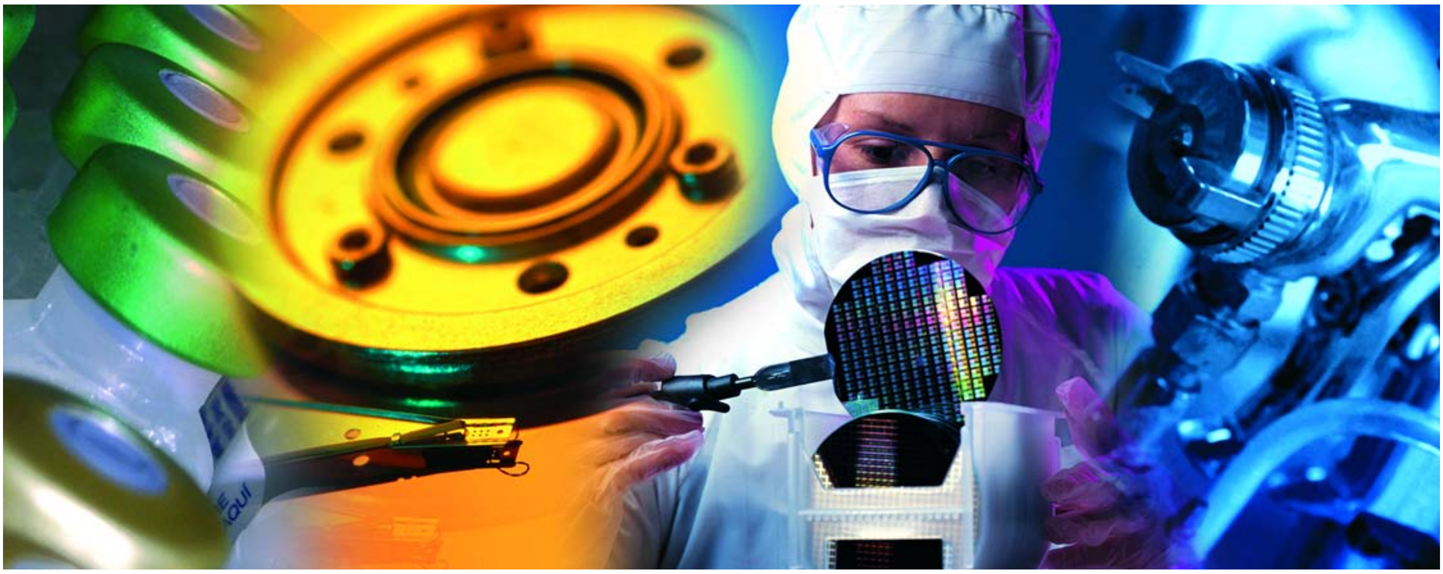
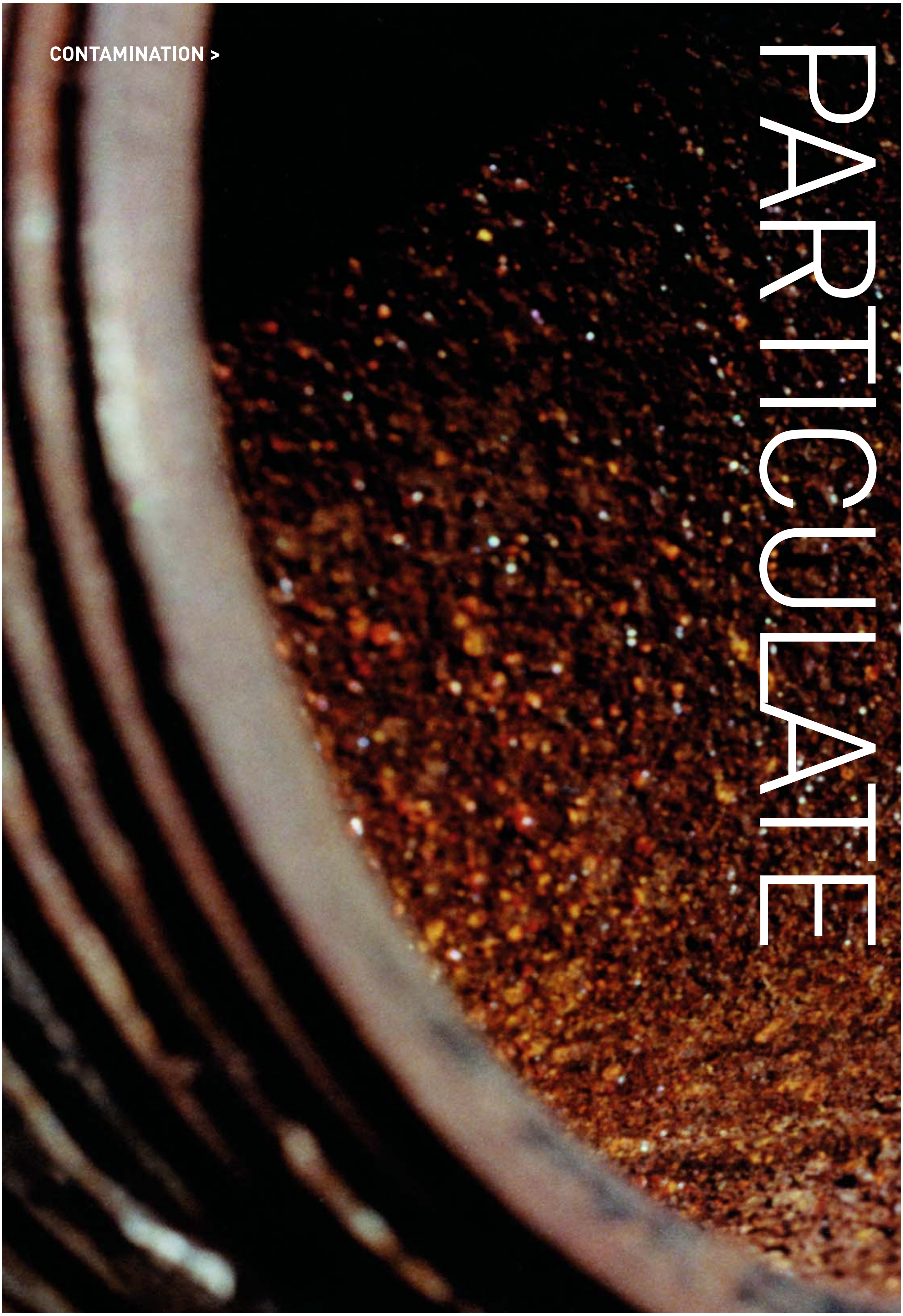


HIGH QUALITY COMPRESSED AIR FROM GENERATION TO APPLICATION

A GUIDE TO THE ISO 8573 AND ISO 12500 SERIES OF COMPRESSED AIR QUALITY STANDARDS

PARTICULATE



TO UNDERSTAND THE NEED FOR AN INTERNATIONAL STANDARD IN COMPRESSED AIR QUALITY, WE MUST FIRST OF ALL UNDERSTAND THE PROBLEMS ASSOCIATED WITH COMPRESSED AIR CONTAMINATION, THE SOURCES OF CONTAMINATION AND THE INDIVIDUAL CONTAMINANTS FOUND WITHIN A COMPRESSED AIR SYSTEM.

