

**REICHHOLD**

*Bringing Solutions to the Surface*

# Novel Composite Materials for Demanding Automotive Applications

ACCE

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## **Overview**

- Introduction
- FRP Composite Attributes
- Market Growth
- Composite Properties
- Conclusion



## **Introduction**

- Objective: Develop an unsaturated polyester resin with thermal and chemical stability of vinyl ester resin.
- Targeted Applications: Under-The-Hood Automotive Components
  - Cam Covers
  - Valve Covers
  - Oil Sumps
  - Heat Shields
  - Engine Covers

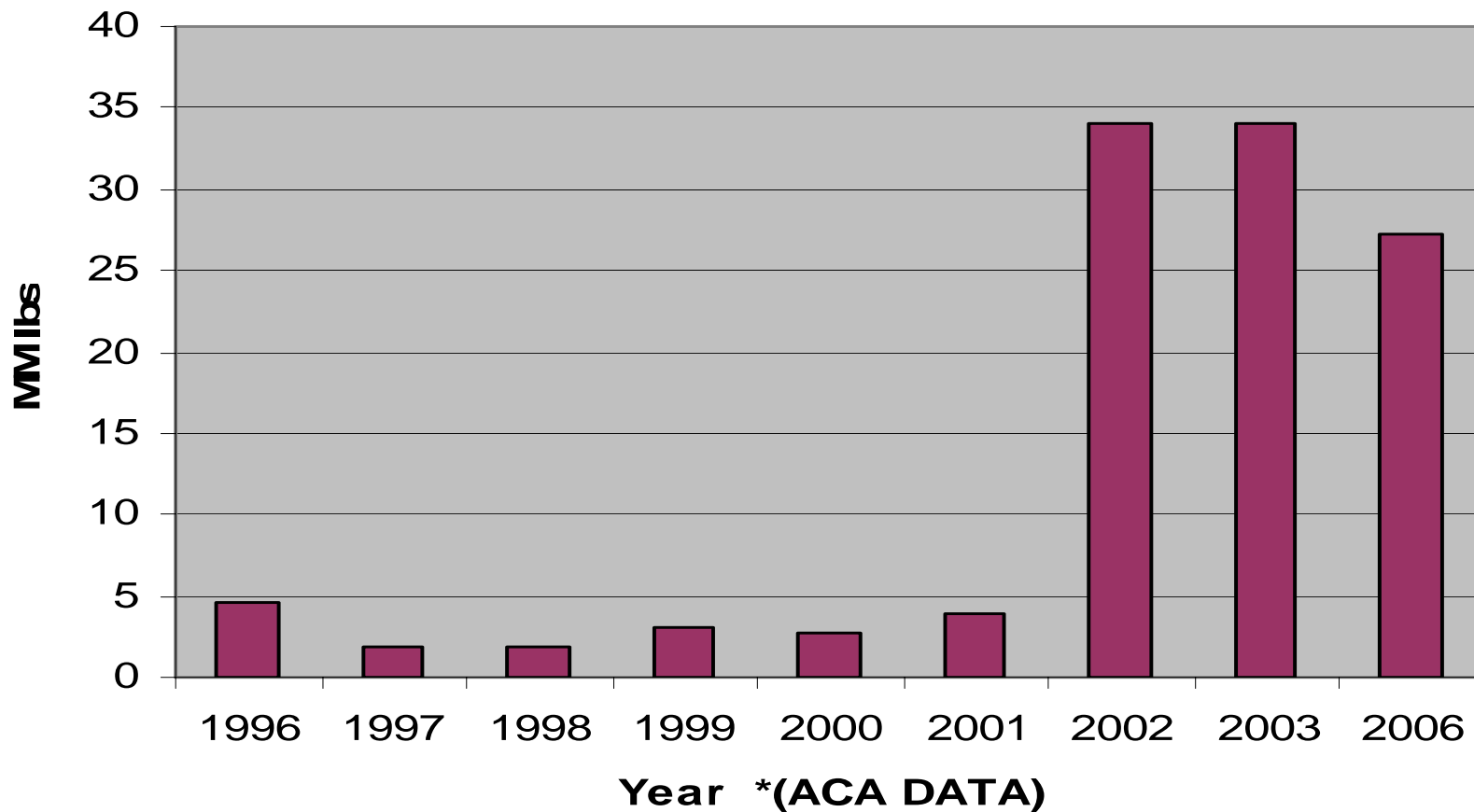


## **FRP Composite Attributes**

- Weight Savings
- Parts Consolidation
- Thermal Stability
- Chemical Stability
- Design Freedom
- Lower Costs
- Lower NVH



