

# ***ASI QuickSplit™***

## **Makeup-Flow Splitters**

**for Mass Directed Fraction Collection**



**Adjustable**



**Fixed**

### ***ASI QuickSplit™* Makeup-Flow Splitter Features**

- ❑ **Fixed and Adjustable configurations**
- ❑ **Split ratios are stable and reproducible, and not affected by changes in solvent viscosity associated with gradient HPLC**
- ❑ **Adjustable splitter enables precise direct control over split ratios, capillary flow rates, and a wide range of inlet flows**
- ❑ **Ideal for prep HPLC and mass directed fraction collection**
- ❑ **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**

# ASI QuickSplit™ Makeup-Flow Splitter

## Product Description

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 (Figure 1) which is then combined and diluted with a makeup-flow. The combined makeup-flow is used by a detector, typically Mass Spectrometer, UV, or other, 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 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.

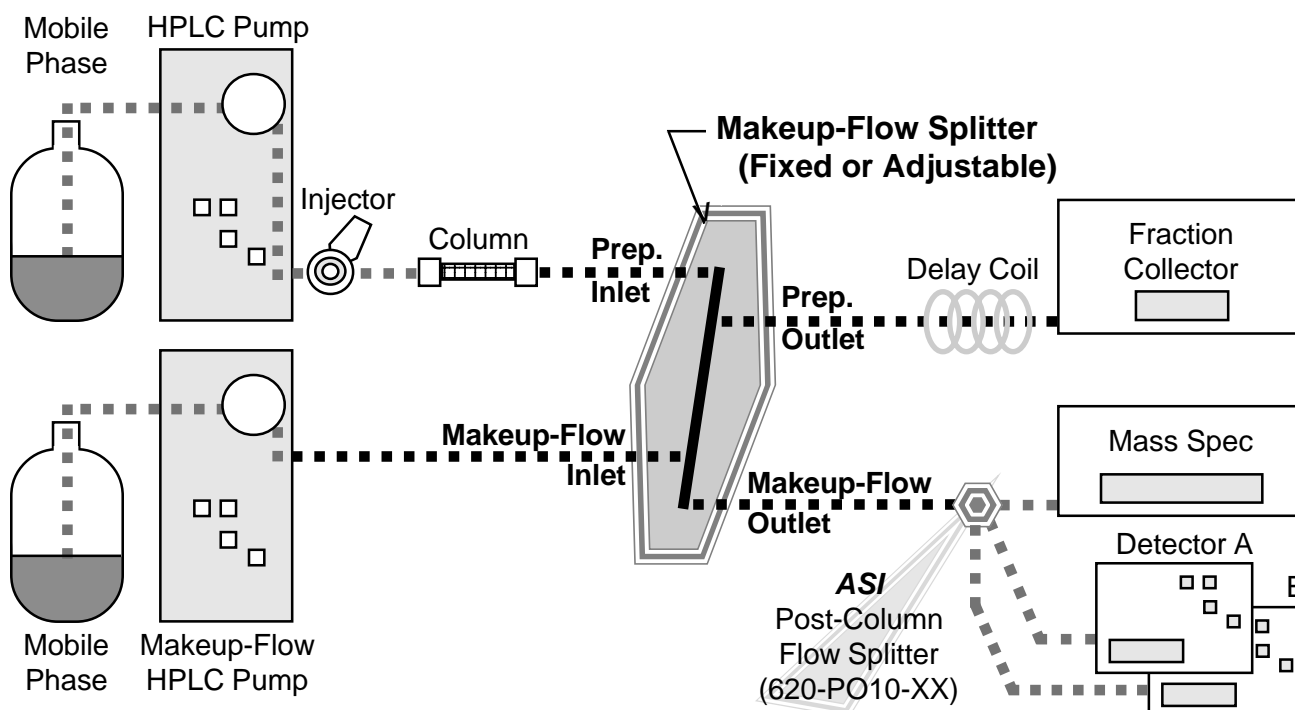


Figure 1.

