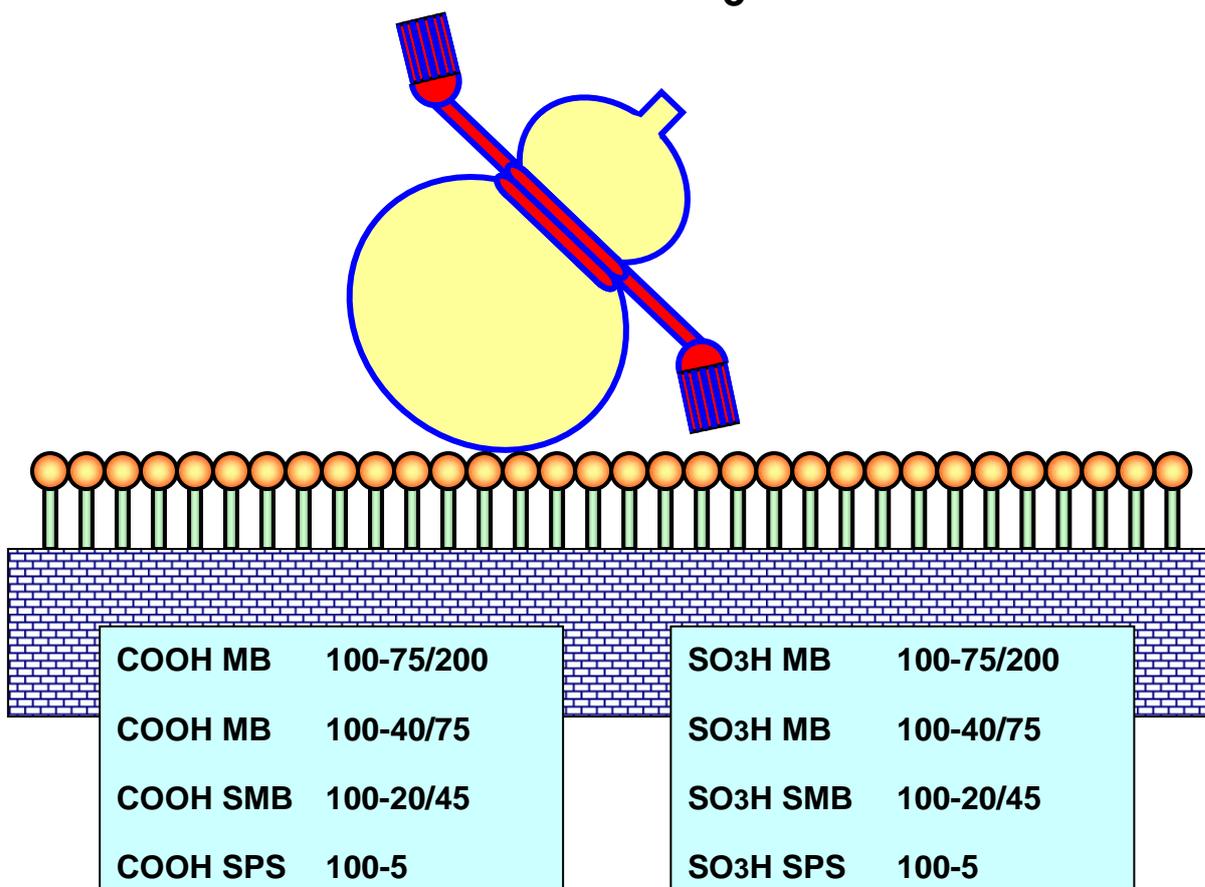


# CHROMATOREX ACD Silica Gels

For the separation of acid compounds

COOH Silica & SO<sub>3</sub>H Silica



## Introduction

Liquid chromatography is a widely used technique for purification of organic compounds. Normal phase chromatography using silica gel and non-polar solvents such as hexane and ethyl acetate is a popular choice because of a high solubility of compounds and easy post-treatment.

However, compounds with basic or acidic characteristics are often difficult to separate using bare silica gel. Though AMINO and DIOL media have been developed for compounds that have basic separation difficulty, there is not yet a proper media to separate acid compounds with carboxyl group, for example.

Fuji Silysia Chemical Ltd. developed an appropriate separation, Chromatorex ACD Silica, for acidic compounds by introducing COOH and SO<sub>3</sub>H bonds on the silica surface (patent applied).