## **UTH Volume Growth \* SMC/BMC**





## **Development Plan**

- Approach
  - Evaluate physical properties of different unsaturated polyester resin to vinyl ester resin blend ratios
    - As made
    - After 1000 hours 180°C heat exposure
    - After 1000 hours 150°C oil exposure
  - Determine optimum blend ratio
  - Evaluate physical property retention of optimal blend ratio after exposure to various automotive fluids

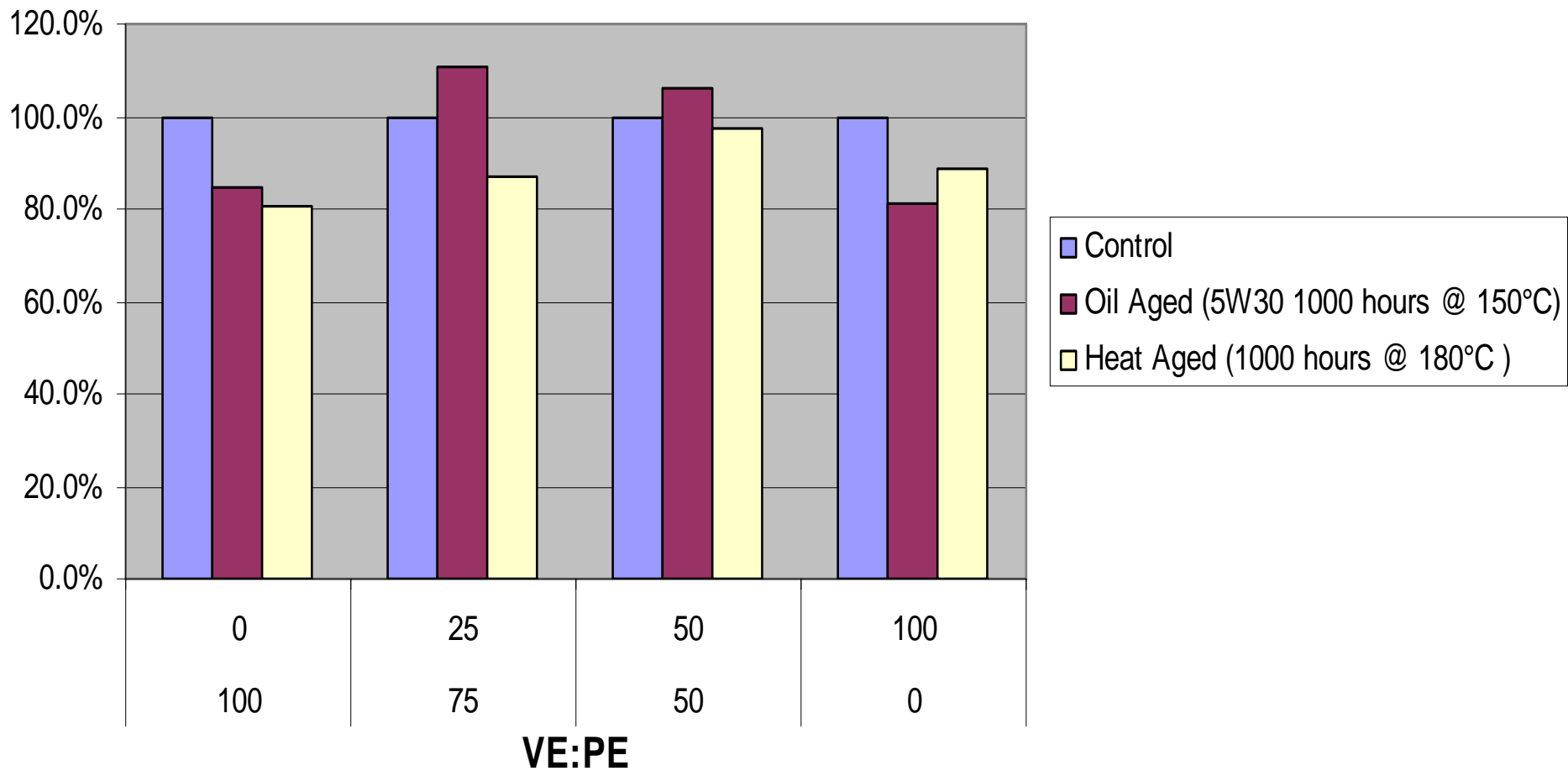


## **UTH Component Fitness-For-Use**

- Thermal Stability at elevated engine compartment temperatures
- Chemical Stability against automotive fluids
- Aesthetics

