



TECHNICAL INFORMATION

UCARSOL AP 804 AND AP 806 SOLVENTS FOR BULK CO₂ REMOVAL

INTRODUCTION

UCARSOL™ AP 804 and UCARSOL AP 806 Solvents are two additions to a series of advanced-performance gas treating solvents from The Dow Chemical Company. Specifically designed for bulk carbon dioxide (CO₂) removal in gas processing to meet pipeline specifications, UCARSOL AP 804 and AP 806 Solvents are effective in both sweet and sour gas streams.

Low heats of reaction combined with the ability to remove both CO₂ and hydrogen sulfide (H₂S) allow the gas processor to meet tight sulfur specifications, while meeting product gas Btu and CO₂ specifications. UCARSOL AP 804 and AP 806 Solvents also provide significant operating savings compared to other commonly used solvents.

UCARSOL AP 806 Solvent is designed to handle lower pressure gas streams (<300 psia or 2.1 MPa) requiring a high degree of CO₂ removal, whereas UCARSOL AP 804 Solvent is designed to treat higher pressure gas streams containing moderate levels of CO₂. Both solvents have excellent high temperature performance versus other commonly available solvents.

SPECIAL FEATURES

The UCARSOL™ AP line of solvents offers these important special advantages to gas processors:

- Low circulation rates and low energy requirements translate into a lower capital cost for grassroots units
- Significant energy savings — through reduced reboiler duties and lower circulation rates — minimize operational costs
- A low foaming tendency coupled with a low solvent vapor pressure minimizes solvent make-up requirements and further reduces operational costs
- High solvent stability, eliminating the need for reclaiming
- Increased acid gas processing ability within existing facilities — increased unit capacity without the need to modify process equipment
- Local technical support assures ongoing trouble-free operation
- Fully supported by Dow Oil & Gas, the global leader in providing gas treating processors with specialized technologies and services

CORROSION EFFECTS

The results of actual field experience in numerous operating units indicate that solutions of UCARSOL™ AP solvents, maintained properly and used as specified, exhibit very low corrosion rates.

PHYSICAL PROPERTIES

UCARSOL™ specialty solvents can be used as aqueous solutions in various concentrations; however, a 40%-50% aqueous solution has been found to offer optimal performance. Physical property data for pure and 50% aqueous solutions of UCARSOL AP 804 and AP 806 Solvents have been developed and are presented on the following pages.

Additional information on UCARSOL AP 804 and AP 806 Solvents, their properties and advantages, is available on request. To explore more specifically what UCARSOL AP 804 and AP 806 solvents can do for your existing or proposed gas treating unit, contact Dow at the numbers listed at the end of this publication.

TABLE 1 • PHYSICAL PROPERTIES OF UCARSOL™ AP 804 AND AP 806 SOLVENT

	AP 804		AP 806	
	Pure	50 Wt % Aqueous	Pure	50 Wt % Aqueous
Average Weight per Gallon at 20°C, lb	8.70		8.70	
Average Weight per Liter at 20°C, kg	1.04		1.04	
lb per Gallon/t at 20°C	0.00613		0.00626	
kg per Liter/t at 20°C	0.00074		0.00075	
Coefficient of Thermal Expansion per °C (est) at 20°C at 55°C	0.00070		0.00071	
	0.00073		0.00079	
Boiling Point, °C (°F) at 760 mm Hg at 50 mm Hg at 10 mm Hg	149 (300)	103 (218)	149 (300)	103 (218)
	75 (167)	42 (107)	89 (192)	42 (107)
	45 (113)	15 (60)	40 (104)	15 (60)
Pour Point, °C (°F)	-51 (-60)	-15 (5)	-51 (-60)	-15 (5)
pH	11.0	10.9	11.0	10.9
Specific Gravity, 20/20°C	1.045	1.0328	1.045	1.0367
Solubility in Water at 20°C, weight percent of Water in at 20°C, weight percent	100	Complete	100	Complete
	100	Complete	100	Complete
Flash Point, °C (°F) Pensky-Martens Closed Cup (ASTM D93) Cleveland Open Cup (ASTM D92)	None		None	
	132 (270)		132 (270)	

