MAN Engines & Components

MAN Warranty Process

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Warranty process between New Flyer and MAN

The warranty validation process can be difficult at some times since components from different suppliers work together in a complex system and the root cause is not automatically the failed part. If a failed part is part of MAN‘s content of delivery, then the customer may be eligible for warranty reimbursement from New Flyer, but not necessarily from MAN.

The failure can be caused by another component, the vehicle design, the installation, the lack of maintenance and the use of non MAN approved service products and parts (including lubricants, operating conditions etc.)

There are the 3 possible scenarios:

- Failure is clearly due to MAN‘s content of delivery (Material and/or workmanship)
  - Customer is eligible for warranty covered by MAN (Please see component coverage list for details)
- Failure is MAN‘s content of delivery (Material) but failure is caused by a component not supplied by MAN, design, assembly process or workmanship by others
  - Customer is eligible for warranty covered by New Flyer, IAS or others
- Failed part is MAN‘s or New Flyers content of delivery (material and/or workmanship), but customer did not adhere to recommended maintenance practice and schedule, used unapproved service products, lubricants or tools or operated the bus under other than normal transit bus application conditions
  - Warranty not covered by MAN or New Flyer or others

In any case: Water Contamination of the Axle or Components thereof is not Warrantable through MAN
Please refer to SB024 and SB027

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Warranty process between New Flyer and MAN

When the Customer informs New Flyer about an issue, the RPSM should be informed and work with the property on the root cause analysis. The RPSM can always involve MAN for support, but should also consider seeking technical support from New Flyer‘s engineers and technical support team first. If requested by New Flyer or if MAN does see the need, MAN will contact the property directly (to the extent of MAN‘s competence) in coordination with New Flyer to resolve an issue quickly and to the customers satisfaction.

If a major component is effected or the expected repair cost exceeds $1,000, then New Flyer should inform MAN before a warranty repair is performed in order to avoid cost not covered under MAN‘s warranty. MAN is more than happy to assist with repair recommendations.

All parts for warranty work shall be provided by New Flyer and claimed through the iWarranty system. New Flyer should inform MEC immediately if parts for warranty work are not available in their warehouses. Then, MEC will provide parts upon receipt of a P.O. from New Flyer if MEC has them in stock.

Always choose the least costly warranty repair (e.g. torn caliper boots > replace boots- not caliper> skim rotor > don‘t replace rotor)

NF customers shall never submit a warranty claim directly to MAN nor shall they directly contact MAN. Claims shall always be submitted through New Flyer‘s iWarranty system.

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Wear Items and Consumables

Excluded from material defect liability

- Normal wear and tear and maintenance
- Maintenance work and rectification of normal wear and tear are required at different intervals depending on distances travelled, geographical and climatic conditions, road and traffic conditions, handling behavior, etc. These conditions have a major influence on the service life of the parts concerned.
- Maintenance can be defined as "scheduled" and "unscheduled" maintenance.
- Scheduled maintenance (service/inspection) is carried out on the basis of time intervals and distance driven and involves replacement of specific parts such as oil and filters.
- Unscheduled maintenance involves the replacement of worn parts whose service life is related to the vehicle's operating environment and the type of work it carries out. During a normal service, these parts are inspected but not necessarily replaced. If during the inspection no “material or manufacturer fault” is found, but a component has to be replaced because it is worn, the repair work is considered unscheduled maintenance and is not covered by the liability for material defects/extended warranty.
- To ensure the vehicle's reliability and roadworthiness, all maintenance and inspection work must be carried out in accordance with current MAN and New Flyer guidelines and the maintenance schedule shown in the service manual.
- Examples of excluded parts which are considered maintenance work and normal wear & tear items are :
- Filters and filter cartridges of any kind, Brake Discs, Caliper Boots, Brake Drums, Brake Pads/Linings, Lubricants including Fluids and Greases, Seals and Bearings