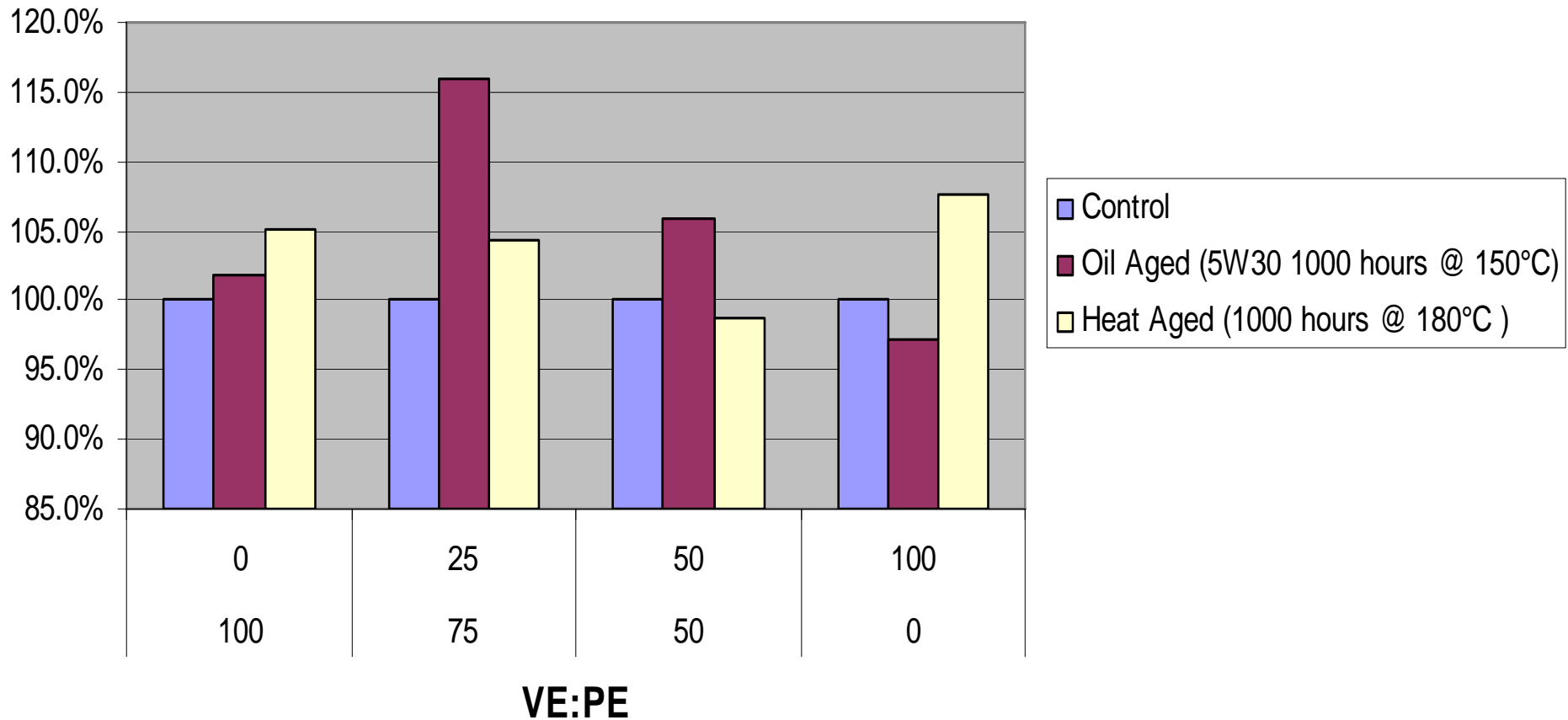


## Flexural Strength Retention



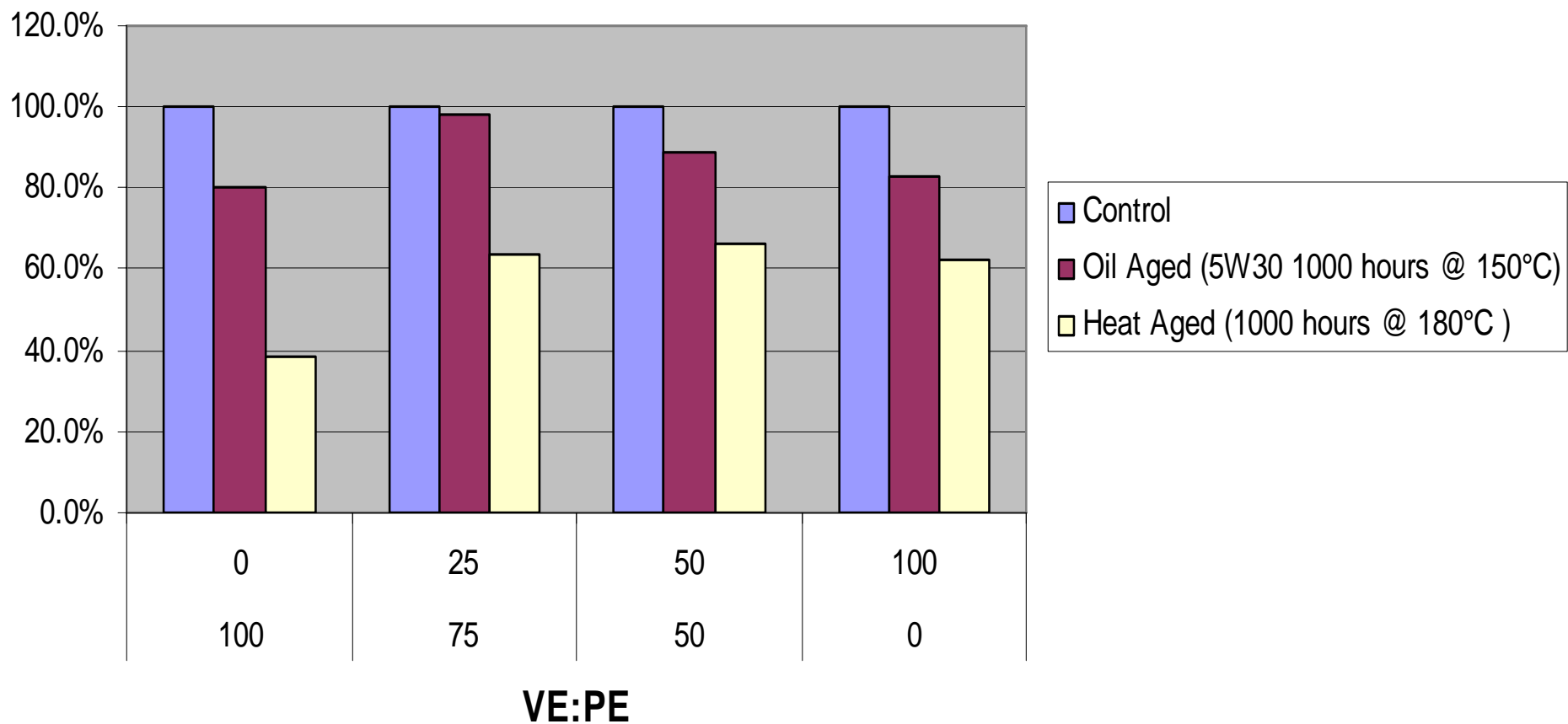


## Flexural Modulus Retention



