CompAir®

# Condensate Treatment

Intelligent Air Technology

## Removing condensate from any compressed air system is vitally important. Even small quantities of condensate can have a significant and detrimental effect on downstream equipment and processes.

Condensate is always present when compressing air. Even the smallest system can produce large quantities of oily acidic condensate.

Removing condensate from any compressed air system is vitally important. Even small quantities can have a significant and detrimental effect on downstream equipment and processes.

Removal using drain valves is simple, however, most are purchased on their initial price with little thought to their maintenance and running costs.

The hidden cost with the most common drain types, lies within their operation to discharge expensive compressed air.

Air leaks are often the biggest single waste of energy associated with a compressed air system and are not always from piping, fittings or joints.

## Z Range of Condensate Drains

## The Simple, Economical Solution

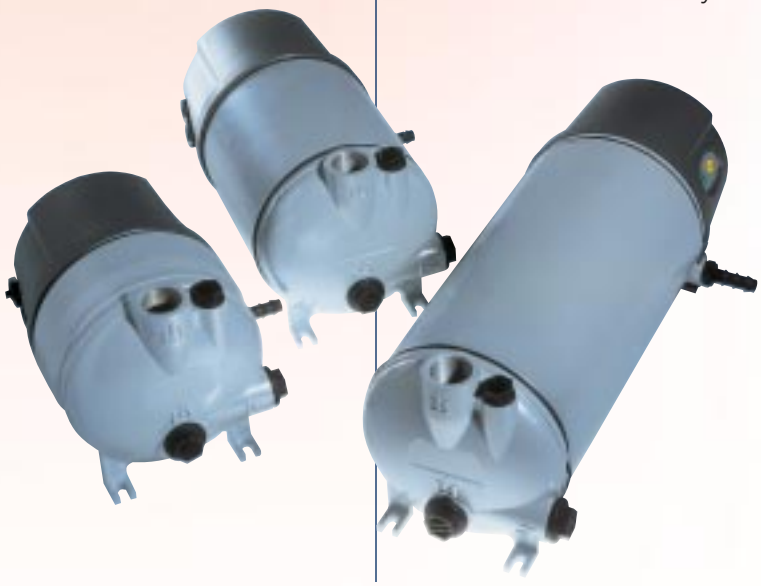
The **CompAir Z Range** electronic level sensing drains detect and discharge only when condensate is present. Intelligent operation always ensures that there is no unnecessary loss of valuable compressed air.

### The benefits are obvious

- Saves valuable compressed air
- Removes the risk of condensate carry-over from your separation and purification equipment
- Protects downstream equipment and processes from condensate carry-over
- Increases overall system reliability

The **CompAir Z Range** of condensate drains is clearly the most economic solution because they do not discharge valuable compressed air. The range of simple, reliable drains has no mechanical sensor parts. Intelligent capacitive sensing works with all types of compressed air condensate, including 100% oil, 100% water or any level of emulsification. **CompAir Z Range** condensate drains will even work with aggressive oil-free condensates because they are internally and externally corrosion protected. Operation is completely automatic and no adjustment for pressure is required.

**CompAir Z Range** condensate drains are the reliable, easy to install, cost-effective solution for condensate removal with a model to suit every system or application.



## The Models

### Z50

Designed as stand-alone drains and to complement the **CompAir** filters, water separators and small refrigeration dryers.

### Z100/Z300/Z1300/Z1700

Designed for higher condensate volumes as seen with compressor intercoolers, aftercoolers, air receivers, refrigeration dryers & large water separators.

# CompAir Z Condensate Drains - Reliable and Efficient

## Customer Benefits

- Saves valuable compressed air - saves air – saves energy – saves money.
- Removes liquid condensate efficiently - eliminates the risk of condensate carry-over.
- Protects downstream equipment and processes from condensate damage.
- Simple to install – multiple inlet design offers flexibility during installation.
- Long service intervals – when sized and installed correctly, the minimum maintenance period is 12 months.
- Simple, easy maintenance – maintenance can be carried out while system is running and without the need to remove the drain.
- Only one service kit to cover all models.
- Helps protect the environment – by using less electrical energy, $CO_2$ emissions from fossil fuel burning power stations are reduced.

## Standard Features

- Zero air loss – zero energy loss.
- No pilot air required – unfiltered pilot air used with diaphragm valves block easily. Direct operating valves are employed to eliminate problems and improve efficiency.
- Intelligent sensing system – operates with all compressor condensates.
- Maximum corrosion protection at no extra cost – standard models are suitable for all condensate types including aggressive oil-free condensate.
- NEMA/IP55 4 Ingress protection rating.
- Large inlet connections - prevent blockage and air locks when using single, top entry piping.
- Constantly rated electrical components increase reliability and prevent overheating problems.
- Designed to be suitable for use in tropical climates.
- Remote volt free alarm contacts indicate blockage, overflow and power loss.
- All models suitable for 115V & 230 V ac, 50/60 Hz operation.

## Special Features - Z300/Z1300/Z1700

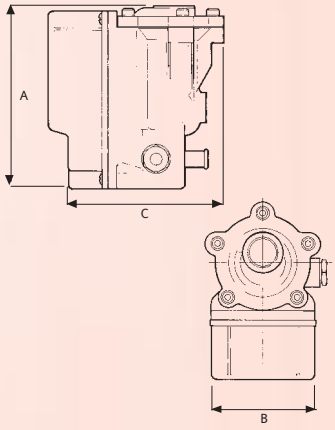
- Integral valve protection – these units incorporate a stainless steel strainer for valve protection. Large surface area and mesh size eliminate premature blocking.
- Easy mounting and installation – no additional mounting brackets required.
- Choice of outlet connection – push over or threaded connections available.
- Manual pressure relief - allows release of pressure in the event of a power loss.

## Optional Items

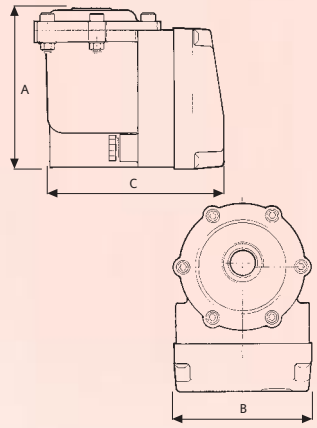
- In line strainer kit for Z50/Z100 when used with heavily contaminated, un-filtered condensate (eg air receivers).
- Simple adapter kits allow easy connection to CompAir filtration and separation products.

| Model | Dimensions inches (mm) | | | Weight lbs (kg) |
|---|---|---|---|---|
| | A | B | C | |
| Z50 | 4.6 (118.0) | 2.9 (75.13) | 4.6 (116.7) | 1.76 (0.8) |
| Z100 | 4.5 (114.0) | 3.9 (99.0) | 5.4 (138.0) | 1.98 (0.9) |
| Z300 | 5.6 (142.0) | 7.3 (186.3) | 5.5 (141.6) | 7.0 (3.2) |
| Z1300 | 5.6 (142.0) | 7.3 (186.3) | 5.5 (141.6) | 7.0 (3.2) |
| Z1700 | 5.6 (142.0) | 14.6 (371.8) | 5.5 (141.6) | 10.3 (4.7) |

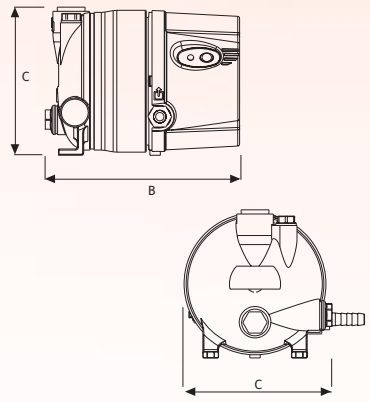
**Model Z50**




**Model Z100**




**Model Z300/Z1300/Z1700**



# Selection Criteria

The most important factors to consider when selecting condensate drains are the ambient conditions of the installation.

Correct product selection is critical for the operation of a condensate drain. Failure to correctly specify a condensate drain could result in condensate carry-over, air-locking and premature valve failure.

Capacities shown in this literature assume installation in two of the worlds major climatic conditions. Should the condensate drain be installed in conditions other than those shown, please contact your local CompAir approved distributor/agent for correct sizing.

An example of how atmospheric conditions affect selection:

A 100 psig, 100 scfm system operating in an ambient of 77°F, RH 65%, and with a discharge temperature of 95°F, will produce .5 gal/hr of condensate at the aftercooler alone.

Increasing the ambient temperature from 77°F to 95°F and the discharge temperature from 95°F to 113°F, will increase the condensate produced by a factor of 1.9 to .95 gal/hr.

Increasing the above temperatures and the relative humidity to 85% will increase the condensate produced by a factor of 2.7 to 1.3 gal/hr.

The addition of a refrigeration dryer to the system, further reduces the temperature and dewpoint and increases the condensate volume.

The result of a 2°C dewpoint can be seen on the previous calculations.

- .5 gal/hr becomes .7 gal/hr.
- .95 gal/hr becomes 1.04 gal/hr.
- 1.3 gal/hr becomes 1.7 gal/hr.

Therefore, a flow rate of 100 scfm can produce between .5 gal/hr and 1.7 gal/hr.

Each condensate drain model has a fixed condensate flowrate which cannot be exceeded.

The condensate drain must be de-rated to accomodate the extra condensate produced.

## Climate Condition 1

| | |
|---|---|
| Ambient Temperature at Compressor Inlet: | 77°F RH: 65% |
| Compressor Discharge Temperature: | 95°F |
| System Pressure: | 100 psig |

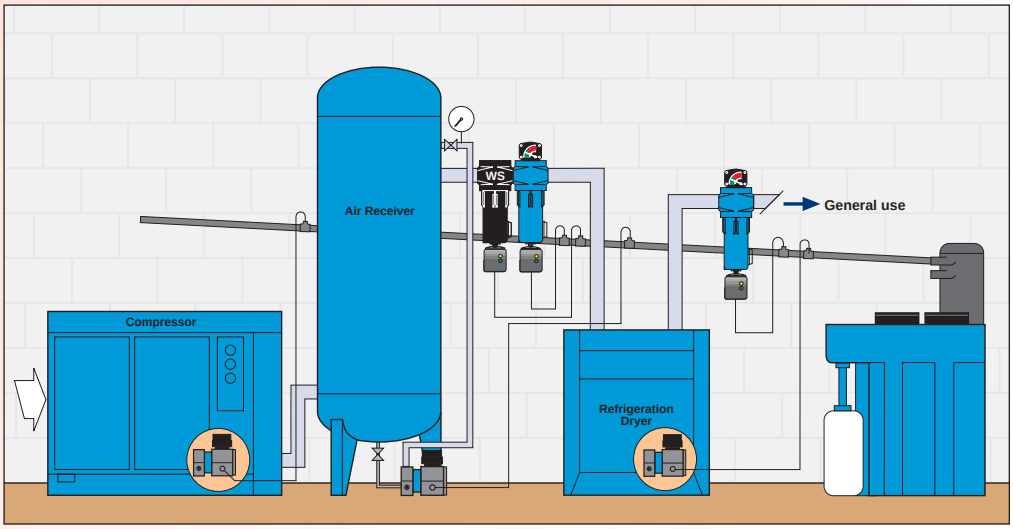
| Model | Compressed Air System Flow Rate scfm |
|---|---|
| Z50 | 185 |
| Z100 | 370 |
| Z300 | 1060 |
| Z1300 | 4542 |
| Z1700 | 6004 |

## Climate Condition 2

| | |
|---|---|
| Ambient temperature at Compressor Inlet: | 95°F RH: 85% |
| Compressor Discharge Temperature: | 113°F |
| System Pressure: | 100 psig |

| Model | Compressed Air System Flow Rate scfm |
|---|---|
| Z50 | 68 |
| Z100 | 136 |
| Z300 | 390 |
| Z1300 | 1690 |
| Z1700 | 2210 |

