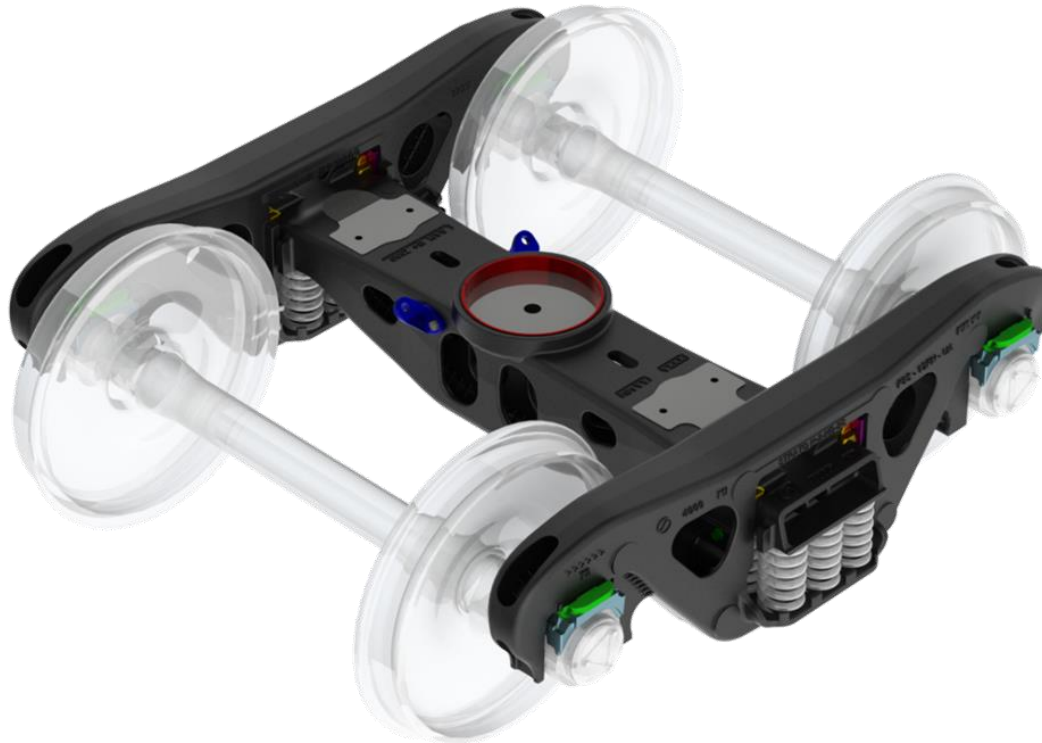


# Strato Inc Truck Reconditioning Manual



**NOTE:** Printed copies of this manual are not controlled documents and are to be treated as reference only. Please ensure the revision date on each printed page matches before use. To ensure you manual is the current revision, contact Strato, Inc or visit [www.stratoinc.com/manuals](http://www.stratoinc.com/manuals).

## IMPORTANT NOTICE!

This manual details the correct reconditioning and repair instructions for Strato N2-HD bolsters and side frames. Users are to utilize the information and to adhere to the instructions and methods described herein and any deviation therefrom and/or altering the product in any way that is not referenced in this manual may result in property damage or personal injury, including severe injury and/or death.

If there are any questions regarding the information, instructions, or methods in this manual, if you do not understand any of said information, instructions or methods, if you think your application may require a deviation from what is contained in this manual, or you need to repair or alter a Strato product not included in this manual, you are to contact either Engineering Support or Customer Service at the contact information contained on the next page to discuss same.

# STRATO INC CONTACT INFORMATION

## **ENGINEERING SUPPORT**

1-732-317-5444

FOR ENGINEERING QUESTIONS, PART NUMBERS, CROSS REFERENCES, AAR CODE NUMBERS, AND  
FOUNDRY PATTERN NUMBERS, PLEASE CONTACT:

ANDREW KUCEROVY  
AKUCEROVY@STRATOINC.COM

## **CUSTOMER SERVICE**

1-800-792-0500

FOR PLACING ORDERS AND PRICING, PLEASE CONTACT STRATO INC CUSTOMER SERVICE:  
CUSTOMERSERVICE@STRATOINC.COM

THE PURPOSE OF THIS MAINTENANCE MANUAL IS, WHERE APPLICABLE, TO SUPPLEMENT THE ASSOCIATION OF AMERICAN RAILROADS (AAR) INTERCHANGE RULES FIELD MANUAL FOR:

RULE 46 – TRUCK SYSTEM PERFORMANCE

RULE 47 – TRUCK BOLSTERS

RULE 48 – TRUCK SIDE FRAMES

RULE 50 – TRUCK SPRINGS

RULE 88 – MECHANICAL REQUIREMENTS FOR ACCEPTANCE

RULE 90 – CARS AND/OR CAR PARTS PROHIBITED IN INTERCHANGE

**IN THE EVENT OF CONFLICT, THE AAR “FIELD MANUAL” AND “OFFICE MANUAL” OF INTERCHANGE RULES SHALL SUPERSEDE THIS MANUAL.**

ADDITIONAL REFERENCES INCLUDE:

AAR STANDARD M-214 – CLASSIFICATION AND REPAIR PROCEDURE

AAR SPECIFICATION M-1003 – QUALITY INSURANCE

AAR MANUAL OF STANDARDS AND RECOMMENDED PRACTICES – SECTION S

AAR MANUAL OF STANDARDS AND RECOMMENDED PRACTICES – SECTION S PART II

THIS TRUCK RECONDITIONING MANUAL IS THE PROPERTY OF STRATO INC. IT IS NOT TO BE COPIED, DISSEMINATED, OR OTHERWISE USED FOR ANY REASON OTHER THAN PROVIDING CORRECT RECONDITIONING AND REPAIR INSTRUCTIONS FOR STRATO N2-HD BOLSTERS AND SIDE FRAMES, NOR USED DIRECTLY OR INDIRECTLY, IN WHOLE OR IN PART, TO ASSIST IN MAKING OR TO FURNISH ANY INFORMATION FOR THE MAKING OF DRAWINGS OR OTHER REPRODUCTIONS HEREOF, OR FOR THE MAKING OF ANY PART OR COMPONENT PART SHOWN HEREIN, WITHOUT THE WRITTEN CONSENT OF STRATO INC.

THIS DOCUMENT IS PROVIDED WITH THE EXPRESS INSTRUCTION, CONDITION, AND AGREEMENT THAT THE DRAWINGS, INSTRUCTIONS, AND OTHER INFORMATION CONTAINED HEREIN ARE THE PROPERTY OF STRATO INC. AND THAT NO OWNERSHIP IS TRANSFERRED, NOR LICENSE IS CONVEYED, BY STRATO INC’S ISSUANCE OF THE SUBJECT MANUAL. ALL PERSONS AND ENTITIES WHO RECEIVE OR POSSESS THIS MANUAL AGREE THAT THEIR RECEIPT AND POSSESSION OF THIS MANUAL, OR OF ANY REPRODUCTION THEREOF, WILL CONSTITUTE AND BE CONTRUED AS ACCEPTANCE OF THE PROVISIONS AS STATED HEREIN.

Page 4 of 27

Issue Date: 4/24/2023

Revision Date: 7/5/2023

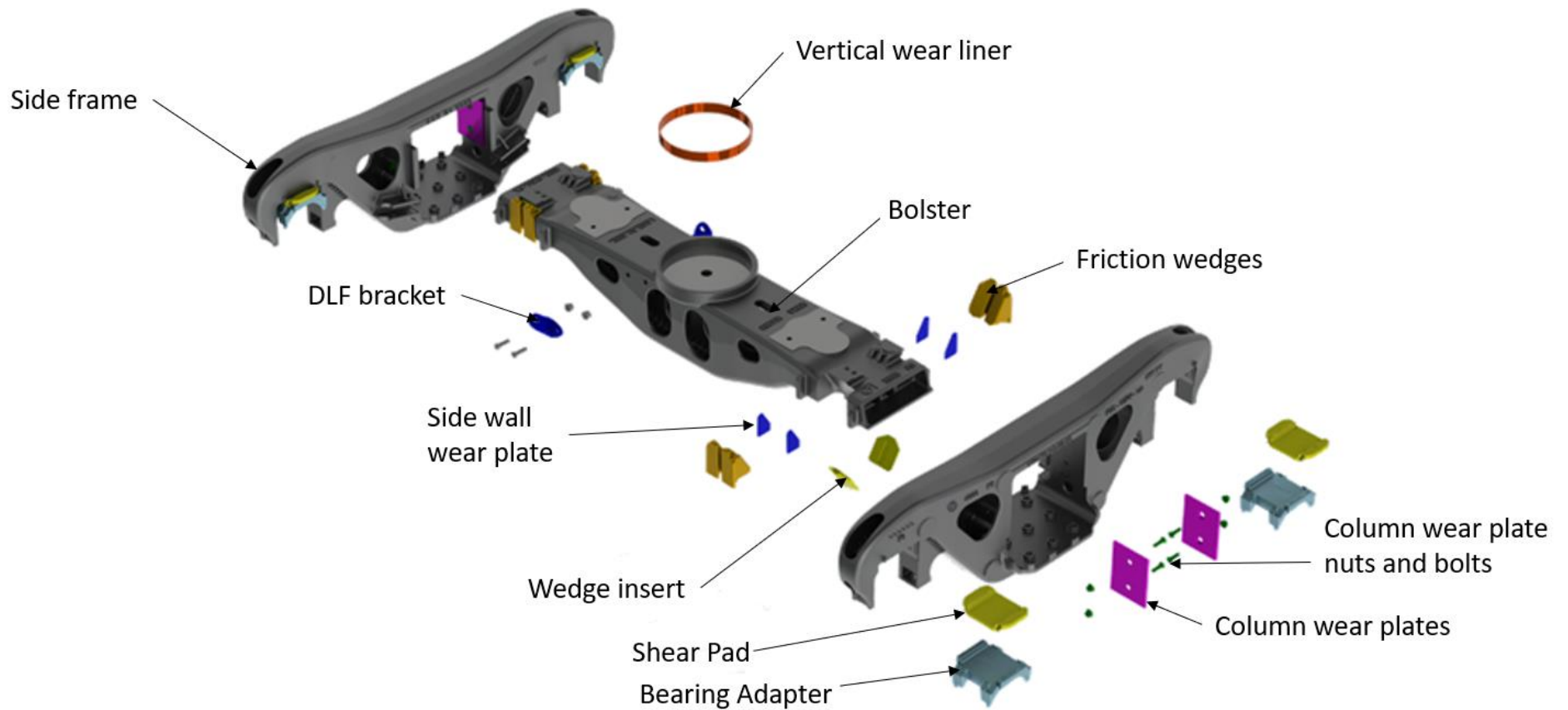
Revision: A

100 New England Avenue • Piscataway, NJ 08854 • Tel: 732-981-1515 • Fax: 732-981-1222 • Toll Free: 800-522-3038  
Customer Service: 800-792-0500 • Customer Service Fax: 800-3-STRATO (378-7286) • www.stratoinc.com

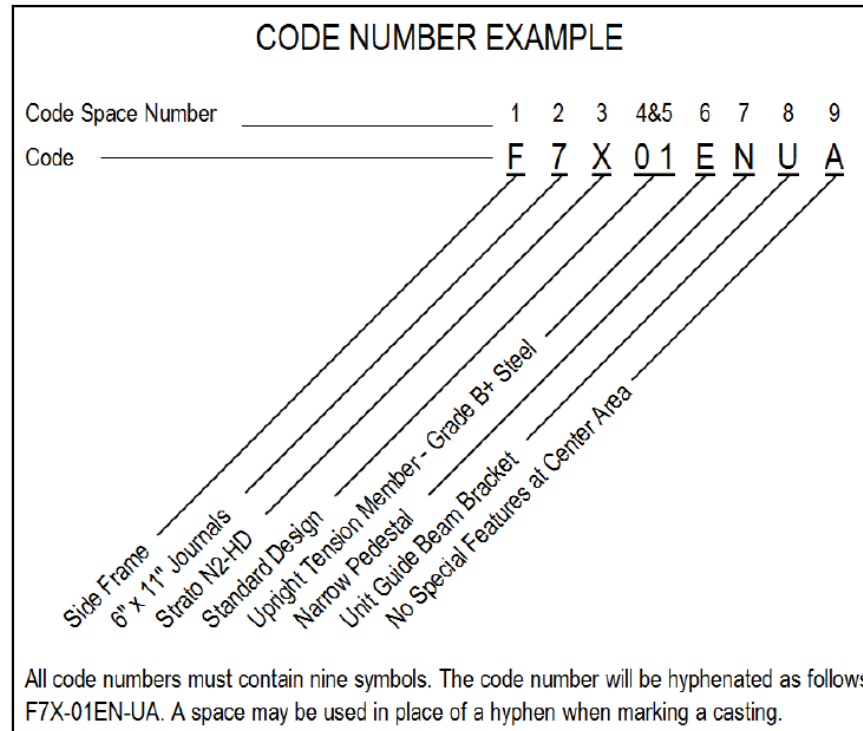
## Table of Contents

Section 1: Nomenclature	6
Section 2: Truck Disassembly & Assembly	13
Section 3: Combined Wear Inspection	14
Section 4: Bolster Pockets	15
Section 5: Split Wedges	23
Section 6: Springs	24
Section 7: Column Wear Plates	26

# Truck Component Diagram

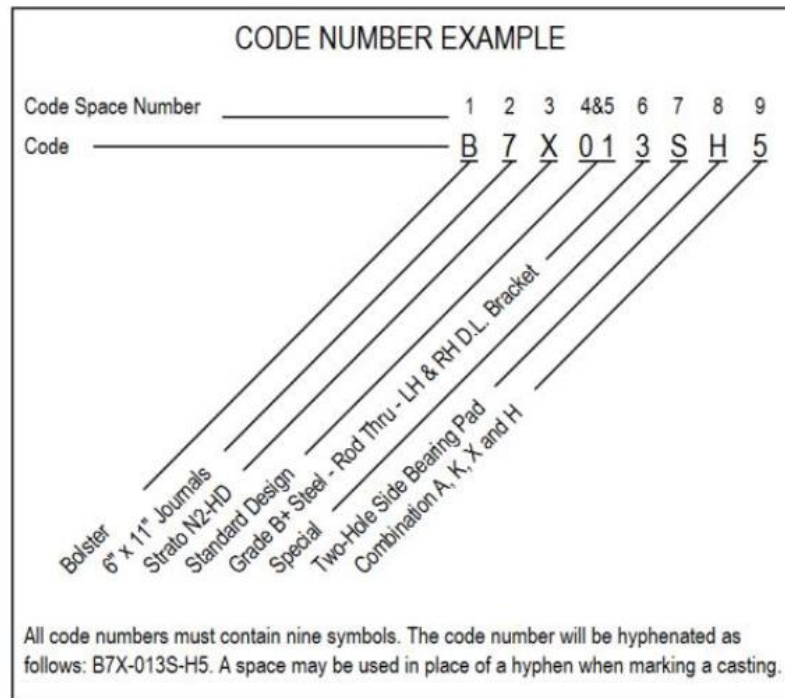


# AAR Code Numbers – Side Frames



**SEE STRATO DRAWING T-SA1463-CUST FOR AAR CODE DESIGNATING SIDE FRAME. CONTACT STRATO CUSTOMER SERVICE FOR THIS DRAWING.**

