ICB™

Ion Charge Bonding Acid and Varnish Removal Filters

While offering best in class acid and varnish removal, ICB™ filter elements significantly reduce production losses and resolve servo-valve issues by eliminating the contamination responsible for sticking or sluggish valves. Conventional acid filters cannot remove this contamination and are also significant contributors of harmful metals and fine particulate. ICB™ filters eliminate these key issues and direct maintenance to where it matters most.

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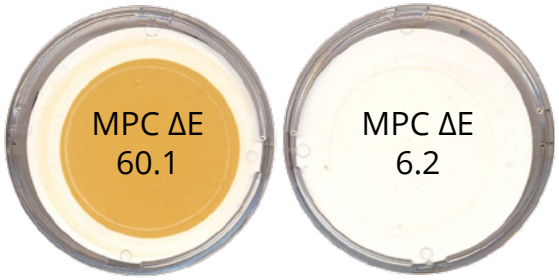
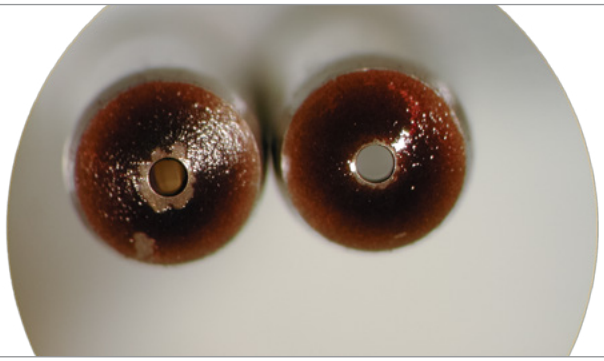
Stop varnish related fail-to-starts and unit trips.

ICB™ attacks the source of the problem on a molecular level, removing the oxidation by-products that form varnish deposits. By reversing the chemical process of varnish deposit formation, ICB™ restores oil health to remove varnish throughout the system and in critical components so your servo valves operate more efficiently than ever.



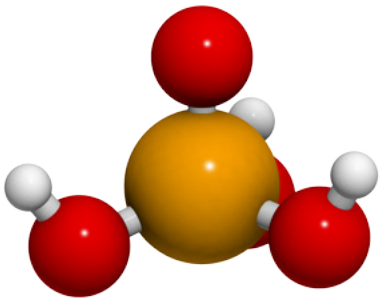


Remove what others left behind.

As dissolved metals accumulate, they act as a catalyst forming depots on servo valves and gels that can cause valve restriction and mask filter elements. ICB™ elements do not contribute metals and will remove dissolved metals from airborne ingress and element leaching to <10 ppm.

Minimize acid. Maximize efficiency.

High acid number (AN) in phosphate ester means premature fluid replacement if left un-managed. Since acid production is autocatalytic, the acid in your system will generate more acid which, left unchecked, can quickly become a serious problem. ICB™ technology removes acid to our target of AN < 0.05 with 4-8 times the capacity of alternate acid removal medias.



H_3PO_4
Phosphoric Acid

Unlike all others.

ICB™ is unlike all other ion exchange resin products. Our 20 years of operating experience and continued research has led to best in class resistivity improving capability with increases >10X having been observed. We use custom engineered resins that have been optimized for the lubricant environment.

Extend your oil life, don't flush it.

For most EHC systems, the primary operating fluid is phosphate ester. This is a very safe fluid with excellent lubricating properties that when properly maintained can provide years of trouble-free operation without the need for a flush during replacement. Unfortunately, many power plants have insufficient or incorrect maintenance which causes wide ranging issues that result in actual or high risk of production loss, and expensive flushes after the fact.

Upgrade your filtration.

ICB™ filters are drop in replacements for many OEM sizes and come in a variety of chemistries for specialized lubricant and fluid applications. When used in conjunction with Hy-Pro Dualglass media filter elements, ISO particle codes will be decreased significantly with document results.

