



**TRINITY INDUSTRIES INC.**  
**RAILCAR DIVISION**

# **Bombardier Capital**

## **POWER FLO<sup>®</sup> II**

**5650 Cubic Foot Covered Hopper Car &  
Pneumatic Pressure Unloading System**

**SPECIFICATION NO. L-40205**

**February 11, 1998**

**Revision "A" November 25, 1998 -2.00, 3.00, 6.00, 7.00, 8.00, 10.00**

**Revision "B" February 5, 1999 - 6.00, 7.00, 9.00, 10.02U**

**Revision "C" February 18, 2000 - 5.01, 5.02, 5.03 Cover**

**Car Series: NRLX 56525-56674 (150 cars)**

**Trinity Job/File No. 2762**

**1.00 GENERAL DESCRIPTION**

- ◆ Car described in this specification is a 5650 C.F. Covered Hopper Car with the following features:
  - ◇ All Steel welded construction
  - ◇ Four Hoppers
  - ◇ Pneumatic outlet gates
  - ◇ Round roof loading hatches
  - ◇ Stub sill design
  - ◇ Curved sides and roof
  - ◇ Meets AAR Plate "C" Equipped Diagrams
  - ◇ Meets 286,000 lb. gross rail load (GRL) in accordance with AAR Standard S-259-94.
  
- ◆ Car is constructed in accordance with the following associations and regulatory commissions known to be in effect as of the date of the specification:
  - ◇ Association of American railroads (AAR)
  - ◇ Federal Railroad Administration (FRA)
  - ◇ American Welding Society (AWS) D15.1 Railroad Welding Specification
  
- ◆ This specification is intended to include everything requisite to the proper building of the car, notwithstanding that everything required may not be mentioned.

**2.00 GENERAL INFORMATION**

**2.01 GENERAL DIMENSIONS**

Length, Inside.....	55' - 9 1/2"
Length Over Coupler Pulling Faces.....	60' - 1 5/8"
Length Over Strikers .....	57' - 6 1/8"
Length Between Truck Centers .....	46' - 3 1/8" (± 1/2)
Truck Wheelbase.....	5' - 10"
Width, Inside.....	10' - 7 5/8"
Height, Maximum .....	15' - 5 5/8"
Roof Hatch Opening .....	20" Dia.
Estimated Light Weight .....	68,000 Lbs.
Gross Rail Load .....	286,000 Lbs.
Cubic Capacity (Approximate) .....	5650 Cu. Ft.
Slope of Floor Sheets.....	55°/ 40°

**2.00 GENERAL INFORMATION (cont.)**

**2.02 CURVE NEGOTIABILITY (PER AAR CALCULATIONS)**

Horizontal Curve Uncoupled.....	180 Ft.
Horizontal Curve Coupled .....	250 Ft.
Vertical Curve Uncoupled.....	850 Ft.
Vertical Curve Coupled to Base or Like Car .....	1650 Ft.

**2.03 CENTER OF GRAVITY - ESTIMATED**

Empty Car.....	61.4"
Loaded per AAR to 286,000 lb. GRL .....	94.2"

**3.00 CONSTRUCTION**

**3.01 MATERIAL**

- ◆ All rolled steel unless otherwise specified, shall meet the minimum requirements of the American Society for Testing and Materials (A.S.T.M.).

**3.02 DRAFT SILLS**

<u>Item</u>	<u>Description / Dimension</u>	<u>Material</u>
◆ Draft Sill	Weldment	A572 GR50 Type 2
◆ Center Plate	Low profile casting 15- <sup>7</sup> / <sub>8</sub> " Dia.	
◆ Striker	Weldment	A572 GR50 Type 2
◆ Front Draft Lug	Weldment	Grade B casting or A151 C-1030 forging
◆ Rear Draft Lug	Weldment	A572-GR50 Type 2
◆ Draft Gear Carrier	One (1) per pocket 8"x <sup>5</sup> / <sub>8</sub> "	A-36

**3.00 CONSTRUCTION (cont.)**

**3.03 BODY BOLSTER**

<i>Item</i>	<i>Description / Dimension</i>	<i>Material</i>
◆ Shear Plate	<sup>7/16"</sup>	A572 GR50 Type 2
◆ Web Plates	1/2"	A572 GR50 Type 2
◆ Side Bearing Brace	3/8"	A572 GR50 Type 2
◆ Side Bearing Wear Plate	4" x <sup>5/8"</sup>	AISI C1095/277-341BHN
◆ Bottom Cover Plate	<sup>3/4"</sup>	A572 GR50 Type 2

**3.04 SLOPE SHEETS**

◆ Crossridge Sheets	<sup>1/4"</sup>	A572 GR50 Type 2
◆ End Slope Sheets	<sup>1/4"</sup>	A572 GR50 Type 2
◆ Skirt Sheets	<sup>1/4"</sup>	A572 GR50 Type 2

**3.05 SIDE ASSEMBLY**

◆ Side Sheets	0.171" & 0.179"	A572 GR50 Type 2
◆ Side Plate	9/32" Min.-"cold formed"	A607 GR55 Type 2 or A572 GR50 Type 2
◆ Side Sill	.334" Min.-"cold formed"	A607 GR55 Type 2 or A572 GR50 Type 2
◆ Ring Stiffeners	<sup>7/32"</sup> x 5 <sup>1/4"</sup> Deep	A607 GR55 Type 2 or A572 GR50 Type 2

Jacking pads, lifting lugs and roping staples are provided at the ends of each side sill.

**3.06 ROOF ASSEMBLY**

◆ Roof Sheets	0.171" & 0.179	A572-GR50 Type 2
◆ Hatch Rings	<sup>1/4"</sup> x 5" x 20" Dia.	304L Stainless Steel

**3.07 ENDS**

◆ Ladder Stiles	2 <sup>1/2"</sup> x 2 <sup>1/2"</sup> x <sup>1/4"</sup>	A36
◆ Corner Posts	<sup>1/4"</sup>	A572 GR50 Type 2

**3.08 SAFETY APPLIANCES**

◆ Handholds	<sup>3/4"</sup> diameter	A576 GR 1015-1020
◆ Handholds - Crossover	1" diameter	A576 GR 1015-1020
◆ Sill Steps	<sup>1/2"</sup> x 2"	A576 GR 1015-1020

**4.00 HATCH COVERS**

- ◆ Six (6) Hatch Covers spaced on 9'-0" centers with the following specifications:
  - ◇ Cast Aluminum covers with machined gasket groove
  - ◇ Six (6) plated cam action latches with safety latch
  - ◇ FDA approved white neoprene gasket

**5.00 PNEUMATIC UNLOADING SYSTEM**

**5.01 AERATION MANIFOLD WITH CROSSOVER**

- ◆ 3" Sch. 20 6061-T6 aluminum pipe with A356-T6 cast aluminum alloy tee's and elbows. Aeration manifold includes the following hardware:
  - ◇ Blower air connection (1) - 3" aluminum male quick connect coupling located at center of car.
  - ◇ Regulating valve (2) - 3" butterfly valve with cast aluminum body, ss stem, stainless steel disc and FDA approved seat.
  - ◇ Check valves (4) - 3" swing type valve with aluminum body, bronze flapper and viton gasket.
  - ◇ Individual aerator valves (8) - 2" full port ball valve with bronze body, chrome plated ball and teflon seal, each valve is located adjacent to hopper it services.
  - ◇ Individual aerator lines (8) - 2" hose with gray UV resistant wrap, helix wire reinforcement and white FDA approved liner.
  - ◇ Crossover (1) - 3" Sch. 20 6061-T6 with 3" air hook-up at center of car on right side.

**5.02 PRODUCT DISCHARGE MANIFOLD**

- ◆ 4" and 5" Sch. 40 6061-T6 aluminum pipe with A356-T6 cast aluminum alloy laterals. Discharge manifold includes the following hardware:
  - ◇ Individually piped and valved hopper sides.
  - ◇ Discharge Cross (1) - 5" A356-T6 cast aluminum alloy cross located at center of car, with access to either side.
  - ◇ Product outlet connection (2) - 5" aluminum male quick connect coupling located on the discharge cross.
  - ◇ Discharge Valves (8) - 5" butterfly valve with cast aluminum body, ss stem, stainless steel disc and white FDA approved seat

**5.03 DEPRESSURIZATION PORT**

- ◆ 3" Sch. 20 304L stainless steel pipe located on A-End of car and includes the following hardware:
  - ◇ Blowdown valve (1) - 3" butterfly valve with cast aluminum body, ss stem, stainless steel disc and FDA approved seat. Valve located at ground level for easy operation.
  - ◇ Vacuum relief valve - (See 5.04)

**5.00 PNEUMATIC UNLOADING SYSTEM (cont.)**

**5.04 PRESSURE RELIEF VALVES AND GAUGES**

- ◇ Primary relief valve (1) - 2" Aluminum body with brass components is set to relieve at 14.5 psi (Tolerance + 1.5 psi - 0 psi). Valve is located on roof between the #3 and #4 hatch covers.
- ◇ Secondary relief valve (1) - 2" Aluminum body with brass components is set to relieve at 17.0 psi (Tolerance + 2 psi - 0 psi). Valve is located on roof between the #3 and #4 hatch covers.
- ◇ Vacuum relief valve (1) - 3/4" bronze valve is set to relieve at 2" HG and is located on the depressurization port.
- ◇ Tank and line pressure gauges (2) - 4 1/2" dial with 0-30 psi range located in gauge box at AL corner of car.

