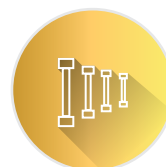
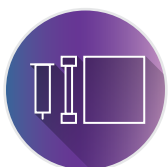
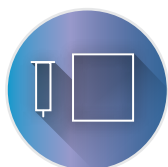


# Reveleris<sup>®</sup> Technologies

A Full Spectrum of Purification Solutions



*The purification revolution continues...*

**GRACE**

Talent | Technology | Trust™

## History of Commitment and Innovation

Whether you are engaged in new-entity discovery or large-scale manufacturing, consider making Grace your premier resource for purification solutions. Grace's experience provides quality and capabilities you can count on. Grace's continuous drive to innovate gives you early access to technology advances that can help improve your productivity.

Grace was the first company to commercially produce silica back in 1919. Today Grace is the world's largest manufacturer of specialty silica gel and a leading supplier of chromatographic silica media. This depth and experience means you can rely on Grace products for superior chromatographic performance, improved capacity and higher purity silica.

## Driving Innovations in Purification for Over a Century

Grace offers an extensive portfolio of products and services to help organic chemists in all industries including: the award winning, patented REVELERIS® X2 and REVELERIS® Prep purification systems, REVELERIS® flash cartridges, VYDAC® and DAVISIL® purification media, MODCOL® SPRING® Columns, together with a complimentary offering of HPLC columns and accessories, innovative preparative columns and column packing solutions.

Patented technology and innovative products combined with Grace's silica materials expertise create a powerful technology base to develop solutions for evolving challenges.

Grace has pioneered a revolution in flash purification, creating both opportunities and solutions.

## GRACE *from past to present*

- 1832** - Davison founded in Baltimore, MD
- 1854** - W. R. Grace & Co. founded
- 1919** - Silica gel patent
- 1921** - First to sell silica gel
- 1954** - Grace acquires Davison
- 1971** - VYDAC® 300A columns and media introduced
- 1981** - DAVISIL® chromatographic media introduced
- 1982** - MODCOL® prep columns introduced
- 1985** - First ELSD introduced
- 1992** - SPRING® column introduced
- 1998** - VYDAC® MS columns and media introduced
- 1999** - ELSD patent
- 1999** - SPRING® column patent
- 1999** - DAVISIL® XWP media introduced
- 2005** - ALLTECH® 3300 ELSD introduced
- 2007** - GraceRESOLV™ flash cartridges introduced
- 2009** - REVELERIS® Flash System introduced
- 2011** - REVELERIS® iES Flash System introduced
- 2012** - REVELERIS® Flash System US patent
- 2012** - VYDAC® 150HC media introduced
- 2012** - Three REVELERIS® Flash System US patents
- 2012** - REVELERIS® X2 Flash System introduced
- 2012** - MODCOL® Multipacker Patent
- 2013** - REVELERIS® Australian Patent
- 2014** - REVELERIS® Chinese Patent
- 2014** - REVELERIS® Prep Purification System introduced

- Company Growth
- Silica Expertise
- Expanding Technology
- Patented Technology

*160 years of innovation, patented technology and trusted brands combined with our silica expertise, allows Grace to provide a total solution for all of your purification needs.*

## The REVELERIS® Technology Revolution Continues

2009

Grace revolutionized flash chromatography by introducing the REVELERIS® flash chromatography system, the first system that integrated ELSD and traditional UV detection. The REVELERIS® flash chromatography system with REVEALX™ detection technology allows the detection of both chromophoric and non-chromophoric compounds, giving users the confidence that all compounds and impurities in their samples are detected, helping to economize the workflow within the industry.

2012

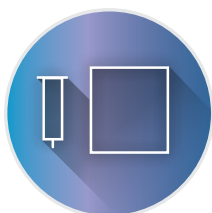
Expanding on this innovative technology, Grace introduced the REVELERIS® X2 flash chromatography system, which offers 3 integrated UV wavelengths plus ELSD detection, with software selectable sensitivity for maximum flexibility of sample types and concentrations in a single, intuitive system.

2014

The new REVELERIS® Prep purification system is a dual-capability instrument that performs both flash and preparative LC. This newest addition to the REVELERIS® instrument family allows the user to switch between flash chromatography and preparative LC modes with a simple touch of the screen allowing the chemist to maintain hands-on control and uninterrupted custody of the sample throughout the entire purification process. This compact intuitive system conserves space and money compared to purchasing both flash and preparative LC systems separately.

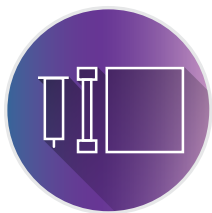
### A Full Spectrum of Purification Solutions

Grace offers an extensive portfolio of products and services including the REVELERIS® X2 and REVELERIS® PREP purification systems, REVELERIS® flash cartridges, VYDAC® purification media, DAVISIL® chromatographic media, and MODCOL® SPRING® DAC Columns, to provide a full spectrum of purification solutions for a wide range of industries.



