



21CR Project 610-50035

Study of the Effects of Water in Synthetic Lubricant Systems and Clathrate Formation

Updated 5 September 2001

Objectives:

- (1) Compiling and critically evaluating the current state of knowledge of the effects of water in HFC/synthetic lubricant systems for refrigeration and air-conditioning
- (2) Identifying key areas requiring further investigation and important tasks in each area.

Information/items expected to result from this project:

Documentation and analysis of current state of knowledge on:

- (1) Description of chemical reactions occurring with water and synthetic lubricants and the effects of reaction products on materials of construction
- (2) Indication of the relative impact of water concentration and system temperatures on water reactivity and reaction products
- (3) Conditions for clathrate formation
- (4) Partitioning of water between refrigerant liquid and vapor and between refrigerant and lubricant
- (5) Impact of water on physical properties such as dielectric properties
- (6) Mitigation techniques

How are the results likely to be applied:

Systems manufacturers may be able to use information from this project in redefining water content criteria for manufacturing new products and for replacement of lubricants and/or refrigerants in the field. Lubricant producers may be able to identify additives to reduce the reaction of water and synthetic lubricants, or at least understand the maximum amount of allowable water in lubricants and systems, thereby prolonging the use of synthetic lubricants in systems. Educators will be able to impart to students a better understanding of water/synthetic lubricant reactions, ice and clathrate formation, and mitigation techniques.

Research subcontractor:

Spauschus Associates, Inc., Atlanta, GA. (Principal Investigator: Rosine Rhatgi, Ph.D.)

Status:

This project was concluded in the third quarter of 2001 and a final report approved for release. The final report is available free for downloading from the ARTI website.

Responsible 21CR Subcommittee: Working Fluids