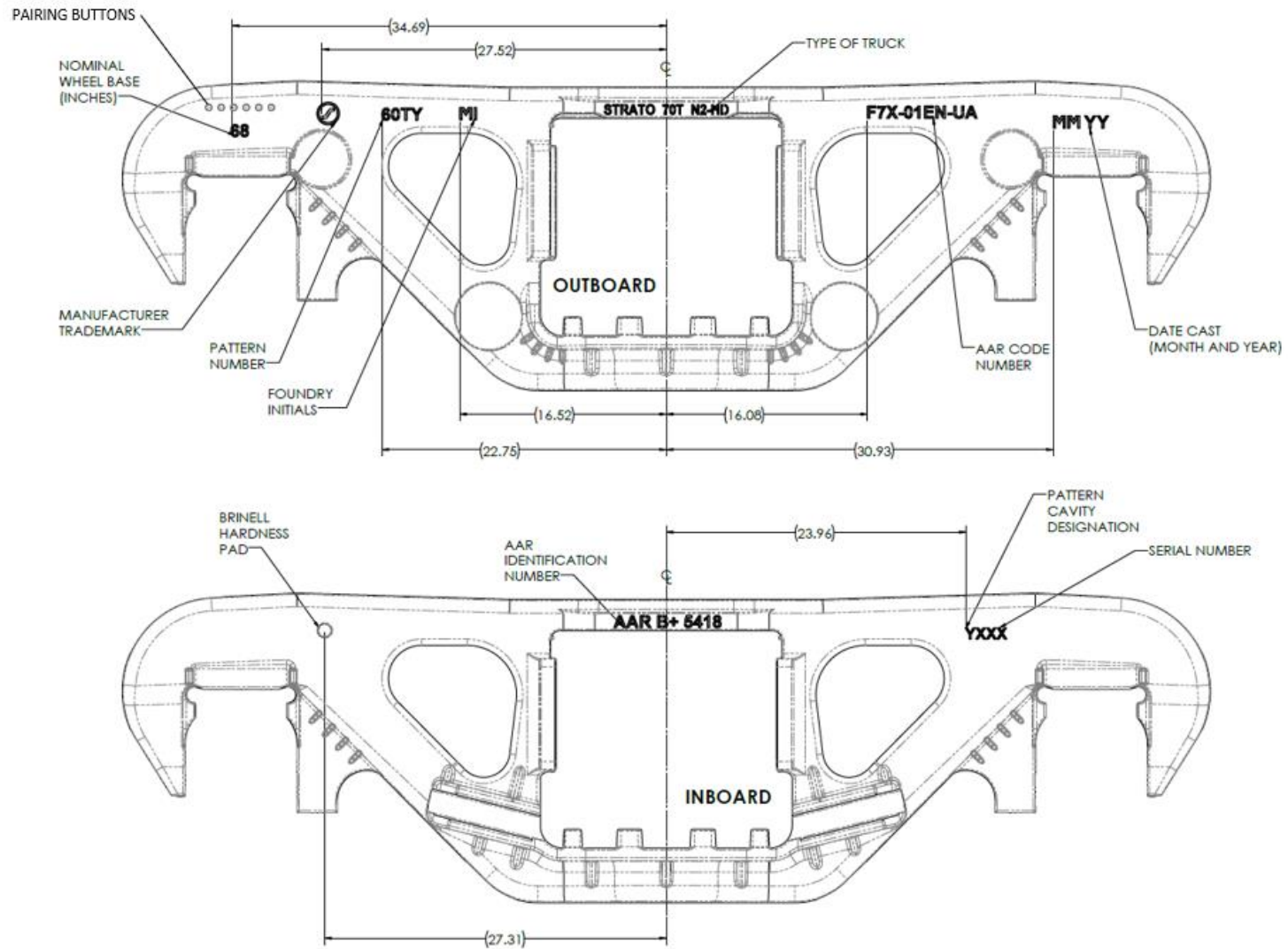
## AAR Code Numbers – Bolsters



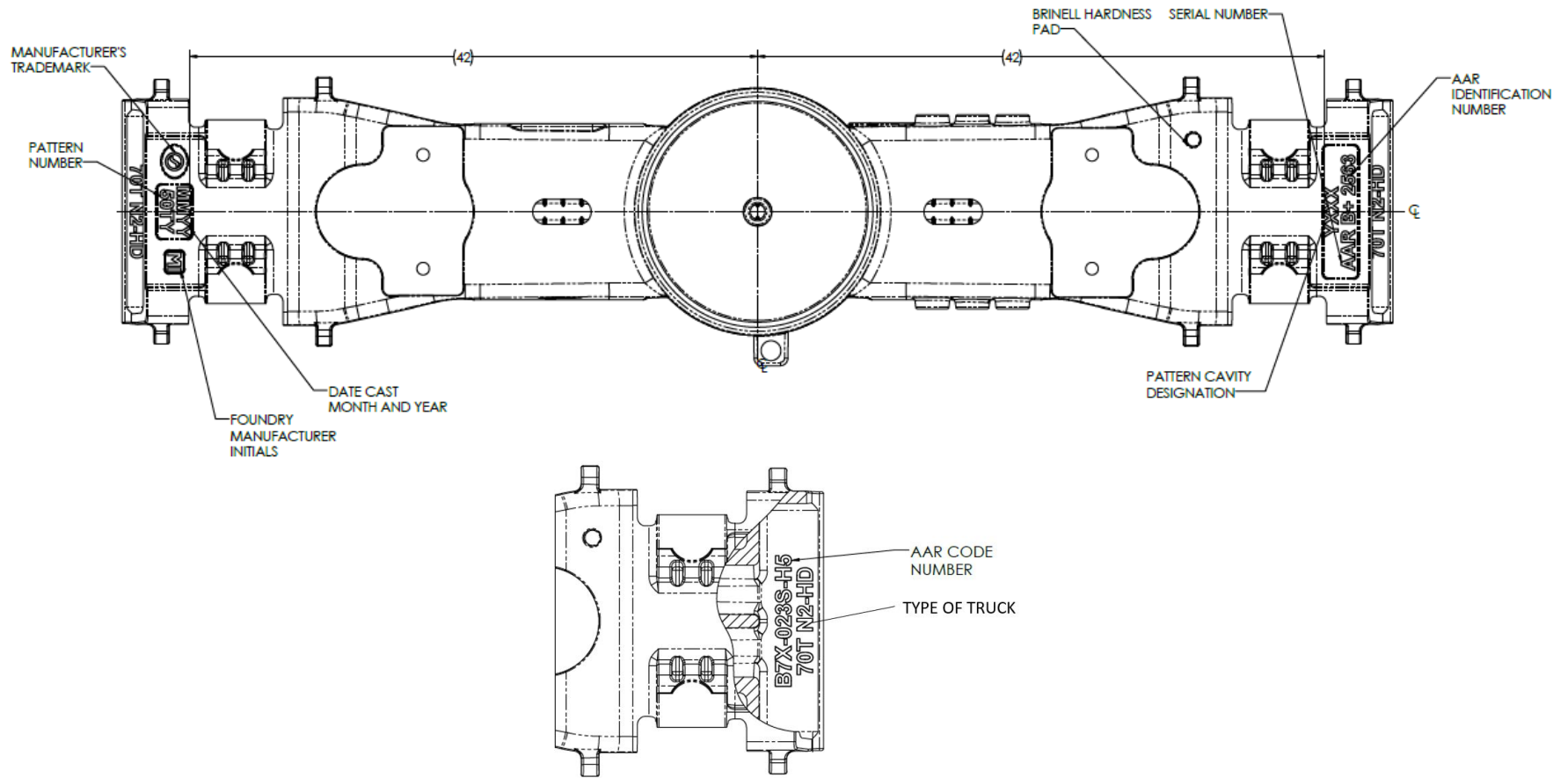
SEE STRATO DRAWING T-BA1462-CUST FOR AAR CODE DESIGNATING BOLSTER. CONTACT STRATO CUSTOMER SERVICE FOR THIS DRAWING.