#### Flash Chromatography System | Pg. 4

REVELERIS® X2 Flash Chromatography System



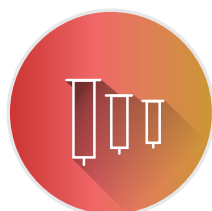
#### Flash and Prep Purification System | Pg. 6

**NEW!** REVELERIS® Prep Purification System



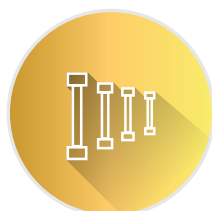
#### Technology and Software | Pg. 8

REVEALX® Detection Technology  
REVELERIS® NAVIGATOR™ Software Feature



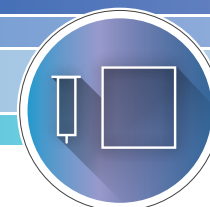
#### Flash Cartridges | Pg. 9

**NEW!** REVELERIS® HP High Performance Cartridges  
**NEW!** REVELERIS® C18WP Wide Pore Cartridges  
REVELERIS® Silica Cartridges  
REVELERIS® Amino, Diol and C18 Phase Cartridges



#### Preparative Columns and Media | Pg. 10

Grace® Pre-packed Columns  
DAVISIL® Chromatographic Media  
VYDAC® Purification Media  
MODCOL® SPRING® Columns



## *Ideal for Flash Chromatographers Needing Greater Purity and Speed*

The REVELERIS® X2 flash chromatography system is an advanced and powerful system that allows the chemist to see previously invisible components and impurities, helping to provide maximum purity and recovery of target compounds in minimal time.

The patented REVEALX™ detection technology integrates up to three UV wavelengths, plus an ELS detector signal and advanced signal processing.

## Benefits

The system offers software selectable sensitivity of all detectors for maximum compatibility with sample types and concentrations.

The integrated ELS detector is extremely low maintenance because it is self-optimizing and requires no makeup solvents or user interaction. It also minimizes sample loss since only a small amount is required for ELS detection.

The combined ELS and REVEALX™ detection technologies help to ensure maximum purity of fractions by detecting both chromophoric and non-chromophoric compounds and impurities.

Also, the use of chromophorically active solvents is possible giving the chemist more options to optimize methods for higher purity.



**CONFIDENCE**

### **Maximize purity and recovery of your target with RevealX™ detection technology**

- Synchronized detection and fraction collection from up to four detector signals (ELSD/UV/Vis)
- Detects the widest range of compounds
- Maximizes recoveries by directing only 50µl/min or less of your sample to ELSD



**FLEXIBILITY**

### **Purify a broad range of sample types with selectable high/low detection sensitivity**

- Detect chromophores, nonchromophores, and visible sample components from mg to kg quantities
- Purify complex samples from discovery through process R&D
- Easily switch between normal phase and reversed-phase applications



