

How Vinyl Window & Door Products Meet the Unique Goals of Multifamily Housing Projects



AIA Best Practices

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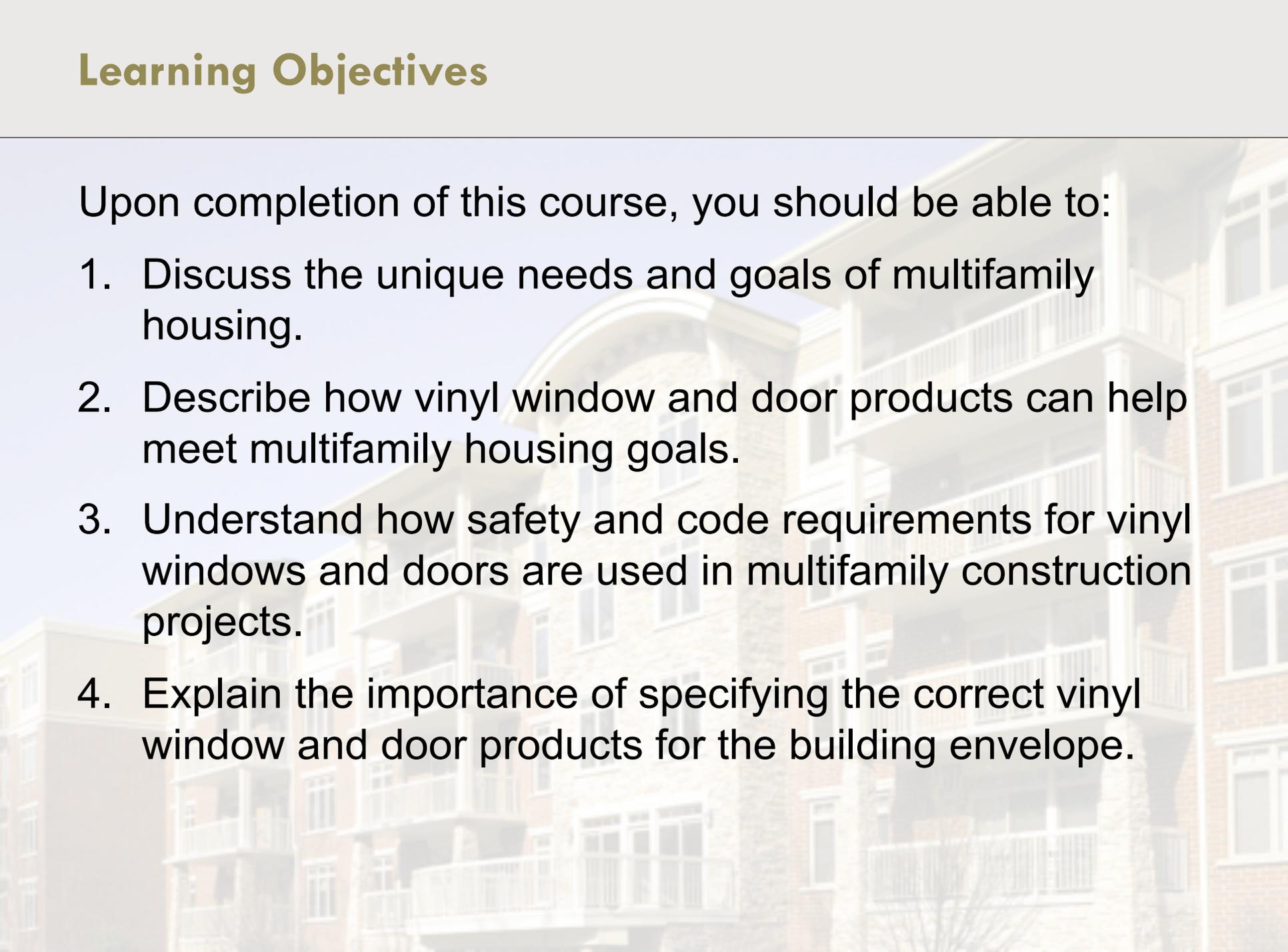
Course Description

Multifamily housing construction presents an array of design and code challenges. These include the need to balance safety and accessibility issues with occupant comfort and design appeal. Energy efficiency and environmental stewardship are also key considerations.

This course will explore the benefits of using vinyl window products to meet the unique goals of multifamily housing. It will also provide guidelines to help architects specify vinyl window systems that best meet a project's performance, aesthetic needs, and budget criteria while benefitting owners, occupants, and the environment.

