



TRINITY INDUSTRIES INC.
RAILCAR DIVISION

NorRail, Inc.

POWER FLO® 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

APPROVED *[Signature]*

DATE 11/25/98

TR9902 & TR9903

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 15-7/8" 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 5/8"	A-36

3.03 BODY CONSTRUCTION (cont.)

3.03 BODY BOLSTER

<u>Item</u>	<u>Description / Dimension</u>	<u>Material</u>
◆ Shear Plate	^{7/16"}	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 5/8"	AISI C1095/277-341BHN
◆ Bottom Cover Plate	^{3/4"}	A572 GR50 Type 2

3.04 SLOPE SHEETS

◆ Crossridge Sheets	1/4"	A572 GR50 Type 2
◆ End Slope Sheets	1/4"	A572 GR50 Type 2
◆ Skirt Sheets	1/4"	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	^{7/32"} x 5 ^{1/4"} 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	1/4" x 5" x 20" Dia.	304L Stainless Steel

3.07 ENDS

◆ Ladder Stiles	2 1/2" x 2 1/2" x 1/4"	A36
◆ Corner Posts	^{1/4"}	A572 GR50 Type 2

3.08 SAFETY APPLIANCES

◆ Handholds	^{3/4"} diameter	A576 GR 1015-1020
◆ Handholds - Crossover	1" diameter	A576 GR 1015-1020
◆ Sill Steps	1/2" 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 or cast iron body, ss stem, alum-bronze 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" 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

- ◆ 5" Sch. 40 6061-T6 aluminum pipe with A356-T6 cast aluminum alloy laterals. Discharge manifold includes the following hardware:
 - ◇ 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 (4) - 5" butterfly valve with cast aluminum or cast iron body, ss stem, alum-bronze 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 or cast iron body, ss stem, alum-bronze disc and FDA approved seat. Includes valve stem extension for easy operation from ground level.
 - ◇ 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) - $\frac{3}{4}$ " bronze valve is set to relieve at 2" HG and is located on the depressurization port.
- ◇ Tank and line pressure gauges (2) - 4 $\frac{1}{2}$ " 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

- ◆ None

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 (1 1/2) 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-SP6 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

*Customer Specified

PowerFlo II Specialty Component Supplier List

Customer: <u>Norral, Inc.</u>	Car Type: <u>5650 of Covered Hopper</u>
File: <u>2697</u>	No. of Cars: <u>150</u>
Plant: <u># 26</u>	Distribution Date: <u>12/9/98 Change #2</u>

Item	Part Disposition Status	Supplier	Description	Other
Wheel		AAR Supplier	36" 1 - W C	
Axle		Trinity	6 1/2" X 12"	
Roller Bearing	*	Brenco	6 1/2" X 12" (NFL)	
Side Frame		ASF		
Bolster		ASF		
Horizontal Liner		Zeftek		
Ride Stabilizer		ASF		
Springs		Trinity		
Roller Bearing Adapters		Advance Cast	6 1/2" X 12"	
Body Side Bearing		A. Stucki		
Brake Beam		Acertek	#24	
Brake Beam Unit Wear Plates		Zeftek		
Truck Side Bearing		Miner	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		Ellicon		
Reservoir		Montex		
Slack Adjuster		Ellicon TMB Pkg.		
Hand Brake		Ellicon	(N) S/H	
Valves		See Tom McCray		
		Interior: Carboline	892	

