

LIQUID POLYMER SYSTEMS

AnCAT[®]



POLYMER PROCESSING AND CONTROL

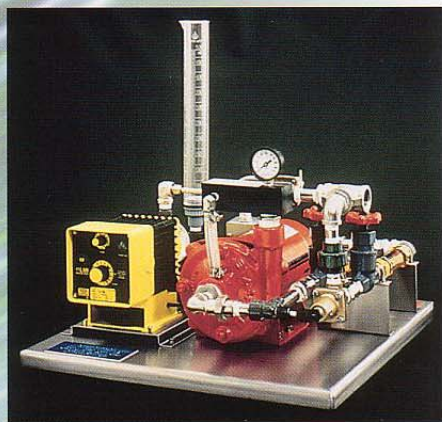


AnCAT[®] SYSTEMS

D Series

AnCAT D (Diaphragm) Series liquid polymer systems were the original "AnCATs" which launched NORCHEM's highly successful liquid polymer equipment program back in the early 1980s. Today, AnCAT D Series systems are a substantial contributor to the mid-sized D and G Series product line with all stainless steel bases, support construction, and a full line of automation and control accessories as standard options.

AnCAT D Series systems are available in a number of custom configurations including special designs for hazardous (Explosion Proof) locations. D Series AnCATs can process up to 4.5 GPH



(108 GPD) of neat liquid polymer and deliver up to 8.0 GPM (480 GPH) of a 0.2 to 2.0% primary, or 16 GPM (960 GPH) combined primary and secondary dilution aqueous polymer solution.

D Series Capacities/Flow Specifications

Model Number	Liquid Polymer (GPD)	Primary Solution (GPM)	Secondary Solution (GPM)	Total Solution (GPM)	Solution Strength (% Conc.)
054D-24 (SD)	24	4.0	(4.0)	4.0 (8.0)	0.2 to 2.0
054D-48 (SD)	48	4.0	(4.0)	4.0 (8.0)	0.2 to 2.0
054D-108 (SD)	108	4.0	(4.0)	4.0 (8.0)	0.2 to 2.0
058D-24 (SD)	24	8.0	(8.0)	8.0 (16.0)	0.2 to 2.0
058D-48 (SD)	48	8.0	(8.0)	8.0 (16.0)	0.2 to 2.0
058D-108 (SD)	108	8.0	(8.0)	8.0 (16.0)	0.2 to 2.0

Note: For liquid polymer viscosities higher than 3500 cps or capacities greater than 108 GPD, consult NORCHEM.

Utilities – Electrical: 115 VAC, 1 Phase, 60 Hz, 20 Amps, standard.

Water: 40 to 100 PSI, clean source recommended.
Maximum discharge pressure - 100 PSI.

Note: Consult NORCHEM for all non-standard installations.

G Series

AnCAT G (Gear) Series liquid polymer systems employ a 316 stainless steel rotary-gear-type metering pump to inject the neat liquid polymer into the four stage, hydraulic mixing circuit. G Series AnCATs can process up to 600 GPD of Mannich/AMPAM or PAM solution polymer and up to 300 GPD of liquid polyacrylamide in the emulsion or dispersion form. Polymer solution flowrates to 8.0 GPM (480 GPD) at 0.2 to 2.0%, volume on volume, polymer solution concentrations are standard while solution flowrates to 16 GPM (960 GPH) are typical for SD (Secondary Dilution) versions.

G Series AnCATs, unless otherwise specified, are supplied with a stainless steel base, stainless steel supports, stainless steel

brackets and stainless steel piping. Polymer-side wetted parts include carbon steel, stainless steel, high density polyethylene (HDPE), polypropylene and teflon. Water-side wetted parts include stainless steel, cast iron, brass and polysulfone. Other materials and custom designs are available upon request.