Learning Objectives

Upon completion of this course, you should be able to:

1. Discuss the unique needs and goals of multifamily housing.
 2. Describe how vinyl window and door products can help meet multifamily housing goals.
 3. Understand how safety and code requirements for vinyl windows and doors are used in multifamily construction projects.
 4. Explain the importance of specifying the correct vinyl window and door products for the building envelope.
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Market Trends in Multifamily Housing



- The number of renters has increased by 23 million over the past 10 years.
- Renters are now the majority in 42 of the U.S. states.

Multifamily Housing Market Gets Competitive

- More choices available to consumers
 - Increased risk of owner liability
 - Greater demand on developers to meet market expectations
 - Balance the needs of tenants and owners
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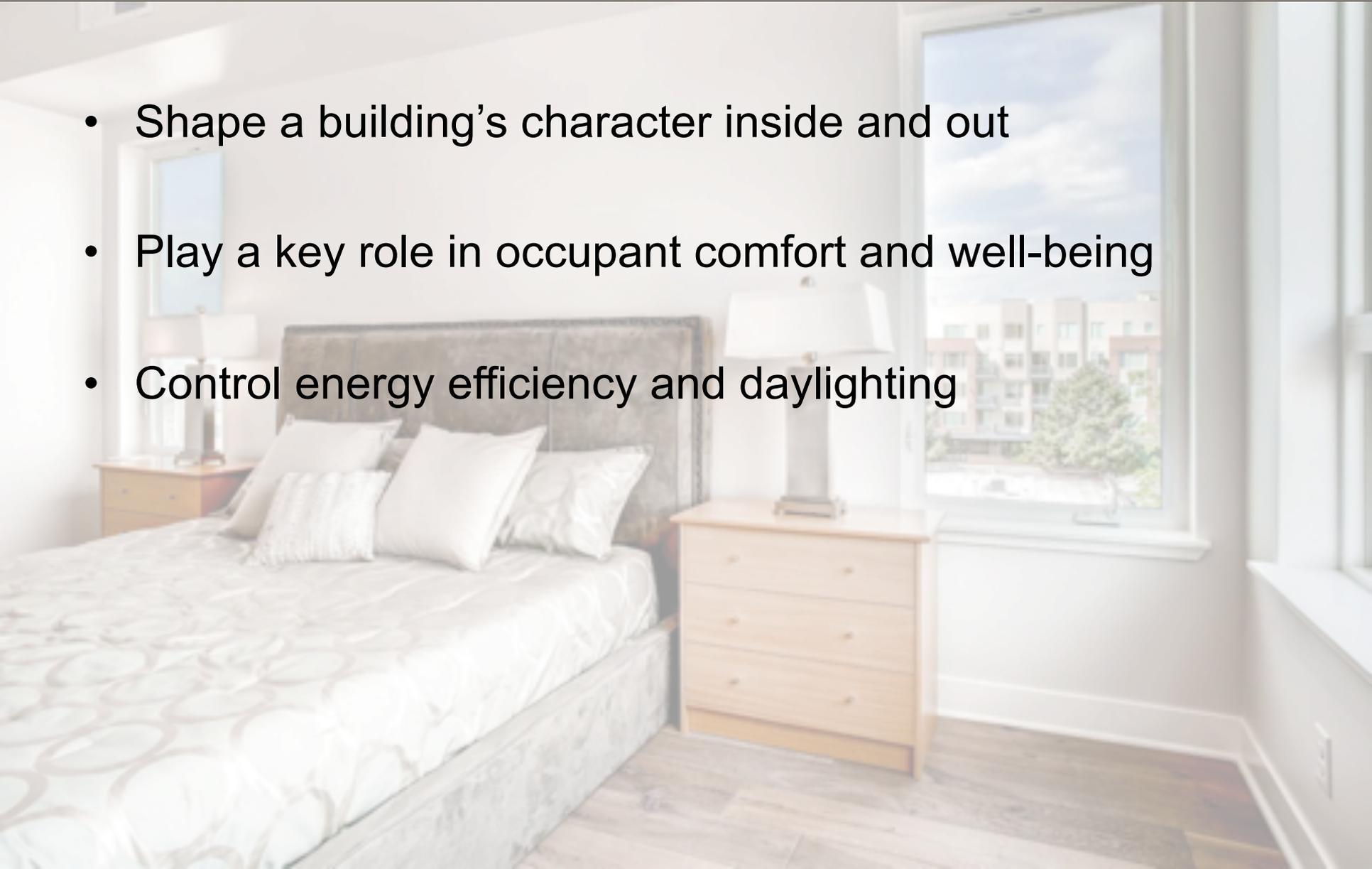
Occupant Expectations

- **Privacy**
- **Sound control**
- **Thermal comfort**
- **Energy efficiency**
- **Daylighting**
- **Safety and security**



