579338/2021/O/o ED/SW/RDSO

NF FORGINGS PVT. LTD.

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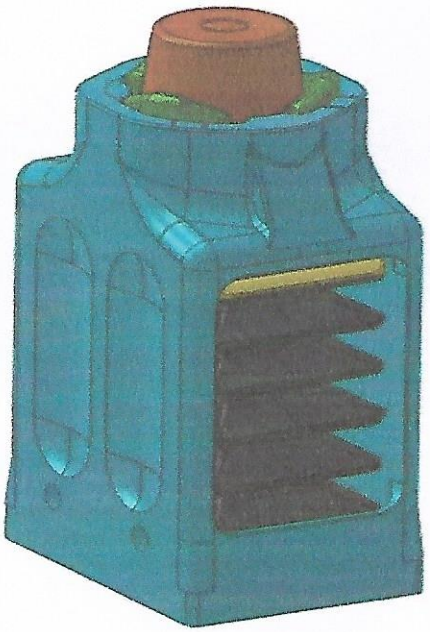
An ISO: 9001 – 2015 Company



RECOMMENDED INSPECTION & MAINTENANCE MANUAL FOR WD-71-BD UPGRADED HIGH CAPACITY DRAFT GEAR

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INTRODUCTION

NF Forgings Pvt. Ltd.(NFFPL here in & after) is a Captive unit, since it is equipped with modernized Steel Foundry, R&D Lab, and Machine Shop & Structural Fabrication Shop. The Company has fully equipped Design & Drawing office having latest software capable of undertaking total engineering work of tailor made equipment in the disciple of mechanical and structural engineering. Due to having highly professional engineers, skilled workers, technical knowhow and expertise, we are capable to produce any type of castings and fabrication work as per customer's requirement.

NFFPL is an **ISO 9001:2008** company, was incorporated in the year **1990**, located by the side of N.H.-6 (Bombay road) with total area of 1,75,000 sq ft. out of which approximately 75% is covered by state of art sheds and remaining open area provides adequate facilities for inward & outward movement of raw materials and finished product. Due to its locational advantages of being situated on highway, our factory provides un-interrupted movement of the heavy vehicles to all the parts of the country.

Our Foundry division have also classified as **'Class-A' Foundry** duly approved by RDSO. We are also approved vendor of RDSO for manufacture & supply of **Centre Pivot Top & Bottom Assembly, Striker Casting, Yoke Pin Support, Backstop and Coupler Assembly** etc. and supplying the same on regular basis to various Zonal Railways and other Wagon manufacturing units. Our foundry is equipped with High Pressure Moulding Line with Intensive mixture for Green sand Mould with Automatic Moisture Control and addition of Binder in fixed rates and No-bake process core making system for which continuous mixer with compaction table are also available. 1 No. 5T Capacity Electric Arc Furnace has already been installed in our foundry, in addition of 1 No. Induction Furnace of 4T Capacity, 1 No. VOD is also under installation and in advantage stage of operation. We cater the needs of our product for all the sectors of Indian Railways viz. Railway Wagons, Coaches and Locomotives, ICF, RCF, and also reputed Public Sectors. We are capable to produce any grade of Steel Casting including SGCI ranging from **80kg to 3MT** weight in single piece Casting as per customers' requirement & Drawing.

Our Foundry is also equipped with 1 No. 15T Heat Treatment Furnace (Oil Fired Double Ended Heath Furnace) with multipoint automatic continuous temperature recording arrangement with digital indicators, 5MT Electric Tempering Furnace and 1.5 MT Furnace for Liner. Water quenching facilities along with water circulating and agitating system by compressed air with digital temperature measuring equipment are also available. For Quenching We have automatic Rapid Quenching Machine.

Our Laboratory is fully equipped with modernized and sophisticated testing equipments and have also planned for getting accreditation of National Accreditation Board for Testing and Calibration Laboratories (NABL) in the field of Chemical & Mechanical testing.

NFFPL pioneered in the field of manufacturing of different **CRF Section** viz. **'Z', 'T', Channel, Angle, Hat Section** etc. in eastern India for catering to the requirements of the Wagon Building Industries since inception of CRF division in the year 2009.The CRF unit of NFFPL is equipped with 5(five) Forming Mills with 300 Tools & Dies and Slitting machine with an annual capacity of **60,000 MT** with thickness range of 0.50mm to 12mm high tensile steel. We also equipped with in-house Tool room and Roll design facility with the use of state of the art COPRA software. We have also planned for further augmentation of our production Capacity depending on the overall requirements of Wagon Industries / Indian railways.

NFFPL is basically a part of "LAL BABA GROUP OF COMPANIES" comprising of other sister/allied companies like **Lal Baba Industrial Corporation Pvt. Ltd., PEW Engineering Pvt. Ltd., Macedon Vinimay Pvt. Ltd., Lalbaba Seamless Tubes Pvt. Ltd.** and **Swamiji Transmission Pvt. Ltd.**

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This document is therefore intended for private circulation and for the purpose stated herein typically by customers and users of the product obtained through legal purchase.

Violation, if any, shall be liable to be prosecuted.

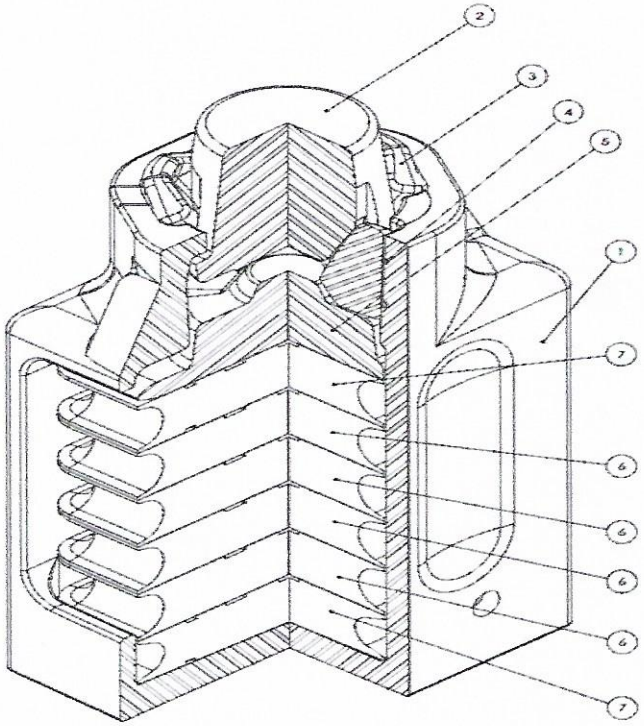
PURPOSE OF THIS MANUAL

The manual has been made for the purpose of Inspection, maintenance and reconditioning of the Draft Gear Assembly. The information contained herein is a summary of Draft Gear Maintenance during the repair for any reason.

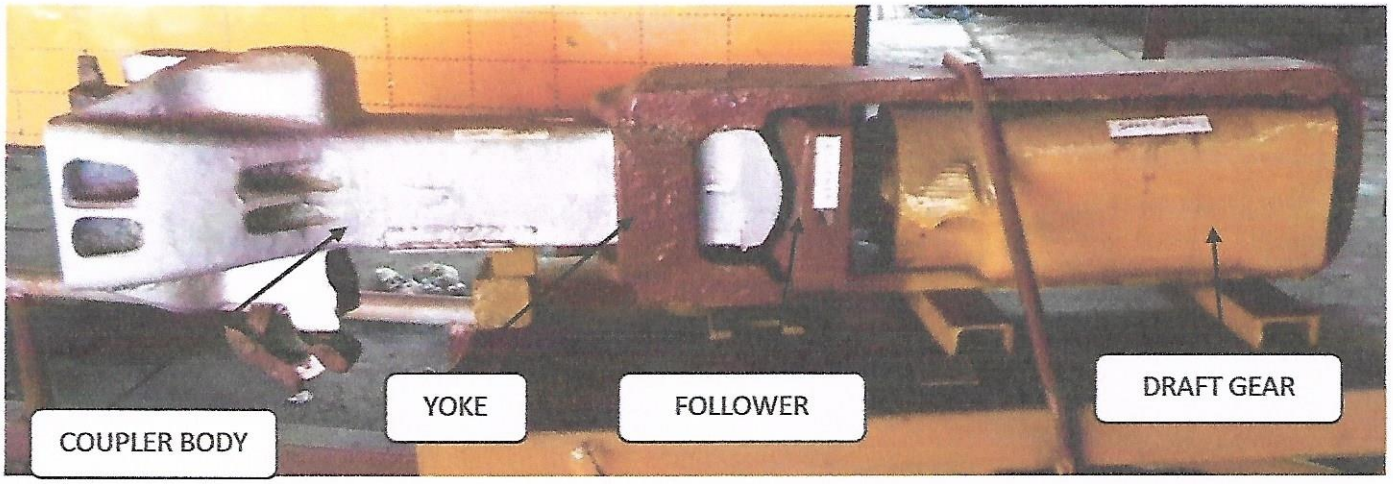
The essential parts of the Draft Gear are:

Sl No.	Description	Qty./ Set	Drawing No.
1	Housing Casting	1	NF - 2051
2	Top Follower	1	NF – 2052
3	Bore Insert	3	NF – 2058
4	30^0 Shoe	3	NF – 2054
5	Wedge	1	NF – 2053
6	Elastomer Middle Pad	4	NF – 2056
7	Elastomer End Pad	2	NF – 2055

The average weight of the assembly is approx 150 Kgs.



POSITION AND PRINCIPLE OF OPERATION



PRINCIPLE OF OPERATION:

This is the heart of the coupler system. The Draft Gear absorbs the total shocks (energy) of the equipment coupling together and it also provides a rebound force that maintains slack between the cars. In this way the cars are moved without damage to other components or to product within the cars. Like human heart, it absorbs all the shocks of the coupling system.

WD-71-BD Draft Gear is designed with further improvement in Rubber Pads suitable for heavy and easy application to new cars with 24 5/8" standard pockets, having capacity 45000 ft lb.

INSPECTION OF DRAFT GEAR BEFORE DISMANTLE

1. The Draft Gear shall be inspected whenever Wagons are coming in Depot.
2. When working with Draft Gear, personal protection of head, hand, eyes and feet shall be taken to protect from accidents.
3. First of all a visual inspection should be carried out on the Draft Gear system to determine whether the Draft Gear is in fully released i.e. in safe condition or unsafe i.e. stuck gear condition. Though the Draft Gear with rubber pad type does not stuck up and not prone to accident like spring loaded type.
4. A Draft Gear having unseen broken parts which does not allow the pad union to take its original place are termed as "stuck Draft Gear". These Draft Gears are little bit dangerous because a small vibration may cause the pad union to release suddenly propelling the components of the Draft Gear and the follower forcibly outwards in several directions. A slight gap could be seen with a fully released Draft Gear e.g. in case of enlarged pocket size, however any gap in excess of 6.35mm should be checked with extra caution.
   i. Partially stuck Draft Gear (fig-2) where the Draft Gear is loose in the under frame pocket and the draft gear travel will be less than 82.5 mm.
   ii. Fully stuck Draft Gear (fig-3) is one where components of the gear are jammed. A large gap appears at the front or rear stops or at both stops. The internal pad union would propel the components outwards if the gear was to suddenly release.

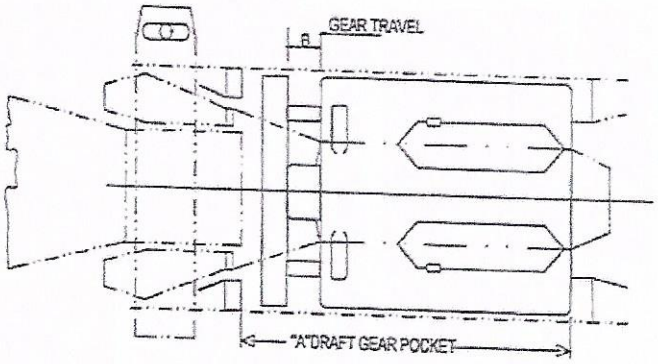


Fig.2- Partially stuck draft gear

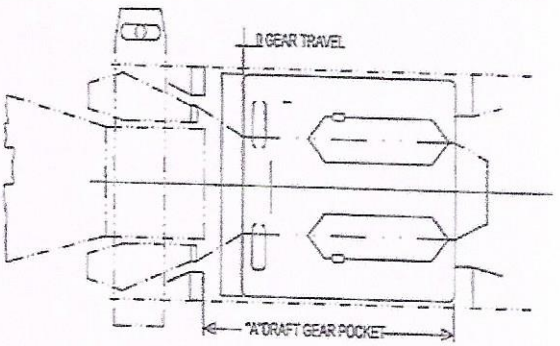


Fig.3- fully stuck draft gear

5. The slack in the Draft Gear arrangement does not indicate that the Draft Gear is defective as this condition may due to worn draft attachment such as yokes, yoke pin, couplers and over-size draft gear pockets. Should this be the case, these parts should be renewed or reworked to return the draft attachments to a like- new condition eliminating the free slack.