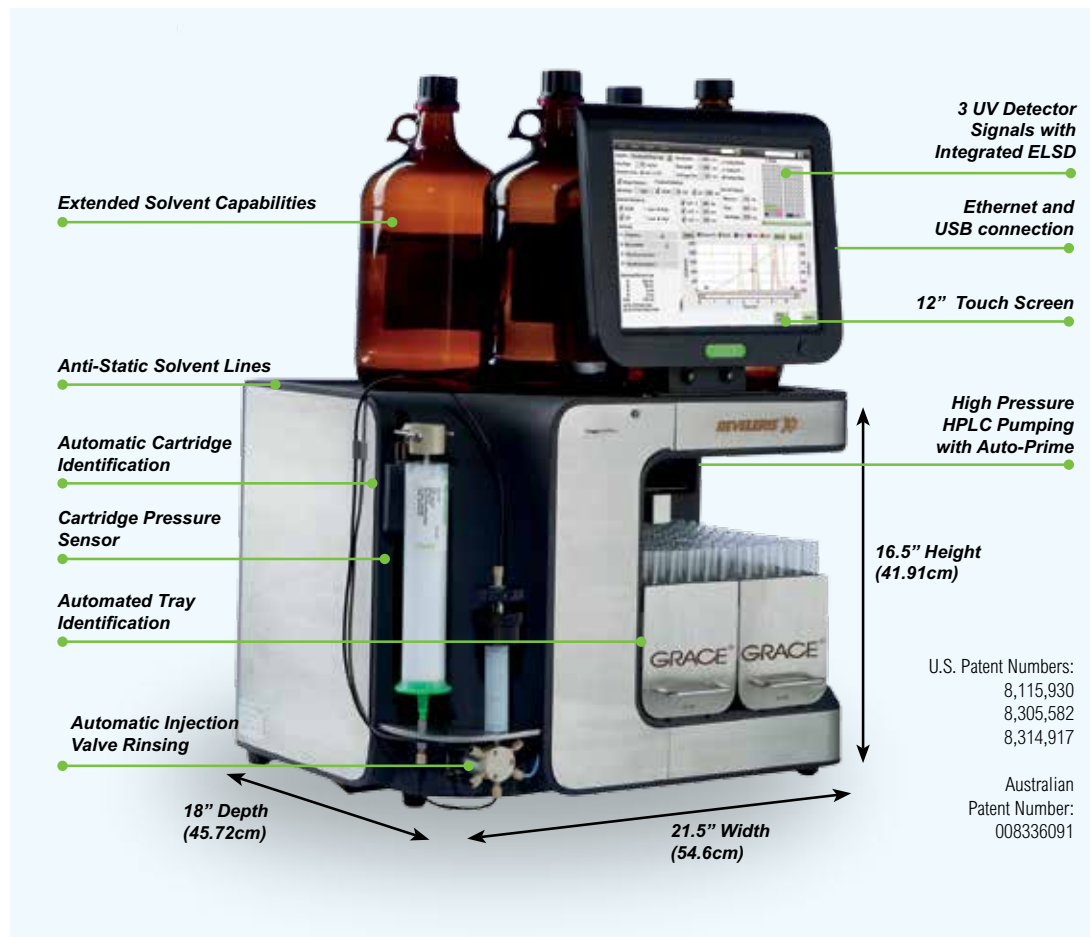
**SIMPLICITY**

### **One-screen programming and run control with intuitive Windows® interface, accelerates system set-up**

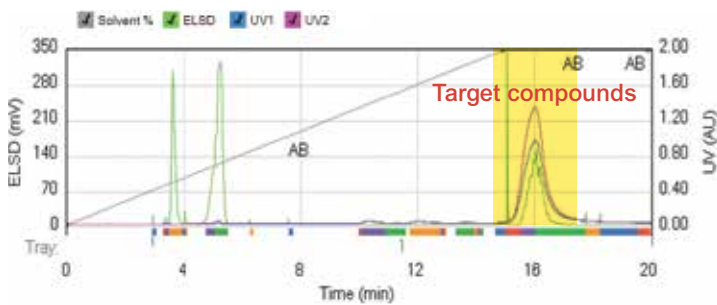
- Quickly modify run parameters on a large 12" touch screen display
- Edit gradients in real time, using click and drag or table
- Auto-recognition of cartridges and trays reduces set-up time, and the risk of potential errors

# Maximizing Purity and Recovery of New Molecules

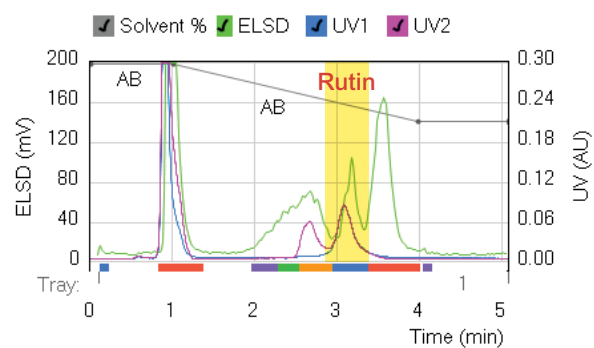
The ability to detect both chromophoric and non-chromophoric compounds makes the REVELERIS® X2 flash chromatography system ideal for difficult applications such as lipids, carbohydrates and natural products as well as traditional small molecule compounds



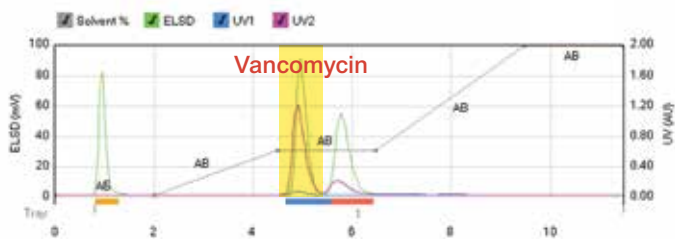
## Flash Purification of Galla Chinensis



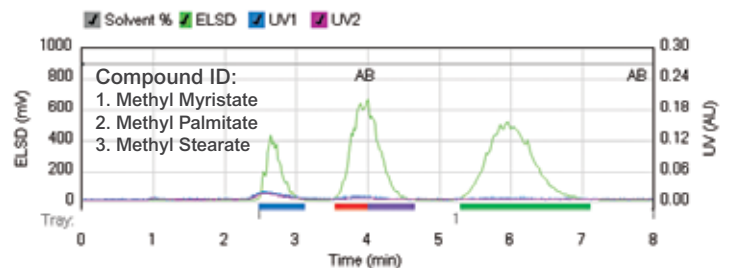
## Flash Purification of Rutin



## Flash Purification of Peptide Mixtures



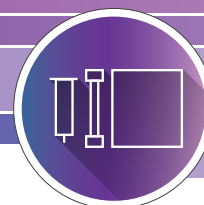
## Flash Purification of FAMES



### REVELERIS® X2 flash chromatography system ordering information

Description	Part No.
REVELERIS® X2 Flash Chromatography System	5164931
REVELERIS® UV-Vis Optional Upgrade	5167301

Description	Part No.
REVELERIS® NAVIGATOR™ Software Optional Upgrade	5156620
REVELERIS® Dry Air Supply, Optional	5168621



*Ideal for Chemists and Chromatographers Wanting to Use Both Flash and Preparative LC*

The REVELERIS® PREP purification system is a powerful, high-performance system that combines flash chromatography and preparative LC capabilities in a single intuitive instrument. The advanced dual-mode system serves the needs of both organic chemists and preparative LC chromatographers, to streamline purification processes.

## Ideal for:

**Organic Chemists** who like the simplicity of flash chromatography but need higher purity and resolution from preparative LC without giving up custody of their sample.

*and*

**Preparative LC Chromatographers** who do not always need the efficiency of preparative LC but want to save time and money by using disposable flash cartridges when high resolution or purity is not required.

## Benefits

**Time and Cost Savings** – The REVELERIS® Prep purification system can be used in flash and preparative modes separately or sequentially, saving the organic chemist time by performing their own preparative LC. In addition, the dual-function capability saves space in the laboratory, and helps reduce the total capital cost of flash and preparative LC purifications by 40% to 50%.

**Control** – The REVELERIS® Prep purification system allows the user to seamlessly switch between flash and preparative modes with a single click, keeping the user in complete control of the purification process.

**Sample Custody** – The dual-mode REVELERIS® Prep purification system, allows the user to perform flash and preparative LC while maintaining custody of the sample.

**Efficiency** – The REVELERIS® Prep purification system allows the user to perform a simple flash separation to clean up samples before injecting fractions onto a preparative LC column, preventing degradation of expensive preparative LC columns and prolonging their lifetimes.