Windows and Doors as Significant Design Elements

- Shape a building's character inside and out
- Play a key role in occupant comfort and well-being
- Control energy efficiency and daylighting



Multifamily versus Single-Family Projects

	Multifamily	Single Family
Liability	<ul style="list-style-type: none"> Elevated owner liability encompassing shared amenities Fire and access Waterproofing (mold and moisture control) Ordinance or law (loss or increased cost due to enforcement of any ordinance or law involving repair or construction)* <p><small>*Source: adjustersinternational.com/publications/adjusting-today/multi-family-complexes-insuring-exposures-and-losses/0</small></p>	<ul style="list-style-type: none"> Standard homeowners insurance covering personal property, fire, flood (depending on region)
Codes & Regulations	<ul style="list-style-type: none"> ADA for accessibility Fire safety STC for sound transmission AAMA and ASTM certification for material properties (e.g., windows/doors) Environmental standards Local codes (e.g., earthquake, CA Title 42) 	<ul style="list-style-type: none"> Construction codes vary by state Owners/occupants do not have to meet stringent codes aimed at public/multifamily housing
Performance Demands	<ul style="list-style-type: none"> Durability of systems and materials for higher occupancy Privacy Air quality Energy conservation for lower utility costs Daylighting 	<ul style="list-style-type: none"> Owners upkeep and repair at own discretion Less wear and tear due to low occupancy

Role of Windows in Curb Appeal

- Influence property value
- Affect property sales and leasing success
- Contribute to a building's maintenance and operations costs

