SVR™ Soluble Varnish Removal Systems

Industry-Leading Solution for Removing and Preventing Lubricant Varnish

Lubricant varnish forms when a lubricant's capacity to hold dissolved oil break-down products is exceeded. SVR™ continuously removes the dissolved oil break-down products during normal turbine operation so that lubricant varnish cannot accumulate and form, period. SVR™ targets the primary cause of varnish formation whereas, all other systems (Electrostatic, BCA, and depth filtration) must wait for varnish to form before they offer any benefit.

SVR™ FEATURES

- EPT™, ICB™ purification technology for soluble varnish contaminant removal
  - Over 30 million successful operating hours
  - ICB™ *will not* affect turbine oil additives1
  - 4X more capacity than competing varnish removal systems
- SVR™ quickly reduces varnish potential in large gas turbines as measured by the MPC or QSA® test
- Unlike particulate removal devices, SVR™ works during normal turbine operation when varnish is in the dissolved form offering full-time protection.
- Quickly reduces and prevents servo valve sticking
- Absolute rated polishing filter reduces ISO particle count
- Small footprint and straight-forward operation
- ICB™ cartridges are changed annually when installed on common sized reservoirs and used in maintenance mode
- Lifting crane for easy cartridge removal
- Low maintenance: Turn it on and let it run, that's it!

CONSUMABLES

P/N **600524V** ICB™ Element†

P/N **600524T** ICB™ Element for lubricants <12 months old

P/N **600699** 3μm β200, micro glass particulate element‡

LOWEST COST OF OPERATION OVER 10 YEARS

80% of all sites clean-up with 2 sets of consumables over 3-4 month period, with annual replacement thereafter. See real-life example on next page.

BEST WARRANTY IN INDUSTRY

3 years on all parts

1 Lubricants less than 12 months old should use EPT- 600524T series elements for additional protection.
† Recommend stock level of 2 each. 2 elements used during operation.
‡ Recommend stock level of 4 each. 1 piece used during operation.
SVR™ and ICB™ are Trademarks of EPT. QSA® is a registered Trademark of Analysts Incv

EPT
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When Results Matter

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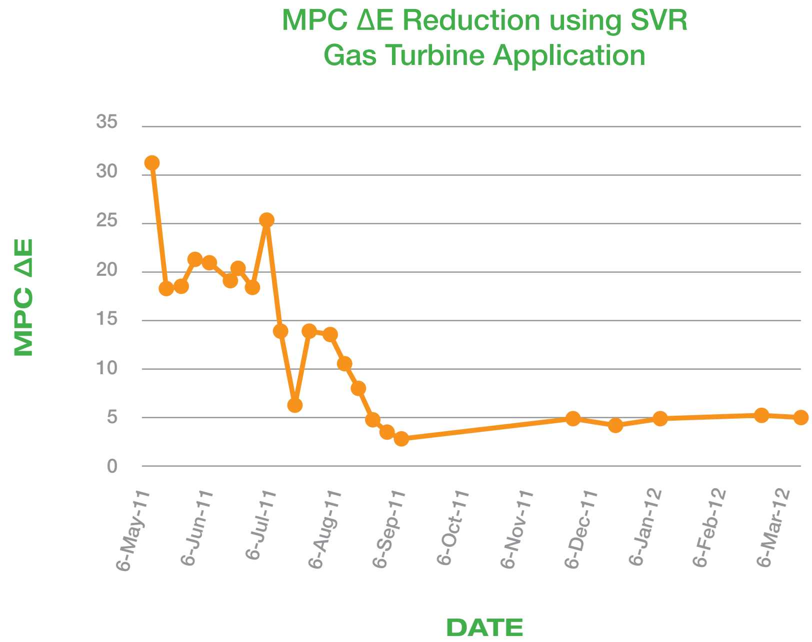

This example demonstrates typical SVR™ performance in a varnish contaminated turbine lubricant reservoir.