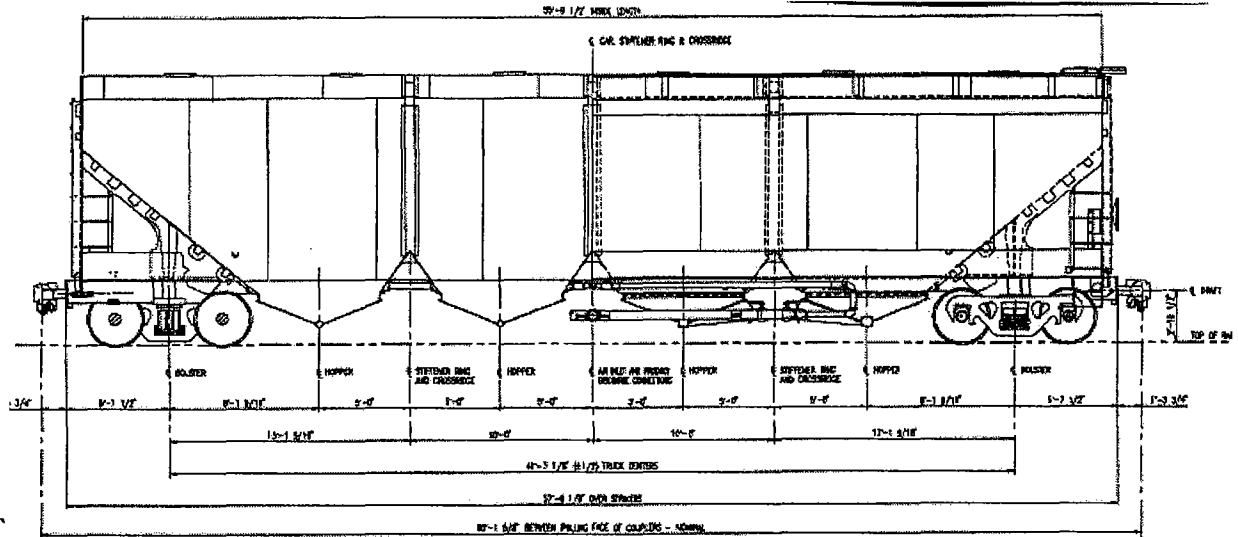
* Customer specified component

Distribution:

Jerry Vande Sande	File
David Uhrik	Jan Sams
Steve Carpenter	Tom McCray
David Conley	Sheri Brooke
Rick Hoffman	Leslie Garza

From:
Donna Morrison

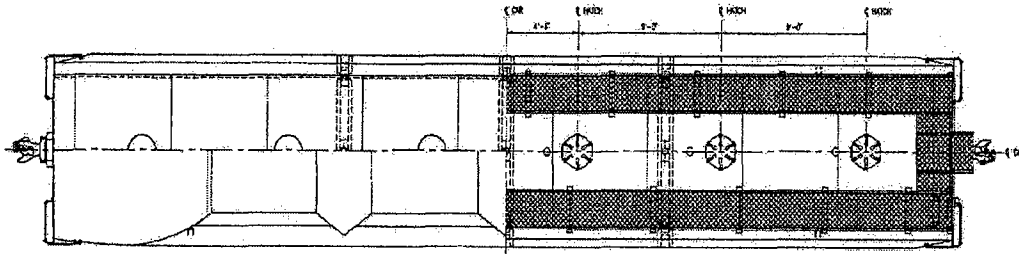
Bombardier Capital Rail Inc.



