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# ENGINEERING AND CONSTRUCTION BULLETIN

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**Subject:** Changes to UFGS 23 07 00 Thermal Insulation for Mechanical Systems

**Applicability:** Directive and Guidance

**References:**

- a. ASTM E 2231, Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics
  - b. ASTM E84-10b, Standard Test Method for Surface Burning Characteristics of Building Materials
  - c. UL 723, Standard for Safety Test for Surface Burning Characteristics of Building Materials to Assess Surface Burning Characteristics
1. Two major changes were part of the latest update to UFGS 23 07 00 Thermal Insulation for Mechanical Systems.
  2. The polyisocyanurate insulation was found to possess very poor flame and smoke rating characteristics. According to UFGS 23 07 00, "Maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance ASTM E84." The polyisocyanurate insulation as manufactured in the United States has a smoke development rating of 200 to 450. Due to safety considerations this insulation was dropped from the specification.
  3. Corps Districts reported several poor experiences with the phenolic foam insulation when utilized for chilled water piping. The insulation became saturated with condensation and rendered a useless insulator. One cause of this problem was the vapor barrier corroding causing the foam insulation to begin absorbing moisture. A second reason was with the foam material itself. By the high rate of water absorption of the material a chemical reaction can occur causing an acid to form. The foam can shrink also when wet (highly likely the material contains at least some moisture due to its high absorption rate and the insulation being exposed prior to applying a vapor barrier). This shrinkage causes seams to fail and in turn moisture to be adsorbed rapidly

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by the insulation. Note, phenolic foam insulation for above ground hot pipeline continues to be permitted.

4. The revised specification was posted November of 2012; however, some further consideration was given to both the polyisocyanurate and phenolic foam insulations over the last several months. While some phenolic foam manufacturers had addressed the vapor barrier issue the risk with the foam material itself remained. The tri-service opinion concluded to keep both of these insulations out of this specification.

5. The point of contact for this ECB is Timothy Gordon, CECW-CE, 202-761-4125.

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