## Normal Phase Bare & Bonded Silica grades

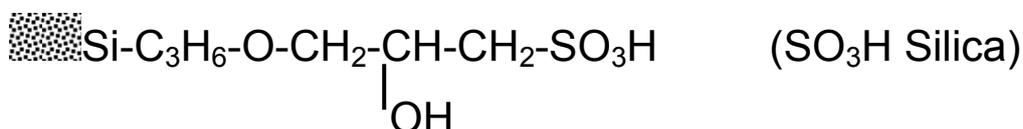
The ACD Silica grades complete the normal phase bare and bonded silica of Fuji Silysia Chemical.

For the separation of organic compounds by normal phase liquid chromatography, it is necessary to select the proper media based on its characteristics:

- Neutral compounds are well separated by bare silica gel.
- NH silica and DIOL silica are used for basic compounds separation.
- Now acid compounds can be separated with our new ACD Silica.



### Surface characteristics of Chromatorex ACD silica



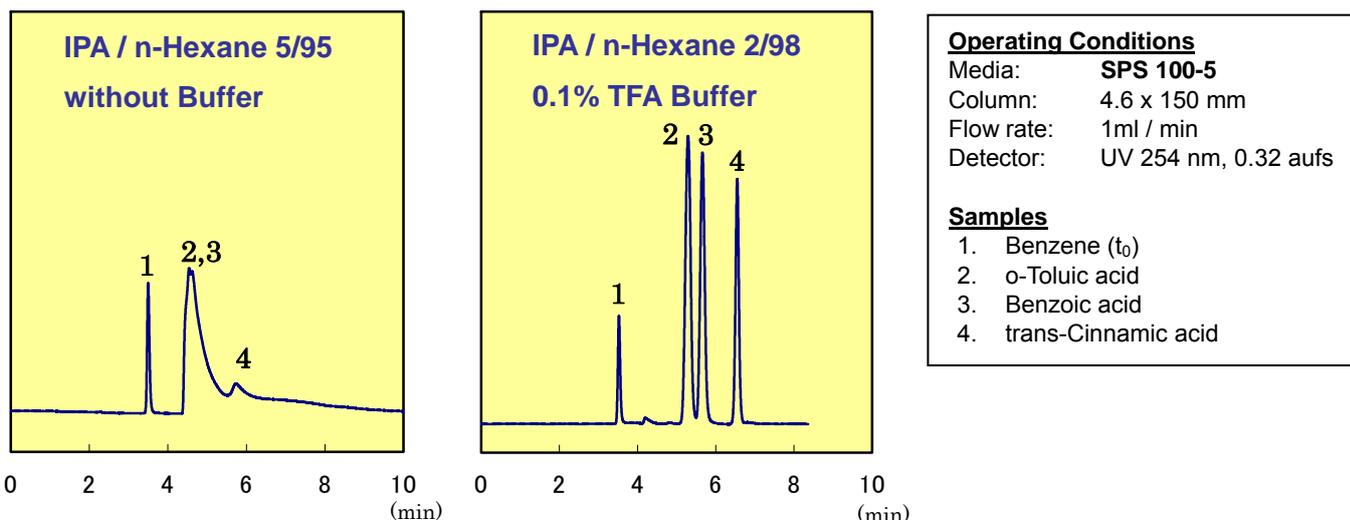
## Advantages of ACD Silica

In solution, a part of acidic organic compounds with carboxylic acid are dissociated:



### ACID COMPOUNDS SEPARATION BY NORMAL PHASE: **SPS100-5**

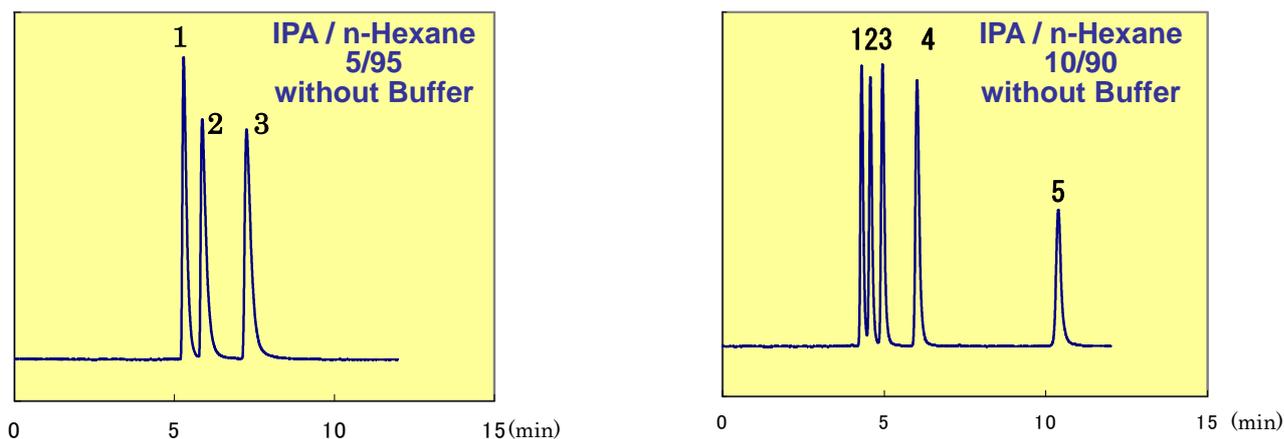
To separate acidic compound by normal phase bare silica gel, the addition of acid is necessary in the solution. It is no problem to use pH buffering agent in the case of analytical separation; however when performing preparative separations, the pH buffering agent must be removed later in the process.



### ACID COMPOUNDS SEPARATION BY ACD SILICA: **COOH SPS100-5 & SO<sub>3</sub>H**

#### **SPS100-5**

ACD silica with an "immobilized acid functional group" works as well as buffer, therefore no need to add TFA buffer

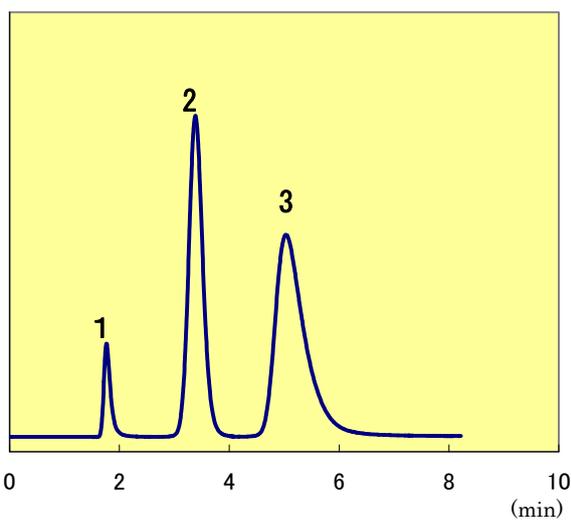


<b>Operating Conditions</b>	
Media:	<b>COOH SPS 100-5</b>
Column:	4.6 x 250 mm
Flow rate:	1 ml / min
Detector:	UV 254 nm, 0.32 aufs
<b>Samples</b>	
1.	o-Toluic acid
2.	Benzoic acid
3.	trans-Cinnamic acid

<b>Operating Conditions</b>	
Media:	<b>SO<sub>3</sub>H SPS 100-5</b>
Column:	4.6 x 250 mm
Flow rate:	1 ml / min
Detector:	UV 254 nm, 0.32 aufs
<b>Samples</b>	
1.	o-Toluic acid
2.	Benzoic acid
3.	trans-Cinnamic acid
4.	Salicylic acid
5.	Phthalic acid

## Standard Separation using Disposable Cartridges

To ease the evaluation of a separation disposable cartridges are available in a convenient size (60 ml, or 28 x 100 mm) before scaling up in large bulk quantity.

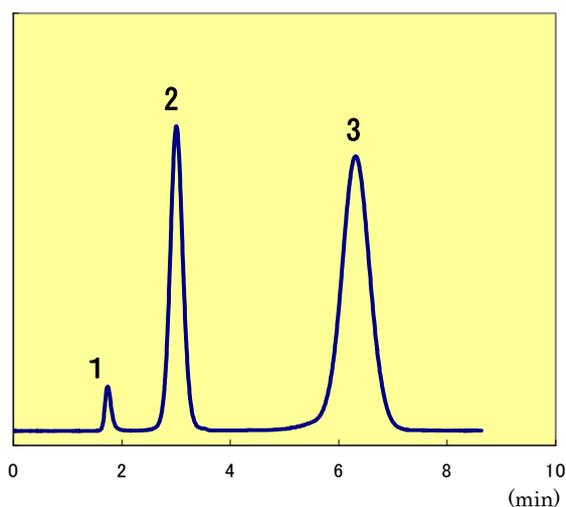


### Operating Conditions

Media: **COOH SMB100-20/45**  
Column: Disposable Cartridge Size 60  
28 x 100 mm  
Mobile Phase: IPA / n-Hexane (10/90)  
Flow rate: 28 ml / min  
Detector: UV 254 nm, 0.32 aufs