Sources of contamination in a compressed air system

Contaminants in a compressed air system can generally be attributed to the following:

- **The quality of the atmospheric air drawn into the compressor**

  There are ten main contaminants found within a compressed air system and almost all can be directly attributed to the quality of the atmospheric air surrounding the compressor. Air compressors draw in huge amounts of this ambient air, continuously filling the system with contamination.

- **The type and operation of the air compressor**

  The air compressor can also add contamination, from wear and tear particles to coolants and lubricants.

- **Compressed air storage devices and distribution systems**

  The air receiver and system piping that distributes the compressed air around the facility will also store the large amounts of contamination drawn into the compressor. Additionally, they cool the warm, moist compressed air which causes condensation on a large scale and promotes corrosion within the compressed air system.

The 10 main contaminants found in a compressed air system

Water Vapour, Condensed Water and Water Aerosols

Up to 99.9% of the total liquid contamination found in a compressed air system is water. Oil is often perceived to cause the most problems as it appears to be seen emanating from open drain points and exhausting valves, however, in the majority of instances, it is actually oily condensate (oil mixed with water) that is being observed.

Atmospheric air contains water vapour (water in a gaseous form). The ability of compressed air to hold water vapour is dependent upon its temperature. The higher the temperature, the more water vapour that can be held by the air. During compression, the temperature increases significantly, which allows the heated air to easily retain the incoming moisture.

Prior to exiting the compressor, compressed air is normally cooled to a usable temperature. This reduces the air's ability to retain water vapour, resulting in a proportion of the water vapour being condensed into liquid water which is removed by a condensate drain fitted to the compressor after-cooler. The air leaving the after-cooler is now 100% saturated with water vapour and any further cooling of the air will result in more water vapour condensing into liquid water.

Condensation occurs at various stages throughout the system as the air is cooled further by the air receiver, piping and the expansion of air in valves, cylinders, tools and machinery. The condensed water and water aerosols cause corrosion to the storage and distribution system, damage production equipment and can also spoil the end product. Overall, water contamination reduces production efficiency and increases maintenance costs and must be removed to enable the system to run correctly and efficiently.

Atmospheric Dirt

Atmospheric air in an industrial environment typically contains 140 million dirt particles for every cubic metre of air. 80% of these particles are less than 2 microns in size and are too small to be captured by the compressor intake filter, therefore passing directly into the compressed air system.

Micro-organisms

Bacteria and viruses will also be drawn into the compressed air system through the compressor intake and warm, moist air provides an ideal environment for the growth of micro-organisms. Ambient air can typically contain around 3800 micro-organisms per cubic metre. If only a few micro-organisms were to enter a clean, sterile environment, or production process, enormous damage could be caused that not only diminishes product quality, but may even render a product entirely unfit for use and subject to recall.

Oil Vapour

Atmospheric air also contains oil in the form of unburned hydrocarbons which are drawn into the compressor intake. Typical concentrations can vary between 0.05 and 0.5mg per cubic metre of ambient air. Once inside the compressed air system, oil vapour will cool and condense, causing the same contamination issues as liquid oil. Vaporised oil from the compression stage of a lubricated compressor will also condense within the system and add to the overall oil contamination

Liquid Oil and Oil Aerosols

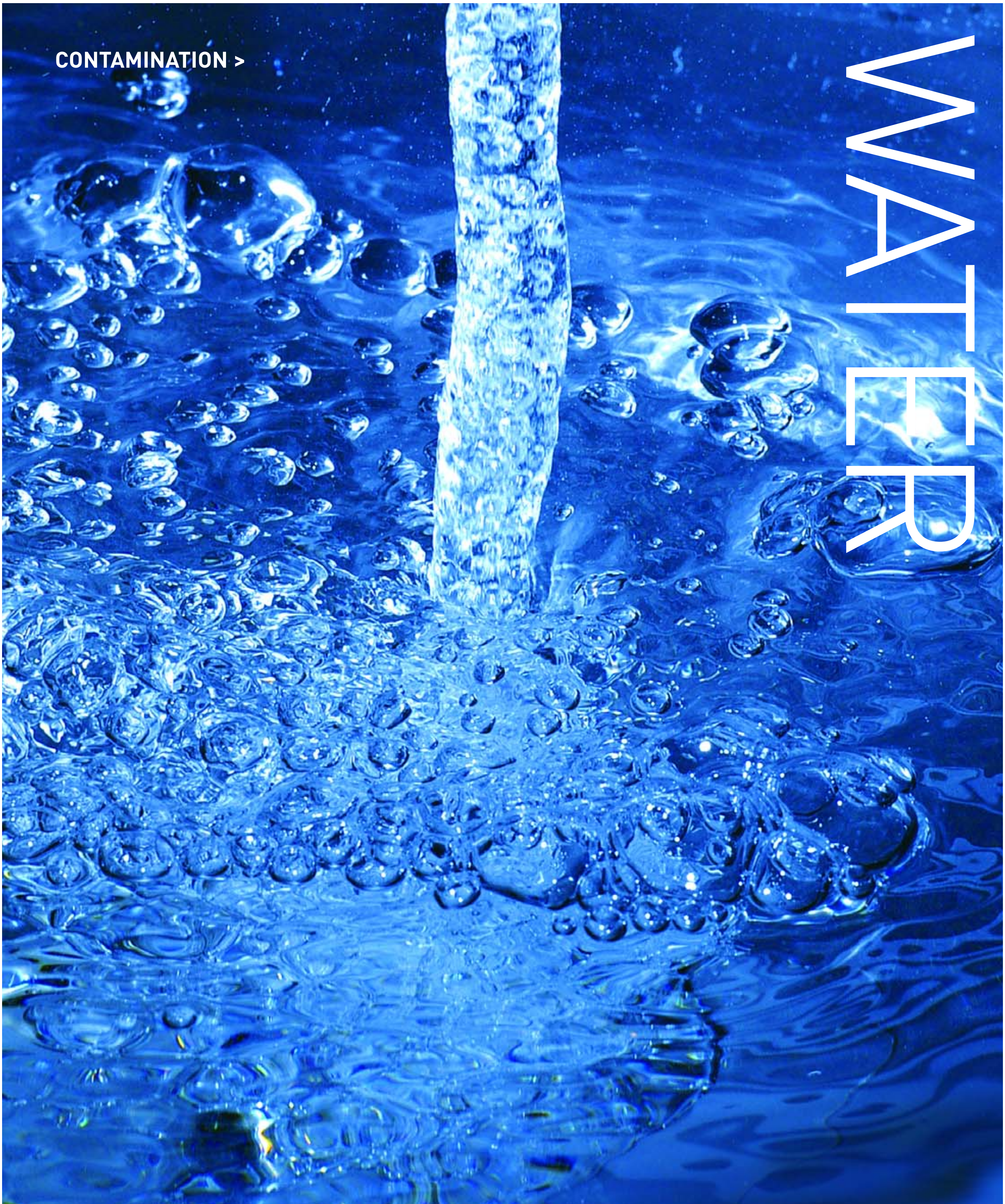
Most air compressors use oil in the compression stage for sealing, lubrication and cooling. During operation, lubricating oil is carried over into the compressed air system as liquid oil and aerosols. This oil mixes with water in the air and is often very acidic, causing damage to the compressed air storage and distribution system, production equipment and final product.

