



## TYPICAL APPLICATIONS

- ▶ Circuit-Breaking Devices
- ▶ High Voltage Transformers
- ▶ Regulators
- ▶ Series Reactors
- ▶ Shunt Reactors
- ▶ Tap Changers

## BENEFITS

- ◆ Cellulo® dielectric fluid reconditioning filters provide economical restoration of service-aged dielectric oils without removing oxidation inhibitors or specific stabilizing agents.
- ◆ Cellulo® reconditioning filters offer greatly increased contaminant loading capacity resulting in lower total filtration costs.
- ◆ Available in sheet form as well as the unique Cellu-Stack® filter module design with anti-rotating spacers.
- ◆ The high capacity 1330AO water removal stack is specifically designed to effectively shut off the flow when fully saturated with water to prevent water from recontaminating the filtrate.
- ◆ Particulate removal is accomplished by mechanical sieving and electrokinetic adsorption.
- ◆ Cellu-Stacks® fit into virtually all commercially available housings without the need to retrofit the equipment.
- ◆ Cellu-Stacks® come packaged in a 4-mil thick polybag that includes an enclosure to prevent leakage when disposing of spent stacks.

Gusmer Enterprises has improved and optimized the Cellulo® series of high capacity dielectric fluid reconditioning depth filters. Both the 1330AO and 1330GO series media are specifically formulated to provide superior reconditioning of contaminated dielectric insulating fluids. In addition, a cellulose-based filter, 1335DD, is available for standard applications. The 1330AO, 1330GO, and 1335DD media are available in both stack and sheet form.

## DIELECTRIC STRENGTH RESTORATION

Insulating fluids must exhibit certain insulating properties in order to ensure satisfactory performance.

It is common for utilities to use the dielectric strength test as a general periodic screening procedure to determine serviceability of the insulating oils for continued use. Dielectric breakdown voltage is a measure of the insulating oil's ability to withstand electrical stress without failure. Cellulo® high capacity reconditioning filters are ideal for the restoration of dielectric strength.

Low dielectric breakdown values can also be attributed to other contaminants such as acids and soluble polar materials. Extensive removal of these degradation products requires reclaiming processes using fuller's earth in combination with specific chemicals.

Electrical failure due to improperly maintained insulating fluids containing high levels of water, carbon, suspended contaminants, and sludge can be catastrophic. The effects of power interruption can also be severe.

Cellulo® media will retain and adsorb polar contaminants and products of oxidation that can act as catalysts for accelerated deterioration of insulating fluids.

Power system maintenance studies have shown that routine filtration of in-service insulating fluids with Cellulo® media will result in greatly extended fluid life. This will assure that the fluid will perform its multiple role of electrical insulating, arc quenching and thermal dissipation.

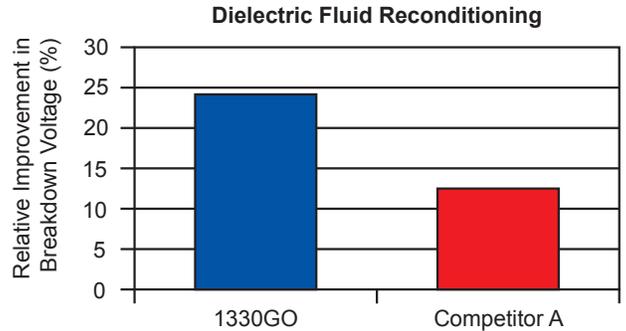


## COMPARATIVE PERFORMANCE ANALYSIS

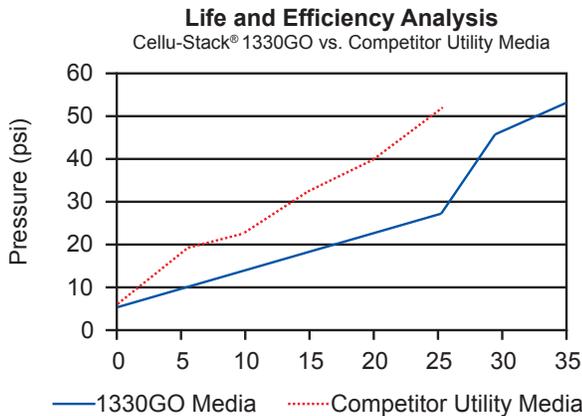
The optimized 1330AO and 1330GO dielectric fluid reconditioning filters have proven effective in field trials at major United States utility companies. Each field trial has validated work performed under lab conditions. Circuit breaker oils with dielectric breakdown voltages less than 18 kV, as determined by ASTM D877, have been reconditioned, removing deterioration by-products and carbon while maintaining the initial pressure drop through the entire filtration cycle. The dielectric fluids have been restored to acceptable dielectric breakdown voltages well above 25 kV.

### IMPROVED RECONDITIONING PERFORMANCE

Cellu-Stacks® produced with 1330AO and 1330GO media provide superior reconditioning of contaminated fluids. Testing by an independent laboratory has shown that the AO/GO series restores dielectric fluid properties better than the leading competitor's media. In the graph (right) the 1330GO media improved the contaminated oil's dielectric breakdown voltages by 24.0% while the competitive media showed only an 11.6% improvement.