## Typical Installation




## Technical Specification

| Model | Connections | | Voltage AC | | Frequency (Hz) | Current/Power Consumption (Energized) | Fuse Rating | Operating Pressure | | Operating Temperature | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inlet | Outlet | Single Phase | Tol. | | | | Max | Min | Max | Min |
| Z50 NPT | 1 x 1/2<br>1 x 1/4 | (5/16") I/d hose | 115/230 | +10%<br>-10% | 50/60 | 115 V - 200mA - 26W<br>230 V - 140mA - 26W | 3A | 232 psig<br>16 bar g | 29 psig<br>2 bar g | 150°F<br>66°C | 36°F<br>2°C |
| Z100 NPT | 2 x 1/2 | (5/16") I/d hose | 115/230 | +10%<br>-10% | 50/60 | 115 V - 200mA - 26W<br>230 V - 140mA - 26W | 3A | 204 psig<br>14 bar g | 29 psig<br>2 bar g | 150°F<br>66°C | 36°F<br>2°C |
| Z300 NPT | 1 x 3/4<br>2 x 1/2 | 3/8 | 115/230 | +10%<br>-10% | 50/60 | 115 V - 250mA - 29W<br>230 V - 190mA - 44W | 3A | 232 psig<br>16 bar g | 29 psig<br>2 bar g | 150°F<br>66°C | 36°F<br>2°C |
| Z1300 NPT | 1 x 3/4<br>2 x 1/2 | 3/8 | 115 /230 | +10%<br>-10% | 50/60 | 115 V - 250mA - 29W<br>230 V - 190mA - 44W | 3A | 232 psig<br>16 bar g | 29 psig<br>2 bar g | 150°F<br>66°C | 36°F<br>2°C |
| Z1700 NPT | 1 x 3/4<br>2 x 1/2 | 3/8 | 115 /230 | +10%<br>-10% | 50/60 | 115 V - 250mA - 29W<br>230 V - 190mA - 44W | 3A | 232 psig<br>16 bar g | 29 psig<br>2 bar g | 150°F<br>66°C | 36°F<br>2°C |

Standard units supplied with NPT threaded connection. BSP connections also available.

## *Discharging oil contaminated condensate from compressed air systems is not only harmful to the environment, it is illegal.*

All compressed air systems contain water, dirt, rust and even degraded lubricating oil which all mix together to form unwanted compressed air condensate. This abrasive sludge collects in piping systems, filters, aftercoolers and dryers and must be efficiently removed before it brings your production process to an expensive standstill.

Efficient on-site disposal of compressed air condensate with **CompAir CS Range Oil/Water Separators**.

After the oily condensate has been removed from the compressed air system, it cannot be discharged without the oil content being reduced to legal disposal limits.

The simple, economical and environmental solution is a **CompAir** CS Range Oil/Water Separator.

Oil/water separators are installed as part of the compressed air system and simply reduce the oil concentration in the collected condensate. By reducing the oil concentration in water to a permitted level, this allows the larger volume of clean water, up to 99.9% of the total condensate, to be discharged safely into the environment. This leaves the relatively small amount of concentrated oil to be disposed of legitimately and economically.

## User Benefits

- Help to protect and maintain the environment.
- Efficiently separate oil and water on-site and dispose up to 99.9% of the condensate.
- Meet trade effluent discharge regulations.
- Rapid payback over conventional disposal methods.
- Simple to install, operate and maintain.

## Standard Features

- Large single piece units.
- Robust rotationally molded polyethylene construction.
- Ribs included for extra strength.
- Large centrifugal inlet chamber for effective venting of compressed air energy.
- Centrifugal inlet chamber has two inlet ports and four positions for ease of installation.
- Large, easily cleaned primary settlement chamber for the accumulation and removal of dirt particles.
- Large main settlement tank for increased settlement time and reduced oil carry-over to carbon stage.
- Large internal galleries reduce risk of internal blockage.
- Pre-filter for carbon bag protection.
- Large, carbon stage for increased contact time, improving water quality and extending carbon life.
- High specification carbon for improved service intervals.
- Optional flashing overflow indicator, or remote alarm contacts available.
- Adjustable oil outlet funnel for the efficient removal of separated oil.
- Sealed external oil container for easy disposal.
- Sample tap for easy testing of outlet water quality.

## Options

- Remote overflow alarm connection (CSOA).
- Overflow indicator (CSOI).
- Flow splitter available on request.

**This will also assist a company in achieving ISO 14000**

# Clean and Simple Operation

**CompAir** oil/water separators are designed to separate compressor oil from condensate without the use of external power.

The oil/water condensate should be removed from the compressed air system using a drainage method appropriate for the unit.

Condensate from the system will enter the oil/water separator under pressure and is allowed to expand in the specially designed centrifugal inlet chamber.