*Take control of your purification with the Reveleris® Prep purification system*

## + VERSATILITY

**Maximize purity and recovery of target molecules**

- Choose flash or preparative chromatography
- Use both flash cartridges and preparative LC columns
- Up to 200mL/min in both flash and preparative modes
- Up to 1700 psi in preparative mode
- 3 channel variable UV-Vis and ELS detection
- Detects both chromophores and non-chromophores

## + SIMPLICITY

**Simple set up, easy operation**

- Intuitive, simple software interface
- Large 12" touch screen system control
- Single click software switches between flash and preparative LC
- No time consuming fluidics changes required
- Easy cartridge and column installation

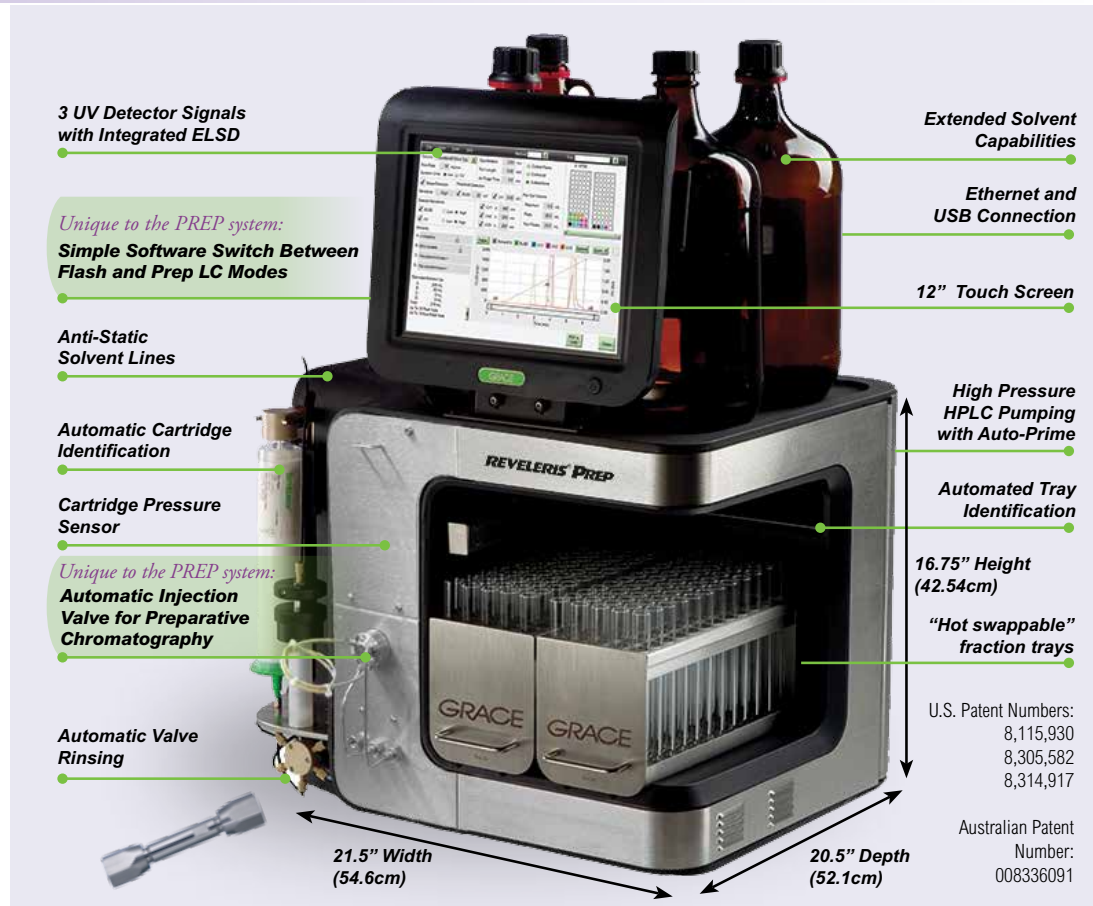
## + CONTROL

**Purify a broad range of samples with complete control**

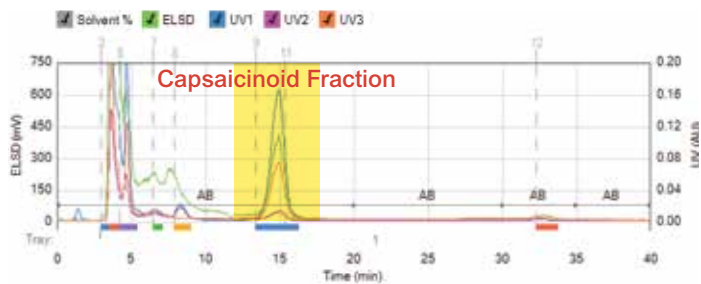
- Maintain custody of your sample
- Single click detector sensitivity choice
- Choose how and what to collect
- Choose speed and/or purity
- Manage the entire purification process yourself

# Integrated Dual Mode Flash and Preparative LC Capabilities in a Single System

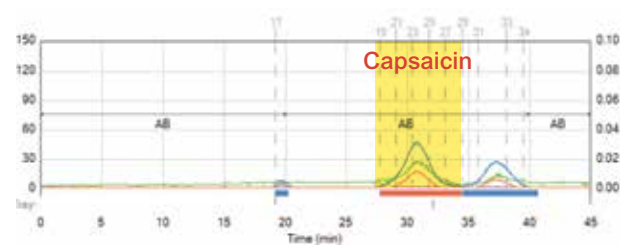
The flexibility of the Reveleris® Prep system allows the user to perform both flash chromatography and preparative LC on a single system. These can be used sequentially to clean up samples by flash prior to preparative LC so that the preparative LC column is protected from impurities as in the isolation of capsaicin from red chili skin extract below.



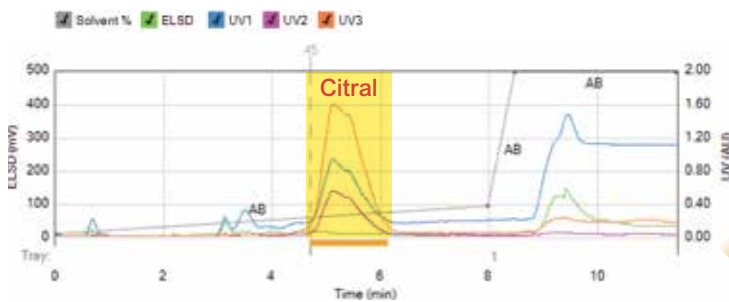
## NP Flash Purification of Red Chili Skin Extract



## RP Preparative LC Purification of Fractions 9-11

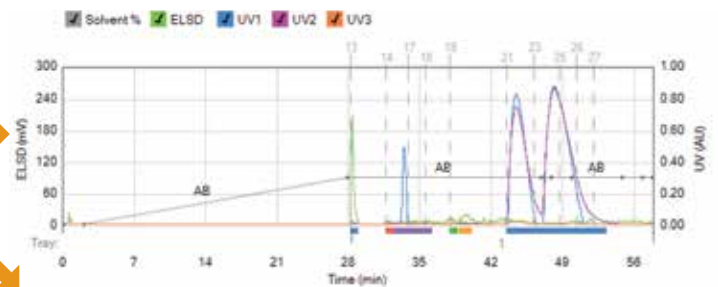


## NP Flash Purification of Lemongrass Oil



## RP Preparative LC Purification of Fraction 45

Reveleris® Prep System (Upper) and Conventional Preparative LC System (Lower)



### REVELERIS® Prep purification system ordering information

Description	Part No.
REVELERIS® Prep Purification System	5172862
REVELERIS® UV-Vis Optional Upgrade	5167301
REVELERIS® NAVIGATOR™ Software Optional Upgrade	5156620
REVELERIS® Dry Air Supply, Optional	5168621

# Innovative REVEALX™ Detection Technology and REVELERIS® NAVIGATOR™ Software



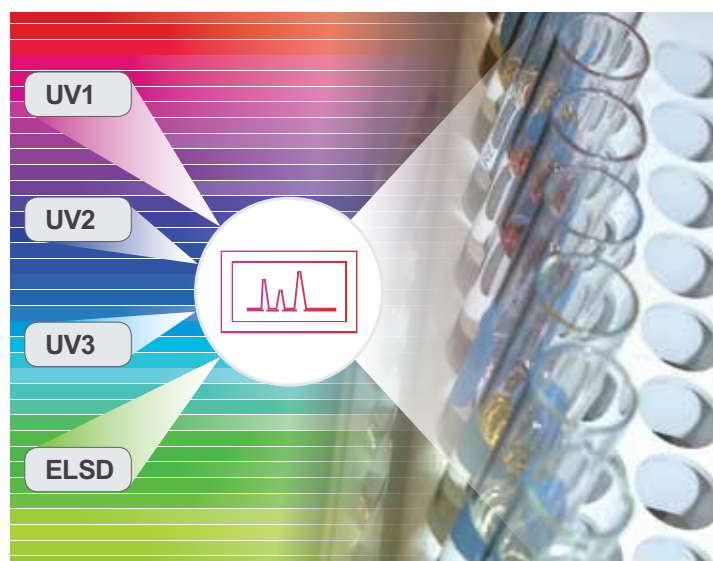
The unique, patented REVEALX™ detection technology and the patent pending REVELERIS® NAVIGATOR™ software feature, provide added benefits by increasing productivity, helping to achieve maximum purity in minimal time. These innovative technologies are available on both REVELERIS® purification systems.

## RevealX™ Detection Technology

- Simplifies Fraction Collection
- Reduces Post Purification Work
- Maximizes Recovery of Target Molecules

The patented REVEALX™ detection technology combines multiple detector signals to optimize the timing of fraction collection. It synchronizes the signals from up to four different detectors, including ELSD, optimizing the number of fractions and helping to ensure maximum purity. The integrated detector signals and advanced signal processing recognize peaks and collect previously undetected compounds. The REVELERIS® Prep purification system is the first to offer the integrated REVEALX™ detection technology for both flash and preparative LC modes.

The REVEALX™ detection technology comes standard on both the REVELERIS® X2 and REVELERIS® Prep purification systems.



