Banlaw Rail

Delivering Unified Fuel Management for Rail

Maximise efficiency with industry-best hardware and innovative software solutions

BANLAW

— UNIFIED FUEL MANAGEMENT —

Global Leaders in Unified Fuel Management for Railways

Banlaw provides high performing, innovative equipment and fuel management solutions. We help rail companies improve their productivity by reducing fuel loss, reducing fuel contamination and delivering more efficient and safer refuelling.

Hydrocarbon Experts

Our heritage is in fuel but our expertise has extended to hydrocarbons in general and management of other liquids: we can provide you with software, hardware and services to optimise the storage, safe handling and use of fuels, oils, coolants, grease and more.

We Believe In Delivering The Best

We have a complete focus on efficiency and safety; our products are engineered for speed, accuracy, durability, and safety of the user at every stage. We have an innovative R&D program, always looking for new solutions to save you time and money, and to make managing your hydrocarbons more efficient whilst keeping the work environment safe, secure and clean.

Engineered In Australia, Used Globally

We are based in NSW, Australia where we design, engineer and manufacture our products and software. We have a network of trained distributors around the world who provide expert sales and service at a local level, in addition to the regional Banlaw teams.

Our clients are high volume fuel users in rail, mining and other industries globally. Customers tell us they value Banlaw's high performance products because they deliver measurable improvements from a fleet optimisation, refuelling interval, servicing, and ROI perspective.

The Banlaw Difference

- **Unrivalled product quality** – safe and reliable, operator-friendly products, expertly engineered for over thirty-five years.
- **Exceptional durability** – the most rugged, robust and ergonomically designed products. Incorporating the best materials gives Banlaw a repair/refurbish service capability.
- **Products designed and engineered specifically for the rail industry.**

How a 90% Reduction in Refuelling Times can be Achieved

Number of locomotive engines	3
Fuel tank size	19,000 litres
Proportion of tank required to top-up	66%
Total diesel required to top-up 3 locomotives	37,620 litres
Previous refuelling speed	300 LPM, performed sequentially
Refuelling time	124 minutes
Banlaw's solution speed	1,000 LPM, simultaneously
Refuelling time	13 minutes
Minutes saved per day	113
Reduction in fuelling time	90%
Machine idle hours saved per year per locomotive	687
Indicative hardware upgrade costs	$72,000
Cost per hour of idle machinery	$1,700
Savings	**$3,501,482 annually**
Payback period	**just over 1 week**

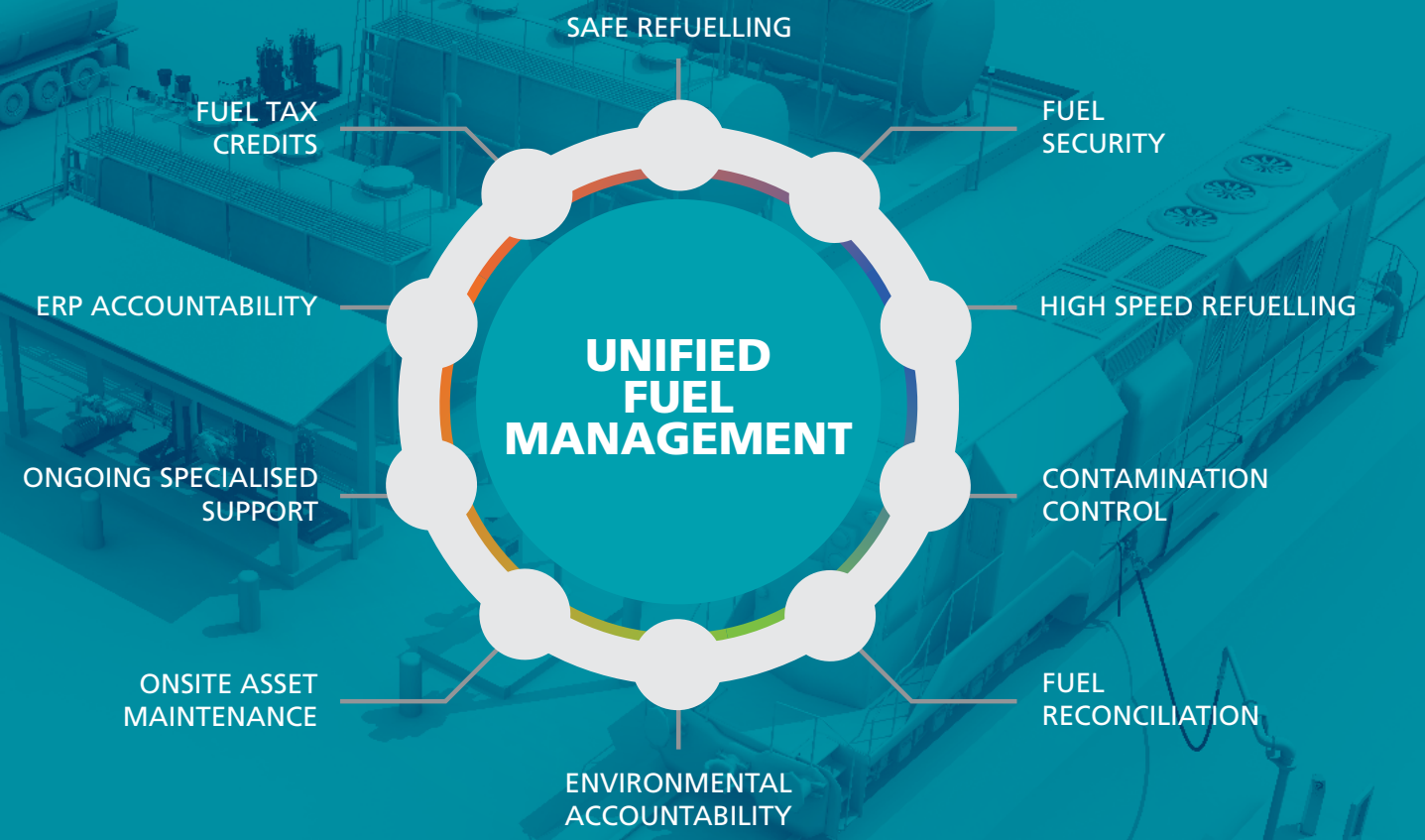
*Example scenario

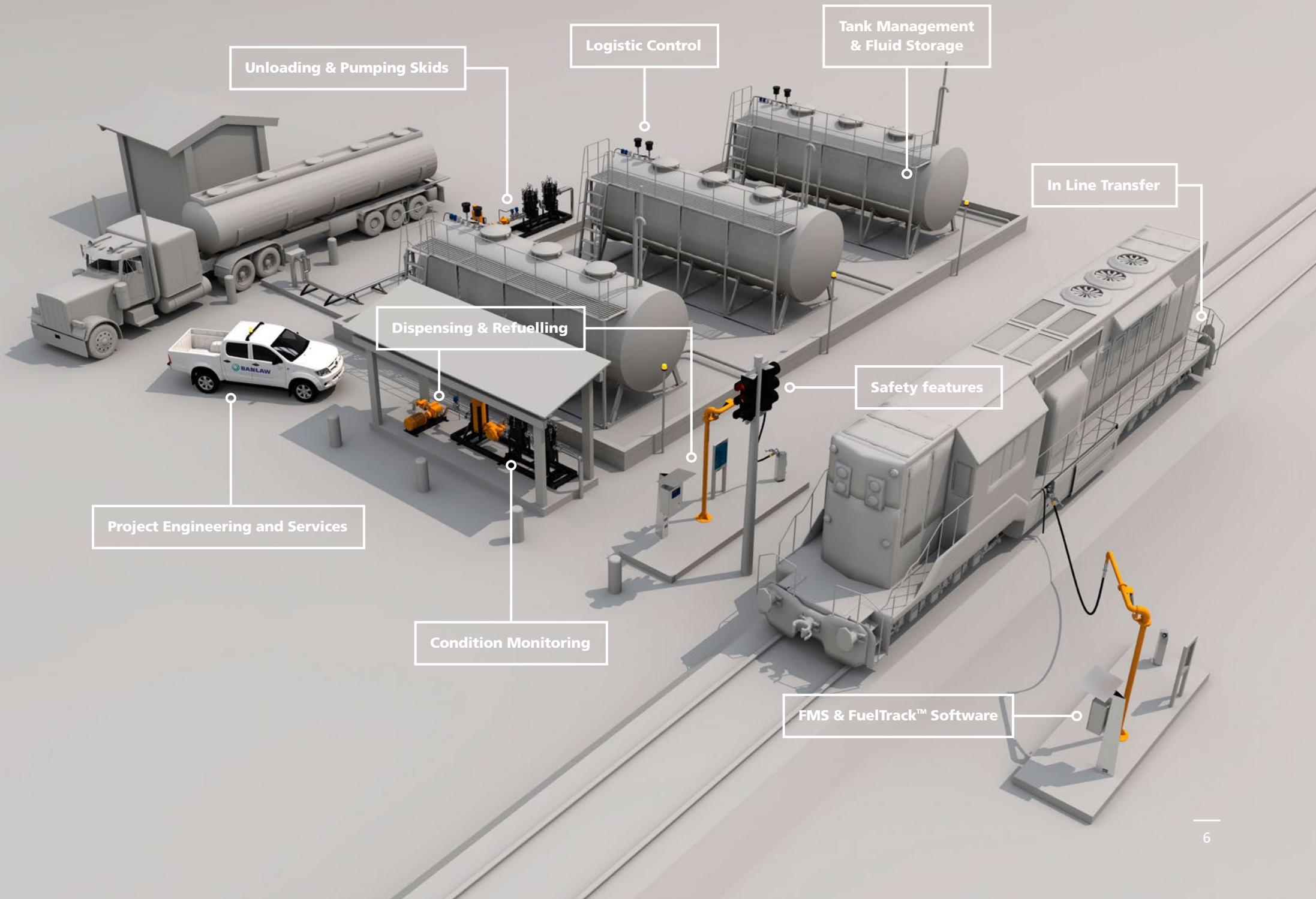
Unified Fuel Management

Your savings multiplied

Unified Fuel Management (UFM) is our unique approach to hydrocarbon management.

It delivers productivity, efficiency and cost reductions like no other system. UFM optimises all aspects of refuelling and hydrocarbon management across your fleet, multiplying the benefits as you integrate more aspects from 'buy to burn'.




Unloading & Pumping Skids
Logistic Control
Tank Management & Fluid Storage
In Line Transfer
Dispensing & Refuelling
Safety features
Project Engineering and Services
Condition Monitoring
FMS & FuelTrack™ Software

Fuel Management Systems

How We Deliver Productivity Gains

Fuel Management Systems maintain, monitor, measure, secure and control hydrocarbon movement and dispensing.

A Banlaw FMS does the basics and more; it is the tool which helps unify fuel management approaches, allowing you to keep innovating and improving year after year.

A Banlaw Fuel Management System scales in size and features from a single refuelling station, to numerous bulk storages and thousands of locomotives spanning regions/countries/continents.

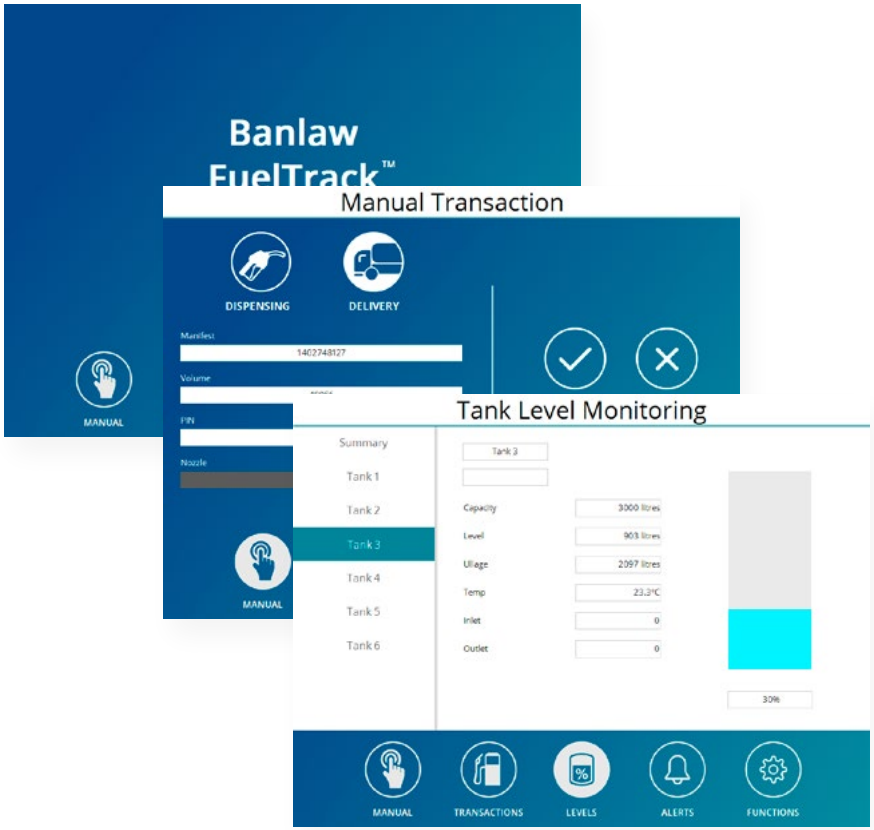
FuelTrack™ manages these functions...