Liquid will drop out of the air stream as it impinges on the chamber walls and the vortex generator, draining without turbulence into the primary settlement chamber below.

Dirt particles suspended in the condensate will settle to the bottom of the primary settlement chamber and the accumulating condensate will then flow into the main settlement tank.

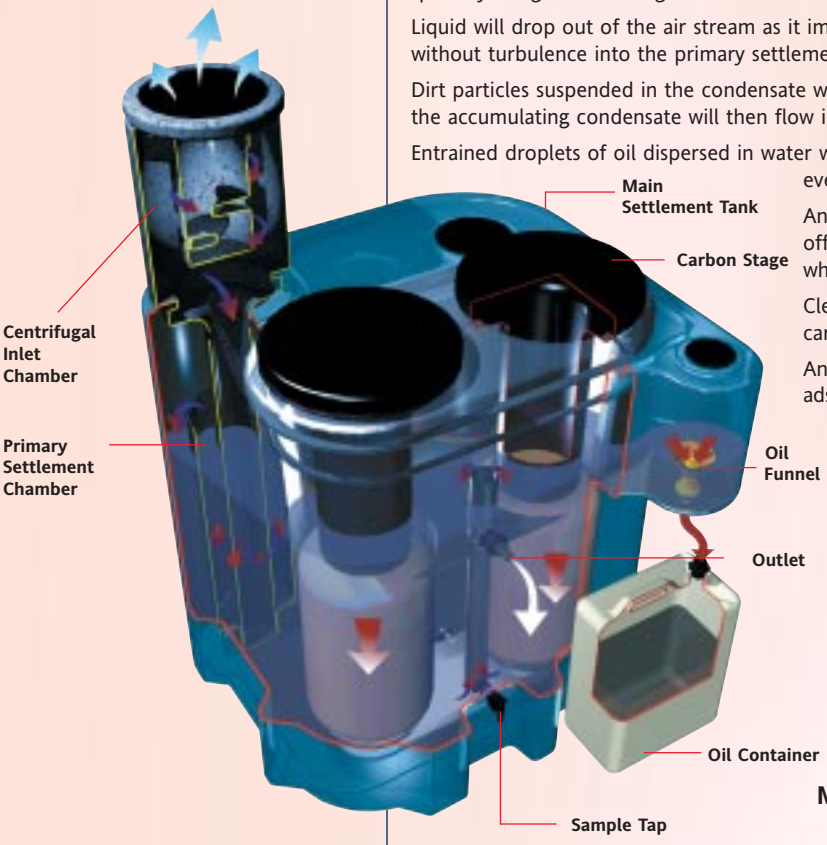
Entrained droplets of oil dispersed in water will rise to the surface due to the lower specific gravity of the oil, eventually coalescing to form a thick layer on the surface.

An adjustable oil funnel allows the oil to be continuously skimmed off the surface. Drained oil is collected in the external oil container where it can be disposed of according to legal requirements.

Clean water taken from the bottom of the tank, flows into the carbon stage, through a pre-filter, into the top of the carbon bags.

Any entrained droplets of oil remaining are then removed by adsorption.

The cleaned water can now be safely discharged through the outlet.



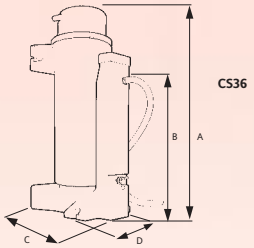

**KEY:**

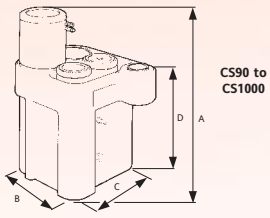
- AIR
- OIL/WATER
- OIL/CLEAN WATER
- CLEAN WATER
- OIL