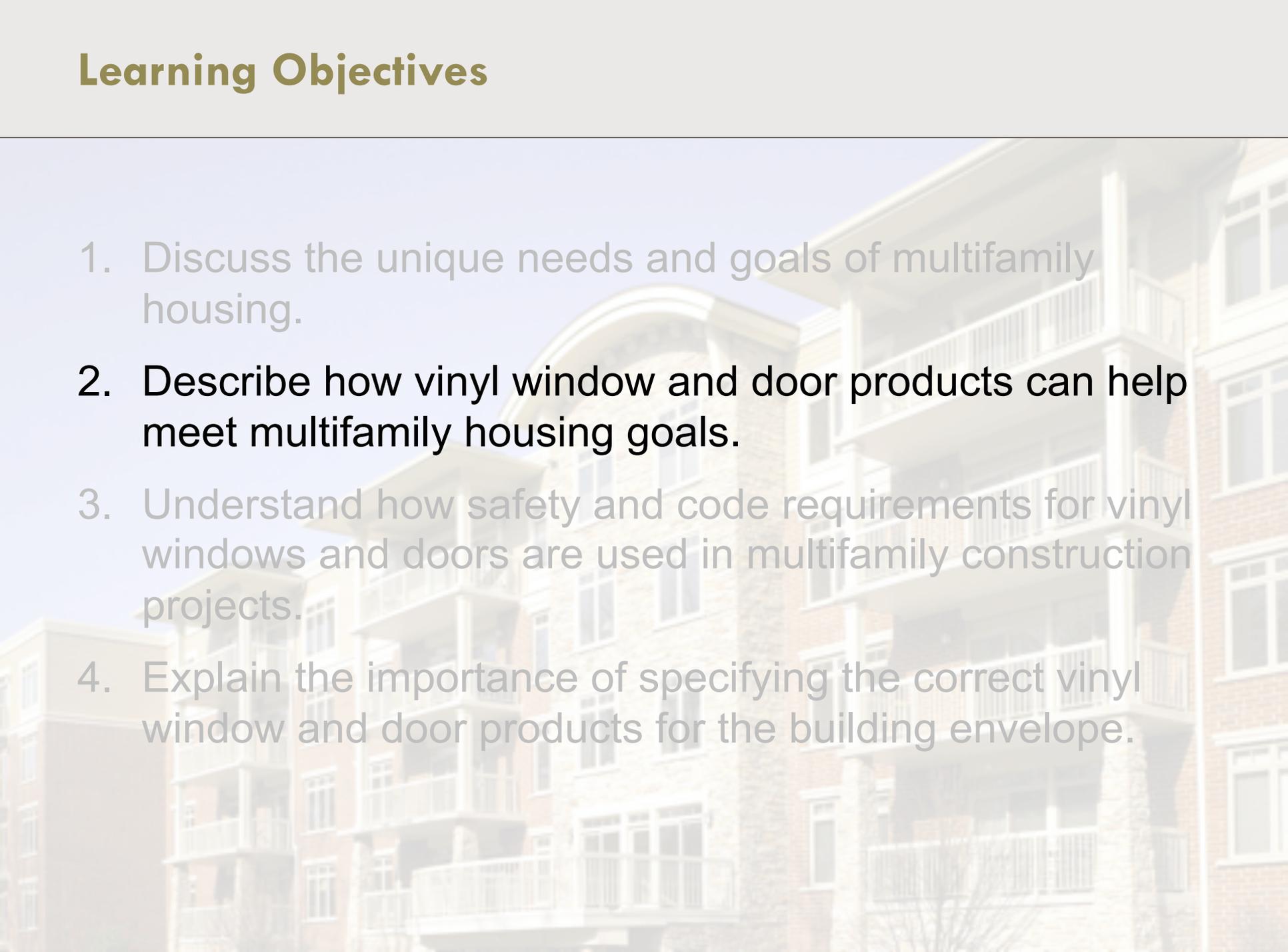


A Greening Market

- Government and utility incentives
- Property prestige
- Energy conservation
- Customers pay more for green apartments or condos



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- A multi-story brick apartment building with balconies and large windows, serving as the background for the text.

Why Vinyl Windows and Doors for Multifamily Construction

- Meet multifamily construction criteria, including ADA codes, STC codes, tempering of windows, safety, etc.
- Address aesthetic, comfort, efficiency, and safety considerations
- Increase performance and perceived value of property



Vinyl Frame Composition

- Quality levels differ based on manufacturer
- Vinyl recipe affects performance and appearance
- Testing of physical properties (e.g., AAMA and ASTM) ensures quality and consistency



Design Flexibility

- Moldable, bendable, and flexible material
- Custom designs and array of shapes and finishes
- High-tech coating technologies for superior performance and durability



Durability and Weather Resistance



- Maintenance free
- Resistant to moisture, pollutants, and insect infestations
- Impervious to fading, peeling, rotting, and blistering

Optimal Daylighting



Acoustic Comfort

- Reduced noise infiltration
- Acoustic privacy



Sound Transmission Class (STC) Factors



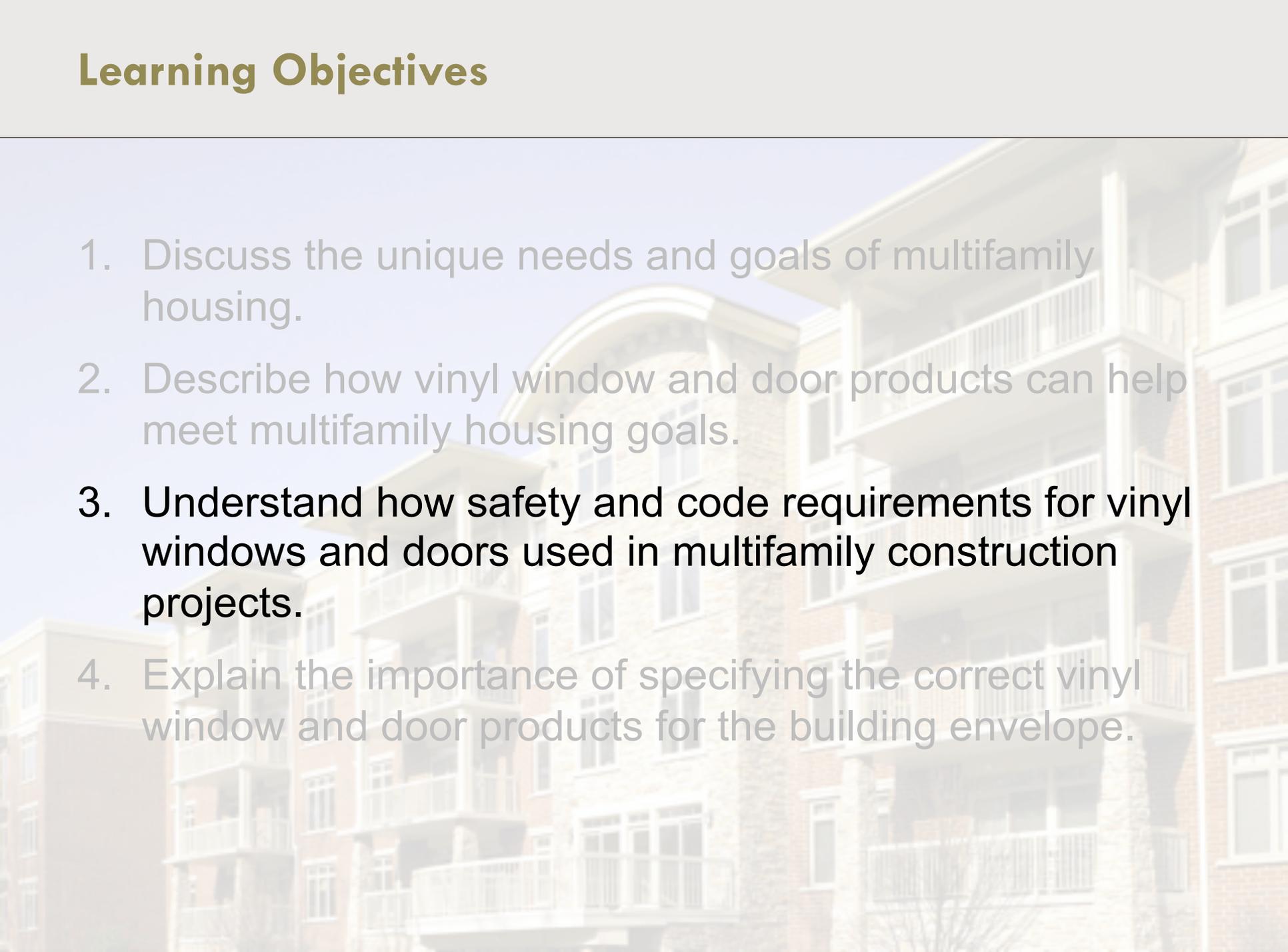
- Airspace
- Number of glazing layers
- Window pane spacing and thickness

