REPORT
INTERTEK-ETL SEMKO Division
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REPORT NO. 3178523COL-001R

RENDERED TO:

A.S.Trust & Holdings
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STANDARD AND TEST USED: ANSI/UL 2182 "Refrigerants", Section 5 "Fractionation Analysis" and an evaluation of the Blend'sOzone Depletion Potential (ODP) and Global Warming Potential (GWP) over 100 years.

AUTHORIZATION: The test was authorized by Mr. Richard Maruya.

SPECIMEN DESCRIPTION: The tests were performed on refrigerant blend with the following nominal liquid composition (mass%): R-170/R-290/R-600a/R-600 (3.1/54.8/6.0/36.1) (±0.3/± 2.0/± 0.6/ ± 2).

INTRODUCTION: The purpose of this evaluation is to first investigate the flammability properties of each component of this refrigerant blend to determine a Worse Case of Formulation for Flammability (WCF). This formulation was then be used to run computer simulations in accordance with section 5 of ANSI/UL 2182 to determine the Worse Case of Fractionation for Flammability (WCFF). Finally, the Global Warming Potential (GWP) over 100 years and Ozone depletion Potential (ODP) were evaluated based on mass% of components of the blend and literature search including the EPA website and several published industry papers.

CONCLUSION: This report describes the results of A.S. Trust & Holdings refrigerant blend R-170/R-290/R-600a/R-600 (3.1/54.8/6.0/36.1) (±0.3/± 2.0/± 0.6/ ± 2). in accordance with section 5 of ANSI/UL 2182. The test evaluations were conducted at Intertek Testing Services located in Columbus, OH between 6/15/09 and 6/29/09. Components of this blend were ranked for flammability based on the evaluation their thermodynamic properties of Heat of combustion, Flash Point, Auto-ignition Temperature, and LEL. LEL was selected as the dominating property for determining higher flammability. Based on the combination of these thermodynamic properties, R-600a was determined to be the most flammable and therefore maximized in the WCF and R-170 least flammable and therefore minimized in the WCF. Property data for each component is listed in Table 1 of this report. Results from WFC Fractionation Simulation Data are reported in Table 2 of this report. Results for Composition including Nominal Formulation, Worse Case of Formulation for Flammability (WCF), and Worse Case of Fractionation for Flammability (WCFF) are reported in Table 3 of this report. Finally, the GWP over 100 years for this blend in it's nominal composition was estimated to be negligible or essentially Zero, and the Ozone Depletion Potential (ODP) of the blend is Zero, due to the absence of any halogenated compounds.

Subject: