



## Floating Cover Information



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Greetings,

I would like to take this opportunity to introduce you to our company.

Lange Containment Systems, Inc. (LCSI) is a premier fabricator of custom geosynthetic membrane products. We specialize in large panels, custom shapes and a full line of accessories. We utilize the highest quality materials including PVC, Hypalon, XR-5, Polypropylene, Urethanes and a variety of coated fabrics.

Our management team has over 50 years experience in all facets of the business and in all corners of the globe. We have had extensive experience with secondary containment of fuels and chemicals. Our applications range from temporary liners below a skid-mounted diesel tank to complex tank farms. At your direction we can provide all the components to do a containment kit and also offer the field installation services of a technician or complete crew to install the system.

LCSI is committed to providing the highest quality products, with the service and flexibility that sets the standard for our industry. This means that each bid, job, and person will get the quality individual attention of our team that is deserved. Our service will not be compromised.

With that said, please take your time reviewing our brochure and work. We welcome your calls and questions, and look forward to doing business with you in the future.

Sincerely,



Stuart Lange, President  
Lange Containment Systems, Inc.



## About LCSI

Centrally located in Denver Colorado, Lange Containment Systems Inc (LSCI) is a fabricator and installer of geomembranes and other geosynthetics. LSCI was founded in 1994 and has since fabricated and installed in excess of 100,000,000 F<sup>2</sup> of liner systems all over the world, including Antarctica.

LCSI received an [Industrial Fabrics Association International](#) (IFAI) award of Excellence for the Salt Lake City International Airport deicing fluid storage and recycling ponds.

### Health & Safety Policy:

At Lange Containment Safety is our number one priority for our staff, our clients and the people with whom we interact. Our approach is based on individual behavior and we apply this behaviour-based safety approach to all aspects of our work.

### Environmental Policy:

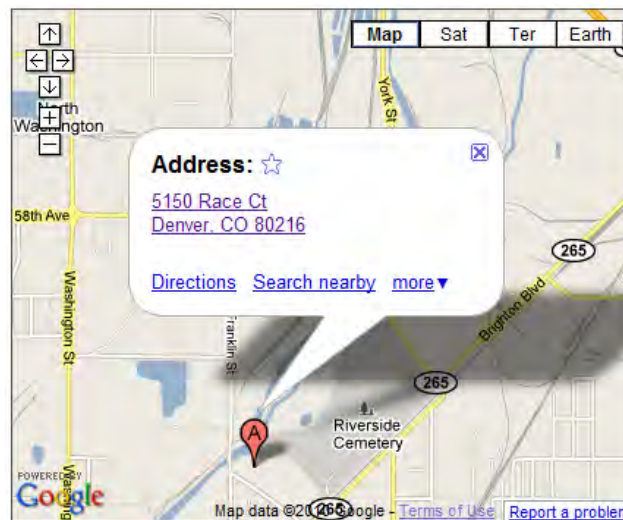
Lange Containment is committed to improving the environment through our own internal initiatives. Our key environmental objectives include:

- Conduct our business in an environmentally responsible manner;
- Minimise environmental risks by employing safe operating procedures; and
- Limiting our impact on the environment by reducing office waste and waste generated by our operations.



## Locate LCSI

We are conveniently located the heart of Denver's Industrial center. Click on Map for further details.