Optimal Life-Cycle Costs

- Heating and cooling account for 56 percent of overall energy use in buildings
- Windows comprise large portion of thermal heat gains and losses
- High-performance vinyl windows have significant positive impact on life-cycle costs



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Codes and Quality

- Structural strength
- Deflection resistance
- Resistance to air and water leaks
- Impact resistance
- Thermal and acoustic insulation
- Safety



ADA Compliance and Accessibility

Addresses accessibility and safety standards in public access areas and main entries to units:

- Door and window handles must be easy to grasp with one hand and not require tight grasping, tight pinching, or twisting of the wrist. Also, these handles must need less than 5 pounds of force to operate.
- Hardware required for accessible door passage should be mounted below 48 inches from finished floor.

ADA Compliance and Accessibility Guidelines

- Door openings must be 32 inches wide at 90 degrees, measured between the face of the door and the opposite stop.
- When a window is 40 inches or less from floor, it needs to be both tempered and ADA compliant in case a wheelchair hits it.
- Windows and doors must have an accessibility reach range of 48 inches maximum and 15 inches minimum.

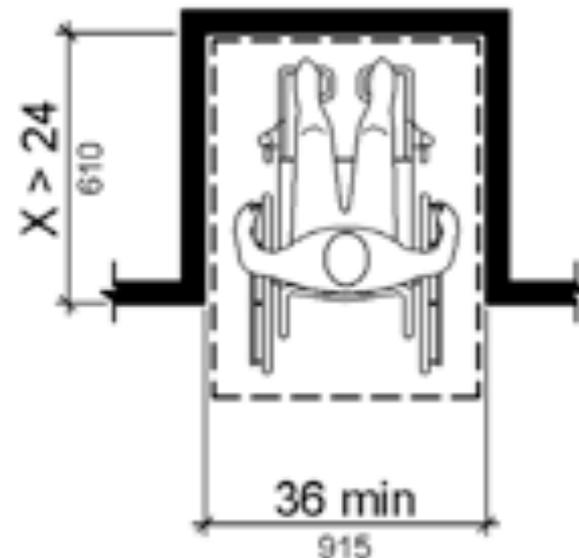
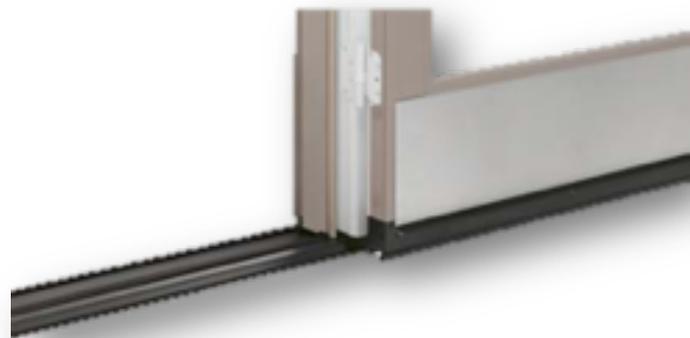


Figure 305.7.1: Maneuvering Clearance in an Alcove, Forward Approach



American National Standards Institute (ANSI)

Basic Type A features:

- Greater turning radiuses
- Lower shelving
- Lever type door hardware
- Accessible threshold throughout unit
- Lower kitchen workstations and lavatories



California Building Standards Code (Title 24)



Encompasses the following for windows and doors:

- 0.30 U-Factor
- 0.23 SHGC



CALIFORNIA
ENERGY COMMISSION

North American Fenestration Standard (NAFS)



American Society for Testing and Materials (ASTM)

Provides PVC testing protocols and specifications.