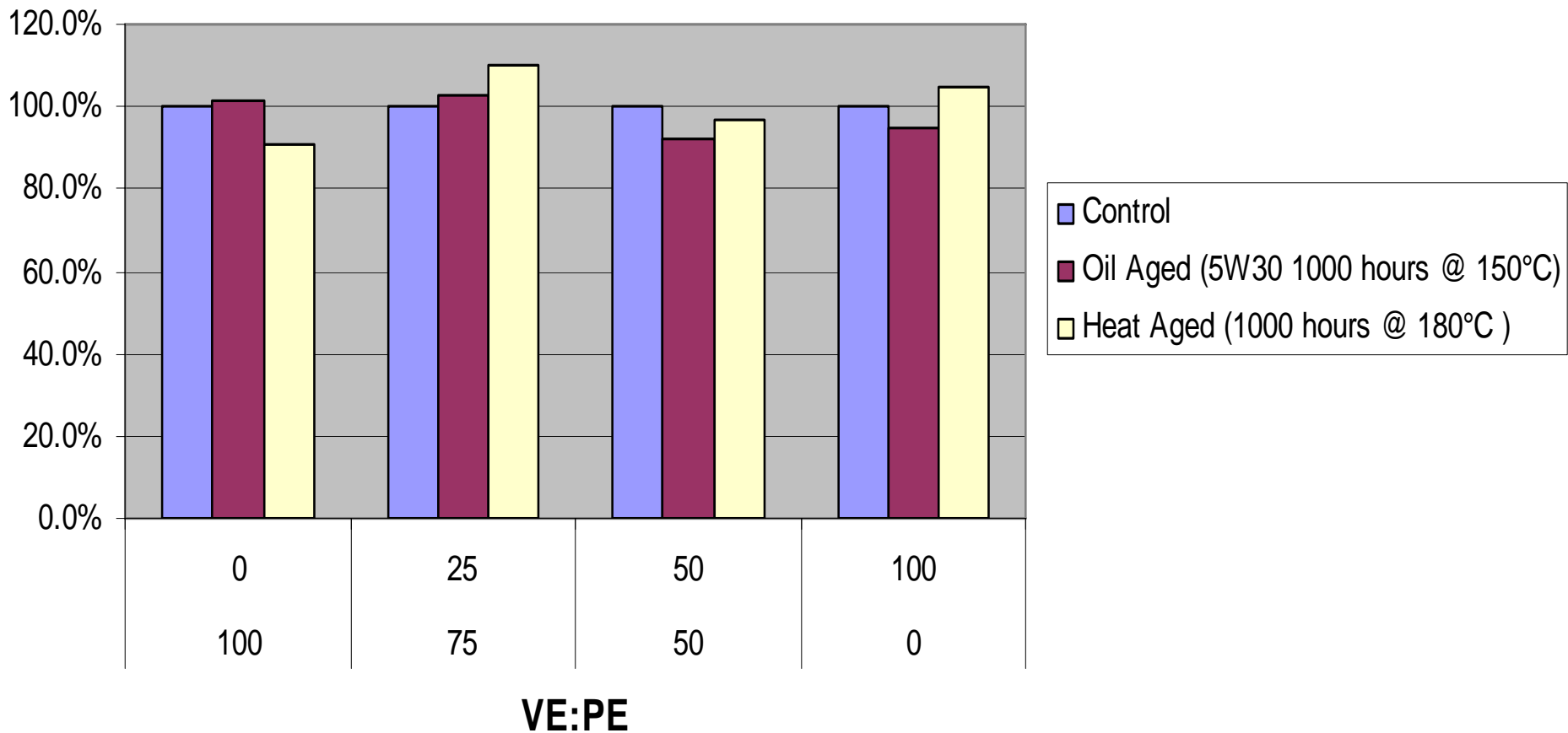


## Tensile Strength Retention



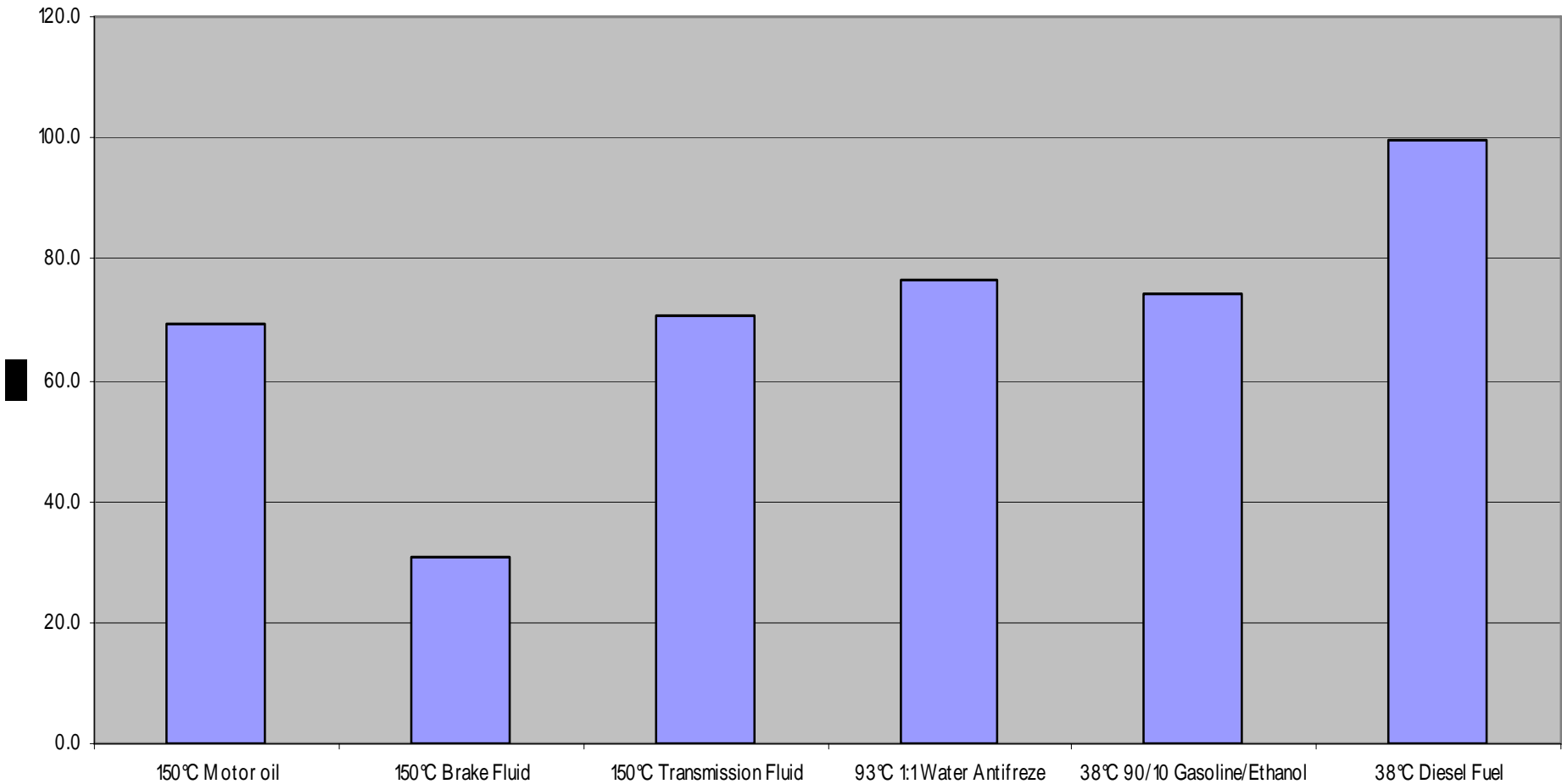


## Tensile Modulus Retention



