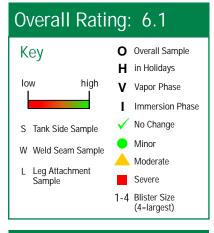
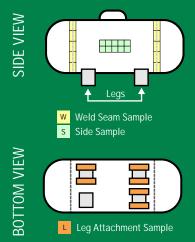
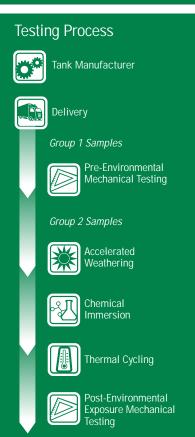


Liberty Tank & Vessels

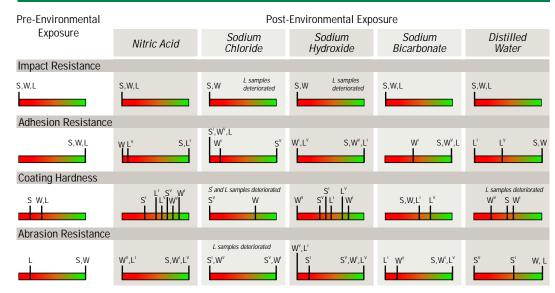
Polyethlylene powder coating











^{*}In some cases the mechanical properties improved after exposure, which may be related to hardening or softening of the coating, or variations in coating thickness across the samples.

Environmental Exposure Testing

Accelerated Weathering—250 hours

Minor-to-moderate color change (dark gray/brown) and gloss reduction; rust spots

Chemical Immersion—90 Days

Tank Area and Results	Nitric Acid	Sodium Chloride	Sodium Hydroxide	Sodium Bicarbonate	Distilled Water
Side Wall					
Color & Gloss	o ^v , o ¹	o - <u>o</u>	0	o '	0
Rusting	H'	<u>o</u> ¹, o ⁰	✓	<u> </u>	<u> </u>
Blistering	\checkmark	\checkmark	✓	\checkmark	\checkmark
Weld Seam					
Color & Gloss	o'	o' -	0	0	0
Rusting	\checkmark	0	\checkmark	0	✓
Blistering	✓	\checkmark	✓	\checkmark	✓
Leg Attachment					
Color & Gloss	o'	o '	\checkmark	0	0
Rusting	\checkmark	O ^V ,	o ^v	o – <u>o</u>	o - <u>o</u>
Blistering	√	\checkmark	✓	\checkmark	✓

Thermal Cycling—30 24-hour cycles

Sodium bicarbonate leg attachment

Rusting: 6

Nitric acid weld seam
Rusting:

Sodium chloride side wall
Blistering: 4

Distilled water side wall
Rusting:

Sodium hydroxide weld seam
Rusting:
Sodium chloride leg attachment

Sodium chloride leg attachment Rusting: 🏡 Blistering: 4 👅 Distilled water leg attachment
Rusting: 6
Sodium chloride weld seam

Sodium hydroxide leg attachment Rusting: o Blistering: 4 o Research was provided by KTA-Tator Inc. under PERC Docket 12469, *Testing and Evaluation of Underground Propane Tank Coatings*. The information provided in this document is intended only as a summary of the tank coating performance results; for more detailed findings, please reference the full report.

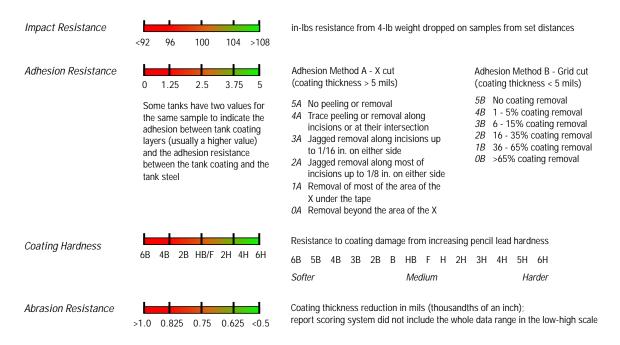
The ranking of the seven propane tanks used in this study on the basis of performance points should not be misinterpreted. Nothing in this report should be construed to suggest that the tanks that have received the lowest number of performance points and the lowest ranking overall, or in any category, are defective, dangerous, or subject to withdrawal from the market or from use in their intended application. Nothing in this report should be construed to suggest that any type of underground propane tank, or any underground propane tank with a particular type of coating, should not be used in the propane industry.

The tank evaluation results have been summarized through the following methods.

Mechanical Durability:

The front page of this document provides a side-by-side comparison of tank performance both before and after environmental exposure (accelerated weathering, chemical immersion, and thermal cycling). KTA-Tator provided pre- and post-environmental exposure test data for tank samples taken from the tank weld seam, side wall, and leg attachment.

The low-to-high scales indicate the performance range unique to each test. Raw performance data was used to rank each sample on the appropriate test's scale:



Chemical Immersion:

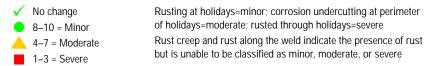
The report includes data for 30-day, 60-day, and 90-day chemical immersion periods. The 90-day results are summarized in this document to demonstrate the longer-term effects of chemical immersion. Color and gloss changes, rusting, and blistering are classified as minor, moderate, or severe for visual purposes using the following scales:

Color and gloss change

· Severity was labeled as minor, moderate, or severe in the report.

Rusting

- Evaluated according to SSPC VIS 2/ASTM D 610, "Evaluating Degree of Rusting on Painted Steel Surfaces."
 - In some cases, rusting was classified as minor/moderate/severe within the report.
 - In other cases, the following numbers were used: 10 (<0.03%); 9 (0.03%); 8 (0.1%); 7 (0.3%); 6 (1%); 5 (3%); 4 (10%), 3 (16%); 2 (33%); 1 (50%).
 - These frequencies are visually conveyed through the following system:



Blistering

- Blister sizes given in report: 2, 4, 6, 8, according to ASTM D 714, "Evaluating the Degree of Blistering of Paints."
 - Blister sizes given in the report indicated 8 as the smallest blister size and 2 as the largest blister size.
 - To aid presentation, these ratings were inversed to a 1–4 scale to show a larger number as a larger blister size.
- Blister frequencies given in report: Few, Medium, Medium Dense, Dense for blister density, according to ASTM D 714.
 These frequencies are visually conveyed through the following system:

