

SPECIFICATION P-6050/09

750 - 28' 9" I.L. ROTARY DUMP GONDOLA CAR

FOR

CIORL PARTNER LTD/MACQUARIE RAIL MANAGEMENT LLC


CAR SERIES

ARRANGEMENT DRAWING NO. 60302080

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Engineering

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## SECTION NO. 1

### GENERAL

#### 1.1 Scope

This specification describes the features of a rotary dump gondola, with a volume of 1780 Cu.Ft. The car is designed for a gross rail load of 286,000, lbs. The car consists of an underframe, two (2) side assemblies, and two (2) end assemblies. The side top chord is pin connected to the end top chord. The car is designed to be rotary dumped by clamping to the top chords. The interior sides are sloped to assist in the release and discharge of product.

#### 1.2 Clearance Diagram

The car shall be within the Plate C clearance diagram.

#### 1.3 Specifications

The car shall be designed and built in accordance with the specifications of the following organizations where applicable:

Association of American Railroads (AAR)  
U.S. Department of Transport, Federal Railroad Administration (FRA)  
Transport Canada - Railway Safety Directorate (RSD)  
American Society for Testing and Materials (ASTM)  
American Welding Society (AWS)  
Canadian Standards Association (CSA)

#### 1.4 Quality Assurance

National Steel Car is certified to ISO 9001:2008 & AAR M-1003.

#### 1.5 Welding

Welding practices shall be in accordance with the requirements of the AWS Railroad Welding Specification D15.1.

#### 1.6 Design

The design and construction of this car shall meet the requirements outlined in the AAR Design Specification M-1001 for cars of this type and for a gross rail load of 286,000 lbs. in accordance with AAR Specification S-286.

**1.7 Material**

Structural steel plate shall generally be high strength low alloy steel (HSLA) to CSA Specification G.40.21, Grade 50W or ASTM A-572 Grade 50.

Where impact testing is required, the structural steel shall be to CSA Specification G40.21 Grade 50 WT to Category 4 (20 ft-lb at zero deg. F) with testing on a heat lot basis in accordance with CSA Specification G40.20.

Structural steel sheet material shall be HSLA to ASTM Specification A1011 or A1018, Grade 50W.

Low stressed structural and non-structural members shall generally be carbon steel to ASTM Specification A36 or its equivalent.

**1.8 Specialties**

All specialty items shall be listed in the attached Application of Specialties unless noted otherwise.



### 2.3 Truck Dimensions

Journal Size	6-1/2" x 9"
Spring Travel	3-11/16"
Center Bowl Diameter (Nominal)	16"
Wheel Diameter	36"
Truck Wheel Base	5' 10"
Rail to Center Plate Bearing Surface (Light Car)	2' 1-1/16"

### 2.4 Curve Negotiation

Curve negotiation to determine minimum radius is calculated in accordance with AAR Design Specification M-1001, Section 2.1.4.

#### **Horizontal Curve Minimum Radii:**

- Uncoupled	150'
- Coupled to AAR Base Car	185'
- No. 7 Crossover	Pass

#### **Vertical Curve Minimum Radii:**

- Uncoupled	500'
- Coupled to AAR Base Car	785'

2.5 The car is suitable for rotary dump service. Clearance requirements will be to specific dumper arrangement.

### SECTION NO. 3

#### BODY CONSTRUCTION

##### 3.1 Underframe

###### 3.1.1 Center Sill Assembly

The center sill shall be a fabricated box section extending from striker to striker. Separators shall be applied at the bolster and crossbearers. The ends of the center sill shall be designed to accommodate a standard draft gear and "F" coupler.

###### 3.1.2 Bolster

The bolster shall be a double web design of all welded construction. The webs shall be welded to the floor sheet and bottom cover. The bottom cover shall extend in one piece from the edge of the center sill bottom flange to the side. The bottom cover shall be contoured to provide the required clearance over the truck side frame and provide the mounting surface for the body side bearing wear plate. Reinforcement shall be applied between the webs stiffening the body side bearing area. The bolster shall incorporate jacking pads and towing & lifting provisions in accordance with AAR Specifications.

###### 3.1.3 Center Plates

The Low Profile 16" diameter center plates shall be cast steel to AAR Specification M-201 Grade B or B+. The horizontal and vertical surfaces shall be hardened to 300 BHN at a depth of 1/8". The center plate shall be applied by welding.

###### 3.1.4 Body Side Bearing Wear Plates

Body side bearing wear plates shall be a 5/8" x 5" x 18" hardened bar, applied to AAR Specification S-235.

###### 3.1.5 Diagonals

The diagonals at the wheels shall be U-pressing sections with the webs welded directly to the floor.

### **3.1 Underframe cont'd...**

#### **3.1.6 Crossbearers**

The crossbearers shall be fabricated from HSLA steel to form a fabricated "U" section. The webs shall be directly welded to the floor, which shall be the top cover. The bottom cover shall be butt welded to the bottom cover of the center sill and to the post extension assembly.

The webs shall be fillet welded to side post extension, the floor, the bottom cover, and the center sill web.

#### **3.1.7 Floor Plate**

The floor plate shall be of one piece and welded directly to the webs of the center sill, bolsters, crossbearers and stringers. The floor sheet shall have extensions beyond the side sheet to allow for the mounting of side posts.

### **3.2 Side Assemblies**

#### **3.2.1 Side Assembly**

The side assembly shall have a top chord, a side sheet, side posts and side sill. The side sheet shall be continuously fillet welded to the top chord. The side posts shall be continuously welded to the sheet and the top chord.

#### **3.2.2 Top Chords**

The top chords shall be a hollow structural tube of HSLA steel.

### 3.2 Side Assemblies cont'd...

#### 3.2.3 Side Posts

Each side sheet shall be reinforced with tapered U-shaped pressings at the crossbearers and bolsters. There shall also be side post extensions welded to the crossbearer and bolster.

#### 3.2.4 Side Sill

Side sill shall be flat bar running full length of side sheets.

### 3.3 End Assemblies

The end assemblies shall consist of an end sheet, U stiffeners, outer sheet, and top chord.

#### 3.3.1 End Sheet

The end sheet shall be welded to the horizontal stiffeners, top chord, side sheets, and the floor.

#### 3.3.2 End Top Chord

The end top chord shall be a hollow structural tube that extends over the side top chords.

#### 3.3.3 End Sheet Stiffeners

The end panel shall be reinforced with U shaped HSLA steel pressings mounted horizontally. The end stiffeners and sheet shall butt into the side sheets.

### 3.4 Corner Connection

The corner connection between the side and end top chord shall be pinned. A fabricated pin connector (lug) shall be welded into the top and bottom ends of the side top chords. A 2" diameter pin shall be installed vertically to connect the end top chord and the side top chord allowing rotation.

### 3.5 Push Pads

Push pads shall be located at the four (4) corners of the car as per the customer specification.

SECTION NO. 4

DRAFT ASSEMBLIES

**4.1 Components**

Fixed Coupler	F type, AAR No. F70DE or equivalent with material to AAR Specification M-211, Grade E
Rotary Coupler	F Type, AAR No. FR304WE or equivalent with material to AAR Specification M-211, Grade E
Coupler Carrier Wear Plate	Manganese
Draft Gear	To AAR Specification M-901G
Draft Gear Follower	AAR Y46AE
Yoke	AAR No. Y45AE with material to AAR Specification M-211 Grade E
Striker and Front Draft Stops	Cast steel to AAR Specification M-201, Grade B or B+
Rear Draft	Cast Steel to AAR Specification M-201, Grade B, B+ or NSC fabricated design
Uncoupling Rod	AAR approved

SECTION NO. 5

TRUCKS

5.1 General

The car shall be equipped with two truck assemblies designed for 286,000 lbs gross rail load to AAR Specification S-286 and Specification M-976. Each truck shall be equipped with the following main components:

5.2 Components

Bolster	To AAR Specification M-202 with cast steel material to AAR Specification M-201 Grade B or B+, and with 16" x 1-3/4" deep bowl (above wear liner)
Side Frame	To AAR Specification M-203 with cast steel material to AAR Specification M-201 Grade B or B+
Wear Liners	Bolster shall have a stainless steel vertical center bowl liner and manganese horizontal liner  Truck side frames shall have bolted column wear plates to AAR Specification S-3003
Springs	D-5, 3-11/16" travel. Springs shall be to AAR Specification M-114
Stabilizers	To suit truck arrangement
Wheels	Two wear 36" diameter Class C with AAR 1B profile and curved plate, AAR Specification M-107/208, type J36 or CJ 36
Axles	Size 6-1/2" x 9", Class K, Grade F, carbon steel material to AAR Specification M-101
Roller Bearings	Size 6-1/2" x 9" NFL to AAR Specification M-934
Bearing Adapters	Size 6-1/2" x 9" narrow type to AAR Specification M-924

5.2 Components cont'd...

Side Frame Key	To AAR Specification S-377 attached with 3/4" mechanical fasteners
Side Bearings	Long Travel Metal Capped Constant Contact
Center Pins	1-3/4" diameter

## SECTION NO. 6

### BRAKES

#### **6.1 General**

The design shall be dual capacity system with body mounted rigging. Installation shall be in accordance with AAR specifications S-400 and S-401.