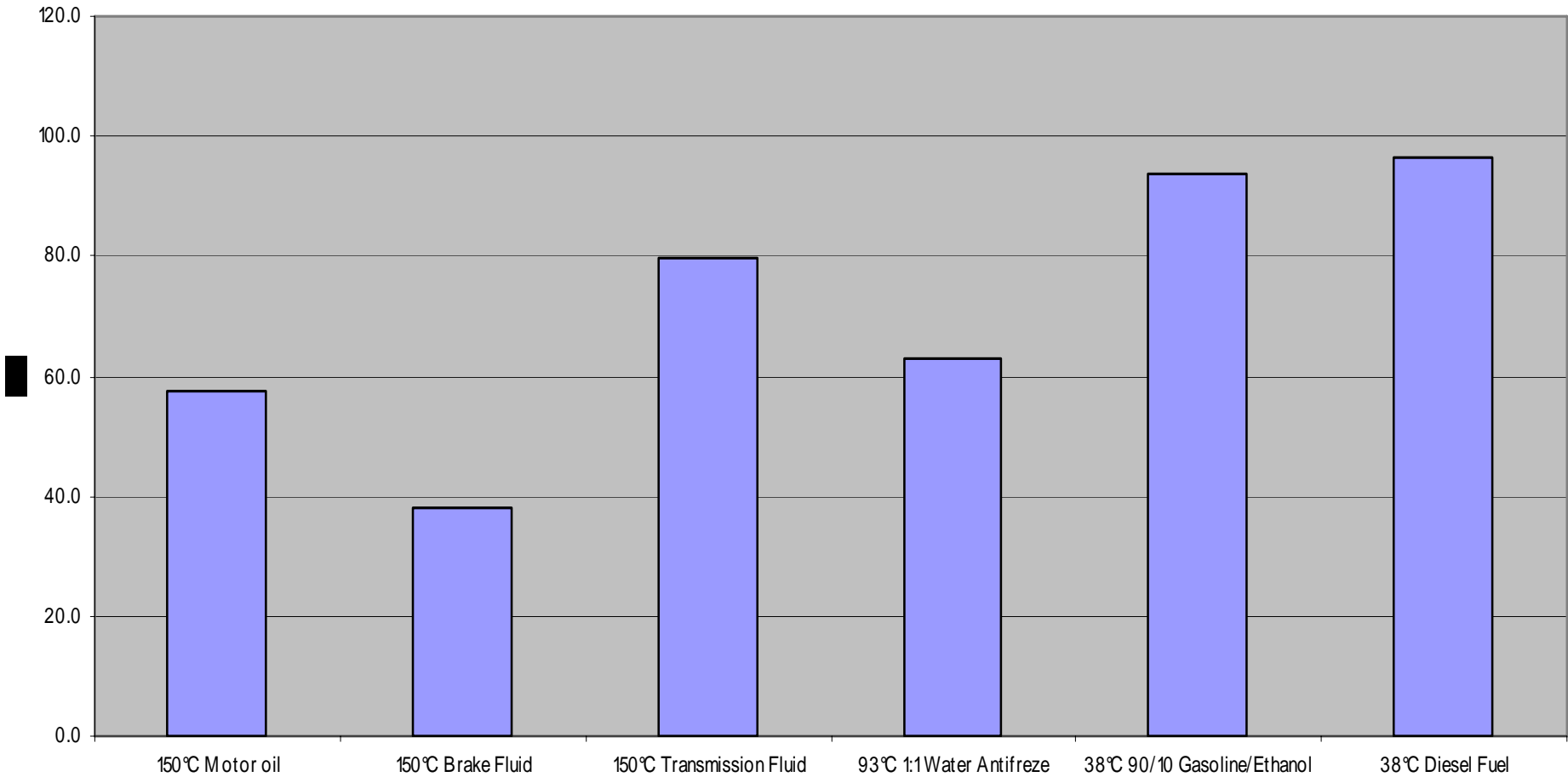


## Flex Modulus Retention 1000 hours Exposure



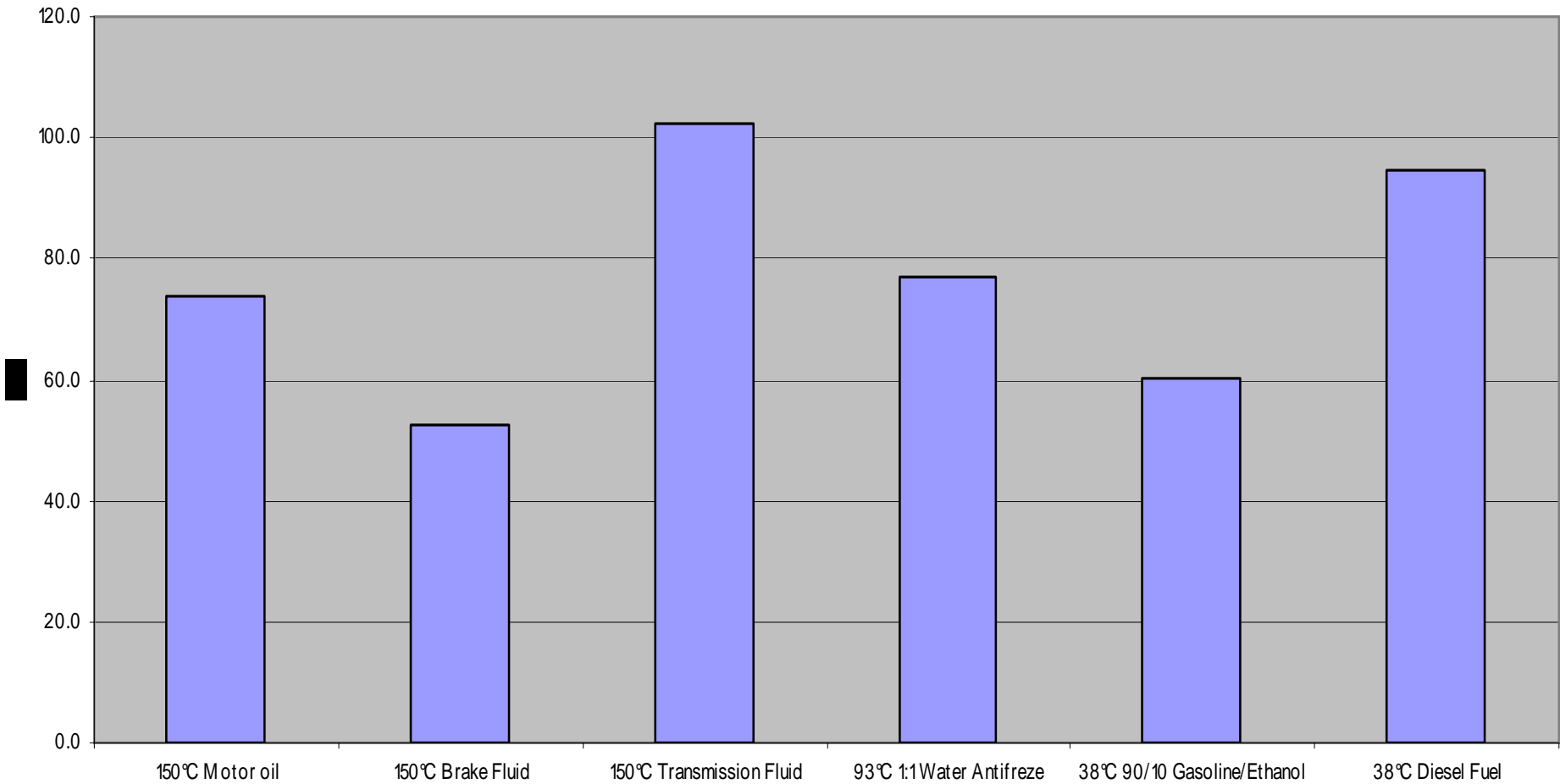


## Flexural Strength