For example:

- ASTM D726: Standard Specification for Rigid PVC Exterior Profile Extrusions Used For Assembled Windows and Doors
- ASTM E2112: Standard Practice for Installation of Exterior Windows

American Architectural Manufacturers Association (AAMA)

Develops window and door performance standards.

Testing encompasses the following:

- Water penetration
- Air leakage
- Structural integrity
- Forced entry resistance



Window & Door Manufacturers Association (WDMA)

Defines the standards of excellence in the residential and commercial window, door, and skylight industry.

Examples of standards include:

- **WDMA-T.M 6-14:** Adhesive Durability – Test Method for Determining the Durability of Adhesive Used in Doors Under Accelerated Aging Conditions
- **WDMA 500-16:** Standard Practice for the Installation of Mounting Flange Windows into Walls Utilizing Foam Plastic Insulating Sheathing (FPIS) with a Separate Water-Resistive Barrier

National Fenestration Rating Council (NFRC)

Establishes window,
door, and skylight
energy performance

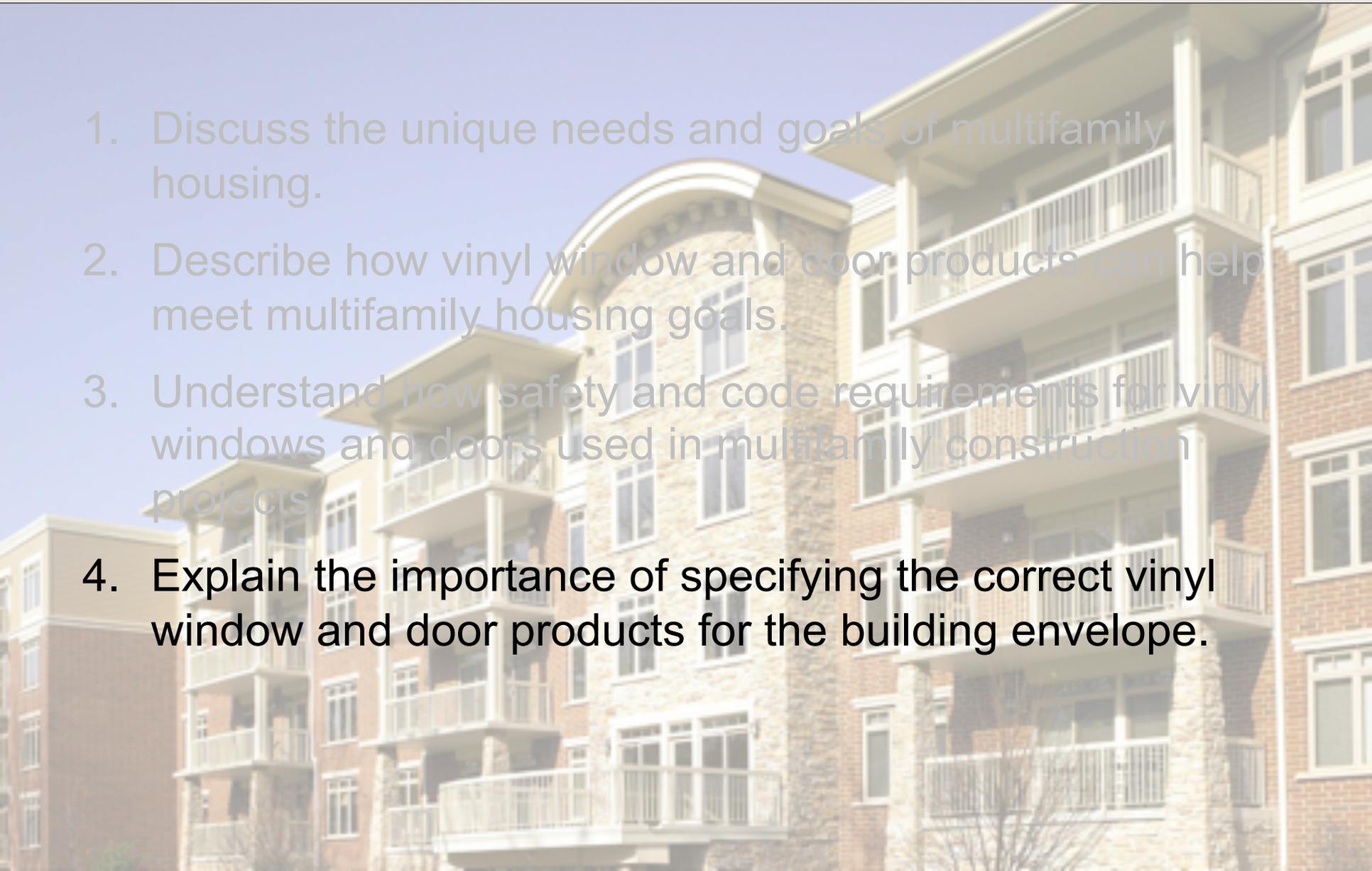
 National Fenestration Rating Council® CERTIFIED	World's Best Window Co. Series "2000" Casement Vinyl Clad Wood Frame Double Glazing • Argon Fill • Low E ABC-X-1-00001-00001
ENERGY PERFORMANCE RATINGS	
U-Factor (U.S. / I-P) 0.35	Solar Heat Gain Coefficient 0.32
ADDITIONAL PERFORMANCE RATINGS	
Visible Transmittance 0.51	Air Leakage (U.S. / I-P) ≤ 0.3
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. NFRC does not recommend any product and does not warrant the suitability of any product for any specific use. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>	

Sample NFRC Label for Windows

www.nfrc.org/energy-performance-label

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Specifying for Climate

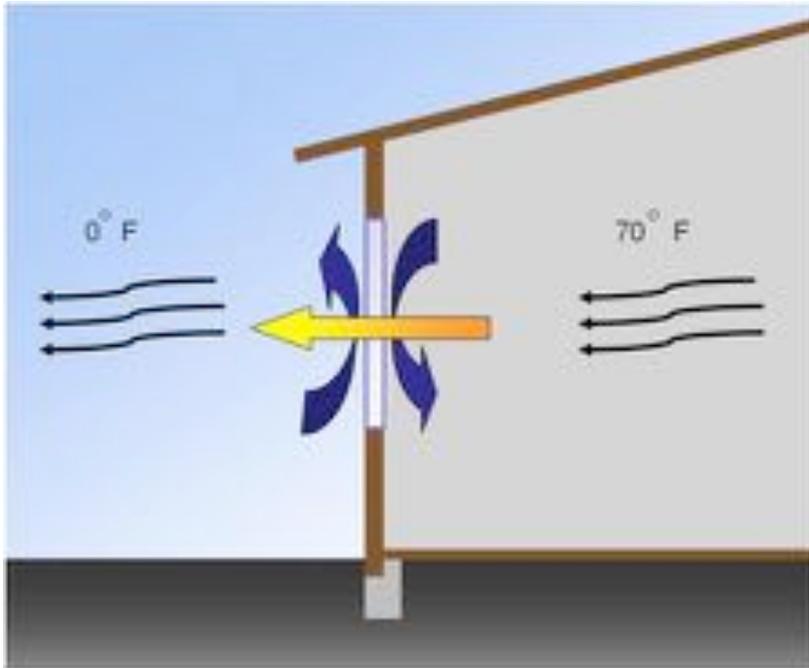


Specifying for Strength and Wind Resistance

- Structural strength
- Design pressure
- Allowable stress design

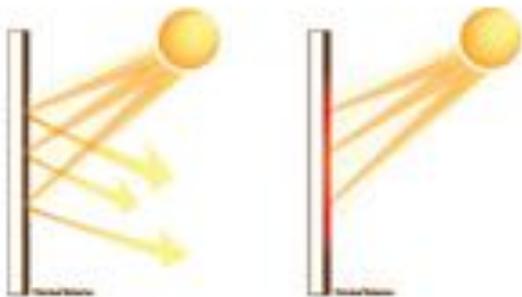


Components of Energy Efficiency



- U-factor is a measure of heat lost and indicates how well a window, skylight, or patio door can withstand heat transfer.

- The solar heat gain coefficient measures the amount of solar radiation transmitted through a window.

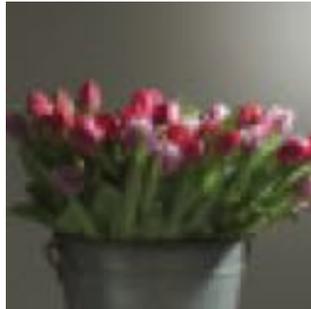


Glazing



Coatings

- Low-e
- Fourth surface
- Tints
 - Can help with the solar heat gain coefficient to reduce heat transfer while also reducing visible transmittance



Spacers

- Maintain correct distance between panes
- Affect insulation efficiency
 - Foam and stainless steel are ideal because they will not transfer heat