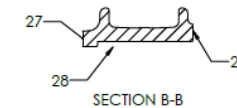
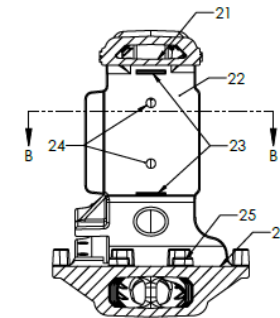
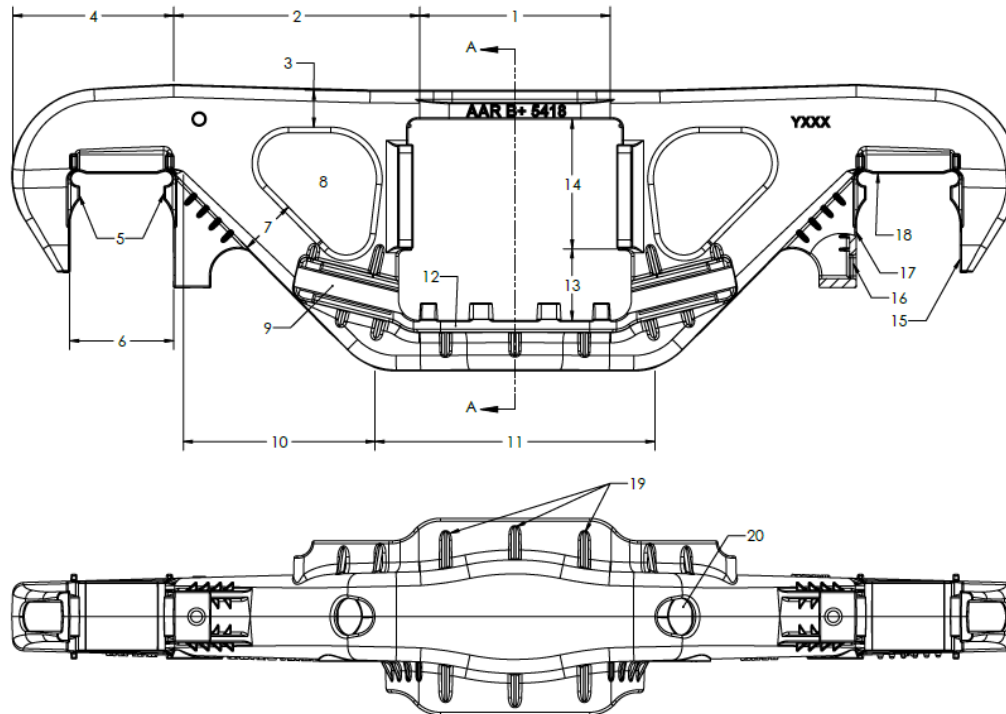
# 70T Side Frame Marking Diagram



# 70T Bolster Marking Diagram

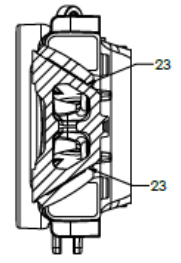
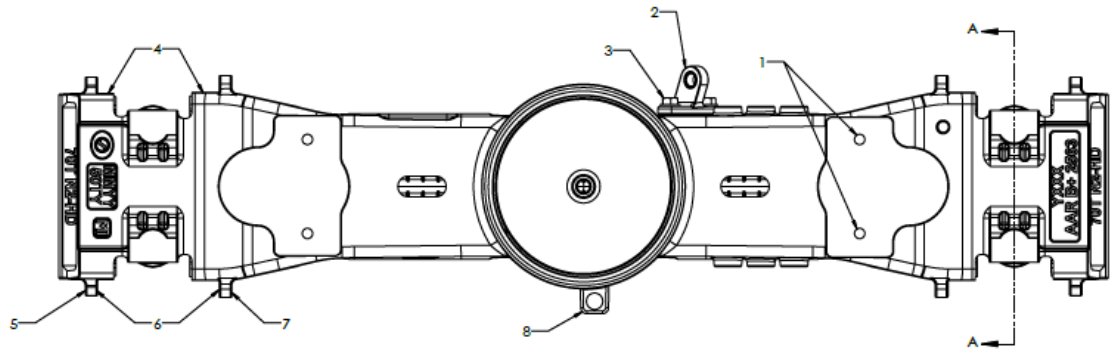


# Side Frame Nomenclature

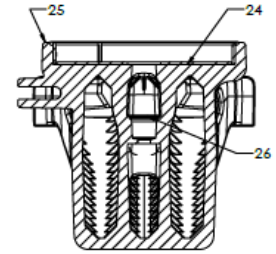
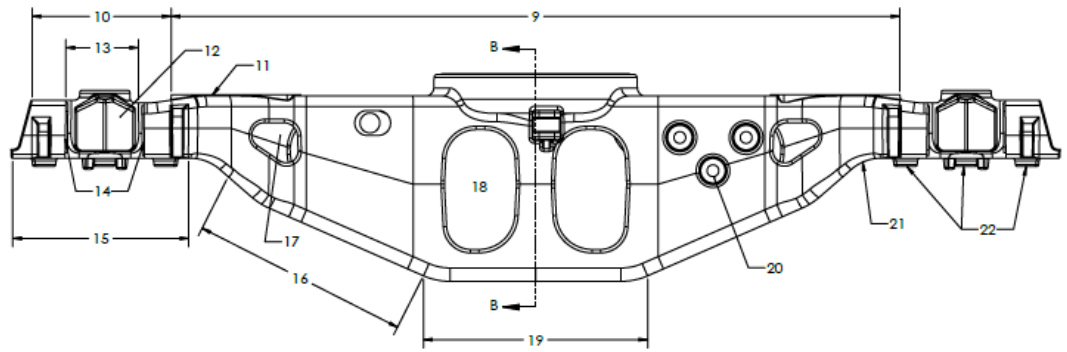


- |                               |                              |                               |                                      |
|-------------------------------|------------------------------|-------------------------------|--------------------------------------|
| 1. Top member center          | 8. Windows                   | 15. Outer pedestal legs       | 22. Column face                      |
| 2. Compression members        | 9. Unite guide brackets      | 16. Retainer key slot         | 23. Column wear plate retainer beads |
| 3. Compression member flanges | 10. Diagonal tension members | 17. Inner pedestal legs       | 24. Column wear plate retainer holes |
| 4. Top ends                   | 11. Bottom center            | 18. Pedestal roof             | 25. Spring seat bosses or lugs       |
| 5. Pedestal thrust lugs       | 12. Spring seat flanges      | 19. Spring seat ribs          | 26. Spring seat                      |
| 6. Pedestal region            | 13. Lower bolster opening    | 20. Bottom center drain holes | 27. Bolster anti-rotation lugs       |
| 7. Tension member flanges     | 14. Columns                  | 21. Top member bridge         | 28. Column wear plate (not shown)    |
|                               |                              |                               | 29. Sides of column                  |

# Bolster Nomenclature



SECTION A-A



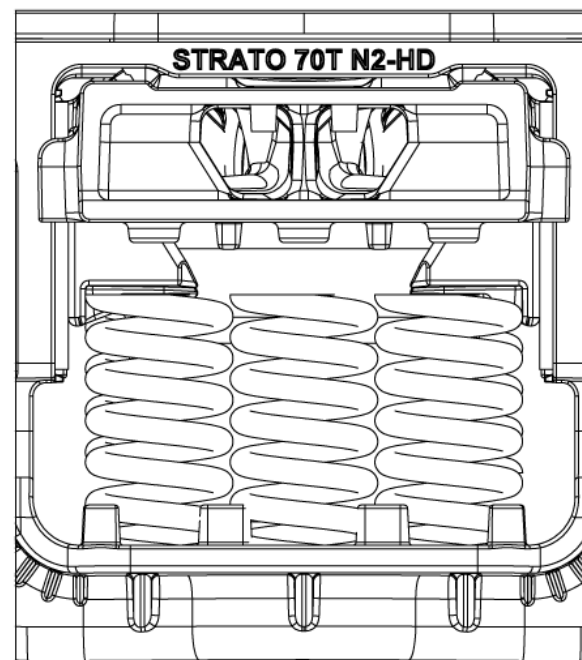
SECTION B-B

- |                                |                                |                              |                                     |
|--------------------------------|--------------------------------|------------------------------|-------------------------------------|
| 1. Side Bearing Retainer Holes | 8. Thrall Davis Clevis Bracket | 15. Spring Seat              | 22. Spring Bosses                   |
| 2. Dead Lever Bracket          | 9. Compression Member          | 16. Tension Member           | 23. Bolster Pocket Slope Surfaces   |
| 3. Dead Lever Bracket Hardware | 10. Bolster Ends               | 17. Side Wall Lightner Holes | 24. Center Plate Horizontal Surface |
| 4. Lands                       | 11. Side Bearing Pads          | 18. Brake Windows            | 25. Center Plate Rim                |
| 5. Outer Gibs                  | 12. Split Wedge Insert         | 19. Bottom Center Member     | 26. King Pin Well                   |
| 6. Columns                     | 13. Bolster Pocket             | 20. Ellcon National TMB      |                                     |
| 7. Inner Gibs                  | 14. Bolster Pocket Side Walls  | 21. Turn of Spring Seat      |                                     |

## Truck Disassembly and Assembly

### Truck disassembly:

1. Lift the truck bolster off the springs to the top of the bolster opening of the side frames. See figure.
2. Remove the field side corner load springs to gain access to the control springs and friction wedges.
3. Carefully remove the control springs.
  - a. **\*WARNING\*** – split wedges will drop out of the bolster pocket. Proceed with caution.
4. Remove remaining springs.
5. Repeat steps 1-4 for other side of the truck.
6. Lower bolster to bottom of side frame bolster opening and lift side frame such that the outer bolster gibs are even with the lower bolster opening and remove side frame from the bolster.