FIGURE 1: DENSITY OF UCARSOL™ AP 804 SOLVENT

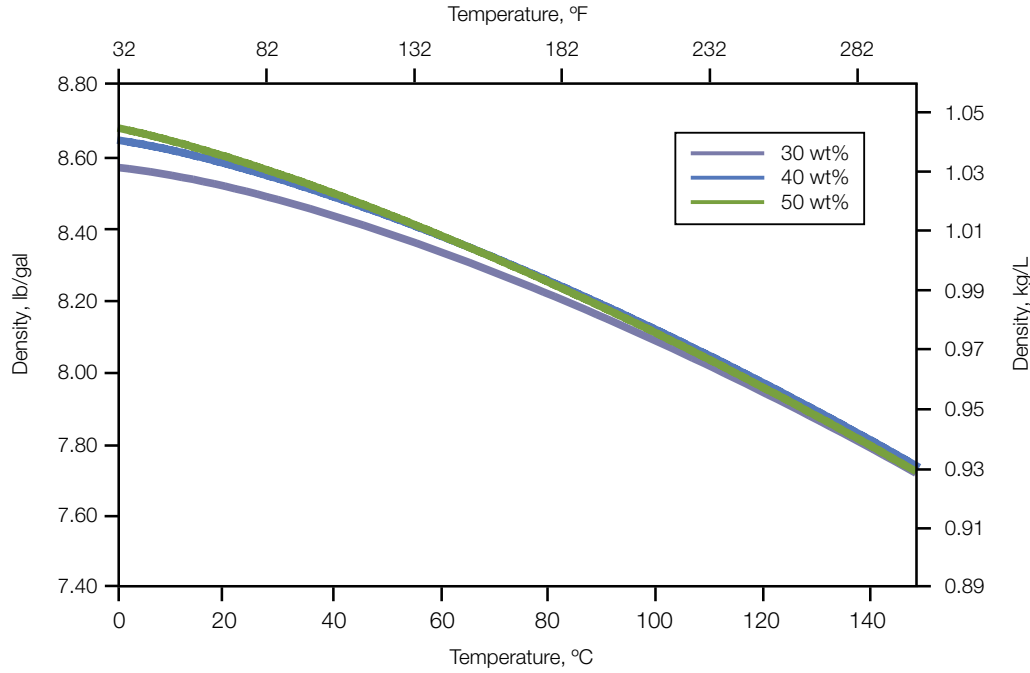


FIGURE 2 • VISCOSITY OF UCARSOL™ AP 804 SOLVENT

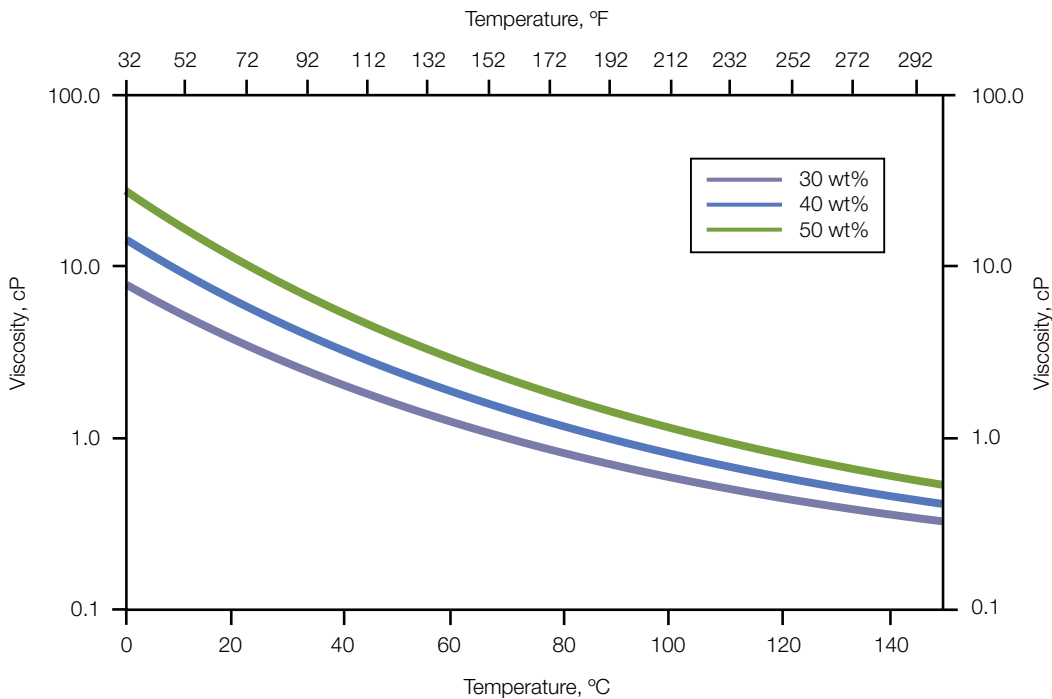


FIGURE 3 • HEAT CAPACITY OF UCARSOL™ AP 804 SOLVENT

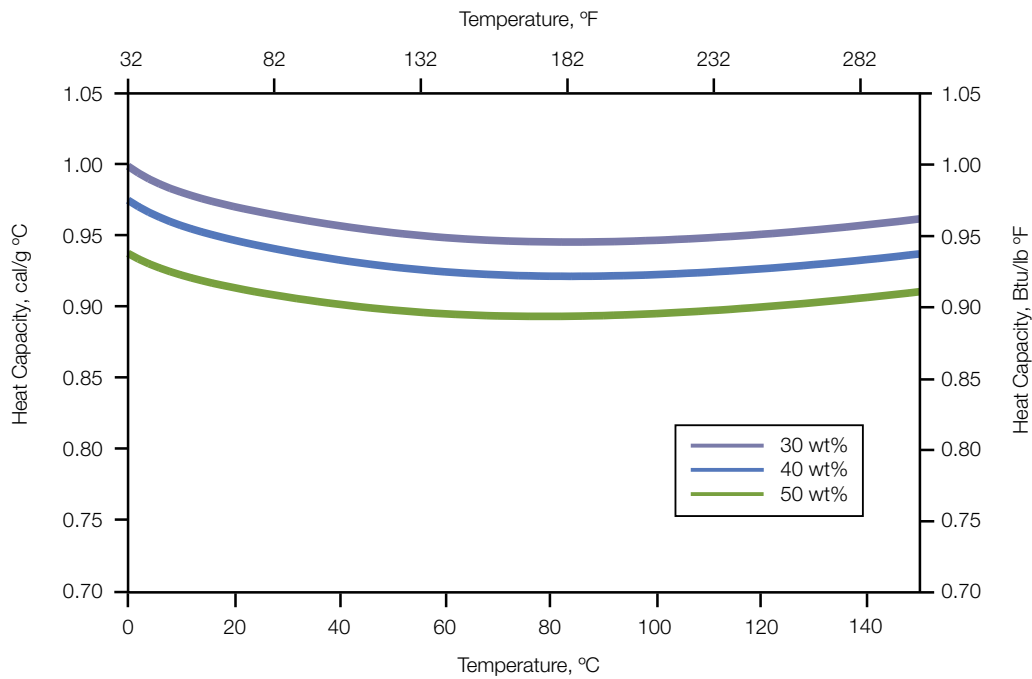