LEED Certification

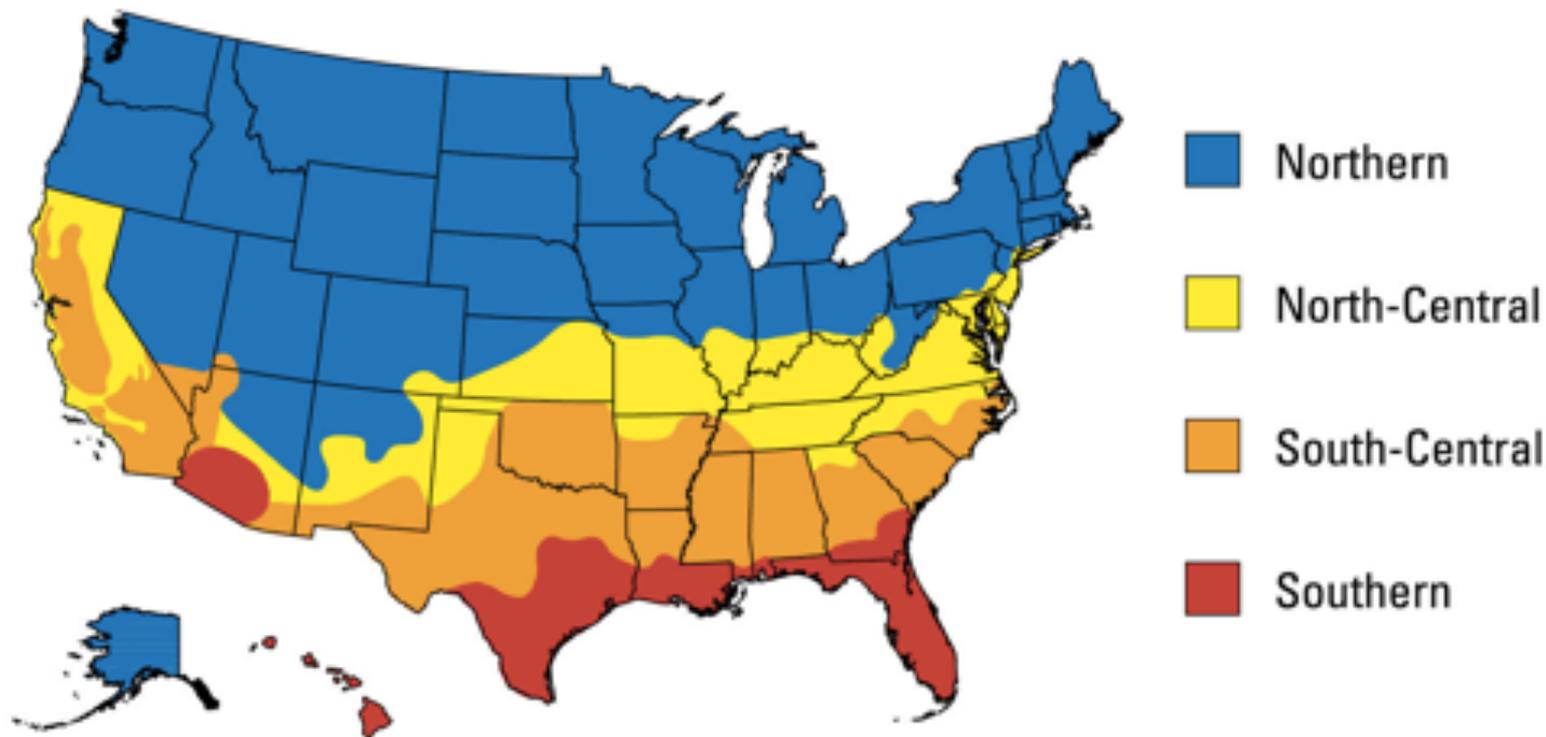
- Prestige
- Optimal energy performance
- Low-emitting materials
- Recycled content



ENERGY STAR Qualification



ENERGY STAR® for Windows, Doors, and Skylights CLIMATE ZONE MAP



Case Study: How PVC Windows Meet Design and Code Challenges



Ferrara Apartment Complex, North Hollywood, California

Ferrara Apartment Complex

- Vinyl used to create the desired silver aluminum frame aesthetic
- Project meets stringent Title 24 requirements
- Window system meets design pressure requirements



Summary

- Multifamily projects must meet stringent performance, safety, and budgetary requirements while also remaining competitive in the marketplace.
- High-performance vinyl windows help lower a building's environmental footprint, energy, and operations costs.
- Vinyl windows offer design flexibility that benefits all stakeholders, including:
 - owners,
 - occupants, and
 - the surrounding community.

Thank You

This concludes the continuing education unit.

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