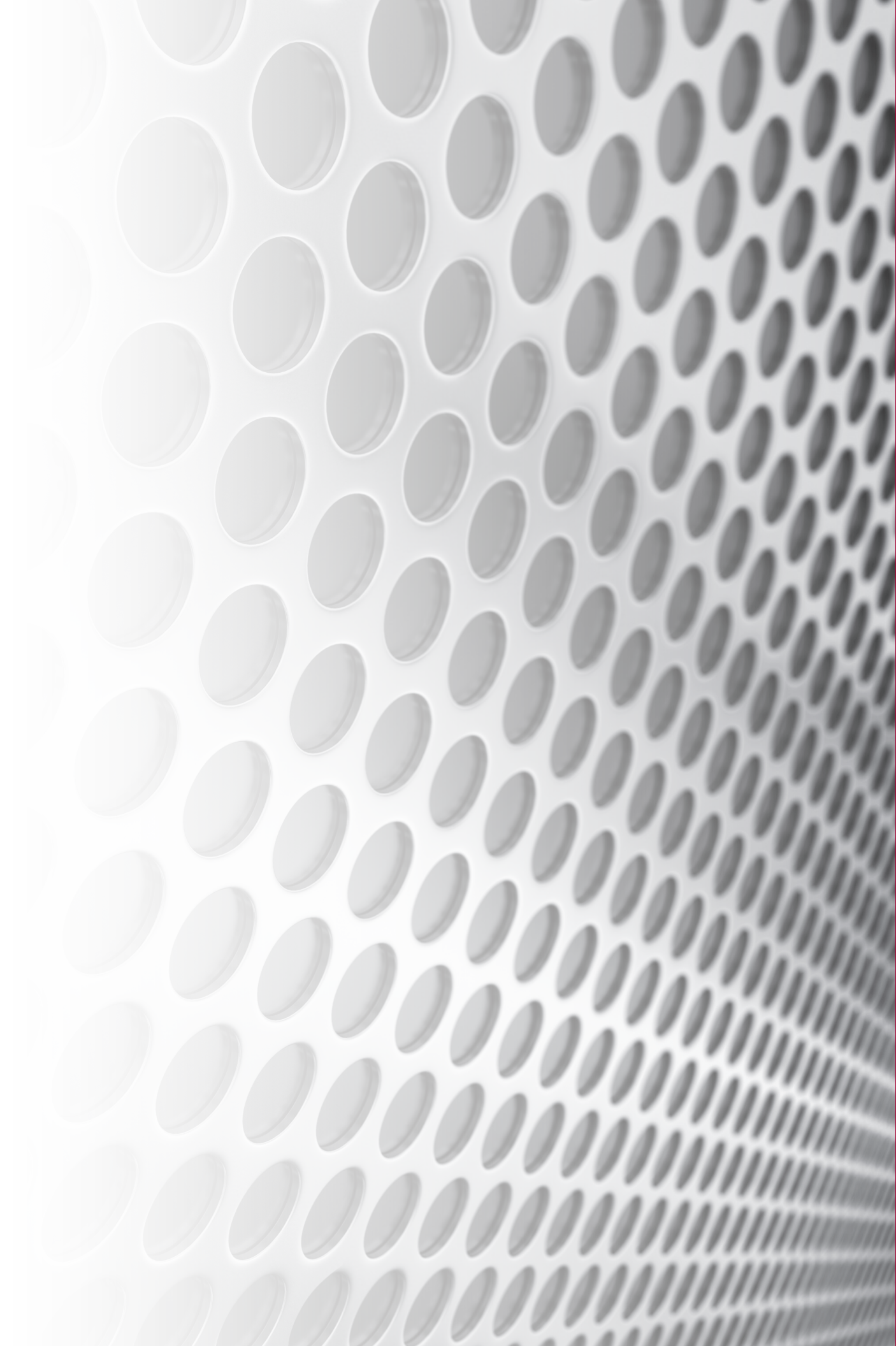


Section 5:

TO MEET ASTM STANDARDS FOR COLD FLOW PROPERTIES





Cold Clear® The ASTM D6751 Cold Soak Filtration Test is leaving many biodiesel producers and consumers “out in the cold.” In response, Schroeder Fuel Filtration is proud to present ColdClear®, a proprietary multi-stage separation technology designed specifically to ensure that biodiesel products conform to this ASTM standard for cold flow properties. The ColdClear® System consists of a three-stage bank of filters using a combination of filtration and adsorption principles to capture compounds that could cause plugging or crystallization in biodiesel fluids. Notably, ColdClear® is the first multi-stage treatment system for solving the cold soak filtration dilemma in B-100 biodiesel and biodiesel blends in a single pass.

The Cold Flow Dilemma

Fuel filter plugging, both in the ASTM procedure and in the field, has been researched significantly with a range of answers to the single question. Most producers and consumers assumed poor cold flow performance was due to feedstock issues, or even poor biodiesel quality. When data started coming in from biodiesel producers across the USA, the answer became even more confusing. A wide range of cold soak results were found for biodiesel samples from a wide range of feedstocks and an even wider range of producers. Obviously, the cold flow problem was not just quality or feedstock dependent.

Why Cold Soak Matters

Cold flow problems can cripple entire fleets during winter months, as evidenced by widespread reports regarding plugged fuel filters, plugged tank filters, and in some instances, even gelling in storage situations. The ASTM Test is performance-based, and designed to aid fleet managers in understanding the gelling potential of fuel during winter operation. Many researchers believed the key culprits were sterol glucosides and monoglycerides produced during the transesterification reaction. While these compounds were found to be in some samples, other biodiesel samples with low concentrations of these compounds were found to fail the cold soak test. In addition, many samples of biodiesel blends gathered due to plugging instances were found to have water and petroleum-based diesel contaminants on the filter.

Why ColdClear® is the Solution

Schroeder Fuel Filtration took this data into consideration in developing ColdClear®, a multi-stage filtration/adsorption system that ensures any potential factors that would initiate crystallization or plugging on the filter are dramatically reduced. By sequentially removing certain impurities that create a higher than normal likelihood of surface crystallization on the filter, our ColdClear® technology ensures that your biodiesel can meet the ASTM specification for cold soak filtration. It also ensures that fleet customers are receiving the very highest quality biodiesel and will minimize system plugging quality issues. ColdClear® is effective for B100 and a range of diesel blends, meaning that producers, distributors or even fleet consumers of biodiesel blends can use it.

The cartridges are disposable and easy to remove from the housings. The cartridges can be changed in minutes, which means very little downtime between production runs. Each bank of cartridges is rated to treat a fixed volume of B100 biodiesel, while biodiesel blends are scaled by the blend percentage.

All housings have the option for test points installed in the base. The first housing can be equipped with a visual or electrical differential pressure indicator. Because differential pressure is not a relevant indicator of life for the cartridges in the latter two housings, an indicator is not offered for stage 2 & 3 housings.

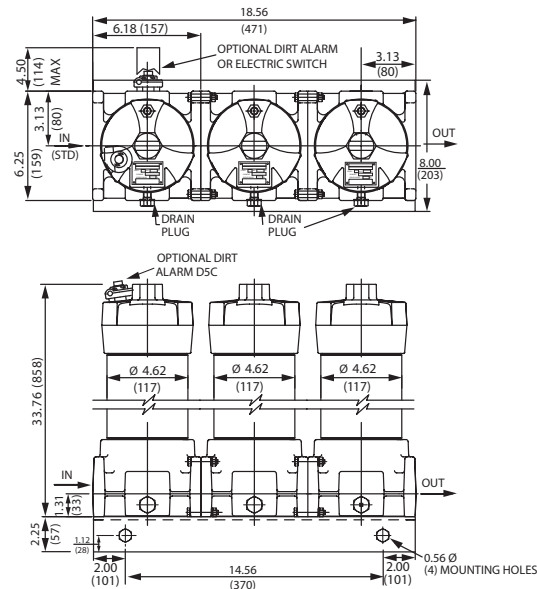
- ColdClear® is a three-stage system with all filters mounted in series on a single skid
- The first stage serves as a pre-filter and captures solid particulates down to three microns in size
- Stages 2 and 3 utilize custom design elements that combine adsorption technologies with the proven effectiveness of Schroeder's high efficiency Excel-ZPlus® synthetic filtering media
- Multiple units can be employed in parallel to meet higher flow requirements
- The ColdClear® System can be easily integrated into existing plant piping environments
- If multiple units are required, Schroeder Fuels offers a range of monitoring options to ensure proper operation of the filter banks
- The essence of the ColdClear® technology is the removal of crystallization precursors from the biodiesel or biodiesel blend. Therefore, knowing the exact flow rate of your system is essential for the ColdClear® System to be properly sized and configured for a specific application.
- In-plant treatment of biodiesel (B100) to conform to ASTM standards prior to blending or shipment
- In-plant treatment of biodiesel blends (ex. B5, B10, etc) to ensure blended biodiesel meets or exceeds cold flow specifications
- For use in diesel fuel storage and distribution systems where B100 or biodiesel blends are stored and distributed to ensure shipped blends conform to ASTM specifications
- Large fleet terminals that have on-site diesel (and biodiesel blend) storage to ensure tight adherence to cold flow standards
- Unit must be wet for at least 10 hours before use.