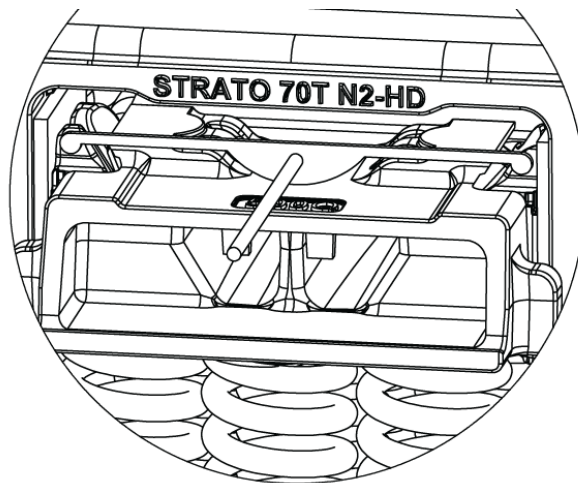


### Truck assembly:

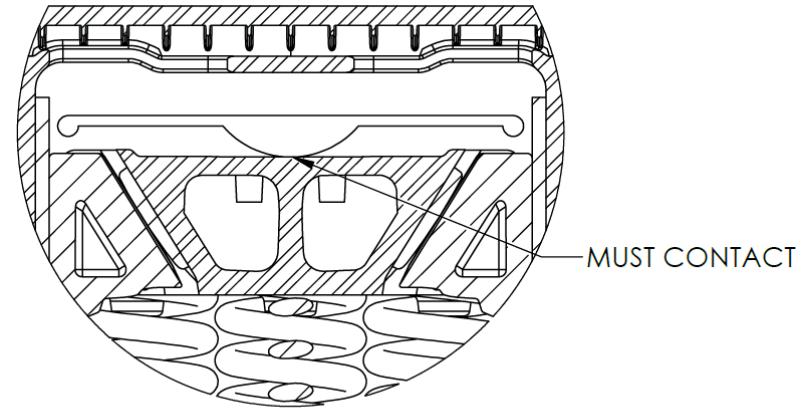
1. Align side frame lower bolster opening with bolster gibs and move the side frame towards the center of the bolster until the outer bolster gibs are beyond the field side of the side frame columns.
2. Repeat Step 1 for the opposite side frame.
3. Lift the bolster from the center until it is in the top member bridge of both side frames, which is as high as it can go if positioned according to Steps 1 and 2.
4. Replace gage side springs.
5. Insert split wedges into bolster opening and place control springs under split wedges.
6. Replace remaining springs.
7. Lower bolster on to the springs.

## Combined Wear Inspection

1. Apply gage G-1297 (AAR Gauge Number SK-1546-1) as shown below.
2. Gage must contact bolster top surface.
3. If both gage ends rest on the split wedge shoulders and there is no contact on the bolster top surface, repair is indicated.



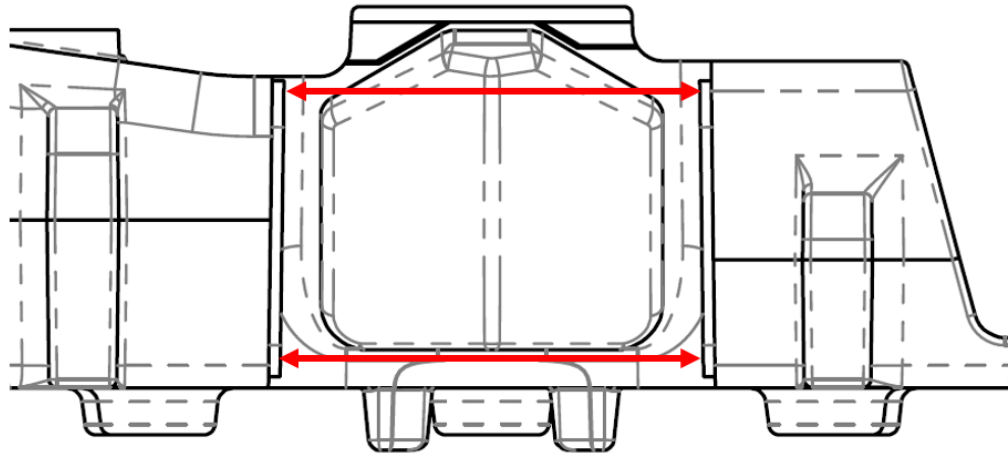
DETAIL A



DETAIL D

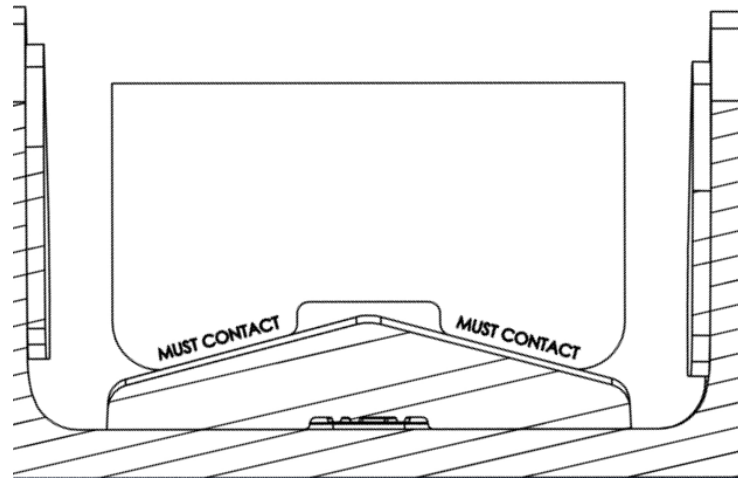
## **Bolster Pocket Sidewall Wear Plate Inspection**

1. Visually check the condition of the side wall wear plates.
  - a. If any cracks are present that are longer than 2” or appear in more than one side of the sidewall wear plate, repair weld according to AAR requirements.
  - b. If any cracks appear on the side wall wear plate greater than ¼”, replace with Strato T-BP1355 side wall wear plate.
    - i. It is recommended that all (8) wear plates be replaced at the same time for optimal performance.
2. Use calipers to check bolster pocket sidewalls for combined wear.
  - a. Measure at the top, and bottom of the bolster pocket.
  - b. Both wear plates need to be replaced with T-BP1355 if either measurement exceeds:
    - i. 6.762” for the top measurement
    - ii. 6.893” for the bottom measurement
    - iii. It is recommended that all (8) wear plates be replaced at the same time for optimal performance.



## Bolster Pocket Split Wedge Insert Inspection

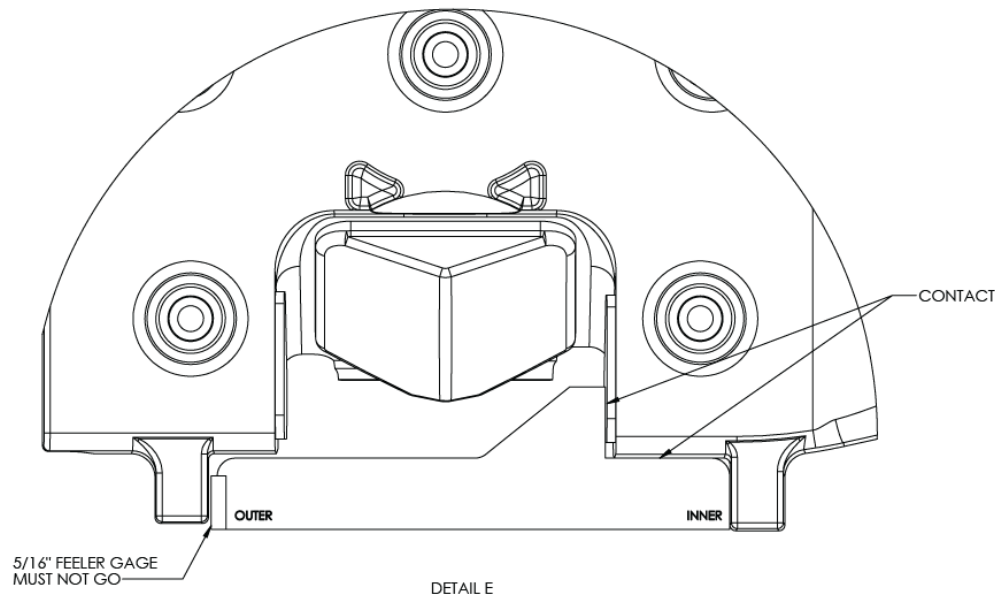
1. Visually check the condition of the split wedge insert.
  - a. If any cracks greater than 1" exist along the welds or if cracks greater than ½" exists on multiple sides, repair welds according to AAR requirements.
  - b. If any cracks appear on the split wedge insert greater than ¼", replace with Strato T-BP1171 split wedge insert.
    - i. It is recommended that all (4) split wedge inserts replaced at the same time for optimal performance.
2. Use gage G-1294 to check bolster split wedge for wear.
  - a. Gage each insert as shown in the figure.
  - b. Apply gage along the length of the split wedge insert.
  - c. If the gage contacts the center ridge at any point, the insert should be replaced with T-BP1171 split wedge insert.