### Samples

1. Benzene ( $t_0$ )
2. Di-Methyl Phthalate
3. trans-Cinnamic acid



### Operating Conditions

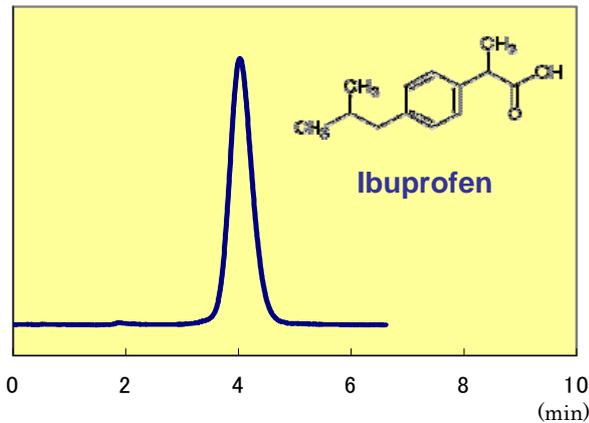
Media: **SO<sub>3</sub>H SMB100-20/45**  
Column: Disposable Cartridge Size 60  
28 x 100 mm  
Mobile Phase: IPA / n-Hexane (10/90)  
Flow rate: 28 ml / min  
Detector: UV 254 nm, 0.32 aufs

### Samples

4. Benzene ( $t_0$ )
5. Di-Methyl Phthalate
6. Phthalic acid

# Separation of drugs using Disposable Cartridges

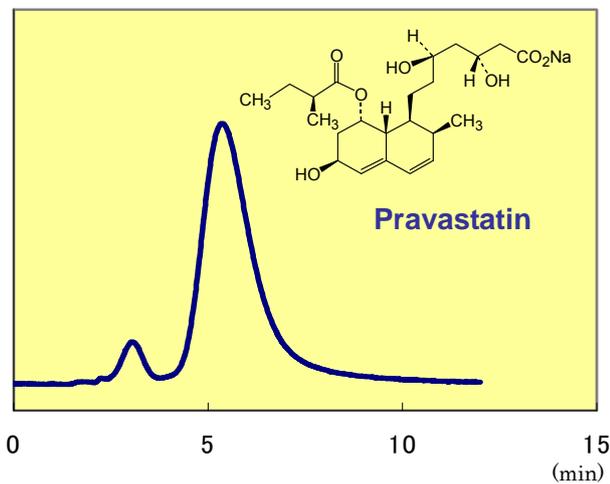
## 1. Ibuprofen



### Operating Conditions

Media: **COOH SMB100-20/45**  
Column: Disposable Cartridge  
Size 60 (28 x 100 mm)  
Mobile Phase: IPA / n-Hexane (5/95)  
Flow rate: 28 ml / min  
Detector: UV 254 nm, 0.32 aufs

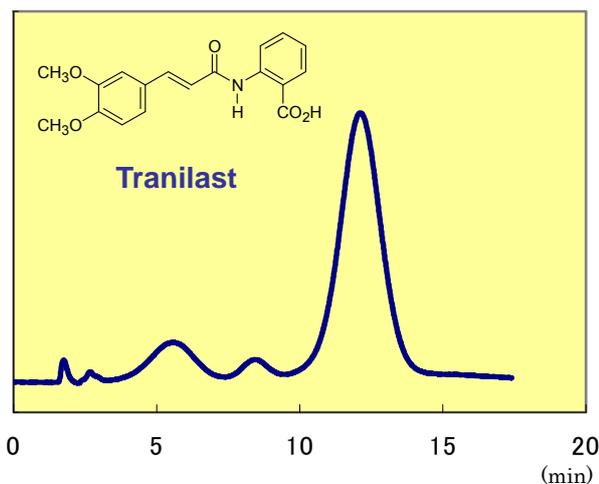
## 2. Pravastatin



### Operating Conditions

Media: **COOH SMB100-20/45**  
Column: Disposable Cartridge  
Size 60 (28 x 100 mm)  
Mobile Phase: IPA / n-Hexane (40/60)  
Flow rate: 28 ml / min  
Detector: UV 254 nm, 0.32 aufs

