsum board for positive pressure ducts, meaning gypsum board can only be used in exhaust and return applications. Additionally, Section 602.5.2 of the 2024 UMC requires the air temperature in contact with gypsum to be "restricted to a range from 50°F to 125°F, and the moisture content shall be controlled so that the material is not adversely affected." As a result, the use of gypsum plenums is already prohibited in applications involving unconditioned air (e.g., garage exhaust) and humid air (e.g., shower exhaust).

In effect, gypsum could only be used as a duct for return and relief applications, both of which are low-risk from a safety and welfare perspective and have been in use for decades.

Committee Action:
Reject

Committee Statement:
Item #109 Public Comment #1 is being rejected because the test methods and duct construction standards have already been clearly established and are consistently applied to other nonmetallic ducts under Section 602.4 (Nonmetallic Ducts).

TOTAL ELIGIBLE TO VOTE:
28

AFFIRMATIVE:	NEGATIVE:	ABSTAIN:	NOT RETURNED:
28	0	0	0

EXPLANATION OF AFFIRMATIVE:
ZEEDYK: See my comment under Item #107 PC 01.