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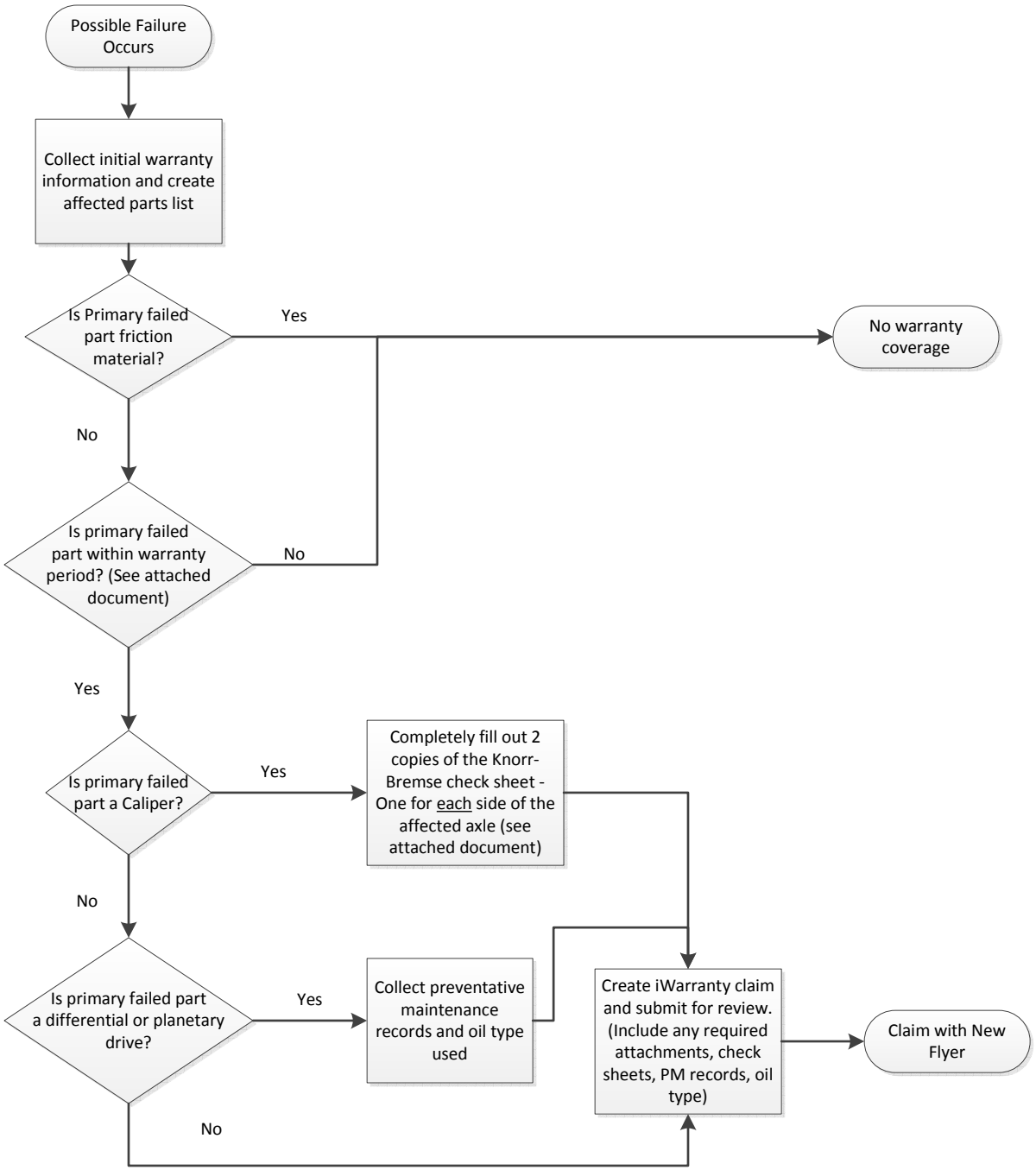
Required Information for axle failures

When the Customer informs New Flyer about an issue, the following information needs to be provided:

- **SR Number**
- **Property Unit Number**
- **Mileage**
- **VIN #**
- **Axle Serial number (17 digits)**
- **Failure Date**
- **Detailed discription of the failure**
- **Caliper related failures require fully completed check sheet for warranty consideration**
- **High quality Pictures (upon request)**
- **Failure analysis and actions taken to date**
- **Contact information at Property**
- **Maintenance record (upon request)**
- **Information about lubricants or parts used if applicable for failure**

FRONT & REAR AXLE WARRANTY CLAIM PROCESS



Warranty Coverage Periods

Xcelsior Front Axle (VOK-07)		
Part	Category	Warranty Period
Axle beam	Full	5 years / 300,000 miles
Track arm (drag link)	Full	5 years / 300,000 miles
Tie rod	Full	5 years / 300,000 miles
Wheel hub unit	Limited 2	2 years / 100,000 miles
Brake caliper core	Limited 2 **	2 years / 100,000 miles **
Caliper tappets and boots	Limited 1	1 year / 50,000 miles
Upper radius rod	Limited 1	1 year / 50,000 miles
Steering knuckle bearing	Limited 1	1 year / 50,000 miles
Steering knuckle seal	Limited 1	1 year / 50,000 miles
Tie rod boots / ball joint	Wear item	1 year / 50,000 miles
Toric seal (O-ring)	Wear item	1 year / 50,000 miles
Brake pads	Friction material	no coverage
Brake rotor	Friction material	no coverage

Xcelsior Rear Axle (HY-1350)		
Part	Category	Warranty Period
Axle housing	Full	5 years / 300,000 miles
Axle shafts	Full	5 years / 300,000 miles
Differential	Full *	5 years / 300,000 miles *
Wheel hub unit	Limited 2	2 years / 100,000 miles
Brake caliper core	Limited 2 **	2 years / 100,000 miles **
Caliper tappets and boots	Limited 1	1 year / 50,000 miles
Pinion seal	Limited 1	1 year / 50,000 miles
Brake pads	Friction material	no coverage
Brake rotor	Friction material	no coverage

BVA / End of life sensor	Wear item	1 year / 50,000 miles

* Requires supporting documentation of PM records.

** Requires supporting checklist fully completed.

Warranty Coverage Periods

Low Floor Front Axle (V8-65L)		
Part	Category	Warranty Period
Axle beam	Full	5 years / 300,000 miles
Track arm (drag link)	Full	5 years / 300,000 miles
Tie rod	Full	5 years / 300,000 miles
Wheel hub unit	Limited 2*	2 years / 100,000 miles
Brake shoes	Limited 2	2 years / 100,000 miles
S-Cam	Limited 2	2 years / 100,000 miles
S-Cam seals and bushings	Limited 1	1 year / 50,000 miles
Slack adjuster	Limited 1	1 year / 50,000 miles
Radius rod	Limited 1	1 year / 50,000 miles
Steering knuckle bearing	Limited 1	1 year / 50,000 miles
Steering knuckle seal	Limited 1	1 year / 50,000 miles
Tie rod boots / ball joint	Wear item	1 year / 50,000 miles
Toric seal (O-ring)	Wear item	1 year / 50,000 miles
Brake drums and linings	Friction material	no coverage

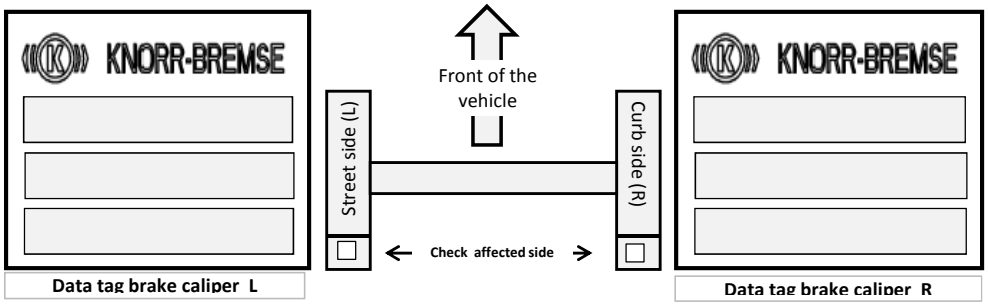
Low Floor Rear Axle (HP-1352)		
Part	Category	Warranty Period
Axle housing	Full	5 years / 300,000 miles
Axle shafts	Full	5 years / 300,000 miles
Differential	Full *	5 years / 300,000 miles *
Planetary drive	Limited 2 *	2 years / 100,000 miles *
Wheel hub unit	Limited 2*	2 years / 100,000 miles
Brake shoes	Limited 2	2 years / 100,000 miles
S-Cam	Limited 2	2 years / 100,000 miles
S-Cam seals and bushings	Limited 1	1 year / 50,000 miles
Slack adjuster	Limited 1	1 year / 50,000 miles
Pinion seal	Limited 1	1 year / 50,000 miles
Brake drums and linings	Friction material	no coverage

* Requires supporting documentation of PM records.

New Flyer — Inspection checklist for disc brakes

Requirements for warranty to be considered - one complete checklist must be completed for each caliper on the affected axle (2 checklists in total)
Take digital photos of marked left (L) and right (R) calipers (different temperature impact should be visible!).