**Model CS2600 sectional view of main settlement tank with twin carbon bags**

## Technical Specifications

| Model | | CS2100 | CS2150 | CS2200 | CS2300 | CS2400 | CS2500 | CS2600 |
|---|---|---|---|---|---|---|---|---|
| Inlet Hose Connection | | 1 x ½" & 1 x ¼" | 1 x ½" & 1 x ¼" | 1 x ½" & 1 x ¼" | 1 x ½" & 3 x ¼" | 1 x ½" & 3 x ¼" | 1 x ½" & 3 x ¼" | 1 x ½" & 3 x ¼" |
| Outlet Hose Connection (I/D) | | ¾" | 1" | ¾" | 1" | 1" | 1" | 1" |
| Settlement Tank Capacity | | N/A | 16 US G | 20 US G | 33 US G | 49 US G | 94 US G | 128 US G |
| | | N/A | 60 L | 75 L | 125 L | 185 L | 355 L | 485 L |
| Max. Pressure | | 232 psig (16 bar g) | | | | | | |
| Min/Max Temperature | °F | 41 - 95 | 41 - 95 | 41 - 95 | 41 - 95 | 41 - 95 | 41 - 95 | 41 - 95 |
| | °C | 5 - 35 | 5 - 35 | 5 - 35 | 5 - 35 | 5 - 35 | 5 - 35 | 5 - 35 |
| Material (Re-cyclable) | | Polyethylene | | | | | | |
| Weight | Empty lbs (kg) | 13 (6) | 22 (10) | 26 (12) | 59 (27) | 79 (36) | 154 (70) | 214 (97) |
| | Full lbs (kg) | 54 (24.5) | 172.7 (78.5) | 206 (93.5) | 350 (159) | 477 (217) | 880 (400) | 1210 (550) |
| Dimensions inches (mm) | A | 33 (842) | 32 (810) | 32 (803) | 47 (1195) | 47 (1195) | 60 (1535) | 60 (1535) |
| | B | 21.6 (550) | 14 (14) | 14 (350) | 26 (650) | 26 (650) | 34 (860) | 34 (860) |
| | C | 12.4 (316) | 17 (433) | 18 (450) | 20 (500) | 26 (650) | 28 (700) | 39 (1000) |
| | D | 10.6 (270) | 26.6 (675) | 27 (675) | 30 (750) | 30 (750) | 43 (1090) | 43 (1090) |




## Easy Maintenance

Pre-filter and activated carbon filter bag(s) should be replaced when tests show that the oil concentration in the water outlet has exceeded local limits.

| Model No | Replacement Carbon Pack | Quantity Required | Replacement Vent Filter | Qty |
|---|---|---|---|---|
| CS2100 | CSCP1 | 1 | CSVF1 | 1 |
| CS2150 | CSCP1 | 1 | CSVF1 | 1 |
| CS2200 | CSCP1 | 1 | CSVF1 | 1 |
| CS2300 | CSCP2 | 1 | CSVF2 | 1 |
| CS2400 | CSCP2 | 2 | CSVF2 | 1 |
| CS2500 | CSCP3 | 1 | CSVF2 | 1 |
| CS2600 | CSCP3 | 2 | CSVF2 | 1 |

# Selection Criteria and Product Selection

**Important Note:**
Additives blended into the lubricants to prevent bacterial growth, rusting, corrosion and to promote emulsification, such as detergents etc., can have an impact on the separating process. Static oil/water separators are unable to separate stable emulsions or oils that are miscible in water. Additionally, these units will not completely separate lubricants containing: emulsifying agents; glycol additives; or polyglycol based coolants.

## Systems Conditions

| | | | | |
|---|---|---|---|---|
| Ambient Temperature at Compressor Inlet: | 70°F (21°C) | Refrigeration Dryer Dewpoint: | 36°F (2°C) | (For conditions other than those shown, e.g. higher ambient temperatures, please contact **CompAir**) |
| Relative Humidity: | 65% | System Pressure: | 102 psig (7 bar g) | |
| Compressor Discharge Temperature: | 95°F (35°C) | | | |

| No Refrigeration Dryer Installed in System | | OIL TYPE | | |
|---|---|---|---|---|
| | | Band A Turbine, Additive Free | Band B Mineral, PAO, TMP, PE | Band C Diesters, Triesters, PAG |
| **Compressor Type** | **Model** | **cfm** | **cfm** | **cfm** |
| | CS2100 | 87 | 73 | 60 |
| Rotary Screw, Vane | CS2150 | 138 | 117 | 95 |
| | CS2200 | 212 | 181 | 147 |
| | CS2300 | 441 | 375 | 305 |
| | CS2400 | 822 | 750 | 610 |
| | CS2500 | 1174 | 1000 | 812 |
| | CS2600 | 2352 | 2000 | 1626 |

