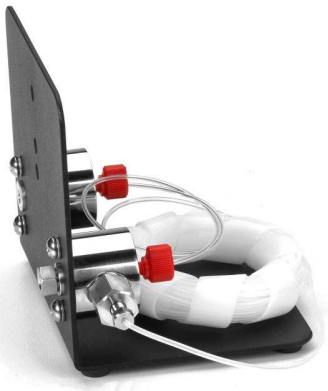
QuickSplit™ Flow Splitters

Binary Fixed Flow Splitters

Multiport Fixed Flow Splitters

Adjustable Flow Splitter



Fixed

Adjustable

Makeup-Flow Splitters

QuickSplit™ Flow Splitters

The *ASI QuickSplit* Flow Splitter is very elegant in its simplicity. Split ratios are created by two or more fluid resistors that form a parallel flow path. *QuickSplit* Flow Splitters are available with a fixed or adjustable split ratio. Interchangeable fluid resistors make it easy to change split ratios quickly, eliminating tedious adjustments to capillary tubing. The technology can be applied to all applications where a controlled, reproducible split ratio is required including LC/MS, flow fractionation, pre/post-column flow splitting, mass directed fraction collection, and capillary chromatography. *ASI QuickSplit* Flow Splitters come in flow rate ranges which make them compatible with micro, analytical, semi-preparative and preparative HPLC flow rates.

QuickSplit™ Flow Splitter Features:

- **Fluid resistor technology eliminates tedious adjustments to capillary tubing for split ratio optimization**
- **Split ratios are stable and reproducible, and not affected by changes in viscosity or pressure**
- **Adjustable metering valve enables precise direct control over split ratios**
- **Easy to use interchangeable fluid resistors make it possible to achieve split ratios from 1:1 to 20,000:1**
- **Rugged stainless steel construction for high pressure operation**
- **Ultra low dead volume fluidic design**
- **Applications include LC/MS, pre/post-column flow splitting, and flow fractionation**
- **Multiport flow splitter diverts the inlet flow into 3 or 4 channels for applications that employ multiple detectors and/or a fraction collector**
- **Makeup-Flow Splitter for mass directed fraction collection**

QuickSplit™ Flow Splitters

Post-Column Application
- Applies to single and multiple Detectors

While **Figure 5** does not cover all possible Post-Column Flow Splitter configurations, it depicts the most common application. Post-Column flow splitters specifications should be reviewed carefully in the subsequent product literature before selecting a splitter to order. If you have questions about which splitter is right for your application, please contact the technical support group at *ASI*.

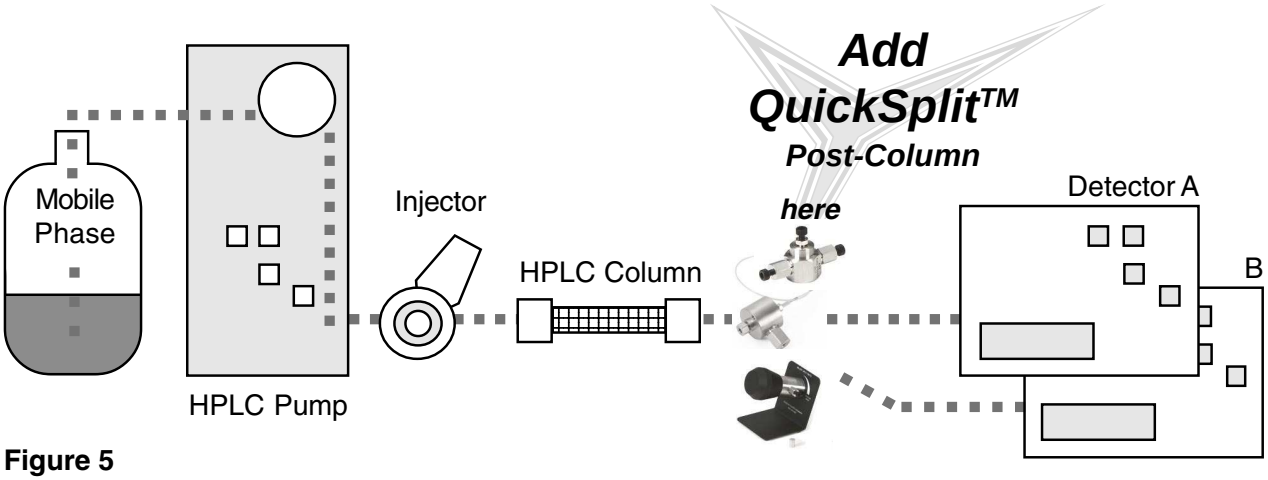


Figure 5

Pre-Column Application
- Applies to single and multiple Columns

While **Figure 6** does not cover all possible Pre-Column Flow Splitter configurations, it depicts the most common application. Pre-Column flow splitters specifications should be reviewed carefully in the subsequent product literature before selecting a splitter to order. If you have questions about which splitter is right for your application, please contact the technical support group at *ASI*.

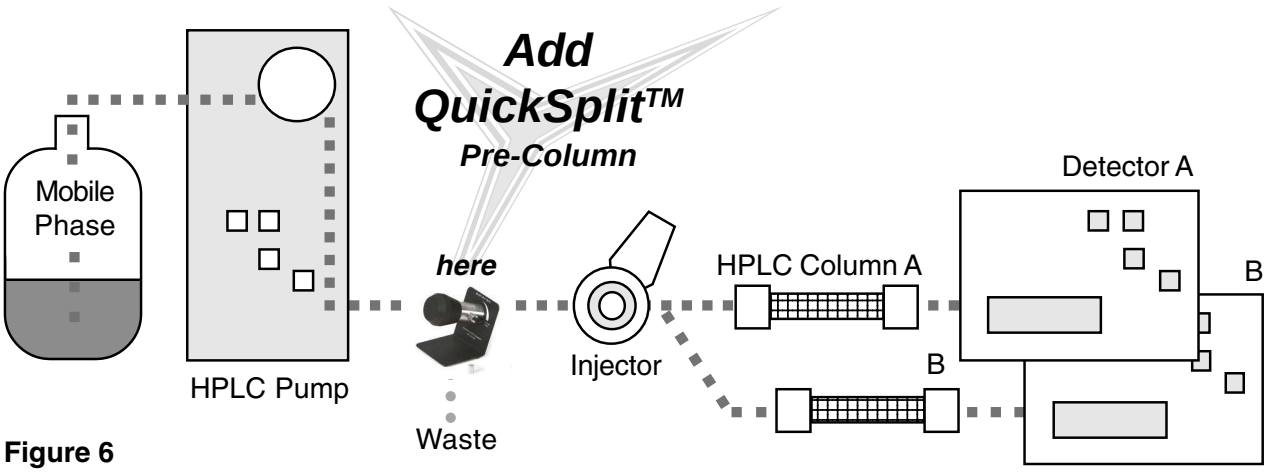


Figure 6

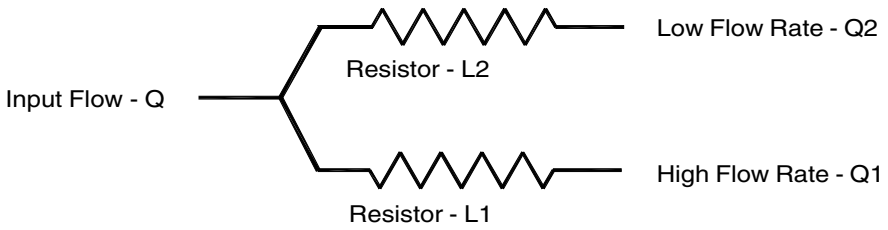
QuickSplit™ Fixed Flow Splitter

Unlike conventional splitters that use long lengths of capillary tubing, the *ASI QuickSplit* Fixed Flow Splitter uses two compact fluid resistor elements which are designed as cartridges for easy replacement. *ASI* fluid resistors are analogous to resistors used in an electrical circuit. Resistance values (L) are rated in PSI/mL/min. Because of the extremely low internal volume of the fluid resistors, the solvent composition in both resistors at any instant in time is the same, and therefore viscosity changes associated with gradient runs do not impact the split ratio.

QuickSplit Fixed Flow Splitters provide a fixed split ratio with extremely low dead volume. Delay volume on the low flow rate side is as low as 100 nanoliters depending upon the resistor cartridge selected. The split ratio is not affected by changes in solvent viscosity or pressure, and is extremely stable and reproducible. The interchangeable fluid resistors are available in a wide range of values which make it possible to create split ratios from 1:1 to as high as 20,000:1.

The flow path of the *QuickSplit* Fixed Flow Splitter contains two fluid resistors that form a parallel flow path. Both low and high flow rate streams pass through fixed resistor cartridges. The ratio of these two resistors creates the split ratio. To understand how the *QuickSplit* Fixed Flow Splitter works, it helps to look at a diagram of a fixed flow splitter, **Figure 7**. The diagram shows the relationship of the fixed fluid resistors relative to the flow paths and how a split ratio is calculated.

Schematic flow diagram of the *QuickSplit* Fixed Flow Splitter



L1 = Fixed fluid resistor (resistance value varies depending on cartridge rating)
L2 = Fixed fluid resistor (resistance value varies depending on cartridge rating)
R = Split ratio = Q1/Q2 = Resistance ratio = L2/L1

Figure 7

Since the flow rate is indirectly proportional to resistance, changing the resistance in either flow path results in a change to the split ratio. Changing resistance is accomplished by exchanging the fixed fluid resistor cartridges with a resistor set that has different resistor ratings.

The *QuickSplit* Fixed Flow Splitter is shipped with resistors installed that deliver the nominal stated split ratio. The split ratios have a tolerance range of +/- 10% assuming there is no pressure drop down stream from the flow splitter. The exact split ratio is measured at *ASI* and is stated on the certificate shipped with the splitter. The input flow rate can be adjusted to compensate for the tolerance in split ratios. For instance, a 10% increase in input flow rate will result in a 10% increase in flow at both the low and high flow channels. Flow rate and viscosity changes will change the backpressure generated by the splitter, but will not affect the actual split ratio. The *QuickSplit* Fixed Flow Splitter is shipped configured for either post-column or pre-column applications.

Post-Column Applications

Post-column splitting is fairly straight forward. Devices contribute to chromatographic dispersion so care must be given to connecting tubing and fittings, especially at low flow rates. The pressure drop specification for all input flow ranges is 500 PSI maximum with water at the calibration flow rate. **When ordering, please specify the actual inlet flow rate if it is significantly different from the calibration flow rate.** Splitters are shipped complete with fluid resistors installed.

QuickSplit™ Binary Fixed Flow Splitter

This easy to use "plug and play" device comes with a predefined split ratio eliminating tedious adjustments to capillary tubing. Split ratio changes are accomplished by changing the resistor set. The split ratio is determined by the ratio of fluid resistors installed in the splitter manifold. The pressure drop across a fixed splitter for post column applications is typically low, less than 500 PSI. The low internal dead volume prevents excessive dispersion and the replaceable inlet filter insures robust operation. Available in models for analytical, semi-preparative and preparative inlet flow rates.

Mounting bracket is optional except with Multiport Splitters

Standard Fixed Flow Splitter

Interchangeable Resistor Set

Fixed Flow Splitter with Capillary Resistor

🕮 *Custom Split Ratios*

Split ratios and resistor cartridges other than those listed can be ordered to custom configure the *QuickSplit* Fixed Flow Splitter. Please contact ASI technical support for additional information about custom splitters. We will gladly assist you in determining the best splitter configuration for your application.

Post-Column Applications continued

QuickSplit™ Binary Fixed Flow Splitters

Analytical Splitters - Binary

Analytical range, 0.1 mL/min. to 5 mL/min. input flow, calibration flow 1.0 mL/min.

These splitters will produce under 500 PSI backpressure with water at 1.0 mL/min. The back-pressure will decrease or increase in proportion to flow rate changes. **In order to assure <500 PSI pressure drop across the splitter, please specify the inlet flow when you order. Please see page 37 for optional mounting bracket.**

Description			ASI Part Number
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	2,000:1	620-PO10-03
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	1,000:1	620-PO10-04
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	500:1	620-PO10-05
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	200:1	620-PO10-06
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	100:1	620-PO10-07
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	50:1	620-PO10-08
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	20:1	620-PO10-09
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	10:1	620-PO10-10
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	5:1	620-PO10-11
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	3:1	620-PO10-12
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	1:1	620-PO10-13
Analytical Fixed Flow Splitter, Post-Column	Split Ratio =	Custom	620-PO10-CS

Analytical Replacement Resistor Sets - Binary

Description			ASI Part Number
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	2,000:1	620-1110-03
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	1,000:1	620-1110-04
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	500:1	620-1110-05
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	200:1	620-1110-06
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	100:1	620-1110-07
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	50:1	620-1110-08
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	20:1	620-1110-09
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	10:1	620-1110-10
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	5:1	620-1110-11
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	3:1	620-1110-12
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	1:1	620-1110-13
Analytical Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	Custom	620-1110-CS

Post-Column Applications continued

QuickSplit™ Binary Fixed Flow Splitters

Semi-Preparative Splitters - Binary

Semi-Prep range, 5 mL/min. to 40 mL/min. input flow, calibration flow 20 mL/min.

These splitters will produce under 500 PSI backpressure with water at 20.0 mL/min. The back-pressure will decrease or increase in proportion to flow rate changes. The Semi-prep Fixed Flow Splitter HS (High Split Ratio) incorporates a resistor set which includes an ASI fluid resistor on the high flow side and a capillary resistor on the low flow side. **In order to assure <500 PSI pressure drop across the splitter, please specify the inlet flow when you order. Please see page 37 for optional mounting bracket.**

Description			ASI Part Number
Semi-Preparative Fixed Flow Splitter, Post-Column	Split Ratio =	200:1	620-PO20-06
Semi-Preparative Fixed Flow Splitter, Post-Column	Split Ratio =	100:1	620-PO20-07
Semi-Preparative Fixed Flow Splitter, Post-Column	Split Ratio =	50:1	620-PO20-08
Semi-Preparative Fixed Flow Splitter, Post-Column	Split Ratio =	20:1	620-PO20-09
Semi-Preparative Fixed Flow Splitter, Post-Column	Split Ratio =	10:1	620-PO20-10
Semi-Preparative Fixed Flow Splitter, Post-Column	Split Ratio =	5:1	620-PO20-11
Semi-Preparative Fixed Flow Splitter, Post-Column	Split Ratio =	Custom	620-PO20-CS
Semi-Preparative Fixed Flow Splitter, Post-Column, High Split Ratio 500:1 to 20,000:1	Split Ratio =	Custom	620-PO20-HS

Semi-Preparative Replacement Resistor Sets - Binary

Description			ASI Part Number
Semi-Preparative Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	200:1	620-1120-06
Semi-Preparative Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	100:1	620-1120-07
Semi-Preparative Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	50:1	620-1120-08
Semi-Preparative Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	20:1	620-1120-09
Semi-Preparative Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	10:1	620-1120-10
Semi-Preparative Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	5:1	620-1120-11
Semi-Preparative Fixed Flow Splitter Resistor Set, Post-Column	Split Ratio =	Custom	620-1120-CS
Semi-Preparative Fixed Flow Splitter Resistor Set, Post-Column, High Split Ratio 500:1 to 20,000:1	Split Ratio =	Custom	620-1120-HS

Post-Column Applications continued

Preparative Splitters - Binary

Prep range, 30 mL/min. to 200 mL/min. input flow, custom calibration flow rate

These splitters will produce under 500 PSI backpressure with water at the specified inlet flow rate. The backpressure will decrease or increase in proportion to flow rate changes. **In order to assure <500 PSI pressure drop across the splitter, the inlet flow rate must be specified when you order. Please see page 37 for optional mounting bracket.**

Description			ASI Part Number
Preparative Fixed Flow Splitter, Post-Column Input Flow Range: 30 - 200 mL/min.	Split Ratio =	Custom	620-PO40-CS

Preparative Replacement Resistor Sets - Binary

Description			ASI Part Number
Preparative Fixed Flow Splitter, Resistor Set, Post-Column Input Flow Range: 30 - 200 mL/min.	Split Ratio =	Custom	620-1140-CS

High-Preparative Splitters - Binary

High-Prep range, 200 mL/min. to 1,000 mL/min. input flow

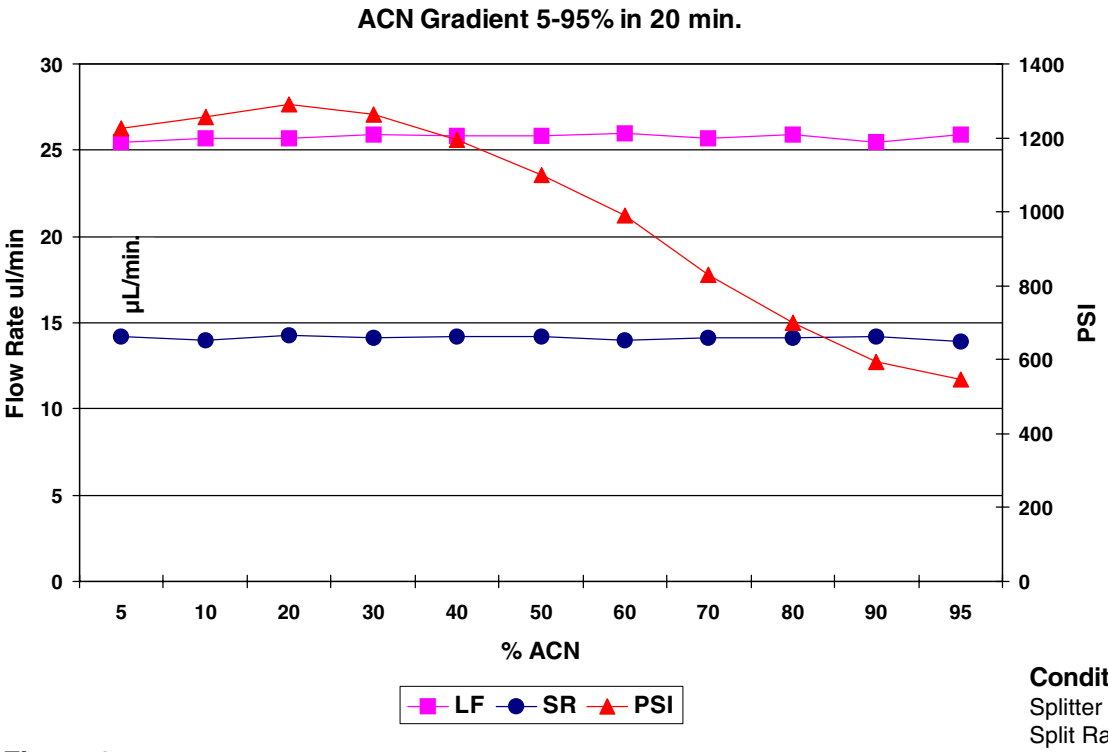
These splitters will produce under 500 PSI backpressure with water at the specified inlet flow rate. The backpressure will decrease or increase in proportion to flow rate changes. **In order to assure <500 PSI pressure drop across the splitter, the inlet flow rate must be specified when you order. Please see page 37 for optional mounting bracket.**

Description			ASI Part Number
High-Preparative Fixed Flow Splitter, Post-Column Input Flow Range: 200 - 1,000 mL/min.	Split Ratio =	Custom	620-PO60-CS

High-Preparative Replacement Resistor Sets - Binary

Description			ASI Part Number
High-Preparative Fixed Flow Splitter, Post-Column, Resistor Set Input Flow Range: 200 - 1,000 mL/min.	Split Ratio =	Custom	620-1160-CS

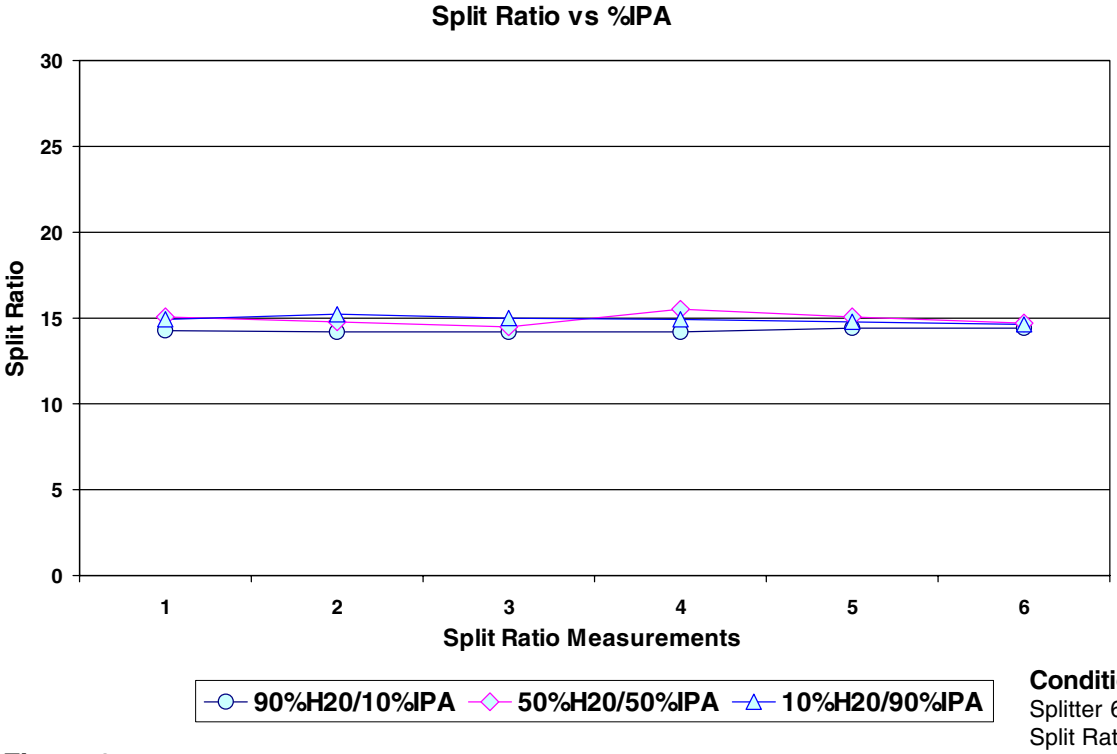
Effect of Gradient on Flow Rate Stability



Conditions:
Splitter 620-PO10-CS
Split Ratio 15:1
Inlet Flow 400 µL/min.

Figure 8

Effect of Viscosity on Split Ratio



Conditions:
Splitter 620-PO10-CS
Split Ratio 15:1
Inlet Flow 400 µL/min.

Figure 9

Post-Column Applications continued

Post-column splitting is fairly straight forward. Devices contribute to chromatographic dispersion so care must be given to connecting tubing and fittings, especially at low flow rates. The pressure drop specification for both analytical and semi-preparative fixed splitters is 500 PSI with water at the inlet flow rate and split ratio specified with the order. **The backpressure will decrease or increase in proportion to flow rate changes.** Multiport splitters are shipped mounted on a bracket complete with fluid resistors installed.

QuickSplit™ Multiport Fixed Flow Splitters

Divides the incoming flow stream into 3 or 4 channels. The *QuickSplit* Multiport Flow Splitter is ideal for applications that use multiple detectors and/or a fraction collector. Split ratios can be configured to be identical in each channel or custom configured to accommodate specific flow rates at each channel. The low internal dead volume prevents excessive dispersion and the replaceable inlet filter insures robust operation. Available in models for analytical and semi-preparative inlet flow rates. **Please contact *ASI* for assistance in configuring your *QuickSplit* Multiport Fixed Splitter prior to ordering. Please specify inlet flow rate and desired output flow rate in each channel when you order.**

***QuickSplit* Multiport Fixed Flow Splitter**

Post-Column Applications continued

QuickSplit™ Multiport Fixed Flow Splitters

Please contact *ASI* for assistance in configuring your *QuickSplit* Multiport Fixed Splitter prior to ordering. **Please specify inlet flow rate and desired output flow rate in each channel when you order. All Multiport Flow splitters are shipped on a mounting bracket.**

Analytical Splitters - Multiport

Analytical range, 0.1 mL/min. to 5 mL/min. input flow
These splitters will produce under 500 PSI backpressure with water at the inlet flow rate specified with the order. The backpressure will decrease or increase in proportion to flow rate changes.

Description			ASI Part Number
Analytical Three Port Fixed Flow Splitter, Post-Column	Split Ratio =	Custom	630-PO10-CS
Analytical Four Port Fixed Flow Splitter, Post-Column	Split Ratio =	Custom	640-PO10-CS

Semi-Preparative Splitters - Multiport

Semi-Prep range, 5 mL/min. to 40 mL/min. input flow
These splitters will produce under 500 PSI backpressure with water at the inlet flow rate specified with the order.. The backpressure will decrease or increase in proportion to flow rate changes.

Description			ASI Part Number
Semi-Preparative Three Port Fixed Flow Splitter, Post-Column	Split Ratio =	Custom	630-PO20-CS
Semi-Preparative Four Port Fixed Flow Splitter, Post-Column	Split Ratio =	Custom	640-PO20-CS

Fixed Flow Splitter Accessories

Replacement Inlet Filters

Description	Applications	ASI Part Number
Inlet Filter Assembly, 2 micron .063" dia. 5/Pack, 1 µL Volume	Fixed FS - Analytical Range	620-0063-2
Inlet Filter & Housing Assembly, 10 micron .125" dia. each, 4 µL Volume	Fixed FS - Semi-Prep Range	620-23-0125-10
Inlet Filter & Housing Assembly, 10 micron .188" dia. each, 10 µL Volume	Fixed FS - Prep Range	620-23-0188-10
Inlet Filter & Housing Assembly, 20 micron .188" dia. each, 12 µL Volume	Fixed FS - Prep Range	620-23-0188-20
Straight Thru Hole, No Filter each, 0.1 µL Volume	Fixed FS - Analytical Range	620-001-2-2
Straight Thru Hole, No Filter each, 1 µL Volume	Fixed FS - High-Prep Range	620-001-2-3

Mounting Bracket 620

Description	ASI Part Number
Mounting Bracket for 620-PO10,620-PO20 ,620-PO40 and 620-PO60	620-1000
Mounting Bracket for 620-PO20-HS	620-1001

Capillary Resistor

Description		ASI Part Number
Capillary Resistor	Custom	620-PR00-CP

Flow Measurement Kits

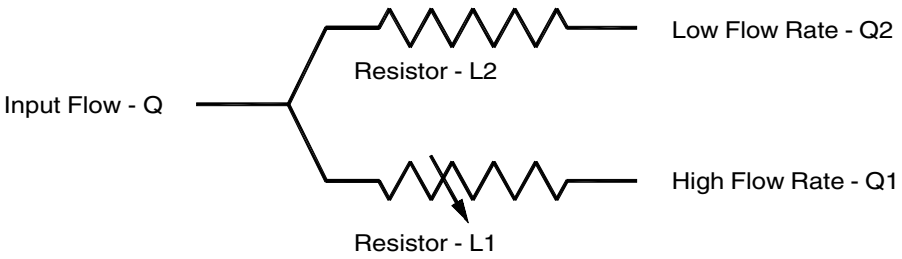
Description		ASI Part Number
Flow Rate Range 50 nL/min. to 5 µL/min.	interfaces to 360 µm OD fused silica tubing	600-0010S
Flow Rate Range 5 µL/min. to 25 µL/min.	interfaces to 1/16” OD PEEK tubing	600-0025S
Flow Rate Range 10 µL/min. to 100 µL/min.	interfaces to 1/16” OD PEEK tubing	600-0100S
Flow Rate Range 25 µL/min. to 500 µL/min.	interfaces to 1/16” OD PEEK tubing	600-0250S

QuickSplit™ Adjustable Flow Splitter

Unlike conventional splitters that use long lengths of capillary tubing, the *ASI QuickSplit* Adjustable Flow Splitter uses fluid resistors to achieve a wide range of split ratios. The flow path of the *QuickSplit* Adjustable Flow Splitter contains two fluid resistors that form a parallel flow path. The low flow rate stream passes through a fixed resistor cartridge, while the high flow rate stream passes through an adjustable fluid resistor (metering valve). The ratio of these two resistors creates the split flow ratio. The fixed fluid resistor is analogous to a resistor used in an electrical circuit. The compact fluid resistor elements are designed as cartridges for easy replacement with resistance values (L2) rated in PSI/mL/min. Because of the extremely low internal volume of the fluid resistors, the solvent composition in both resistors at any instant in time is the same, and therefore viscosity changes associated with gradient runs do not impact the split ratio.

Due to the rugged design, the split ratio repeatability is +/- 1% of setting, and unlike alternative splitter valves or tees, will not be affected by actions that effect input flow such as turning the pump off and on, or pressure spikes. Because the *QuickSplit* Adjustable Flow Splitter incorporates a metering valve, split ratios can be changed frequently with flow changes that are stable and reproducible. The *QuickSplit* Adjustable Flow Splitter will create split ratios that are not affected by changes in solvent viscosity or pressure and provides direct real time control over split ratio optimization. To understand how the *QuickSplit* Adjustable Flow Splitter works, it helps to look at a diagram of an Adjustable Flow Splitter, **Figure 10**. The diagram shows the relationship of the fixed and adjustable fluid resistors relative to the flow paths and how a split ratio is calculated.

Schematic flow diagram of the *QuickSplit* Adjustable Flow Splitter



L1 = Adjustable fluid resistor (metering valve)
L2 = Fixed fluid resistor (resistance value varies depending on cartridge rating)
R = Split ratio = Q1/Q2 = Resistance ratio = L2/L1

Figure 10

Since the flow rate is indirectly proportional to resistance, changing the resistance in either flow path results in a change to the split ratio. Changing resistance is accomplished by adjusting the metering valve on the high flow rate channel or exchanging the fixed fluid resistor cartridge in the low flow rate channel with a resistor cartridge which has a different resistance rating. Adjusting the metering valve is analogous to changing the capillary tubing length or diameter on conventional tee type flow splitters. The *QuickSplit* Adjustable Flow Splitter has a convenient mounting bracket and hand adjustment knob to control the split ratio. A calibrated indicator rod tracks the split ratio setting and each splitter is shipped with calibration data. Split ratios are not affected by changes in solvent viscosities or pressure, which makes this product suitable for gradient applications as well as isocratic. The *QuickSplit* Adjustable Flow Splitter is shipped configured for either post-column or pre-column applications.

QuickSplit™ Adjustable Flow Splitter

***QuickSplit* Adjustable Flow Splitter**

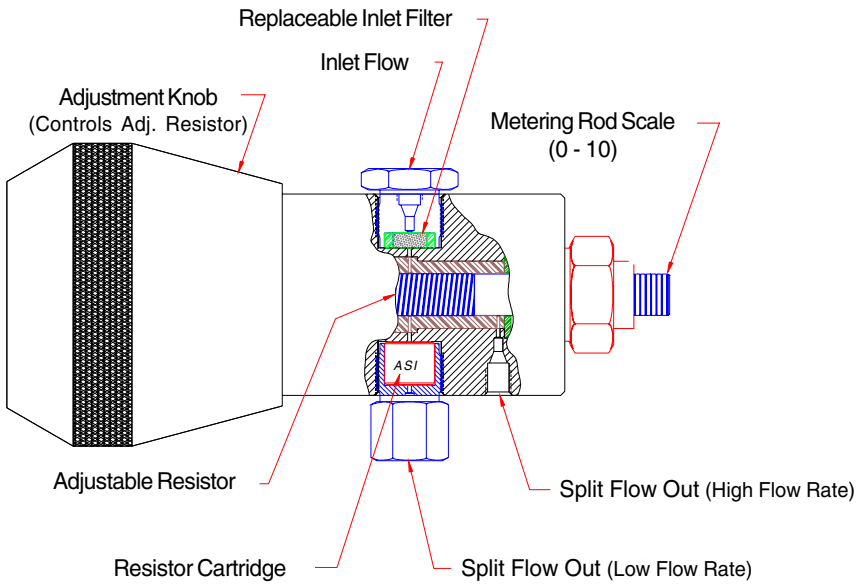


Figure 11

***QuickSplit* Adjustable Flow Splitter**

Post-Column Applications

Post-column splitting is fairly straight forward. Like pre-column flow splitting, any significant additional pressure (resistance) down stream from the splitter may affect the split ratio. Post-column devices also contribute to chromatographic dispersion so care must given to connecting tubing and fittings, especially at low flow rates.

Use the back pressure vs split ratio chart on *page 42 and 43* to select a *QuickSplit* Adjustable Flow Splitter that will provide the desired split ratio range and back pressure. These charts correspond to several flow rates and solvent systems. The back pressure is directly proportional to flow rate and viscosity. The back pressure estimates on these charts only apply to post-column applications. Splitters are shipped complete with the resistor cartridge installed.

To assure optimum pressure drop across the splitter, please specify the actual inlet flow rate when the splitter is ordered if it is significantly different from the calibration flow rate.

🕮 *Custom Split Ratios*

Split ratios and resistor cartridges other than those listed below can be ordered from *ASI* to custom configure the *QuickSplit* Adjustable Flow Splitter. Please contact technical support for additional information about custom splitters. We will gladly assist you in determining the best splitter configuration for your application.

QuickSplit™ Adjustable Flow Splitters

Analytical Splitters

Analytical range, 0.1 mL/min. to 5 mL/min. input flow, calibration flow rate 1.0 mL/min.

Description	Split Ratio Range	ASI Part Number
Analytical Adjustable Flow Splitter, Post-Column	50:1 to 1,000:1	600-PO10-01
Analytical Adjustable Flow Splitter, Post-Column	15:1 to 250:1	600-PO10-03
Analytical Adjustable Flow Splitter, Post-Column	5:1 to 100:1	600-PO10-04
Analytical Adjustable Flow Splitter, Post-Column	1:1 to 20:1	600-PO10-06
Analytical Adjustable Flow Splitter, Post-Column	Custom	600-PO10-CS

Analytical Replacement Resistor Cartridges

Description	Split Ratio Range	ASI Part Number
Analytical Adjustable Flow Splitter Resistor Cartridge, Post-Column	50:1 to 1,000:1	600-1110-01
Analytical Adjustable Flow Splitter Resistor Cartridge, Post-Column	15:1 to 250:1	600-1110-03
Analytical Adjustable Flow Splitter Resistor Cartridge, Post-Column	5:1 to 100:1	600-1110-04
Analytical Adjustable Flow Splitter Resistor Cartridge, Post-Column	1:1 to 20:1	600-1110-06
Analytical Adjustable Flow Splitter Resistor Cartridge, Post-Column	Custom	600-1110-CS

Post-Column Applications continued

Semi-Preparative Splitters

Semi-Prep range, 5 mL/min. to 40 mL/min. input flow, calibration flow rate 20.0 mL/min.

Description	Split Ratio Range	ASI Part Number
Semi-Preparative Adjustable Flow Splitter, Post-Column	1,000:1 to 20,000:1	600-PO20-00
Semi-Preparative Adjustable Flow Splitter, Post-Column	100:1 to 2,000:1	600-PO20-01
Semi-Preparative Adjustable Flow Splitter, Post-Column	15:1 to 300:1	600-PO20-02
Semi-Preparative Adjustable Flow Splitter, Post-Column	1:1 to 20:1	600-PO20-03
Semi-Preparative Adjustable Flow Splitter, Post-Column	Custom	600-PO20-CS

Semi-Preparative Replacement Resistor Cartridges

Description	Split Ratio Range	ASI Part Number
Semi-Preparative Adjustable Flow Splitter Resistor Cartridge, Post-Column	1,000:1 to 20,000:1	600-1120-00
Semi-Preparative Adjustable Flow Splitter Resistor Cartridge, Post-Column	100:1 to 2,000:1	600-1120-01
Semi-Preparative Adjustable Flow Splitter Resistor Cartridge, Post-Column	15:1 to 300:1	600-1120-02
Semi-Preparative Adjustable Flow Splitter Resistor Cartridge, Post-Column	1:1 to 20:1	600-1120-03
Semi-Preparative Adjustable Flow Splitter Resistor Cartridge, Post-Column	Custom	600-1120-CS

Preparative Splitters

Prep range, 40 mL/min. to 1,000 mL/min. input flow, custom calibration flow rate

Description	Split Ratio Range	ASI Part Number
Preparative Adjustable Flow Splitter, Post-Column, Input Flow Range: 40 - 125 mL/min.	Custom	600-PO30-CS
Preparative Adjustable Flow Splitter, Post-Column, Input Flow Range: 75 - 200 mL/min.	Custom	600-PO40-CS
Preparative Adjustable Flow Splitter, Post-Column, Input Flow Range: 100 - 1,000 mL/min.	Custom	600-PO60-CS

Preparative Replacement Resistor Cartridges

Description	Split Ratio Range	ASI Part Number
Preparative Adjustable Flow Splitter Resistor Cartridge, Post-Column, Input Flow Range: 40 - 125 mL/min.	Custom	600-1130-CS
Preparative Adjustable Flow Splitter Resistor Cartridge, Post-Column, Input Flow Range: 75 - 200 mL/min.	Custom	600-1140-CS
Preparative Adjustable Flow Splitter Resistor Cartridge, Post-Column, Input Flow Range: 100 - 1,000 mL/min.	Custom	600-1160-CS

Adjustable Flow Splitters

QuickSplit Adjustable Flow Splitter Selection Charts

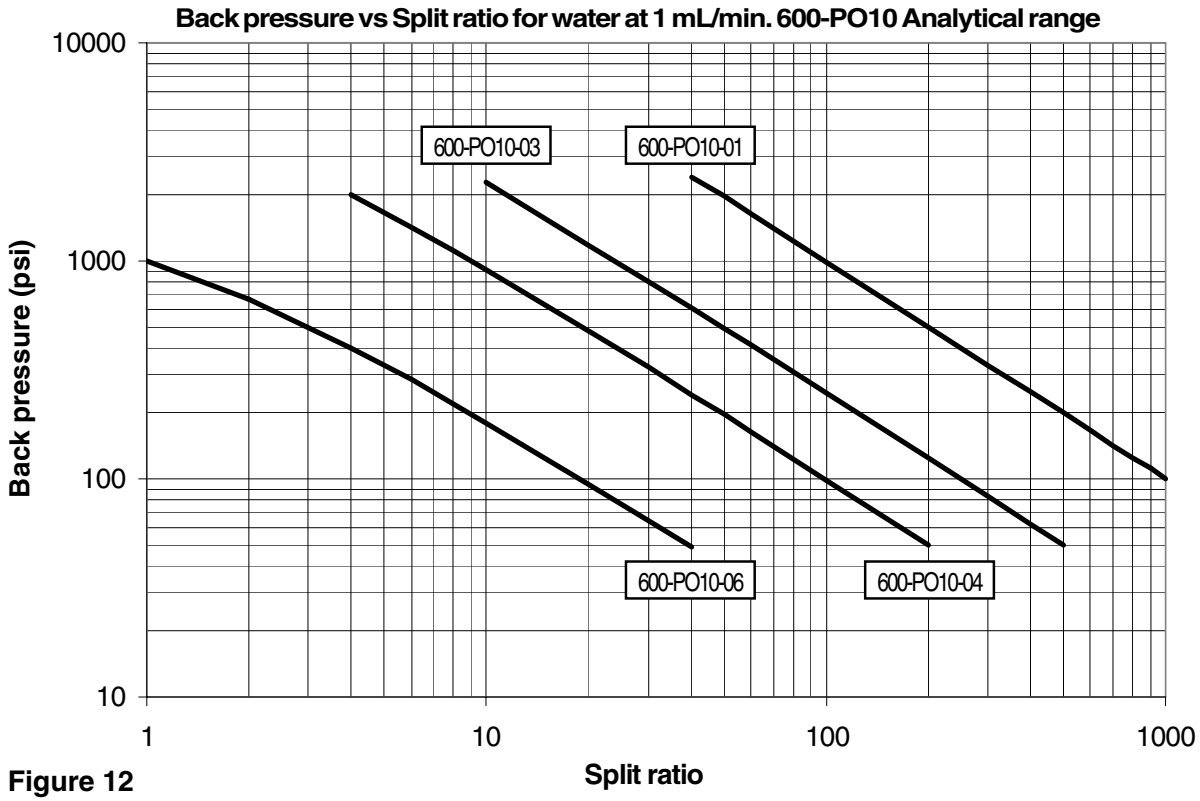


Figure 12

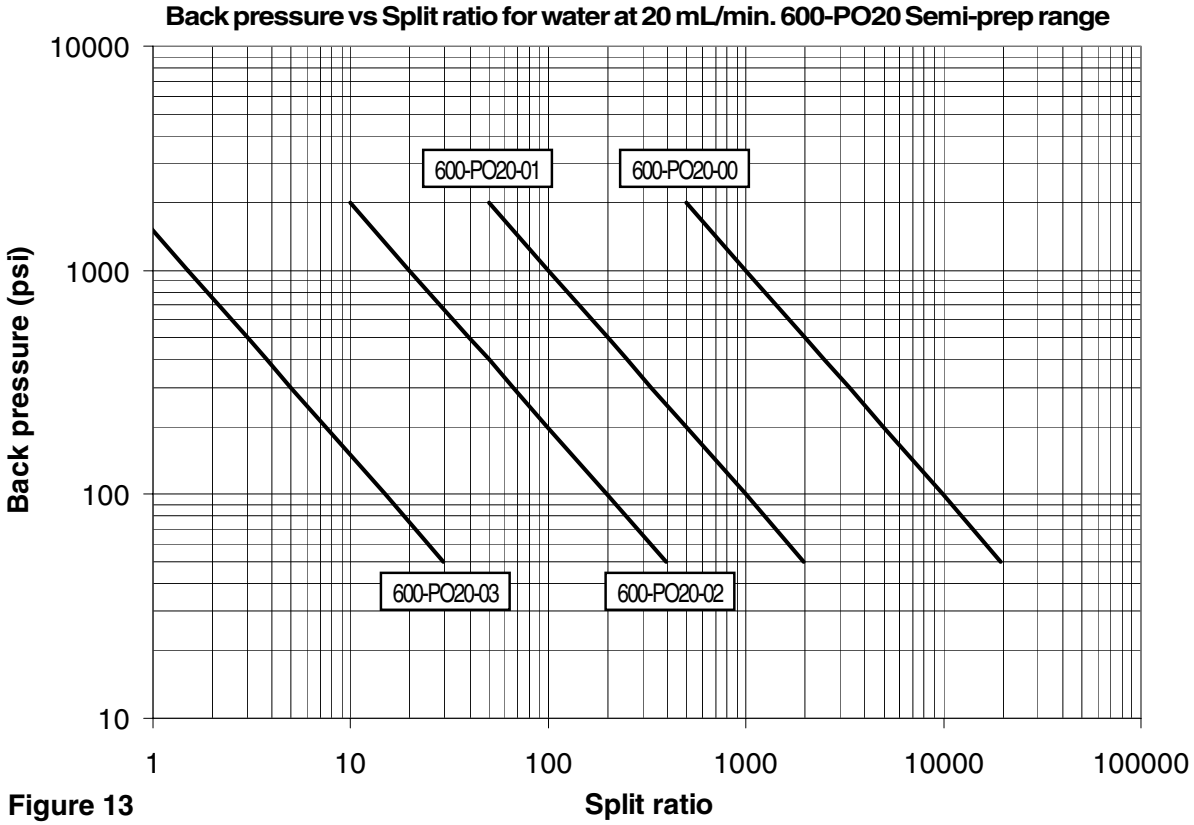


Figure 13

Flow Splitters

QuickSplit Adjustable Flow Splitter Selection Charts

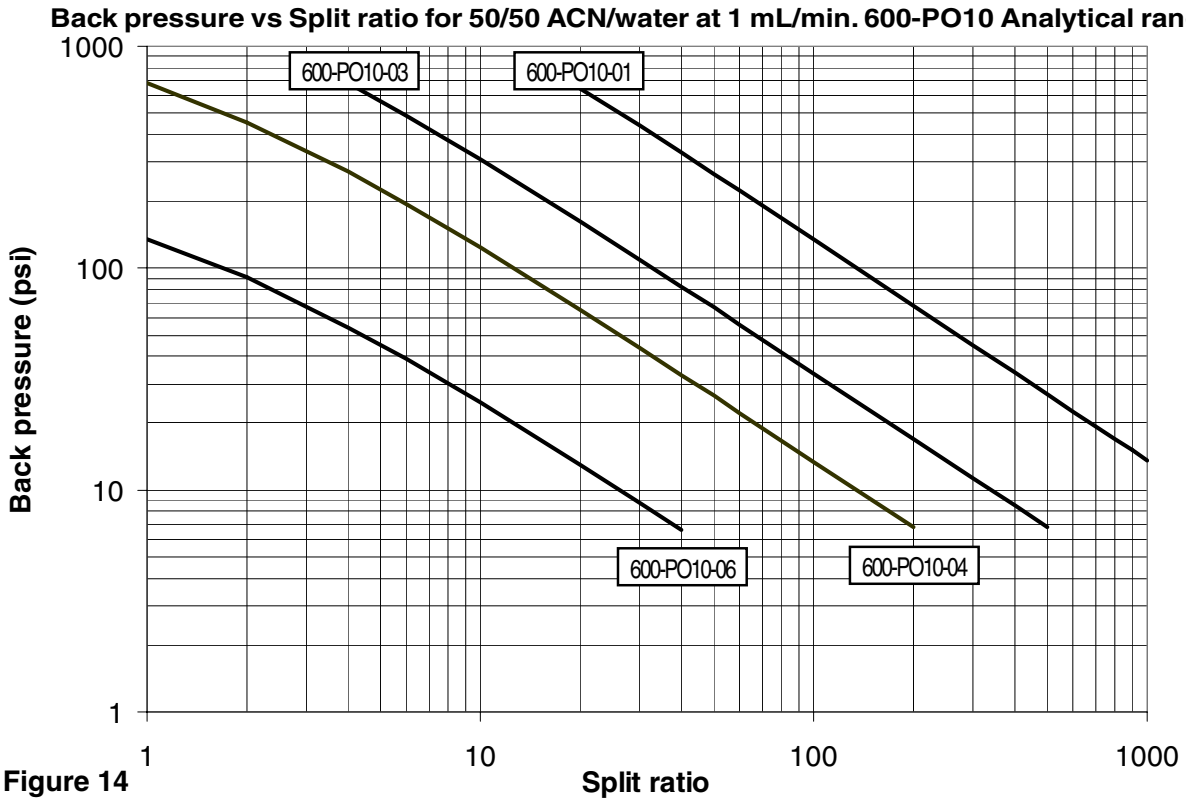


Figure 14

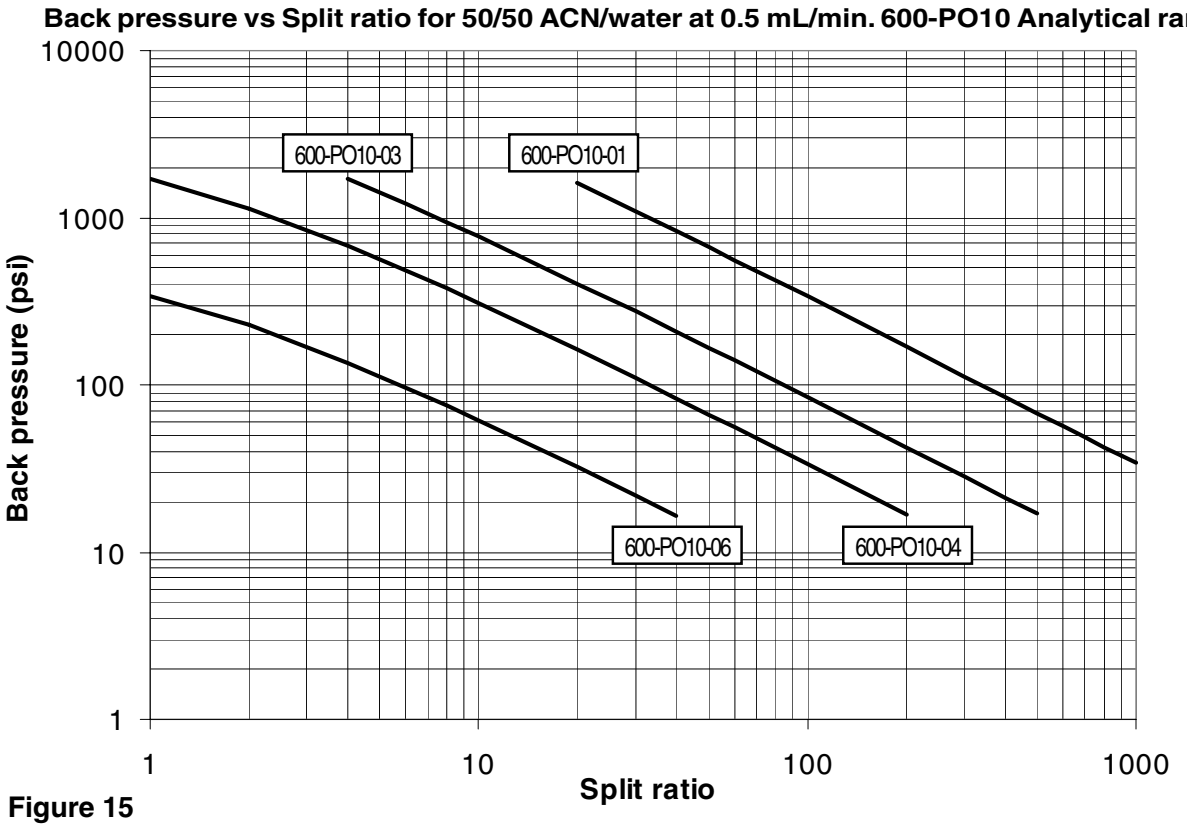


Figure 15

Pre-Column Applications

Pre-column splitting is used for micro, capillary, and nano HPLC applications, where the flow from the pump is split from analytical flow rates down to microliter or nanoliter flows. It is important to note that even though the split ratio created by the splitter valve will remain constant, the split ratio will change when a HPLC column is installed. This is due to the added resistance on the low flow rate channel from the HPLC column. This added resistance must be factored in to make sure the fluid resistor selected for the flow splitter provides the correct split ratio. Please contact *ASI* if you need assistance. The charts on *page 42 and 43* only estimate the pressure drop across the splitter for post column applications and do not include the HPLC column back pressure. Splitters are shipped complete with the resistor cartridge installed.

When ordering a pre-column flow splitter, please provide *ASI* with the column flow rate and back pressure. If the inlet flow rate or column pressure specification is not provided, *ASI* will configure pre-column flow splitters assuming a 0.5 mL/min. inlet flow rate and a pressure drop across the column of 1,500 PSI.

🕮 *Custom Split Ratios*

Split ratios and resistor cartridges other than those listed below can be ordered from *ASI* to custom configure the *QuickSplit* Adjustable Flow Splitter. Please contact technical support for additional information about custom splitters. We will gladly assist you in determining the best splitter configuration for your application.

QuickSplit™ Adjustable Flow Splitters

Analytical Splitters

Analytical range, 0.25 mL/min. to 1 mL/min. input flow, calibration flow rate 0.5 mL/min.

These splitters will produce under 3,500 PSI backpressure with water at 0.5 mL/min.

Description	Split Ratio Range	ASI Part Number
Analytical Adjustable Flow Splitter, Pre-Column	50:1 to 1,000:1	600-PR10-01
Analytical Adjustable Flow Splitter, Pre-Column	15:1 to 250:1	600-PR10-03
Analytical Adjustable Flow Splitter, Pre-Column	5:1 to 100:1	600-PR10-04
Analytical Adjustable Flow Splitter, Pre-Column	1:1 to 20:1	600-PR10-06
Analytical Adjustable Flow Splitter, Pre-Column	Custom	600-PR10-CS

Analytical Replacement Resistor Cartridges

Description	Split Ratio Range	ASI Part Number
Analytical Adjustable Flow Splitter Resistor Cartridge, Pre-Column	50:1 to 1,000:1	600-PR00-01
Analytical Adjustable Flow Splitter Resistor Cartridge, Pre-Column	15:1 to 250:1	600-PR00-03
Analytical Adjustable Flow Splitter Resistor Cartridge, Pre-Column	5:1 to 100:1	600-PR00-04
Analytical Adjustable Flow Splitter Resistor Cartridge, Pre-Column	1:1 to 20:1	600-PR00-06
Analytical Adjustable Flow Splitter Resistor Cartridge, Pre-Column	Custom	600-PR00-CS

Adjustable Flow Splitter Accessories

Replacement Inlet Filters

Description	Flow Splitter	ASI Part Number
Inlet Filter, 2 micron .063" dia. 5/Pack, 1 µL Volume	Adjustable FS - Post/Pre-column Analytical Range	600-0063-2
Inlet Filter, 10 micron .125" dia. 5/Pack, 4 µL Volume	Adjustable FS - Semi-Prep Range & Prep Range for 600-PO30,40	600-0125-10
Straight Thru Hole, No Filter 5/Pack, 1 µL Volume	Adjustable FS - Prep Range for 600-PO60	600-028-2-0

Capillary Resistor

Description		ASI Part Number
Capillary Resistor	Custom	600-PR00-CP

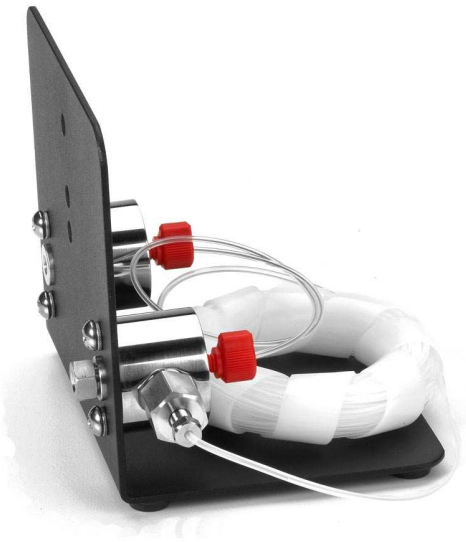
Flow Measurement Kits

Description		ASI Part Number
Flow Rate Range 50 nL/min. to 5 µL/min.	interfaces to 360 µm OD fused silica tubing	600-0010S
Flow Rate Range 5 µL/min. to 25 µL/min.	interfaces to 1/16” OD PEEK tubing	600-0025S
Flow Rate Range 10 µL/min. to 100 µL/min.	interfaces to 1/16” OD PEEK tubing	600-0100S
Flow Rate Range 25 µL/min. to 500 µL/min.	interfaces to 1/16” OD PEEK tubing	600-0250S

QuickSplit™ Makeup-Flow Splitters

for Mass Directed Fraction Collection

Adjustable



Fixed

ASI QuickSplit™ Makeup-Flow Splitter Features:

- Ideal for prep HPLC and mass directed fraction collection
- Fixed and Adjustable configurations
- Adjustable splitter enables precise direct control over split ratios, capillary flow rates, and a wide range of inlet flows
- Split ratios are stable and reproducible, and not affected by changes in solvent viscosity associated with gradient HPLC
- All configurations include integral makeup port and delay coil
- Low dead volume fluidic design minimizes dispersion and band broadening
- Compatible with flow rates from 1 to 150ml/min., custom versions available
- Installs in minutes
- Easy access to replacement filters and high and low flow resistors

QuickSplit™ Makeup-Flow Splitters

for Mass Directed Fraction Collection

Mass directed Fraction collection in HPLC/MS

The *ASI QuickSplit* Makeup-Flow Splitter is designed for post-column flow splitting applications where a small amount of flow from an HPLC column is efficiently combined with a makeup-flow before it reaches the detector. Although there are many variations of this type of application, one of the most common involves splitting a small portion of the outlet flow from a preparative HPLC column which is then combined and diluted with a makeup-flow (**Figure 16**). The combined makeup-flow is used by a detector, typically Mass Spectrometer, UV or other detectors to trigger fraction collection from the remaining preparative flow. A minimum delay time of 5 seconds (maximum inlet flow) is caused by the delay coil built into the splitter to insure proper sequencing between detection and fraction collection. Unique manifold design eliminates tees and fittings within the splitter resulting in extremely low dead volume and peak dispersion. An additional binary splitter can be added after the splitter to allow additional splitting of the makeup-flow stream prior to entering the detector. Open access to all components simplifies routine maintenance and minimizes down time. Split ratio accuracy is +/- 10% for all stated values. **Custom splitter configurations (CS) are available for both fixed and adjustable splitters to meet specific application requirements. If you have questions about which splitter is right for your application, please contact the technical support group at *ASI*.**

Diagram of HPLC/MS System with Makeup-Flow Splitter

While the diagram below does not cover all possible Makeup-Flow Splitter configurations, it depicts the most common application. *ASI QuickSplit* Makeup-Flow Splitter specifications should be reviewed carefully before making your splitter selection.

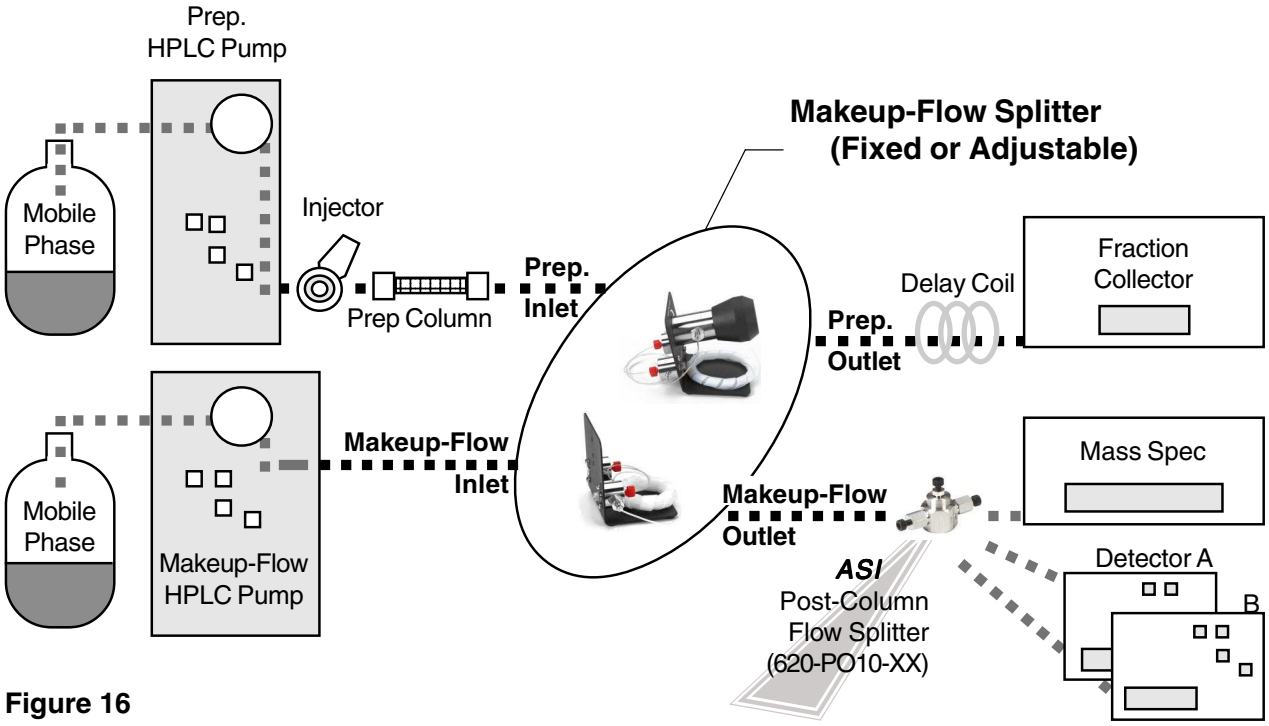


Figure 16

QuickSplit™ Makeup-Flow Splitters

for Mass Directed Fraction Collection

Fixed Makeup-Flow Splitter

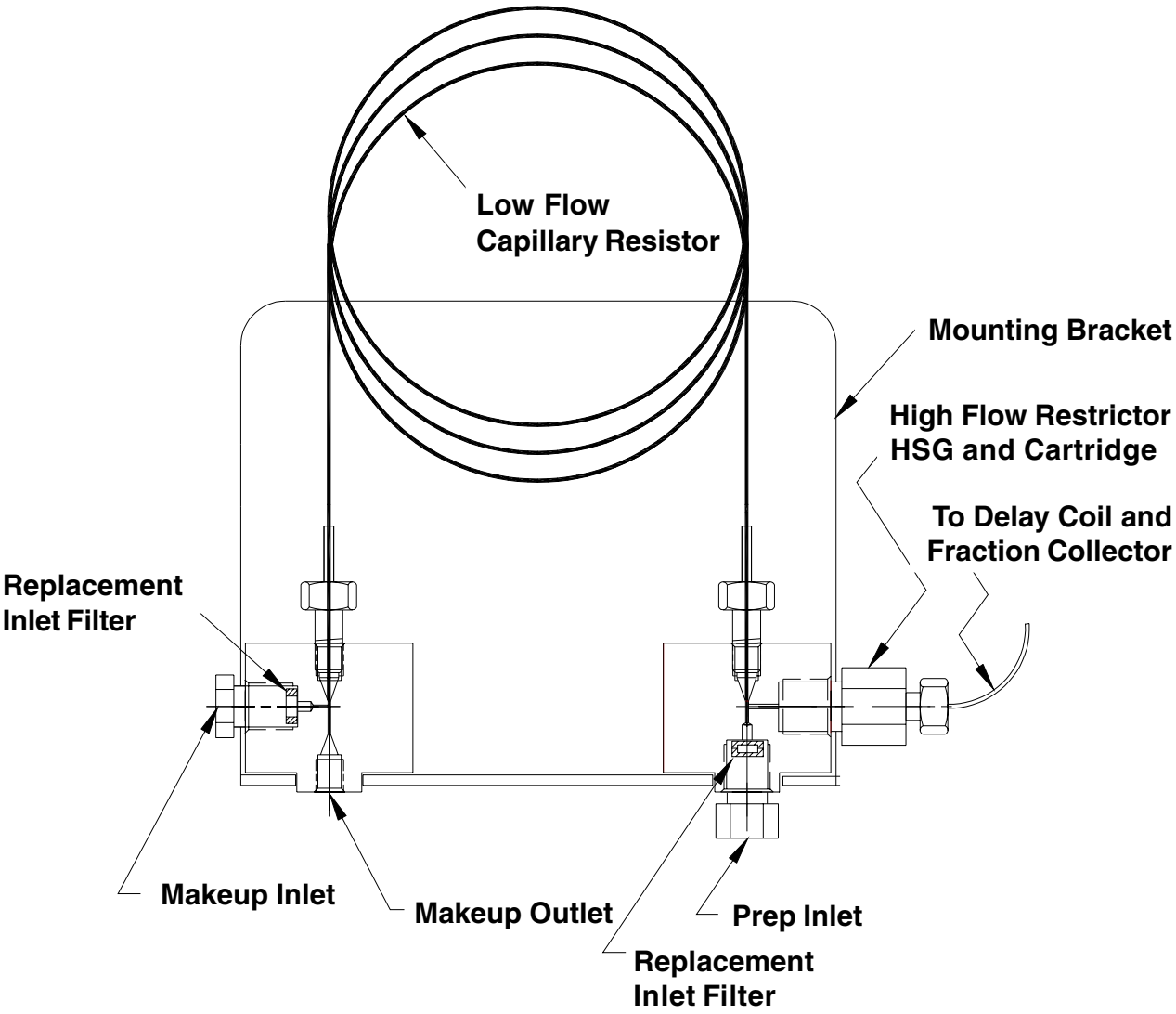


Figure 17

QuickSplit™ Makeup-Flow Splitters

for Mass Directed Fraction Collection

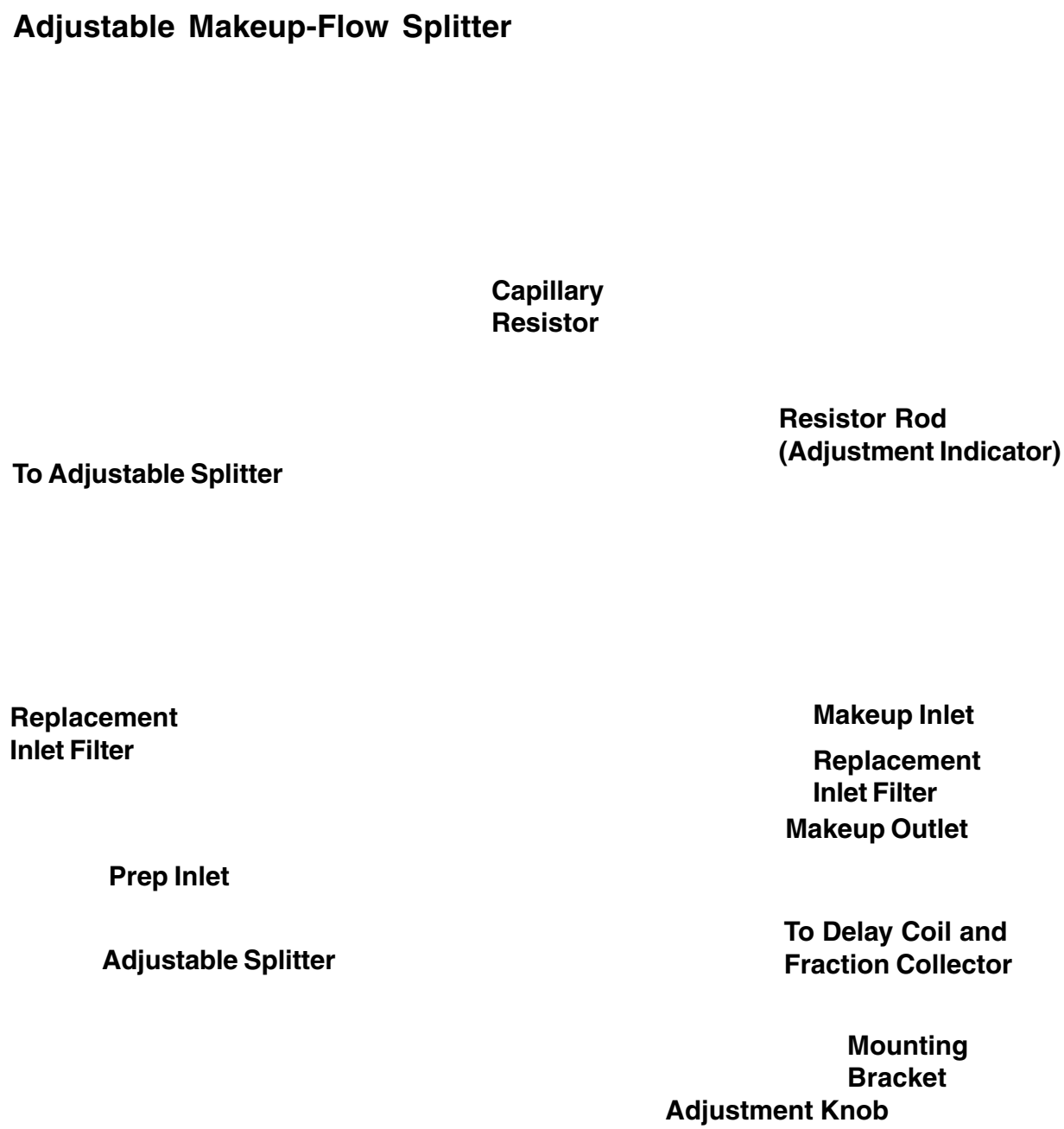


Figure 18

QuickSplit™ Makeup-Flow Splitters

for Mass Directed Fraction Collection

Adjustable Makeup-Flow Splitter Performance

The chromatographic data below compares the dispersion (band broadening), measured as variance, at 10 µL/min. between an ideal system with direct flow (**Figure 19**) and a split system incorporating the *ASI QuickSplit* Adjustable Makeup-Flow Splitter (**Figure 20**). Split flow variance is measured with and without the addition of a small amount of makeup flow. The data proves conclusively that *ASI* splitter dead volume does not contribute significantly to overall system dispersion. It also demonstrates the advantages of adding a makeup flow not only to improve peak shape but acts as an additional tool to optimize the timing sequence between Mass Spectrometer detector and the fraction collector.

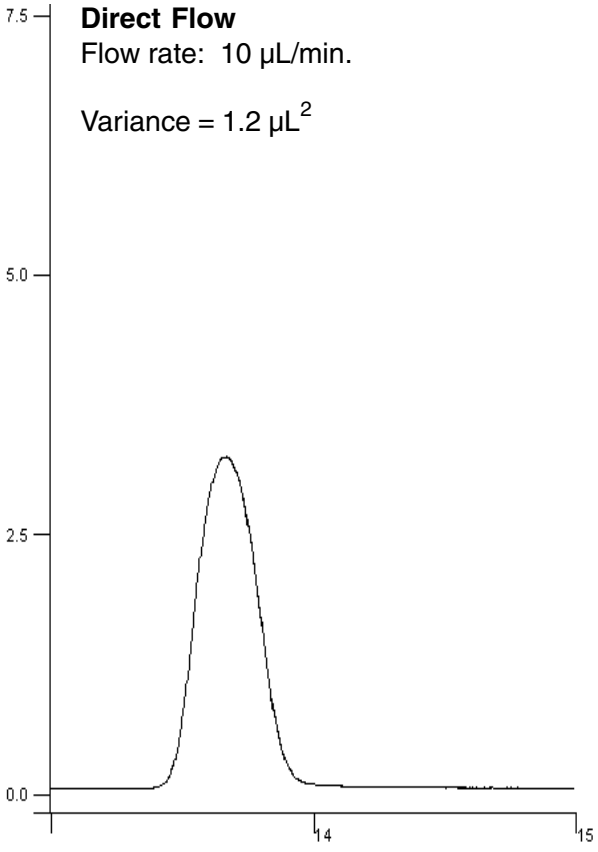
Conditions:

HPLC System: Shimadzu LC10 AD VP
Detector: UV @254 on column
Solvent: Water
Injection vol: direct 600 nL, split 135 µL

Variance Calculation:

Variance = Sigma^2 = (Wh x F)^2 = µL^2

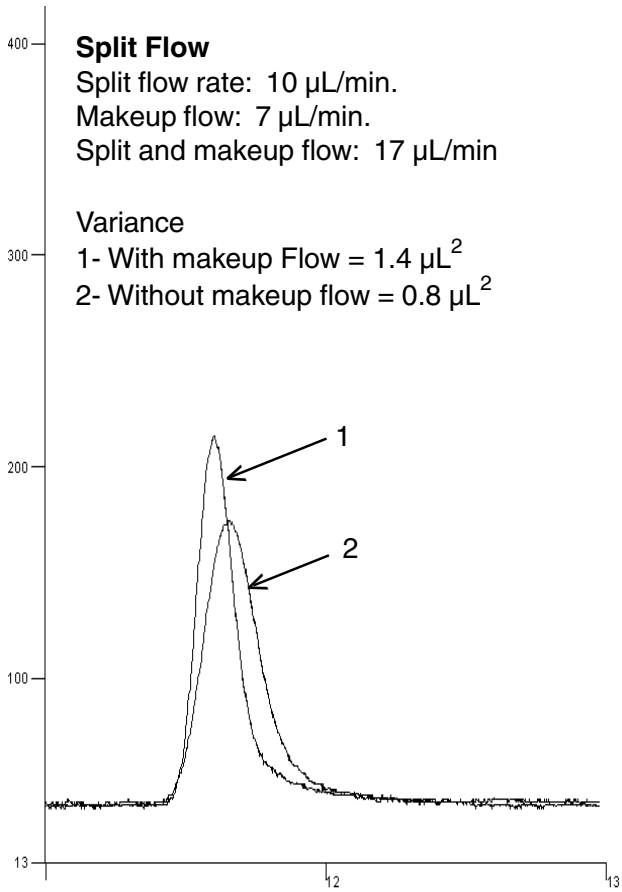
Wh = Peak width at half height
F = Flow rate



Direct Flow
Flow rate: 10 µL/min.

Variance = 1.2 µL^2

Figure 19



Split Flow
Split flow rate: 10 µL/min.
Makeup flow: 7 µL/min.
Split and makeup flow: 17 µL/min

Variance
1- With makeup Flow = 1.4 µL^2
2- Without makeup flow = 0.8 µL^2

Figure 20

QuickSplit™ Fixed Makeup-Flow Splitter

The Fixed Makeup-Flow Splitter is shown in **Figure 17, page 48**. Each Fixed Makeup-Flow Splitter is individually tested and calibrated at the inlet flow and split ratio specified. These splitters will produce under 500 PSI backpressure with water at their calibrated inlet flow rate. Backpressure and outlet flow rates will decrease or increase in proportion to inlet flow rate changes, the split ratio will remain constant. Split ratio accuracy is +/- 10% for all stated values. **In order to assure <500 PSI pressure drop across the splitter, please specify the actual inlet flow rate with your order if it deviates substantially from the calibration flow rate listed below.**

Fixed Makeup-Flow Splitters

Description	Inlet Flow Range	Split Flow	Calibration Flow & Split Ratio	ASI Part Number
Makeup-Flow Splitter	1 - 5 mL/min.	5 µL/min.	2 mL/min. = 400:1	692-PO01-05
Makeup-Flow Splitter	1 - 5 mL/min.	10 µL/min.	2 mL/min. = 200:1	692-PO01-10
Makeup-Flow Splitter	1 - 5 mL/min.	20 µL/min.	2 mL/min. = 100:1	692-PO01-20
Makeup-Flow Splitter	1 - 5 mL/min.	50 µL/min.	2 mL/min. = 40:1	692-PO01-50
Makeup-Flow Splitter	5 - 10 mL/min.	5 µL/min.	10 mL/min. = 2,000:1	692-PO05-05
Makeup-Flow Splitter	5 - 10 mL/min.	10 µL/min.	10 mL/min. = 1,000:1	692-PO05-10
Makeup-Flow Splitter	5 - 10 mL/min.	20 µL/min.	10 mL/min. = 500:1	692-PO05-20
Makeup-Flow Splitter	5 - 10 mL/min.	50 µL/min.	10 mL/min. = 200:1	692-PO05-50
Makeup-Flow Splitter	10 - 20 mL/min.	5 µL/min.	20 mL/min. = 4,000:1	692-PO10-05
Makeup-Flow Splitter	10 - 20 mL/min.	10 µL/min.	20 mL/min. = 2,000:1	692-PO10-10
Makeup-Flow Splitter	10 - 20 mL/min.	20 µL/min.	20 mL/min. = 1,000:1	692-PO10-20
Makeup-Flow Splitter	10 - 20 mL/min.	50 µL/min.	20 mL/min. = 400:1	692-PO10-50
Makeup-Flow Splitter	20 - 50 mL/min.	5 µL/min.	50 mL/min. = 10,000:1	692-PO20-05
Makeup-Flow Splitter	20 - 50 mL/min.	10 µL/min.	50 mL/min. = 5,000:1	692-PO20-10
Makeup-Flow Splitter	20 - 50 mL/min.	20 µL/min.	50 mL/min. = 2,500:1	692-PO20-20
Makeup-Flow Splitter	20 - 50 mL/min.	50 µL/min.	50 mL/min. = 1,000:1	692-PO20-50
Makeup-Flow Splitter	50 - 150 mL/min.	5 µL/min.	100 mL/min. = 20,000:1	692-PO50-05
Makeup-Flow Splitter	50 - 150 mL/min.	10 µL/min.	100 mL/min. = 10,000:1	692-PO50-10
Makeup-Flow Splitter	50 - 150 mL/min.	20 µL/min.	100 mL/min. = 5,000:1	692-PO50-20
Makeup-Flow Splitter	50 - 150 mL/min.	50 µL/min.	100 mL/min. = 2,000:1	692-PO50-50
Makeup-Flow Splitter	Custom	Custom		692-POCS-CS

QuickSplit™ Adjustable Makeup-Flow Splitter

The Adjustable Makeup-Flow Splitter (**Figure 18, page 49**) is used to maintain a constant split ratio over an inlet flow rate range specified below. Each Adjustable Makeup-Flow Splitter ships with a calibration plot of inlet flow rate vs. resistor rod setting required to maintain the specified split flow. The Adjustable Makeup-Flow Splitters listed below are configured and calibrated assuming the Adjustable Makeup-Flow Splitter will be used to maintain a constant split ratio over the specified inlet flow rate range. Please contact ASI for ordering information if your application requires a wider dynamic split ratio range and low flow.