# **ASI QuickSplit™**

## **Makeup-Flow Splitter**

### **Fixed Makeup-Flow Splitter Diagram**

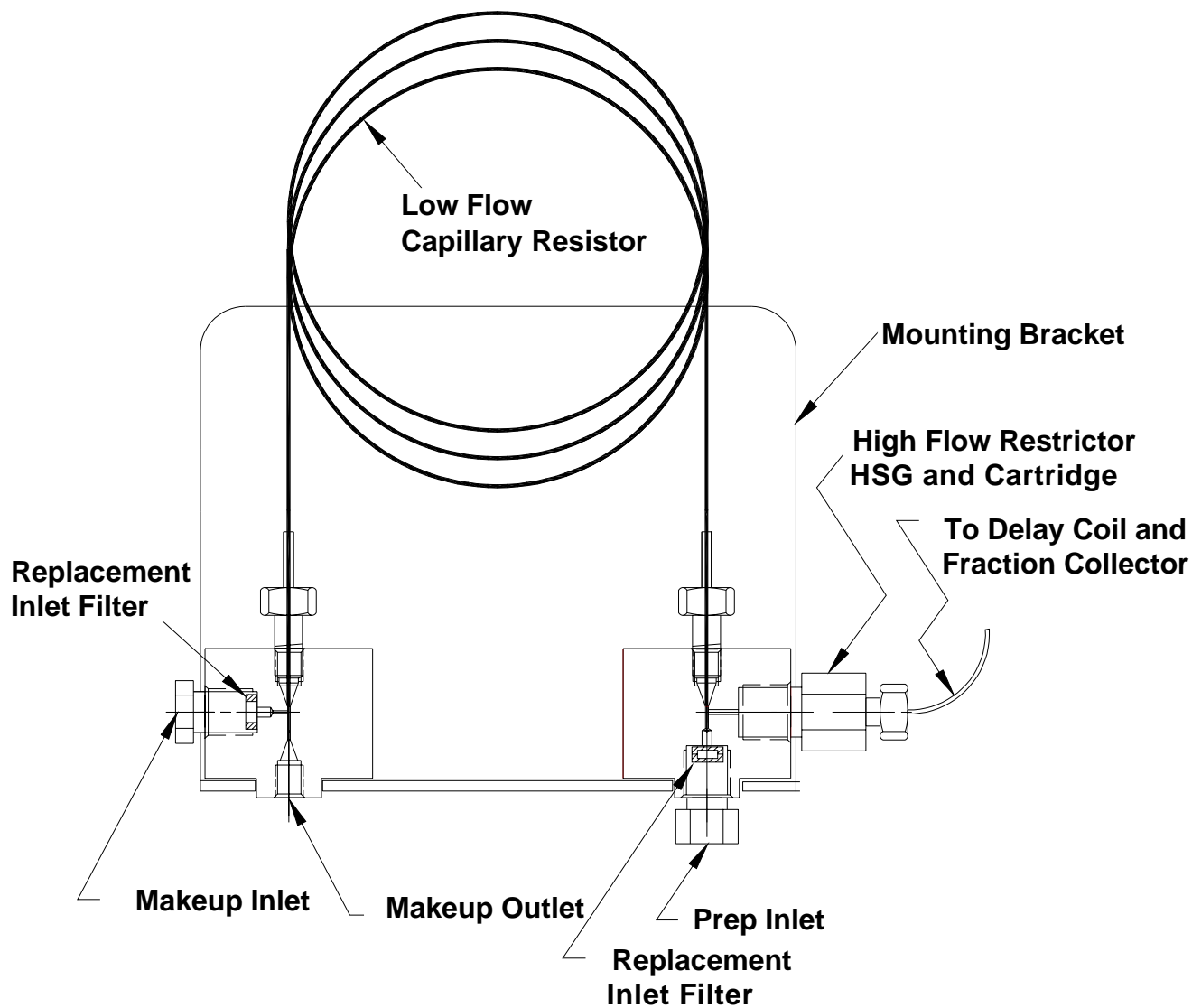


Figure 2.

# ASI QuickSplit™

## Makeup-Flow Splitter

### Adjustable Makeup-Flow Splitter Diagram

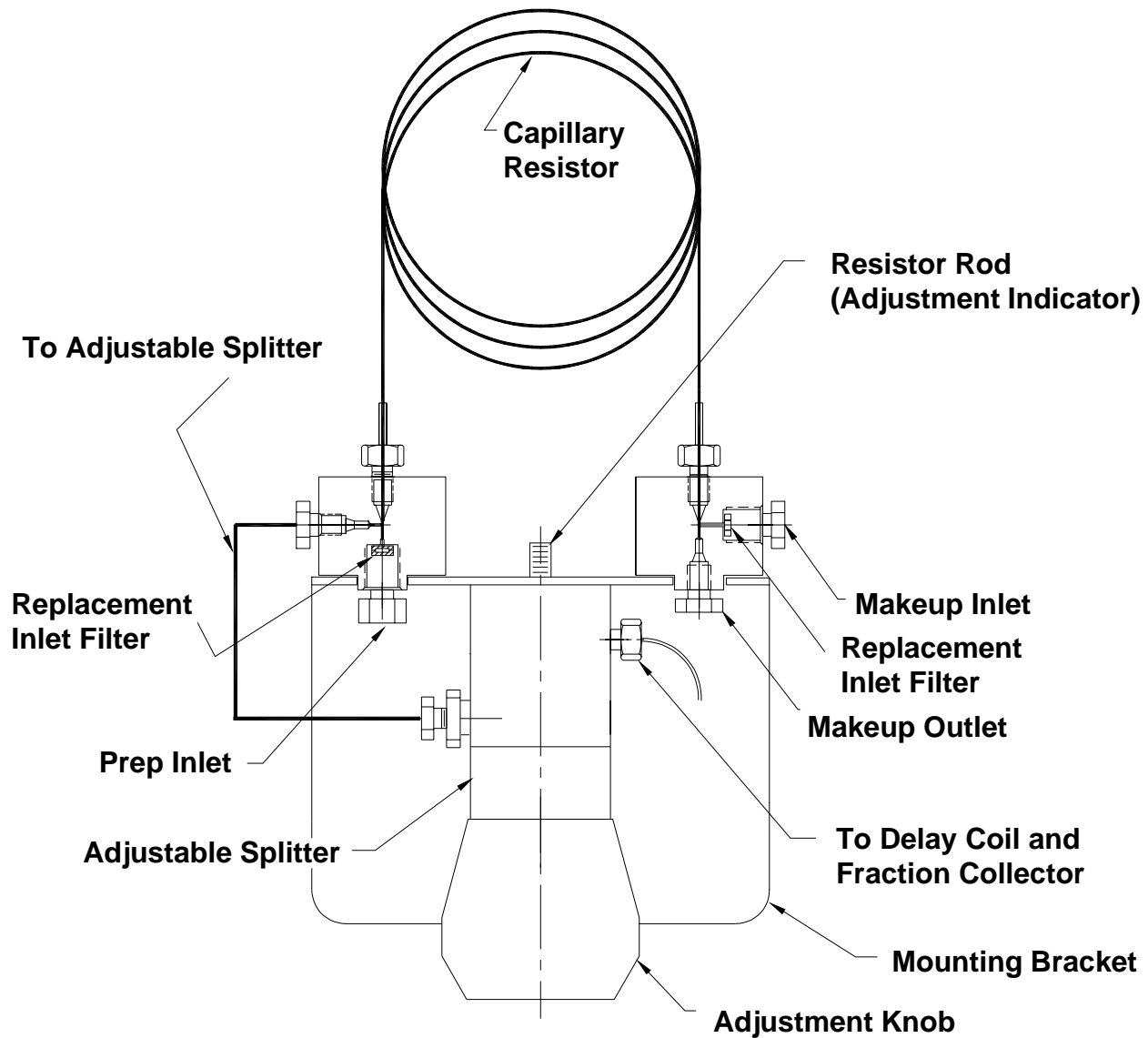


Figure 3.

# ASI QuickSplit™ Makeup-Flow Splitter

## Adjustable Makeup-Flow Splitter Performance

The chromatographic data below compares the dispersion (band broadening), measured as variance, at 10ul/min. between an ideal system with direct flow (Figure 4) and a split system incorporating the ASI QuickSplit Adjustable Makeup-Flow Splitter (Figure 5). 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 oncolumn  
Solvent: Water  
Injection vol: direct 600nL, split 135μL

### Variance Calculation:

$$\text{Variance} = \text{Sigma}^2 = (\text{Wh} \times \text{F})^2 = \mu\text{L}^2$$

Wh = Peak width at half height

F = Flow rate

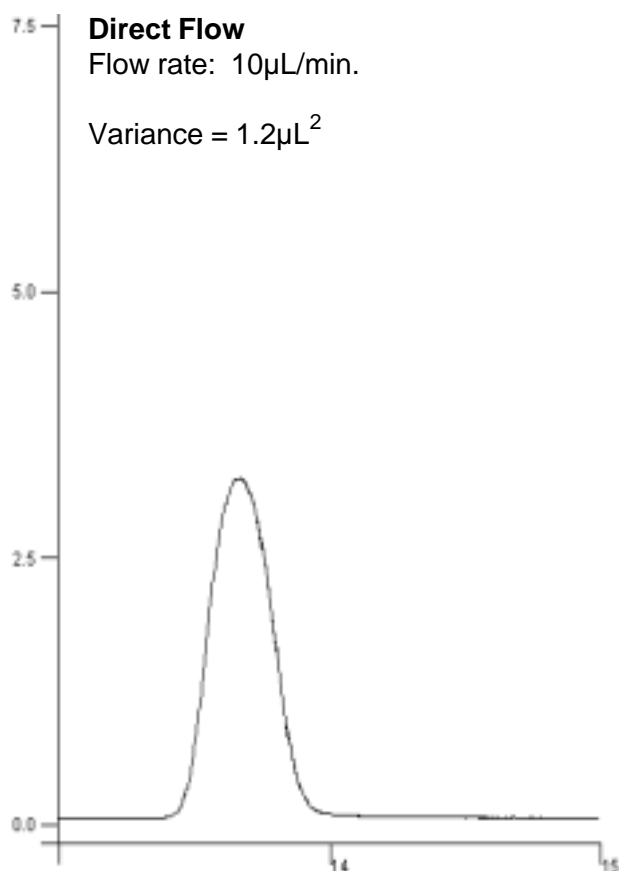


Figure 4.

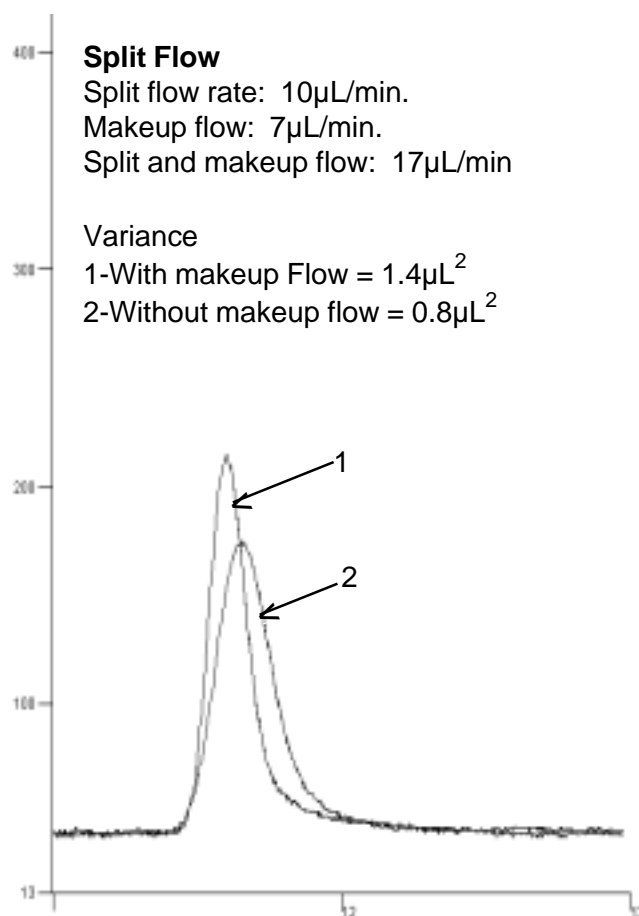


Figure 5.