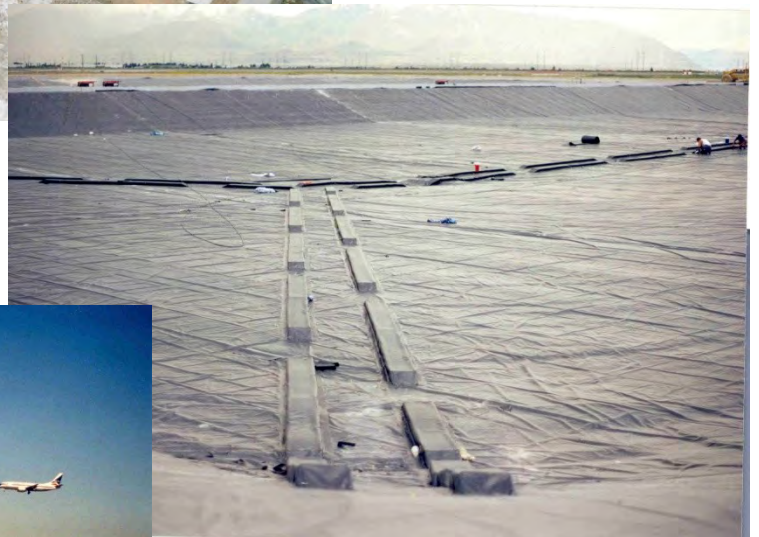
## Project Profile

### SALT LAKE CITY INTERNATIONAL AIRPORT DE-ICING STORAGE PONDS

In preparation for the onslaught of visitors attending the 2002 Winter Olympics, the Salt Lake City Airport was humming with activity. One of the main infrastructure improvements was the implementation of a collection, storage and recycling system for aircraft de-icing fluids. Ethylene Glycol, the major component of de-icing fluid can be problematic as a run-off pollutant. In addition, when stored in open ponds odor control and waterfowl kill are key issues. The airport and their consulting engineer, CH2M Hill, were looking for a design/build plan for three 2½ acre impoundments.

Lange Containment Systems' design, utilizing XR-5 8130 from Seaman Corporation, was approved. The floating cover design incorporates a rain water collection system with an active pumping and discharge piping system as well as maintenance walkways and access hatches. Utilizing large prefabricated panels and shop customized components, Lange Containment Systems completed the lining and floating cover system installation on schedule and without delays. Lange Containment was able to meet the challenge of providing a low profile, economical storage system that will protect the surrounding eco-systems for years to come.

**Salt Lake City Airport—Project Photos**



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**Aztec Floating Cover—2003—Project Photos**



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## XR-5 Geomembrane – Mechanical Properties



XR-5 <sup>®</sup> 8130 Reinforced	Test Method	Specification
Base Fabric Type	ASTM D3776	Polyester
Base Fabric Weight (nominal)	ASTM D3776	6.5 oz/yd <sup>2</sup>
Thickness	ASTM D751	30.0 mils (min.)
Weight	ASTM D751	30.0 ± 2 oz/yd <sup>2</sup>
Tear Strength	ASTM D4533, Trapezoid Tear	35/35 lb <sub>f</sub> (min.)
Breaking Strength	ASTM D751, Grab Tensile	550/550 lb <sub>f</sub> (min.)
Low Temperature	ASTM D2136, 4hr – 1/8" mandrel	Pass @ -30 °F
Dimensional Stability	ASTM D1204, 212°F / 100°C – 1 hr	1.5% max. each direction
Adhesion – Heat Sealed Seam	ASTM D751, Dielectric Weld	35 lb <sub>f</sub> /2 in (min.)
Dead Load – Seam Shear Strength	ASTM D751	2 in seam, 4 hr, 1 in strip 210 lb <sub>f</sub> @ 70°F 105 lb <sub>f</sub> @ 160°F
Bursting Strength	ASTM D751 Ball Tip	650 lb <sub>f</sub> (min.) 800 lb <sub>f</sub> (typical)
Hydrostatic Resistance	ASTM D751, Method A	800 psi (min.)
Blocking Resistance	ASTM D751 (180°F / 82°C)	#2 Rating (max.)
Adhesion – Ply	ASTM D413	15 lb <sub>f</sub> /in (min.) or Film Tearing Bond
Bonded Seam Strength	ASTM D751 as modified by NSF 54	550 lbf (min.)
Abrasion Resistance	ASTM D3389 (H-18 Wheel, 1000 g load)	2,000 cycles (min.) before fabric exposure 50 mg/ 100 cycles max weight loss
Weathering Resistance	ASTM G23 (Carbon-Arc)	8,000 hrs (min.) – No appreciable changes or stiffening or cracking of coating
Water Absorption	ASTM D471, Section 12, 7 days	0.025 kg/m <sup>2</sup> (max.) @ 70°F / 21°C 0.14 kg/m <sup>2</sup> (max.) @ 212°F / 100°C
Wicking	Shelter-Rite <sup>®</sup> Procedure	1/8 in (max.)
Puncture Resistance	ASTM D4833	250 lb <sub>f</sub> (min.)
Coefficient of Thermal Expansion / Contraction	ASTM D696	8 x 10 <sup>-6</sup> in/in/°F (max.)

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## Geomembrane Chemical Resistance Comparison



	PVC	Hypalon	XR-5®	Polypropylene	HDPE
<b>Kerosene</b>	C	C	A	C	B
<b>Diesel Fuel</b>	C	C	A	C	A
<b>Acids (General)</b>	A	B	A	A	A
<b>Naphtha</b>	C	B	A	C	A
<b>Jet Fuels</b>	C	B	A	C	A
<b>Saltwater 160°F</b>	C	B	A	A	A
<b>Crude Oil</b>	C	B	A	C	B
<b>Gasoline</b>	C	C	B	C	B

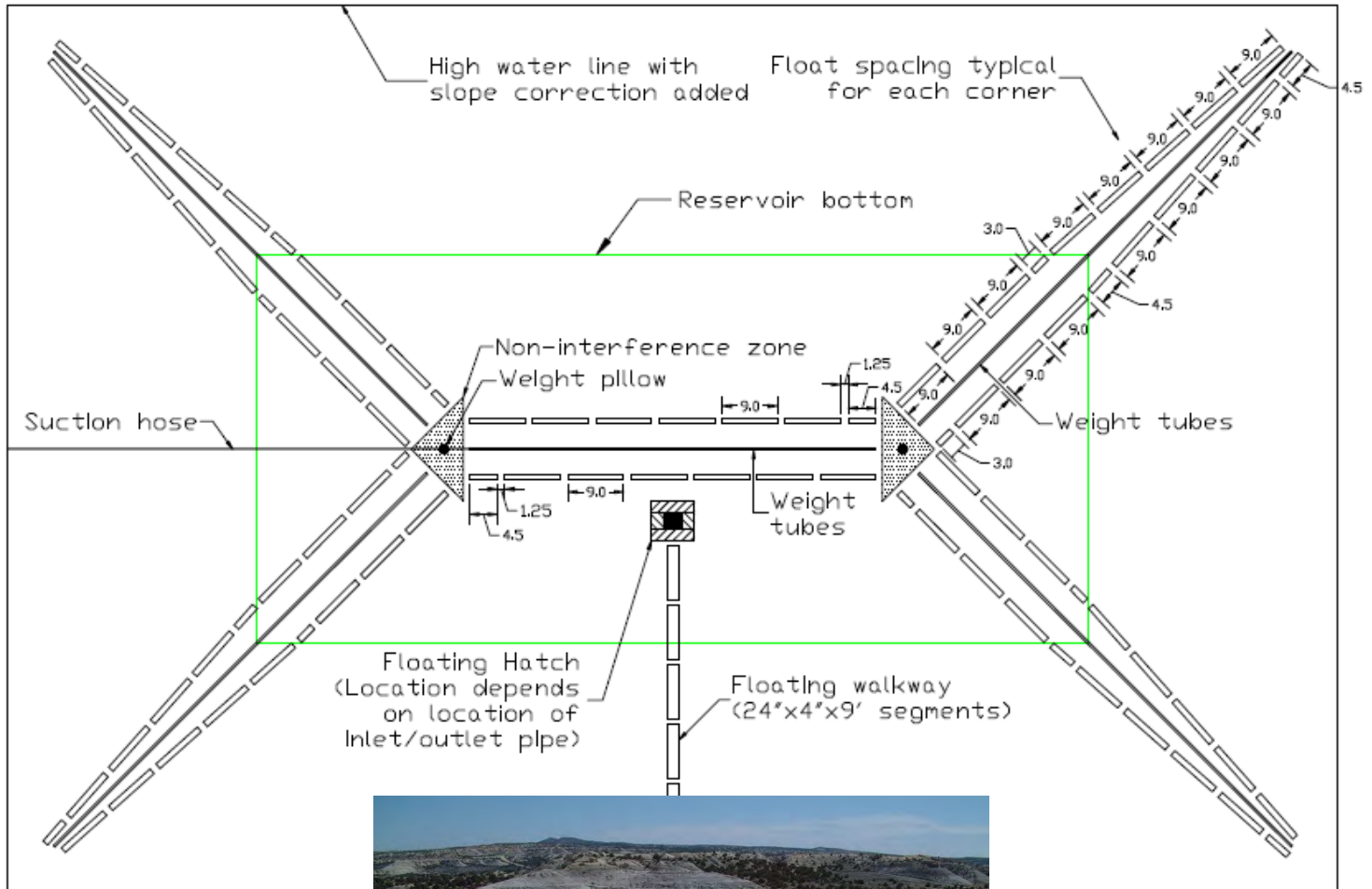
A = Excellent  
 B = Moderate  
 C = Poor  
 NF = Not Found in Published Chart

