

# CFF Series

## COMPRESSED AIR FILTERS

- ▶ Maintains Required Air Quality by Creating a Custom Air Treatment System
- ▶ Seven Filtration Grades Provide ISO 8573.1 Standard Air Quality
- ▶ Internal Automatic Drains Protect Downstream Equipment
- ▶ Features an Optional Element Monitor Which Promotes System Efficiency



**CHAMPION**<sup>®</sup>

# World Class Filtration



CFF Series Filters provide your compressed air system with premium quality filtration for the three typical contaminant types

- 1) Solid particles come from ambient air contaminants like dust and from rusted, oxidized pipework. They will cause pneumatic equipment to malfunction, cause instrument and control failures, and contaminate end products.
- 2) Condensed water droplets come from the humidity in ambient air. Water will oxidize pipework and pneumatic equipment, ruin paint finishes and end products.
- 3) Liquid oil and oil vapors are introduced by compressor lubricants and by hydrocarbon vapors present in ambient air. Oil-free compressed air is particularly important in food and pharmaceutical processes.

## SEVEN FILTRATION GRADES PROVIDE ISO 8573.1 STANDARD AIR QUALITY

Filter Grade	Description	Filtration*			ISO 8573.1 Quality Classes***	
		Water Droplets** ppm w/w	Solid Particulates micron	Oil Removal ppm w/w	Solids	Oil
A	Water Separator	30,000	-	-	-	-
B	Separator/Filter	25,000	3	5	3	5
C	General Purpose	2,000	1	1	2	4
D	Dry Particulate	-	1	-	2	-
E	High Efficiency Oil Removal	1,000	0.01	0.008	1	1
F	Maximum Efficiency Oil Removal	100	0.01	0.0008	1	1
G	Oil Vapor Removal	-	0.01	0.003	1	1

## COMPLY WITH PRESSURE VESSEL DIRECTIVES WORLDWIDE

CFF Series Filters utilize housings which conform to most major pressure vessel directives in the Americas, Europe, and Asia.



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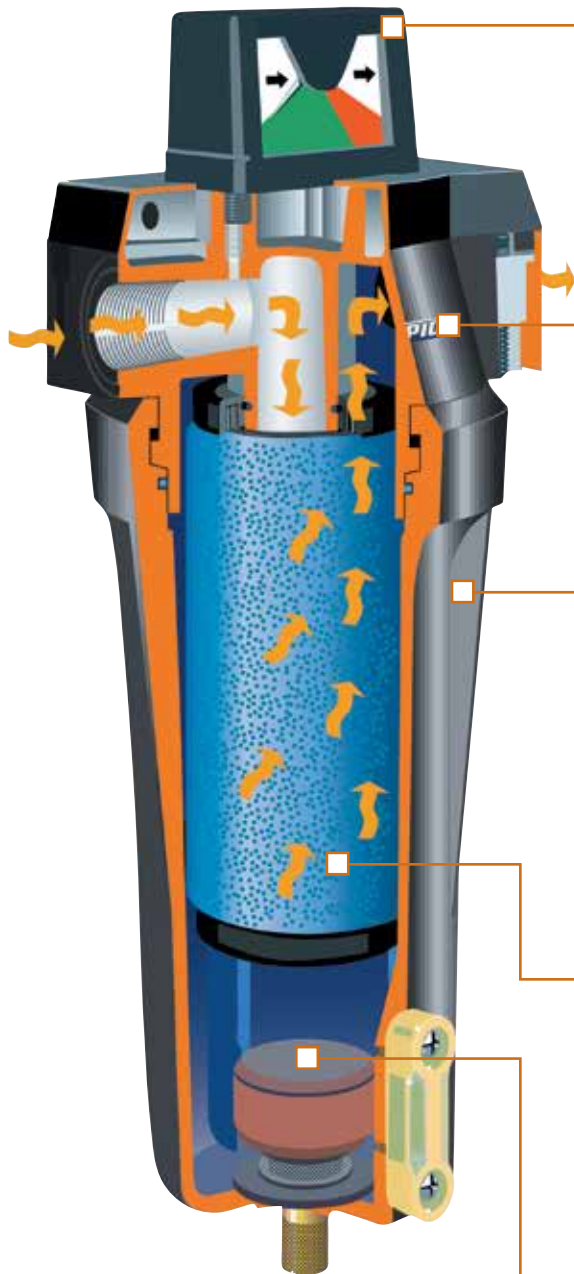
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# Features

AN INNOVATIVE DESIGN FOR ALL APPLICATIONS



## GAUGE

- ▶ Standard on 100–21,250 scfm models
- ▶ Dual gauge face allows housings to be mounted in any flow direction
- ▶ Indicates element change-out based on differential pressure
- ▶ Large easy-to-read gauge face
- ▶ Remote mounting possible

## SIMPLE MAINTENANCE

- ▶ 1/8" turn, self-locking bayonet head to bowl connection (up through 1" connection sizes)
- ▶ Audible warning by escaping air if housing is not depressurized before disassembly
- ▶ Ribbed bowls allow use of C-spanner
- ▶ Color-coded elements for easy identification

## MODULAR HOUSINGS SAVE SPACE AND TIME

- ▶ Standard on 20–780 scfm models
- ▶ Large flow paths reduce pressure drop
- ▶ Chromated and epoxy powder painted (interior and exterior) add durability and corrosion resistance
- ▶ MWP 300 psig (21 bar)
- ▶ Can be mounted for left or right entry
- ▶ High-quality aluminum, zinc, and steel materials

## ELEMENT GRADES OFFER SUPERIOR FILTRATION

- ▶ Large effective surface areas ensure high capture rates
- ▶ Large open areas minimize pressure drop
- ▶ Silicone-free, withstand temperatures to 150° F (66° C)
- ▶ Push-on elements for quick replacement
- ▶ Corrosion resistant, stainless steel cores

## INTERNAL AUTOMATIC DRAINS

- ▶ Reliable discharge of condensate
- ▶ Pilot operated, pneumatically actuated, particulate-resistant mechanism
- ▶ Viton seals and inlet screen for additional protection



## SLIDE INDICATOR

- ▶ Standard on 20–60 scfm models
- ▶ Changes color based on differential pressure

## ENERGY SAVING ELEMENT MONITOR

- ▶ Optional on grades B through G
- ▶ Three modes determine element change: time, differential pressure, element performance
- ▶ Selectable filter performance settings
- ▶ Maximizes system efficiencies
- ▶ Reduces operating costs

# Filter Elements for all Grades of Filtration

Compressed air systems continually challenge filtration with moisture, solid particulates, and liquid oil or oil vapors. VAF Series filter elements represent state-of-the-art filter designs which allow for custom filtration at every installation.

- Inside-to-out air flow maximizes filtration efficiency
- Two-stage filtration ensures long element life
- Stainless steel inner and outer cores add structural integrity
- Uniquely blended coalescing fiber media design
- Coated foam sleeves provide protection against chemical attack
- 100% silicone free, withstand temperatures to 150° F (66° C)

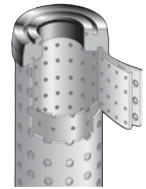
## Grade A - Water Separator

**Installation:** After an air compressors' (or a stand-alone) aftercooler.

**Design:** One-stage filtration with two stainless steel orifice tubes. Labyrinth style air flow path removes liquid

water by forcing abrupt directional changes.

**Performance\*:** Handles bulk liquid inlet loads to 30,000 ppm w/w and provides 10 micron solid particulate separation. Efficient to flows as low as 5% of rated flow.



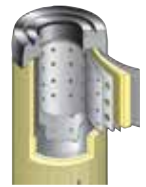
## Grade B - Separator/Filter

**Installation:** After an air compressors' (or a stand-alone) aftercooler or as a prefilter to a refrigerated dryer.

**Design:** Two-stage filtration with first stage of two stainless steel orifice tubes which remove bulk liquids and solid particulates to 10 micron. Second stage has in-depth

coalescing fiber media which captures solid particulates to 3 micron.

**Performance\*:** Handles bulk liquid inlet loads to 25,000 ppm w/w, provides 3 micron solid particulate filtration and oil removal to 5 ppm.



## Grade C - General Purpose Filter

**Installation:** 1 micron particulate prefilter for refrigerated dryers and high efficiency oil removal filters.

**Design:** Two-stage filtration with a first stage of multiple layers of fiber media which pre-filter the air. Second stage has in-depth coalescing fiber media which coalesces oil

aerosols and removes finer particulates to 1 micron.

**Performance\*:** Handles bulk liquid inlet loads to 2,000 ppm w/w, provides 1 micron solid particulate filtration and oil removal to 1 ppm.



## Grade D - Dry Particulate Filter

**Installation:** Dry, solid particulate afterfilter for heatless desiccant dryers.

**Design:** Two-stage filtration with life-prolonging outside/in air flow with first stage of alternate layers of fiber media and a media screen capturing large particulates. Second

stage captures finer particulates. Not designed for any liquid loading.

**Performance\*:** Provides 1 micron solid particulate filtration of desiccant dust.



## Grade E - High Efficiency Oil Removal Filter

**Installation:** Prefilter to desiccant and membrane dryers, afterfilter to refrigerated dryers and stand-alone oil removal at the point-of-use of compressed air.

**Design:** Two-stage filtration with a first stage of multiple layers of fiber media which prefilter the air. Second stage has in-depth coalescing fiber media which coalesces

oil aerosols. Includes an outer-coated, closed cell foam sleeve.

**Performance\*:** Handles bulk liquid water inlet loads to 1,000 ppm w/w and provides 0.008 ppm oil aerosol removal and 0.01 micron solid particulate separation.



## Grade F - Maximum Efficiency Oil Removal Filter

**Installation:** Prefilter to desiccant and membrane dryers with a Grade C prefilter, oil-free air applications.

**Design:** Two-stage filtration with a first stage of a coated, closed-cell foam sleeve which acts as a prefilter and flow disperser. Second stage has in-depth coalescing fiber

media which coalesces fine oil aerosols. Includes an outer-coated, closed cell foam sleeve.

**Performance\*:** Handles bulk liquid water inlet loads to 100 ppm w/w and provides 0.0008 ppm oil aerosol removal and 0.01 micron solid particulate separation.



## Grade G - Oil Vapor Removal Filter

**Installation:** Afterfilter to high efficiency liquid oil removal filters for true oil-free applications.

**Design:** Two-stage filtration with a generously-sized first stage of a stabilized bed of carbon particles which remove the majority of the oil vapor. Second stage has multiple layers of fiber media with bonded microfine carbon

particles which remove the remaining oil vapors. Includes an outer-coated, closed cell foam sleeve which prevents fiber migration.

**Performance\*\*:** No liquid should be present at filter inlet. Provides 0.003 ppm w/w oil (as a vapor) removal and 0.01 micron solid particulate separation.



\* Filter efficiencies have been established in accordance with CAGI standard ADF400 and are based on 100° F (38° C) inlet temperature

\*\* Filter efficiency has been established in accordance with CAGI standard ADF500 and is based on 100° F (38° C) inlet temperature



## ISO 8573.1 QUALITY CLASSES

ISO 8573.1 was developed in 1992 by ISO (International Organization for Standardization) to help plant engineers specify desired compressed air quality globally by providing “Quality Classes” for solid particulates, humidity and oil. Quality classes provide engineers with an internationally accepted unit of measure. A typical pharmaceutical plant, for example, would have a compressed air specification of ISO Quality Classes 1.2.1. This is equivalent to 0.1 micron particulate filtration, -40° F (-40° C) dew point, and 0.008 ppm (0.01 mg/m<sup>3</sup>) oil filtration.

No matter what language is spoken and what unit of measure is used, using ISO 8573.1 Air Quality Classes ensures that your factory will get the compressed air quality you specified.

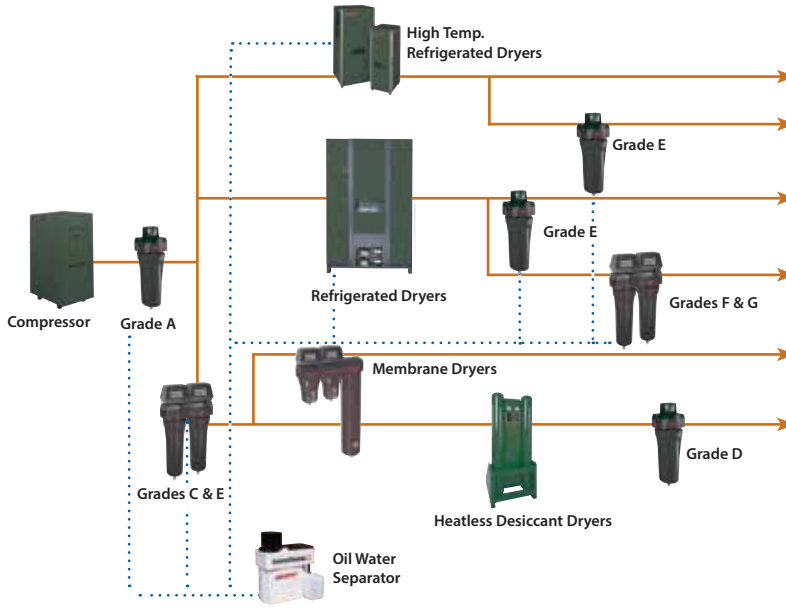
Quality Classes	Solid Contaminants (maximum particle size in microns)	Maximum Pressure Dew Points ° F (° C)	Maximum Oil Content (droplets, aerosols, and vapor ppm w/w (mg/m <sup>3</sup> ))
1	0.1	-94 (-70)	0.008 (0,01)
2	1	-40 (-40)	0.08 (0,1)
3	5	-4 (-20)	0.8 (1)
4	15	38 (3)	4 (5)
5	40	45 (7)	21 (25)
6	–	50 (10)	–

## AIR QUALITY/PRESSURE DROP TABLE

Filter Grade	Description	Pressure Drop at Rated Conditions psid (kgf/cm <sup>2</sup> )	
		Dry	Wet
A	Water Separator	0.8 (0.06)	0.8 (0.06)
B	Separator/Filter	1 (0.07)	1.5 (0.11)
C	General Purpose	1 (0.07)	2 (0.14)
D	Dry Particulate	1 (0.07)	–
E	High Efficiency Oil Removal	1 (0.07)	3 (0.21)
F	Max. Efficiency Oil Removal	2 (0.14)	6 (0.42)
G	Oil Vapor Removal	1 (0.07)	–

# Maintain System Pressure by Creating a Custom Air Treatment System

Champion Air Treatment offers solutions to all air treatment applications. Maximize system pressure by choosing the combination of Champion air treatment products which perfectly match your applications' requirements.



ISO 8573.1 Air Quality Class			System ΔP*	
Solids	Moisture	Oil	psi	bar
3	6 Body shops, sand blasting	5	<5	<0,35
1	6 Large pneumatic tools, spray painting	1	<8	<0,56
1	4 Powder painting, fine pneumatic tools, air gauging & conveying, pneumatic instruments & controls	1	<8	<0,56
1	4 Food packaging, cosmetics, photo labs, textile looms	1	<11	<0,75
1	2-5 Telephone cable, printing, photo labs, spray painting, dental, laboratory instruments	1	<10	<0,68
1	1-3 Air lines exposed to freezing ambient conditions, pharmaceutical, chemical, powder paint	1	<10	<0,68
1	2-3 Food processing, dairies, breweries, air in direct contact with foods, microchips, optics, medicines, point-of-use filtration	1	<15	<1,02

\* Efficiencies per CAGI standards ADF100 and ADF400 and wetted element conditions.

## Filter Grades:

- A - Mechanical Separator (bulk liquid)
- B - Separator/Filter (3 micron and bulk liquid)
- C - Air Line Filter (1 micron)
- D - Dry Desiccant Afterfilter (1 micron)
- E - High Efficiency Oil Removal Filter (0.008 ppm)
- F - Maximum Efficiency Oil Removal Filter (0.0008 ppm)
- G - Oil Vapor Removal Filter (activated carbon)

## Features:

- A - Internal Automatic Drain Mechanism
- E - Electric Demand Drain
- P - Differential Pressure Slide Indicator
- G - Differential Pressure Gauge Indicator
- L - Liquid Level Indicator
- S - Corrosion Proof Stainless Steel Element
- M - Element Monitor

Model	Capacity SCFM (M <sup>3</sup> /MIN)	Connections NPT/ANSI FLG.	Standard Features Filter Grades					Max Pressure (psig)		(KGF/CM <sup>2</sup> )	Temp °F (°C)	Dimensions			Replacement Element	
			A	B	C,E,F	D	G	Manual Drain	With D or L			Height in (MM)	Width in (MM)	Weight LB (KG)	Model_Grade	Qty