# ASI QuickSplit™

## Makeup-Flow Splitter

### Fixed Makeup-Flow Splitters

The Fixed Makeup-Flow Splitter is shown in Figure 2. Each 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	Split Flow	Cal. Flow and Split	ASI Part Number
Makeup-Flow Splitter	1 - 5mL/min.	5µL/min.	2mL/min. = 400:1	692-PO01-05
Makeup-Flow Splitter	1 - 5mL/min.	10µL/min.	2mL/min. = 200:1	692-PO01-10
Makeup-Flow Splitter	1 - 5mL/min.	20µL/min.	2mL/min. = 100:1	692-PO01-20
Makeup-Flow Splitter	1 - 5mL/min.	50µL/min.	2mL/min. = 40:1	692-PO01-50
Makeup-Flow Splitter	5 - 10mL/min.	5µL/min.	10mL/min. = 2,000:1	692-PO05-05
Makeup-Flow Splitter	5 - 10mL/min.	10µL/min.	10mL/min. = 1,000:1	692-PO05-10
Makeup-Flow Splitter	5 - 10mL/min.	20µL/min.	10mL/min. = 500:1	692-PO05-20
Makeup-Flow Splitter	5 - 10mL/min.	50µL/min.	10mL/min. = 200:1	692-PO05-50
Makeup-Flow Splitter	10 - 20mL/min.	5µL/min.	20mL/min. = 4,000:1	692-PO10-05
Makeup-Flow Splitter	10 - 20mL/min.	10µL/min.	20mL/min. = 2,000:1	692-PO10-10
Makeup-Flow Splitter	10 - 20mL/min.	20µL/min.	20mL/min. = 1,000:1	692-PO10-20
Makeup-Flow Splitter	10 - 20mL/min.	50µL/min.	20mL/min. = 400:1	692-PO10-50
Makeup-Flow Splitter	20 - 50mL/min.	5µL/min.	50mL/min. = 10,000:1	692-PO20-05
Makeup-Flow Splitter	20 - 50mL/min.	10µL/min.	50mL/min. = 5,000:1	692-PO20-10
Makeup-Flow Splitter	20 - 50mL/min.	20µL/min.	50mL/min. = 2,500:1	692-PO20-20
Makeup-Flow Splitter	20 - 50mL/min.	50µL/min.	50mL/min. = 1,000:1	692-PO20-50
Makeup-Flow Splitter	50 - 150mL/min.	5µL/min.	100mL/min. = 20,000:1	692-PO50-05
Makeup-Flow Splitter	50 - 150mL/min.	10µL/min.	100mL/min. = 10,000:1	692-PO50-10
Makeup-Flow Splitter	50 - 150mL/min.	20µL/min.	100mL/min. = 5,000:1	692-PO50-20
Makeup-Flow Splitter	50 - 150mL/min.	50µL/min.	100mL/min. = 2,000:1	692-PO50-50
Makeup-Flow Splitter	Custom	Custom		692-POCS-CS

# ASI QuickSplit™

## Makeup-Flow Splitter

### Adjustable Makeup-Flow Splitter

The adjustable splitter (Figure 3) is used to maintain a constant split flow 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 Splitters listed below are configured and calibrated assuming the adjustable splitter will be used to maintain a constant split flow 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 Flow

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

# ASI QuickSplit™

## Makeup-Flow Splitter

### Adjustable Makeup-Flow Splitter

The adjustable splitter (Figure 3) 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 Splitters listed below are configured and calibrated assuming the adjustable splitter will be used to produce a wide split flow 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 Flow

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

# ASI QuickSplit™

## Makeup-Flow Splitter

### 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 - 5mL/min.	5µL/min.	2mL/min. = 400:1	692-1101-05
Fixed Resistor Set	1 - 5mL/min.	10µL/min.	2mL/min. = 200:1	692-1101-10
Fixed Resistor Set	1 - 5mL/min.	20µL/min.	2mL/min. = 100:1	692-1101-20
Fixed Resistor Set	1 - 5mL/min.	50µL/min.	2mL/min. = 40:1	692-1101-50
Fixed Resistor Set	5 - 10mL/min.	5µL/min.	10mL/min. = 2,000:1	692-1110-05
Fixed Resistor Set	5 - 10mL/min.	10µL/min.	10mL/min. = 1,000:1	692-1110-10
Fixed Resistor Set	5 - 10mL/min.	20µL/min.	10mL/min. = 500:1	692-1110-20
Fixed Resistor Set	5 - 10mL/min.	50µL/min.	10mL/min. = 200:1	692-1110-50
Fixed Resistor Set	10 - 20mL/min.	5µL/min.	20mL/min. = 4,000:1	692-1120-05
Fixed Resistor Set	10 - 20mL/min.	10µL/min.	20mL/min. = 2,000:1	692-1120-10
Fixed Resistor Set	10 - 20mL/min.	20µL/min.	20mL/min. = 1,000:1	692-1120-20
Fixed Resistor Set	10 - 20mL/min.	50µL/min.	20mL/min. = 400:1	692-1120-50
Fixed Resistor Set	20 - 50mL/min.	5µL/min.	50mL/min. = 10,000:1	692-1150-05
Fixed Resistor Set	20 - 50mL/min.	10µL/min.	50mL/min. = 5,000:1	692-1150-10
Fixed Resistor Set	20 - 50mL/min.	20µL/min.	50mL/min. = 2,500:1	692-1150-20
Fixed Resistor Set	20 - 50mL/min.	50µL/min.	50mL/min. = 1,000:1	692-1150-50
Fixed Resistor Set	50 - 150mL/min.	5µL/min.	100mL/min. = 20,000:1	692-1100-05
Fixed Resistor Set	50 - 150mL/min.	10µL/min.	100mL/min. = 10,000:1	692-1100-10
Fixed Resistor Set	50 - 150mL/min.	20µL/min.	100mL/min. = 5,000:1	692-1100-20
Fixed Resistor Set	50 - 150mL/min.	50µL/min.	100mL/min. = 2,000:1	692-1100-50
Fixed Resistor Set	Custom	Custom		692-11CS-CS

# ASI QuickSplit™

## Makeup-Flow Splitter

### Makeup-Flow Splitter Accessories

#### Adjustable Makeup Capillary Resistors

Description	Replacement Filters	ASI Part Number
Inlet Filter, 2 micron .063" dia. 1 µL , Flows 1-5mL/min., 5 Pack	Makeup Inlet Filter	690-0063-2
Inlet Filter, 10 micron .125" dia. 4 µL, Flows 20-50mL/min.	Makeup Inlet Filter & Housing Assembly	690-23-0125-10
Inlet Filter, 10 micron .188" dia. 10 µL, Flows 50-100mL/min.	Prep Inlet Filter & Housing Assembly	690-23-0188-10
Inlet Filter, 20 micron .188" dia. 12 µL, Flows 75-150mL/min.	Prep Inlet Filter & Housing Assembly	690-23-0188-20
Straight Thru Hole, No Filter 5 Pack, 1 µL	High-Prep Inlet Filter & Housing Assembly	690-001-2-3

#### Replacement Inlet Filters for Both Fixed and Adjustable Splitters

Description	Replacement Filters	ASI Part Number
Inlet Filter, 2 micron .063" dia. 1 µL , Flows 1-5mL/min., 5 Pack	Makeup Inlet Filter	690-0063-2
Inlet Filter, 10 micron .125" dia. 4 µL, Flows 20-50mL/min.	Makeup Inlet Filter & Housing	690-23-0125-10
Inlet Filter, 10 micron .188" dia. 10 µL, Flows 50-100mL/min.	Prep Inlet Filter & Housing	690-23-0188-10
Inlet Filter, 20 micron .188" dia. 12 µL, Flows 75-150mL/min.	Prep Inlet Filter & Housing	690-23-0188-20
Straight Thru Hole Fitting, 1 µL	Prep Inlet Fitting & Housing	690-001-2-3