FIGURE 4 • THERMAL CONDUCTIVITY OF UCARSOL™ AP 804 SOLVENT

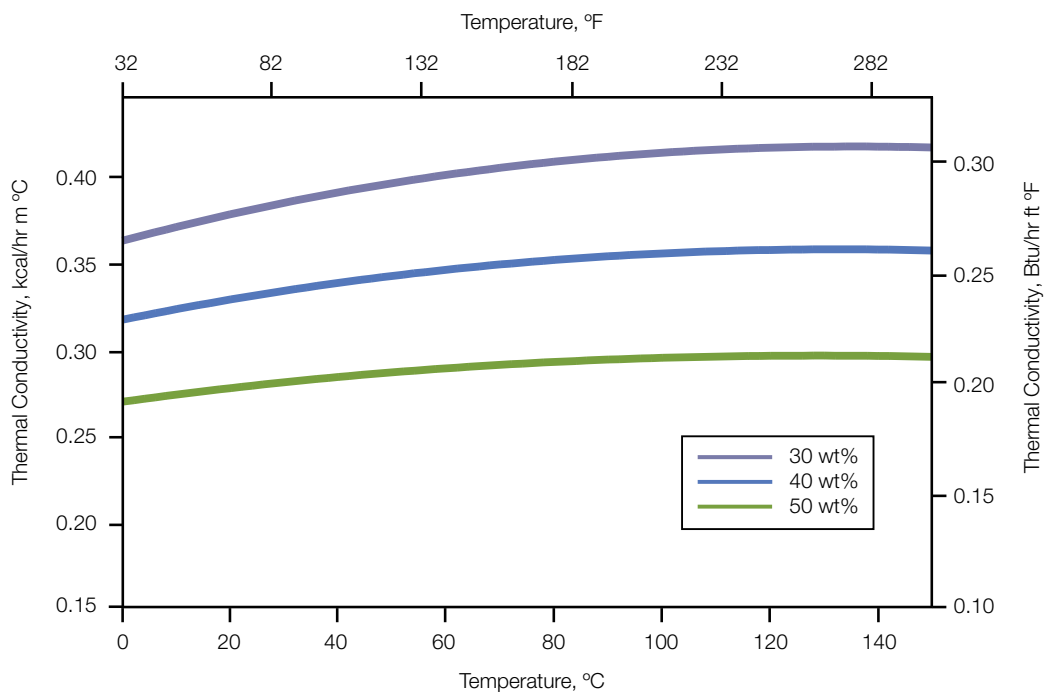


FIGURE 5 • SURFACE TENSION OF UCARSOL™ AP 804 SOLVENT

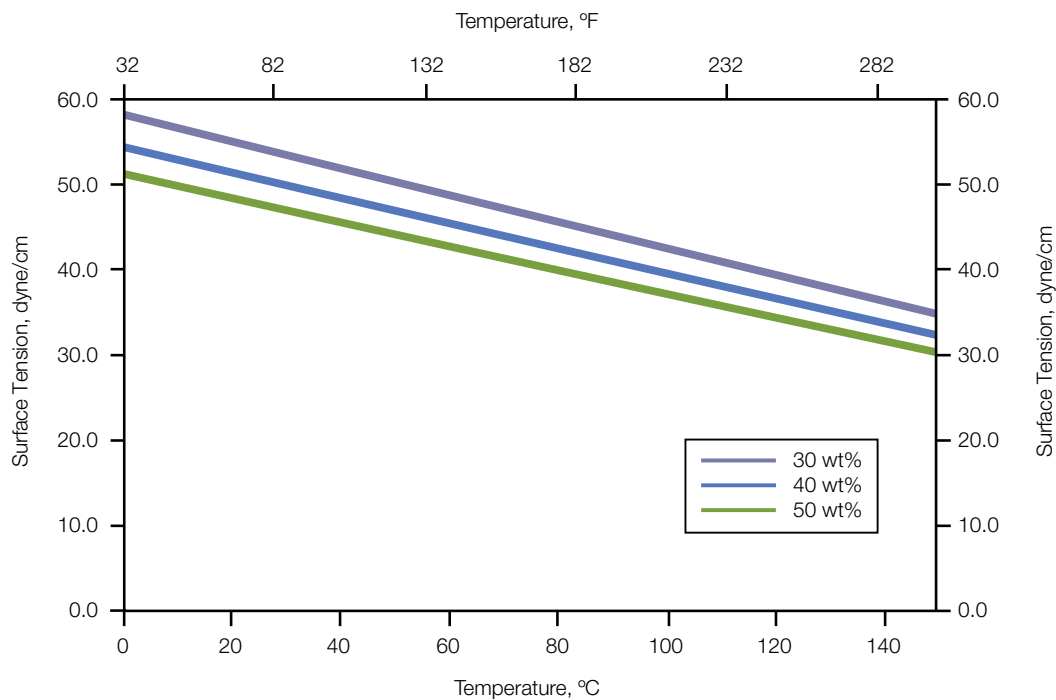


FIGURE 6 • DENSITY OF UCARSOL™ AP 806 SOLVENT

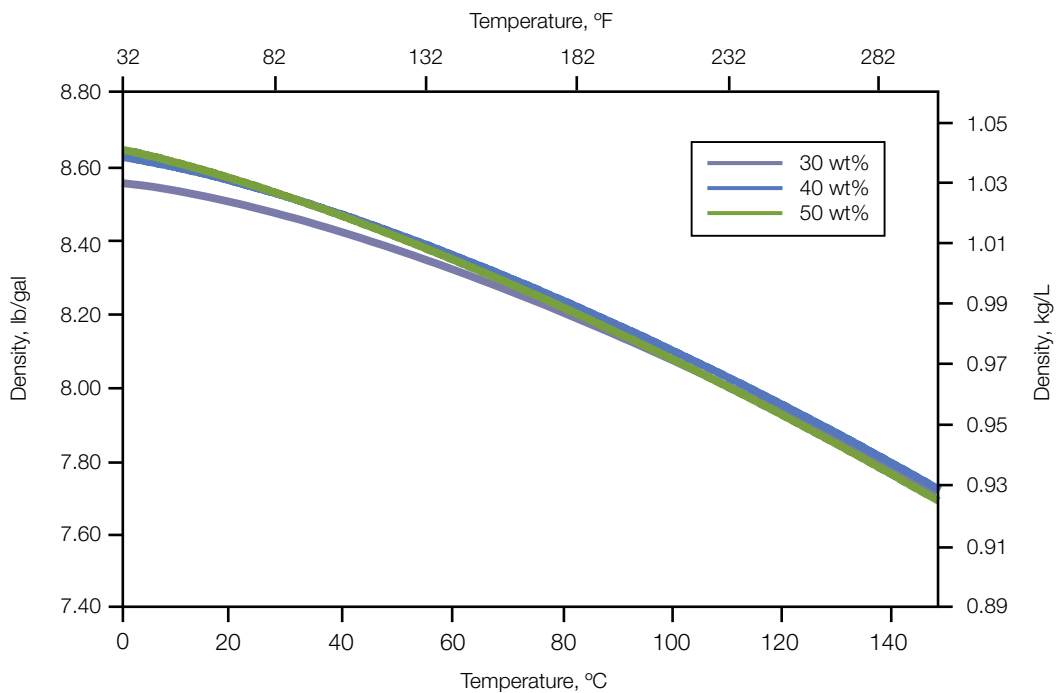


