Clean and dry compressed air for the railway industry
Contents

Filtration, purification and separation is our business ........ 1
Compressed air contamination is a real problem for rail operators ........................................ 3
Sources and types of contamination in a compressed air system ................................................. 5
Compressed air purification .............................................................................................................. 7
A dedicated solution for every application ..................................................................................... 9
Railway filter and dryer packages .................................................................................................. 11
The Parker domnick hunter design philosophy ............................................................................. 13
Aftermarket support ....................................................................................................................... 13
Operating an efficient production facility allows increased volumes and better quality products to be manufactured at a lower cost. Downtime and unreliability are not acceptable.

Fundamental to most modern production environments is the compressed air network, often referred to as the 4th utility. This must be totally reliable and effective.

To guarantee maximum performance and reliability, Parker domnick hunter protects your entire compressed air network, providing the best quality compressed air, exactly where it is needed.

These world class compressed air treatment solutions will improve production performance and reliability whilst lowering energy consumption, CO₂ emissions and operational costs to deliver 100% manufacturing uptime and total peace of mind.

Together, we can improve the reliability, efficiency and profitability of your on-board compressed air systems.

A reliable and environmentally friendly compressed air system will allow you to operate your railway business profitably and with guaranteed performance.

Parker domnick hunter, a world leader in purification and separation technologies can help reduce your operating and maintenance costs by providing you with the best quality compressed air, highest energy efficiency and sustainable operation in any climate.
Compressed air contamination is a real problem for rail operators

Reliability and punctuality of operation are key demands with passenger and freight rolling stock today, in an industry where safety and performance are paramount.

Compressed air provides power to some of the most sophisticated applications that keep the rolling stock operational but is generally contaminated with some of the most natural contaminants known – dirt, water and oil. Further contamination in the form of compressor oil and wear particles then mix with the atmospheric dirt and water to produce an abrasive paste which has no lubricating properties at all.

If this contamination is not removed from the compressed air system, it will result in:

- Detrimental effect on performance
- System breakdown
- Unscheduled maintenance
- Set out for service costs
- Costly repairs
- Dissatisfied customers

As the majority of applications are external, they are therefore susceptible to climatic conditions. Any moisture remaining in the compressed air system has a major effect on performance, and is a contributing factor to fracturing air lines and damaged pneumatic cylinders caused by freezing and blocked pipes. Unplanned and unbudgeted maintenance will be required, affecting the single most important value each operator is striving to attain – a reliable service!

Awareness of the value of compressed air used in railway applications is growing, and so is the need for better quality in terms of the elimination of contamination and the improved lifetime of all applications which depend upon it.

The introduction of new and sensitive pneumatic control systems, linked with economic and environmental considerations makes the effective treatment of compressed air necessary.

Different applications place varying demands on the compressed air system. Not only is reliability a major concern but the entire safety of the train and therefore the entire rail transport network is heavily dependent on a reliable compressed air supply.

Whether new build or refurbishment of locomotives and rolling stock, total compressed air protection can be provided by the installation of a dedicated Parker domnick hunter railway dryer package complete with pre- and after filtration.
Applications depend on clean, dry compressed air for reliable operation.
Sources and types of contamination in a compressed air system

Understanding the sources of compressed air contamination and the types of contaminants which must be eliminated is fundamental to understanding the principles of effective purification methods.

- **The atmospheric air**
  Air compressors draw in vast volumes of air from the surrounding atmosphere which contain large numbers of airborne contaminants.

- **The type and operation of the air compressor**
  The air compressor can also add contamination, from wear particles to coolants and degraded lubricants.

- **Air receivers and system piping**
  The air receiver and system piping distributes the compressed air but will also retain the large amounts of contamination drawn into the system. Additionally, they cool the moist compressed air to cause condensation on a large scale. This will promote corrosion, poor performance and ultimately costly damage.

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

Water vapour
Large volumes of atmospheric air enter the compressed air system through the compressor intake. As the air is compressed, the temperature increases significantly, causing it to become fully saturated with water vapour. The ability of air to retain water vapour is dependent upon its temperature and pressure. The higher the temperature, the more water vapour that can be retained. The higher the pressure, the greater the amount of condensed water that will be released.

Condensed liquid water and water aerosols
After the compression stage, the saturated air is normally cooled to a usable temperature by an aftercooler, causing the retained water vapour to be condensed into liquid water which can now be removed by a condensate drain. 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 and cylinders. The condensed water and water aerosols cause corrosion to the storage and distribution system, reduce performance efficiency and increase maintenance costs of the application. Water in any form must be removed to enable the system to function correctly and perform efficiently.
Rust and pipescale
Water contamination will cause rust and pipescale to form in air receivers and the system piping which will eventually break away to cause blockage or damage to the application.

Oil
Most air compressors use oil in the compression stage for sealing, lubrication and cooling. During operation and especially at elevated operating temperatures, as much as 50% of the degraded compressor oil, in liquid, aerosol and vapour form can be carried over into the compressed air system.
Additionally, unburned hydrocarbons drawn into the compressor intake will carry over into the compressed air system where it will cool and condense.
All this acidic oil mixes with water vapour in the compressed air causing damage to air receivers, the air distribution system and valve/cylinder seals.
It should also be noted that oil-free compressors do not supply contaminant free air. Regardless of which compressor type is selected, whether oil-free or oil lubricated, adequate filtration and separation equipment will be required to remove the large volume of dirty contaminated water in addition to unburned hydrocarbons, dirt, rust and pipescale contamination from entering the system.

Compressed air contamination
The accumulative effect of oil, water and dirt contamination collected by a compressed air filter.
Compressed air purification

Having identified the different types of contamination found within a compressed air system, the purification technologies available for its removal can now be explained.

**Water separators**
Water separators are used to protect coalescing filters in systems where excessive cooling takes place in air receivers and distribution piping.

Using mechanical separation techniques, water separators will remove in excess of 92% bulk liquid contamination.

**Coalescing filters**
Coalescing filters are probably the single most important purification equipment in a compressed air system. They are designed to not only remove aerosols (droplets) of oil and water using mechanical filtration techniques, but also to remove solid particulate to very low levels (as small as 0.01 micron in size). Installed in pairs, the first filter is a ‘general purpose filter’ which protects the second ‘high efficiency filter’ from bulk contamination. The dual filter installation from Parker domnick hunter ensures a continuous supply of high quality compressed air with the additional benefits of low operational costs and minimal maintenance.

**Adsorption dryers**
Water vapour is removed from compressed air using an adsorption dryer. Adsorption dryers remove moisture by passing air over a regenerative desiccant material which strips the moisture from the air. This type of dryer is extremely efficient and a typical pressure dewpoint for adsorption dryers is -40°C. However, in rolling stock applications the dryness of the compressed air is stated as a dewpoint suppression of 40°C below the ambient temperature.

As adsorption 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.

**Dust removal filters**
Dust removal filters are used for the removal of dry particulates which may be carried over from the desiccant material in the dryer. They 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.
A dedicated solution for every application

Parker domnick hunter offers maximum protection, with a dedicated range of railway and transportation air purification and separation systems, designed specifically to combat the problems experienced with today’s rolling stock.

A filter package combining high-efficiency water separation (better than 92% efficiency) with high-efficiency coalescing technology (oil removal down to 0.01 mg/m³ and particle retention down to 0.01 micron), ensures that compressed air can be filtered to meet the requirements of both the NF F11-100 standards for rolling stock and the international ISO 8573-1 compressed air quality standards.

The Parker domnick hunter range of railway dryers uses extruded aluminum in its design which is engineered for each application and enables the air treatment to be installed either internally or externally, both horizontally or vertically. Utilising the smallest space envelope available for installation makes upgrading of existing rolling stock easy.

This patented design technology has the ability to withstand the rigours of shock and vibration in the most arduous and extremes of operating conditions and climates.

Awareness of the value of compressed air purification in rolling stock and the systems dependent on it is growing. More and more users recognise the problems associated with poor filtration and the need for better quality compressed air in terms of contamination removal and the improved lifetime of all applications and systems which rely upon it.

Addressing the cause rather than the symptom has enabled many operators to provide a long-term solution to contamination problems, rather than applying short-term fixes in the hope that the symptoms will disappear. This has resulted in longevity of operation, with significantly lower maintenance and operating costs with the added benefits of minimal downtime and a reliable service.

In many cases, a dedicated solution can be achieved by installing filtration in applications where no previous air treatment existed. In other cases, upgrading a railway compressor installation by installing filtration in a system fitted with an existing adsorption dryer or by utilizing a typical Parker domnick hunter railway filters and adsorption dryer package, designed to provide maximum protection.
Railway filter and dryer packages

Features
- Fully corrosion protected
  Alocrom treatment and epoxy paint finish
- Flexible installation
  Can be installed vertically or horizontally, internally or externally
- Independently validated
  Independently tested for shock, vibration, EMC and flammability
- Quiet operation
  Low operating noise level
- Electrical supply
  Designed to customer specifications

Benefits
- Highest quality compressed air
  Meets international standards
- Optimal performance
  guaranteed
  Continued protection in any climate
- Compact and lightweight
  Can be installed almost anywhere
- Modular design
  Simple to install
- Low maintenance
  Simple and easy to maintain
- Compatible with all
  compressor oils
  Suitable for all types of compressor
- Cost effective
  Low operational costs

Options
- 70°C dewpoint suppression
- OEM design and build
- Electronic condensate drains
- Pneumatic condensate drains
- Trace heating

A modern approach to high efficiency compressed air drying can remove water vapour to 40°C dewpoint suppression. Vertical and horizontal solutions shown.
Types of rail vehicles which benefit from clean, dry compressed air for reliable operation.

1 High speed train
2 Maintenance vehicle
3 Light rail vehicle
4 Locomotive
5 Class 1 locomotive
6 People carrier

1 3
2 4
5
6
The Parker domnick hunter design philosophy

Air quality
Improved air quality is the main reason for installing filtration and drying equipment in the first instance. All Parker domnick hunter purification equipment has been designed to provide compressed air quality in accordance with the recommendations described in ISO8573-1:2010, the latest edition of the international air quality standard. Additionally, Parker domnick hunter product performance has been independently verified by Lloyd's Register and is backed up by a 12 month performance guarantee, which can be extended simply by conducting annual maintenance in accordance with the Parker domnick hunter recommendations.

Energy efficiency
During the development of Parker domnick hunter filtration and drying products, our engineers strive to provide the lowest operating costs whilst achieving the best air quality. Pressure loss is the major contributor to operational costs of filtration products. Parker domnick hunter Railway & Transportation filters have been designed using aerospace technology to ensure both pressure loss and energy consumption are kept to an absolute minimum.

Low lifetime costs
Equipment with a low purchase price may turn out to be a more costly investment in the longer term. The operational and maintenance costs of the purification equipment also needs to be considered. The user should also consider the cost of poor quality compressed air impacting on his railway operation.

Aftermarket support
Many railway applications require much more than simply supplying high quality compressed air products in order to maintain operational effectiveness.

Equipment manufacturers must not only comply with ever increasing industry standards, they must also provide maximum utilisation and optimum efficiency from their products to ensure a minimum lifetime cost of ownership.

Our commitment goes much further than simply supplying high quality products. Our aim is to maximise benefits of your compressed air purification system by providing you with an unparalleled service.

From product design and selection through to installation, validation and maintenance, Parker domnick hunter can support you every step of the way.

For further information please email: dhrail@parker.com or visit: www.parker.com/dhfns
Parker’s Motion & Control Technologies

Parker is guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver.

No company knows more about motion and control technology than Parker. For further information call 0800 27 27 5374.

Key Markets
- FLUID & GAS HANDLING
  - Plastic fittings
    - Quick disconnects
    - Tube fittings & adapters
    - Rubber & thermoplastic hose & couplings
  - Unmanned aerial vehicles
- AEROSPACE
  - Key Markets
    - Aircraft engines
    - Business & general aviation
    - Commercial transports
    - Land-based weapons systems
    - Military aircraft
    - Missiles & launch vehicles
    - Regional transports
    - Key Products
      - Flight control systems & components
      - Fluid conveyance systems
      - Fluid metering delivery & atomization devices
      - Fuel systems & components
      - Hydraulic systems & components
      - Inert nitrogen generating systems
      - Pneumatic systems & components
      - Wheels & brakes
- CLIMATE CONTROL
  - Key Markets
    - Agriculture
    - Air conditioning
    - Food, beverage & dairy
    - Life sciences & medical
    - Precision cooling
    - Processing
    - Transportation
    - Key Products
      - CCZ controls
      - Electronic controllers
      - Filter driers
      - Hand shut-off valves
      - Hose & fittings
      - Pressure regulating valves
      - Refrigerant distributors
      - Safety relief valves
      - Sintered valves
      - Thermostatic expansion valves
- ELECTROMECHANICAL
  - Key Markets
    - Aerospace
    - Factory automation
    - Food & beverage
    - Life sciences & medical
    - Machine tools
    - Packaging machinery
    - Paper machinery
    - Plastic machinery & converting
    - Primary metals
    - Semiconductor & electronics
    - Textile
    - Wire & cable
    - Key Products
      - AGCC drives & systems
      - Electric actuators
      - Controllers
      - Gantry robots
      - Gearheads
      - Human machine interfaces
      - Industrial PCs
      - Inverters
      - Linear motors, slides & stages
      - Precision stages
      - Servo motors
      - Servo motors, drives & controls
      - Structural extrusions
- FILTRATION
  - Key Markets
    - Analytical gas generators
    - Compressed air & gas filters
    - Condition monitoring
    - Engine, air, fuel & oil filtration & systems
    - Hydraulic, lubrication & coolant filters
    - Process, chemical, water & microfiltration filters
    - Nitrogen, hydrogen & zero air generators
    - Key Products
      - Air preparation
      - Compact cylinders
      - Fluid bus valve systems
      - Grippers
      - Guided cylinders
      - Manifolds
      - Mist & fume filters
      - Pneumatic accessories
      - Pneumatic actuators & grippers
      - Pneumatic valves and controls
      - Rodless cylinders
      - Rotary actuators
      - Valve & actuator accessories
      - Vacuum generators, cups & sensors
- PROCESS CONTROL
  - Key Markets
    - Chemical & refining
    - Factory automation
    - Food & beverage
    - Life sciences & medical
    - Machine tools
    - Packaging machinery
    - Paper machinery
    - Plastic machinery & converting
    - Primary metals
    - Semiconductor & electronics
    - Textile
    - Wire & cable
    - Key Products
      - Analytical sample conditioning products & systems
      - Fluoropolymer chemical delivery fittings, valves & pumps
      - High purity gas delivery fittings, valves & regulators
      - Instrumentation fittings, valves & regulators
      - Medium pressure fittings & valves
      - Process control manifolds
- SEALING & SHIELDING
  - Key Markets
    - Aerospace
    - Chemical processing
    - Consumer
    - Energy, oil & gas
    - Fluid power
    - General industrial
    - Information technology
    - Life sciences
    - Military
    - Semiconductor
    - Telecommunications
    - Transportation
    - Key Products
      - Dynamic seals
      - Elastomeric O-rings
      - DFI shielding
      - Extruded & precision-cut, fabricated elastomeric seals
      - Homogeneous & inserted elastomeric shapes
      - High temperature metal seals
      - Metal & plastic retained composite seals
      - Thermal management

ENGINEERING YOUR SUCCESS.
Europe, Middle East, Africa

AE – United Arab Emirates, Dubai
Tel: +971 4 8127100
parkerm.e@parker.com

AT – Austria, Wiener Neustadt
Tel: +43 (0)2622 23501-0
parkeraustria@parker.com

AT – Eastern Europe, Wiener Neustadt
Tel: +43 (0)2622 23501 900
parkeraesteurope@parker.com

AZ – Azerbaijan, Baku
Tel: +994 50 2233 458
parker.azerbaijan@parker.com

BE/LU – Belgium, Nivelles
Tel: +32 (0)67 280 900
parker.belgium@parker.com

BY – Belarus, Minsk
Tel: +375 17 209 9399
parker.belarus@parker.com

CH – Switzerland, Etoy
Tel: +41 (0)21 821 87 00
parker.switzerland@parker.com

CZ – Czech Republic, Kleneany
Tel: +420 284 083 111
parker.czechrepublic@parker.com

DE – Germany, Kaarst
Tel: +49 (0)2131 4016 0
parker.germany@parker.com

DK – Denmark, Ballerup
Tel: +45 43 56 04 00
parker.denmark@parker.com

ES – Spain, Madrid
Tel: +34 902 330 001
parker.spain@parker.com

FI – Finland, Vantaa
Tel: +358 (0)20 753 2500
parker.finland@parker.com

FR – France, Contamine s/Arve
Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

GR – Greece, Athens
Tel: +30 210 933 6450
parker.greece@parker.com

HU – Hungary, Budapest
Tel: +36 1 220 4155
parker.hu@parker.com

IE – Ireland, Dublin
Tel: +353 (0)1 466 6370
parker.ireland@parker.com

IT – Italy, Corsico (MI)
Tel: +39 02 45 19 21
parker.italy@parker.com

KZ – Kazakhstan, Almaty
Tel: +7 7272 505 800
parker.easteurope@parker.com

NL – The Netherlands, Oldenzaal
Tel: +31 (0)541 585 000
parker.nl@parker.com

NO – Norway, Asker
Tel: +47 66 75 34 00
parker.no@parker.com

PL – Poland, Warsaw
Tel: +48 (0)22 573 24 00
parker.polen@parker.com

PT – Portugal, Leca da Palmeira
Tel: +351 22 999 7360
parker.portugal@parker.com

RO – Romania, Bucharest
Tel: +40 21 252 1382
parker.ro@parker.com

SE – Sweden, Spånga
Tel: +46 (0)8 59 79 50 00
parker.se@parker.com

SK – Slovakia, Banska Bystrica
Tel: +421 484 162 252
parker.slovakia@parker.com

SL – Slovenia, Novo Mesto
Tel: +386 7 337 6650
parker.slovenia@parker.com

TR – Turkey, Istanbul
Tel: +90 216 4997081
parker.tr@parker.com

UK – United Kingdom, Warwick
Tel: +44 (0)1926 317 878
parker.uk@parker.com

ZA – South Africa, Kempton Park
Tel: +27 (0)11 961 0700
parker.southafrica@parker.com

North America

CA – Canada, Milton, Ontario
Tel: +1 905 693 3000

US – USA, Cleveland
Tel: +1 216 896 3000

Asia Pacific

AU – Australia, Castle Hill
Tel: +61 (0)2-9634 7777

CN – China, Shanghai
Tel: +86 21 2899 5000

HK – Hong Kong
Tel: +852 2428 8008

IN – India, Mumbai
Tel: +91 22 6513 7081-85

JP – Japan, Tokyo
Tel: +81 (0)3 6408 3901

KR – South Korea, Seoul
Tel: +82 2 559 0400

MY – Malaysia, Shah Alam
Tel: +60 3 7849 0800

NZ – New Zealand, Mt Wellington
Tel: +64 9 574 1744

SG – Singapore
Tel: +65 6887 6300

TH – Thailand, Bangkok
Tel: +66 2 186 7000-99

TW – Taiwan, Taipei
Tel: +886 2 2298 8987

South America

AR – Argentina, Buenos Aires
Tel: +54 3137 44 4129

BR – Brazil, Sao Jose dos Campos
Tel: +55 800 727 5374

CL – Chile, Santiago
Tel: +56 2 623 1216

MX – Mexico, Apodaca
Tel: +52 81 8156 6000

European Product Information Centre
Free phone: 00 800 27 27 5374
(from AT, BE, CH, CZ, DE, DK, EE, ES, FI, FR, IE, IL, IS, IT, LU, MT, NL, NO, PL, PT, RU,
SE, SK, UK, ZA)