

# Facilities Planning and Construction







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a' steel bands

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a' Pittsburgh Corning (FoamGlass) or approved equal



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- ?' -ndoor concealed range hood exhaust duct ) or/ \$6 hour UD . ated%
- 9' -ndoor ex#osed oven and dish ) asher exhaust duct ) or/'
- @' -ndoor concealed oven and dish ) asher duct ) or/'

-tems not insulated unless other ) ise indicated' o not a##ly insulation to the lollo ) ing systems, materials, and e (ui#ment-

- 1' Fibrous!glass ducts'
- 6' " etal ducts ) ith duct liner'
- : ' Factory!insulated !lexible ducts'
- >' Factory!insulated #lenums, casings, terminal boxes, and !ilter boxes and sections'
- ? ' Flexible connectors'
- 9' Aibration!control devices'
- @' Testing agency labels and stam#s'
- B' 7ame#lates and data #lates'
- H' \* ccess #annels and doors in air!distribution systems'

7o su##ly air duct shall be internally insulated un

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3 Outdoor Duct and Plenum Application Schedule:

Service: Outdoor, supply air ducts'

1' Material: Mineral fiber board

6' Thickness: Per Design Professional Requirements

7' Number of Layers: 3

> Field Applied Lac/et: Glass cloth

? Field Applied Lac/et: FSP Material

9' Field Applied Lac/et: PAC

@ Field Applied Lac/et: Aluminum

a' Aluminum Thickness: Per Design Professional Requirements

b' Corrugation Dimension: Per Design Professional Requirements

B' Field Applied Lac/et: Stainless steel'

a' Corrugation Dimension: Per Design Professional Requirements

H' Alternative: Retarder Required: No

Service: Outdoor, return air ducts

1' Material: Mineral fiber board

6' Thickness: Per Design Professional Requirements

7' Number of Layers: 3

> Field Applied Lac/et: Glass cloth

? Field Applied Lac/et: Foil and Paper

9' Field Applied Lac/et: PAC

@ Field Applied Lac/et: Aluminum

a' Aluminum Thickness: Per Design Professional Requirements

b' Corrugation Dimension: Per Design Professional Requirements

B' Field Applied Lac/et: Stainless steel'

a' Corrugation Dimension: Per Design Professional Requirements

H' Alternative: Retarder Required: No

Service: Rectangular, supply air ducts'

1' Material: Mineral fiber board

6' Thickness: Per Design Professional Requirements

7' Number of Layers: 3

> Field Applied Lac/et: Glass cloth

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- ? Field \*##lined Lac/et- Foil and #a#er
- 9 Field \*##lined Lac/et- PAC
- @ Field \*##lined Lac/et- \*luminum
  - a' \*luminum Thic/ness- Per esign Professional .e(uirements
  - b' Corrugation imension- Per esign Professional .e(uirements
- B Field1\*##lined Lac/et- Stainless steel'
  - a' Corrugation imension- Per esign Professional .e(uirements
- H Aa#or .etarder .e(uiired- Nes

Service= .ectangular, returnfair ducts'

- 1 " aterial- " ineralfiber board
- 6 Thic/ness- Per esign Professional .e(uirements
- : 7umber o! Dayers- 3ne
- > Field1\*##lined Lac/et- Glass cloth
- ? Field \*##lined Lac/et- Foil and #a#er
- 9 Field \*##lined Lac/et- PAC
- @ Field \*##lined Lac/et- \*luminum
  - a' \*luminum Thic/ness- Per esign Professional .e(uirements
  - b' Corrugation imension- Per esign Professional .e(uirements
- B Field1\*##lined Lac/et- Stainless steel'
  - a' Corrugation imension- Per esign Professional .e(uirements
- H Aa#or .etarder .e(uiired- Nes

Val#es

This section shall be !ollo )ed !or all valves common to several mechanical #i#ing systems' -t shall include all valves and connections'

Use gate valves !or isolation and shut o!! duty' o not use !or throttling or balancing duty'

Gate Aalves, 61106 -nches and Smaller- Class 16?, 6 ; ;1#si cold ) or/ing #ressure \$CE P%, or Class 1? ; , : ; ;1#si CE P( cast1bron4e body and bonnet, solid1bron4e ) edge, rising stem, tellon1im#regnated #ac/ing ) ith bron4e #ac/ing nut, threaded or soldered end connections( and ) ith malleable1iron hand ) heel'





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\* All soldered joints shall be made with high temperature solid string or wire solder, 60/40 tin, 40/60 antimony, using non-corrosive paste flux; or > 19; low temperature solder shall not be used'

Select valves with the following ends or types of pipe connections-

- 1' Copper Tube Size, 6 inches and Smaller- Solder ends, except provide threaded ends for heating hot water and low pressure steam service'
- 6' Steel Pipe Size, 6 inches and Smaller- threaded'
- 8' Steel Pipe Size, 6 inches and Larger- flanged'

\* Application Schedule-

Use gate, ball, and butterfly valves for shut-off duty; globe, ball, and butterfly for throttling duty'

\* Application Schedule-

Domestic Water Systems- Use the following valve types-

- 1' Gate Valves- Class 150, bronze or cast iron body to suit piping system'
- 6' Ball Valves- Class 150, 150 psi CWP, with stem extension'
- 8' Plug Valves- 70 degree bevel faced plug, 2 inch diameter'
- > 8' Globe Valves- Class 150, bronze or cast iron body to suit piping system, and bronze disc'
- 9' Butterfly Valves- 7 inch diameter ductile iron disc, 1 inch sleeve and stem seals'
- 9' Bronze Sizing Check- Class 150, with rubber seat'
- @ Check Valves- Class 150, swing or other type as indicated'

Heating Water Systems- Use the following valve types-

- 1' Gate Valves- Class 150, bronze or cast iron body to suit piping system'
- 6' Ball Valves- Class 150, 150 psi CWP, with stem extension and memory stop'
- 8' Plug Valves- teflon diameter'
- > 8' Globe Valves- Class 150, bronze or cast iron body to suit piping system, and bronze disc'
- 9' Butterfly Valves- 7 inch diameter ductile iron disc, 1 inch sleeve and stem seals'
- 9' Bronze Sizing Check- Class 150, with composition seat'
- @ Check Valves- bronze swing, other, or lift type, as indicated' Swing check shall be Class 150 with bronze seat ring'

Steam and Condensate Return Systems- Use the following valve types-

- 1' Gate Valves- Class 150, bronze body or Class 150, cast iron body'
- 6' Ball Valves- Class 150, 150 psi CWP, with stem extension'
- 8' Plug Valves- teflon diameter'
- > 8' Globe Valves- Class 150, bronze body with teflon disc or Class 150, cast iron body'

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? ' Chec/ Aalves= Class 1?;, bron4e body s ) ing chec/ ) ith com#osition seat( Class 1?;, cast1 iron body s ) ing chec/ ) ith bron4e seat ring( or Class 16?, cast1iron body ) a!er chec/ '

Chilled/E ater Systems= Use the !ollo ) ing valve ty#es=

- 1' Gate Aalves= Class 1?;, bron4e body( or Class 16?, cast1iron body'
- 6' 2all Aalves= Class 1?;, : ; ;1#si C E P, ) ith stem extension and memory sto#'
- : ' Plug Aalves= 2una 7 #ac/ing'
- >' Globe Aalves= Class 16?, bron4e body ) ith bron4e

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Steel Pipe,

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PAC and CPAC Piping shall not be used in hydronic piping systems'

Piping Applications=

Hot and Chilled Water 6" and smaller, aboveground, use **Type D** drawn temper copper tubing with soldered joints' Below ground or within slabs, use **Type P** annealed temper copper tubing with soldered joints' Use the best possible joints below ground and within slabs'

Hot and Chilled Water, 6" and larger- Schedule 40; steel pipe with welded and flanged joints'

Condensate Drain Lines- **Type D** drawn temper copper tubing with soldered joints'

Chilled Water

The chilled water piping will include a decoupler piping design that allows the incoming chilled water to circulate through the building system and is separated from the tunnel and other chiller systems by an interconnecting pipe from the supply and return piping' The chilled water shall circulate through the building chilled water systems supplying as much cooling to the building without sacrificing comfort' Cross-leaking or short-circuiting of the supply and return waters shall be prevented by having actuated modulating valves to return chilled water back to the tunnel or chiller at an adjustable 95.149 0 Tdc [ (b) 2



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Furnish a cast iron receiver tank with strainer. Provide the necessary float switches and alternator. Alternate the pumps and give standby service automatically. Furnish a receiver with condensate return, vent overflows, drain connections, water level gauge, thermometer and strainer.

Mount 7, 1/2" control cabinet on the unit. Include magnetic starters, circuit breakers, cover interlock, alternator, test button and fused control circuit transformer. Provide Domestic Series C2.

Specify pressure reducing valves (PRVs) and steam pilots or approved equivalent.