ICB™ Part Number Builder +Specifications

ICB- [ ] **-** [ ]

Model Number Media

Dimensions

Model	Length	Outer Diameter	Inner Diameter	Dry Weight
ICB-600502-*	11.030 in (28.016 cm)	4.869 in (12.367 cm)	1.866 in (4.740 cm)	8.5 lbs (3.9 kg)
ICB-600503-*	18.000 in (45.720 cm)	6.211 in (15.776 cm)	2.250 in (5.715 cm)	13.0 lbs (5.9 kg)
ICB-600504-*	18.000 in (45.720 cm)	6.211 in (15.776 cm)	2.600 in (6.604 cm)	13.0 lbs (5.9 kg)
ICB-600508-*	32.072 in (81.463 cm)	6.202 in (15.753 cm)	1.555 in (3.950 cm)	23.0 lbs (10.4 kg)
ICB-600509-*	17.875 in (45.403 cm)	11.045 in (28.054 cm)	2.375 in (6.033 cm)	35.0 lbs (15.9 kg)
ICB-600510-*	19.010 in (48.285 cm)	11.045 in (28.054 cm)	2.375 in (6.033 cm)	37.0 lbs (16.8 kg)
ICB-600511-*	19.473 in (49.461 cm)	11.020 in (27.991 cm)	2.375 in (6.033 cm)	38.0 lbs (17.2 kg)
ICB-600514-*	20.157 in (51.199 cm)	11.045 in (28.054 cm)	2.375 in (6.033 cm)	40.0 lbs (18.1 kg)
ICB-600524-*	20.157 in (51.199 cm)	11.045 in (28.054 cm)	2.375 in (6.033 cm)	40.0 lbs (18.1 kg)
ICB-601349-*	24.563 in (62.390 cm)	10.281 in (26.114 cm)	8.919 in (22.654 cm)	35.0 lbs (15.9 kg)
ICB-601946-*	9.119 in (23.162 cm)	6.211 in (15.776 cm)	2.600 in (6.604 cm)	6.0 lbs (2.7 kg)

Operating Temperature

86°F to 176°F
(30°C to 80°C)

Operating Pressure

Maximum operating ΔP is <90 psid (<6.2 bard) with normal ΔP <25 psid (<1.8 bard)

Materials of Construction

Shell
Stainless steel

Endcaps
Stainless steel

Handle
Stainless steel

Seals
Silicone[1]

Media Description[2]

A
A filter for phosphate ester, fire-resistant lubricants, sold under the brand names: Fyrquel®, Fyrquel® EHC, Fyrquel® EHC Plus, Fyrquel® GT, Reolube® TurboFluid 46XC, Reolube® TurboFluid B, Anvol® 46 XC, Shell Turbo® Fluid DR 46, Mobil Pyrotec® HFD 46, and many others

C
C filter for polyol ester fluids including QuintoLubric®

J
J filter for polyol ester lubricants used in aero derivative jet engines including Mobil Jet® II

T
T filter for mineral oil based hydraulic fluids

V
V filter for mineral oil based turbine and compressor lubricants

Applications

A
Acid + Varnish Scavenging (Acid Numbers <0.5 mg KOH/g)

C
Aggressive Acid + Varnish Scavenging (Acid Numbers >0.5 mg KOH/g)

J
Acid + Varnish Scavenging

T
Varnish Removal

V
Aggressive Varnish + Moderate Acid Scavenging

Filter Sizing Guidelines

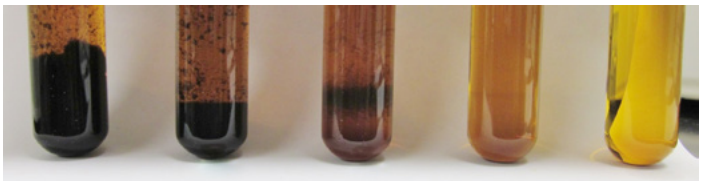
Phosphate ester and EHC applications ideally require 3-4x reservoir exchange per day for normal fluid maintenance. Mineral Oil based turbine and compressor lubricants require 1x reservoir exchange per day for normal lubricant maintenance. For fluid or lubricant restoration higher flow rates may be required. Contact Hy-Pro for application guidelines, selection and sizing assistance.

[1] ICB-600508 utilizes Fluorocarbon gasket standard.
[2] Fyrquel is a registered trademark of ICL, Reolube is a registered trademark of Chemtura, Anvol is a registered trademark of Castrol. Shell Turbo is a trademark of Shell Oil Company. Mobil Pyrotec and Mobil Jet are trademarks of Exxon Mobil Corporation. Quintolubric is a registered trademark of Quaker Chemicals.

Acid Scavenging Technology Comparison

Selexsorb	Fuller's Earth	ICB™ Ion Charge Bonding
Produces by-products that react with fluid to cause soft gel deposits	Produces hard salts and soap deposits that coat sensitive servo valves	Removes the dissolved break-down products that are responsible for servo valve failures (See Figures 1 and 2)
Can only control acids up to 0.25 mg KOH/g, leading to diminished fluid resistivity	Can only control acids up to 0.25 mg KOH/g, leading to diminished fluid resistivity	Dramatically increases fluid resistivity values which eliminates a common servo-valve failure mode referred to as electro-kinetic-wear or valve erosion
Removes acid but re-contaminates your fluid with sodium, aluminum, silicon	Removes acid but re-contaminates your fluid with magnesium, iron, calcium	Does not contribute fine particulate, or add dissolved metals that normally contribute to increased rates of oxidation
3x less capacity to remove acid than ICB	6-7x less capacity to remove acid than ICB	Highest ratio of resin volume to flow rate for higher single pass removal rate and much lower cost of ownership
Made from purified activated Alumina as a Y-Zeolite	Made from magnesium oxide and hydroxide, processed from attapulgus clay or attpulgite	Complete stainless steel construction, featuring robotic, spiral welding which provides maximum filter integrity, adding a new fail-safe in the EHC fluid conditioning system

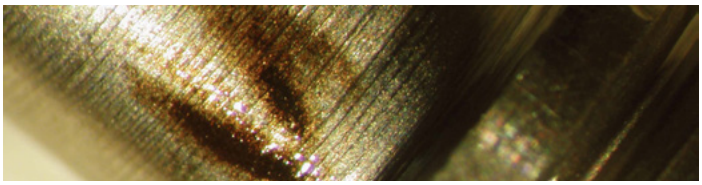
Figure 1 – Deposition Tendency Test



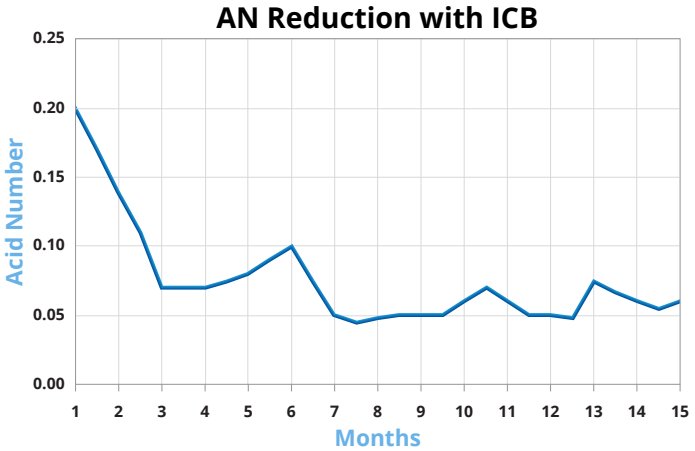
A B C D E

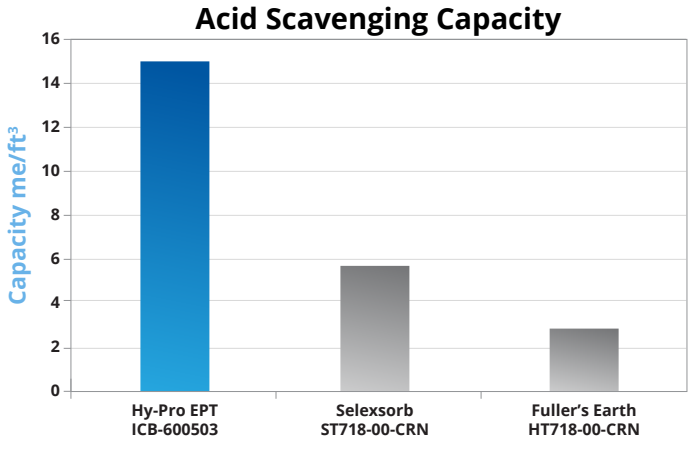
In Step 1 of the Deposition Tendency Test referred to in the EPRI EHC Fluid Maintenance Guide 2002, Page 4-39, EHC fluid is mixed with Hexane which forces out dissolved contamination into solid form. In the first three test tubes (A,B,C), EHC fluid using conventional treatment form visible solids. Servo-valve performance and reliability would be significantly impaired using EHC fluid in this condition. In the last 2 test tubes (D,E) where the EHC fluid was cleaned with ICB™, no deposition or solids of any form are observed. Servo-valve response time and reliability would be maximized operating EHC fluid in this condition.

Figure 2 – Servo Valve Spool with Contamination Deposit



Servo Valve Spool showing signs of fluid contamination deposition. The contamination responsible for these deposits is not routinely measured and in this example the servo-valve would be at abnormal risk level for failure. The Deposition Tendency test as shown in Figure 1, easily identifies if this contamination is present.





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