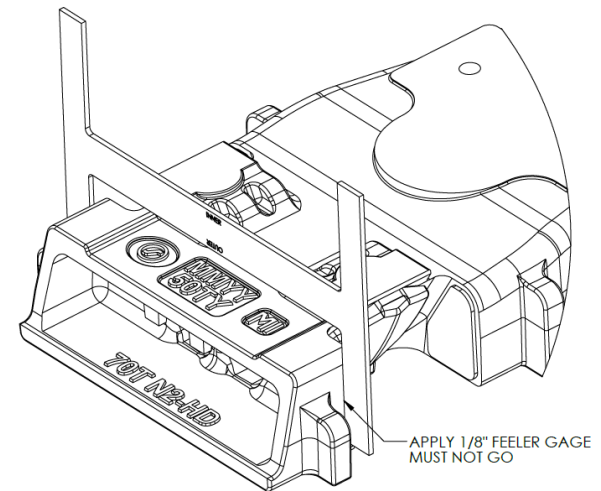
## **Bolster Pocket Gib Inspection**

1. Use gage G-1295 to check gib spacing and condition.
  - a. Apply gage as shown in the figure. The gage should contact surfaces as indicated.
    - i. Note, inner side wall wear plate surface must be unworn, or this gauge must be checked after replacement of side wall wear plate if worn.
  - b. Use a 5/16" NOGO feeler gage between the gage and the gibs.
2. If either inboard or outboard gap exceeds 5/16", according to AAR MSRP M-214, the worn gib(s) must be restored to the gage dimensions.
3. If either inboard or outboard gap exceeds 1/2", according to AAR MSRP M-214, the worn gib may not be repaired by weld build-up. The remaining portion must be removed and replaced with a weld on gib. For further assistance on this procedure, please contact Strato Inc.



## **Bolster Pocket Column Outer Land Inspection**

1. Use gage G-1296 to check dimensions of outer land surfaces.
2. Apply gage as shown in the figure. The gage can be applied resting on the top surface or spring seat of the bolster.
  - a. Gage must contact either top surface or spring seat depending on gaging orientation as well as one of the outer lands.
  - b. Use a 1/8" NOGO feeler gage between the opposite side outer land and gage.
3. If the gap between the gage and the outer land exceeds 1/8", restore lands to gage dimension.



DETAIL F

## **Bolster Pocket Column Inner Land Inspection**

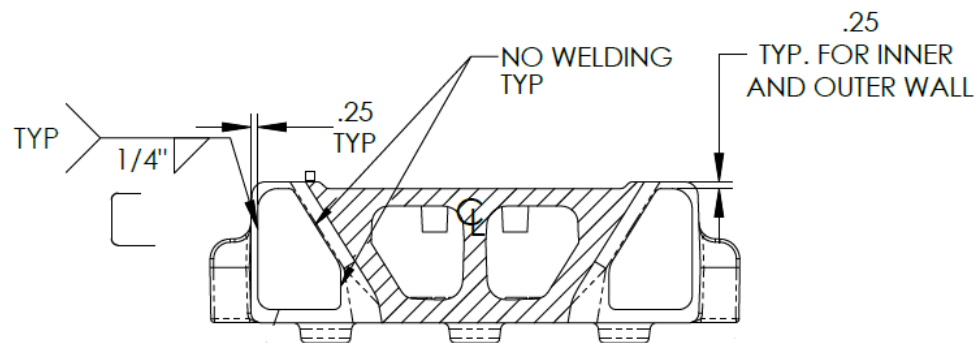
1. Use gage G-1296 to check dimensions of inner land surfaces.
2. Apply gage as shown in the figure. The gage can be applied resting on the top surface or spring seat of the bolster.
  - a. Gage must contact either top surface or spring seat depending on gaging orientation as well as one of the inner lands.
  - b. Use a 1/8" NOGO feeler gage between the opposite side inner land and gage.
3. If the gap between the gage and the inner land exceeds 1/8", restore lands to gage dimension.

## **Bolster Weld Procedures**

1. This specification is intended for use in conjunction with AAR Rule 47 and AAR MSRP M-214. Bolsters meeting the reconditioning requirements of this rule and specification meet the bolster end requirements for classification as reconditioned according to AAR MSRP M-214.
2. Bolster repair preparation inspection:
  - a. Check bolster for cracks and gouges. If bolster is cracked or gouged, refer to Rule 47 and AAR MSRP M-214 for further instructions.
  - b. Check bolster center bowl for wear and condition of any wear liner(s). Center bowls exceeding the wear liner limits in Rule 47 and AAR MSRP M-214 must be repaired before reuse.
3. Bolster end repair preparation procedure:
  - a. Prepare bolster for gage checking and repair. Position bolster to allow ample space above and below bolster ends for grinding and weld application. Remove all debris from gaged surfaces.
4. Electrode recommendation for Grade B+ material is as follows:
  - a. Shielded Metal Arc Welding:
    - i. E8018, 5/32" Maximum diameter electrode, Dry
  - b. Flux Core Arc Welding:
    - i. E81T1-B2 (75% Ar 25% CO<sub>2</sub>), 1/16" Maximum diameter wire
  - c. Gas Metal Arc Welding:
    - i. ER80S-D2 (75% Ar 25% CO<sub>2</sub>), 1/16" Maximum diameter wire
    - ii. ER80C-D2 (75% Ar 25% CO<sub>2</sub>), 1/16" Maximum diameter wire
    - iii. ER81S-G (75% Ar 25% CO<sub>2</sub>), 1/16" Maximum diameter wire
    - iv. ER81C-G (75% Ar 25% CO<sub>2</sub>), 1/16" Maximum diameter wire

## **Bolster Pocket Sidewall Wear Plate Installation Procedure**

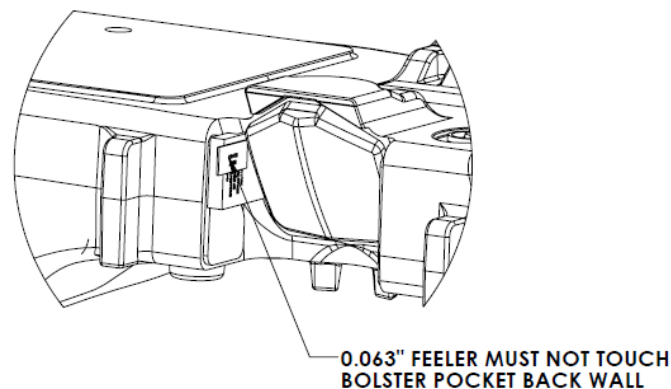
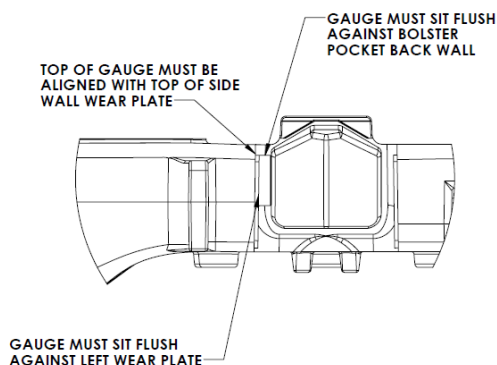
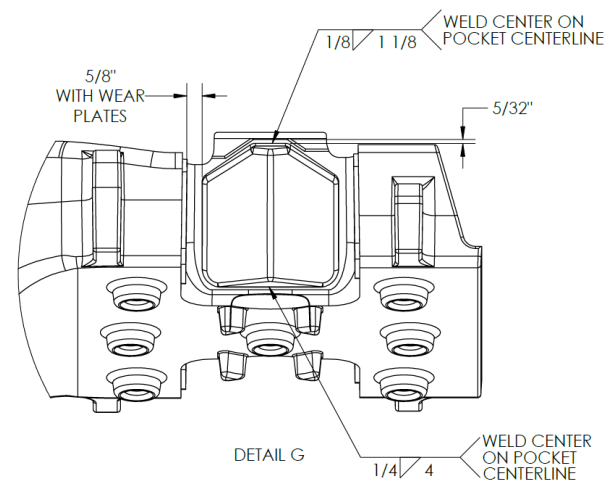
1. Only use Strato T-BP1355 sidewall wear plate for replacements.
2. Bolster pocket sidewall surface must be smooth, dry, and at a temperature over 50°F.
3. Position wear plate on pocket sidewall surface as shown in Section C-C.
  - a. Position top horizontal edge of wear plate  $\frac{1}{4}'' \pm \frac{1}{32}''$  from the top surface of the bolster pocket.
  - b. Position outer vertical edge of wear plate  $\frac{1}{4}'' \pm \frac{1}{32}''$  from the vertical outer surface of the bolster pocket.
4. Tack weld sidewall wear plate in place and verify position.
5. Sidewall wear plate should be adjusted if:
  - a. Conditions is 3a and 3b are not satisfied.
  - b. A  $\frac{1}{32}'' \times \frac{3}{8}''$  shim will fit between the wear plate and pocket sidewall  $\frac{3}{4}''$  deep. If this happens, the pocket sidewall of the bolster may require grinding to insure proper positioning and seating.
6. Welding shall be done in accordance with AAR specifications for Grade B+ material. Welds should be homogeneous, free of gas and foreign inclusions.
7. Inspect bolster pockets to be sure side wall wear plates, split wedge insert, and spring seat are free of weld splatter, burrs, and sharp edges.



SECTION C-C

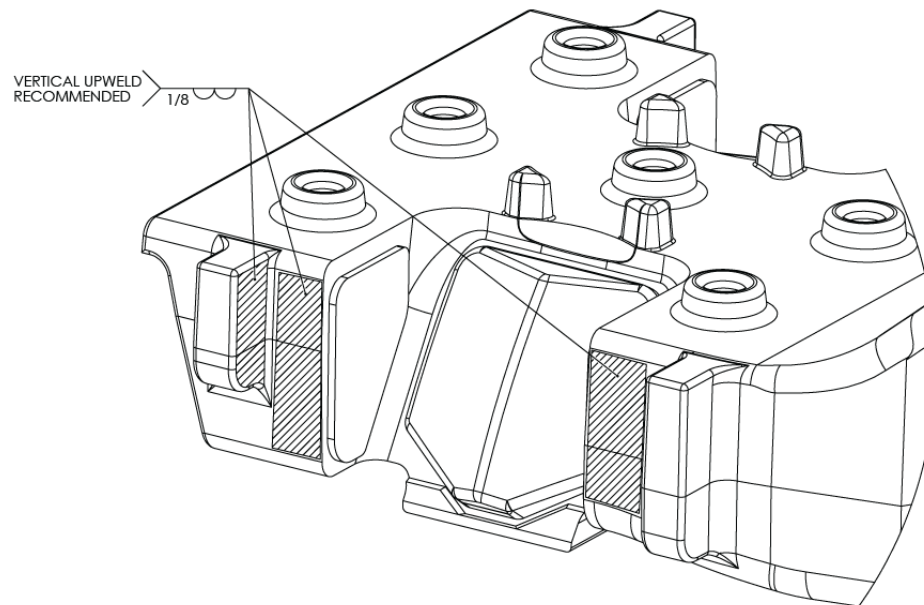
# Bolster Pocket Split Wedge Insert Installation Procedure

1. Only use Strato T-BP1171 split wedge insert plate for replacements.
2. Bolster pocket sloped surface must be smooth, dry, and at a temperature over 50°F.
3. Position wear plate on pocket sloped surface as shown in Detail G.
  - a. Position top horizontal edge of insert  $5/32'' \pm 1/32''$  from the top surface of the bolster pocket.
  - b. If installing before sidewall wear plates are installed, position outer vertical edge of insert  $13/16'' \pm 1/32''$  from the inner sidewall pocket wall of the bolster pocket.
  - c. If installing after sidewall wear plates are installed, position outer vertical edge of insert  $5/8'' \pm 1/32''$  from the inner sidewall pocket wear plate of the bolster pocket.
4. Tack weld insert in place and verify position.
  - a. Installation gage, G-1144, is available to accurately verify horizontal positioning of insert for when side wall wear plates are installed.
5. Sidewall wear plate should be adjusted if:
  - a. Conditions is 3a and 3b/3c are not satisfied.
  - b. A  $1/32'' \times 3/8''$  shim will fit between the insert and sloped surface  $3/4''$  deep. If this happens, the sloped surface of the bolster may require grinding to insure proper positioning and seating.
6. Welding shall be done in accordance with AAR specifications for Grade B+ material. Welds should be homogeneous, free of gas and foreign inclusions.
7. Inspect bolster pockets to be sure side wall wear plates, split wedge insert, and spring seat are free of weld splatter, burrs, and sharp edges.



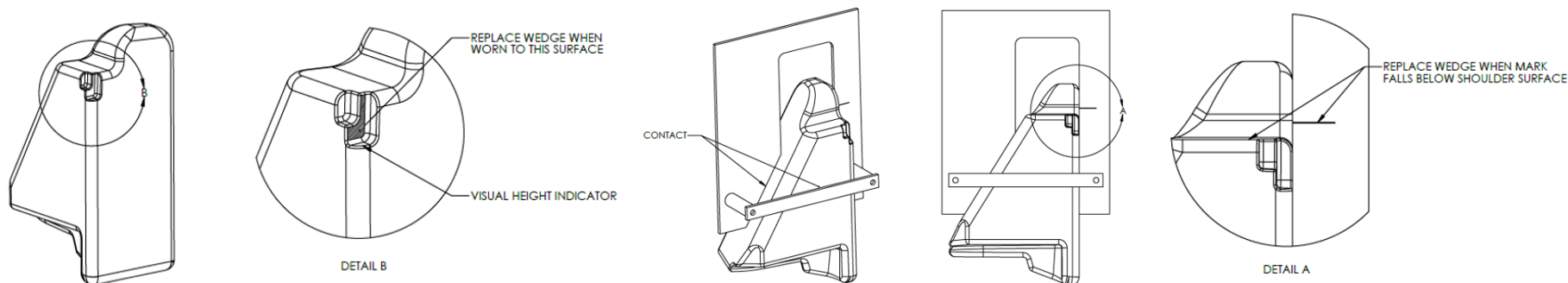
## Bolster Pocket Gib and Land Repair Procedure

1. Prepare worn surface for welding by lightly grinding away all corrosion, contamination, and high spots.
2. Follow AAR MSRP M-214 requirements for casting temperature and preheating casting prior to welding for Grade B+ material.
3. Recommended position of the bolster is to have the spring seat facing up.
4. Apply vertical up welds in wear area for good bead size and penetration in sequence. Chip off slag coating after each bead is applied.
5. Grind down high spots to produce a flat, even surface.
6. Inspect gib and land repair as needed. Refer to gib inspection (page 17) and outer (page 18) and inner (page 18) land inspection instructions.



