



TRANSPORT

PERFORMANCE GLASS FOR RAIL

(rolling stock and infrastructure)

You imagine, we deliver

Dellner-Romag will work
with you, every step
of the way

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Precision Performance Protection in Glass



Bespoke design and manufacture

With over 70 years' experience, Dellner-Romag has a history of processing glass in innovative ways to meet the specialist and sometimes complex needs of our clients; an 'all inclusive' service provider, we will work from concept, to design and build, right through to installation and beyond. Dellner-Romag will work with you, every step of the way.

Precision Dellner-Romag is a world leader for innovation in glass. Many of our clients have come to us needing solutions to seemingly impossible problems. Our technical design team has the specialist experience and know-how to keep pace with transportation innovation and we take customers' exacting new specifications and standards on board to develop the very best solution.

Doing so, Dellner-Romag have secured many design and build contracts, like the asymmetric, compound curved windscreen for Bombardier's Crossrail. Curved in all directions it is typical of the way we shape glass conform to incredibly demanding parameters in contours, composition and quality.

Performance Our continual investment in new technologies ensures we provide bespoke, reliable solutions of the highest quality that keep us ahead of our competitors and our customers at the forefront of their markets.

Whether it is a train or tram windscreen, glass for body side doors and windows, internal glass and headlights or attractive architectural, structural or security glass for stations; these are all solutions that Dellner-Romag as an expert glass processor has successfully delivered - from idea conception to installation.

Every project is bespoke, but bespoke doesn't always mean small quantities. For example we have produced over 13,500 double glazed body side windows for 886 carriages on 65 trains for the UK East Coast and Great Western main lines.

Whatever the scale of your project, Dellner-Romag's industry-leading design team and multi-skilled, highly experienced workforce will provide high quality glass that gives you the edge in your market.

Tinted, printed and shaped architectural glass for Deansgate - Castlefield tram station



We firmly believe that our glass not only needs to look good, but it must provide outstanding protection against a specified threat level. Throughout the design process our products are tested to their limits. For instance, the windscreens on Bombardier's latest London tube trains have an incredibly complex curved profile. It took five months for us to develop the tooling to build and bend them, layer by laminated layer and over 30 different impact tests at our in-house testing facility to prove their resistance and resilience.

Today's demands for high quality glass with excellent optical and visual appearance requires the best production facilities. Hence we have a suite of temperature and humidity controlled clean rooms to ensure glass laminates are of the highest quality - every time.

Dellner-Romag is an ISO: 9001 and ISO: 14001 factory, and all our products are fully tested and certified independently to European standards. Our expertise in the rail industry has meant that we have secured design and build contracts with world leading manufacturers including Hitachi Rail Europe, CAF and Bombardier. Dellner-Romag is also preferred supplier to Siemens.



Bespoke glass luggage racks and draft screens for Hitachi

Dellner-Romag supplied the side body windows on this AT200 commuter train



Extraordinary products

From our factory in County Durham, in the heart of the British countryside, we manufacture world class windscreens, passenger side body windows, headlight covers and glass interiors for all rail vehicles including DMU/EMU trains and LRV's including trams and metros. We are passionate about quality and innovation in rail and have invested in the very latest machinery and processes to improve our product and service offerings.



Image supplied by Railway Gazette

Shaped Glass Dellner-Romag are in possession of Europe's largest 360° water jet cutter. Custom built, the machine allows us to cut custom shapes out of laminated glass, increasing precision and speeding up our production processes and output capabilities.

Bends and Curves Dellner-Romag's production capabilities in curved glass are unmatched. We have the technical expertise and machinery to produce the most complex of shapes without compromising optical quality. The mould preparation is a highly skilled process conducted by our dedicated fabrication team. Every curve requires bespoke tooling and we also have the ability to produce curved glass to templates.

Dellner-Romag secured a long term supply with Bombardier for the windscreens on the Avenra platform



Heating Dellner-Romag offer the capability of heating both flat and curved glass for rapid de-icing and de-fogging to ensure the driver's vision is not compromised. This can be produced through the use of coatings on the glass surface or micro fine wires inside the lamination. Heating is designed to the client's specification to achieve the required power density over a range of voltages.

Impact Resistance Dellner-Romag are proud to have an onsite testing facility enabling us to test our products to the latest standards GM/RT2100 BS EN 1512, GM/RT2456 and BS857 as well as many others that predate them.

The testing centre is highly technical, allowing us to simulate real-life situations in different climates including extreme hot and extreme cold, and clients are invited to be on site to witness the testing process.

The test facilities include a dedicated air canon capable of propelling impactors to rail industry standards. Custom designed impactors can also be produced on request to specification. Other facilities includes hard body drop and swing tyre impact testing whilst additional test equipment can be designed to specification.



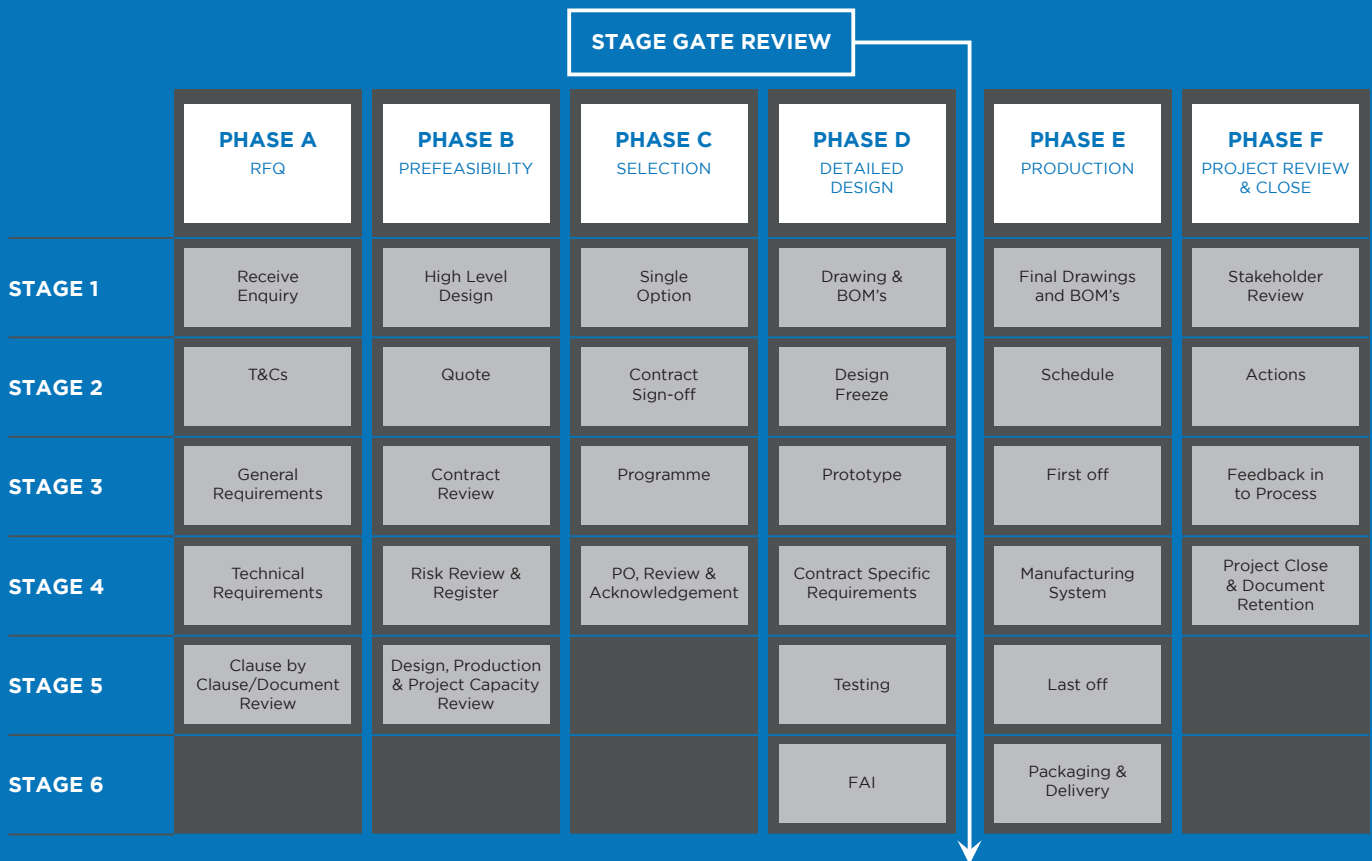
Dellner-Romag have an in-house testing facility for the development of new products

The complex, asymmetrical, compound curve windscreen for Crossrail was developed at our County Durham factory



Outstanding service

Dellner-Romag are unique in the offering of a completely “all in one” service, from concept to installation. No other provider is equipped to provide this level of service under one roof. An outline of the process is shown below. The client is involved at every stage for consultation and approval.



Dellner-Romag have achieved no1 supplier status with Bombardier

PROJECTS

Dellner-Romag is a long standing supplier to some of the biggest names in the rail industry, including Hitachi, Bombardier and Siemens who trust us to deliver high quality glass and maintain pace with a tight build schedule.

