

# FSA

## Phosphate Ester Conditioning Systems

A complete solution for trouble-free EHC operation using phosphate ester fluids. Avoid premature fluid replacement, bleed and feed, and eliminate expensive flushes. FSAPE is the new standard for maintenance of water, acid, ISO Code, resistivity, and removal of gels and deposits that cause servo valve failure.

Ideal for steam turbine EHC fire resistant fluid maintenance.

**Donaldson**  
HY-PRO™

[hyprofiltration.com/](http://hyprofiltration.com/)



## Resolve servo valve issues.

FSA skids featuring ICB® technology will maintain ideal fluid chemistry and cleanliness. Systems will reduce elevated Acid Number and water, increase resistivity and eliminate the cause of fluid gelling and servo valve sticking.



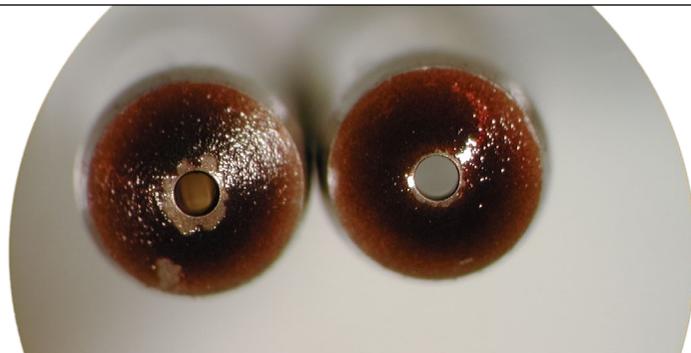
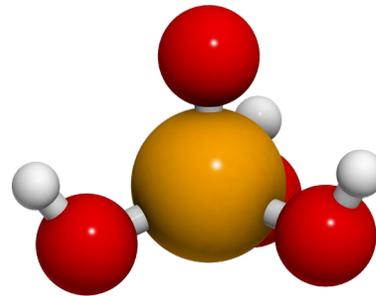
## Clean, dry, healthy oil.

Water and phosphate ester together form strong acid which leads to premature fluid replacement. Integrated TMR™ N<sub>2</sub> Headspace Dehydrators continuously introduce nitrogen through the headspace to simultaneously remove water, O<sub>2</sub>, CO, H and other high temperature breakdown gases. Maintaining low water levels and eliminating reservoir contact with O<sub>2</sub> will proactively manage the rate of fluid breakdown and minimize acid production.



## Minimize acid. Maximize efficiency.

High acid number (AN) in phosphate ester means premature fluid replacement if left unmanaged. Since acid production is autocatalytic, the acid in your system will generate more acid until your fluid becomes unusable. ICB technology can reduce AN to as low as 0.03 with 4-8x the capacity of other acid removal filters.

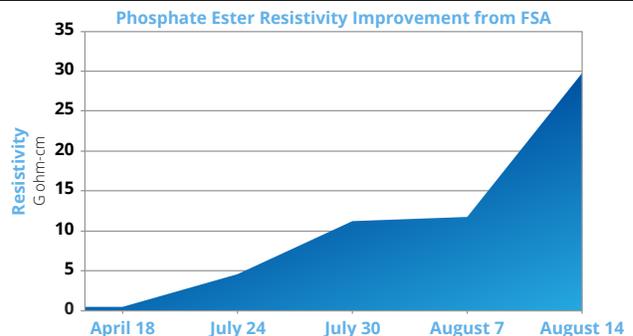


## Remove what others left behind.

Dissolved metal ions in phosphate ester form gels and deposits that accumulate on servo valve nozzles & flappers, resulting in slow servo valve response time, unit trips, and reduced fluid resistivity. ICB removes all dissolved metal, reverses gel and deposit formation, prevents unit trip and restores servo valve response time.

## Extend your oil life, don't flush it.

Low resistivity in phosphate ester leads to electro-kinetic corrosion between dissimilar metal surfaces and is one of the condemning factors of phosphate ester. In addition to removing acids and dissolved metals, ICB has been shown to significantly increase fluid resistivity to prevent premature fluid replacement, expensive bleed-and-feed routines and unnecessary chemical flushes.



## Comprehensive EHC protection.

In addition to FSA we offer these important companion products that eliminate common weak points in EHC fluid maintenance. Dynafuzz stainless steel filters to eliminate the common issues of high pressure filter fiber migration and static discharge, ECR to restore fluid color and to reduce patch weight, and VTM to upgrade existing low pressure filters.

