

## ANSYS Class3 Error Report

**ERROR NO:**

2013-23

**Keywords:**

TEMPERATURE-DEPENDENT DENSITY      BEAM188      BEAM189      PIPE288  
PIPE289      ELBOW290

**Description of Error:**

When using temperature-dependent density, the mass matrix is incorrect for the following cases:

1. When using the SECT,,BEAM or SECT,,PIPE commands for:
  - Element types BEAM189, PIPE289, and ELBOW290 (all cases), and
  - Element types BEAM188, and PIPE288 when KEYOPT(3) = 2 (quadratic shape functions along the length)
  - Element types BEAM188, and PIPE288 when KEYOPT(3) = 3 (cubic shape functions along the length)(The error is that only the density at the last integration point along the length is used.)
  
2. When using the SECT,,COMB command for:
  - Element types BEAM188 and BEAM189(The error is that the density is not properly interpolated between input temperatures.)

The mass matrix is used for all dynamic analyses as well as with any acceleration loads.

**Typical GUI Path(s):**

Main Menu>Solution>Load Step Opts>Other>Change Mat Props>Material Models

**Other Comments:**

**First Incorrect Version:**

Release 7.0

**Corrected In:**

Release 15.0 for ELBOW290

Release 16.0 for BEAM188, BEAM189, PIPE288, and PIPE289

**Suggested User Action For Running on Uncorrected Version:**

1. Shorter elements will diminish the error.
2. Input of densities at or near actually used temperature values will diminish the error.

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