*REVEALX™ detection technology identifies more and enables combined fraction triggering.*

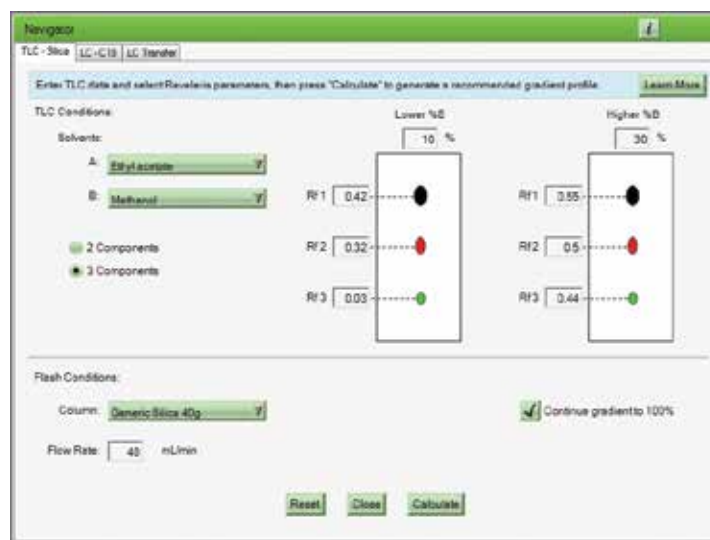
## REVELERIS® NAVIGATOR™ Software

- Improve Target Purities and Recovery
- Simplify Method Optimization
- Reduce Solvent Waste/Costs
- Shorten Run Times

The powerful REVELERIS® NAVIGATOR™ software helps improve efficiency and productivity by simplifying method optimization, taking the guesswork out of interpreting your TLC or HPLC scouting runs. The patent pending algorithm allows you to choose to optimize for the fastest possible run time, or the highest purity possible.

The intelligent REVELERIS® NAVIGATOR™ software will also warn you if your compound will be difficult to separate with the selected solvents before you begin your run. The REVELERIS® NAVIGATOR™ software is an optional upgrade designed to optimize flash purification, and is available on both the REVELERIS® X2 and REVELERIS® Prep purification systems.

This optional upgrade can be purchased with your system, or can be added to your system later. Contact us for more information.



*The REVELERIS® NAVIGATOR™ software simplifies method optimization improving efficiency and productivity*





## Cartridges

- Superior Resolution with ultrapure 40 or 20µm silica
- Standard and High Performance cartridges available
- Silica and multiple bonded phases available
- Standard 60Å or wide pore silica available
- Compatible with all REVELERIS® purification systems

REVELERIS® flash cartridges are packed with silica specially developed by Grace for optimal chromatographic performance. This efficient high purity silica enables more peaks to be baseline resolved, resulting in increased fraction purity and decreased fraction volumes. Its high sample loading capacity improves sample throughputs and yields so that overall purification costs are lowered.

All REVELERIS® flash cartridges have an RFID label that pre-populates methods with optimum conditions on the REVELERIS® purification system. The cartridge usage history is also written to the RFID label.



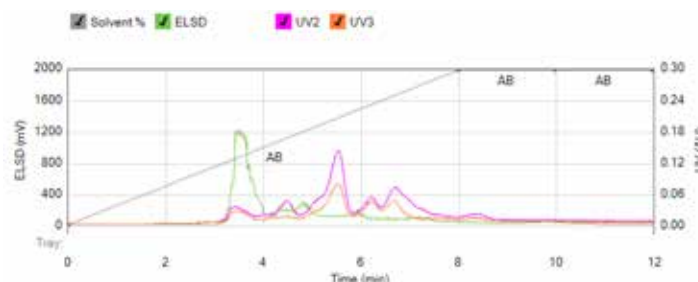
REVELERIS® flash cartridges are available in silica and bonded phase chemistries bringing unique separation capabilities to help resolve a wide range of complex samples.

Chemistry	Ideal For
Silica	Conventional applications, polar compounds
Silica HP	High resolution for complex or difficult to purify samples
C18	Non-polar compounds
C18-WP	A high resolution Wide Pore media for large molecule purification, ideal for peptides, proteins, lipids
Amino	Better peak shapes with polar and basic compounds, ideal for carbohydrates
Diol	Alternate selectivity for a variety of polarity types, ideal for lipids

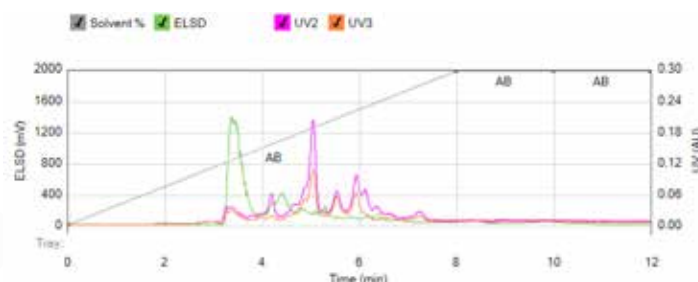
### REVELERIS® silica flash cartridges (up to 200psig\*)

Cartridge size	Qty	Std. Part No.	HP Part No.
Silica 4g	20	5146130	5170200
Silica 12g	20	5146131	5170201
Silica 24g	15	5165730	5170202
Silica 40g	15	5146132	5170203
Silica 80g	12	5146133	5170204
Silica 120g	10	5146134	5170205
Silica 220g	6	5165750	5170207
Silica 330g	4	5146135	5170208

### REVELERIS® 40g 40µm Silica Cartridge

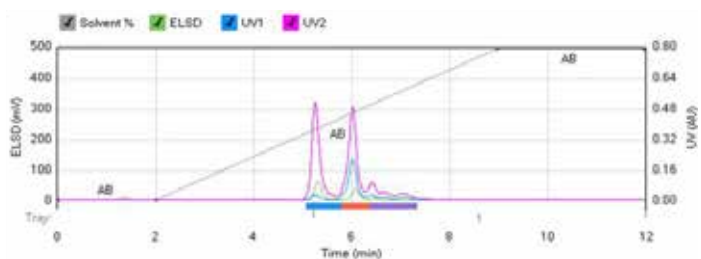


### REVELERIS® HP 40g 20µm Silica Cartridge



*Purification of Neem Oil, 500mg on a REVELERIS® 40g silica cartridge (upper) and a REVELERIS® HP 40g silica cartridge (lower).*

