



*Ingenuity for life*



# S70 Low-Floor Light Rail Vehicle

## Minneapolis/ St. Paul, Minnesota

The Twin Cities opened their second light rail project with a base fleet of 59 Siemens vehicles running on 11 miles of track and linking downtown St. Paul and downtown Minneapolis. The new line added stops at the University of Minnesota and the State Capital as well as connecting with the Hiawatha line serving the Mall of America and Target Field. In 2015, an additional 5 vehicles were ordered by Twin Cities followed by an additional 27 in 2016, reflecting a new interior design.

The Minneapolis/St. Paul line will feature new, full-width, removable steel snow plows at each cab end of the S70 light rail vehicle. The new design allows for full functionality of the coupler and anticlimbers without any impediment to the normal operation.

A steel carbody construction; fully bi-directional; double articulated; 70% low-floor vehicle, ideal for street-level operation and built in the USA. Each six-axle S70 light rail vehicle is equipped with two power trucks (one under each end) and a non-powered center truck.

The interior of this S70 LRV has been designed to maximize passenger space, incorporating an even blend of knee-to-back seating and longitudinal seating,

including a new center section with a wide, ADA-compliant aisle. Each S70 LRV is equipped with eight wide opening sliding plug doors all located in the low-floor area, with four to each side of the vehicle. The door spacing has been optimized to allow for greater passenger flow entering and exiting the vehicle, which ultimately decreases the station dwell times.

In addition to the maximized passenger

space and wide doorways the vehicle is also equipped with four designated wheelchair spaces allowing for priority seating to disabled passengers and hydraulic height control system to permit level boarding and exiting of the vehicle.

To accommodate Minneapolis' extensive bicycle population, this S70 incorporates four bicycle racks located adjacent to each doorway.

### Performance and Capacity

Maximum operational speed	55 mph	88 km/h
Maximum allowable speed	59 mph	95 km/h
Service acceleration and deceleration	3.0 mph/s	1.34 m/s <sup>2</sup>
Emergency braking rate	5.0 mph/s	2.2 m/s <sup>2</sup>
Passenger capacity	63 seats Approx. 231 total passengers @ 6 p/m <sup>2</sup> 4 wheelchair spaces and 2 bicycle racks	
Maximum operational gradient	7%	
Motor power rating	174 hp x 4	130 kW x 4
Catenary supply voltage	750 Vdc	



To combat the extreme winter conditions in Minneapolis the S70 features improved sidewall heaters in the passenger area and increased thermal insulation throughout the vehicle. To maximize passenger comfort each vehicle is also equipped with two roof-mounted HVAC units per LRV. The S70 utilizes a passenger information system consisting of operator and automated announcements, passenger-operator intercoms and interior and exterior electronic destination signs, as well as interior and exterior surveillance system for increased passenger safety.

The S70 LRV is electrically powered from an overhead wire system (catenary) and for Minneapolis operates at speeds up to



55 mph, carrying close to 290 passengers in each vehicle with the ability to operate in multiple vehicle consists (up to four). The S70 removes automobiles off the road in turn helping cities decrease their CO<sub>2</sub> emissions.



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### Vehicle Dimensions and Weight

Length over coupler	94.3 ft	28742 mm
Width	8.7 ft	2650 mm
Height with pantograph (locked down)	12.7 ft	3870 mm
Maximum pantograph height	up to 23 ft	7010 mm
Vehicle empty weight	101,000 lbs (AWO)	48800 kg
High-floor section above TOR	2.2 ft (with 1 step plus slight ramp)	670 mm
Low-floor section above TOR	1.2 ft (threshold) 1.3 ft (center)	356 mm (threshold) 396 mm (center)
Minimum turning radius	82 ft	25 m
Vertical curve, crest	820 ft	250 m
Vertical curve, sag	1150 ft	350 m
Track gauge	4.7 ft	1435 mm
Wheel base (power trucks)	6.2 ft	1900 mm
(center truck)	5.9 ft	1800 mm