### Modular Type Housings

CFF20	20 (0.57)	3/8" NPTF	A	AP	AP	P	(2)	300	250	21	150 (66)	8.15 (207)	4.13 (105)	4.2 (1.9)	C20_E	1
CFF35	35 (1.00)	1/2" NPTF	A	AP	AP	P	(2)	300	250	21	150 (66)	11.05 (281)	4.13 (105)	8.1 (3.7)	C35_E	1
CFF60	60 (1.72)	1/2" NPTF	A	AP	AP	P	(2)	300	250	21	150 (66)	13.4 (340)	4.13 (105)	8.5 (3.9)	C60_E	1
CFF100	100 (2.9)	3/4" NPTF	A	AG	AG	G	(2)	300	250	21	150 (66)	15.32 (389)	5.25 (133)	6.3 (2.9)	C100_E	1
CFF170	170 (4.9)	1" NPTF	A	AG	AG	G	(2)	300	250	21	150 (66)	19.57 (497)	5.25 (133)	6.9 (3.1)	C170_E	1
CFF250	250 (7.2)	1 1/2" NPTF	(1)	G (1)	G	G	(2)	300	250	21	150 (66)	22.8 (579)	6.44 (164)	10.2 (4.6)	C250_E	1
CFF375	375 (11)	1 1/2" NPTF	(1)	G (1)	G	G	(2)	300	250	21	150 (66)	27.29 (693)	6.44 (164)	11.3 (5.1)	C375_E	1
CFF485	485 (14)	2" NPTF	(1)	G (1)	G	G	(2)	300	250	21	150 (66)	31.08 (789)	7.63 (194)	28 (12.7)	C485_E	1
CFF625	625 (18)	2 1/2" NPTF	(1)	G (1)	G	G	(2)	300	250	21	150 (66)	36.83 (935)	7.63 (194)	33 (15.0)	C625_E	1
CFF780	780 (22)	2 1/2" NPTF	(1)	G (1)	G	G	(2)	300	250	21	150 (66)	42.96 (1091)	7.63 (194)	38 (17.2)	C780_E	1

### Pressure Vessels

CFF625P	625 (18)	3" NPTM	A	AG	AG	AG	(1)	300	250	21	150 (66)	40.88 (1038)	10.25 (260)	36 (16.3)	CP_E	1
CFF1000	1,000 (29)	3" NPTM	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	48.00 (1219)	16.00 (406)	91 (41.3)	C1000_E	2
CFF1250	1,250 (36)	3" NPTM	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	48.00 (1219)	16.00 (406)	91 (41.3)	CP_E	2
CFF1875	1,875 (54)	3" NPTM	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	49.00 (1245)	16.25 (413)	120 (54.4)	CP_E	3
CFF2500	2,500 (72)	4" flg.	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	52.25 (1327)	20.00 (508)	179 (81.2)	CP_E	4
CFF3125	3,125 (89)	4" flg.	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	52.25 (1327)	20.00 (508)	182 (82.6)	CP_E	5
CFF5000	5,000 (143)	6" flg.	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	54.63 (1387)	24.00 (610)	271 (123)	CP_E	8
CFF6875	6,875 (197)	6" flg.	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	62.56 (1589)	28.00 (711)	518 (235)	CP_E	11
CFF8750	8,750 (250)	6" flg.	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	62.56 (1589)	28.00 (711)	527 (239)	CP_E	14
CFF11875	11,875 (340)	8" flg.	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	69.13 (1756)	33.00 (838)	709 (322)	CP_E	19
CFF16250	16,250 (465)	8" flg.	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	67.94 (1726)	39.00 (991)	918 (416)	CP_E	26
CFF21250	21,250 (608)	10" flg.	(1)	G (1)	G	G	(1)	300	250	21	150 (66)	70.94 (1802)	45.88 (1165)	1412 (640)	CP_E	34

(1) Drain plugs standard. Externally mounted automatic drains are available.  
 (2) Time-based Element Monitor recommended  
 (3) ASME coded pressure vessels