These splitters will produce under 500 PSI backpressure with water at their calibrated inlet flow rate and split ratio specified below. **In order to assure <500 PSI pressure drop across the splitter, please specify the actual inlet flow rate with your order if it deviates substantially from the calibration flow rate listed below.**

Adjustable Splitter: Variable Inlet Flow, Fixed Split Ratio

Description	Inlet Flow Range	Split Flow	Calibration Flow & Split Ratio	ASI Part Number
Makeup-Flow Splitter	1 - 10 mL/min.	5 µL/min.	5 mL/min. = 1,000:1	690-PO01-05
Makeup-Flow Splitter	1 - 10 mL/min.	10 µL/min.	5 mL/min. = 500:1	690-PO01-10
Makeup-Flow Splitter	1 - 10 mL/min.	20 µL/min.	5 mL/min. = 250:1	690-PO01-20
Makeup-Flow Splitter	1 - 10 mL/min.	50 µL/min.	5 mL/min. = 100:1	690-PO01-50
Makeup-Flow Splitter	10 - 50 mL/min.	5 µL/min.	30 mL/min. = 6,000:1	690-PO10-05
Makeup-Flow Splitter	10 - 50 mL/min.	10 µL/min.	30 mL/min. = 3,000:1	690-PO10-10
Makeup-Flow Splitter	10 - 50 mL/min.	20 µL/min.	30 mL/min. = 1,500:1	690-PO10-20
Makeup-Flow Splitter	10 - 50 mL/min.	50 µL/min.	30 mL/min. = 600:1	690-PO10-50
Makeup-Flow Splitter	50 - 150 mL/min.	5 µL/min.	100 mL/min. = 20,000:1	690-PO50-05
Makeup-Flow Splitter	50 - 150 mL/min.	10 µL/min.	100 mL/min. = 10,000:1	690-PO50-10
Makeup-Flow Splitter	50 - 150 mL/min.	20 µL/min.	100 mL/min. = 5,000:1	690-PO50-20
Makeup-Flow Splitter	50 - 150 mL/min.	50 µL/min.	100 mL/min. = 2,000:1	690-PO50-50
Makeup-Flow Splitter	Custom	Custom		690-POCS-CS

QuickSplit™ Adjustable Makeup-Flow Splitter

The Adjustable Makeup-Flow Splitter (**Figure 18, page 49**) can also be used with a constant inlet flow rate thereby allowing the user dynamic control over the split ratio and split flow rate. The Adjustable Makeup-Flow Splitters listed below are configured and calibrated assuming the Adjustable Makeup-Flow Splitter will be used to produce a wide split ratio range at the specified inlet flow rate. Each Adjustable Makeup- Flow Splitter ships with a calibration plot of inlet flow rate vs resistor rod setting required to produce the specified split flow within the defined range. Please contact *ASI* for ordering information if your application requires an inlet flow or split ratio range not included in the table below.

These splitters will generate a pressure range from approximately 100 to 800psi over the split flow range specified. Although the split ratio will remain constant, pressure drop and outlet flow rates will change in proportion to changes in the inlet flow rate. **In order to maintain the pressure profile in the calibration plot, it is important to use these splitters at the inlet flow specified. Please specify the actual inlet flow rate with your order if it deviates substantially from the calibration flow rate listed below.**

Adjustable Splitter: Fixed Inlet Flow, Variable Split Ratio

Description	Inlet Flow	Split Flow Range	ASI Part Number
Makeup-Flow Splitter	5 mL/min.	1.2 - 10.0 µL/min.	690-PO01-05
Makeup-Flow Splitter	5 mL/min.	2.5 - 20.0 µL/min.	690-PO01-10
Makeup-Flow Splitter	5 mL/min.	5.0 - 40.0 µL/min.	690-PO01-20
Makeup-Flow Splitter	5 mL/min.	12.5 - 100.0 µL/min.	690-PO01-50
Makeup-Flow Splitter	30 mL/min.	1.2 - 10.0 µL/min.	690-PO10-05
Makeup-Flow Splitter	30 mL/min.	2.5 - 20.0 µL/min.	690-PO10-10
Makeup-Flow Splitter	30 mL/min.	5.0 - 40.0 µL/min.	690-PO10-20
Makeup-Flow Splitter	30 mL/min.	12.5 - 100.0 µL/min.	690-PO10-50
Makeup-Flow Splitter	100 mL/min.	1.2 - 10.0 µL/min.	690-PO50-05
Makeup-Flow Splitter	100 mL/min.	2.5 - 20.0 µL/min.	690-PO50-10
Makeup-Flow Splitter	100 mL/min.	5.0 - 40.0 µL/min.	690-PO50-20
Makeup-Flow Splitter	100 mL/min.	12.5 - 100.0 µL/min.	690-PO50-50
Makeup-Flow Splitter	Custom	Custom	690-POCS-CS

QuickSplit™ Makeup-Flow Splitter Accessories

Fixed Resistor Sets (Capillary Resistor and Resistor Cartridge)

Description	Inlet Flow	Split Flow	Cal. Flow and Split	ASI Part Number
Fixed Resistor Set	1 - 5 mL/min.	5µL/min.	2mL/min. = 400:1	692-1101-05
Fixed Resistor Set	1 - 5 mL/min.	10 µL/min.	2 mL/min. = 200:1	692-1101-10
Fixed Resistor Set	1 - 5 mL/min.	20 µL/min.	2 mL/min. = 100:1	692-1101-20
Fixed Resistor Set	1 - 5 mL/min.	50 µL/min.	2 mL/min. = 40:1	692-1101-50
Fixed Resistor Set	5 - 10 mL/min.	5 µL/min.	10 mL/min. = 2,000:1	692-1110-05
Fixed Resistor Set	5 - 10 mL/min.	10 µL/min.	10 mL/min. = 1,000:1	692-1110-10
Fixed Resistor Set	5 - 10 mL/min.	20 µL/min.	10 mL/min. = 500:1	692-1110-20
Fixed Resistor Set	5 - 10 mL/min.	50 µL/min.	10 mL/min. = 200:1	692-1110-50
Fixed Resistor Set	10 - 20 mL/min.	5 µL/min.	20 mL/min. = 4,000:1	692-1120-05
Fixed Resistor Set	10 - 20 mL/min.	10 µL/min.	20 mL/min. = 2,000:1	692-1120-10
Fixed Resistor Set	10 - 20 mL/min.	20 µL/min.	20 mL/min. = 1,000:1	692-1120-20
Fixed Resistor Set	10 - 20 mL/min.	50 µL/min.	20 mL/min. = 400:1	692-1120-50
Fixed Resistor Set	20 - 50 mL/min.	5 µL/min.	50 mL/min. = 10,000:1	692-1150-05
Fixed Resistor Set	20 - 50 mL/min.	10 µL/min.	50 mL/min. = 5,000:1	692-1150-10
Fixed Resistor Set	20 - 50 mL/min.	20 µL/min.	50 mL/min. = 2,500:1	692-1150-20
Fixed Resistor Set	20 - 50 mL/min.	50 µL/min.	50 mL/min. = 1,000:1	692-1150-50
Fixed Resistor Set	50 - 150 mL/min.	5 µL/min.	100 mL/min. = 20,000:1	692-1100-05
Fixed Resistor Set	50 - 150 mL/min.	10 µL/min.	100 mL/min. = 10,000:1	692-1100-10
Fixed Resistor Set	50 - 150 mL/min.	20 µL/min.	100 mL/min. = 5,000:1	692-1100-20
Fixed Resistor Set	50 - 150 mL/min.	50 µL/min.	100 mL/min. = 2,000:1	692-1100-50
Fixed Resistor Set	Custom	Custom		692-11CS-CS

QuickSplit™ Makeup-Flow Splitter Accessories

Adjustable Makeup Capillary Resistors

Description	Split Flow rate	ASI Part Number
Replacement Capillary Resistor for Adjustable Splitters	Output Flow, 5 µL/min.	690-POCR-05
Replacement Capillary Resistor for Adjustable Splitters	Output Flow, 10 µL/min.	690-POCR-10
Replacement Capillary Resistor for Adjustable Splitters	Output Flow, 20 µL/min.	690-POCR-20
Replacement Capillary Resistor for Adjustable Splitters	Output Flow, 50 µL/min.	690-POCR-50
Replacement Capillary Resistor for Adjustable Splitters	Output Flow, Custom	690-POCR-CS

Replacement Inlet Filters for Both Fixed and Adjustable Splitters

Description	Applications	ASI Part Number
Inlet Filter Assembly, 2 micron .063" dia. 5/Pack, 1 µL Volume	Makeup-Flow Splitter inlet Port - Inlet flow range: 1 ~ 10 mL/min. Makeup-Flow Splitter, MakeupInlet Port - All Ranges	690-0063-2
Inlet Filter & Housing Assembly, 10 micron .125" dia. each, 4 µL Volume	Makeup-Flow Splitter inlet Port - Inlet flow range: 10 ~ 50 mL/min.	690-23-0125-10
Inlet Filter & Housing Assembly, 10 micron .188" dia. each, 10 µL Volume	Makeup-Flow Splitter inlet Port - Inlet flow range: 50 ~ 100 mL/min.	690-23-0188-10
Inlet Filter & Housing Assembly, 20 micron .188" dia. each, 12 µL Volume	Makeup-Flow Splitter inlet Port - Inlet flow range: 75 ~ 150 mL/min.	690-23-0188-20
Straight Thru Hole, Fitting & Housing Assembly, No Filter each, 1 µL Volume	Makeup-Flow Splitter inlet Port	690-001-2-3