| Refrigeration Dryer Installed in System | | OIL TYPE | | |
|---|---|---|---|---|
| | | Band A Turbine, Additive Free | Band B Mineral, PAO, TMP, PE | Band C Diesters, Triesters, PAG |
| **Compressor Type** | **Model** | **cfm** | **cfm** | **cfm** |
| | CS2100 | 65 | 55 | 45 |
| | CS2150 | 103 | 88 | 71 |
| | CS2200 | 159 | 135 | 110 |
| Rotary Screw, Vane | CS2300 | 330 | 281 | 228 |
| | CS2400 | 660 | 561 | 456 |
| | CS2500 | 879 | 749 | 607 |
| | CS2600 | 1761 | 1497 | 1217 |

The sizing guidelines are based upon an ambient inlet temperature to the compressor of 70°F (21°) and a relative humidity of 655 For all other operating conditions use the correction factor tables below to properly size the separator.

### Correction factor for ambient temperature at the compressor inlet in degrees F.

| Temp | 40°F | 50°F | 60°F | 70°F | 80°F | 90°F | 100°F | 110°F | 120°F |
|---|---|---|---|---|---|---|---|---|---|
| | 4°C | 10°C | 16°C | 21°C | 27°C | 32°C | 38°C | 43°C | 49°C |
| Factor | 2.82 | 1.96 | 1.39 | 1.00 | 0.73 | 0.54 | 0.40 | 0.31 | 0.22 |

### Correction factor for relative humidity of the ambient air at the compressor inlet

| RH | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% | 100% |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Factor | 1.30 | 1.18 | 1.08 | 1.00 | 0.93 | 0.87 | 0.81 | 0.76 | 0.72 | 0.68 | 0.65 |

For systems using 1 or 2 stage piston/reciprocating compressors multiply compressor flow by 1.4 and selector separator from screw compressor flow rates shown, ensuring due consideration is given to oil type.
For 3 or 4 stage piston/reciprocating compressors, please contact **CompAIr**.

There are many factors that play a part in the selection of a static oil/water separator with ambient conditions of the installation site being the most important.

Correct selection is critical for the operation of oil/water separators. Increased condensate flow through an oil/water separator reduces settlement time in the main tank, increases oil carry-over to the carbon stage and reduces contact time with the carbon. The overall effect of incorrect sizing is poor outlet water quality, reduced carbon filter life and the potential for overflowing.

Should the oil/water separator be installed in conditions other than those shown, please contact your local **CompAir** outlet or approved distributor/agent for correct sizing.

Due to the diversity of lubricants used in modern compressors, it would be difficult to make specific recommendations on their individual performance of separation from condensate. Generally air compressor lubricants fall into one of the following classifications:

- Mineral
- Poly Alpha Olefins (PAO)
- Trimethylolpropane Ester (TMP)
- Pentaerythrityl Ester (PE)
- Diesters
- Triesters
- Polyoxyalkylene Glycol (PAG)
- Automatic Transmission Fluid (ATF)

To simplify the selection, lubricant classifications have been split into three bands depending upon their ability to separate within a static type oil/water separator.

**Band A:** Turbine Oil, Additive Free Oil

**Band B:** Mineral, Poly Alpha Olefins (PAO) Trimethylolpropane Ester (TMP), Pentaerythrityl Ester (PE)

**Band C:** Diesters, Triesters, Polyoxyalkylene Glycol (PAG)

Inseparable using Static Separation Techniques: Automatic Transmission Fluid (ATF)

# Intelligent Air Technology

## Compressed air solutions for every application

### Compressors

3-1520 cfm
1-350 HP

### Lubricated

Rotary Vane

Single Stage Screw

Speed Regulated Screw

Piston

Portable

### Oil-Free

Two Stage Screw

Water-Sealed Screw

Piston

Portable

### Complete Accessories Program

Filters and Dryers

Cooling Systems

Heat Recovery

Condensate Management

Air Receivers

Multi-Set Controllers

Lubricants

### Value Added Services

Air Audit

Performance Reporting

Utility Air

Performance Contracting

### Complete Service for Compressed Air Technology

Engineering of Complete Compressor Stations

Local Service Centers

Guaranteed Parts Availability

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