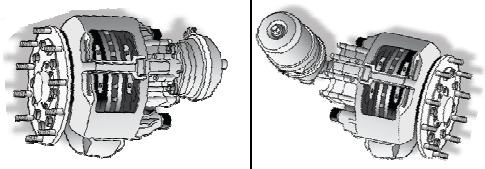
Technician:		**Fail date:**		**Date:**	
Customer:		**Complaint:**			
Vehicle manufacturer:	New Flyer	**Vehicle type:**		**Vehicle number:**	
In service date:		**Chassis no. (VIN):**		**Mileage:**	
Axle manufacturer:		**Axle part number:**			
Axle model:		**Axle serial number:**			
Brake chamber manufacturer:	☐ MGM e-stroke	☐ MGM non e-stroke	☐ Knorr		
Brake manufacturer:	Knorr-Bremse				
Axle position in the vehicle:	☐ Front (steering)	☐ Center (tag)	☐ Rear (drive)		



Data tag brake caliper L | Data tag brake caliper R

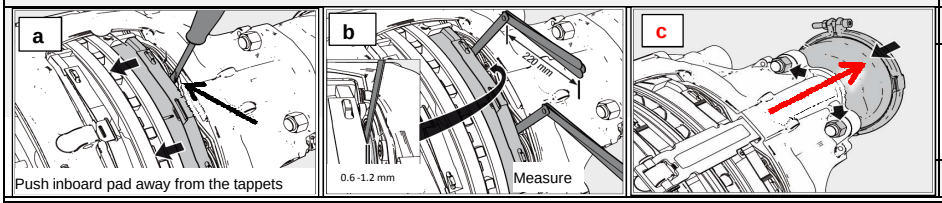
Brake type:

☐ Axial ☐ Radial



Note: Apply service brake one time and slide the caliper back and forth prior beginning of the measurement, after the wheels are removed.

1. Measure running clearance of brake in cool down state (a + b): Nominal: **0.6 -1.2 mm**



Incoming tappet / outcoming tappet	/	mm

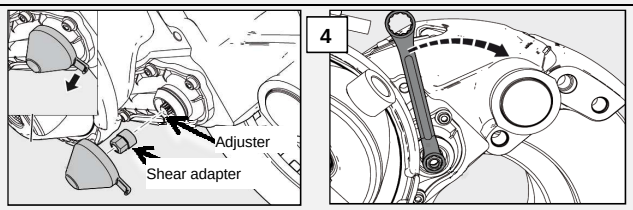
2. If running clearance is less then 0.6 mm

- **remove the brake air chamber (c)**
- **measure running clearance again (a + b)**
- **if clearance OK - go to step 3**

Incoming tappet / outcoming tappet	/	mm

3. Thickness of brake pads including back plate (30mm new)	Inboard pad:	**mm**	Outboard pad:	**mm**

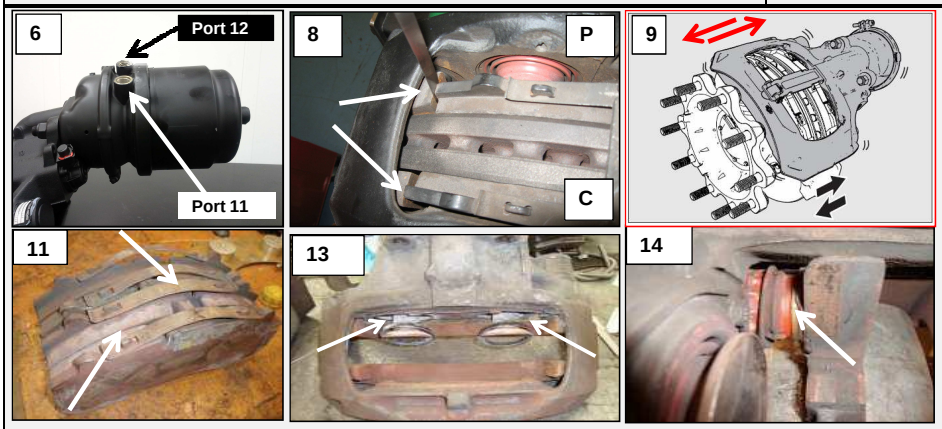
	OK	**not OK**	**Comments**
4. Check brake adjuster function (refer to New Flyer manual)	☐	☐	

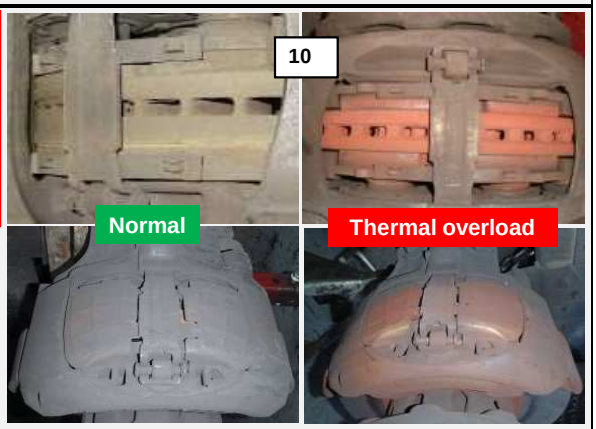


Never turn **adjuster** without **shear adapter** being fitted. If the shear torque of the shear adapter is exceeded, then it is designed to fail. Try again with a new (unused) shear adapter. With a second failure of the shear adapter the caliper must be exchanged since internal damage is present. **Do not** use an open-ended spanner as this may damage the adapter.