BOMBARDIER SSL

Dellner-Romag has achieved ‘number 1 supplier’ status with Bombardier by delivering on time, in full and at the precise specification required. This has enabled Bombardier to achieve their tight build program for Transport for London and has enabled Dellner-Romag to become a supplier of choice. This is one of the more complex screens seen in the rail sector and demonstrates Dellner-Romag’s ability to manufacture complex, high-performance windscreens.



BOMBARDIER CROSSRAIL PROJECT

Dellner-Romag secured a prestigious, long-term supply contract with Bombardier (Derby) for train windscreens for their new Aventura platform. This contract win is further testament to Dellner-Romag's ability to work closely with our customers to develop bespoke glass solutions to resolve complex technical problems. As can be seen from the images on pages four and five, the large, framed, double curved, heated windscreen was designed specifically for the new Aventura train platform.

HITACHI RAIL EUROPE

Dellner-Romag won a significant contract with Hitachi Rail Europe for work on the Intercity Express Programme (IEP) trains on the British East Coast Line. The new fleet of trains are being manufactured at high tech plant in Newton Aycliffe and Dellner-Romag supply the high performance glass for the body side windows. The high performance glass meets and exceeds regulations and expectations including

containment post impact, telephone attenuation, pressure pulse testing and small missile impact resistance.

SIEMENS

Dellner-Romag continues to develop and supply high quality compliant glass for the rail industry and have recently been awarded global supplier approval by Siemens. This has led to Dellner-Romag's unique project management approach being used to develop a number of new, on-going projects for Siemens in the UK, Germany and Austria and re-engineering existing rolling stock projects to maintain current supply of existing glass to Siemens services.

Dellner-Romag's willingness to adopt new standards such as IRIS and DIN6701 has also played a major part in becoming an approved supplier to such a prestigious customer.

Elegant architecture

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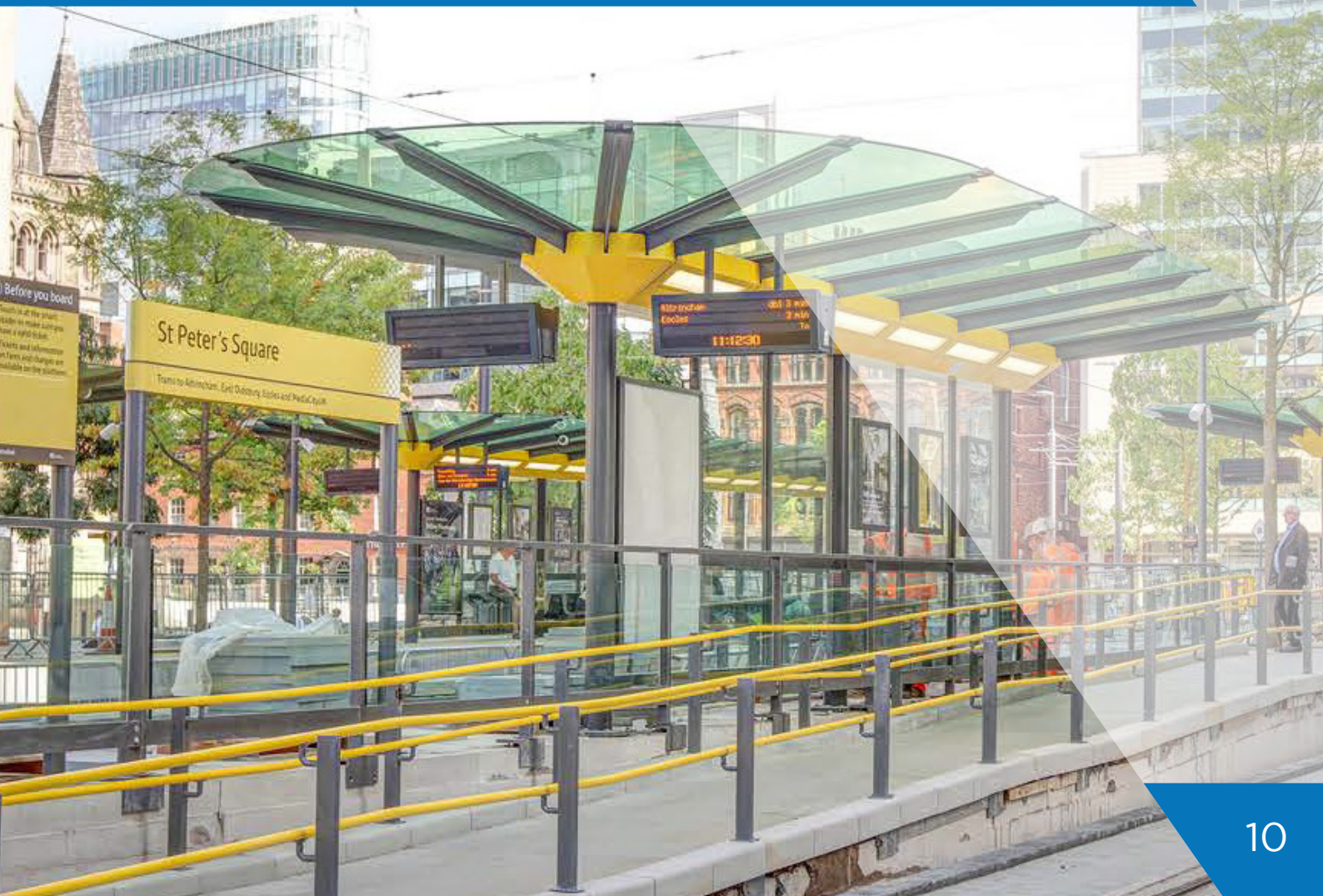
Glass and solar in rail architecture Dellner-Romag are proud to be a one-stop shop for all glass requirements in the rail industry, this includes curved, printed or coloured architectural and security glass for stations and tram stops including innovative solar PV to meet carbon reduction targets.

Dellner-Romag have a reputation for innovation and product development. We draw upon a wealth of technical resources to meet the most complex of specialist glass requirements. Our unrivalled capability ensures we are able to make a promise, we will provide the performance you require, with the precision you specify, and the protection you can trust, with a brilliance only Dellner-Romag can supply.

St Peter's Square in Manchester has undergone a £44 million redevelopment. Dellner-Romag manufactured the green tinted glass panels that form four eye-catching canopies for passengers sheltering from the elements on two newly built platforms, designed by German architects Latz + Partners.

Manchester Victoria Dellner-Romag supplied the clear glass balustrading a new bridge that links the station with the adjoining area. The bridge completely transforms the layout of the concourse, making it easier for train, tram and arena customers to travel around the station. The 60m bridge is fully accessible, offering new and modern retail space at the heart of the station.

Dellner-Romag are experts in architectural glass, from toughened heat soaked to physical attack resistance, bullet resistance and beyond



Dellner-Romag supplied 60m of glass balustrading for the new glass bridge at Manchester Victoria



Deansgate Castlefield tram station An oasis right in the heart of Manchester, the Deansgate-Castlefield tram station has successfully undergone a complete transformation. Dellner-Romag supplied glass balustrading for an impressive staircase to the station that incorporates a living wall, as well as printed and shaped glass for a specialised island platform. The redevelopment of the station has transformed the station into a greener environment; a breath of fresh air within the city.

Exchange Square tram station High performance shaped architectural glass from Dellner-Romag was specified as an eye-catching feature on a new passenger stop completed for Greater Manchester's Metrolink tramway system.

More than 132 sq.m of clear glass laminate was supplied by Dellner-Romag for the Exchange Square stop in the city centre, where it will provide an attractive protective canopy for passengers sheltering from the elements. The final design was specifically produced using 17.5mm toughened heat soaked laminated glass, drilled and shaped.



Dellner-Romag printed and shaped glass is an impressive embellishment to this Manchester tram stop

The tram stop at Exchange square incorporates a minimalist approach for passengers whilst providing an architectural statement with shaped glass



Innovative Solar PV



King Cross Station Dellner-Romag were tasked with creating bespoke Building Integrated solar panels (BIPV) for Kings Cross Station, that combined the very best in modern design, technical excellence and sustainability in the redevelopment of the iconic Grade 1 listed building.

The technology involves solar cells in a custom, frameless glass laminate and fit to the glass ceiling in a seamless design that respects the integrity of the original structure. The 1392 panels produce 175,000kWh of electricity each year, saving over 100 tonnes of CO₂ emissions per annum.

Dellner-Romag supplied 1392 BIPV panels to Kings Cross Station, saving 100 tonnes of CO₂ emissions a year



Dellner-Romag will work
with you, every step
of the way

www.dellner-romag.co.uk

You imagine, we deliver



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The achievements shown in this brochure are the latest examples of how Dellner-Romag continually push the boundaries of what is possible with glass. As far as your imagination takes you, Dellner-Romag has the unique experience, technical expertise and creativity to develop and deliver the perfect bespoke solution - to the highest standards of performance, precision and protection.

Let's start exploring the possibilities together.