C614 – 5650 cu ft Pressure Differential (PD) Covered Hopper

BCRI ID # 56000-56149	BRAKE SYSTEM	Outer Ctrl Sprg: ASF 5062
Type: Power Flo II PD Hopper	Air Brake: ABDX & DB 60	Inner Ctrl Sprg: ASF 5063
AAR Code: C614	Bk Rigging: Elcon Trk Mtd 8500	DRAWINGS: Gen'l Arrgt:
Year: 1998	Levers: Schaefer	Brake Arrgt:
Builder: Trinity	Slack Adj: Ellcon 2000DJ	Stencil Arrgt:
Location: Ft. Worth/Saginaw, Tx.	Piston: Truck Mounted	Draft Arrgt:
Lot # 2582 – 2603, 2603A & 2603B	Handbrake: Ellcon D 31000	SUPERSTRUCTURE
Clearance Plate: C	Bellcrank: Sheave wheel 8" (#EN 1749)	Roof: A572-Gr50 Type 2
Car Hire Default Rates: Load/MTV	Anglecock: Ball Type	Roof Hatches: (16) 20" 304L Steel
Hourly:	Brake Shoe: 2" H.F. Composition	Upper Slope Sheet Angle: 55°
Mileage	Brake Shoe Key:	Lower Slope Sheet Angle: 40°
GENERAL DIMENSIONS	Brake Beam: #24 Unit type	Unloading Systems
Truck Centers: 46'3 1/8"	MTY/LD: None	Fabric: (16) Aerator Fabrics
Inside Length: 55' 9 1/2"	TRUCKS	Product Line: 5" Aluminum
Length over Strickers: 57' 6 1/8"	Truck-Type: ASF SS Ridemaster	Air line: 3"-or 4" Aluminum
Length o' Coupler Faces: 60' 1 5/8"	Bolsters: B9A-944 N-FS	56060-56079 equipped (w) 4" air inlet. 56134-56149 equipped (w) 4" air inlet and dual gauge boxes. 56080-56133 built as unlined cars.
Width-Extreme: 10' 8"	Side Frames: F9A-11EN-UA	(2) Safety Valves: 1 @ 14.5 (1) @ 17.0 psi
Width-Inside: 10' 7 5/8"	Axles: 6 1/2 X 12" Class F	UNDERFRAME
Height-Extreme: 15' 5 5/8"	Bearings: Brenco. 6 1/2 X 12" Brenco	Couplers: SBE 60 DE McConway
Hft-from Rail to Eave:	Wheels: Griffin 36" 1w C grade	Cplr Release: Stanrail
	Side Brgs: Miner TCC 8000	Draft Gear: Miner, TF 880
	R. Brg. Adapters: 6 1/2 "X 12"	
Cubic Cap: 5650 cu ft	Friction Wedge: ASF 17823	Yokes: McConway SY 40 AE
Ld. Lmt: 218,000 lbs Avg Lt. Wt: 68,000 lbs	Truck Springs: (28) D-5 Outers Truck Springs: (28) D-5 Inners	COATINGS:
	Curvature Uncoupled: 150 ft.	Ext. Primer:
	40 ft Base CAR: 1650 ft.	Exterior Topcoat: Sigma 5478 Epoxy
		Int. Primer:
		Int. Topcoat: Carboline 892 Epoxy

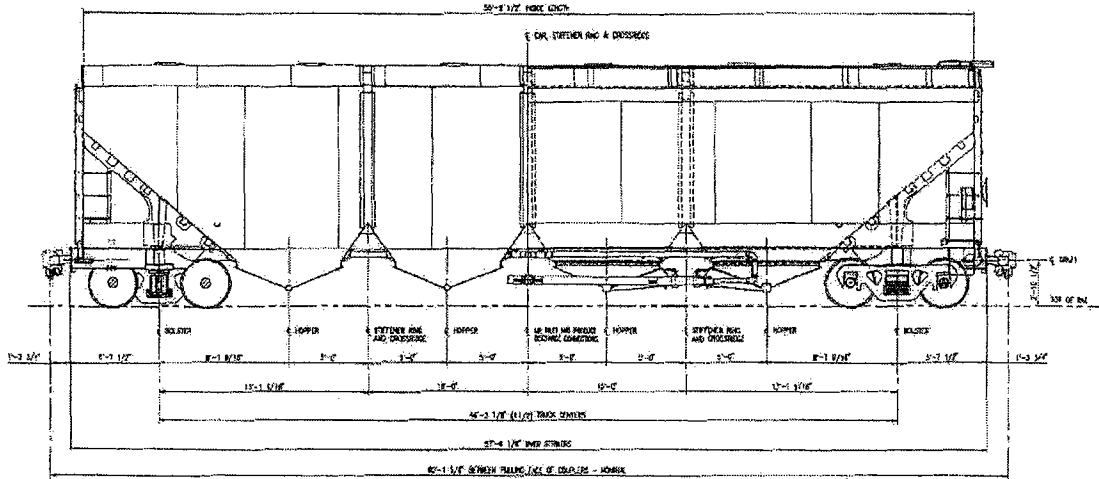
Bombardier Capital Rail Inc.