FIGURE 7 • VISCOSITY OF UCARSOL™ AP 806 SOLVENT

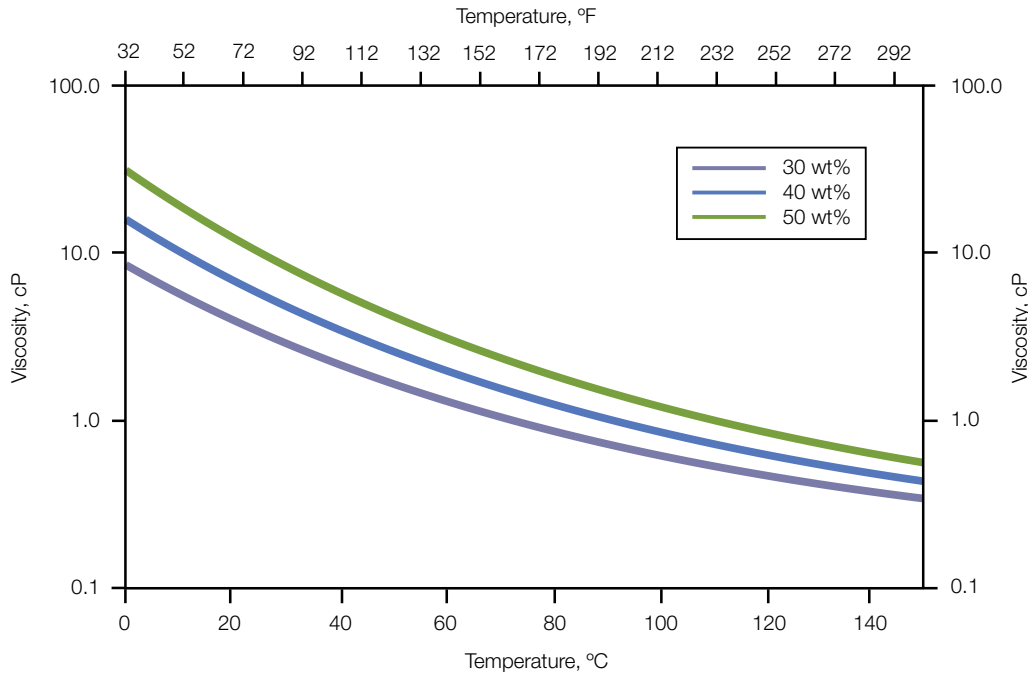


FIGURE 8 • HEAT CAPACITY OF UCARSOL™ AP 806 SOLVENT

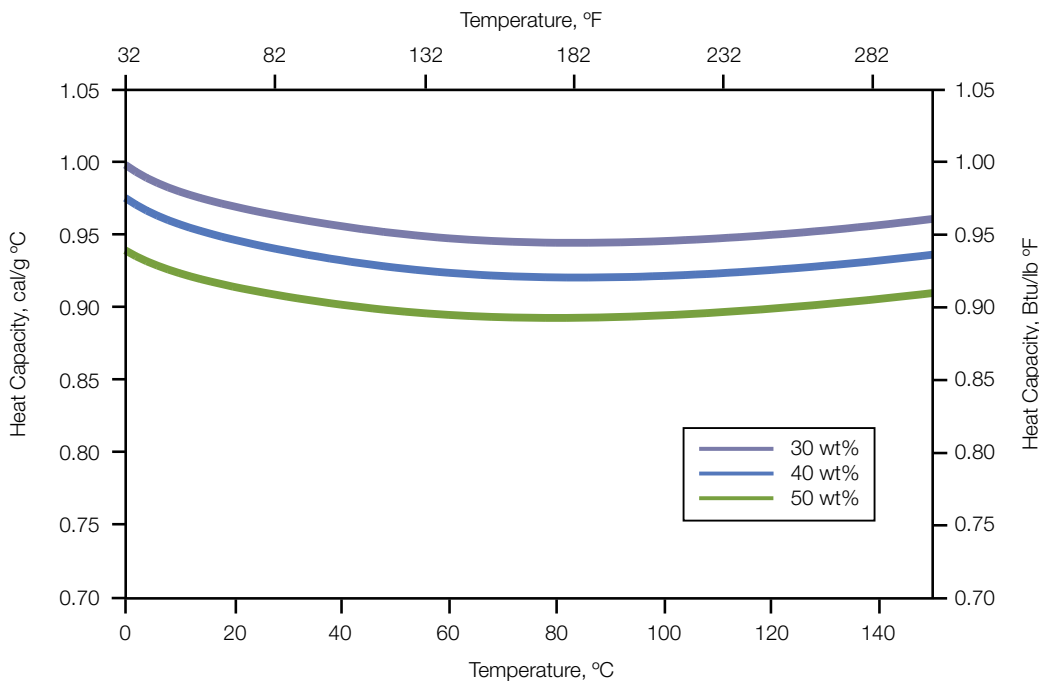


FIGURE 9 • THERMAL CONDUCTIVITY OF UCARSOL™ AP 806 SOLVENT

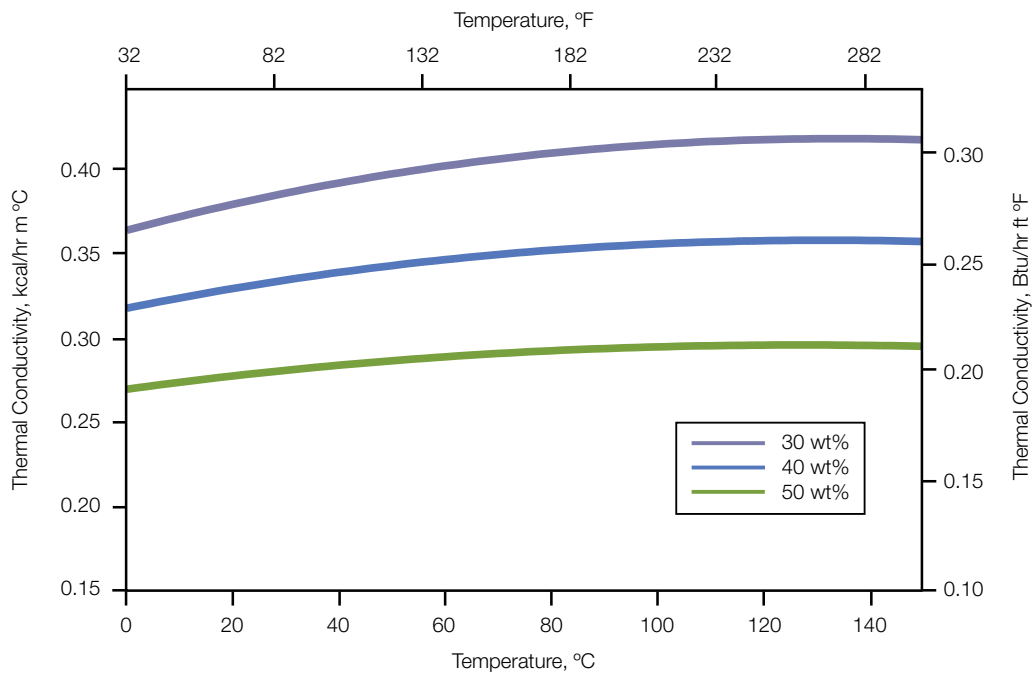
