

**SUMMARY OF INDEPENDENT TESTS CONDUCTED ON ELASTEC DRUM SKIMMERS
(FULL PAPERS AVAILABLE ON REQUEST)**

**March 1999 - Environment Canada (SAIC) testing facility Ottawa.
Skimmer model – TDS118**

Test Variables according to ASTM Standard F631;

Oil Type:	Low, medium and high viscosity blend of diesel & Bunker C.
Oil Viscosity:	200, 2000 and 12,000 cp
Drum Speed:	10 to 45 rpm
Oil Film Thickness:	25 mm to 30 mm
Drum Surface Pattern:	Smooth
Skimmer Model:	TDS118 using one drum only (skimmer is fitted with two drums)
Water Conditions:	Calm with surface current of 0.05 to 0.1 m/s

Conclusions;

Oil recovery rate increased with viscosity.

Maximum fluid recovery rate for the system was 4.49 cu.m per hour with the heavy oil for one drum only. (note - extrapolate 9 cu.m per hour for both drums)

Recovery efficiency averaged 96% over all 15 test runs.

Oil recovery rate had linear increase up to max drum speed tested.

**October 2004 - Ohmsett test facility, New Jersey.
Skimmer model TDS136 with ES400 helical screw pump**

Test Variables according to ASTM Standard F631

Oil Type:	HydroCal 300 and Sundex 8600T
Oil Viscosity:	420 to 27,000 cp
Oil Film Thickness:	10 mm, 25 mm (both oils) and 25 mm (Sundex)
Drum Surface Pattern :	Smooth
Water Conditions:	Calm & waves

Conclusions;

Oil recovery efficiency (95%) was highest with Sundex heavy oil in waves.

Maximum fluid recovery rate for the system was 98 gpm / 22 cu.m per hour

2006 - Broje V. and A. A. Keller, Improved Mechanical Oil Spill Recovery Using tailored surfaces in oleophilic skimmers. Funded by the U.S. Department of the Interior (Minerals Management Service) and the University of California Toxic Substances Research and Teaching Program

Test Variables;

Ambient Temperature:	10°C and 30°C
Oil Type:	Diesel, Endicott (Alaskan Crude), and HydroCal 300
Oil Viscosity:	2 to 340 cp
Oil Film Thickness:	10 mm, 25 mm and 50 mm
Drum Rotation Speed:	30, 40 and 70 rpm
Material of the Drum Surface:	Aluminum, Polyethylene, Polypropylene, Neoprene, Hypalon
Drum Surface Pattern:	Smooth and grooved
Skimmer Model:	ELASTEC MiniMax

Conclusions;

Proposed grooved pattern can increase recovery efficiency by 100-200%.

Recovery surface material can increase recovery efficiency by 20%.

We determined the effect of oil viscosity, oil slick thickness, and drum rotation speed on the recovery efficiency.

**March 2007 - Cold Regions Research and Engineering Laboratory.
Skimmer model – Elastec MiniMax, TDS118G**

Test Variables;

Ambient Temperature:	0 to -3°C
Oil Type:	Diesel, Endicott, and HydroCal – with and without Ice
Oil Film Thickness:	25 mm on Seawater
Drum Rotation Speed:	Up to 60 rpm
Drum Surface Pattern:	Smooth and grooved

Conclusions;

All the grooved drums performed substantially better than the traditional flat drums. Grooved drums perform better than flat drums at all speeds, and better at higher RPM.

TDS118G skimmer achieved 40gpm with ice conditions using one drum only.

Slush Ice entrained in the oil could be recovered and processed.

In all tests no free water was recovered.

**August 2007 - Ohmsett test facility, New Jersey. Test conducted by SL Ross.
Skimmer model –TDS118**

Nameplate capacity testing according to ASTM standard.