Rust and Pipescale

Rust and pipescale can be found in air receivers and the piping of "wet systems" (systems without adequate purification equipment) or systems which were operated "wet" prior to purification equipment being installed. Over time, this contamination breaks away to cause damage or blockage in production equipment which can also contaminate final product and processes.

CONTAMINATION >

WATER



How much water can be found in a typical compressed air system?

The amount of water in a compressed air system is staggering. A small 2.8m^3/min (100 cfm) compressor and refrigeration dryer combination, operating for 4000 hours in typical Northern European climatic conditions can produce approximately 10,000 litres or 2,200 gallons of liquid condensate per year.

If the compressor is oil lubricated with a typical 2 mg/m^3 (2ppm) oil carryover, then although the resulting condensate would visually resemble oil, oil would in fact account for less than 0.1% of the overall volume and it is this resemblance to oil to which a false association is made.

The example above is illustrated by the use of a small compressor to highlight the large volume of condensate produced. If a compressed air system was operated in warmer, more humid climates, with larger compressors, or run for longer periods, the volume of condensate would increase significantly.

COMPRESSED AIR AND IT'S PURIFICATION

HAVING IDENTIFIED THE DIFFERENT TYPES OF CONTAMINATION THAT CAN BE FOUND WITHIN A COMPRESSED AIR SYSTEM, WE CAN NOW EXAMINE THE PURIFICATION TECHNOLOGIES AVAILABLE FOR IT'S REMOVAL.

Coalescing Filters

Coalescing filters are probably the most important items of purification equipment in any compressed air system. They are designed to remove oil and water aerosols using mechanical filtration techniques and have the additional benefit of removing solid particulate to very low levels (as small as 0.01 micron in size).

Installed in pairs, most users believe one to be an oil removal filter and the other to be a particulate filter. Infact, the pair of filters both perform the same function. The first filter, a general purpose filter is used to protect the high efficiency filter against bulk contamination. This 'dual filter' installation ensures a continuous supply of high quality compressed air with low operational costs and minimal maintenance time.

Water Separators

Used to protect coalescing filters in systems where excessive cooling takes place in distribution piping. Water Separators will remove in excess of 90% of bulk liquid contamination.

Adsorption (Desiccant) Dryers

Water vapour is water in a gaseous form and is removed from compressed air using a dryer, with dryer performance being measured as pressure dewpoint.

Adsorption or desiccant dryers remove moisture by passing air over a regenerative adsorbent material which strips the moisture from the air. This type of dryer is extremely efficient and typical pressure dewpoint ratings are -40°C or -70°C pdp. This means that for water vapour to condense into a liquid, the air temperature would have to drop below -40°C or -70°C respectively (the actual air temperature after an adsorption dryer is not the same as it's dewpoint).

A pressure dewpoint of -26°C or better will not only prevent corrosion, but will also inhibit the growth of micro-organisms within the compressed air system.

Refrigeration Dryers

Refrigeration dryers work by cooling the air, so are limited to positive pressure dewpoint ratings to prevent freezing of the condensed liquid. Typically used for general purpose applications, they provide pressure dewpoints of +3°C, +7°C or +10°C. Refrigeration dryers are not suitable for installations where piping is installed in ambient temperatures below the dryer dewpoint i.e. systems with external piping.

Important Note Regarding Compressed Air Dryers

As adsorption and refrigeration dryers are designed to remove only water vapour and not water in a liquid form, they require the use of coalescing filters to work efficiently.

Adsorption (Activated Carbon) Filters

Oil vapour is oil in a gaseous form and as with water vapour will pass through a coalescing filter just as easily as the compressed air. Therefore, oil vapour removal filters must be employed as these provide a large bed of activated carbon adsorbent for the effective removal of oil vapour, providing the ultimate protection against oil contamination.

Dust Removal Filters

Dust removal filters are used for the retention of particulates where no liquid is present. They usually provide identical particulate removal performance to the equivalent coalescing filter and use the same mechanical filtration techniques to provide up to 99.9999% particle removal efficiency. For absolute particulate retention (100% at a given size), a sieve retention membrane filter must be used.

Micro-biological (Sterile) Filters

Absolute removal of solid particulates and micro-organisms is performed by a sieve retention or membrane filter. They are often referred to as sterile air filters as they also provide sterilised compressed air. Housings are manufactured from stainless steel to allow in-situ steam sterilisation of the filter housing and element. It is important to note that the piping between the sterile filter and the application must also be cleaned and sterilised on a regular basis.