G Series Capacities/Flow Specifications

Model Number	Liquid Polymer (GPD)	Primary Solution (GPM)	Secondary Solution (GPM)	Total Solution (GPM)	Solution Strength (% Conc.)
054GS-100 (SD)	100	4.0	(4.0)	4.0 (8.0)	0.2 to 2.0
054GS-300 (SD)	300	4.0	(4.0)	4.0 (8.0)	0.2 to 2.0
054GS-600 (SD)	600	4.0	(4.0)	4.0 (8.0)	2.0 to 5.0
058GS-100 (SD)	100	8.0	(8.0)	8.0 (16.0)	0.2 to 2.0
058GS-300 (SD)	300	8.0	(8.0)	8.0 (16.0)	0.2 to 2.0
058GS-600 (SD)	600	8.0	(8.0)	8.0 (16.0)	2.0 to 5.0

Note: Effective (pumping) viscosities to 25,000 cps or apparent (bulk) viscosities of 50,000 to 100,000 cps. For special liquid polymers with unusual rheologies, ask about our PC (Progressive Cavity) Series of AnCAT systems.

Utilities – Electrical: 115 VAC, 1 Phase, 60 Hz, 20 Amps, standard.

Water: 40 to 100 PSI, clean source recommended.
Maximum discharge pressure - 100 PSI.

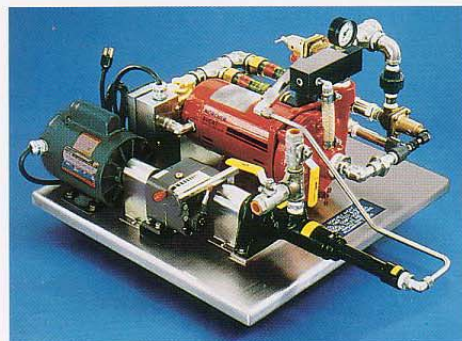
Note: Consult NORCHEM for all non-standard installations.

PC Series

AnCAT PC (Progressive Cavity) Series liquid polymer systems are designed for liquid polymers with unique properties and unusual rheologies. PC Series AnCAT systems can process up to 288 GPD of an extremely viscous or difficult to handle emulsion or dispersion polymer product. Like their D and G Series counterparts, PC Series systems can deliver up to 480 GPH of a 0.2 to 2.0%, volume on volume, primary polymer solution or up to 960 GPH of a combined primary and secondary aqueous solution product.

PC Series AnCAT systems are supplied with a progressive cavity polymer injection pump containing a Viton[®] stator and stainless steel rotor. Like the D Series and G Series systems, the PC Series comes with an all stainless steel base, stainless steel supports and stainless steel brackets. Custom designs are also

available for PC Series AnCAT systems.



PC Series Capacities/Flow Specifications

Model Number	Liquid Polymer (GPD)	Primary Solution (GPM)	Secondary Solution (GPM)	Total Solution (GPM)	Solution Strength (% Conc.)
054PC-144 (SD)	144	4.0	(4.0)	4.0 (8.0)	0.2 to 2.0
054PC-288 (SD)	288	4.0	(4.0)	4.0 (8.0)	0.2 to 2.0
058PC-144 (SD)	144	8.0	(8.0)	8.0 (16.0)	0.2 to 2.0
058PC-288 (SD)	288	8.0	(8.0)	8.0 (16.0)	0.2 to 2.0

Note: Effective (pumping) viscosities to 50,000 cps or apparent (bulk) viscosities of 100,000 to cps and up. Consult NORCHEM on liquid polymers with special characteristics or unusual rheologies.

Utilities – Electrical: 115 VAC, 1 Phase, 60 Hz, 20 Amps, standard.
Water: 40 to 100 PSI, clean source recommended.
 Maximum discharge pressure - 100 PSI.

Note: Consult NORCHEM for all non-standard installations.

L Series



AnCAT L Series liquid polymer systems have the most recognizable "L" shaped profile of any system on the market today. L Series AnCAT systems can be found in the most important liquid polymer applications worldwide. The L Series systems range in polymer solution delivery capacity from 20 GPM to 300 GPM.

