



## Investigation of Mud Motor Thread Adhesives Under Temperature

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# Speaker Information

- William Keiser
- Mechanical Engineer
- January 26, 2023
- Scientific Drilling International, Inc.,
  - Motor Engineering Department
- 10+ years experience in designing and sustaining mud motors

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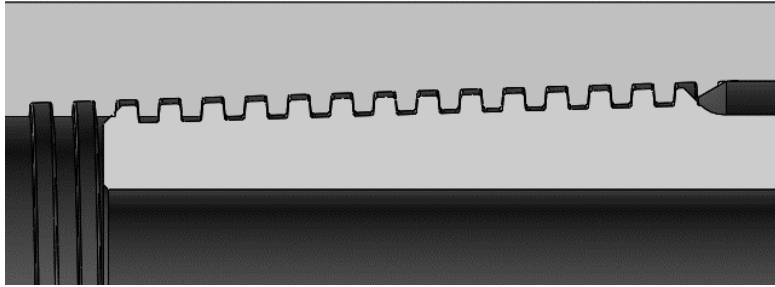
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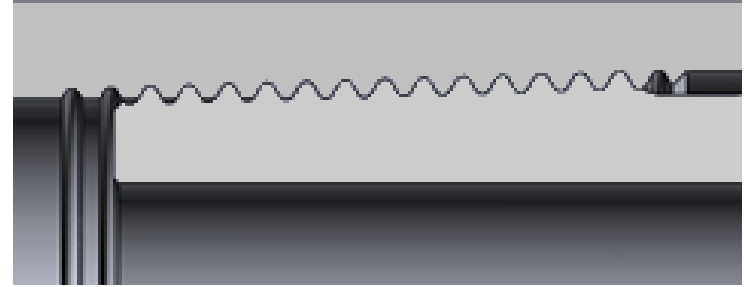
# Introduction

- Investigation triggered by several back-offs in mud motors in HT-environments several years ago
  - Several thread adhesives used w/ limited success
- Question: **What is the break-out torque at temperature?**
  - No data found in literature
  - Specs from adhesive vendors provide little guidance

# Background: Mud Motor Thread & Adhesives



- Industry Standard **Modified ACME Thread**
- “Glue Thread” – named for clearance between pin and box thread for adhesive

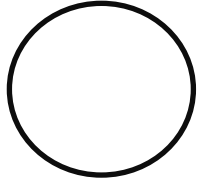


- **SDI V-thread**
- Recent trend towards this type thread type with less thread clearance

## Thread Adhesives

- Commonly used in mud motor operations in the oilfield
- Multiple brands from different manufacturers
  - Some Operators specify thread adhesives for motors

# Heating Methods Used



## Induction Coil

- Pro: Minimal time out of heat source
- Con: Uncertainty regarding radial heat gradient



## Baking Oven

- Pro: Reduced radial heat gradient
- Con: Increased time out of heat source (1-2 minutes)

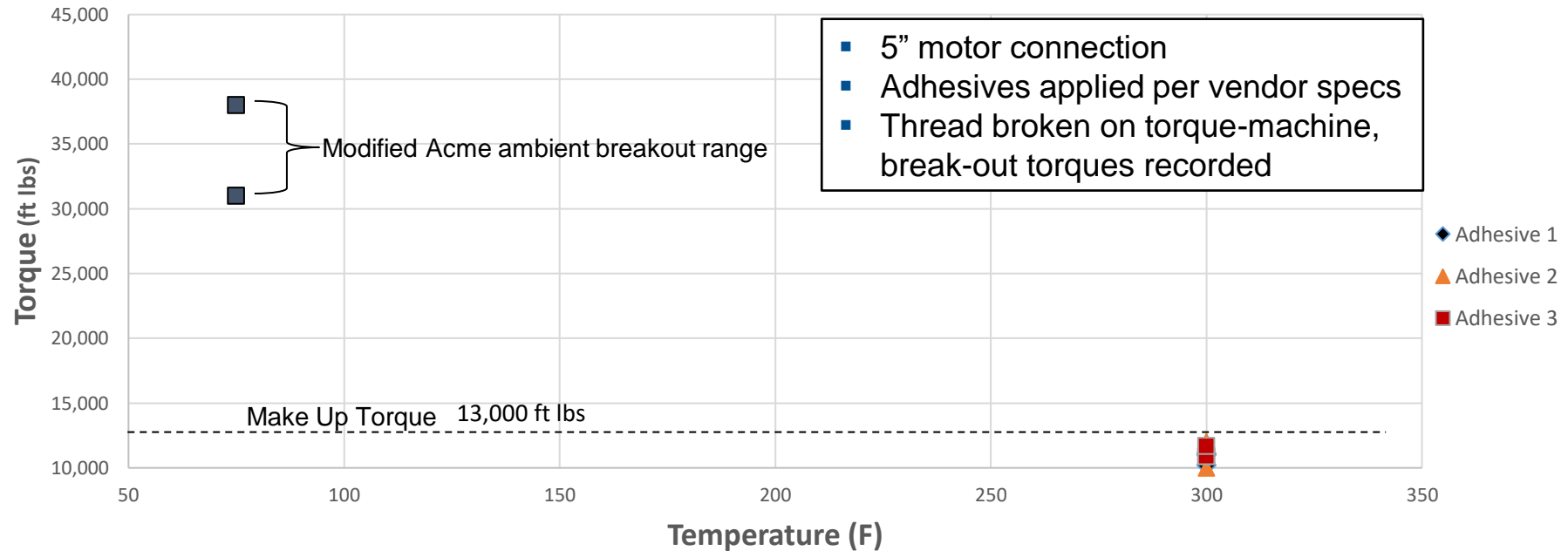
## Climate Chamber

- Pro: Even temperature distribution
- Con: Increased time out of heat source (1-2 minutes)



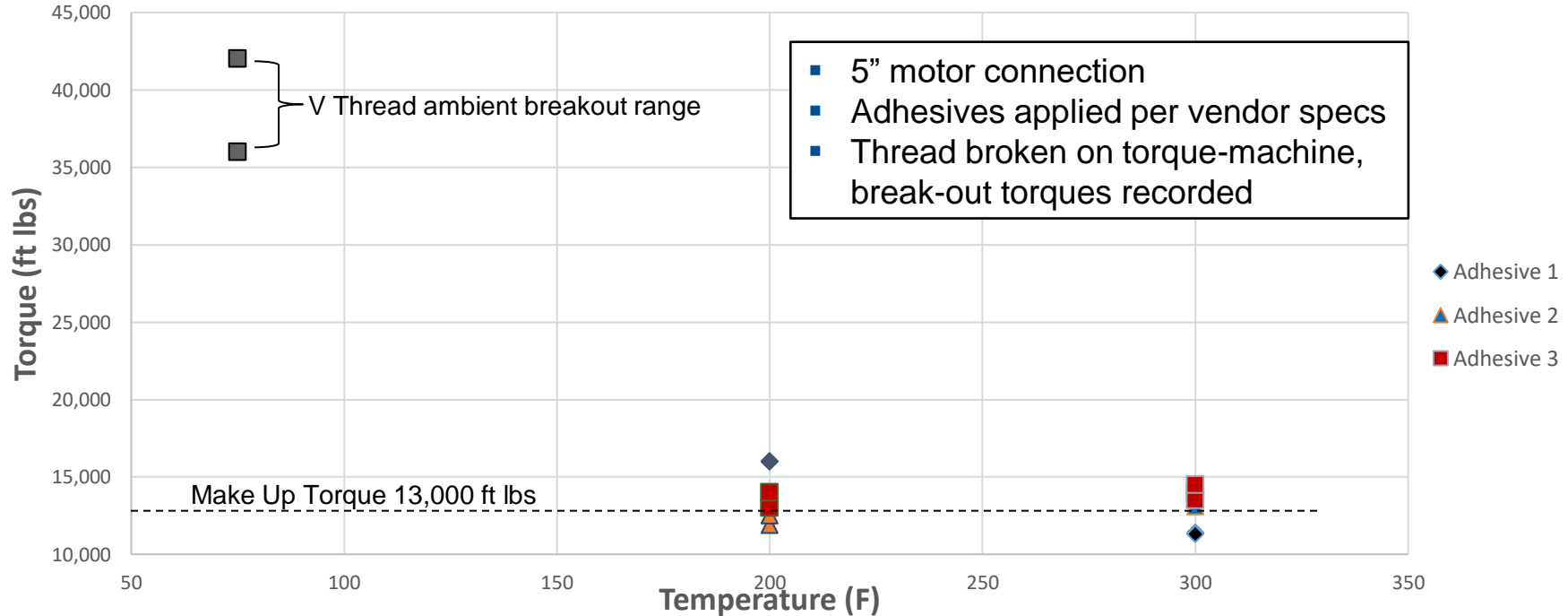
# Induction Coil Break-out Torque Data (1)

## Modified ACME 300F Break Test



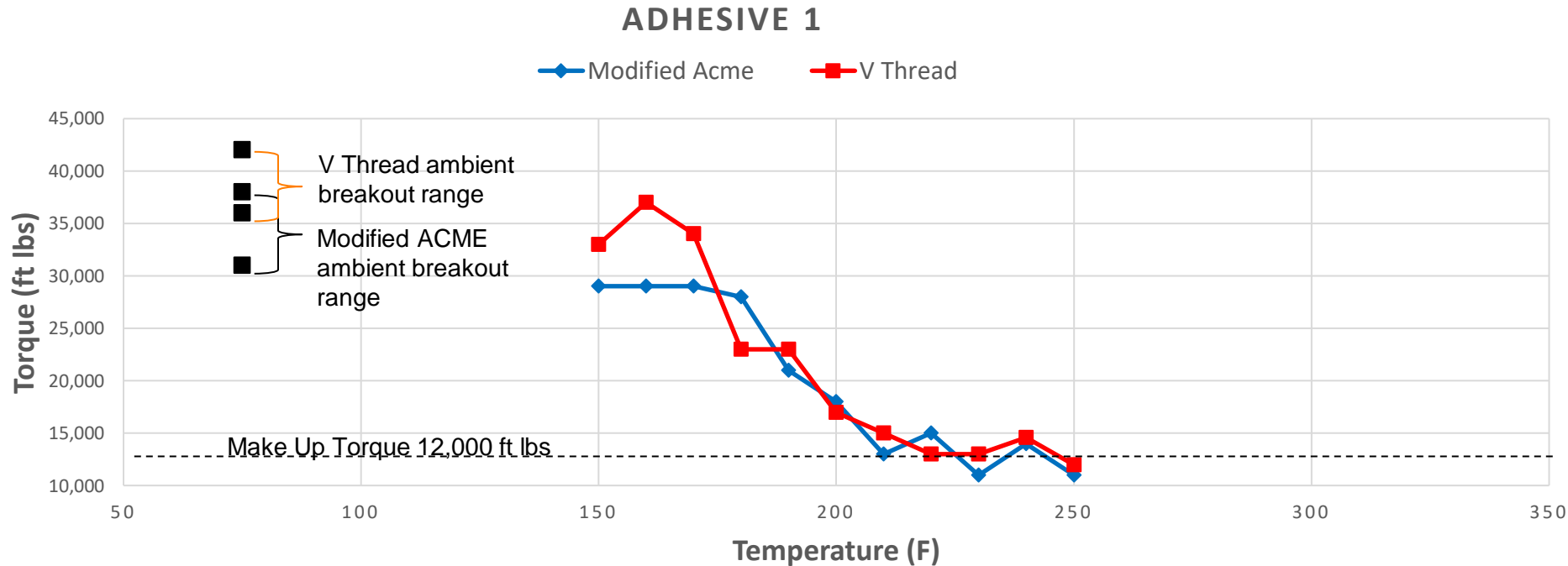
# Induction Coil Break-out Torque Data (2)