	BCC100	BCC300	BCC900	BCC1200	BCC1500
Flow gpm (L/min):	5 (19)	15 (57)	45 (170)	60 (225)	75 (280)
Throughput (gal):	15,000	40,000	120,000	160,000	200,000
Max Oper Press psi (bar):	150 (10.3)	150 (10.3)	150 (10.3)	150 (10.3)	150 (10.3)
Oper Temp °F :	70 Optimal; Allowable 40-100	70 Optimal; Allowable 40-100	70 Optimal; Allowable 40-100	70 Optimal; Allowable 40-100	70 Optimal; Allowable 40-100
Element Bowl Material:	Steel	Aluminum	Aluminum (Pod arrangement)	Aluminum (Pod arrangement)	Aluminum (Pod arrangement)
Porting Base & Cap Mat'l:	Cast Aluminum	Aluminum	Housing Construction: Steel	Housing Construction: Steel	Housing Construction: Steel
Element Change Clearance in (mm):	8.5 (215)	33.8 (859)	33.8 (859)	33.8 (859)	33.8 (859)
Pre-filter Cartridge P/N:	BCCPREFILTER	BCC39QPRE	BCC39QPRE	BCC39QPRE	BCC39QPRE
Polish Cartridge P/N:	BCCPOLISH	BCC39QPOL	BCC39QPOL	BCC39QPOL	BCC39QPOL
No. of Housings per Stage:	1	1	1	1	1
No. of Cartridges per Stage:	3	1	3	4	5
Cartridge Case Lot Qty:	12	1	1	1	1

Description ICF
BDF
BDA
GHPF
GHCF
QCF
BDS
BDS2
BDS3
BDS4
LVH-F

Specifications LVH-C
BDFC
BDFP
BDC
HDP
HDPD
BCC

Notes:
The above results are based on using the best feedstock available



Dimensions shown are inches (millimeters) for general information and overall envelope size only. For complete dimensions please contact Schroeder Industries to request a certified print.

Metric dimensions in ().

Filter Model Number Selection

How to Build a Valid Model Number for a Schroeder BCC100:



Example: NOTE: One option per box



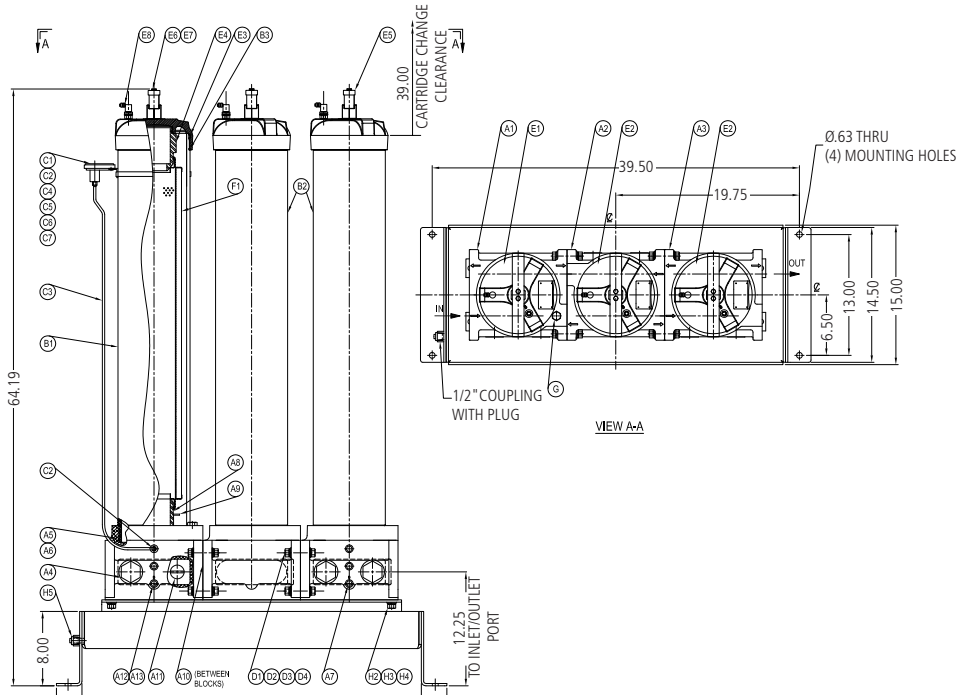
BOX 1	BOX 2	BOX 3	BOX 4
Filter Series	Seals	Inlet Porting	Outlet Porting
BCC100	V = Viton®	P16 = 1" NPT F16 = 1" SAE 4-bolt flange code 61	P16 = 1" NPT F16 = 1V" SAE 4-bolt flange code 61
	BOX 5	BOX 6	
	Dirt Alarm®	Test Points	
	Omit = None D5 = Visual Pop-up D5C = Visual Pop-up in cap MS10 = Electrical w/ DIN connector (male end only)	Omit = None UU = Test Points in all housings	

NOTES:

- Option UU is not available with D5 or MS10 indicator
- Box 2. Viton® is a registered trademark of DuPont Dow Elastomers

Replacement Cartridges

BCCPREFILTER	BCCPOLISH
Stage 1 Cartridge (3 required)	Stage 2 & 3 Cartridges (3 required for each housing)
Performs micron pre-filtering to protect ColdClear® cartridges	Incorporates ColdClear® technology
Stage 1 Cartridge:	BCCPREFILTER
Stage 2 & 3 Cartridges:	BCCPOLISH



Metric dimensions in ().
 Dimensions shown are inches for general information and overall envelope size only.
 For complete dimensions please contact Schroeder Industries to request a certified print.

How to Build a Valid Model Number for a Schroeder BCC300:



Example: NOTE: One option per box



BOX 1	BOX 2	BOX 3	BOX 4
Filter Series	Seals	Inlet Porting	Outlet Porting
BCC300	V = Viton®	P24 = 1½" NPT P32 = 2" NPT F32 = SAE 4-bolt flange code 61	P24 = 1½" NPT P32 = 2" NPT F32 = SAE 4-bolt flange code 61

BOX 5	BOX 6
Dirt Alarm®	Test Points
Omit = None D5 = Visual Pop-up D5C = Visual Pop-up in cap DPG = Differential Pressure Gage MS10 = Electrical w/ DIN connector (male end only)	Omit = None UU = Test Points in all housings

NOTES:

Box 2. Viton® is a registered trademark of DuPont Dow Elastomers

Stage 1 Cartridge:	BCC39QPRE
Stage 2 & 3 Cartridges:	BCC39QPOL

Filter Model Number Selection

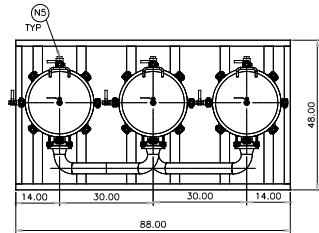
- ICF
- BDF
- BDA
- GHPF
- GHCF
- QCF
- BDS
- BDS2
- BDS3
- BDS4
- LVH-F
- LVH-C
- BDFC
- BDFP
- BDC
- HDP
- HDPD
- BCC