Contamination and Types of Compressor

It is often believed that the level of compressed air purification equipment required in a system is dependent upon the type of compressor used. Contamination in a compressed air system originates from many sources and is not related solely to the compressor or it's lubricants. No matter which compressor type is selected, adequate filtration and separation products will be required to remove the large volume of oily contaminated water as well as the dirt, rust, pipescale and micro-biological contamination in the system.

Coalescing and dust removal filters

Sterile air filters

Modular adsorption dryers

Refrigeration dryers

Oil vapour removal filters

CONTAMINATION >

ISO 8573 – COMPRESSED AIR QUALITY STANDARDS

ISO 8573 IS THE GROUP OF INTERNATIONAL STANDARDS RELATING TO THE QUALITY OF COMPRESSED AIR AND CONSISTS OF NINE SEPARATE PARTS. PART 1 SPECIFIES THE QUALITY REQUIREMENTS OF THE COMPRESSED AIR AND PARTS 2 – 9 SPECIFY THE METHODS OF TESTING FOR A RANGE OF CONTAMINANTS.

ISO 8573.1 : 2001 is the primary document used from the ISO 8573 series and it is this document which allows the user to specify the air quality or purity required at key points in a compressed air system.

Within ISO 8573.1 : 2001 purity levels for the main contaminants are shown in separate tables, however for ease of use, this document combines all three into one easy to understand table.

The horizontal headings show the three major contaminants of solid particulate, water and oil, vertical headings show "purity classes" identified by a number.

Alongside each purity class, is a maximum permissible amount of contamination allowed per cubic metre of compressed air.

ISO 8573-1:2001 CLASS	Solid Particulate					Water		Oil
	Maximum number of particles per m^3			Particle Size micron	Concentration mg/m^3	Vapour Pressure Dewpoint	Liquid g/m^3	Total Oil (aerosol liquid and vapour) mg/m^3
	0.1 - 0.5 micron	0.5 - 1 micron	1 - 5 micron					
0	As specified by the equipment user or supplier					As specified by the equipment user or supplier		As specified by the equipment user or supplier
1	100	1	0	-	-	-70°C	-	0.01
2	100,000	1,000	10	-	-	-40°C	-	0.1
3	-	10,000	500	-	-	-20°C	-	1
4	-	-	1,000	-	-	+3°C	-	5
5	-	-	20,000	-	-	+7°C	-	-
6	-	-	-	5	5	+10°C	-	-
7	-	-	-	40	10		0.5	-
8	-	-	-	-	-		5	-
9	-	-	-	-	-		10	-

Specifying Air Purity In Accordance With ISO 8573.1 : 2001

When specifying the purity of air required, the standard must always be referenced, followed by the purity class selected for each contaminant (a different purity class can be selected for each contaminant if required). An example of how to write an air quality specification is shown below :

ISO 8573.1 : 2001 Class 1.2.1
ISO 8573.1 : 2001 refers to the standard document and its revision, the three digits refer to the purity classifications selected for solid particulate, water and total oil. Selecting an air purity class of 1.2.1 would specify the following air quality when operating at the standard's reference conditions :

Class 1 Particulate
In each cubic metre of compressed air, no more than 100 particles in the 0.1 - 0.5 micron size range are allowed
In each cubic metre of compressed air, no more than 1 particle in the 0.5 - 1 micron size range is allowed
In each cubic metre of compressed air, no particles in the 1 - 5 micron size range are allowed

Class 2 Water
A pressure dewpoint of -40°C or better is required and no liquid water is allowed.

Class 1 Oil
In each cubic metre of compressed air, not more than 0.01mg of oil is allowed. This is a combined level for both oil aerosol and oil vapour.

ISO 8573.1 : 2001 CLASS 0

THE ISO 8573.1 : 2001 TABLE ALSO INCLUDES A CLASS 0 FOR EACH TYPE OF CONTAMINANT. SHOULD AN APPLICATION REQUIRE COMPRESSED AIR PURITY WHICH IS HIGHER THAN THE LEVELS SHOWN FOR CLASS 1, THEN CLASS 0 ALLOWS THE USER AND AN EQUIPMENT MANUFACTURER OR SUPPLIER TO AGREE THEIR OWN LEVELS WITHIN THE FOLLOWING GUIDELINES

- THE PURITY LEVELS SELECTED MUST BE MORE STRINGENT THAN THOSE OF CLASS 1
- THE PURITY LEVELS SELECTED ARE MEASURABLE WITH THE TEST EQUIPMENT AND METHODS OF ISO 8573 PARTS 2 TO 9
- THE AGREED LEVELS ARE WRITTEN AS PART OF THE AIR QUALITY SPECIFICATION

IMPORTANT NOTES

- CLASS 0 DOES NOT MEAN ZERO CONTAMINATION ALLOWED IN THE COMPRESSED AIR.
- MANUFACTURERS SHOULD NOT STATE PRODUCTS COMPLY WITH CLASS 0 UNLESS PURITY LEVELS HAVE CLEARLY BEEN DEFINED AND AGREED WITH THE USER.
- PURITY LEVELS BEYOND THE ACCURATE MEASUREMENT CAPABILITIES GIVEN IN ISO 8573 PARTS 2 TO 9 SHOULD NOT BE SELECTED AS THERE IS NO ACCURATE WAY OF VERIFYING PRODUCT PERFORMANCE
- TO OPERATE A COST EFFECTIVE COMPRESSED AIR SYSTEM, CLASS 0 SHOULD ONLY BE SPECIFIED AT THE POINT OF USE AND FOR THE MOST CRITICAL OF APPLICATIONS

MICRO-ORGANISMS

TESTING AND VALIDATION

OF THE NINE PARTS THAT MAKE UP ISO 8573, PARTS 2 TO 9 ARE USED TO SPECIFY THE METHODS AND EQUIPMENT REQUIRED TO ACCURATELY TEST FOR CONTAMINANTS IN COMPRESSED AIR.

On-site testing using ISO 8573 Test Methods

On-site testing is often difficult due to the complexity of the test method and the expense of test equipment required and for this reason all CompAir filtration products have been tested in accordance with the relevant parts of ISO 8573 with performance independently validated by Lloyds Register, one of the world's largest risk management organisations.

Using the standards to select and purchase purification products

Presenting product data in this way should allow users to easily compare the performance of purification products from different manufacturers and cost effectively meet the air quality requirements of their application, however the ISO 8573 test methods were primarily developed to verify air quality in a compressed air system, not test purification equipment, therefore not all products claiming compliance with the standards are tested in the same way.