C614 – 5650 cu ft Pressure Differential (PD) Covered Hopper

BRAKE RATIO – Empty: 30% of the cars 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" A572-50 Type 2
	WEBS: 1/2" A572 GR50 Type 2
	BOTTOM COVER PLATE: 3/4" A572 –50- 2
CROSSTIES:	
FLOOR STRINGERS:	
END SILL: Shear Plate Design	
CENTER SILL: N/A	
DRAFT SILL: A572 Gr 50 type 2	
SIDE SILL: 334 A607, Gr55 type 2 or A572 Gr 50 type 2	
SIDE SHEETS: 0.171" & 0.179" A572 Gr 50 type 2	
CTR PLATES: 16" Low Profile	
Comments/Miscellaneous:	

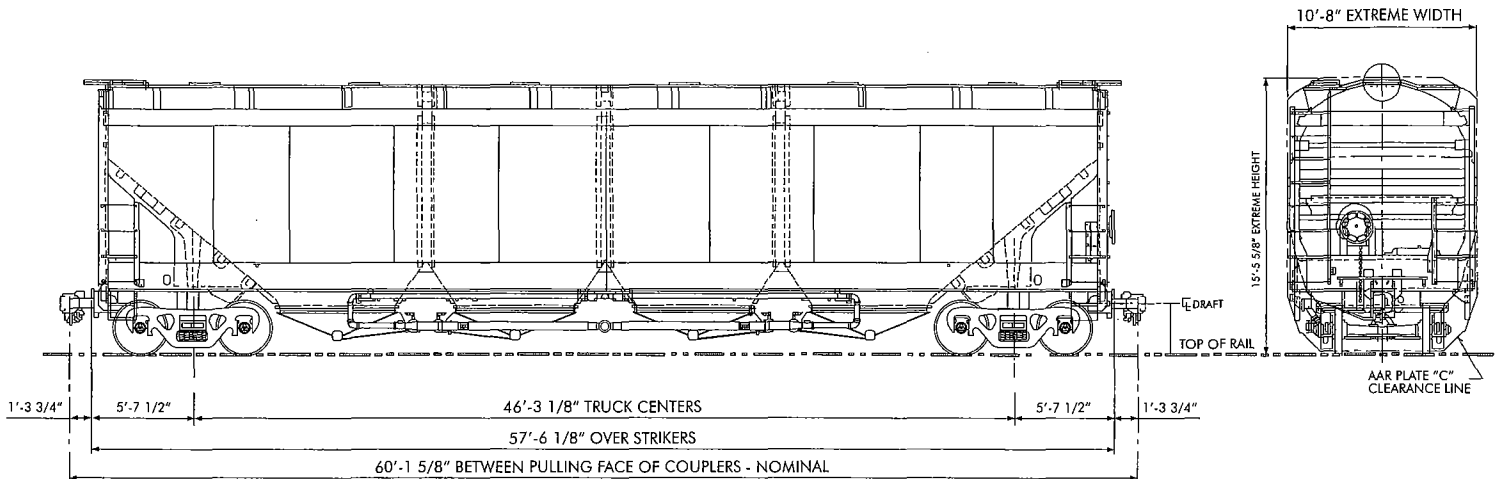
Bombardier Capital Rail Inc.



NorRail Inc.
General Specifications
Builder: Trinity Industries - Ft. Worth, Texas

Car Design:	5650 cuft PD covered hopper
Builder:	Trinity Industries
Year Built:	March 1999
Capacity:	286,000 lbs
Estimated Light Weight:	69,000 lbs
Clearance:	Plate C
Extreme Height:	15' 5 5/8"
Extreme Width:	10' 8"
Product Discharge:	5" aluminum pipes connected to 5" butterfly valves, and flow cones to assist in the unloading.
Aeration Manifold:	3" aluminum pipe assessable from both sides
Draft System:	Rigid - Miner TF880
Air Brakes:	NYAB DB-60
Roller Bearings:	Brenco - DDL seals
Special Information:	Car is lined with Carboline 892.

Power Flo® II 5650 Cu. Ft. Covered Hopper



STANDARD SPECIFICATIONS

Length Over Coupler Pulling Faces	60'-1 5/8"
Length Over Strikers	57'-6 1/8"
Length Between Truck Centers	46'-3 1/8"
Width, Extreme	10'-8"
Height, Extreme	15'-5 5/8"
Truck Wheelbase	5'-10"
Roof Hatch Openings	(6) 20" dia.
Discharge Outlet Opening	5" pipe
Estimated Lightweight	69,500 lbs.
Gross Rail Load	286,000 lbs.
Slope of Floor Sheets	55°, 40°
Cubic Capacity	5,650 cu. ft.



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