Replacement Cartridges

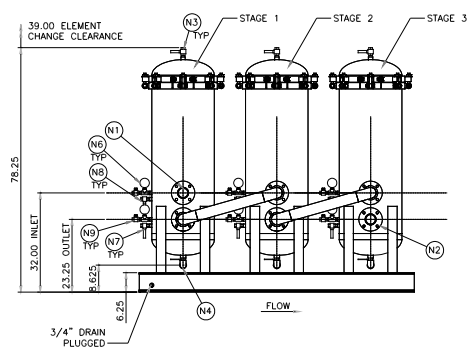
DESIGN DATA			
DESIGN PRESSURE	1149 PSIG		
MIN./MAX. DESIGN TEMP.	40°F-100°F (70° IDEAL)		
VESSEL OPENING SCHEDULE			
MK. NO.	SIZE	TYPE	REMARKS
N1	*	*	INLET
N2	*	*	OUTLET
N3	3/4"	FNPT	VENT, 1/2" BALL VALVE
N4	1"	FNPT	CLEAN DRAIN, 1" BALL VALVE
N5	1"	FNPT	DIRTY DRAIN, 1" BALL VALVE
N6/N7	1/2"	FNPT	DPI
N8/N9	1/2"	FNPT	TEST PT., 1/2" BALL VALVE

* PER MODEL CODE CHART

REPLACEMENT CARTRIDGE				
STAGE	PART NUMBER	QTY. (900)	QTY. (1200)	QTY. (1500)
1	BCC39QPRE	3	4	5
2	BCC39QPOL	3	4	5
3	BCC39QPOL	3	4	5



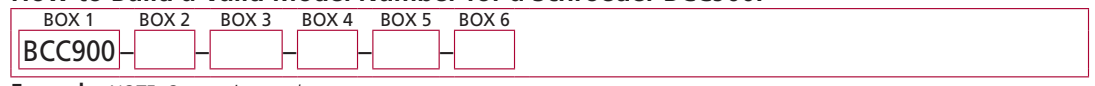
MODEL NUMBER					
BOX 1 MODEL CODE	BOX 2 SEALS	BOX 3 INLET PORTING	BOX 4 OUTLET PORTING	BOX 5 STAGE 1 INDICATOR	BOX 6 TEST POINTS
BCC900	V=VITON	P48=3" NPT A48=3" ANSI 150# FLANGE	P48=3" NPT A48=3" ANSI 150# FLANGE	OMIT=NONE RD5=VISUAL POP-UP DPG1=DIFFERENTIAL PRESSURE GAUGE RMS10=ELECTRICAL W/DIN CONNECTOR (MALE END ONLY)	OMIT=NONE UU=TEST POINTS IN EACH STAGE
BCC1200					
BCC1500					



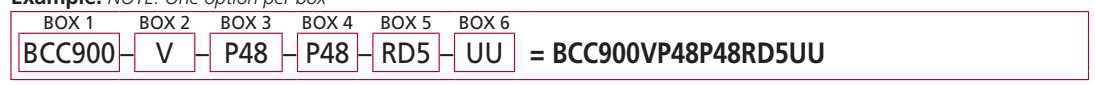
Metric dimensions in ().
Dimensions shown are inches for general information and overall envelope size only.
For complete dimensions please contact Schroeder Industries to request a certified print.

Filter Model Number Selection

How to Build a Valid Model Number for a Schroeder BCC900:



Example: NOTE: One option per box



BOX 1 Filter Series BCC900	BOX 2 Seals V = Viton®	BOX 3 Inlet Porting P48 = 3" NPT A48 = 3" ANSI 150# Flange	BOX 4 Outlet Porting P48 = 3" NPT A48 = 3" ANSI 150# Flange
BOX 5 Dirt Alarm® Omit = None RD5 = Visual Pop-up DPG1 = Differential Pressure Gage RMS10 = Electrical w/ DIN connector (male end only)		BOX 6 Test Points Omit = None UU = Test Points in all housings	

NOTES:

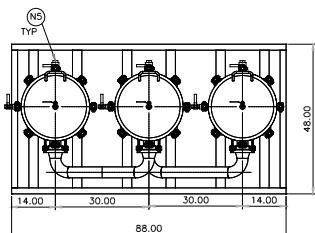
Box 2. Viton® is a registered trademark of DuPont Dow Elastomers

Replacement Cartridges

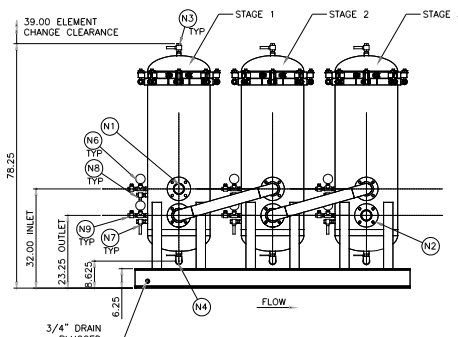
Stage 1 Cartridge:	BCC39QPRE
Stage 2 & 3 Cartridges:	BCC39QPOL