To accurately detect contaminants in a compressed system and show compliance with the selected purity levels from ISO 8573.1, the equipment and methods shown in ISO 8573 parts 2 to 9 must be used.

These test methods can also be used to test the performance of purification equipment, however for this purpose, they contain a major omission, one which makes comparison and selection of compressed air filters extremely difficult for the user.

The vital piece of information which is missing when testing products is a challenge concentration. So even though different manufacturers claim their products meet a certain purity class, they will most likely have been tested with differing concentrations of contamination entering the product and as challenge concentrations are rarely included in technical data, filter performance which may look similar or identical on paper, can provide significantly different results when installed in a compressed air system.

Introducing ISO 12500

The ISO 8573 air quality standards were introduced to assist, not confuse compressed air users, so to overcome the problems associated with selecting products, a new standard has been introduced. This will complement the existing ISO 8573 series. The new standard, ISO 12500, will consist of three parts, with ISO 12500.1 covering the testing of compressed air coalescing filters for oil aerosol (liquid) removal, ISO 12500.2 to determine the adsorption capacity of oil vapour removal filters and ISO 12500.3 covering the testing of solid particulate filters. Parts one and two were released in June 2007, with part three to follow.

ISO 12500.1 – Testing of Coalescing Filters

ISO 12500.1 has introduced two challenge concentrations of oil aerosol to be used when testing coalescing filters, these are 40mg/m^3 and 10mg/m^3. The new standard requires filters to be tested using the existing test method and equipment shown in ISO 8573.2 whilst using one of the two challenge concentrations.

In addition to this, ISO 12500.1 requires filters to be "wetted out" which is representative of a filter in operation. Recording of the filters initial saturated pressure drop has also been included, again to give a more accurate and representative indication of the filters operational costs.

Three filters of each size must be tested and each filter tested three times. Published performance data is then an average of all the tests in order to provide the person selecting a new product with a more representative indication of performance.

ISO 12500.2 – Testing of Adsorption Filters

ISO 12500.2 has been introduced to assist users when selecting oil vapour removal filters or adsorption filters. Adsorption filters have a finite ability to remove oil vapour and when their capacity is used up, they must be replaced. ISO 12500.2 is an accelerated test of a filters adsorption capacity.

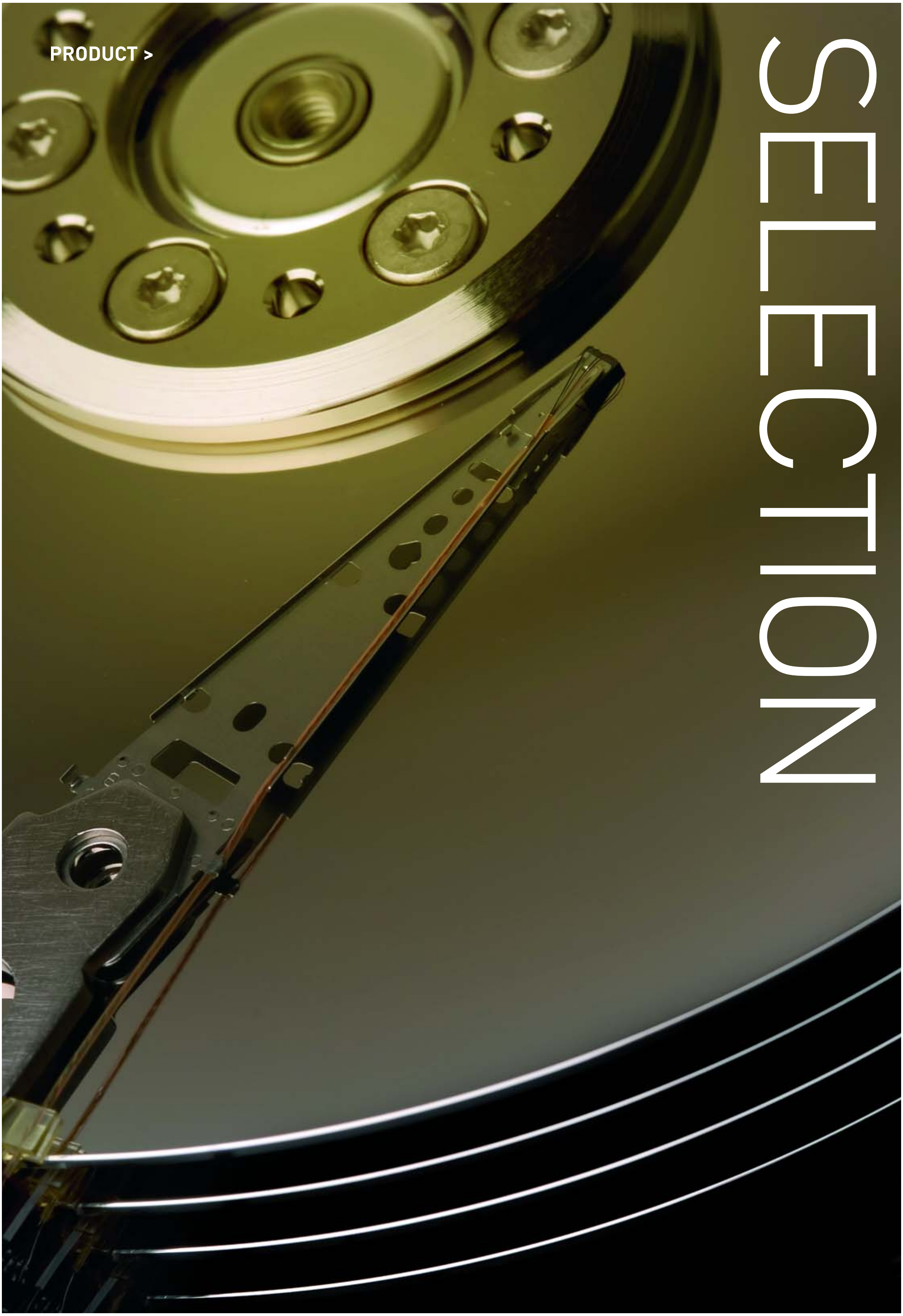
As the test is accelerated, the results must not be misinterpreted as the actual lifetime of the filter element or cartridge, it's purpose is to indicate which filter has the largest adsorption capacity and hence will require changing less frequently.

ISO 12500.3 – Testing of Particulate Removal Filters

ISO 12500.3 is not currently released.

PRODUCT >

SELECTION



ARE ALL COMPRESSED AIR FILTERS AND DRYERS THE SAME?