- Lubricant solvency is quickly improved after SVR installation which removes the accumulation of dissolved breakdown products.
  - This initial period of operation is known as the restoration phase and is where varnish that has been previously deposited is re-dissolved by the lubricant because of its improved solvency characteristics.
  - Varnish testing is recommended bi-weekly during the restoration phase as monthly testing will not show the initial dramatic VPN decrease or subsequent deposition removal VPN increases/ decreases.
- The length of the restoration phase is based on the amount of varnish and contamination that has accumulated in the lubricant reservoir.
  - 3-4 months being common in most systems. Longer for heavily varnished systems.
  - ICB™ elements may have to be replaced 1x in normal restoration phase situations, or 2x in situations with heavier contamination levels.
- Observe varying VPN increases/decreases.
  - Increases are expected in situations where varnish deposits are present; the increase is showing the impact of deposited varnish being dissolved back into the lubricant.
- The second MPC decrease is a positive indication that suggests the restoration phase is coming to an end. In the example above, there is a third increase/ decrease showing that additional varnish deposits were still being dissolved and then removed.
- 4 months after SVR™ installation, the restoration phase is complete, and the lubricant enters the "stability phase" where varnish potential values are extremely low and stable >7 months in this example.
  - Varnish pre-cursors are removed as they are produced during the stability phase, eliminating the normal accumulation cycle and the potential for varnish formation.
  - Operating in the stability phase should be the goal of all turbine operators as it optimizes lubricant/ additive performance, and reduces the associated risk of lubricant related turbine failures.

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SVR SPECIFICATIONS

SVR SIZE	SVR150 M	SVR300 M	SVR600M	SVR1200 M	SVR2400 M
Dimensions (LxWxH) "/cm	47x32x72 121x76x182	47x32x72 121x76x182	47x30x72 121x76x182	47x30x92 121x76x235	47x60x92 121x152x235
Weight Lbs/ Kgs	350/159	400/181	550/201	600/273	1000/454
Connections **Inlet/Outlet NPTF**	¾"	¾"	1.5"/1.0"	1.5"/1.0"	2.0"/1.5"
Electrical Options	120VAC1P, 230/ 380/ 475/ 575 VAC 3P 50/60Hz, Standard Unit is General Purpose, Class 1 Div. 1 and Div. 2 options are available.				
Current	12.8 Amps				
Oil Temperature	>25˚C <70˚C, Heater and cooler options are available.				
Certifications	ASME Certified Vessels @150PSI/ UL, CUL, CSA				

SYSTEM SIZING FOR TURBINE AND COMPRESSOR LUBRICANT MAINTENANCE:

For normal turbine or compressor oil maintenance, the desirable flow rate is to exchange the fluid reservoir volume 1-2x per day. For Recovery projects higher exchange rates are desired.

SVR SIZE	SVR150 M	SVR300 M	SVR600 M	SVR1200 M	SVR2400 M
Reservoir Volume: Gallons/Liters (for larger volumes contact factory)	400 / 1600	800 / 3200	1600 / 6400	5000 / 20000	10000 / 40000
Flow Rate GPM/LPM	0.5 / 2	1.0 / 4.0	2.0 / 8.0	4.0 / 16.0	8.0 / 32.0
Reservoir Exchange Rate per 24hrs	1.8x	1.8x	1.8x	1.44x	1.44x
Estimated Acid Reduction Capacity Per Set of Filters	2	2	2	2	2

Notes: *Using the above sizing, 80% of sites are typically restored with 2 sets of filter elements with a replacement interval of 6 weeks. The clean-up or restoration period is typically 3-4 months. Heavily contaminated sites normally require 3 sets of filter elements with a replacement interval of 1 month. After lubricant restoration is complete, the normal fluid maintenance mode requires that filter elements are replaced annually. All installations include detailed monthly analysis until clean-up period is complete. See SVR Case Studies for additional information.*

ADDITIONAL RESOURCES AND INFORMATION:

20 Case Studies: Turbine Lubricant Varnish Removal using SVR Combined Cycle Journal: Lubricant Varnishing and Mitigation Strategies

Modern Power Systems: Turbine Lubricant Maintenance for Varnish Free Operation

MPC Varnish Potential Testing White Paper (ASTM 7843)

ICB elements for SVR systems, ICB 600524

CONTACT INFORMATION

For Assistance please contact
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