# Ordering Information

## CFF

Housing Type	Housing (1)		Grade (2) Filters/Separator	Connections (3)		Features (4)
	Number	Flow (scfm)		Standard Size	Optional Sizes	
Modular Housing	20	20	A = Mechanical Separator	11 = 3/8" NPTF	13 = 1/2" NPTF 37 = 3/8" BSP 39 = 1/2" BSP	A = Internal Automatic Drain
	35 60	35 60	B = Separator/Filter (3 micron, 5 ppm)	13 = 1/2" NPTF	11 = 3/8" NPTF 37 = 3/8" BSP 39 = 1/2" BSP	E = Electronic Demand Drain P = Differential Pressure Slide
	100	100	C = Air Line Filter (1 micron, 1 ppm)	15 = 3/4" NPTF	17 = 1" NPTF 41 = 3/4" BSP 43 = 1" BSP	G = Differential Pressure Gauge
	170	170	D = Dry Particulate Filter (1 micron Afterfilter)	17 = 1" NPTF	15 = 3/4" NPTF 41 = 3/4" BSP 43 = 1" BSP	L = Liquid Level Indicator
	250 375	250 375	E = High Efficiency Oil Removal (.01micron, .008 ppm)	21 = 1 1/2" NPTF	17 = 1" NPTF 19 = 1 1/4" NPTF 43 = 1" BSP 45 = 1 1/4" BSP 47 = 1 1/2" BSP	S = Stainless Steel T = Standard Core
	485	485	F = Maximum High Efficiency Oil Removal (.01 micron, .0008 ppm)	23 = 2" NPTF	25 = 2 1/2" NPTF 49 = 2" BSP 51 = 2 1/2" BSP	M = Element Monitor
	625 780	625 780	G = Oil Vapor Removal (.01 micron, .003 ppm)	25 = 2 1/2" NPTF	51 = 2 1/2" BSP	U = ASME "U" Stamped Vessel
Pressure Vessel	625 1000 1250 1875	625 1000 1250 1875		27 = 3" NPTM	53 = DN 80 Flange	
	2500 3125	2500 3125		29 = 4" ANSI Flange	55 = DN 100 Flange	
	5000 6875 8750	5000 6875 8750		31 = 6" ANSI Flange	57 = DN 150 Flange	
	11875 16250	11875 16250		33 = 8" ANSI Flange	59 = DN 200 Flange	
	21250	21250		35 = 10" ANSI flange	61 = DN 250 Flange	

- 1) Housing number is indicated in space (1)
- 2) Filter grade is indicated in space (2)
- 3) Connection is indicated in space (3)
- 4) Multiple options are indicated in space (4).

Example 1: CFF20A11A is a configured filter with 20 scfm flow, grade A mechanical separator, 3/8" NPTF connection, and internal automatic drain.

Example 2: To order a Grade E High Efficiency Oil Removal filter with a capacity of 100 scfm (3/4" NPTF connections), integral automatic drain, differential pressure gauge, and liquid level indicator would be configured as: CFF100E15AGL

Example 3: A replacement element for a CFF100E15AGL filter is C100EE

## SIZING CORRECTION FACTORS

To find the maximum flow at pressures other than 100 psig [7 kgf/cm<sup>2</sup>], multiply the flow (from table above) by the Correction Factor corresponding to the minimum pressure at the inlet of the filter. Do not select filters by pipe size; use flow rate and operating pressure.

psig	20	30	40	60	80	100	125	150	175	200	250	300
kgf/cm <sup>2</sup>	1.4	2.1	2.8	4.2	5.6	7.0	8.8	10.6	12.3	14.1	17.6	21.1
Correction Factor	0.30	0.39	0.48	0.65	0.82	1	1.22	1.43	1.65	1.87	2.31	2.74

# Aftermarket Parts, Lubricants & Remanufactured Products

## Protect Your Investment in Champion

Only Champion can provide the assurance that your investment will maintain the productivity your business requires. Regular maintenance and service will ensure that you continue to enjoy the productivity and benefits that Champion products provide.

## Reliability

Only Champion can provide parts and services designed specifically with your business in mind. All parts and lubricants have been engineered to the highest standards and rigorously tested to meet the most stringent quality measures.

## Performance

Champion understands the importance of performance and efficiency to your business. Only Champion can provide factory certified parts that ensure your investment will continue to perform year after year with the same reliability and efficiency as when new.

## Ease of Doing Business

Only Champion can provide the peace of mind of turning to one supplier and one source for all aftermarket needs. Champion has the support network in place to handle all of your customer service, service and technical support where and when you need it.

## Value

Only Champion can provide high quality aftermarket parts and services for the life of your investment. Proper care of your investment is vital to the equipment's performance and efficiency. Rely on a trusted source – Champion.

For further assistance, contact your local authorized Champion distributor.