COMPRESSED AIR PURIFICATION EQUIPMENT IS ESSENTIAL TO ALL MODERN PRODUCTION FACILITIES. IT MUST DELIVER UNCOMPROMISING PERFORMANCE AND RELIABILITY WHILST PROVIDING THE RIGHT BALANCE OF AIR QUALITY WITH THE LOWEST COST OF OPERATION. TODAY, MANY MANUFACTURERS OFFER PRODUCTS FOR THE FILTRATION AND PURIFICATION OF CONTAMINATED COMPRESSED AIR, WHICH ARE OFTEN SELECTED ONLY UPON THEIR INITIAL PURCHASE COST, WITH LITTLE OR NO REGARD FOR THE AIR QUALITY THEY PROVIDE OR THE COST OF OPERATION THROUGHOUT THEIR LIFE. WHEN PURCHASING PURIFICATION EQUIPMENT, THE DELIVERED AIR QUALITY, COST OF OPERATION AND THE OVERALL COST OF OWNERSHIP MUST ALWAYS BE CONSIDERED.

Air Quality

Compressed air purification equipment is installed to deliver high quality, clean dry air, and to eliminate the problems and costs associated with contamination. When selecting this type of equipment, the delivered air quality and the verification of performance must always be the primary driver, otherwise why install it in the first place.

CompAir were instrumental in the development of the international standards for compressed air quality and CFN is the first filter range specifically designed to comply with the stringent requirements of ISO 12500.1.

Energy Efficiency

After air quality, the next consideration when selecting compressed purification equipment is the cost of operation. Pressure loss is the major contributor to operational costs of filtration products. CompAir CFN filters have been designed using aerospace technology to ensure pressure loss and thus energy consumption is kept to an absolute minimum.

By also considering pressure losses after 12 months of operation and not just at start-up, energy savings in excess of 60% compared to an ordinary filter are not uncommon.

CompAir modular adsorption dryers offer minimal pressure losses and are also optimised to ensure regeneration costs are minimised. Energy management systems are available to further reduce operational costs during periods where the water vapour entering the dryer is reduced whether it is due to ambient conditions, shift patterns, variable air demand or a combination of all three.

Low Lifetime Costs

Equipment with a low purchase cost may turn out to be a very costly investment in the longer term. Always consider the initial purchase cost, plus the cost of operating and maintaining the purification equipment. In addition, consider the cost to your business of poor air quality. By guaranteeing air quality and ensuring energy consumption is kept to a minimum, CompAir purification equipment can reduce the total cost of ownership and improve your bottom line through improved manufacturing efficiencies.

Guaranteed Air Quality

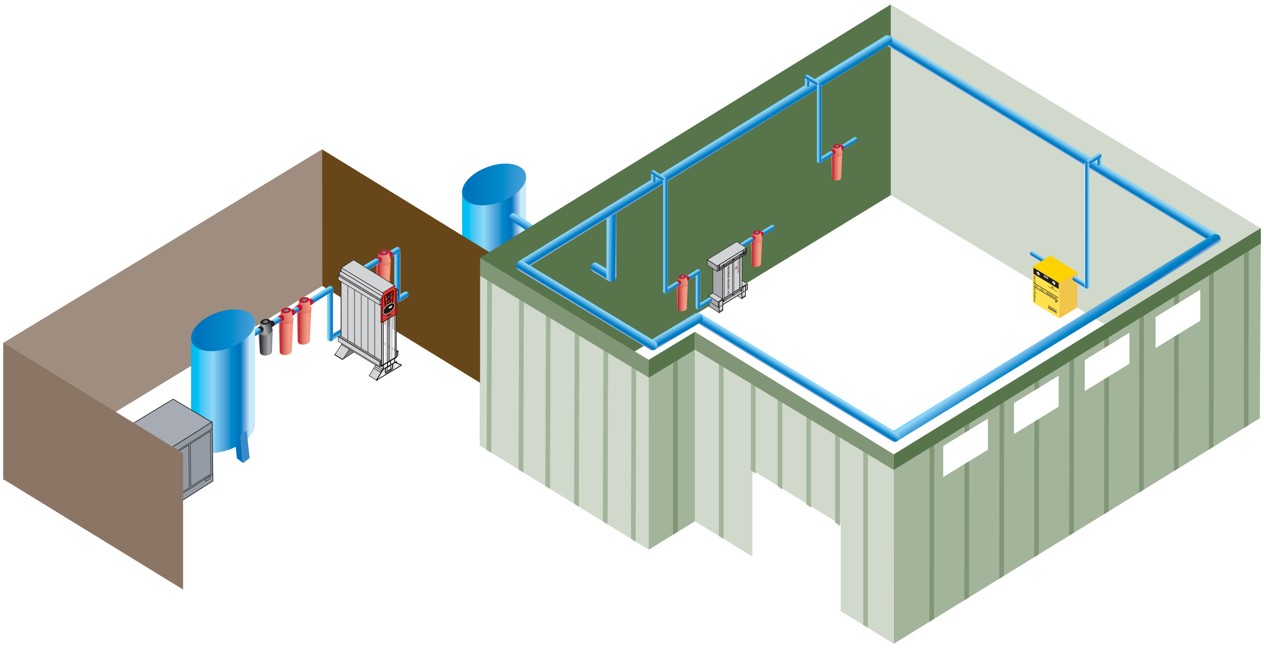
All products (excluding adsorption filters) are supplied with a one year compressed air quality guarantee, when sized, installed and maintained in accordance with CompAir recommendations. The air quality guarantee is automatically extended by replacing the filter element and consumable items with genuine parts annually.


COST EFFECTIVE >
SYSTEM DESIGN

OPTIMISED SYSTEM DESIGN FOR TYPICAL APPLICATIONS

THE QUALITY OF AIR REQUIRED THROUGHOUT A TYPICAL COMPRESSED AIR SYSTEM CAN VARY. THE EXTENSIVE RANGE OF PURIFICATION EQUIPMENT AVAILABLE FROM COMPAIR ALLOWS THE USER TO SPECIFY THE QUALITY OF AIR FOR EVERY APPLICATION, FROM GENERAL PURPOSE RING MAIN PROTECTION, THROUGH TO CRITICAL CLEAN DRY AIR (CDA) POINT OF USE SYSTEMS.