# FSA Specifications

<b>Dimensions<sup>1</sup></b>	<b>Height</b> 58" (147 cm)	<b>Length<sup>2</sup></b> 47.5" (121 cm)	<b>Width<sup>2</sup></b> 31.5" (80 cm)	<b>Approximate Weight</b> 571 lbs (259 kg)
<b>Connections</b>	<b>Inlet</b> 1" FNPT with locking ball valve		<b>Outlet</b> 1" FNPT with locking ball valve	
<b>Max Reservoir Size</b>	<b>FSA05</b> 200 gal (750 liters)	<b>FSA1</b> 400 gal (1,500 liters)	<b>FSA2</b> 800 gal (3,000 liters)	<b>FSA4</b> 1,600 gal (6,050 liters)
<b>Element Configuration</b>	<b>Particulate filter</b> HP107L18-VTM710-C-V		<b>ICB</b> FSA05: ICB600504-A FSA1: ICB 600504-A x 2 FSA2: ICB600524-A FSA4: ICB600524-A x 2	
<b>Seals</b>	Fluorocarbon + silicone			
<b>Operating Temperature</b>	<b>Fluid Temperature</b> 86°F to 176°F (30°C to 80°C)		<b>Ambient Temperature</b> -4°F to 104°F (-20C to 40C)	
<b>Materials of Construction</b>	<b>Housings</b> Carbon steel with industrial coating		<b>Tray</b> Carbon steel with industrial coating	
<b>Electric Motor</b>	TEFC, 56-145 frame 0.5 – 1 HP, 900 – 1750 RPM			
<b>Motor Starter</b>	MSP (motor starter/protector) in an IP55, aluminum enclosure with short circuit and overload protection.			
<b>Pump</b>	Cast iron, positive displacement gear pump with internal relief. Maximum pressure on pump inlet 15 psi (1 bar). Consult factory for higher pressures.			
<b>Pump Bypass</b>	Full bypass at 150 psi (10 bar)			
<b>Pneumatic Option Air Consumption</b>	~40 cfm @ 80 psi <sup>3</sup>			
<b>TMR-N<sub>2</sub> Air Consumption</b>	<b>FSA05</b> < 1.2 SCFM TMR-N <sub>2</sub> - 601902	<b>FSA1</b> < 1.2 SCFM TMR-N <sub>2</sub> - 601902	<b>FSA2</b> < 2.0 SCFM TMR-N <sub>2</sub> - 601903	<b>FSA4</b> < 3.6 SCFM TMR-N <sub>2</sub> - 601904
<b>Media Description</b>	<b>VTM</b> β <sub>0.9</sub> ( <sub>cl</sub> ) ≥ 4000 particulate, insoluble oxidation by-product and water removal media.		<b>ICB</b> Ion charge bonding resin media for molecular removal of acids, gels and deposits, oxidation by-products and dissolved metal ions from phosphate ester and other synthetic fluids.	
<b>Fluid Compatibility</b>	EHC Fire resistant hydraulic fluids (phosphate ester). For polyol ester and other specified synthetics contact factory.			
<b>Hazardous Environment Options</b>	Select pneumatic powered unit (Power Option 00) or explosion proof NEC Article 501, Class 1, Division 1, Group D. Call for IEC, Atex or other requirements.			

<sup>1</sup>Dimensions & weights are approximations taken from base model and will vary according to options chosen.

<sup>2</sup>Spill retention pan standard size. Consult factory for custom pan sizing.

<sup>3</sup>Air consumption values are estimated maximums and will vary with regulator setting.



# FSA Part Number Builder

**FSA**     -

Fluid Type    Flow Rate    Indicator    Power Options    Special Options

<b>Fluid Type</b>	<b>BS</b> BioSyn <sup>1</sup>
	<b>PE</b> Phosphate Ester (not compatible with Skydrol) <sup>1</sup>
	<b>SK</b> Skydrol <sup>1</sup>

<b>Flow Rate<sup>2</sup></b>	<b>05</b> 0.5 gpm (1.7 lpm)	900 RPM (50Hz) / 1200 RPM (60Hz)
	<b>1</b> 1 gpm (3.7 lpm)	1450 RPM (50Hz) / 1750 RPM (60Hz)
	<b>2</b> 2 gpm (7.5 lpm)	1450 RPM (50Hz) / 1750 RPM (60Hz)
	<b>4</b> 4 gpm (15.1 lpm)	1450 RPM (50Hz) / 1750 RPM (60Hz)

<b>ΔP Indicator<sup>3</sup></b>	<b>D</b> 22 psid visual gauge + electric switch
	<b>E</b> 22 psid visual gauge

<b>Power Options</b> Contact factory for options not listed	<b>60 Hz</b>	<b>50 Hz</b>	<b>Pneumatic</b>
	<b>12</b> 120 V ac, 1P	<b>11</b> 110 V ac, 1P	<b>00</b> Pneumatically driven air motor & PD pump. FRL & flow meter included.
	<b>22</b> 208-230 V ac, 1P	<b>21</b> 220 V ac, 1P	
	<b>23</b> 208-230 V ac, 3P	<b>40</b> 380-440 V ac, 3P	
	<b>46</b> 460-480 V ac, 3P	<b>52</b> 525 V ac, 3P	
	<b>57</b> 575 V ac, 3P		

**Explosion proof - Class 1, Division 1, Group D per NEC 501 – Ready for outdoor use**  
**X\_\_** Add X prefix to power option listed above. Not available with (00) Pneumatic Option.

<b>Special Options</b>	<b>A</b> Air cooled heat exchanger (consult factory)
	<b>C</b> CE marked for machinery safety directive 2006/42/EC
	<b>D<sup>4</sup></b> High filter ΔP auto shutdown
	<b>E</b> 100 mesh cast iron basket strainer
	<b>F</b> Filter element ΔP gauge with tattle tale follower needle
	<b>H</b> Automatic high temp shut down (160°F, 71°C)
	<b>L</b> High filter element ΔP indicator light
	<b>M</b> Total system flow meter (120 cSt max)
	<b>O</b> On-board PM-1 particle monitor & clean oil indicator light
	<b>S</b> All wetted components 303 or higher stainless steel <sup>5</sup>
	<b>T3</b> Remove TMRN <sub>2</sub> reservoir headspace dehydrator
	<b>U</b> CUL and/or CSA marked starter enclosure for Canada
	<b>V</b> Lifting eye kit
<b>W</b> Automatic air bleed valve	
<b>Z</b> On site start-up training	

<sup>1</sup>Consult factory for additional fluid type information.

<sup>2</sup>Nominal flow rate at 60 Hz motor speeds.

<sup>3</sup>Particulate filter only. ICB housing is equipped with 0-160 psi static pressure gauge. Industrial, liquid filled.

<sup>4</sup>“D” Option required DP Indicator option with electric switch to be selected (“D”).

<sup>5</sup>With exception to cast iron gear pump.

For all up to date option details and compatibilities, please reference our Contamination Solutions Price List or contact customer service.

**Want to find out more? Get in touch.**

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