**5.05 AERATOR TUB (WELD-ON)**

- ◇ Four (4) steel aerator tub assemblies with two 4" dia. clean out ports and fabric type fluidizers.

**6.00 SCAFFOLDING BRACKETS**

- ◇ Stainless Steel

**7.00 TESTING**

- ◇ Each vessel and pneumatic piping system is air tested for leaks at a minimum of 14.5 psig. The pressure drop shall not exceed (3/4) psig. in 30 minutes. The prototype car was hydrostatically tested at a pressure at the roof of 22.5 psig.

**8.00 BRAKES**

**8.01 BRAKING POWER**

- ◇ Brake shoe force test will be conducted per AAR Standard S-401 current revision and meet the following requirements:
  - ◇ Maximum air brake 38.0% of the car light weight
  - ◇ Minimum air brake 8.5% of the gross rail load of 286,000 Lbs.
  - ◇ Minimum hand brake 10.0% of the gross rail load of 286,000 Lbs.

**9.00 PAINTING**

- ◆ **PAINT MATERIAL** will meet current environmental laws for volatile organic compound. All paint material used is lead and chrome free.
- ◆ Exterior surface **CLEANING** of completed car underframe, sides, ends, and roof are abrasive blasted to SSPC-SP6 commercial blast.
- ◆ Interior surface **CLEANING** of completed car body are abrasive blasted to SSPC-SP10 commercial blast.
- ◆ **INACCESSIBLE SURFACES**, including metal to metal lap joints (except weld joints) and surfaces which are inaccessible after assembly, are painted with primer before assembling.
- ◆ **EXTERIOR SURFACES** of the underframe, sides, ends, and roof are given one coat of **Sigma 5478** direct-to-metal gray epoxy paint to obtain a dry film thickness of four (4) mils minimum.
- ◆ **INTERIOR SURFACES** of the car body are given one coat of **Carboline 892** direct to metal blue FDA approved epoxy lining to obtain a dry film thickness of six (6) mils. minimum.
- ◆ **STENCILING** is applied in accordance with AAR Manual of Standards and Recommended Practices, Page L34, latest revision. Ownership information (if required) to be stenciled on car body. Decals or stencil paint can be used, both will be compatible with exterior paint.
- ◆ **TRUCK SIDE FRAMES AND BOLSTERS** are given one light coat of black primer by the supplier prior to shipment. Trucks are stenciled with customer's reporting marks and car number on side of each bolster facing outboard end of car.
- ◆ Gray **ANTI-SKID** compound is applied to the exterior of roof area between the longitudinal and lateral running boards.

**10.00 SPECIALTY LIST**

**10.01 TRUCKS - 110 TON**

- a. Wheels ..... 36" Dia., One Wear Class "C", Mounting Pressure 90-160 Tons
- b. Axles ..... AAR, M-101, Class "F" 6-1/2" x 12"
- c. Side Frames ..... Narrow Pedestal arranged with roof wear plate, Grade "B+" steel to AAR M-203 and M-210. Column Wear Plates applied with H.S. Bolts
- d. Bolsters ..... Grade "B+" Steel to AAR M-203 & M-210. Bowl Machined to AAR S-305
- e. Stabilizers..... ASF Super Service Ridemaster
- f. Springs..... 3-11/16" travel min. solid capacity 105,911# per group
- g. \*Center Plate Liners..... Manganese Steel Vertical Welded with AAR approved horizontal non-metallic liner (Zeftek)
- h. \*Roller Bearings ..... AAR, NFL Type, 6-1/2" x 12" (Brenco w/DDL Seal & D-EP Grease)
- i. Pedestal Roof Liners ..... Transdyne
- j. Roller Bearing Retainer Keys ..... None
- k. Roller Bearing Adapters ..... AAR, M-924, 6-1/2" x 12" with Hardened Crown and Shoulders
- l. \*Side Bearings ..... Miner Constant Contact (TCC-8000)
- m. \*Brake Beam Wear Plate ..... AAR Non Metallic (Zeftek)
- n. Brake Beams ..... AAR No. 24
- o. Brake Shoes ..... AAR H-4 (2" H.F. Composition)
- p. Center Pins..... AAR 1-3/4" Diameter
- q. Truck Brake System ..... Ellcon National #8500 281L/ 681L