#### **6.2 Components**

Air Brake	One stabilized control valve, empty load valve, and fabricated reservoir
Brake Beams	No. 24 unit guide type to AAR Specification S-344
Brake Cylinder	10" x 12" with suspended mount
Slack Adjuster	Double acting automatic to AAR Specification S-419
Hand Brake	One vertical wheel, non-spin, short handle quick release, standard power, Group N, to AAR Specification S-475. #66 Bell Crank
Guide Wear Plate	Steel to AAR Specification S-367
Brake Shoes	2" high friction composition type to AAR Specification M-926, Type H4
Brake Shoe Keys	Single leaf type to AAR Specification S-376
Brake Pins	To AAR Specification S-375, hardened

#### **6.3 Brake Forces**

Brake forces shall be in accordance with AAR Specification S-401. At 65 psi equalization, the total net shoe force as determined by a static dynamometer test shall be not less than 11% or more than 14% of the gross rail load with empty/load valve in loaded car mode and not less than 15% or more than 32% of the light weight with empty/load valve in light car mode.

A 6.0 to 7.0 psi brake reduction from a 90 psi brake pipe pressure must result in all brake shoes being forced against the wheels. The average brake shoe force of all brake shoes on the test car shall be no less than 100 pounds at each wheel.

**SECTION NO. 7**

**SAFETY APPLIANCES AND SPECIAL EQUIPMENT**

**7.1 Safety Appliances**

The safety appliances shall be in accordance with the customer requirements for a low mount hand brake application.

The ladder rungs and handholds shall be 3/4" diameter and the lengths specified shall be exclusive of any bend radii. Rungs shall be attached to the car by 5/8" diameter mechanical fasteners.

Sill steps shall be 2" x 1/2" in cross section and fastened with 5/8" diameter mechanical fasteners.

The "B" end of the car shall be fitted with a brake step to AAR standard S-226 for applying the hand brake.

**7.2 Route Card Boards & Defect Card Holder**

There shall be two (2) route card boards per car to be applied to AAR Specification S-229. A defect card holder shall be applied to the BR corner of each car.

**7.3 Automatic Equipment Identification**

The car shall be equipped with two (2) Automatic Equipment Identification Transponder Tags per AAR Specification S-918.

## SECTION NO. 8

### PAINING

#### **8.1 General**

The car body exterior shall be grit blasted and painted with an epoxy paint system.

#### **8.2 Surface Preparation**

Rough welds, sharp edges and corners shall be ground, and weld spatter removed.

Rubber hoses, critical brake components and mechanisms, draft components, and finish painted items which are on the car shall be masked from grit and paint.

The trucks shall be removed for blasting.

Surface grease, oil, and other similar matter shall be removed.

All exterior surfaces shall be prepared and grit blasted to SSPC SP-6, commercial quality.

#### **8.3 Car Body Interior**

The interior of the car shall not be blasted or painted.

#### **8.4 Painting - Car Body Exterior**

The car shall be painted with one coat of epoxy paint. Average dry film thicknesses shall be 4-6 mils.

#### **8.5 Painting - Trucks**

Truck side frames and bolsters shall be given a fog coat of black direct to metal paint by the manufacturer.

#### **8.6 Lettering**

Lettering to be in accordance with the AAR, FRA and related industry standards.

SECTION NO. 9

TESTING

**9.1 Air Brakes**

Each car shall receive a "Single Car Test" in accordance with AAR Specification S-486 and a "Brake Pipe Restriction Test" in accordance with AAR Specification S-471.

Brake force tests and air leakage tests shall be performed in accordance with AAR requirements.

**9.2 Curve Negotiation**

The sample car will be tested for body and truck interference with the trucks swiveled to simulate the minimum curve radius requirement and with springs removed to simulate the solid spring height. To test for brake and truck interference, the loaded car spring height shall be simulated. Testing shall be done on a 150' "S" curve horizontal test track at NSC to T.O.P. ENG-04.

**9.3 Interior Dimensional Requirements**

The interior dimensions of the gondola will conform to T.O.P. ENG-16.