Make sure the ring spanner or socket can turn freely clockwise during the following procedure.

Make sure brake pads are installed in the caliper during adjuster check



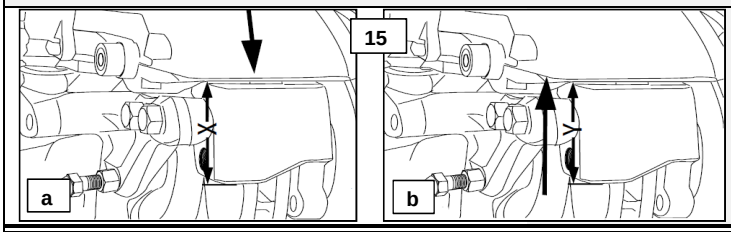


	Yes	No	Comments
5. Residual air pressure in service brake?	☐	☐	
6. Air tightness from port (12) parking brake to (11) service brake?	☐	☐	
7. Brake pads movement in brake carrier?	☐	☐	

8. Gap back plate of pad in brake carrier (mm)	**Caliper side (C)**	**mm**	**Plunger side (P)**	**mm**	

	OK	not OK	Comments
9. Caliper movement along guide pins - mounted on axle (slide caliper fully IN and OUT - brake pads removed)	☐	☐	
10. Thermal load at brake pads visible?	☐ **Yes**	☐ **No**	
11. Brake pad retainer springs connection to the pad back plate?	☐ **Loose**	☐ **Fixed**	
12. Brake pad manufacturer / date of manufacture?	**Jurid**	☑ **Ferodo**	**Textar** **Galfer** **Date:**
13a.Thermal damage of tappets with rubber boots ?	☐ **Yes**	☐ **No**	
13b.Tappets seized ?	☐ **Yes**	☐ **No**	
14. Thermal damage of fixed / loose guide pin boots ?	☐ **Yes**	☐ **No**	

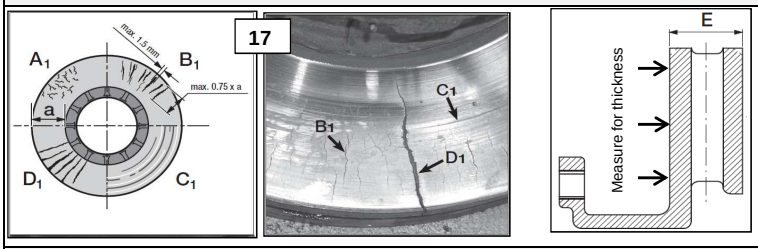
15. Floating guide pin to rubber bushing clearance (SB models only)	☐ **Yes**	☐ **No**	**Nominal: 3.0 mm max**	**Actual:**	**mm**



- Push the caliper in the direction of the arrow (a)
- Note that there is no contact between caliper and carrier (a)
- While maintaining pressure on the caliper, measure distance X (a)
- Pull the caliper away from the carrier and measure distance Y (b)
- If distance **Y - X** is greater than **3.0 mm**, rubber bushing must be replaced

16. Excessive marks from plunger of the brake chamber in the lever cup	☐ **Yes**	☐ **No**
17. Check for presence of grease in the lever cup	☐ **Yes**	☐ **No**

18. Brake disc condition (check appropriate designation) →	☐ **OK**	**Not OK:** ☐ **A1** ☐ **B1** ☐ **C1** ☐ **D1**



A1 = Small cracks spread over the surface are allowed

B1 = Cracks less than 1.5 mm deep or wide, running in a radial direction are allowed

C1 = Unevenness of the disc surface less than 1.5 mm deep is allowed

D1 = Cracks going through to the cooling duct or onto the inner or to the outer edge of the friction ring are not allowed and the disc MUST BE REPLACED.

*In case of surface conditions A1, B1 or C1, the disc can continue to be used until the minimum thickness **E = 37 mm** is reached.*

19. Rotor thickness (based on average of three or more measured values across the run surface of the rotor)**:**	**E(ave)=**	**mm**	

ABS or Air system diagnostic information and fault codes:

Service history of the bus and/or the brake system; previous exchange of brake parts:

Corrective measures:

Comments and remarks: