

# **Sandia Status Report on First Compression Spin Tests and Results Using the SNL SCO<sub>2</sub> Compression Loop**

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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under Contract DE-AC04-94AL85000.



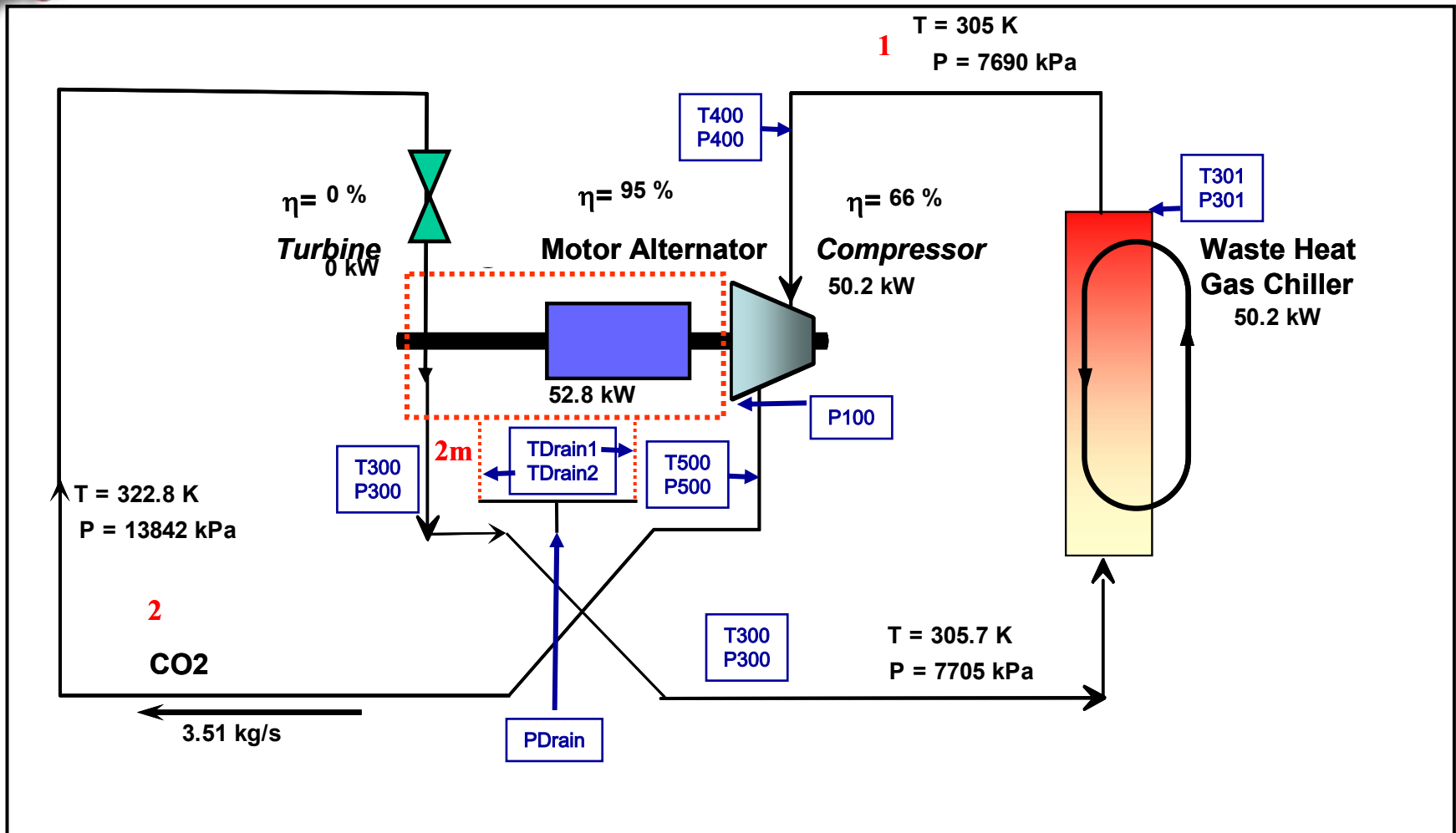


# Introduction

- **Sandia Supercritical Compression Loop**
  - Schematic of Compression Loop
  - Engineering Drawings and Photos of Loop and Instrumentation
- **Test Results Summary**
- **Summary and Conclusions**



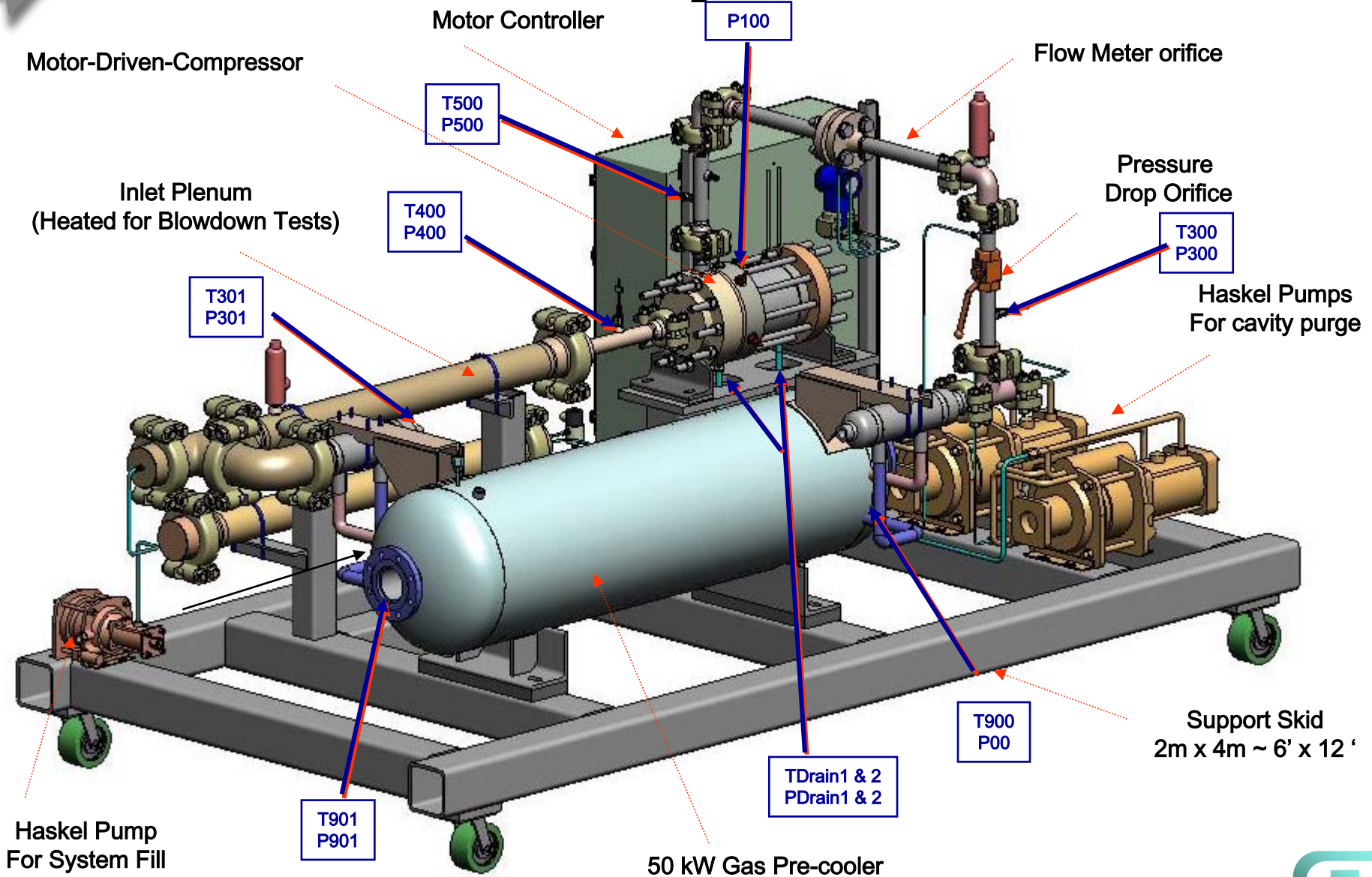
# SNL Supercritical CO<sub>2</sub> Compression Loop



- Compression Loop Configuration
- Nomenclature
- Instrumentation Names and Locations



# Engineering Drawing of Sandia's $\text{SCO}_2$ Compression Loop





# Sandia Supercritical CO<sub>2</sub> Compression Loop Configuration





# Summary of Test Data

- **High Pressure Spin Tests up to 30,000 rpm and 800 psia**
  - **Design Conditions are 75,000 rpm and 1100 psia**
  - **Tests Measurements provide**
    - **Leakage Rates Through Supercritical CO<sub>2</sub> Gas Seals**
  - **Power Loss Measurements**
    - **Relative Electrical Losses : Friction Losses: Windage Fraction**
  - **Measured Compressor Flow Map Data at Low RPM and Pressure**
    - **Data are Consistent with SNL's Compressor Mapping Analysis**





# Conclusions and Next Steps

- **Sandia Supercritical CO<sub>2</sub> Compression Loop is Operating**
- **Generally good agreement between Compressor Models and Compressor Map Measurements at Low Pressure and at Low Shaft Speed**
- **Next Steps**
  - **Increase shaft speed and fill pressure**
  - **Complete Compressor Performance Mapping**
  - **Add in more components**
    - **PCHE Gas Chillers, Heaters, Recuperators**