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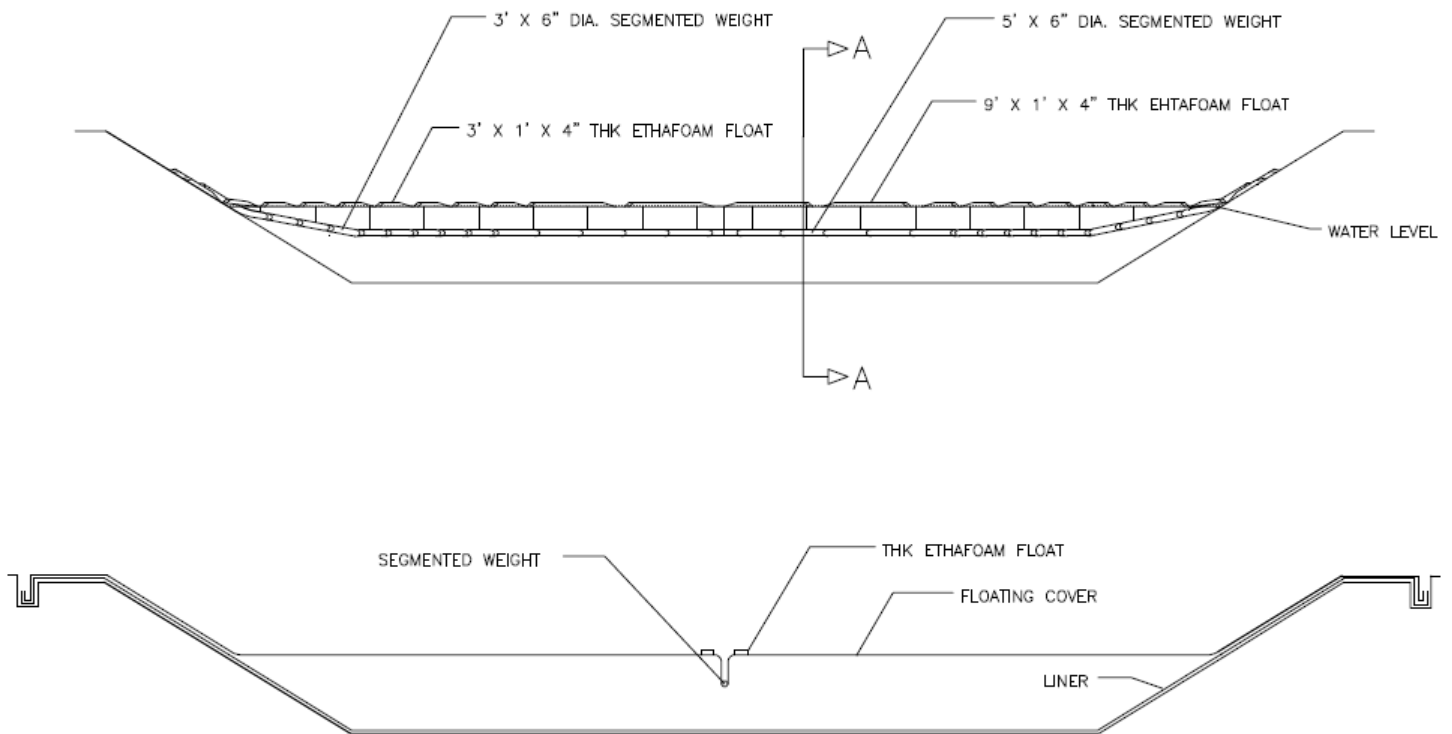
### Typical Floating Cover Layout