Our Industry-Leading Solution

Banlaw Fueltrack™

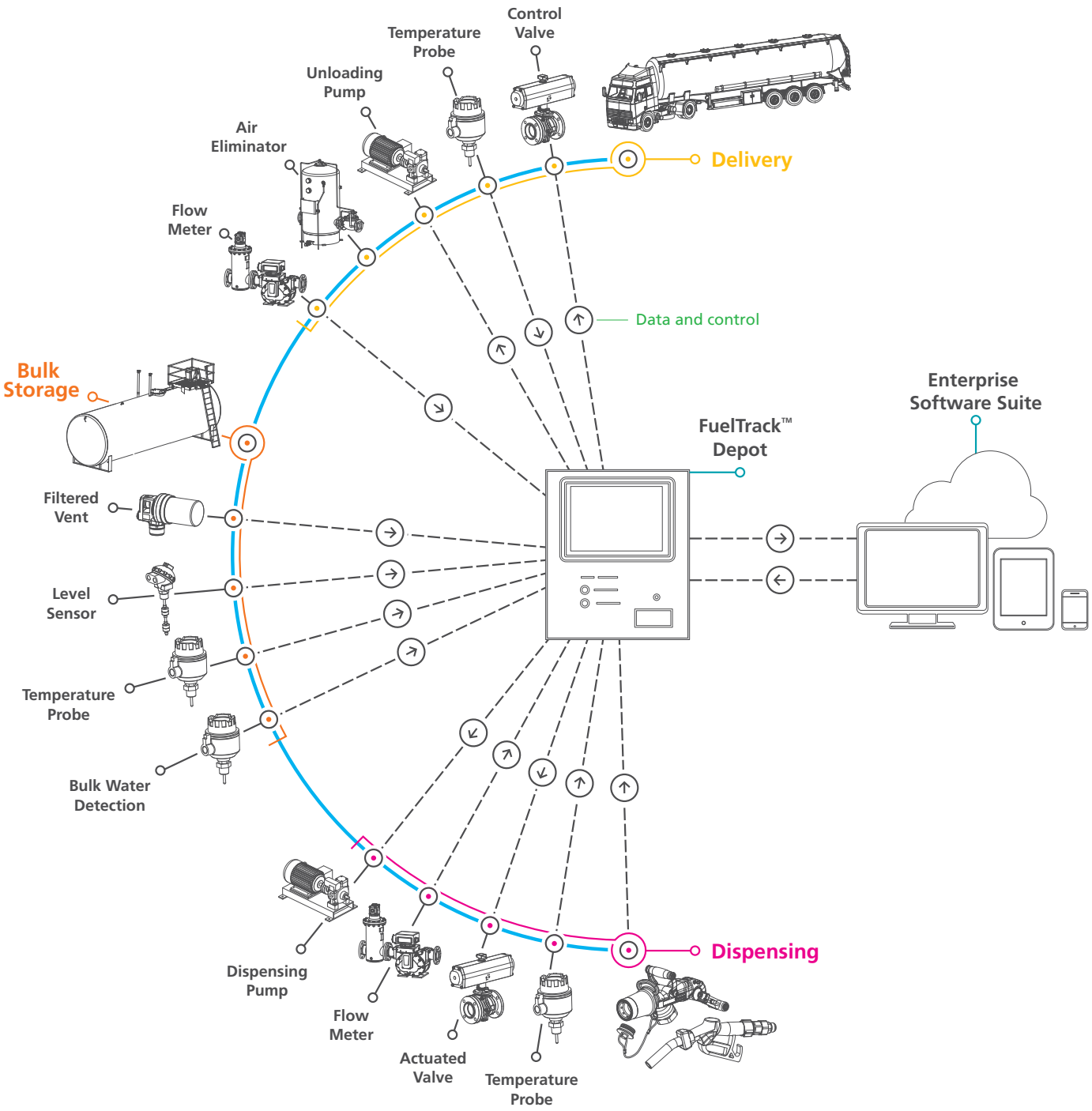
Banlaw's FuelTrack™ FMS is recognised as being world-leading in technology and design. We are the only OEM of a complete solution for the hydrocarbon market, including software design, hardware manufacturing and service.

Best practice fuel facilities set up with FuelTrack™ are able to reconcile up to 99.95% of all hydrocarbons received, or moved, from point of custody transfer: from 'buy to burn'.



Our best-in-class solution delivers unbeatable productivity, reconciliation and measurable cost reductions

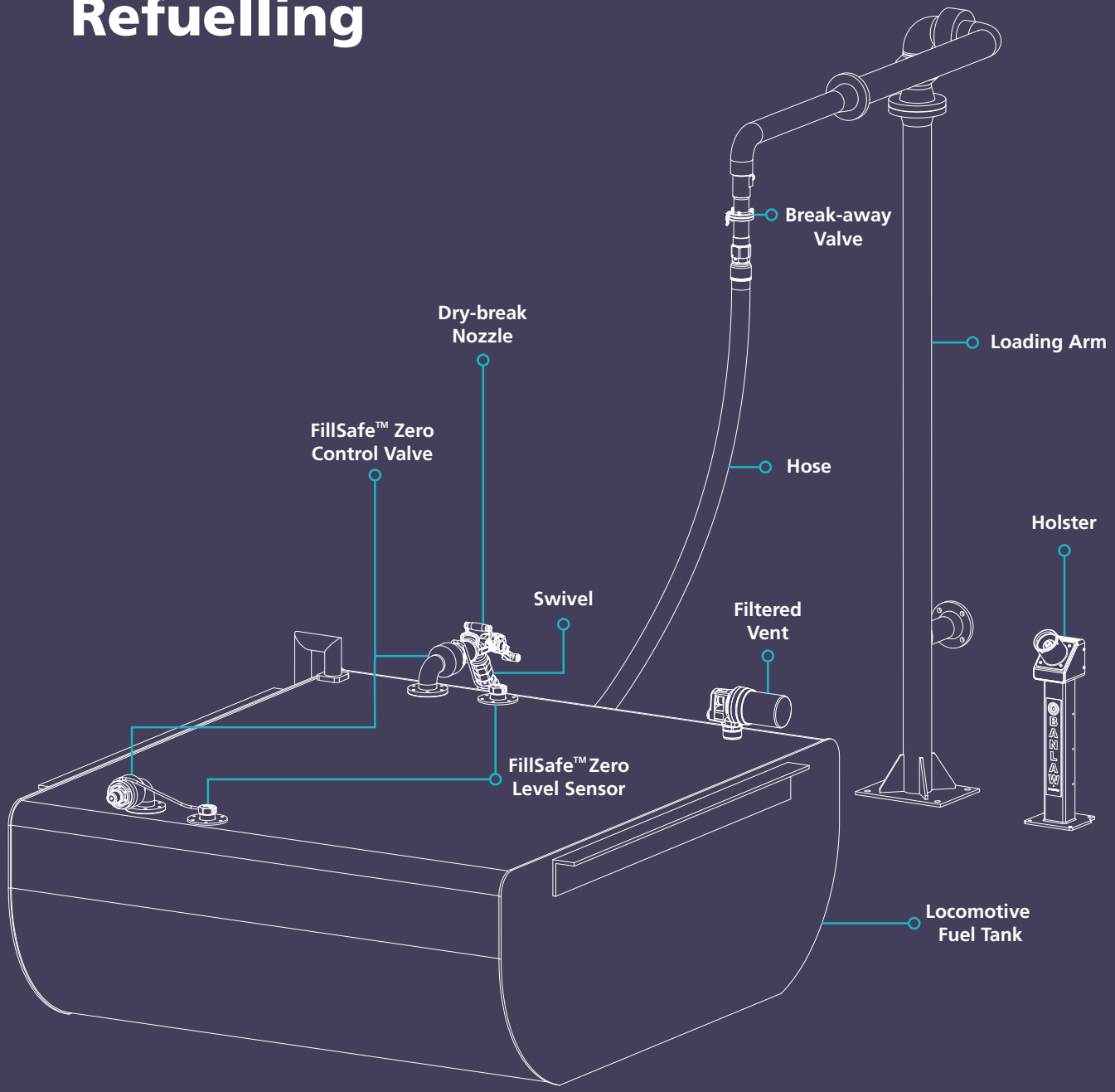
- **Security** – dispense only to authorised locomotives/vehicles/operators: 'No ID, No Fuel'.
- **Fuel Loss** – quickly identify if you are losing fuel through unaccounted or unauthorised use, or from equipment malfunction.
- **Labour savings** – FuelTrack™ automatically secures and reports fuel delivered to site, fuel dispensed, tank levels, plus locomotive and other vehicle IDs without human intervention. A Banlaw Fuel Management System usually achieves a payback period of less than 12 months.
- **Consignment** - for both supplier and client, open and transparent data disclosure. Product received accurately matches delivery dockets.
- **Reconciliation** – accurately and efficiently record fluids delivered, transferred, dispensed, and disposed of in real time.
- **Operational/Maintenance** – tracking fuel consumption and service fluids for every locomotive/vehicle.
- **Tank Level Monitoring** – allow logistics and operations teams to evaluate levels in real time, order automatically on present levels, and schedule deliveries.
- **Flexibility** – transfer data from the Banlaw FMS to an ERP system, or leverage the robust native reporting suite.
- **Scalability** – designed to scale easily as various elements of the architecture are commissioned. Tank level monitoring, inwards metering, reconciliation, refuelling, multiple sites; Banlaw can make it feel easy.
- **24/7 helpdesk** – Banlaw support teams are available to provide help whenever you need it. They provide configuration support, education, remote diagnostics, troubleshooting, as well as proactive health check reporting. They will help you ensure timeliness of availability, accuracy, and identification of fuel assets.
- **Tax Office Compliance** – all fuel moves from inwards metering through to consumption can be automatically logged, and presented in segment-by-segment reconciliation reporting – this is of heightened value in countries where government Fuel Tax Credits (FTC) are available.



Accurately reconcile and manage your most expensive consumables

- In the field, users initiate refuelling and deliveries which are automatically monitored and controlled via the FuelTrack™ depot.
- With press-button and touch screen options available, this little box 'does more than turn the pumps on'! FuelTrack™ depots control and track delivery, storage, and dispensing of any liquids such as fuel, coolant, and oil. The depots can identify users, locomotives, and other machines ***automatically***, or via pin numbers, swipe cards and other mechanisms.
- All of your locomotives and fuel tenders can be individually tracked and reconciled. You can monitor and control fuel use per FuelTrack™ 'Auto ID', Banlaw's world-leading method of identification.
- The FuelTrack™ Enterprise Software Suite is constantly communicating with depots in the field, but it may also be accessed via PC, tablet, or telephone to view reporting or perform administrative tasks.
- FuelTrack™ includes numerous configurable alarms. Users receive notification for tank levels, the filtration system, performance issues, and more.
- The system can be designed, installed, and supported by Banlaw. A service level assurance and maintenance framework will be established during the project, and this will drive continuous improvements and ongoing positive results.

Refuelling



How We Deliver Productivity Gains

Refuelling Hardware

Reducing the time associated with refuelling locomotive engines and tanker wagons brings significant savings and efficiencies.

Our refuelling hardware delivers flow rates of up to 1,000 litres per minute per nozzle. Rail operators currently refuelling at 300-500 litres per minute could therefore halve refuelling times by installing correctly matched Banlaw dry-break nozzles, receivers, and tank vents.

With Banlaw, high speed refuelling is achieved whilst maximising safety and machine life. Pressureless overfill protection systems extend tank life, and are available in electronic and hydraulic versions. Self-closing vents and auto shut-off nozzles provide a second layer of overfill protection. Fire-safe valves and break-away valves can also be incorporated into the system for added safety. Banlaw's patented Ultra-Fine Filtered Vent (3µm absolute) has been shown to significantly increase the life of fuel injectors and other engine components. Our refuelling equipment has been ergonomically designed to reduce strain on the operator, and every element has been engineered to mitigate fuel spillages.

Extreme Temperatures

Banlaw's cold temperature range includes both refuelling side and locomotive side components specified down to -40°C, keeping your refuelling processes in action even at extreme temperatures.

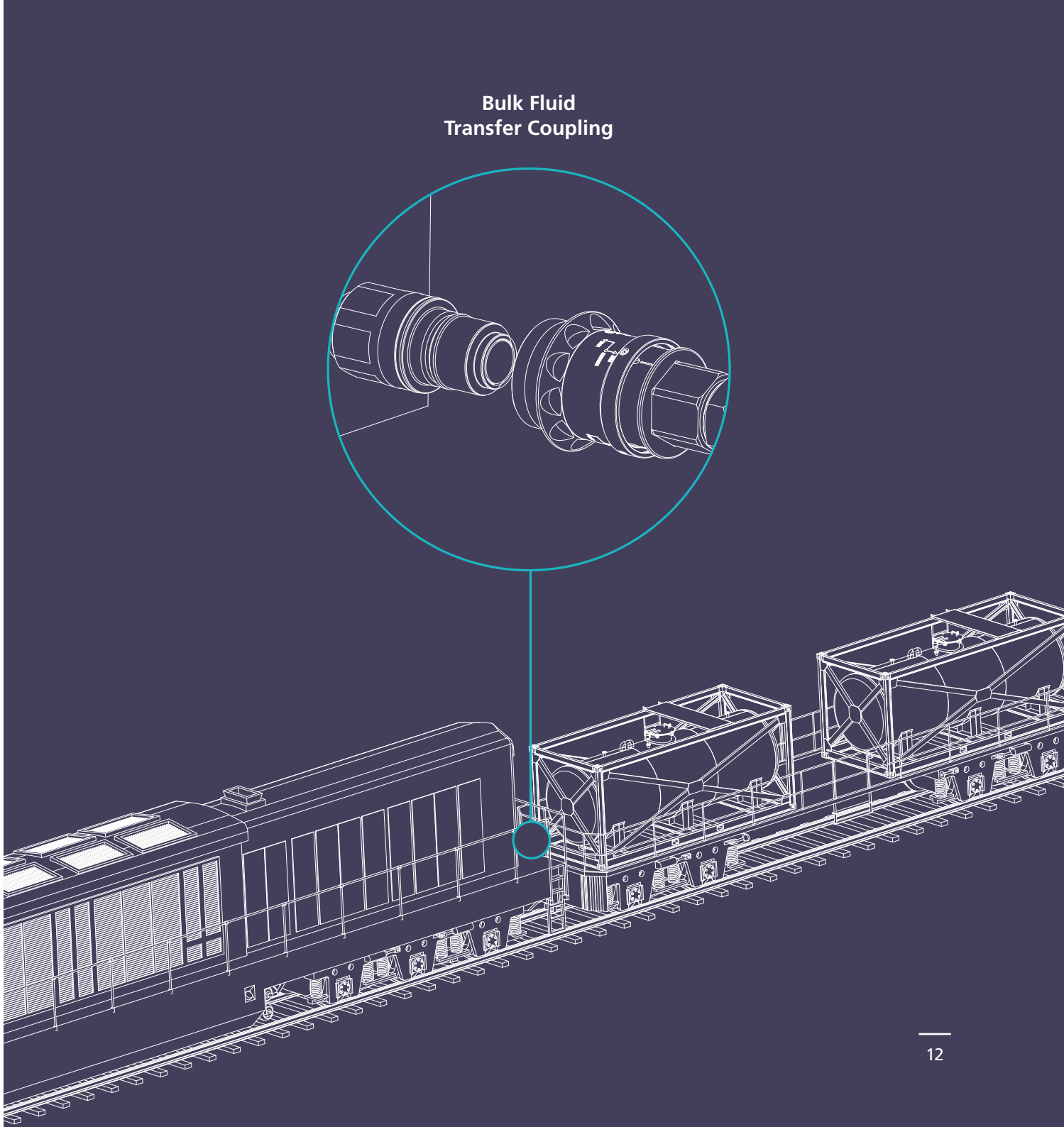
Refuelling in Motion

In partnership with Australian rail freight operators, we have engineered a high performance In Line connection system to enable unattended diesel-fuel transfer for scenarios such as extended long haul journeys.

Banlaw Bulk Fluid Transfer Couplings are of robust design and materials due to the relatively harsh environments they are exposed to, and incorporate extra safety features to ensure they stay connected in a constantly moving, and high-vibration application.

Using a reliable fluid transfer solution is key for In Line Refuelling, where unplanned decoupling of hoses from the tender can cause fuel outages, and spills that lead to environmental situations and fire risk.

The couplings alone can be used to upgrade your existing system; or Banlaw specialists can be engaged to help design and install an In Line Refuelling solution specific to your requirements.



Our Industry-Leading Products

Bulk Fluid Transfer Coupling

Banlaw's unique, safe and reliable in line transfer coupling:

- Dry-break design is leak free under load and vibration.
- The nozzle is designed to couple/uncouple under residual line pressure.
- Twist-lock mechanism secures the coupling under normal operating conditions, including being hit by ballast.
- Simple, user-friendly operation.
- Highly durable: all steel construction.
- Rated to 500 LPM bi-directional flow when used for diesel.
- Suitable for other oils and coolants.
- Purpose built for extended unattended refuelling operation.
- Integrated dust seal on the receiver helps protect the coupling against the ingress of contaminants.

FillSafe™ Power

FillSafe™ Zero

Primary Overfill Protection Systems
Banlaw Fillsafe™ Power And Fillsafe™ Zero

Setting the bar high for zero tank-pressure overfill protection

A new revolution in clean and safe refuelling, FillSafe™ incorporates the latest technology to deliver overfill protection with no pressure build-up in the tank. Even at the highest speeds, FillSafe™ delivers consistently accurate filling of locomotive tanks and fuel tenders to your specified levels – no underfilling or overfilling. With Banlaw FillSafe™, operators can initiate a refuelling event, and then move on to other locomotive maintenance tasks.

Banlaw FillSafe™ Power

An electronic system suitable for a wide range of fluid types, flowrates, and a variety of tank refilling or refuelling applications. FillSafe™ Power solutions can include features such as fire-safe valves, or multiple-ullage selections to support locomotives travelling on variable track weights.

Banlaw FillSafe™ Zero

This cost-effective system is designed for railway locomotive diesel tanks, small capacity stationary diesel tanks, and similar applications. It requires no power as a result of its patent pending* hydraulically-powered design.

* Patent Pending AU2014905114

Dry-Break Rail Nozzles & Receivers

The world's toughest and safest nozzles. High flow rates reduce the time spent refuelling.

Vents

Filtered (down to 3µm) and unfiltered vents with float valve shut-off.

Holsters

Reduce risk of drive-aways and spillages using the integrated proximity sensor. Also reduce contamination ingress, increasing nozzle life.

Break-Away Valves

Provides a physical break point to minimise machine and equipment damage in the event of a ‘drive away’. Dry-break design automatically seals both the supply pipe and the dispensing hose.

Loading Arms

Improve flowrates and user safety through ergonomic design, and support the weight of heavy hoses and couplings.

Our refuelling equipment is considered to be the most durable in the industry, providing unparalleled value over the lifetime of the product.

As an example, after 15 years this particular nozzle is still in use.

Servicing

Think "Inside" the Box

How We Deliver Productivity Gains

Banlaw is revolutionising the approach to locomotive servicing. By locating the access points for servicing or provisioning of diesel fuel and hydrocarbon products near to each other, we have been able to introduce significant efficiencies through design.

We have also engineered the Banlaw Evacuation Coupling (BEC), one common coupling which can be used to remove waste product from different sized receivers without the need to change the mating nozzle each time. It works fast, using vacuum for evacuation rather than gravity.

Banlaw's LubeCentral™ range of fittings are dry-break, eliminate fluid cross-contamination, offer enhanced flow rates, and work with the BEC.

Customers commonly replace different fluids at points around a locomotive engine. Efficiencies can be realised by centralising these service points, and accessing multiple fluid types via a service box.

Banlaw can help design and fit out service bays, with FMS for monitoring and control, hose reels for multiple fluids, and best in class couplings for refilling and evacuating machine fluids.

Our Industry-Leading Products

Banlaw Lubecentral™

Control contamination, reduce wear and manage your fluid assets

- This family of couplings is designed to fill and evacuate a wide range of fluids cleanly and quickly.
- Avoids contamination and cross-contamination of fluids, as only paired couplings of the same colour are able to connect.
- Eliminates spillage through dry-break design.
- Flow rates and burst pressures go beyond industry standards, delivering improved efficiency and safety.
- Robust: the all-metal nozzles contain an industry standard ball-lock latching system for a stronger connection.
- Push-to-Connect: fast and easy to use.
- Connect/Disconnect under residual pressure (size 11) – no need for bleed-off valves.
- Long life stainless steel sampling coupling (size 0) – corrosion resistant, and ready for use even after long periods.

Banlaw Service Box

Transforms service times through efficient centralised design, and a simplified process.

Lubecentral™ Flush Face Range

Our range of high-performance couplings which connect with the BEC. Customers have observed flow rates increasing >20% from these couplings alone!

Banlaw Evacuation Coupling (BEC)

Using just one BEC, service teams can connect to all the Banlaw Flush Face receivers from size 1 to 11 and rapidly evacuate waste fluids under vacuum.

Contact your Banlaw Distributor or sales representative for more information.

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