Ambient Temperature:	0 to -3°C
Oil Type:	Hydrocal, Calsol
Oil Viscosity:	200, 2,000 cSt
Oil Film Thickness:	According to ASTM standard
Drum Rotation Speed:	Up to 60 rpm
Drum Surface Pattern:	Smooth

Conclusions;

Calsol – highest recovery rate was achieved at 50mm (in excess of 40 gpm) with recovery efficiencies of 97 – 100%

Hydrocal – recovery rates greatly exceeded advertised rates on multiple test runs (approx 45 gpm)

**May 2012 - Ohmsett test facility, New Jersey.
Skimmer model –TDS136G**

ASTM F2709 test method for Determining Nameplate Recovery Rate of Stationary Oil Skimmer Systems

Test Oil Temperature: 82°F
Oil Type: Calsol
Oil Viscosity: 580 cps
Oil Film Thickness: According to ASTM standard
Drum Rotation Speed: 44 to 70 rpm
Drum Surface Pattern: Grooved

Conclusions;

Nameplate recovery rate established: 170 gpm / 38 cu.m per hour
Recovery efficiency: 89%

**May 2012 - Ohmsett test facility, New Jersey.
Skimmer model – Magnum 100G**

ASTM F2709 test methods for Determining Nameplate Recovery Rate of Stationary Oil Skimmer Systems

Test Oil Temperature: 70°F
Oil Type: Calsol
Oil Viscosity: 1720 cps
Oil Film Thickness: According to ASTM standard
Drum Rotation Speed: 44 to 70 rpm
Drum Surface Pattern: Grooved

Conclusions;

Nameplate recovery rate established: 251 gpm / 56 cu.m per hour
Recovery efficiency: 95%

**August 2013 - Ohmsett test facility, New Jersey.
Skimmer model – TDS118G**

ASTM F2709 test method for Determining Nameplate Recovery Rate of Stationary Oil Skimmer Systems

Test Oil Temperature: 30 – 35 C
Oil Type: Calsol
Oil Viscosity: 656 cps
Oil Film Thickness: According to ASTM standard
Drum Rotation Speed: 53 to 54 rpm
Drum Surface Pattern: Grooved

Conclusions;

Nameplate recovery rate established: 91.8 gpm / 20 cu.m per hour
Recovery efficiency: 89.7%

**June, 2014 - Ohmsett test facility, New Jersey.
Skimmer model – TDS118G**

ASTM F2709 test method for Determining Nameplate Recovery Rate of Stationary Oil Skimmer Systems

Test Oil Temperature: 72 F
Oil Type: Hydrocal 300
Oil Viscosity: 181.1 cps
Oil Film Thickness: 3"
Drum Rotation Speed: 77 to 79.8 rpm
Drum Surface Pattern: Grooved Drum

Conclusions;

Nameplate recovery rate established: 102.5 gpm
Recovery efficiency: 91%

**June, 2014 - Ohmsett test facility, New Jersey.
Skimmer model – TDS118G**

ASTM F2709 test method for Determining Nameplate Recovery Rate of Stationary Oil Skimmer Systems

Test Oil Temperature: 76 F
Oil Type: Calsol 8240
Oil Viscosity: 1771 cps
Oil Film Thickness: 3"
Drum Rotation Speed: 56 to 79.8 rpm
Drum Surface Pattern: Grooved Drum

Conclusions;

Nameplate recovery rate established: 102.5 gpm
Recovery efficiency: 91%

**June, 2015 - Ohmsett test facility, New Jersey
Skimmer model – TDS118G**

ASTM F2709 test method for Determining Nameplate Recovery Rate of Stationary Oil Skimmer Systems

Test Oil Temperature: 22C
Oil Type: Hydrocal 300 & Calsol 8240
Oil Viscosity: 180 & 1770 cps
Oil Film Thickness: 75mm
Drum Rotation Speed: 60 & 80 rpm
Drum Surface Pattern: Grooved Drum

Conclusions;

Nameplate recovery rate established: 388 lpm & 366 lpm
Recovery efficiency: 91 & 85 %