## V Thread 300F & 200 F Break Test

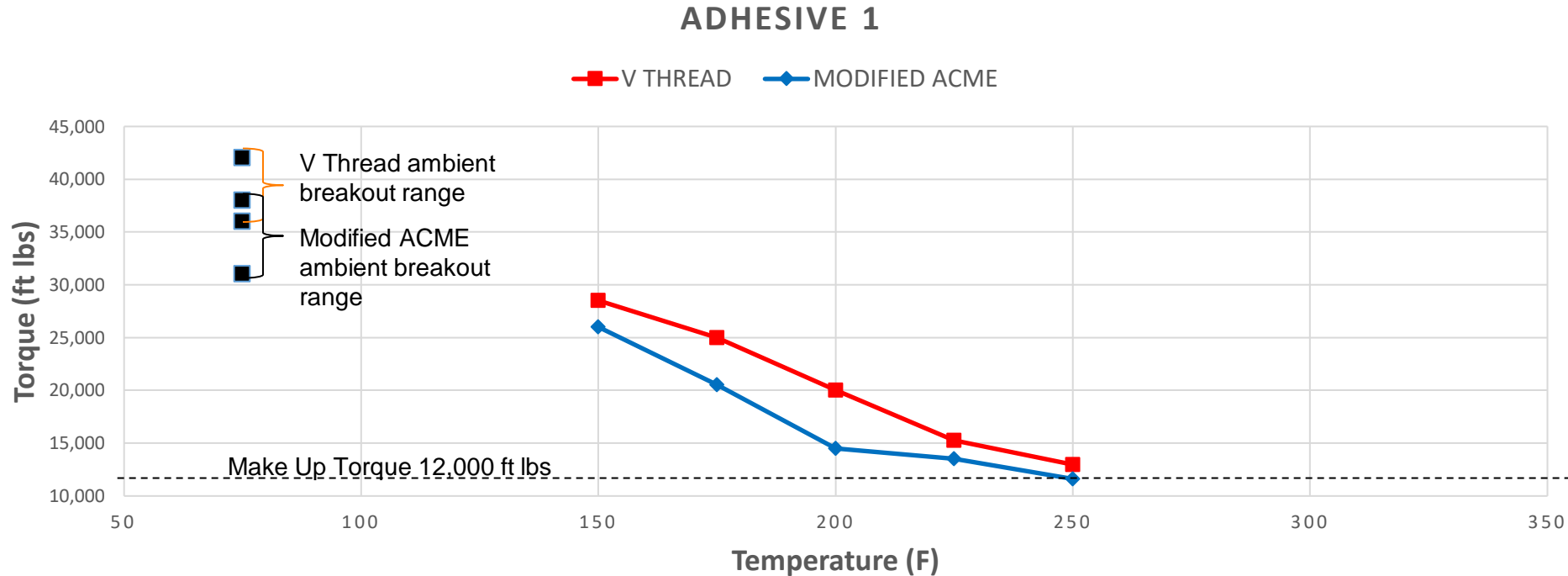




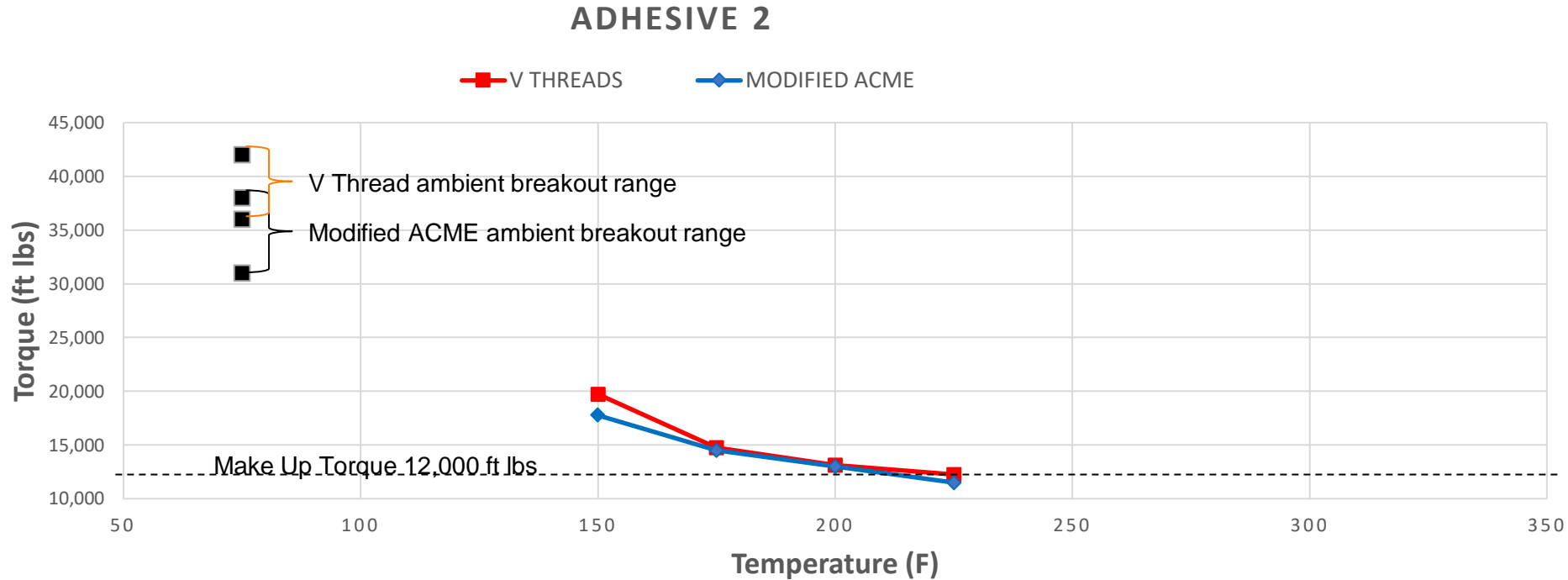
# Detailed Analysis Using Baking Oven



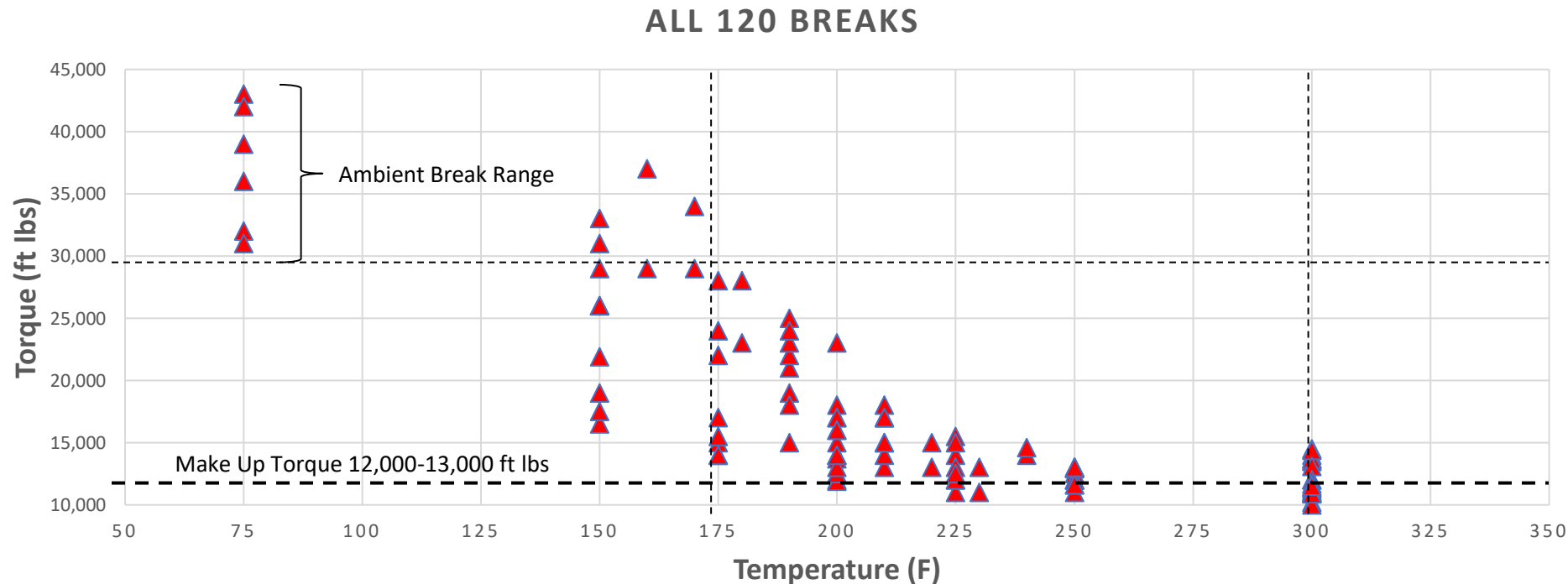
# Detailed Analysis Using Climate Chamber (1)



# Detailed Analysis Using Climate Chamber (2)



# Overview All Break-out Tests



# Summary and Conclusions

- Key Investigation Findings
  - Thread adhesives effective up to approx. 150°F
  - Significant decrease in effectiveness from 175°F - 250°F
    - Marginal differences between adhesives in this temp range
  - Thread adhesives not effective at temperatures > 250°F
  - When connections were broken at high temperature, adhesives were found to have softened and secreted oily substance
  - After heat exposure, adhesives reset after cool down, and connection regains high break-out torque at ambient
- Oilfield is in need for adhesives more effective at high temperatures
- Findings emphasize needs for limiting torque spikes while drilling in HT environments

# IADD MUD MOTOR FORUM

January 26 – Oxy Woodlands Allison Tower  
Reception at Landry's to follow



# Thank You