L Series Capacities/Flow Specifications

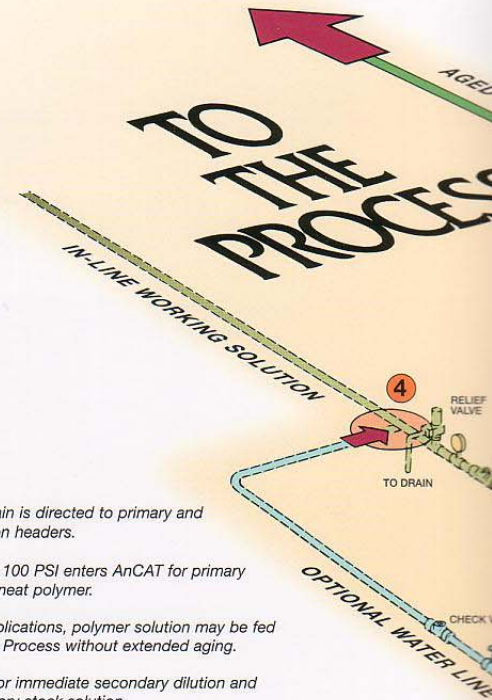
Model Number	Liquid Polymer Minimum (GPD)	Liquid Polymer Maximum (GPD)	Polymer Solution Minimum (GPM)	Polymer Solution Maximum (GPM)	Solution Strength (% Conc.)
L-20	96	576	4.0	20	0.2 to 2.0
L-30	144	864	4.0	30	0.2 to 2.0
L-60	288	1728	5.0	60	0.2 to 2.0
L-80	384	2304	5.0	80	0.2 to 2.0
L-100	480	2880	10.0	100	0.2 to 2.0
L-200	960	5760	20.0	200	0.2 to 2.0
L-300	1440	8640	30.0	300	0.2 to 2.0

Notes: L Series systems listed above are L Series (Standard) for single component Emulsion or Dispersion polymers only. L Series (P-version), PAAM, AMPAM/Mannich Solutions or (D-version), Dual Component, Emulsion/Dispersion or PAAM, AMPAM/Mannich Solutions, available on request.

Effective (pumping) viscosities to 25,000 cps or apparent (bulk) viscosities of 50,000 to 100,000 cps. 316 SS rotary-gear-type liquid polymer injection, standard. PC (Progressive Cavity) versions also available.

Utilities – Electrical: 460 VAC, 3 Phase, 60 Hz, standard.
Water: 40 to 100 PSI, clean source recommended.
 Maximum discharge pressure - 100 PSI.

Note: Consult NORCHEM for HP and Amp-Draw requirements.



- 1 Water from main is directed to primary and optional dilution headers.
- 2 Water at 40 to 100 PSI enters AnCAT for primary processing of neat polymer.
- 3 For certain applications, polymer solution may be fed directly to The Process without extended aging.
- 4 Water enters for immediate secondary dilution and mixing of primary stock solution.
- 5 Water enters for post dilution and mixing of aged stock solution.

SHARPSHOOTER™ Series

SHARPSHOOTER liquid polymer systems are the lowest capacity AnCAT Series and are frequently found in isolated, stand-alone applications. The SHARPSHOOTER is handily portable and can be installed practically anywhere without special tools or complicated instructions. The SHARPSHOOTER is available in a variety of capacities.