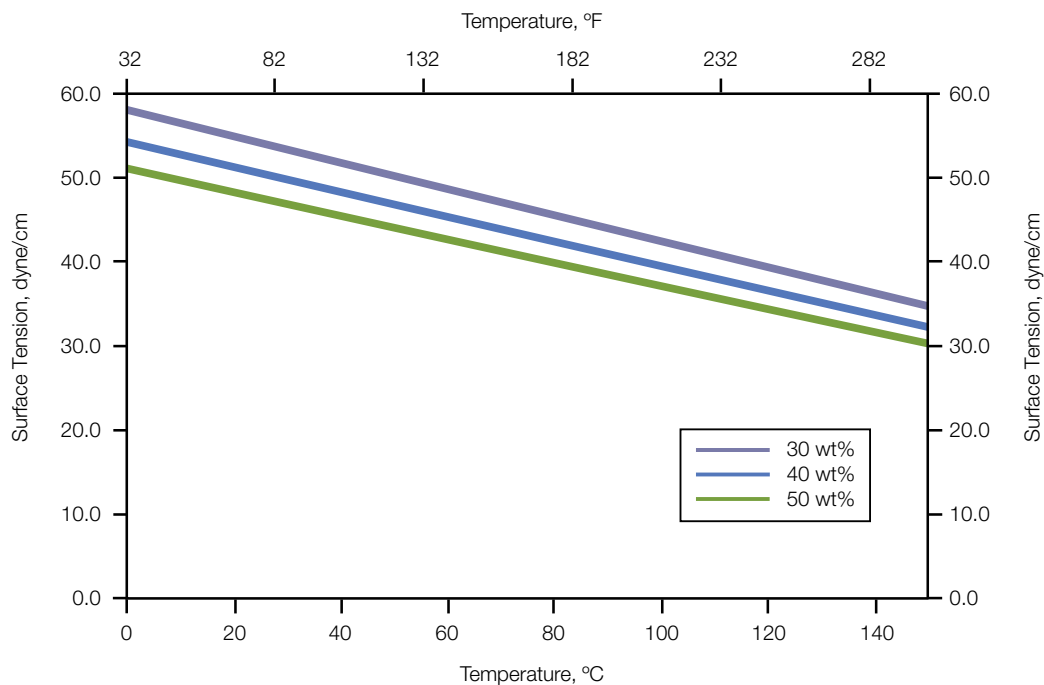


FIGURE 10 • SURFACE TENSION OF UCARSOL™ AP 806 SOLVENT



GAS TREATING SERVICES

Dow is a worldwide leader in providing gas treating processors with specialized technology and services. To aid in both plant design and operation, UCARSOL™ solvents are supported by advanced computer capabilities, state-of-the-art laboratory, field test equipment, analytical procedures and an optimization program. The services Dow provides encompass preliminary assessments, start-up services, continual monitoring and follow-up services. Included in this total support program is the training for people in the field, regular sample testing and performance evaluation. To help ensure complete customer protection and satisfaction, Dow is there every step of the way – before, during and after installation.