COMPAIR HAS COMPREHENSIVE RANGES OF PURIFICATION EQUIPMENT AVAILABLE TO EXACTLY MATCH SYSTEM REQUIREMENTS, ENSURING BOTH CAPITAL AND OPERATIONAL COSTS ARE KEPT TO A MINIMUM.



Cost effective system design

To achieve the stringent air quality levels required for today's modern production facilities, a careful approach to system design, commissioning and operation must be employed. Treatment at one point alone is not enough and it is highly recommended that the compressed air is treated prior to entry into the distribution system to a quality level suitable for protecting air receivers and distribution piping. Point of use purification should also be employed, with specific attention being focussed on the application and the level of air quality required. This approach to system design ensures that air is not "over treated" and provides the most cost effective solution to high quality compressed air.

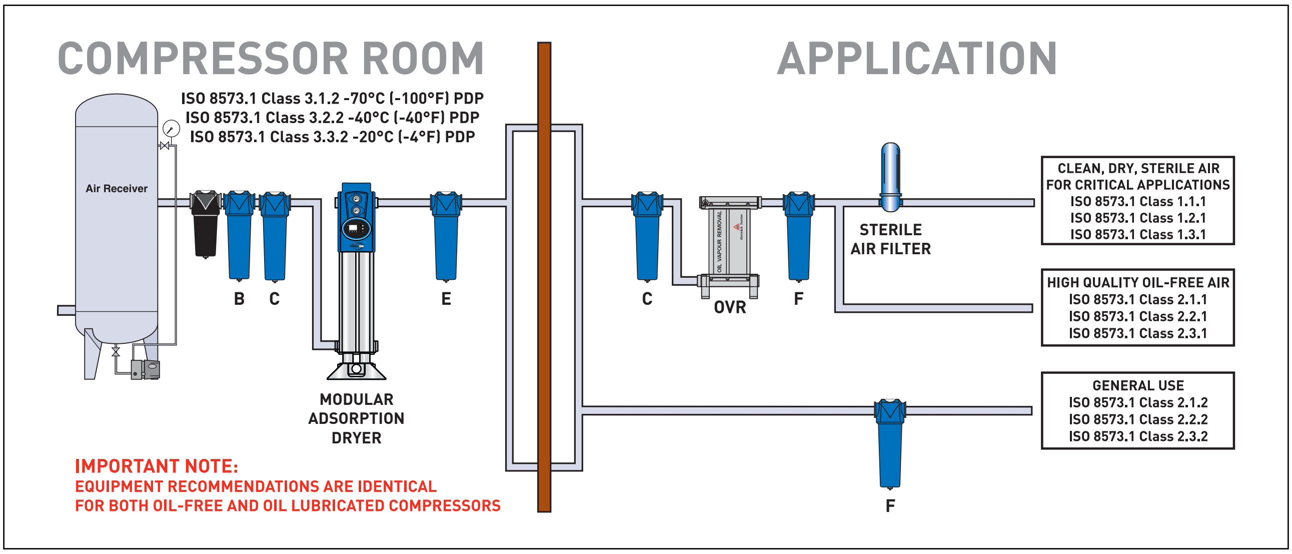
The following table highlights the CompAir filtration and drying products required to achieve each air purity classification shown in ISO 8573.1 : 2001. If a Class 0 purity level is required, contact CompAir for recommendations regarding product requirements.

ISO 8573-1:2001 CLASS	Solid Particulate		Water	Oil
	Wet Particulate	Dry Particulate	Vapour	Total Oil (aerosol liquid and vapour)
1	CFN Types B + C + Sterile Air Filter	CFN Types E + F + Sterile Air Filter	Modular Adsorption Dryer -70°C PDP	CFN Types B + C + D CFN Types B + B + OVR
2	CFN Type B + C	CFN Type E + F	Modular Adsorption Dryer -40°C PDP	CFN Types B + C
3	CFN Type B	CFN Type E	Modular Adsorption Dryer -20°C PDP	CFN Type B
4	CFN Type B	CFN Type E	Refrigeration Dryer +3°C PDP	CFN Type B
5	CFN Type B	CFN Type E	Refrigeration Dryer +7°C PDP	-
6	-	-	Refrigeration Dryer +10°C PDP	-

Simple guidelines for the selection of purification equipment

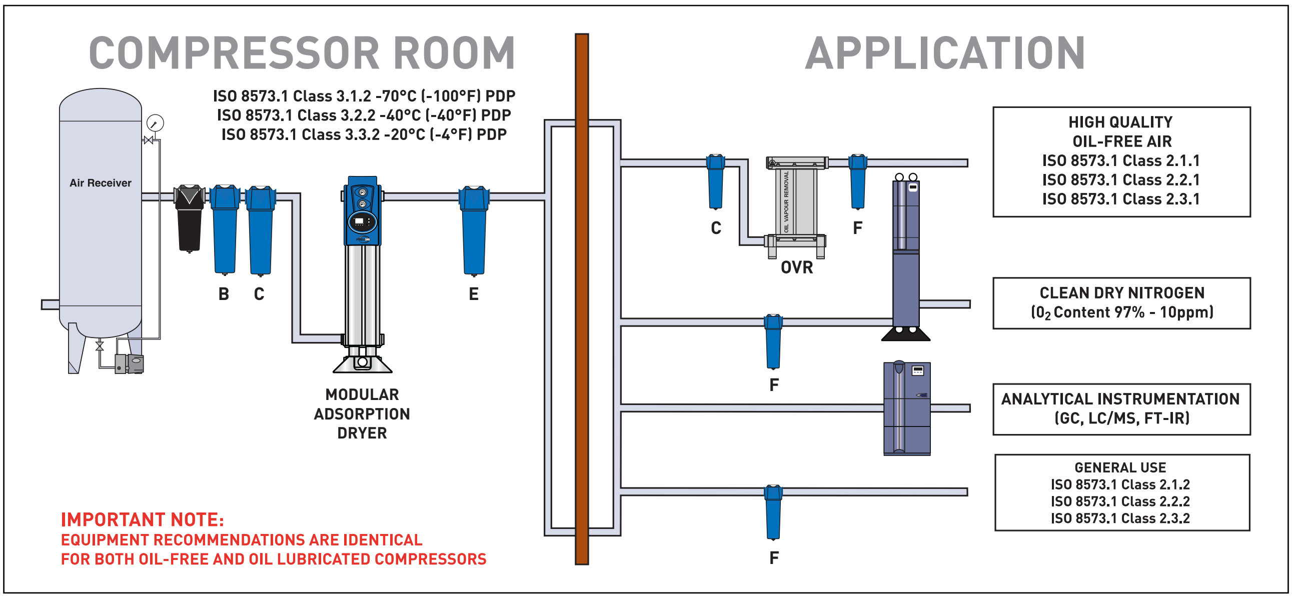
1. Purification equipment is installed to provide air quality and you must first of all identify the quality of compressed air required for your system. Each usage point in the system may require a different quality of compressed air dependent upon the application. Using the quality classification's shown in ISO 8573.1 : 2001 will allow your equipment supplier to quickly and easily select the correct purification equipment necessary for each part of the system.
2. ISO 8573.1 : 2001 is the latest edition of the standard. Ensure it is written in full when contacting suppliers. Specifying air quality as "ISO 8573.1" or "ISO 8573.1 : 1991" refers to the previous edition of the standard and may result in a lower quality of delivered compressed air.
3. Ensure that the equipment under consideration will actually provide delivered air quality in accordance with the quality classifications you have selected from ISO 8573.1 :2001.
4. When comparing coalescing filters, ensure that they have been tested in accordance with both the ISO 8573.2, ISO 8573.4 & ISO 12500.1 standards.
5. Ask for independent validation of product performance by a 3rd party.
6. For peace of mind, ensure the manufacturer provides a written guarantee of delivered air quality.
7. Oil-free compressor installations require the same filtration considerations as oil lubricated compressor installations.
8. When considering the operational costs of coalescing filters, only compare the initial saturated pressure loss as dry pressure loss is not representative of performance in a normally wet compressed air system. ISO 12500.1 requires pressure losses for coalescing filters to be recorded when the element is saturated
9. Look at the blockage characteristics of the filter. Just because it has a low starting dp, doesn't mean it will remain low throughout the filter element's lifetime. Energy costs should always be calculated based upon the blockage characteristics of the filter, not just initial saturated dp.
10. Look at the total cost of ownership for purification equipment (purchase cost, operational costs and maintenance costs), a low initial purchase price, may look inviting, but may end up costing significantly more in terms of poor air quality and high operational costs.