SHARPSHOOTER Capacity/Flow Specifications

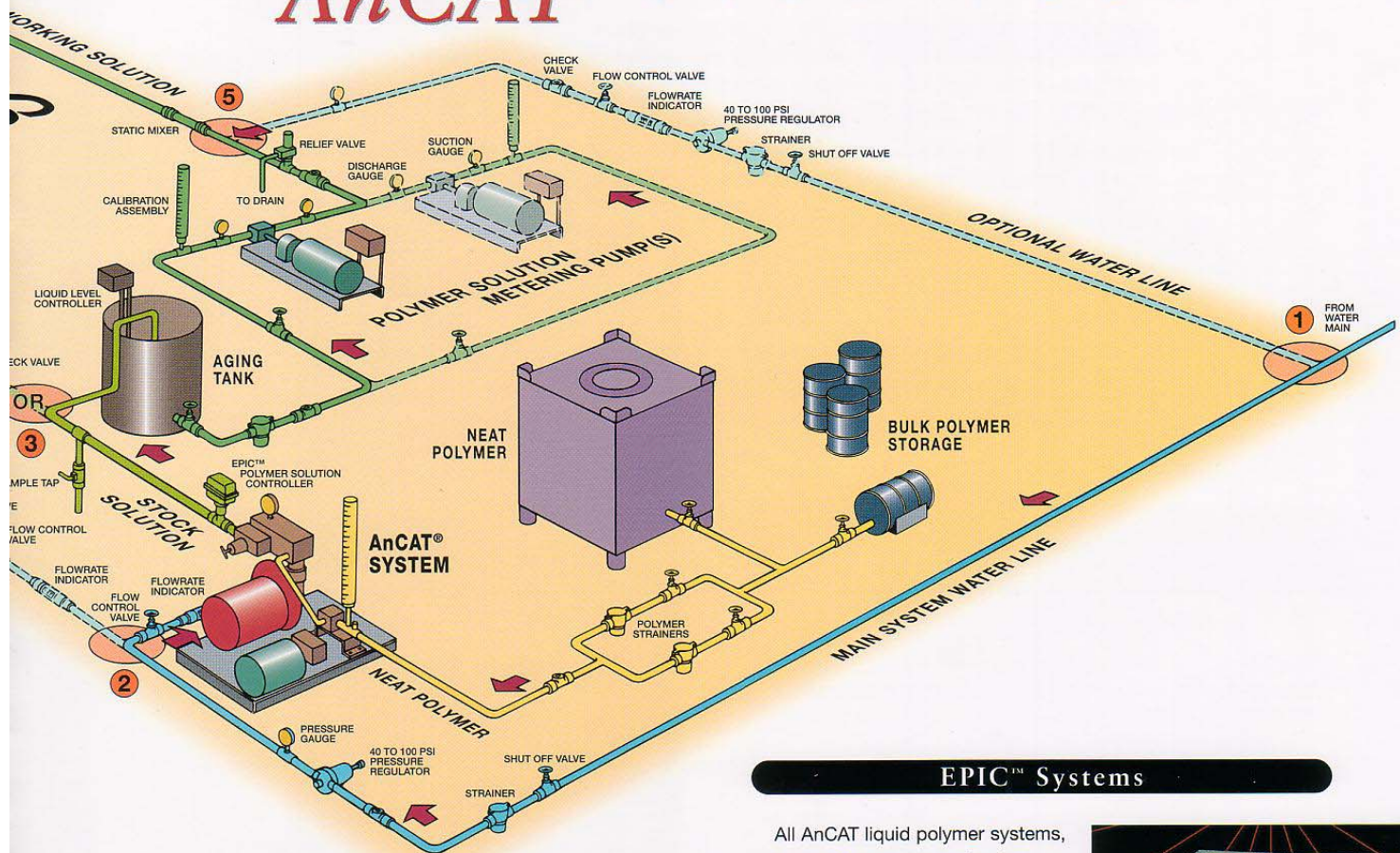
Model Number	Liquid Polymer (GPD)	Polymer Solution (GPM)	Polymer Solution (GPH)	Solution Strength (% Conc.)
412	12	4.0	240	0.2 to 2.0
424	24	4.0	240	0.2 to 2.0
444	44	4.0	240	0.2 to 2.0
812	12	8.0	480	0.2 to 2.0
824	24	8.0	480	0.2 to 2.0
844	44	8.0	480	0.2 to 2.0

Note: For liquid polymer viscosities higher than 3000 cps or capacities greater than 44 GPD, consult NORCHEM.

Utilities – Electrical: 115 VAC, 1 Phase, 60 Hz, 20 Amps, standard.
Water: 40 to 100 PSI, clean source recommended.
 Maximum discharge pressure - 100 PSI.

Note: Consult NORCHEM for all non-standard installations.

AnCAT[®] SYSTEM FLOW

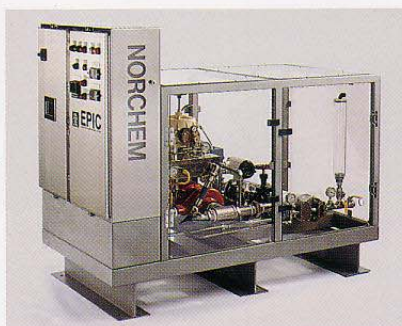


ENVIRONMENTAL Systems

AnCAT ENVIRONMENTAL Series liquid polymer systems are available in a variety of configurations and are designed for aggressive, conductive and often hazardous (requiring Explosion Proof components) locations. ENVIRONMENTAL Series systems are found in bauxite (aluminum) mining in high temperature, high pH environments, pulp and paper mills in corrosive bleachery locations and other hazardous areas requiring dependable polymer processing and reliable solution delivery.

ENVIRONMENTAL Series systems range from standard processing components surrounded by a Lexan® environmental enclosure to special metallurgies and NEMA ratings designed for extremely aggressive and hostile environments. Since most ENVIRONMENTAL Series systems are custom designed to meet specific requirements, their size and configuration will depend on capacity and actual application requirements. The ENVIRONMENTAL Series systems are available in the same capacities, both liquid polymer processing and

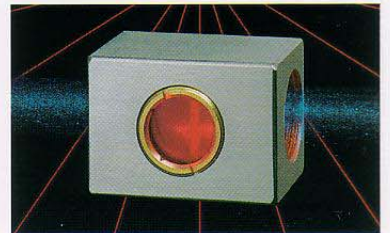
aqueous solution delivery, as other standard AnCAT systems while surpassing the most stringent codes, standards and requirements of the industry.



E-100/Environmental

EPIC™ Systems

All AnCAT liquid polymer systems, except those requiring pulsed or diaphragm-type liquid polymer injection, are available as EPIC, Enhanced Polymer Imaging Control, systems. The EPIC, laser operated liquid polymer system, is NORCHEM's latest development in fully automatic



polymer processing and control equipment. The EPIC system combines proven AnCAT polymer processing with advanced laser imaging technology to create the most accurate and reliable polymer system available.



EPIC/G Series Environmental

The EPIC system, through its automatic laser controller, employs a combination of laser light scattering and absorption principles to precisely control the aqueous polymer solution to within set-point tolerances of +/- 2.5%, full scale, for concentrations within the control range of 0.2 to 2.0%, volume on volume. The EPIC laser controller establishes a reference point, based on the composition of the aqueous polymer composite and varies the volumetric ratio of neat polymer to dilution water flow rate, holding the active polymer concentration constant and ensuring the quality of the aqueous polymer solution and its performance in the application process.

The NORCHEM EPIC trademark is your guarantee of highest polymer solution quality resulting in superior polymer program performance. See the AnCAT E Series system featuring the EPIC laser controller in the standard L Series configuration on the front cover of this bulletin.

NORCHEM INDUSTRIES is a prime supplier of chemical preparation and delivery equipment specializing in the design and manufacture of both liquid and dry polymer processing and control systems. NORCHEM's clients represent all major industrial groups including chemical processing, coal preparation, mining, mineral recovery, petroleum refining, petrochemicals, plastics, pulp and paper, steel, textiles, water treatment and wastewater management.

The NORCHEM AnCAT® registered trademark is acknowledged throughout the industry as the standard of quality and performance by polymer suppliers and end-users alike.

NORCHEM research and development, engineering support, applications experience, operations assistance and technical expertise are recognized worldwide and when applied in combination with quality production, superior craftsmanship and reliable performance of the AnCAT product line, earn NORCHEM the reputation of "The Industry Leader Through Polymer Technology."

L I Q U I D P O L Y M E R S Y S T E M S

AnCAT®

AnCAT Systems — AnCAT liquid polymer systems are designed to process and deliver the full range of HMW (High-Molecular-Weight) polymers in the emulsion, dispersion and solution form. The unique four-step process is controlled by the patented, pressure regulated, AnCAT hydraulic mixing circuit. Liquid polymer and water combine through the four processing stages of premixing, blending, recycling and control to invert, disperse and condition the polymer for maximum activity development in the dilute aqueous solution phase. The entire process benefits from judicious application of proven physical and chemical principles of kinetic acceleration, polymer dispersion, viscosity equalization, polymer seeding, pressure equilibrium and polymer structuring which influence the activity, quality and performance of the optimally conditioned aqueous polymer solution product.