**10.02 BODY**

- a. Center Filler and Center Plate ..... Low Profile, Grade "B" cast steel with 15-7/8 dia. Hardened Bowl
- b. Front Draft Lugs ..... Cast or Forged Steel
- c. Rear Draft Lugs ..... Fabricated
- d. Draft Gears ..... AAR M901E (Mark 325 or TF-880)
- e. Draft Gear Followers ..... AAR Y44A
- f. Couplers ..... AAR SBE60DE Type "E"
- g. Yokes..... AAR Y40AE or SY40AE
- h. \*Coupler Carrier Wear Plate ..... AAR Non Metallic (Zeftek)
- i. Route Card Holder ..... Two (2), open metal frame type
- j. Defect Card Receptacle ..... One (1), AAR Type
- k. Uncoupling Device ..... AAR Bottom Operated
- l. End Platforms ..... 8" x 60" Galvanized (A-525-G90)
- m. \*Air Brake ..... NYAB DB60 less cylinder to AAR Spec. Section E
- n. Hand Brake..... AAR Vertical Wheel Group "N" with short release handle and Sheave wheel
- o. Running Boards ..... Galvanized Steel (A-525-G90)
- p. Roof Hatch Covers..... Cast Aluminum (See 4.00)
- q. A.E.I. Tags . ..... Two (2), per Spec. S-917
- r. Brake Pins..... Induction Hardened with Std. Cotters
- s. Brake Badge Plate..... Stainless Steel
- t. \*Draft Key Washer ..... ACF
- u. \*Trainline Hose Support..... Ireco #20406 (cable type)



~~1. WABCO Package~~  
 2. Ireco.  
 3. ~~3~~ Linney-  
 4. Central Sales Package

**PowerFlo II Specialty Component Supplier List**

<b>Customer:</b> Bombardier Capital / Norrail	<b>Car Type:</b> 5650 cf
<b>File:</b> <del>2707 2682</del> 2762	<b>No. of Cars:</b> 150
<b>Plant:</b> # 26	<b>Distribution Date:</b> 6/30/99

Item	Part Disposition Status	Supplier	Description
Wheel		AAR Supplier	36" 1 - W C <del>2 AAR Supplier</del>
Axle		Trinity	6 1/2" X 12"
Roller Bearing	*	Brenco	6 1/2" X 12" (DDL Seals DE-P Grease)
Side Frame	*	ASF	
Bolster	*	ASF	
Horizontal Liner	*	Zeftek	
Ride Stabilizer	*	ASF	SSRM
Springs		Trinity	
Roller Bearing Adapters		Advance Cast	6 1/2" X 12"
Brake Beam	*	<del>Buffalo</del>	#24
Brake Beam Unit Wear Plates	*	Zeftek	
Side Bearings	*	Miner	TC 8000 Constant Contact
Center Plate		Unit Forge	16" Low Profile
Draft Gear	*	Miner	TF 880
Coupler		Mc & T	SE 60 DE
Yoke		Mc & T	SY 40 AE
Coupler Wear Plate	*	Zeftek	
Uncoupling Device		Stanrail	
Air Brake	*	NYAB	DB60 ✓
Truck Mounted Brakes	*	Elcon	
Reservoir		Montex	
Running Boards		YSD	
Slack Adjuster		Elcon	TMB Package
Hand Brake		Elcon	(N) S/H
Valves		See Tom McCray	
Paint	*	<del>Hempel</del> <i>Sigma</i>	DTM Epoxy

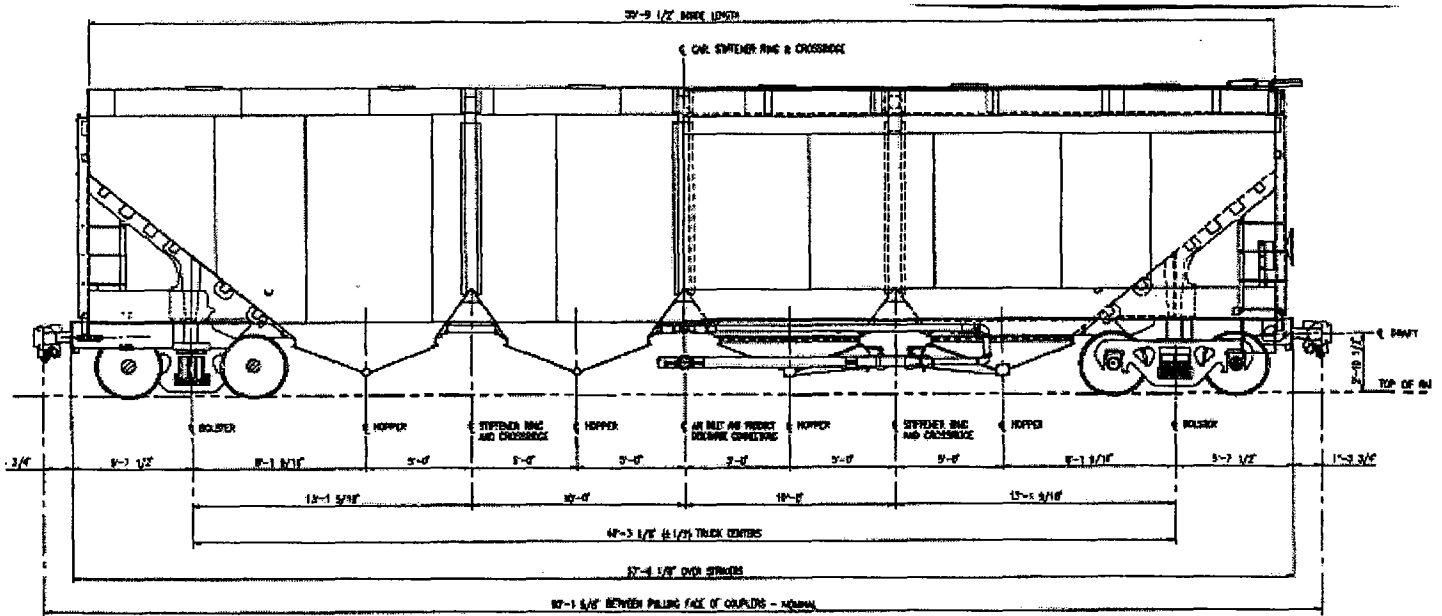
\* Customer specified component

Distribution:  
 Jerry Vande Sande  
 Steve Walden  
 Steve Carpenter  
 Carlos Tomas  
 Leslie Garza  
 Monique Brown

File  
 Jan Sams  
 Tom McCray  
 Sheri Brooke  
 Doug Williams

From:  
 Donna Morrison

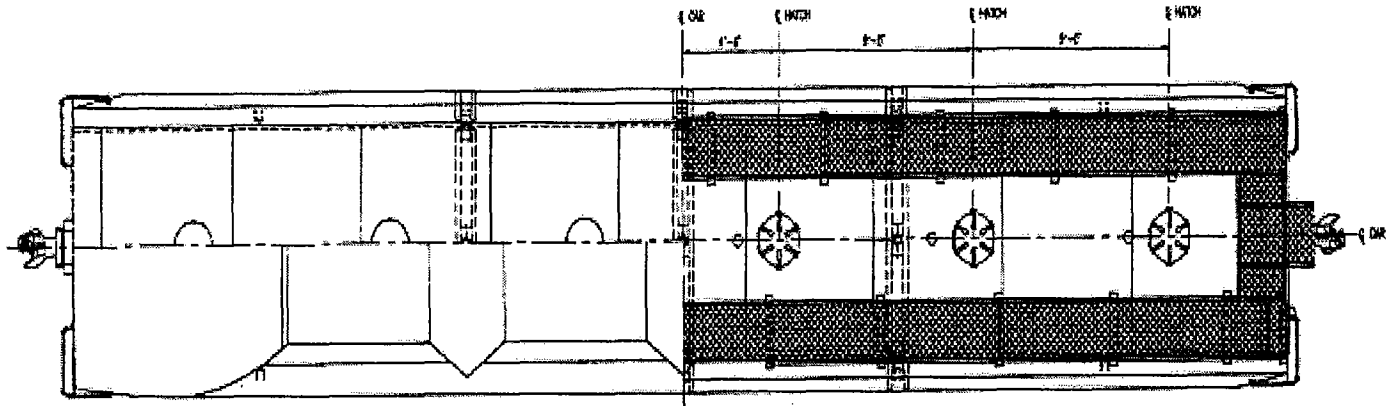
# Bombardier Capital Rail Inc



## 5650 Cu. Ft. Power Flo II Pressure Differential Covered Hopper

Car Nos. NRLX 056525- 056674	<b>BRAKE SYSTEM</b>	<b>Drawings</b>
Type: 5650 Cu. Ft. PD Cov. Hop.	Air Brake DB60	Gen'l. Arrg't.: M-042-2149
AAR Code: C-614	Bk. Rigging: Truck Mounted EN8500	Brake Arrg't.: B-003-2164
Year: 2000	Slack Adj Ellcon 2000 DJ	Stencil Arrg't.: M-024-2229
Builder: Trinity Industries	Piston: Truck Mounted	
Location: Ft Worth, TX #26	Handbrake: Ellcon 2000DJ	<b>SUPERSTRUCTURE</b>
Lot No.; TR9905 / 2762	Bellcrank: Sheave Wheel 8" EN 1749	Roof: A572-GR50 Type 2
	Anglecock: Ball Type	Roof Hatches: 16 - 20" dia., 304L S.Steel 1/4"x 5" Knappco
Center of Gravity:	Brake Shoe: 2" H.F. Composition	
Ld. Lmt.: 286,000 lbs.	Brake Beam: Acertek, #24 Unit Type	Upper Slope Sht:
Avg. Lt. Wt.: 66,000 lbs.	Bk. Shoe Key:	Angle: 55°
Cubic Capy.: 5650 cu. Ft..	MTY/LD: None	Lower Slope Sht.:
Clearance Plate: "C"		Angle: 40°
Inside Length: 55'-9-1/2"	<b>TRUCKS</b>	
Inside Width: 10'-7-5/8"	Truck-Type: ASF, SS Ridemaster	Outlet: 16 Aerator Fabrics
Inside Height:	Bolsters: B9A-944 N-FS	Air Inlet: 3" Alum
Max. Height 15'-5-5/8"	Side Frame: F9A 11EN-UA	Product Line: 5" Alum
Max. Width: 10'5 7/16"	Axles: Trinity, 6-1/2" x 12", Class F	<b>UNDERFRAME</b>
	Bearings: Brenco, 6-1/2x12" (NFL)	Couplers: McConway, SBE 60 DE
	Wheels: Griffin, 36" 1 - WC	Cplr.Release: Stanrail
	Side Brgs.: Stucki 688-B	Draft Gear: Miner, TF 880
Curvature Uncoupled: 150 ft.	R.Brg.Adapters Adv. Cast 6-1/2x12"	Yokes: McConway, SY 40 AE
40 ft. Base CAR: 1650 ft.	Friction Wedge: ASF 17823	Draft Key:
Alike CAR: ft.	Outer Ctrl.Sprg.: ASF 5062	
	Inner Ctrl.Sprg.: ASF 5063	
	Bk. Beam Wear Plt.: Zeftex 1696-	Paint Ext: Sigma 5478
	Truck Springs: Outer:28 D-5	Paint Int. Carboline 892 one coat
	Inner: 28 D-5 Inner/inner:	

# Bombardier Capital Rail Inc



## 5650 Cu. Ft. Power Flo II Pressure Differential Covered Hopper

BRAKE RATIO – Empty: 30% of the car light weight

BRAKE RATIO – Loaded: 6.5% of the GRL of 286,000 lbs.

BRAKE RATIO – Handbrake: 10% of the GRL of 286,000 lbs.

### STRUCTURALS

BOLSTER	TOP COVER PLATE 7/16" A572 Gr 50 Ty 2
	WEBS 1/2", A572 GR50 Type 2
	BOTTOM COVER PLATE 3/4", A572 GR50 Type 2
	SOLE PLATE

END SILL: Shear Plate Design

CENTER SILL: Does not have a center sill

DRAFT SILL: A572 Gr 50 Ty2

SIDE SILL: 334 A607, Gr55 Ty 2 or A572 Gr50 Type 2

CORNER POST: 1/4" A572 Gr 50 ty 2

SIDE SHEET: 0.171" & 0.179" A572 Gr 50 Ty 2

TOP CHORD:

END SLOPE SHEETS: 1/4" A572 Gr 50 Ty2

CENTER PLATES: 16" Low Profile

VIBRATOR CASTINGS: N/A

PAINT: Interior: Carboline 892, epoxy; Exterior: Sigma 5478, epoxy

COMMENTS: 2 Safety Valves, 1 @ 16.5, 1 @ 19 PST