Retention 1000 Hours Exposure



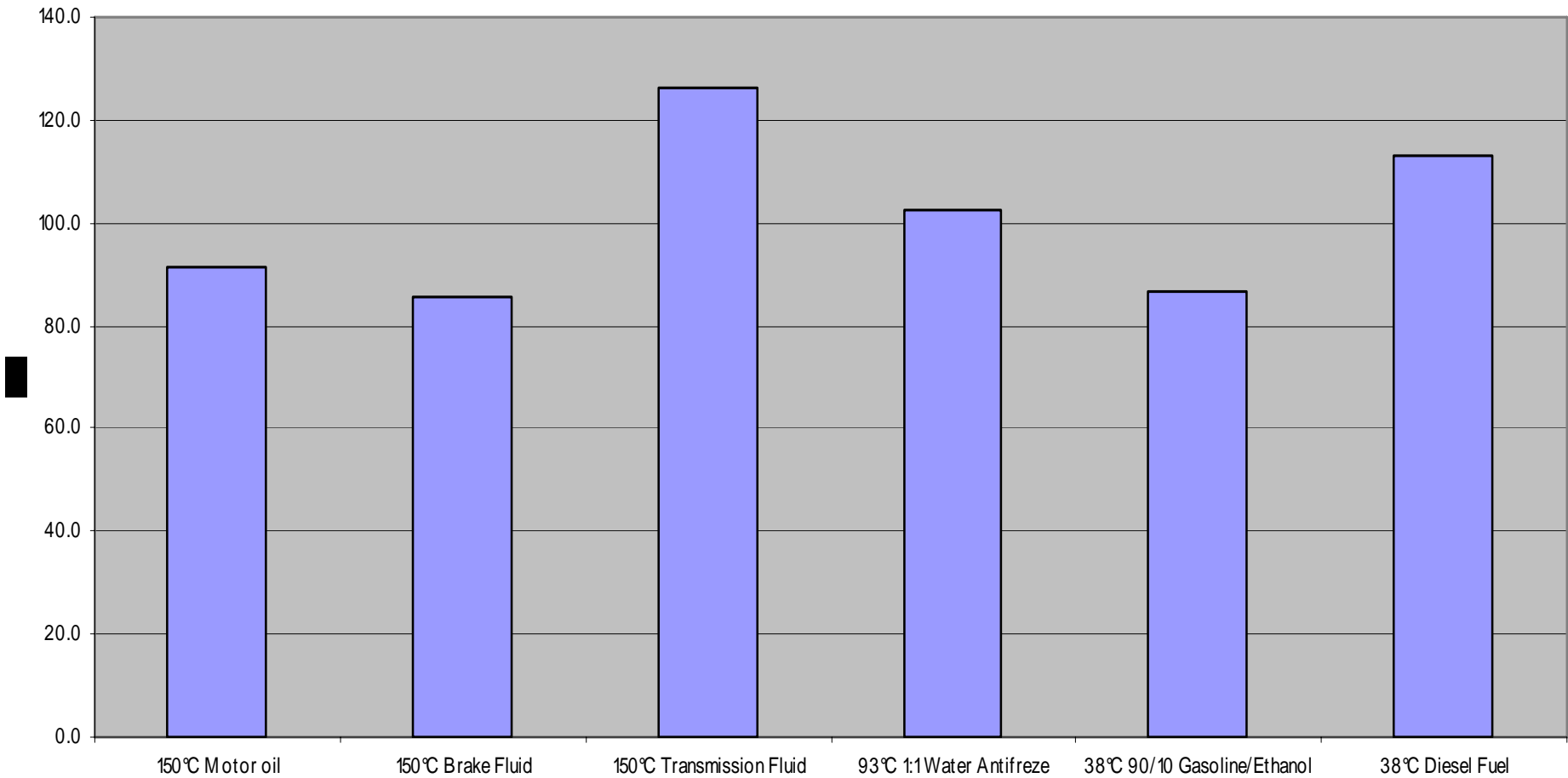


## Tensile Strength Retention 1000 hours Exposure





## Elongation Retention 1000 hours Exposure





## **Conclusions:**

- A unique unsaturated polyester resin has been developed for UTH applications.
- This resin offers molders a lower cost option verses traditional vinyl ester resin systems.
- This resin has excellent thermal and chemical stability at elevated service temperatures.