Natural Gas Piping

Either 1/2" or 3/4" pipe of building line and above grade in accessible locations. For 1/2" or smaller, specify black steel (ASTM A106) standard weight with 1/2" round black malleable screw fittings. For 3/4" and larger, specify black steel (ASTM A106) standard weight.

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With the approval of the engineer and the contractor's representative, joints and fittings may be of mechanical fitting type. Mechanical fittings shall be - \* P " 30UPC listed' Permaset or equivalent approved by the engineer. Transitions from polyethylene to steel pipe shall be by factory fabricated transition fitting type, Central Double Seal or transition riser Central Plast



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throughout the entire operating range of the air valve, regardless of the pressure changes in

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State, Federal, Local building and fire codes' Balancing dampers shall be provided at each branch of supply mains' Design of duct system (round, rectangular, oval, etc.) shall be coordinated with all other trades for clearances, maintenance, and proper airflow. Internally lined ducts are not preferred and will be allowed only with the owner's consent. Dampers located above hard ceilings shall have extended balancing adjustment rods for manual adjustment. 32 grills are not preferred in the system. Ducts shall be tested according to SMACNA Air Leakage Test Manual.

Air and Dirt Separator

Required, specify high efficiency air and dirt separator or approved equivalent.

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system controls' -n the event o! a maior renovation to a building, i! a###licable, the entire system shall be u#graded'

Control ) or/ includes, but is not necessarily limited to, the !ollo ) ing systems=

1. Unitary +A \* C e(ui#ment controls'
2. Pac/aged air conditioning unit \$P \* CU% humidity control and high humidity override'
3. T \* +U system\$s% and activation0control o! 4one electric duct heater'
4. , xhaust !ans start0sto# or enable0disable'
5. emand controlled ventilation via C360 . 959823 (a) 11 . 4807 (r) -4|79 11 . 04 T f c0 . 99a-0 . 957164480

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. , TU . 7 F * 7 SP , ,
SUPPDN F * 7 C3 " " * 7 5 ST * TUS
SUPPDN F * 7 SP , ,
+ - G + ST * T - C * D * . "

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For , emergency " aintenance \$ , "%, gra#hic screens !or +A \* C systems should sho ) the air handling units, their locations and room numbers'

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The Controls Contractor or Subcontractor shall coordinate #ro#osing0 bidding and execution o! the ) or/ ) ith that o! other trades, including mechanical \$ducting%, testing, ad!usting, and balancing, and electrical \$including !ire alarm%' Full coo#eration and coordination ) ith the other trades shall be re(ui#red' The controls contractor0subcontractor shall be res#onsible !or ver!ying #ro#er installation \$to be done by mechanical trades% o! all ) ells, #orts, ta#s, etc' needed !or installation o! all control and instrumentation devices'

S#ecily \*ll e(ui#ment, com#onents, #arts, materials, #eri#herals, etc' #rovided shall be the latest current versions o!!ered by the res#ective manu!acturer, and shall be !ully com#atible ) ith all other e(ui#ment, etc' #rovided at any other time throughout the ) arranty #eriod #lus > years' Should u#dated versions o! e(ui#ment be #rovided ) ich are not !ully com#atible ) ith earlier e(ui#ment #rovided \$e'g' a re(ui#ment to add hard ) are or solt ) are \$inter!acing\$ bet ) een an earlier and later generation results in the systems not being !ully com#atible%, Controls Contractor and " anu!acturer shall re#lace earlier e(ui#ment ) ith the later version at Controls Contra

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Provide an enlarged floor plan, which shall display room temperatures and provide link/s to Building Information Modeling (BIM) Level Graphics on each floor plan graphic, provide navigation link/s to all building levels and menus with link/s to other building graphics. Provide one graphic for each +A \* C system including fan systems, chilled water systems, hot water systems, steam systems, return fan systems and other systems as appropriate for project specifics.

Minimum graphics update rates-

Display Refresh= 6; dynamic points in 1; seconds, with automatic refresh every 6; seconds

Object Command= ? seconds

Object Scan= ? seconds





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Remove these strainers in service until the equipment has been tested, then remove either entire strainer or straining element only. Fit strainers with a line size below the valve. Provide backflow protection for the domestic water when connected to the system being flushed.

6. Circulate a chemical cleaner in chilled, heating, condenser water conditioning systems to remove mill scale, grease, oil and silt. Circulate 3 times per approved detergent with 3 times per approved anti-foam compound. Circulate for 24 hours or as required by 3 times per, flush system and replace with clean water. Dispose of circulated water with chemicals as per local code requirements. Submit all chemicals to 3 times per, engineer