



SECTION VIEW

# INSULATION IN FLOODABLE TUNNELS AND VAULTS DETAIL

1  
\_1.01 SCALE: 1/2"=1'-0"

## GENERAL NOTES

1. USE ASPEN AEROGELS PYROGEL XTE OR PITTSBURGH CORNING FOAMGLAS (NO SUBSTITUTIONS) INSULATION (BOTH STEAM AND CONDENSATE) FOR TUNNELS THAT COULD BE FLOODED AND ALL VAULTS. INSTALL PER MANUFACTURERS RECOMMENDATIONS, EXCEPT JACKETS AS DESCRIBED BELOW.
2. FOR STEAM LINES, IT IS EXTREMELY IMPORTANT THAT NO VOIDS ARE LEFT AGAINST PIPE OR UNDERNEATH CLADDING. FLOODWATER CAN BOIL/FLASH, AND FURTHER LOOSENING THE INSULATION/CLADDING. THIS WILL INCREASE THE LIKELIHOOD OF INCREASED HEAT TRANSFER IN A FLOOD, WHICH WILL FORM LARGE AMOUNTS OF CONDENSATE IN THE STEAM PIPES, WHICH CAN CATASTROPHICALLY HAMMER APART THE STEAM PIPE. IT IS BETTER TO OVER-COMPRESS THE INSULATION TO MINIMIZE VOIDS AND KEEP IT IN PLACE, (AND TO BETTER WITHSTAND PEOPLE STANDING ON IT) THAN TO LIGHTLY COMPRESS IT FOR BETTER R-VALUE. DECENT R-VALUE IS SECONDARY TO NOT ALLOW FLOODWATER TO GET TO STEAM PIPE. ALL VAULTS ARE CONSIDERED FLOODABLE. TUNNELS SECTIONS THAT ARE CONSIDERED FLOODABLE WILL BE CALLED OUT ON THE PLANS AS SUCH.
3. VAULTS/TUNNELS MAY BE INTENTIONALLY FLOODED AS PART OF COMMISSIONING.
4. ALL INSULATION TO BE INSTALLED USING STAINLESS STEEL BANDS/WIRE-TIES (NO ADHESIVES/TAPES). INSULATION CLADDING AND SEALING MUST STAND UP TO PERSONS WALKING/CLIMBING ON IT WITH NO DAMAGE INCURRED. PIPE TO BE NYLON BRISTLE BRUSH CLEANED, PRIOR TO INSTALLING INSULATION.
5. PYROGEL:
  - A. USE MINIMUM 21 GAGE STAINLESS CLADDING, TWO LAYERS (STAGGER SEAMS). SEAL WITH HIGH TEMPERATURE SEALANT (RATED FOR MIN. 250°F), BRAND XX. PERIODIC INTENTIONAL UNSEALED STRIP (3-4") SHALL BE LEFT UNSEALED IF NO OTHER AREA TO VENT CLADDING IF WATER IS PRESENT (I.E. ROTATING VALVE STEM).
  - B. STEAM: 5 LAYERS OF 0.40 INCH PYROGEL CONDENSATE: 3 LAYERS OF 0.40 INCH PYROGEL.
  - C. WRAP PIPE USING 2 LAYERS OF PYROGEL AT A TIME, OVERLAP (STAGGER SEAMS) EACH ADDITIONAL SET OF LAYER(S).
  - D. FOR 1/2" TO 4" PIPE, USE EITHER V-GROOVED OR 0.2" THICKNESS PYROGEL.
6. FOAMGLAS:
  - A. USE MINIMUM 21 GAGE STAINLESS STEEL PERFORATED CLADDING, TWO LAYERS (STAGGERED SEAMS). PERFORATED CLADDING TO BE RPR PRODUCTS INC., ACOUSTI-MATE, 0.125" DIA. HOLES ON 21/64 INCH STAGGERED CENTERS (13% OPEN AREA).
  - B. STEAM: 2.5" THICKNESS, CONDENSATE: 1.5" THICKNESS