## 3. Tranilast



### Operating Conditions

Media: **SO<sub>3</sub>H SMB100-20/45**  
Column: Disposable Cartridge  
Size 60 (28 x 100 mm)  
Mobile Phase: IPA / n-Hexane (10/90)  
Flow rate: 28 ml / min  
Detector: UV 254 nm, 0.32 aufs

# Separation of Natural Products using Disposable Cartridges

## 1. Separation of Sikimic acid from Star Anise

Star anise powder

→ Hot water (90°C) extraction → Condensation

→ pH adjustment by NaOH (pH=5)

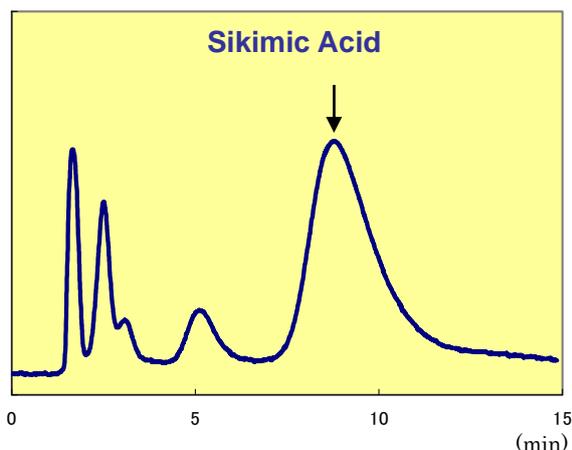
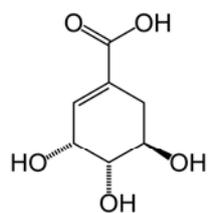
→ NaCl addition → THF extraction → (water phase) pH

adjustment

by H<sub>2</sub>SO<sub>4</sub> (pH=3) → THF extraction → Evaporation to

dryness

→ Dissolve, Filtration → Extract sample Sikimic Acid



### Operating Conditions

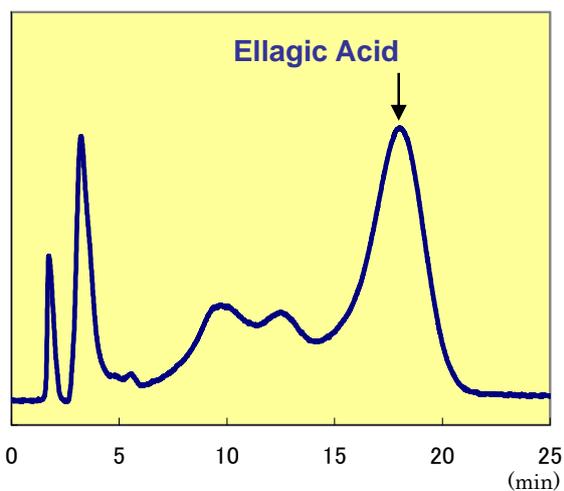
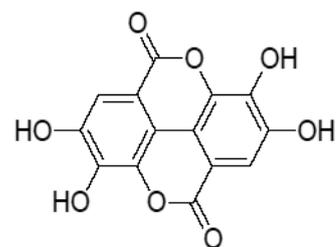
Media: **COOH SMB100-20/45**  
Column: Disposable Cartridge  
Size 60 (28 x 100 mm)  
Mobile Phase: IPA / n-Hexane (40/60)  
Flow rate: 28 ml / min  
Detector: UV 254 nm, 0.32 aufs

## 2. Separation of Ellagic acid from Pomegranate

Pomegranate essence

→ THF extraction → Filtration →

Extract sample



### Operating Conditions

Media: **SO<sub>3</sub>H SMB100-20/45**  
Column: Disposable Cartridge  
Size 60 (28 x 100 mm)  
Mobile Phase: IPA / n-Hexane (10/90)  
Flow rate: 28 ml / min  
Detector: UV 254 nm, 0.32 aufs

## ACD Silica on TLC Plates

In addition to bulk and disposable cartridges, FSC provides TLC plates corresponding to ACD silica (COOH silica and SO<sub>3</sub>H silica) for determination of analytical conditions. The condition setting should be started with ethyl acetate/n-hexane or isopropanol /n-hexane as a standard. Please note that there are undetectable chemical compounds by UV and in the case of no molybdenum chromophore.