SIMULATION CAPABILITIES

With information drawn from actual operating conditions at more than 1,000 plants, Dow has an extensive formulated solvent database used to optimize the simulation programs used in design. This sophisticated computer program provides a powerful tool for process analysis and design, including tray-by-tray calculations. Basic hydraulic evaluations can be made of existing trayed or packed towers to help ensure that conversion to UCARSOL™ solvents will be trouble-free.

Field representatives have the latest equipment and programs that make it possible to predict the performance of UCARSOL solvents under actual plant conditions. In addition, their use as an in-field preliminary design tool is extremely valuable after conversion to make any adjustments necessary to optimize the process.

LABORATORY AND FIELD TESTING

The Dow Oil & Gas Characterization Lab performs regular service analyses of customer solvents to ensure good performance of the amine unit, as well as specialized analyses to assist in trouble-free operation. Routine analysis performed includes ion chromatography, inductively coupled plasma and solution alkalinity. Analysis is normally completed and reported to the customer within a few days upon receiving the sample. Dow's customer report includes a technical service review of the analytical results and their impact on the customer's operation.

SAMPLE KITS

Dow offers a unique sample kit. Completely self-contained, the kit provides everything necessary – from containers to labels – to obtain lean amine samples, seal them and safely ship them for routine analysis.

OTHER SERVICES

Dow's engineering expertise is also available to provide information on process and equipment requirements. Dow also trains customer personnel prior to and during conversion and works with them to ensure optimal performance.

STORAGE AND HANDLING

UCARSOL AP 804 and AP 806 Solvents are usually stored and handled in steel equipment. They are also compatible with stainless steel. **Zinc or galvanized steel and copper and its alloys should not be used. Materials of construction guidelines for specific plant areas are available upon request.**

These products become viscous at outside winter temperatures and have a freezing point of -23°C. Therefore, storage inside a warm building or in a heated, insulated tank may be desirable. A centrifugal pump is suitable for transfer service, assuming the temperature of the product is sufficiently above its pour point. A rotary or gear pump is suggested for low-temperature transfers.

Piping should be of adequate size to handle the maximum viscosity expected to be encountered. Valves, piping, etc. are usually of steel construction. Type 304 stainless steel, spiral-wound GRAFOIL gaskets for flanges and GRAFOIL packing for valves are recommended. For O-rings, ethylene propylene rubber (EPR) is recommended below 50°C, and Kalrez elastomers or equivalent above 50°C. Do **not** use Viton or Buna N elastomers.

Aqueous solutions of UCARSOL AP 804 and AP 806 Solvents can be handled in steel equipment. They should **not** be handled or stored in contact with aluminum, zinc or galvanized iron, or with copper and its alloys.

PRODUCT STEWARDSHIP

When considering the use of any Dow products in a particular application, you should review the latest Material Safety Data Sheets from Dow and ensure that they are intended for safe use. For Material Safety Data Sheets and other product safety information, contact Dow. Before handling any other products mentioned in the text, you should obtain available product safety information and take necessary steps to ensure safety of use.

No chemical should be used as or in a food, drug, medical device or cosmetic, or in a product or process in which it may contact a food, drug, medical device or cosmetic until the user has determined the suitability and legality of the use. Since government regulations and use conditions are subject to change, it is the user's responsibility to determine that this information is appropriate and suitable under current, applicable laws and regulations.

Dow requests that the customer read, understand and comply with the information contained in this publication and the current Material Safety Data Sheet(s). The customer should furnish the information in this publication to its employees, contractors and customers, or any other users of the product(s), and request that they do the same.

TO LEARN MORE...

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**Toll-free service not available in all countries.*



Oil & Gas

For more information, visit www.dowoilandgas.com.

Note: This guide is designed as a general product overview. Please contact your local Dow Oil & Gas representative for up-to-date, detailed technical information including general registrations and use limitations and to discuss individual applications or requirements.

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