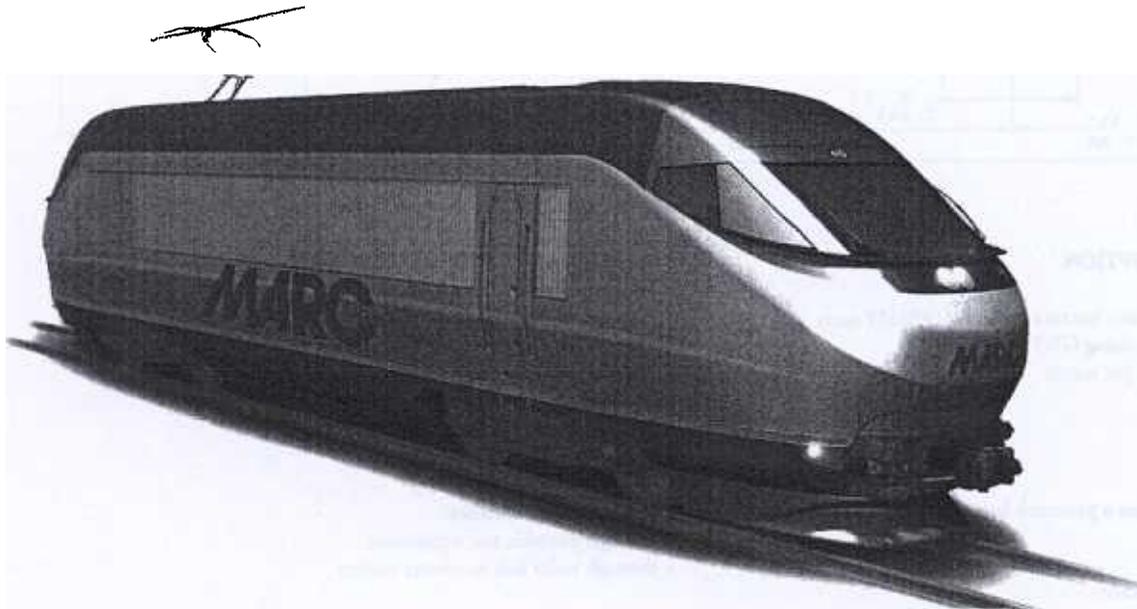


APPENDIX 5

**Design Data
High Horsepower Electric Locomotive
(for Amtrak, MARC)**

High Horsepower Electric Locomotive



GENERAL DATA

Type of vehicle

- high horsepower electric locomotive
- multipurpose with dual cab
- fully FRA & AAR compliant

Train consist

- up to 14 cars at maximum speed
- up to 18 cars at reduced performance

Catenary voltages

- 12.0 kV, 25 Hz
- 12.5 kV, 60 Hz
- 25 kV, 60 Hz

TECHNICAL CHARACTERISTICS

- Stainless steel carbody incorporating crash management (total of 6 MJ of energy)
- Fabricated steel frame outboard trucks
- Coil springs primary and secondary suspension
- Two access doors per side (behind cab bulkhead)
- Dual lateral aisle layout
- Dual pantograph
- One toilet room complete with washbasin
- One HVAC unit per cab, based on R-134a

- Ergonomic cab console arrangement
- Cab signal and speed control system
- ACSES
- EMI limit detector
- Integrated alerter and event recorder