### REVELERIS® C18-WP Cartridge



*Separation of Ampicillin and Piperacillin on a REVELERIS® C18-WP cartridge.*

### REVELERIS® bonded flash cartridges (up to 200psig\*)

Cartridge size	Qty	Amino	Diol	C18 Std	C18-WP
Silica 4g	EA	5157330	5157335	5152990	5169482
Silica 12g	EA	5157331	5157336	5152103	5169483
Silica 24g	EA	--	--	5171532	--
Silica 40g	EA	5157332	5157337	5152104	5169484
Silica 80g	EA	5157333	5157338	5152105	--
Silica 120g	EA	5157334	5157339	5152991	--
Silica 220g	EA	--	--	5171538	--
Silica 330g	EA	--	--	5164430	--

*\*220 and 330g cartridges are limited to 100 psig*



## Columns and Media

Grace offers a variety of pre-packed preparative columns, industry leading column hardware, and an extensive offering of chromatographic media to enhance the performance of the REVELERIS® Prep purification system. Grace's silica based media is packed into proprietary column hardware that extends media lifetime and helps ensure high column efficiency.

## Recommended pre-packed columns for use on the REVELERIS® Prep purification system:

### DAVISIL® 710N Columns

- General purpose 60Å silica for normal phase

### VYDAC® 150HC C18 Columns

- Robust, high capacity 150Å silica bonded with C18 for reversed phase

### DENALI® Silica Columns

- High performance, spherical 120Å silica, available in 5 and 10µm

### DENALI® C18 Columns

- High performance spherical C18 bonded 120Å silica, available in 5 and 10µm

### VISIONHT® C18-P Columns

- High performance spherical media with proprietary C18 bonding that is fully water wettable and offers unique selectivity especially for polar molecules



Media	Length/mm	ID/mm	Particle Size/µm	SKU
Davisil® 710N	250	4.6	10µm	5145654
	250	10	10µm	5174062
	150	22	10µm	5174056
Vydac® 150HC C18	250	4.6	10µm	5168320
	250	10	10µm	5174065
	150	22	10µm	5174060
Denali® Silica	250	4.6	10µm	5174066
	250	10	10µm	5174063
	150	22	10µm	5174057
	150	4.6	5µm	5174061
	150	10	5µm	5174054
	150	22	5µm	5174058
Denali® C18	250	4.6	10µm	5110601
	250	10	10µm	5109183
	150	22	10µm	5121184
	150	4.6	5µm	5108806
	150	10	5µm	5174053
	150	22	5µm	5120570
VisionHT® C18-P	250	4.6	10µm	5174067
	250	10	10µm	5174064
	150	22	10µm	5174059
	150	4.6	5µm	5152061
	150	10	5µm	5152078
	150	22	5µm	5152080

## Additional Prep Hardware, Media and Packing Services Available

### DAVISIL® 710N Media

Manufactured for over 25 years, DAVISIL® Chromatographic silica is one of the world's most widely used chromatography sorbents. With excellent mechanical and structural properties, DAVISIL® silicas are versatile, consistent, reliable and ideal for HPLC, flash chromatography and preparative applications.

### Vydac® Purification Media

VYDAC® silicas are well defined, high purity, total porous separation media that meet the most demanding needs of preparative and process scale users. Proven by over two decades of applications for protein, peptide and nucleic acids separations, VYDAC® 300A reversed phase media has excellent selectivity and reproducibility. VYDAC® 150HC media, developed specifically for peptide purification, is highly effective for purifying many small to medium-sized peptides with greater loading capacity and improved productivity.

### MODCOL® SPRING® Columns

The SPRING® column system has a unique portable design with patented internal dynamic axial compression (DAC) technology that gives DAC performance independently from the external packing device. DAC actively suppresses voids, improves peak symmetry, column lifetime, reproducibility and overall efficiency. MODCOL® SPRING® columns packed with VYDAC® or DAVISIL® media provide a highly effective purification solution. MODCOL® SPRING® columns are available in a selection of dimensions from 1" to 4" ID, with or without water jackets.

Our patented MULTIPACKER® packing instrumentation allows the chromatographer to quickly and efficiently pack their own MODCOL® DAC SPRING® Column hardware.

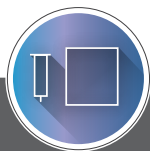
Grace also offers column packing services to help with your column packing needs. With nearly 100 years of combined column packing experience, Grace is the reliable choice for your preparative column packing needs. Grace has the experience to pack over 100 different medias including Grace manufactured and other manufactured media.

**Not sure which media and column hardware to choose for your application?**

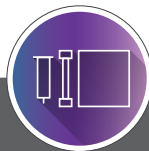
**Interested in our column packing services?**

Contact us for additional information.