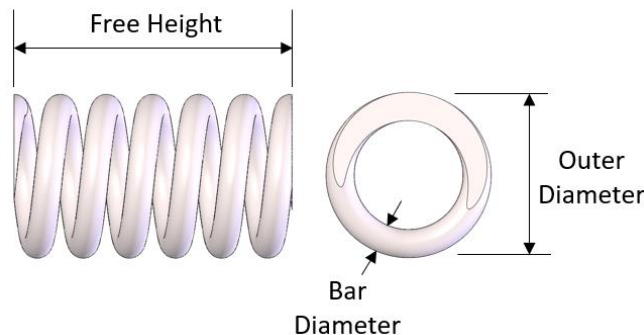
## Split Wedge Inspection and Replacement

1. Note – split wedges cannot be repaired and can only be replaced once condemning limits are reached as detailed below.
2. Visually check the condition of split wedges regularly.
  - a. The wear indicator on the split wedge is visible while the truck is still assembled and can be seen when split wedges have been removed. Replace wedge when column contact surface is worn as indicated in below.
    - i. Only replace with T-WG1174 split wedge.
    - ii. It is recommended that both wedges get replaced at the same time.
3. Split wedges must be replaced if either split wedge fails G-1298. Apply gauge as indicated in below.
  - a. If indicator line falls below split wedge shoulder, both split wedges are condemnable and need to be replaced.
  - b. To ensure proper truck performance, it is recommended that all (8) split wedges in that truck be replaced at the same time.
  - c. To check other split wedge, remove handle assembly and place on other side of vertical portion of the gage.



## Spring Inspection

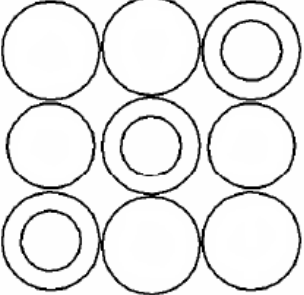
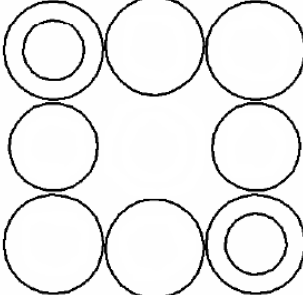
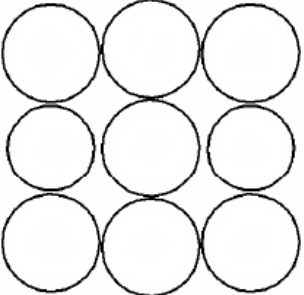
1. Note – springs cannot be repaired and can only be replaced once condemning limits are reached as detailed below.
2. Visually inspect for broken springs, excess pitting, or detrimental rust. Replace springs if any of the aforementioned issues exist.
  - a. When truck load springs are being replaced for excessive corrosion or pitting per AAR Rule 50, wedge springs should also be replaced.
3. Measure free height and replace if less than condemning height as listed below.
  - a. Wedge springs must be replaced if the load springs are being replaced for condemning height even if the wedge spring did not reach condemning height.
4. For load spring arrangements, contact Car Owner or Strato Inc for assembly drawing showing proper orientation and correct part numbers for springs.



Part Number	Bar Dia, in	Outer Dia, in	Solid Height, in	Free Height, in	Solid Capacity, lbs	Scrap Height, in
D5 - Outer	61/64	5-1/2	6-9/16	10-1/4	8,266	9-5/8
D5 – Inner	5/8	3-3/8	6-9/16	10-5/16	4,204	9-5/8
49427-1 - Outer	-	-	6-9/16	11-5/16	6,455	10-11/16



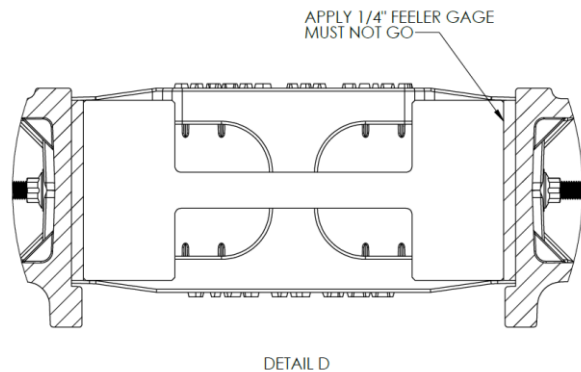
## Spring Groupings for 70T (6" x 11")

Spring Travel, in	3-11/16	3-11/16	3-11/16
Solid Height, in	6-9/16	6-9/16	6-9/16
<b>Field Side</b>  <b>6" x 11" Bearing Size</b> <b>220,000 lbs Max Rail</b> <b>Load</b>  <b>Gage Side</b>	 (7) D5 Outer (3) D5 Inner (2) 49427-1	 (6) D5 Outer (2) D5 Inner (2) 49427-1	 (7) D5 Outer (2) 49427-1
Solid Capacity, lbs	83,384	70,914	70,772

# Column Wear Plate and Side Frame Column Inspection

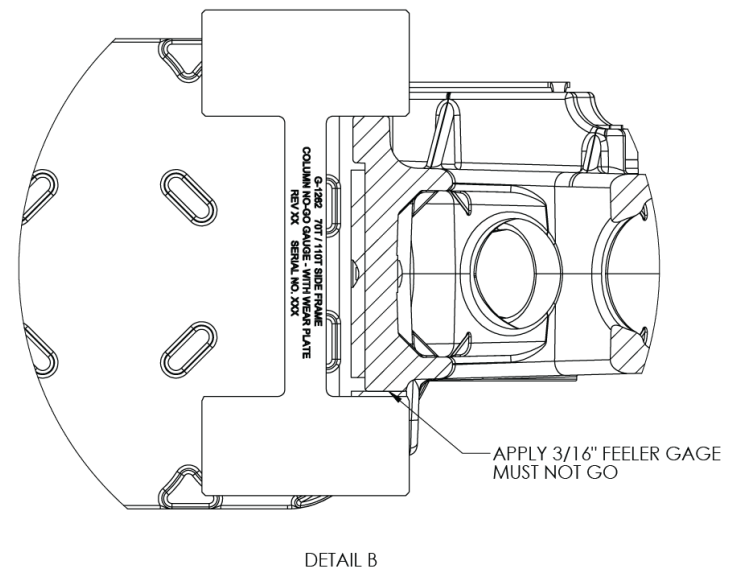
## Column Wear Plate:

1. Column wear plates missing, broken, or worn to less than 1/4" thick should be replaced.
2. Use gage G-1262 to check the distance between column wear plates.
  - a. If a 1/4" thick feeler gage fits between the end of the gage and wear plate, replace wear plates and rebuild side frame column if necessary.
  - b. If needed, replace column wear plate with Strato T-SP1198 and hardware T-SP1000 and T-SP1001.



## Side Frame Column:

1. Use gage G-1262 to check the distance between inboard and outboard column guide.
  - a. If a 3/16" thick feeler gage fits between the end of the gage and column guide, rebuild guide with weld per AAR Field Manual Rule 48.



# Column Wear Plate Installation Procedure

1. Visually examine each wear plate and column surface to ensure there are no obvious defects. Column surfaces must be true, smooth, and free of foreign material and flat to approximately 1/32" concave.
2. Apply column wear plate (T-SP1198) using the fasteners T-SP1000 and T-SP1001.
3. Torque the nut to 325-375 foot-pounds (non-lubricated fasteners).
  - a. Note – the Auditorx drive head is only to be used for holding the fastener from spinning. It is NOT to be used as an indication of torque value or acceptable clamp load.
4. Seat the column wear plate with at least 20 blows to the face of the wear plate with a 3-lb dead blow hammer. Distribute blows across the entire face of the wear plate.
5. Re-torque the nut to 325-375 foot-pounds (non-lubricated fasteners).
  - a. Note – the Auditorx drive head is only to be used for holding the fastener from spinning. It is NOT to be used as an indication of torque value or acceptable clamp load.
6. If the Auditorx drive head does not break off during the nut tightening sequence, then it shall be removed afterward by turning in the clockwise or tightening direction. Ensure that the bolt head is flush with, or under, the wear plate surface.
7. The face of the nut or washer shall seat flat against the casting for 270 degrees around the circumference. A 1/64" x 1/2" feeler gage shall not pass between the nut or washer and the casting for 270 degrees consecutively.
8. Apply a 1/32" feeler gage between the column surface and the wear plate. Feeler gage must not be inserted more than 1/2" deep.
  - a. If feeler can penetrate beyond 1/2", the side frame should be reworked to provide a smooth surface free of irregularities.
9. After wear plate bolting procedure is complete, weld top and bottom of the wear plate. Welds must not extend beyond the wear plate surface.
  - a. Use electrode of AWS Spec E-305, E-309 Stainless steel electrode: wire preferred.
10. Weld is not intended for securement, rather as a compression-filler weld between wear plate and lugs.