DESIGN DATA			
DESIGN PRESSURE	149 PSIG		
MIN./MAX. DESIGN TEMP.	+40F/-100F (70" IDEAL)		
VESSEL OPENING SCHEDULE			
MK. NO.	SIZE	TYPE	REMARKS
N1	•	•	INLET
N2	•	•	OUTLET
N3	3/4"	FNPT	VENT, 3" BALL VALVE
N4	1"	FNPT	CLEAN DRAIN, 1" BALL VALVE
N5	1"	FNPT	DIRTY DRAIN, 1" BALL VALVE
N6/N7	1/2"	FNPT	DPI
N8/N9	1/2"	FNPT	TEST PT., 3/4" BALL VALVE

REPLACEMENT CARTRIDGE				
STAGE	PART NUMBER	QTY. (900)	QTY. (1200)	QTY. (1500)
1	BCC39QPRE	3	4	5
2	BCC39QPOL	3	4	5
3	BCC39QPOL	3	4	5

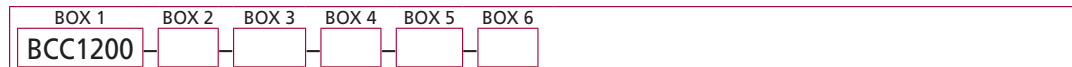


MODEL NUMBER					
BOX 1 MODEL CODE	BOX 2 SEALS	BOX 3 INLET PORTING	BOX 4 OUTLET PORTING	BOX 5 STAGE 1 INDICATOR	BOX 6 TEST POINTS
BCC900	V=VITON	P48=3" NPT A48=3" ANSI 150# FLANGE	P48=3" NPT A48=3" ANSI 150# FLANGE	OMIT=NONE RD5=VISUAL POP-UP DPG1=DIFFERENTIAL PRESSURE GAUGE RMS10=ELECTRICAL W/DIN CONNECTOR (MALE END ONLY)	OMIT=NONE UU=TEST POINTS IN EACH STAGE
BCC1200					
BCC1500					

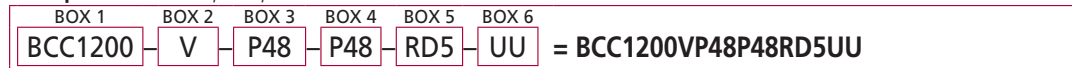


Metric dimensions in ().
Dimensions shown are inches for general information and overall envelope size only.
For complete dimensions please contact Schroeder Industries to request a certified print.

How to Build a Valid Model Number for a Schroeder BCC1200:



Example: NOTE: One option per box



BOX 1	BOX 2	BOX 3	BOX 4
Filter Series	Seals	Inlet Porting	Outlet Porting
BCC1200	V = Viton®	P48 = 3" NPT A48 = 3" ANSI 150# Flange	P48 = 3" NPT A48 = 3" ANSI 150# Flange
	BOX 5	BOX 6	
	Dirt Alarm®	Test Points	
	Omit = None RD5 = Visual Pop-up DPG1 = Differential Pressure Gage RMS10 = Electrical w/ DIN connector (male end only)	Omit = None UU = Test Points in all housings	

NOTES:

Box 2. Viton® is a registered trademark of DuPont Dow Elastomers

Stage 1 Cartridge:	BCC39QPRE
Stage 2 & 3 Cartridges:	BCC39QPOL

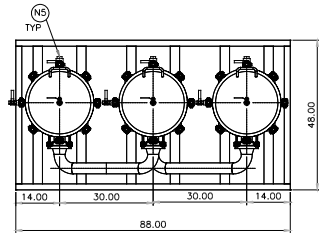
Filter Model Number Selection

- ICF
- BDF
- BDA
- GHPF
- GHCF
- QCF
- BDS
- BDS2
- BDS3
- BDS4
- LVH-F
- LVH-C
- BDFC
- BDFP
- BDC
- HDP
- HDPD
- BCC

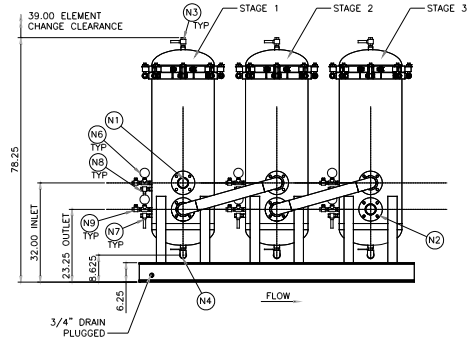
Replacement Cartridges

DESIGN DATA			
DESIGN PRESSURE	149 PSIG		
MIN./MAX. DESIGN TEMP.	40°F-100°F (70° IDEAL)		
VESSEL OPENING SCHEDULE			
MK. NO.	SIZE	TYPE	REMARKS
N1	*	*	INLET
N2	*	*	OUTLET
N3	3/4"	FNPT	VENT. 1/2" BALL VALVE
N4	1"	FNPT	CLEAN DRAIN. 1" BALL VALVE
N5	1"	FNPT	DIRTY DRAIN. 1" BALL VALVE
N6/N7	1/2"	FNPT	DPI
N8/N9	1/2"	FNPT	TEST PT., 1/2" BALL VALVE

REPLACEMENT CARTRIDGE				
STAGE	PART NUMBER	QTY. (900)	QTY. (1200)	QTY. (1500)
1	BCC39QPRE	3	4	5
2	BCC39QPOL	3	4	5
3	BCC39QPOL	3	4	5



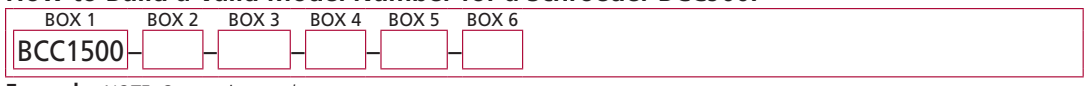
MODEL NUMBER					
BOX 1 MODEL CODE	BOX 2 SEALS	BOX 3 INLET PORTING	BOX 4 OUTLET PORTING	BOX 5 STAGE 1 INDICATOR	BOX 6 TEST POINTS
BCC900	V=VITON	P48=3" NPT A48=3" ANSI 150# FLANGE	P48=3" NPT A48=3" ANSI 150# FLANGE	OMIT=NONE RD5=VISUAL POP-UP DPG1=DIFFERENTIAL PRESSURE GAUGE RMS10=ELECTRICAL W/DIN CONNECTOR (MALE END ONLY)	OMIT=NONE UU=TEST POINTS IN EACH STAGE
BCC1200					
BCC1500					



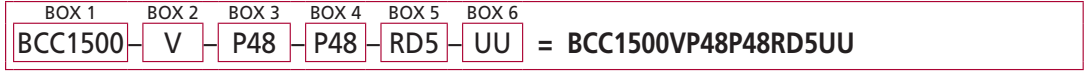
Metric dimensions in ().
Dimensions shown are inches for general information and overall envelope size only.
For complete dimensions please contact Schroeder Industries to request a certified print.

Filter Model Number Selection

How to Build a Valid Model Number for a Schroeder BCC900:



Example: NOTE: One option per box



<p>BOX 1</p> <p>Filter Series</p> <p>BCC1500</p>	<p>BOX 2</p> <p>Seals</p> <p>V = Viton®</p>	<p>BOX 3</p> <p>Inlet Porting</p> <p>P48 = 3" NPT A48 = 3" ANSI 150# Flange</p>	<p>BOX 4</p> <p>Outlet Porting</p> <p>P48 = 3" NPT A48 = 3" ANSI 150# Flange</p>
<p>BOX 5</p> <p>Dirt Alarm®</p> <p>Omit = None RD5 = Visual Pop-up DPG1 = Differential Pressure Gage RMS10 = Electrical w/ DIN connector (male end only)</p>		<p>BOX 6</p> <p>Test Points</p> <p>Omit = None UU = Test Points in all housings</p>	

NOTES:

Box 2. Viton® is a registered trademark of DuPont Dow Elastomers

Replacement Cartridges

Stage 1 Cartridge:	BCC39QPRE
Stage 2 & 3 Cartridges:	BCC39QPOL