# Reveleris® X2 and Reveleris® Prep Purification System Specifications

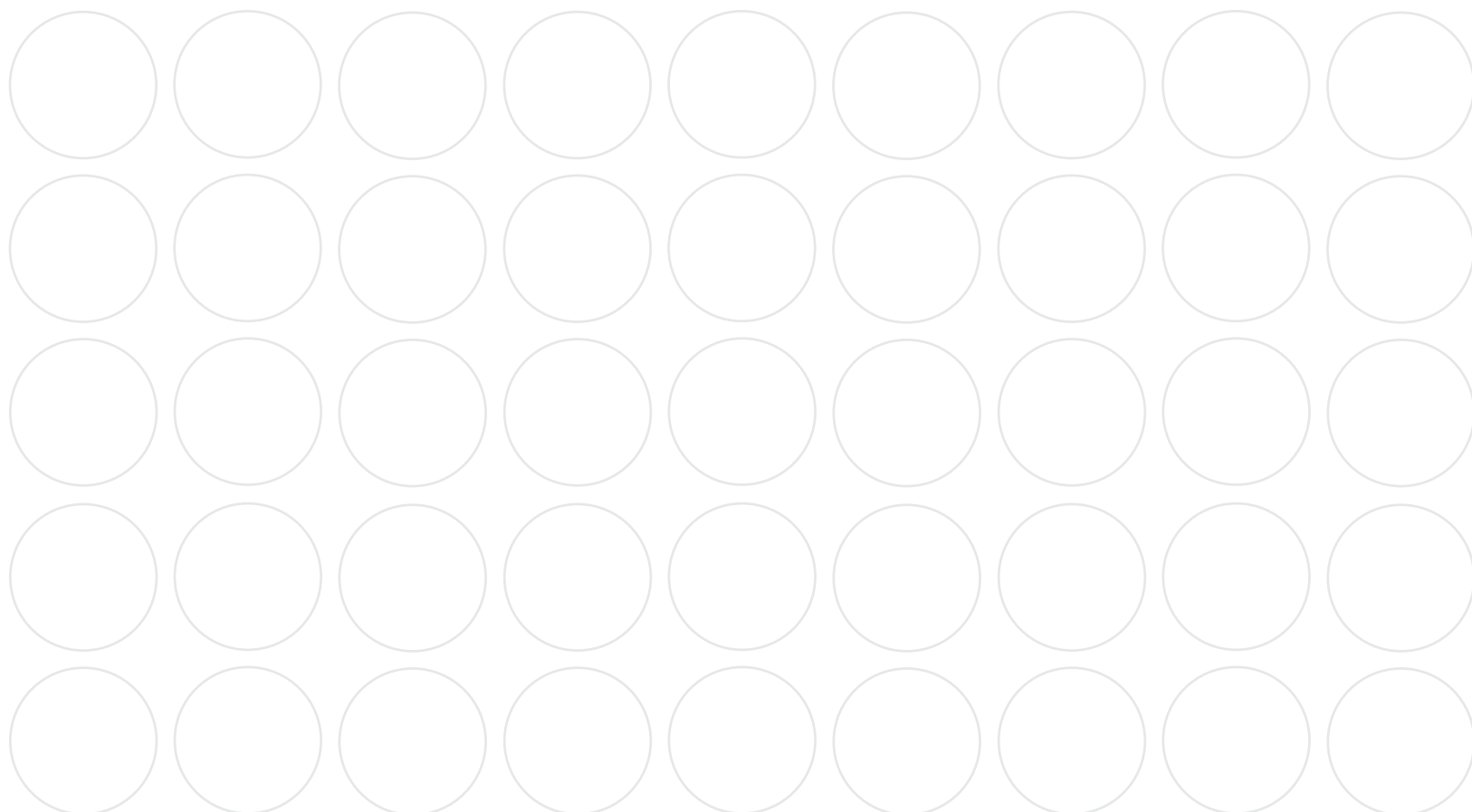


## Flash Mode Specifications



## Preparative LC Mode

Display	12" Windows® based graphical LCD touch screen with full on-screen QWERTY keyboard	
Data Entry	Touch screen or USB connection to mouse/keyboard	
Software	REVEALX™ detection technology with advanced signal processing to combine multiple detector signals	
Solvent Delivery System	High pressure HPLC pumps, 4 independent channels with up to four solvents in a single run, auto-switches lines when solvent depletes, normal phase and reversed phase compatible	
Flow Pump Rate	1-200mL/min (Accuracy +/- 3%, precision +/- 0.5% for 4-200 ml/min)	
Maximum Pressure	200 psig	Up to 1700 psig (depending on flow)
Gradients	Linear, step, isocratic, 4 solvent binary, on-screen mid-run gradient adjustment, isocratic hold/pause	
Sample Injection	Liquid or solid sample modes. Solid injection up to 75g	Liquid Injection via 6-port Loop injection valve (partial or full loop filling). 5ml loop installed
Solid Loader	A range of solid loader sizes and types are compatible	A self fill solid load pre-column is available
Detector Sensitivity	Software selectable high/low sensitivity of all detectors.	
UV Wavelength Range	200-500nm, up to 3 signals. Optional extension to visible wavelength, UV-VIS 200-850nm	
Accommodates Flash Cartridge/ Prep Column Sizes	4-330g luer type on system, and up to 1500g with an adapter	10mm to 75mm ID
Triggers	Combination of up to 3 UV signals plus ELSD with slope and/or threshold detection	
Fraction Collection Trays	Holds two 5"x 12" trays, with auto tray recognition	
Power Options	120/240V, 50/60Hz, 10A	120/240V, 50/60Hz, 10A
Instrument Dimensions	16.75"h x 21.5" w x 18.0" d (42.5cm h x 54.6cm w x 45.72cm d)	16.75"h x 21.5" w x 20.5" d (42.5cm h x 54.6cm w x 52.1cm d)
Instrument Weight	70 lbs (31.75kg)	92 lbs (41.73Kg)
Certifications	CE, TÜV®, ISO9001	
Warranty	One year limited warranty coverage of parts and labor from date of installation. Additional warranty and service options are available.	



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