NOTE: Testing used circuit breaker oil reported to have over 108 fault trips and an initial turbidity of 340 NTU.

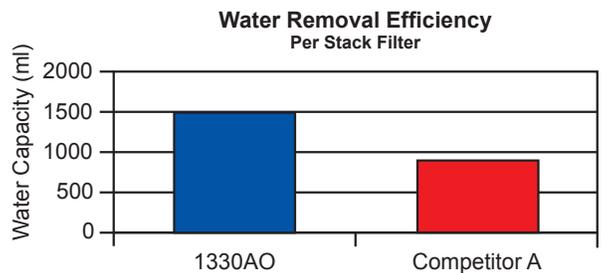


### LONGER FILTER LIFE

Both the 1330AO and 1330GO high capacity dielectric fluid reconditioning filter media have been optimized to provide longer filtration cycles resulting in lower total filtration costs. The graph (left) illustrates the enhanced throughput performance provided by the 1330GO grade media. In this example, the 1330GO grade media provided by 28% longer life than the competitor with equal particulate retention when filtering carbon contaminated service aged transformer oil.

### IMPROVED PARTICLE AND WATER RETENTION

The 1330AO filter media is specifically designed as a high capacity water removal filter. This series incorporates advanced absorbent materials that exhibit high capacity to remove water in free, emulsified and dissolved form. In addition, the media shuts off fluid flow when the filter reaches its maximum water removal capacity. This automatic shut-off feature will prevent water from bypassing the filter and contaminating the filtrate.





## DIELECTRIC FLUID RECONDITIONING FILTER ORDERING GUIDE

### Dielectric Fluid Reconditioning Sheets

#### 1330AO, 1330GO, 1335DD Sheets

The Cellulo® 1330AO, 1330GO, and 1335DD media are available in die-cut sheets for use in Westinghouse and General Electric filter presses.



#### 1330AO, 1330GO, 1335DD Cellu-Stack® Filters

Gusmer Enterprises' Cellu-Stack® filters are constructed from individual cells and assembled into a convenient-to-use filtration system offering significant advantages over conventional plate and frame filter press operations.

Cellu-Stack® filters are designed for ease in loading and unloading filter housings. This significantly reduces operating costs and production downtime.

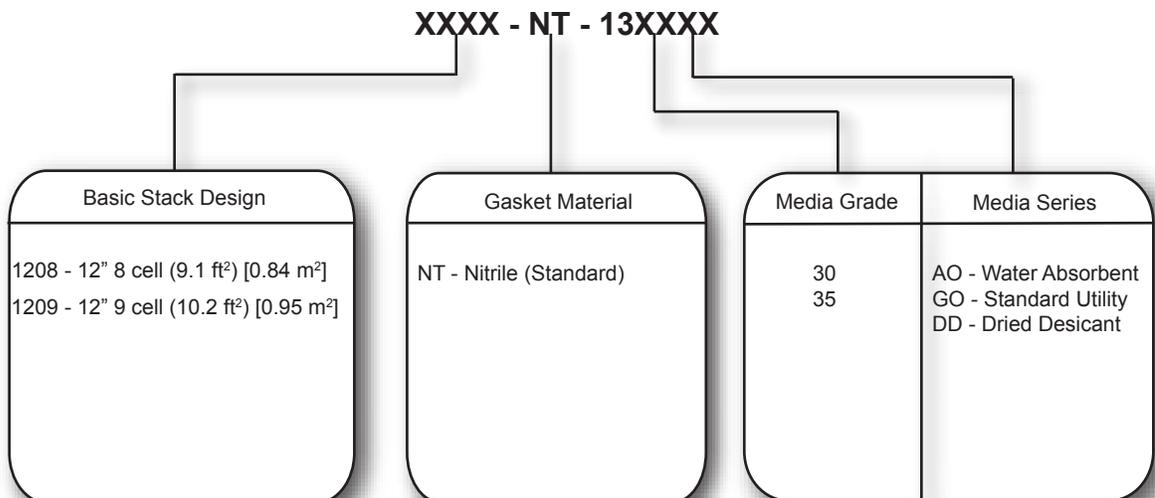
Each Cellu-Stack® filter cell is independently sealed through an injection molding process. Edge seal bosses are incorporated as a special feature to prevent cell collapse during prolonged filtration runs. Specially designed anti-rotating spacers are placed between the cells and the entire unit is held together by three stainless steel straps.

Cellu-Stack® filters are assembled under sufficient compression to maintain integrity in 8 or 9 cell configurations.

### Dielectric Fluid Reconditioning Cellu-Stack® Filters



### Dielectric Fluid Reconditioning Cellu-Stack® Ordering Guide



Example: To order a 9 cell 1330 Utility Series 12" 1330 Cellu-Stack® filter with nitrile gaskets in an AO series, the order should read as follows: 1209-NT-1330AO.

**Important Note:** *Gusmer Enterprises, Inc. provides this information to the best of our knowledge. This information does not claim to be complete and Gusmer Enterprises, Inc. cannot assume liability for improper use. All users are advised to test products to meet their specific needs.*

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