

FLEXITY Freedom



Light Rail Vehicles

BOMBARDIER

Freedom

Riding the winds of change

Times are changing in North America and the *BOMBARDIER* FLEXITY* Freedom* is the perfect vehicle for that change.

Built for the city and the suburbs with its optional 100% catenary-free design.
Built for sustainability.
Built for the environment.
Built in North America.
Built to last.

The *FLEXITY Freedom* is built for our times...and times to come.



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« Built for North America In North America »

Bombardier is the leading manufacturer of Light Rail Vehicles (LRV) with over 3,500 vehicles worldwide. With a workforce of over 7,000 North American employees we lead the way to economic growth through eco-friendly and efficient transportation.

The *FLEXITY* Freedom is the perfect catalyst for Transit Oriented Development (TOD), which seeks to foster urban growth along transit lines. It does so by connecting neighbourhoods to the city core, effectively reducing

congestion and harmful emissions. What will the city of the future be like? How will urban society stay mobile in years to come? The answer is sustainable mobility, a principle Bombardier has been dedicated to for years.

The *FLEXITY* family has become the benchmark for urban mobility in many countries around the world. As the market leader in light rail solutions, we are always striving to set higher standards. That is why our experts have listened to our customers' needs and learned from their requests before setting out to make a great LRV even better.



“Clients are increasingly demanding solutions that are adapted to their particular needs. The extraordinary flexibility built into the *FLEXITY* Freedom means they can get the LRV they want, configured the way they need, with the features they want, and the look they want.”

Joe Kenas, P.E.
Bombardier Senior Specialist,
Product Definition

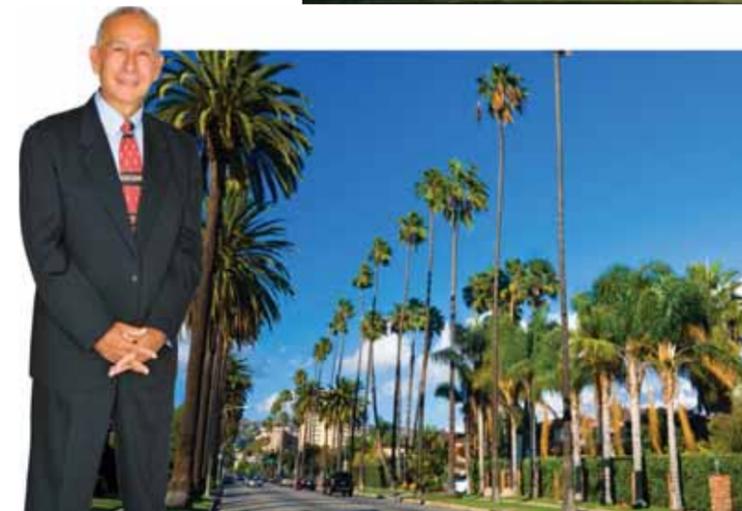


“The *FLEXITY* Freedom is the latest development of the highly successful *FLEXITY* modular LRV platform. It combines proven elements and innovations which make it the vehicle of choice for future developments in urban transportation. The *FLEXITY* Freedom was the perfect match for the City of Toronto.”

Carolyn Leroux, Eng.
Bombardier Project Director,
Toronto LRV

“Superior quality is standard for Bombardier. The *FLEXITY* Freedom is top-of-class when it comes to performance, safety and reliability. And its combination of 100% low-floor design running on conventional axle bogies offers passengers a significantly more comfortable ride.”

Jacques Drouin, Eng.
Bombardier Senior Specialist,
Product Management
Member of the APTA Streetcar Subcommittee



“North Americans want North American solutions. Since our roots are here and we build here, we know North America inside and out. The *FLEXITY* Freedom conforms to or surpasses all North American standards for performance, manufacture, safety and disability access, among many others.”

George Mekosh, P.E.
Bombardier Senior Specialist,
Product Management

Freedom will shape your city Feel free to shape your train

Cities come in every possible shape, size and style. Fortunately, the *FLEXITY Freedom* has shape, size and style options built in from the drawing board for the greater benefit of passengers.

Passenger-friendliness is a standard feature of the *FLEXITY Freedom*. The highlights include maximized aisle width throughout the vehicle and extra large windows.

Add the ultra-smooth ride made possible by conventional axle wheel-set bogies and passengers can look forward to first-class travelling. For the interior design, the *FLEXITY*

Freedom offers a virtually unlimited choice of colours and fabrics to make it a distinctive mode of transportation.

Going low is the way to go.

Part of *FLEXITY Freedom's* commitment to shaping the future is its 100% low-floor design. The low-floor entrance and entirely step-free interior are key features for elderly passengers, as well as those with strollers or heavy shopping bags. This increases safety, allows more fluid and more rapid exit and entry (lowering dwell times for more efficient operation) and facilitates access for the disabled.

Other advantages include large-scale lettering on passenger information displays and audio-visual signs at door locations.



Low-floor design throughout the vehicle means easy exit and entry for every passenger.



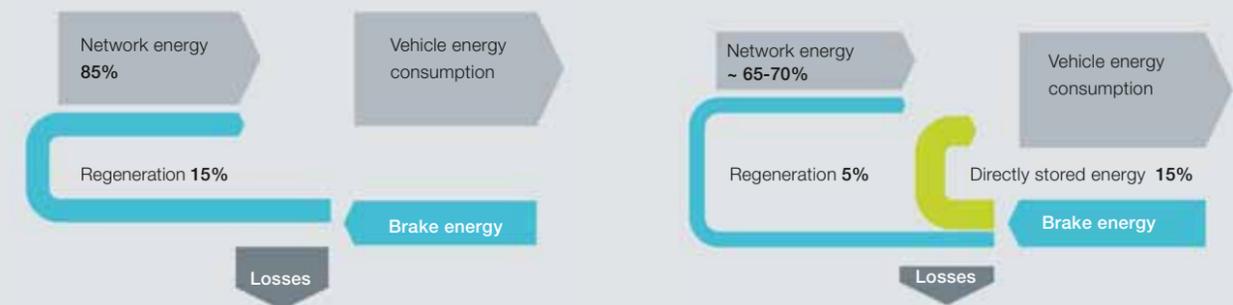
- The *FLEXITY Freedom* offers a host of comfortable and colourful seating configurations.
- Stanchions and grab handles are just two of the customizable options.
- The *FLEXITY Freedom's* wide body translates into an easy to configure interior layout that can readily accommodate bikes and wheelchairs.
- Different seating layouts are available to meet the required passenger comfort ratio.

Freedom

Feel good about where you're heading

eco⁴

Energy. Efficiency. Economy. Ecology.
*ECO4** lies at the heart of Bombardier's commitment to sustainable mobility – and is the driving force behind the design of the *FLEXITY Freedom*.

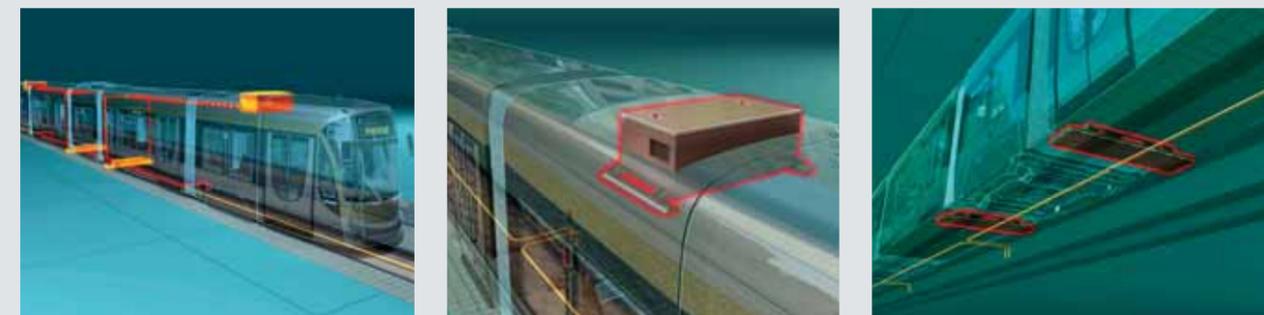


Standard operation with regenerating braking

Substantial energy savings with *MITRAC Energy Saver* (compared with standard operation)

The *MITRAC Energy Saver* system recuperates energy lost in braking in traditional systems and stores it in devices mounted on the vehicle's roof. Up to 30% energy savings can be obtained using this technology.

100% Catenary-free with *PRIMOVE*



A host of innovations was introduced to save energy and reduce CO₂ emissions, including the *BOMBARDIER* MITRAC** Energy Saver, LED lighting and an energy-efficient heating, ventilation and air-conditioning system adapted for North American climate conditions. Other measures include

lowering visual pollution thanks to *BOMBARDIER* PRIMOVE**, a catenary-free power transfer system that uses covered induction loops on the rail bed as its energy source. The *FLEXITY Freedom*'s smooth ride features help reduce noise pollution, a benefit to passengers and residents alike.

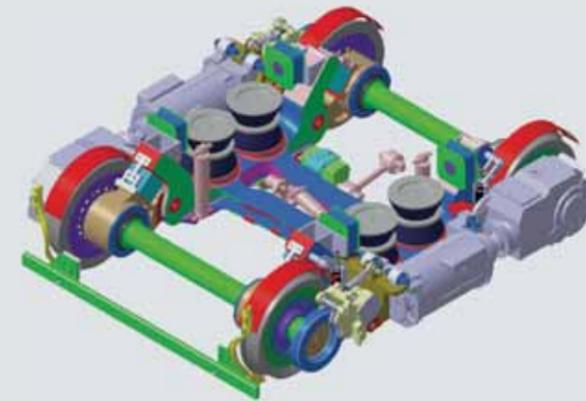
Freedom Propelled by innovation

Innovation is a guiding principle at Bombardier, one that has led us to global leadership in the light rail sector. Nowhere is the principle more evident than in the *FLEXITY Freedom*.

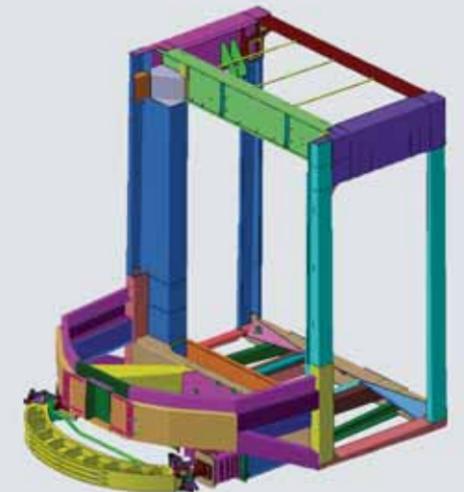
With top speeds of 80 km/h (50 mph) and a design that conforms to the strictest ASME-RT1 standards, the *FLEXITY Freedom* is ideal for both mixed traffic and higher speeds in suburban environments.

It runs on *BOMBARDIER* FLEXX* Urban 3000* bogies that were specifically developed for this 100% low-floor vehicle, featuring conventional axles with primary and secondary suspension elements. A hydraulic load-leveling system that adjusts to boarding platforms completes the design.

The modular design of the *FLEXITY Freedom* allows for easy access to components and systems, providing for an excellent level of maintainability and savings for operators.



The two traction units are installed outside the side beams of the frame to prevent interference with the low-floor structure of the vehicle.

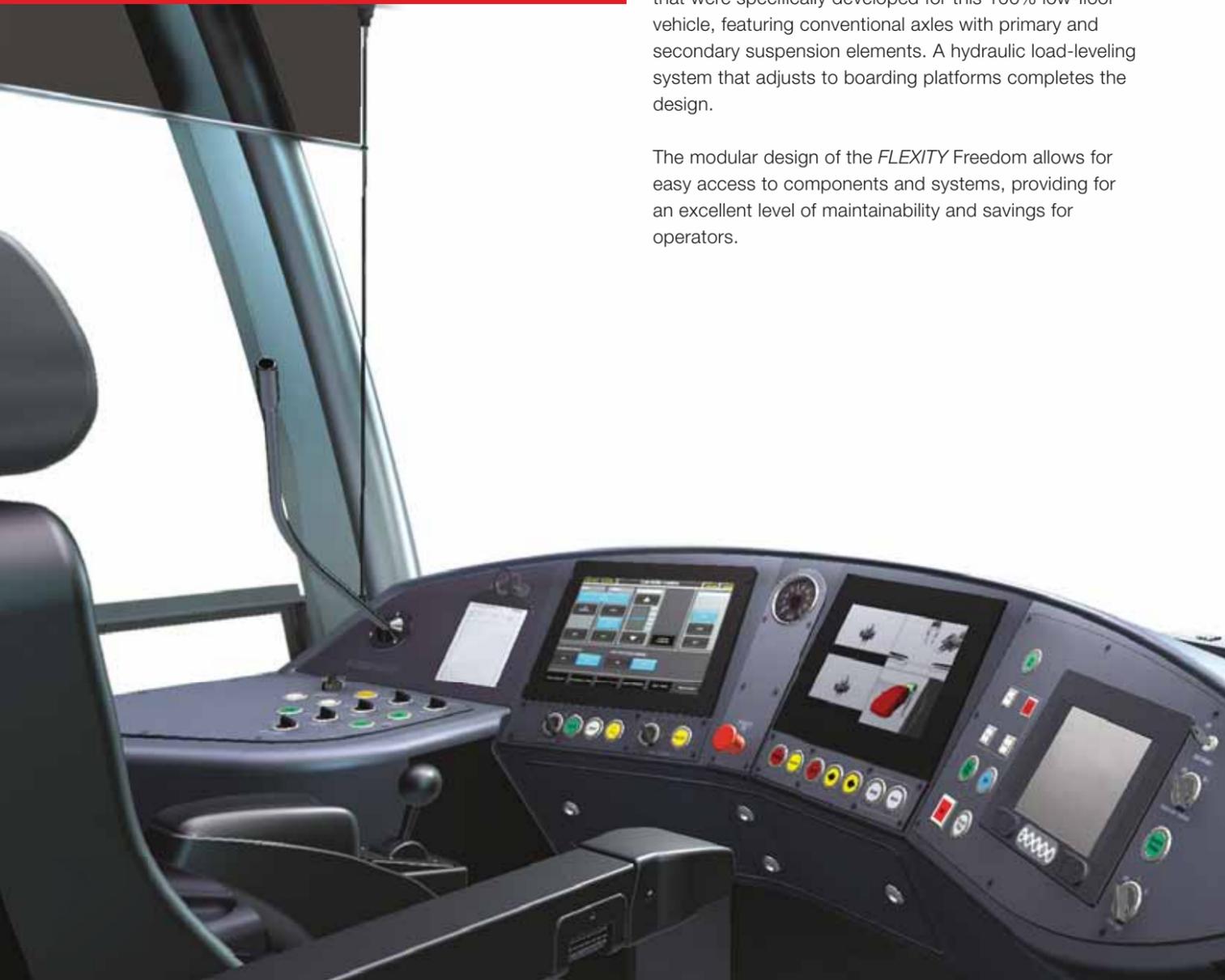


This vehicle sets new standards for non-deforming and deforming crash performance, as per ASME-RT1.

Bombardier was the first in the industry to combine 100% low-floor technology with conventional wheel-set bogies. Besides making low-floor entrances and easier passenger access possible, this leading-edge technology gives the *FLEXITY Freedom* ultra-smooth running qualities.

Safety has always been one of our top priorities. With our extensive experience in safety technology reflected in the design of the *FLEXITY Freedom*, this vehicle reaches much stricter safety standards than those in force today.

The driver's cab layout is spacious, modern and comfortable, offering a high degree of visibility. The ergonomically designed cab offers clearly arranged instruments to allow for driver-friendly and safe vehicle operation.



Freedom

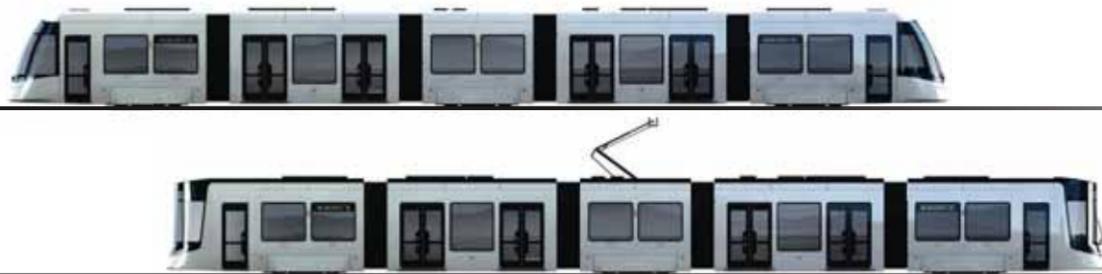
Is what you make of it

The **FLEXITY Freedom** is all about giving **Bombardier's** customers the opportunity to create exactly the kind of LRV system North American cities need.

The **FLEXITY Freedom** can be shaped to suit individual needs in a variety of ways. The exterior colour scheme and style of many components, including the driver's cab, nose, headlights and covers, can be tailored to particular preferences.

Trains can be either uni- or bi-directional, and come in a variety of motorized and trailer bogie combinations. The **FLEXITY Freedom** can operate 100% catenary-free, or adapt itself to an existing catenary network. Other options include stanchions with anti-microbial film, anti-graffiti and vandal-resistant film on windows, passenger counting and extendable platform ramps to facilitate access.

The **FLEXITY Freedom** has a carbody width of 2.65 m (8'8½") with a host of floor plans available to optimize comfort and capacity. It also comes with optional door configurations that ensure easy adaptation to variations in transportation requirements and passenger comfort.

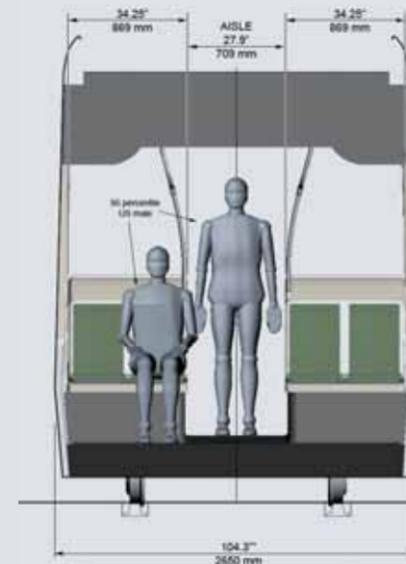


Modules	Width	Length	Height	Fixed seats	Flip up seats	ADA/ Multi-use	Standees*	Max capacity**
3	2.65 m (8' 8½")	20.0 m (65' 7½")	3.6 m (11' 9¾")	34	4	2	79	135
5	2.65 m (8' 8½")	30.8 m (101' 0")	3.6 m (11' 9¾")	56	8	4	130	251

* At 6 pass./m² (1.8 ft/pass.)
 ** As per ASME RT1



The **FLEXITY Freedom** offers unit variations in 3 and 5 module configurations. These vehicles can also be coupled together to form trains of up to 4 cars, yielding an overall capacity of more than 30,000 passengers per hour, per direction (PPHPD).



With its extra-wide carbody, the **FLEXITY Freedom** offers the benefits of two-two seating as well as maximized aisle width.



Conventional 2.4 m LRV carbody width



Interior layout advantages of the 2.65 m carbody width of the **FLEXITY Freedom**

Freedom Makes sense

The **FLEXITY Freedom** is the made-in-North America LRV of the future. Agile enough for urban roadways and fast enough to connect a city to its suburbs, it allows modern cities to reduce congestion and dependence on the automobile. It saves energy, emits no CO₂ and reduces visual and noise pollution.

Designed to be an enhancement to urban environments and not an impediment to enjoying them, the **FLEXITY Freedom** can be configured and customized to suit any city's individual needs and personality.

Whether as the mainstay of an urban transportation network, or complementing existing urban and suburban rail networks, **FLEXITY Freedom** offers sustainable mobility solutions to support Transit Oriented Development. The result: revitalization of urban areas, attraction of new business and transit users, and above all, improved quality of life.

BASE VEHICLE

Type of vehicle	FLEXITY
Model	Freedom
Train consist capability	Up to 4 vehicles

Dimensions and Weight

Number of modules	5
Length of vehicle	30.8 m (101')
Height	3.6 m (11' 9 3/4")
Width	2.65 m (8' 8 1/2")
Track gauge	1,435 mm (4' 8 1/2")

Technical Characteristics

Hydraulic load leveling / height compensation
100% low-floor
4 or 6 doors on each side
Manually deployed automatic couplers (electrical/mechanical)
Stainless steel underframes

FLEX Urban 3000 conventional axle bogies	
Train Control Management System	
Bi-directional	
Nominal current supply 750 VDC Overhead Catenary	
Catenary-free operation with <i>PRIMOVE</i> technology	
Horizontal curve	25 m (82')
Maximum speed	80 km/h (50 mph)
Sanding system	
Passenger information system with exterior destination signs	
Heating, ventilation and cooling system (HVAC)	
4 Wheelchair areas (including 4 tip down seats)	

Braking system

Regenerative braking
Hydraulic disc braking
Magnetic track braking



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Learn more about our commitment to sustainable mobility on:
www.theclimateisrightfortrains.com

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