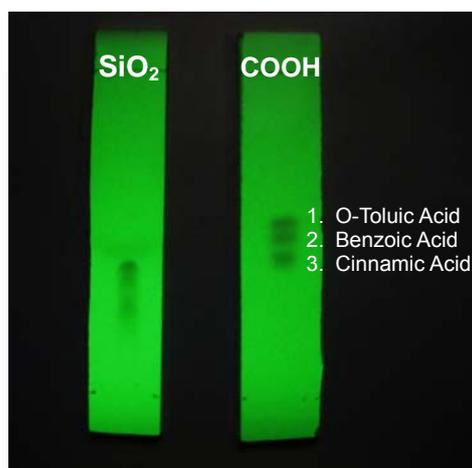
### Example 1:

#### **Comparison between COOH TLC and Silica Gel TLC**

Developing solvent:  
IPA / n-Hexane (10/90)

#### Samples

1. o-Toluic acid
2. Benzoic acid
3. trans-Cinnamic acid



### Example 2:

#### **HPLC separation by SO<sub>3</sub>H silica & TLC comparison between SO<sub>3</sub>H, COOH and Silica**

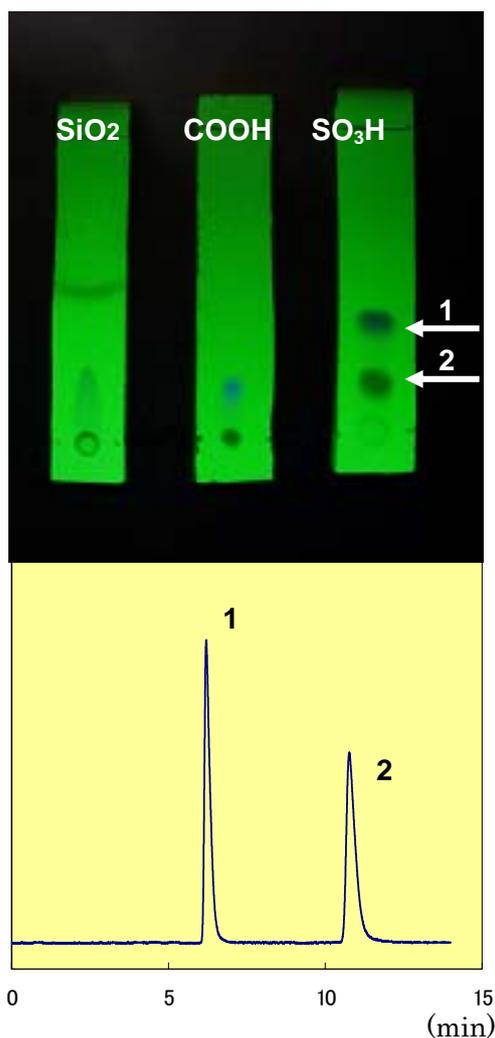
Developing solvent:  
IPA / n-Hexane (10/90)

#### Operating Conditions:

Media: **SO3H SPS 100-5**  
Column: 4.6 x 250 mm  
Mobile Phase: IPA / n-Hexane (10/90)  
Flow rate: 1ml / min  
Detector: UV 254 nm, 0.32 aufs

#### Samples

1. Salicylic acid
2. Phthalic acid



## Order Information

### 1. Bulk ACD Silica

Grades	100 g pack	1 kg pack	5 kg pack
COOH MB100-75/200	-	Yes	Yes
COOH MB100-40/75	-	Yes	Yes
COOH SMB100-20/45	-	Yes	Yes
COOH SPS100-5	Yes	Yes	-
SO <sub>3</sub> H MB100-75/200	-	Yes	Yes
SO <sub>3</sub> H MB100-40/75	-	Yes	Yes
SO <sub>3</sub> H SMB100-20/45	-	Yes	Yes
SO <sub>3</sub> H SPS100-5	Yes	Yes	-

### 2. TLC Plates ACD Silica

Grades	Dimension	Thickness	F Reagent	Plates/Pack
COOH TLC Plates	20 x 20 cm	0.25 mm	F 254	10 pieces
SO <sub>3</sub> H TLC Plates	20 x 20 cm	0.25 mm	F 254	10 pieces

### 3. Disposable Cartridges

Grades	DC Size	Dia. x L	DC/Box	Box/Carton
COOH MB100-40/75	60	28 x 100 mm	20	8
COOH SMB100-20/45	60	28 x 100 mm	20	8
SO <sub>3</sub> H MB100-40/75	60	28 x 100 mm	20	8
SO <sub>3</sub> H SMB100-20/45	60	28 x 100 mm	20	8

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