CRITICAL APPLICATIONS



Typical Applications

Pharmaceutical products
Silicon wafer manufacturing
TFT / LCD Screen manufacturing
Memory device manufacturing
Optical storage devices (CD, CD/RW, DVD, DVD/RW)
Optical disk manufacturing (CD's/DVD's):
Hard disk manufacturing
Foodstuffs
Dairies
Breweries
CDA systems for electronics manufacturing

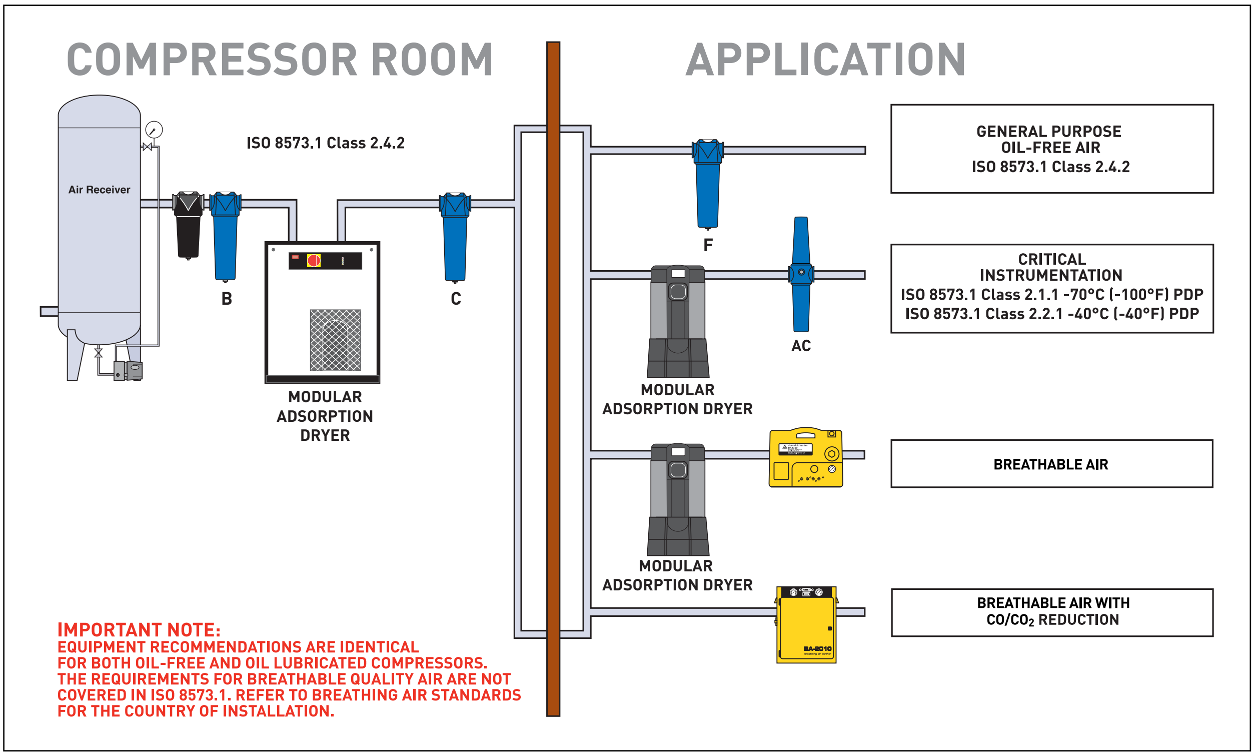


Typical Applications

Blow Moulding of Plastics e.g. P.E.T. Bottles
Film processing
Critical instrumentation
Advanced pneumatics
Air blast circuit breakers
Decompression chambers

Cosmetic production
Medical air
Dental air
Lasers and optics
Robotics
Spray Painting

Air bearings
Pipeline purging
Measuring equipment
Blanketing
Modified Atmosphere Packaging
Pre-treatment for on-site gas generation



Typical Applications

General ring main protection
Pre-filtration to point of use adsorption air dryers
Plant automation
Air Logistics
Pneumatic tools

General instrumentation
Metal stamping
Forging
General industrial assembly
(no external pipework)
Air conveying

Air motors
Workshop (Tools)
Garage (Tyre filling)
Temperature control systems
Blow guns
Gauging equipment
Raw material mixing
Sand / bead blasting

CompAir FZE
LOB 16
Office No. 503
PO BOX 61146 Dubai
UAE