AnCAT Arrangements — AnCAT liquid polymer systems are supplied complete and can be used in stand-alone applications or as the principal processing component in a more elaborate polymer management program. In the AnCAT SYSTEM FLOW illustration liquid polymer in emulsion, dispersion or solution form is injected into the AnCAT hydraulic mixing circuit where primary dilution occurs under controlled processing conditions converting the (neat) liquid polymer into primary aqueous (stock) solution. The primary aqueous composite may be delivered directly to process, aging tank or secondary dilution header where it combines with secondary dilution water forming an in-line (working) solution of dilute aqueous polymer.

Polymer activation is a process characterized by successive activity development in the dilute aqueous solution phase and may require both primary AnCAT processing and time dependent hydration (aging) to achieve maximum reactivity and effectiveness in the application process. A substantial increase in viscosity of the aqueous composite (stock) solution or in-line (working) solution is a good indication of solution activity development or polymer activation.

If aging is required for maximum polymer activity, the primary (stock) solution may be held in the aging tank for a few minutes or until maximum activity is attained thereby ensuring optimum performance in the application process.

Aged or conditioned polymer may be delivered directly to process by the polymer solution metering pump(s) or the aged primary solution may be diluted through a static mixer for delivery as aged

(working) solution. If secondary dilution water is added to the aged (stock) solution the process is referred to as post-dilution and the product is aged (working) solution. Regardless of the flow path of the liquid polymer and water, the conditioned aqueous polymer solution ultimately finds its way to the process where the last (final) dilution takes place.

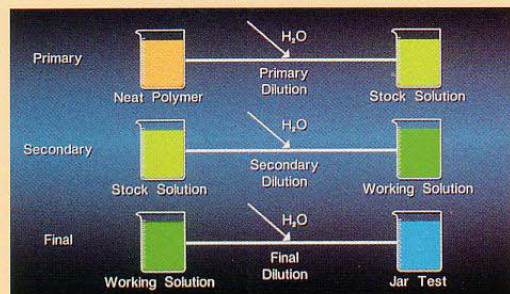
The critical flow path and optimal processing specifications for properly conditioned aqueous polymer solution depend on the characteristics of the selected polymer and the specific requirements of the intended application. For the best liquid polymer for your application consult your polymer supplier and for the best AnCAT system or arrangement consult NORCHEM INDUSTRIES.

AnCAT Performance — The AnCAT liquid polymer system is the most reliable polymer processing and delivery product on the market today. NORCHEM INDUSTRIES stands behind its AnCAT products and will repair or replace any AnCAT system which is shown to be defective in materials or workmanship within eighteen (18) months of shipment or one (1) year of start-up.

In addition, NORCHEM offers laboratory testing of your polymer for your specific application. All laboratory investigations are undertaken with discretion and due regard for proprietary concerns. Pursuant to laboratory evaluation, NORCHEM will issue a performance statement for the polymer processing system and its ability to prepare aqueous polymer solution at or above the determined performance value established for the subject polymer.