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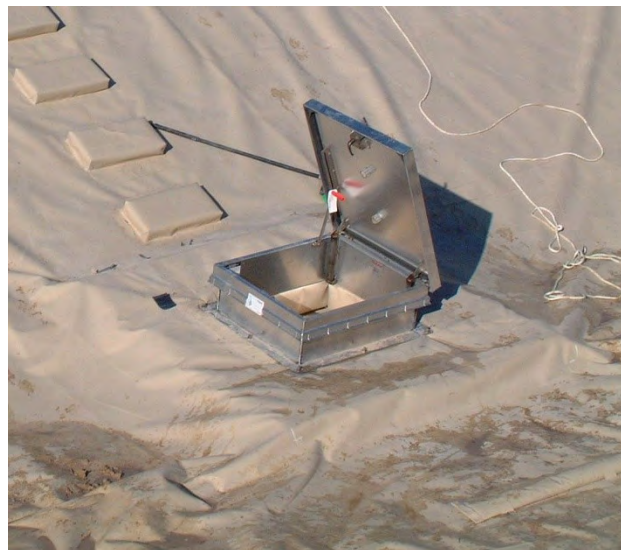
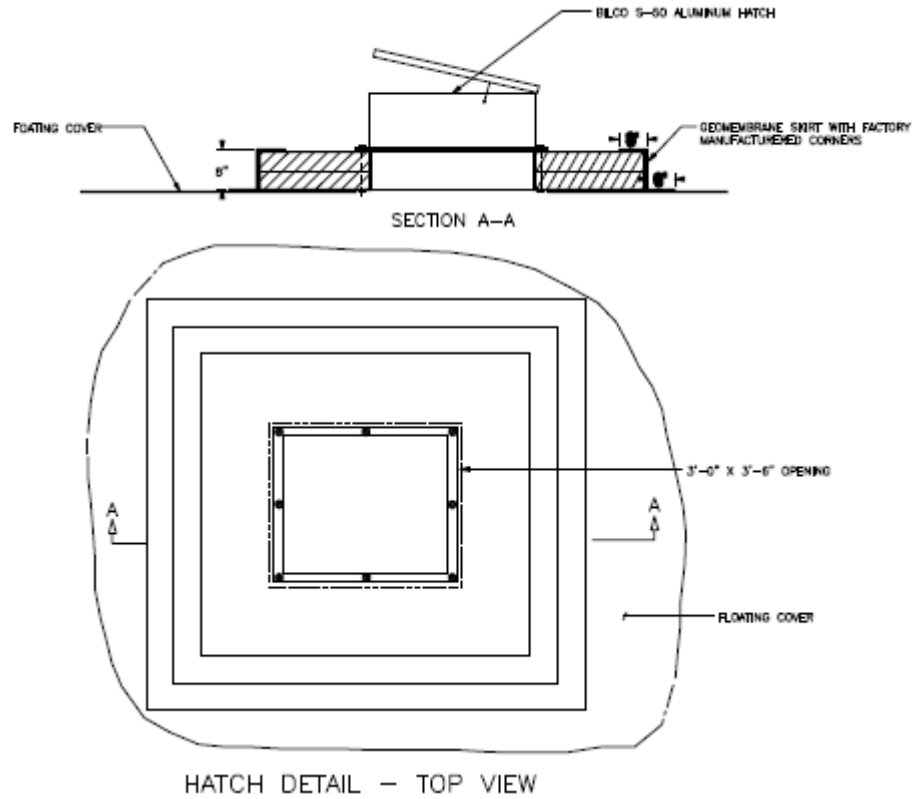
## Typical Floating Cover Cross-Section



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## Typical Floating Cover Hatch Detail



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Thank You for your time in reviewing our  
brochure and work.

We welcome your calls and questions, and  
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