HVAC Mandatory Measures

- For All Newly Installed Residential HVAC Systems (New Ducts & Equipment)

- Installer and HERS Verification:
  - Duct leakage at 6%
  - Air Flow at 350 CFM
  - Fan Watt Draw at .58 W/CFM, or (return duct and filter sizing)

- MERV 6 Filter
Residential HVAC Measures

- New Ducts and Plenums R-value at:
  - All Climate Zones Minimum R6 Plenums
  - CZ 1-10, 12-13 Minimum R6 Ducts
  - CZ 11, 14-16 Minimum R8 Ducts

- HVAC Changeouts

- Installer and HERS Verification:
  - Duct Leakage at 15%
  - Refrigerant Charge Testing in CZ 2, 8-15
Non Residential HVAC Measures

- Newly Installed HVAC Systems
  - Controls - HVAC systems with DDC to the Zone level shall be programmed to allow centralized demand shed for non-critical zones.
  - Mandatory HVAC Occupancy sensors
  - Requires 2 Deg. Temp set back (up) and reduce outdoor air
    - Multipurpose rooms less than 1000 ft²
    - Classrooms greater than 750 ft²
    - Conference rooms greater than 750 ft²
Non Residential HVAC Measures

- **New Efficiencies for DX Equipment**
  - Implementation Jan 1, 2015
  - Equipment $< 65,000$ Btuh $= 14$ SEER
  - Equipment $\geq 65,000$ Btuh $< 240,000$ Btuh $= 11.7$

- **New Efficiencies for Chillers**
  - Table 110.2 – D
  - Chilled water plants shall not have more than 300 tons provided by air cooled chillers
Non Residential HVAC Measures

- Cooling Towers greater than 150 tons
  - Controls required to maximize cycles of concentration based on local water quality.
  - Flow meter required on makeup water line
  - Overflow Alarm required for sump
  - Drift eliminators required to achieve drift reduction to .002% of the circulated water volume.
Non Residential HVAC Measures

Fan Power

- Constant Volume fans - each fan system with total horsepower over 25 hp shall not exceed 0.8 watts per cfm of supply air.

- Variable Air Volume systems
  - Each fan system with total horsepower over 25 hp shall not exceed 1.25 watts per cfm of supply air; and
  - Static Pressure Sensor Location. Static pressure sensors used to control variable air volume fans shall be placed in a position where static pressure set points shall be reset based on the zone requiring the most pressure.
Non Residential HVAC Measures

- Fans
  - Fans must be designed to vary airflow rate as a function of actual load per Table 140.8-B
  - Single Zone systems will require two speeds or VSD
  - Multi Zone will require additional controls
Non Residential HVAC Measures

- **Economizers**
  - Threshold moved from 75,000 Btuh down to 54,000 Btuh (Table 140.4-A is a efficiency trade off table)
  - There is no longer a Minimum Air flow CFM requirement that triggers economizers.
  - Computer and telecommunication rooms no longer exempted
Non Residential HVAC Measures

- Economizers Manufacturer Warranty for 5 years
  - Assembly including dampers, linkage and actuator for 60,000 cycles
  - Dampers Leakage tested per AMCA 511
  - Fixed dry-bulb or fixed enthalpy + fixed dry-bulb then the control shall have an adjustable setpoint.
  - All temp sensors calibrated $\pm 2 \, ^\circ F$, Enthalpy to $\pm 3 \, \text{Btu/lb}$, and RH to $\pm 5 \, \%$. 
Non Residential HVAC Measures

- **Acceptance Testing**
  - Acceptance Testing – ALL HVAC Systems
    - Verify outside air, duct sealing (5,000sf and less and 75% ducts in nonconditioned space), DCV verification, VFD testing, Boilers & Chillers, Fault Detection, Water Chillers
  - Acceptance Test Technician (3rd Party) required for some Tests
Non Residential HVAC Measures

- Building Commissioning required for all new buildings - Section 120.8
  - Under 10,000 ft² Design Review by Design Engineer
  - 10,000 ft² to 50,000 ft² of the Design Review Checklist by either an engineer in-house to the design firm but not associated with the building project
  - Larger than 50,000 ft² or for buildings with complex mechanical systems, an independent, review of these documents by a third party design engineer is required.
Issues for Manufacturers

- **Residential**
  - FAU Fan energy use – Must be less than .58 w/cfm for newly installed systems
  - Low Leakage Air Handlers – Should develop and register with the Commission
  - EER/SEER HERS Verification – AHRI # required for newly constructed buildings when credit is taken
Issues for Manufacturers

Non Residential

- HVAC Control changes
- DX Efficiencies Increase Jan 1, 2015
- Cooling Towers water use and efficiency requirements
- Fan power and VFD requirements
- Economizer now required for 4.5 tons or larger.
- Economizer Warranty requirements
Issues for Installers

- **Residential**
  - Energy Consultant will model more HERS HVAC measures just to get the building to comply
  - Air Flow at 350 CFM or default table (150.0 C or D)
  - FAU Fan energy use – Must be less than .58 w/cfm for newly installed systems
  - EER/SEER HERS Verification – AHRI # required for newly constructed buildings when credit is taken
Issues for Installers

- Residential
  - HVAC Changeouts
    - Duct Testing Required in ALL Climate Zones
    - Refrigerant Charge Testing in CZ 2, 8-15 any time refrigerant device is replaced (coil, condenser, TXV, compressor)
  - Higher R-value for Plenums (R6)
Issues for Installers

- Non Residential
  - HVAC Control changes
  - DX Efficiencies Increase Jan 1, 2015
  - Cooling Towers water use and efficiency requirements
  - Fan power and VFD requirements
  - Economizer now required for 4.5 tons or larger.
  - Acceptance testing by 3rd party for some measures
# Duct and Filter Table

**Single Return Table 150.0-C**

<table>
<thead>
<tr>
<th>System Nominal Cooling Capacity (Ton)*</th>
<th>Minimum Return Duct Diameter (inch)</th>
<th>Minimum Total Return Filter Grille Gross Area (inch²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>16</td>
<td>500</td>
</tr>
<tr>
<td>2.0</td>
<td>18</td>
<td>600</td>
</tr>
<tr>
<td>2.5</td>
<td>20</td>
<td>800</td>
</tr>
</tbody>
</table>
## Duct and Filter Table

### Two Return Table 150.0-D

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<th></th>
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</tr>
</thead>
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<td>10</td>
<td>500</td>
</tr>
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</tr>
<tr>
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<td>16</td>
<td>16</td>
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</tr>
<tr>
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<td>18</td>
<td>1200</td>
</tr>
<tr>
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<td>20</td>
<td>1500</td>
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</tbody>
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