Laboratory Preparation

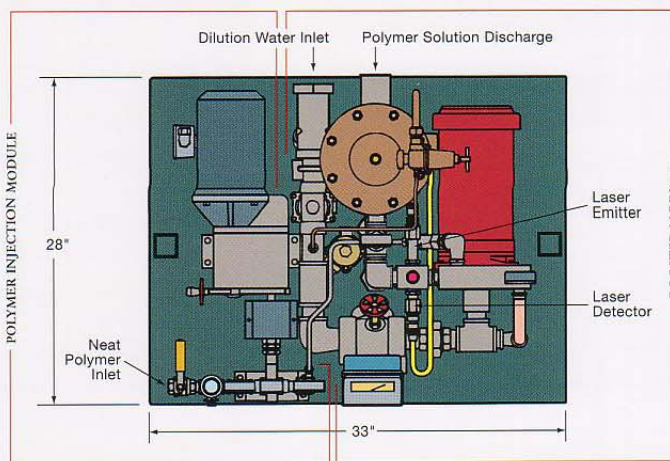
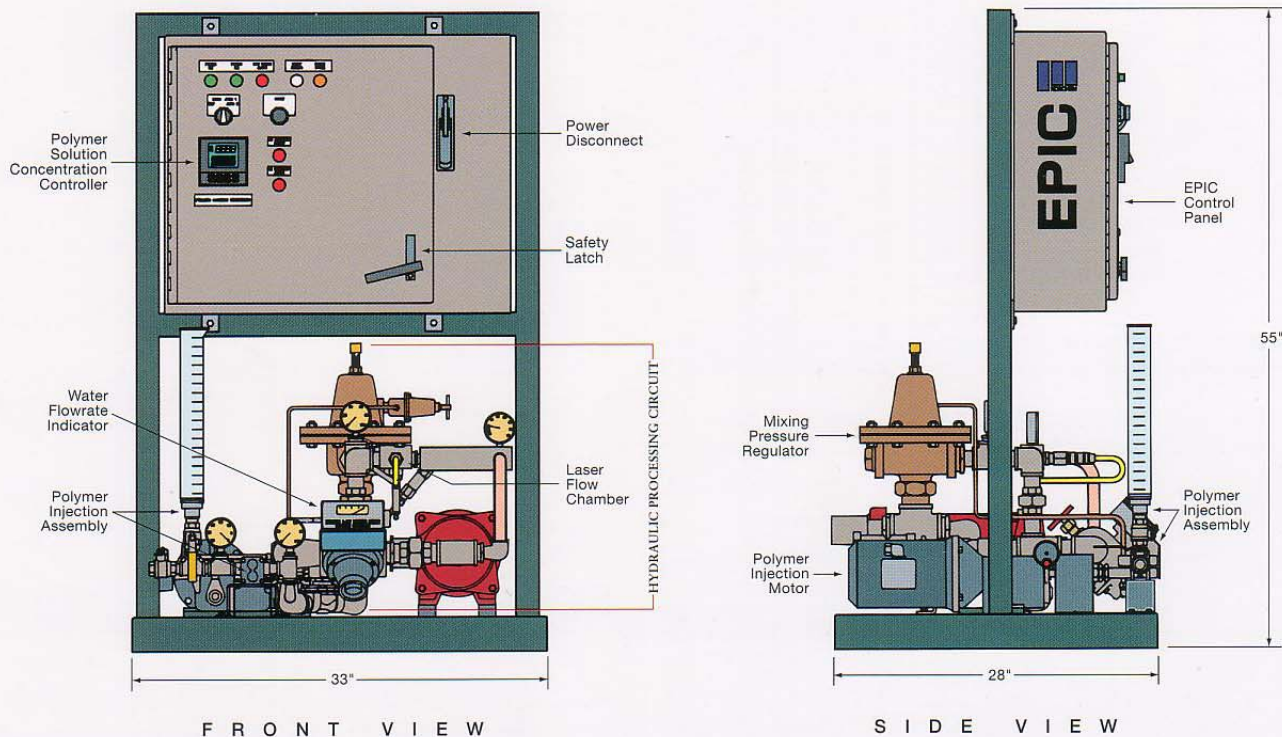
SYSTEM FLOW COMPARISON



AnCAT[®]

Model E-30 Series II

D I M E N S I O N S / S P E C I F I C A T I O N S



AnCAT products are covered under one or more of the following U.S. and foreign patents: 5,403,552 • 5,323,017 • 5,372,421 • 0,473,356 • 5,599,101 • 5,470,150 • 5,407,975 • 2668950 • 2606700 • 2192806 • 183419 • 37 18 818

Dimensions are approximate and may vary slightly with optional arrangements. Other patents applied for and pending.

