



# Research Report

## RR-206

### Hydrocarbon Solubility in Glycol and Amine Solutions

**Project 975-5**



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## Foreword

The Gas Processors Association (GPA) initiated Project 975 to aid in updating key industry resources, specifically the 13<sup>th</sup> Edition of the GPSA Engineering Data Book. Sub project 5 (Project 975-5) was undertaken specifically to review the content of previously published GPA Research Reports (specifically RRs 117, 131, 137, 149, 180 and 185), Technical Publications (specifically TP 29), and other trusted and available published data in the literature on the solubility of various hydrocarbons in glycol (TEG and EG) and amine (MEA, DEA, DGA, and MDEA) solutions at conditions pertinent to gas processing industry operations.

Much of the experimental data generated in these previous GPA projects focused on aromatic compounds (i.e. BTEX – benzene, toluene, ethyl benzene, and xylenes) due to their relatively high solubility compared to other hydrocarbons and their importance in emission regulations. However, some limited data has also been generated for the solubility of non-BTEX hydrocarbons. Because all of these gas treating solvents will dissolve some amount of hydrocarbons; understanding solubility in these gas treating solvents is important for many reasons such being able to estimate treated gas product shrinkage (hydrocarbon loss); estimating emissions of Hazardous Air Pollutants such as BTEX, n-Hexane, 2,2,4-Trimethylpentane, among others for health, safety and permitting reasons; and estimating the level of BTEX or other hydrocarbons in the acid gas stream since these have negative impacts to downstream processes (i.e. sulfur removal).

The ultimate goal was to summarize the data into forms that would be convenient for use in quick and approximate manual calculations such as figures, descriptive text, and where feasible equations that more accurately represent the data over a wider range of conditions yet were simple enough for suitable inclusion into the Data Book. This project focused on an update to Section 20 (Dehydration) and Section 21 (Hydrocarbon Treating). Applicability of the data, including expected error and range of use, were included to help the user better understand the limitations of using this data for various applications. The overall intent was to make the subject data more easily interpreted and applied by user company engineers and operators with guidance

to assist users of the Data Book to apply the data and correlations to real design and operating problems.

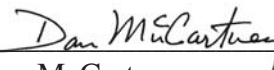
In addition to the Data Book updates described above, this report was prepared and contains:

- a more detailed review of the original source data with tables summarizing all of the data used with reference to the original data source,
- a description of the methods and techniques used to analyze the data,
- new representation of these data such as equations and figures describing the relationships of the data in specific areas of interest to the gas processing industry, and
- the use and limitation of these new and updated representations such as anticipated error specific to the new equations or plots and their range of applicability.


As noted above, this work is based on the data generated by a number of previous projects sponsored by the GPA. No new data were generated as part of this project.



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