Attachment 1

# HEAVY WATER HANDBOOK

Evaluatlon of Available Thermophysical Properties of Heavy Water ($D_2O$) Liquid and Vapour

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**Abstract** Numerous publications on the thermophysical data of heavy water ($D_2O$) have been published since $D_2O$ became commercially available in the 1930'es. Some of these data are in mutual disagreement. This has led to confusion among the scientifical and technical staffs who needed the information on the $D_2O$ thermophysical data.

Comct thermophysical data must be consistent, i.e. their mutual relations musl be in accordance to the fundamental thermophysical laws. The work behind this publication has been focussed at collecting all available $D_2O$ dala and checking the data mutually by means of these fundamtntal thermophysical criteria.

Depending on the variaus production methods, the oxygen content of the $D_2O$ is enriched more or less in the heavier oxygen isotopes $^{17}O$ and $^{18}O$. This, together with the amount of impurities and dissolved gases in the $D_2O$ samples of the various references, might - to some extent - explain the discrepancies between the data sources. Only a few references contain informations on these subjects.

The $D_2O$ dala sets which were found to be the most reliable are presented in chapter 9, in tables as well as in diagrams, together with the corresponding $H_2O$ data for comparison. The diagrams are commentted for reliability where it was found necessary.

Furthermore, the publication contains short descriptions on the heavy water sources, availability, production processes, economy, material and energy demands for production.

A comprehensive list of references is enclosed.