LOCOMOTIVE PERFORMANCE

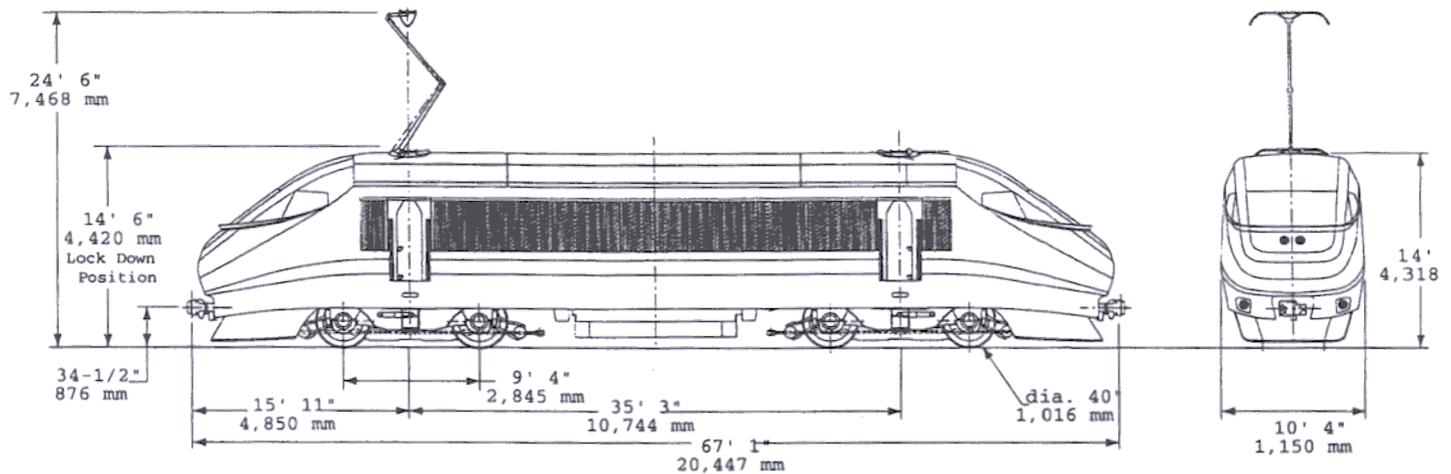
	Metric	Imperial
• Starting traction effort	316 kN	71,200 lb
• Tractive effort at continuous rating	250 kN	56,600 lb
• Continuous power rating	6000 kW	
• Maximum operating speed	200 km/h	125 mph
• Maximum design speed	217 km/h	135 mph
• Acceleration rates:		
- 1 locomotive and 8 cars		
• 5 miles in 5 minutes		
• 10 miles in 7-1/2 minutes		
• Minimum horizontal curve radius	76 m	250'
• Minimum vertical curve radius (main line)	610 m	2000'

BOMBARDIER
TRANSPORTATION



NONSTOP

High Horsepower Electric Locomotive



MAJOR SYSTEMS DESCRIPTION

Propulsion system

- Four 3-phase AC asynchronous traction motors, 1,500 kW each
- Solid state power electronic using GTO's
- One inverter control system per motor
- Built-in slip/slide system

Braking system

- Electric and friction brakes
- Control and blending done on a per-truck basis and priority to electric braking first
 - Electric:
 - regenerative and rehostatic
 - Friction:
 - two wheel cheek discs per axle and thread brakes on all wheels
 - two-pipe electro-pneumatic system
 - compatible with 26 L brake equipment
 - parking brake spring applied and air released

Train Monitoring System (TMS) and Data Management System (DMS)

- State-of-the-art and monitors most locomotive subsystems
- Provides human interface through 3 Cab Display Units (CDU)
- Interfaces with Data Management System
- DMS enables two-way communication with remote site through radio links
- Fully redundant Locomotive Network (LNET) using LonWorks network
- Provides direct compatibility with existing cars by using conventional 27 pins trainline

- Operating mode Cab Display Units used for:
 - operation critical information such as actual speed, speed limits and overspeed limitations
 - critical subsystem information such as pneumatic pressures, traction effort, motor currents, abnormal states and alarms
- Maintenance mode capabilities:
 - detailed information on subsystem health
 - maintenance event logs
 - detailed time-history record
- Data download capability:
 - through portable test equipment
 - through radio link to remote station

DIMENSIONS AND WEIGHT

	Metric	Imperial
Length over couplers	20,447 mm	67' 1"
Width over side sheets	1,150 mm	10' 4"
Height rail to top of roof	4,318 mm	14' 2"
Height rail to lock down pantograph	4,420 mm	14' 6"
Pantograph reach	7,468 mm	24' 6"
Coupler height above rail	876 mm	34-1/2"
Wheel diameter	1,016 mm	40"
Truck wheelbase	2,845 mm	9' 4"
Truck centre distance	10,744 mm	35' 3"
Track gauge	1,435 mm	4' 8-1/2"
Locomotive weight (ready-to-run)	99,790 kg	220,000 lb

BOMBARDIER
TRANSPORTATION



1101 Parent Street, St. Bruno, Québec, Canada J3V 6E6 • Telephone 1 (450) 441-2020

- Austria - Tel.: (43-1) 25 110 • Belgium - Tel.: (32-50) 40 11 11 • Canada - Tel.: 1 (613) 384-3100 • Czech Republic - Tel.: (42-0425) 343 190
- France - Tel.: (33-3) 27 23 53 00 • Germany - Tel.: (49 30) 6793-0 • Mexico - Tel.: 52 (5) 209-67-00 • Switzerland - Tel.: (41 21) 967 0505
- United Kingdom - Tel.: (44-1-924) 271 881 • United States - Tel.: 1 (212) 682-5860

www.transportation.bombardier.com