6. A WD-71-BD Draft Gear which has to be removed from a freight car for inspection and repairing purposes is suitable for service if it is found to be:
   i. The housing is not broken and is without cracks and without bulging.
   ii. The friction clutch consisting of wedge and shoes is intact.
   iii. The friction clutch is tight.
   iv. Less than 6.5mm wear in the original metal thickness at the mouth of the friction bore housing contacted by the friction shoes.

7. After the examination of the Gear applied to the freight car, the device shall be condemned, if it is found that:

   i. Broken or split housings, housing with cracks of any length in critical areas or cracks 1" or longer anywhere in the housing. Cracks less than 1" in non-critical areas shall not be considered defects.
   ii. A bulge in the rear wall of housing more than 3/16".
   iii. Broken or cracked parts that bear on the follower at any time during the buff or draft stroke.
   iv. Splitting or separation of rubber from metal plates.
   v. Obvious heat or fire damage to rubber.
   vi. Installed draft gears with gear length less than specified.
   vii. The protrusion of the three shoes out of the housing averages- 1-1/8 inch or more.

If a Draft Gear conforms to any of the above factors, it will be called as rejected.

8. During Inspection before removing the Draft Gear the following precautions are to be taken according to following symptoms:

A. When Yoke is not broken but Draft Gear is stuck or damaged:

i. First, move another wagon against coupler, forcing follower and Draft Gear against rear stop. Do not remove Yoke support plates, remove front support only. Securely weld Yoke support housing and follower to yoke strap **(See fig.-4 for welding procedure).**
ii. Now torch cut the follower or Draft Gear front area and lose it.
iii. Coupler is removed.
iv. Remove all the parts one by one after cutting the welding

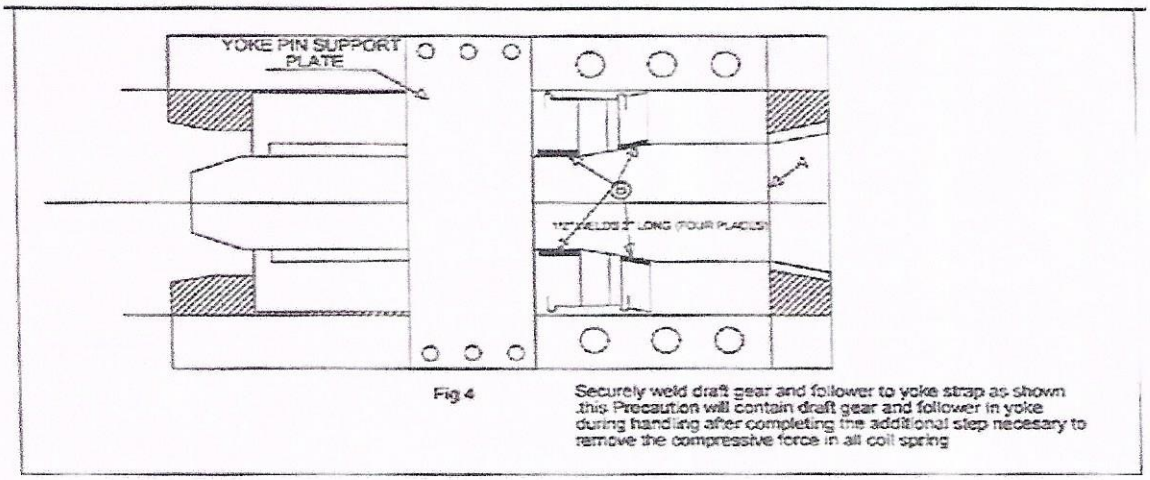


fig-4

B. When Yoke is broken and follower is in place, and Draft Gear is stuck or broken:

i. First move another wagon against coupler, forcing follower and Draft Gear against rear stop. Do not remove the Yoke support plates, remove front support plate only. Securely weld Yoke support housing and follower to yoke strap **(See fig.-4 for welding procedure**). If insufficient yoke strap is remaining, add a suitable plate sufficient to weld housing and follower together **(See fig.-6 for welding procedure).**
ii. Now torch cut the follower or front area of Draft Gear **(See fig.- 6 & 7 for welding procedure).**
iii. The coupler is now loose and can be pulled out.
iv. Now remove all the parts one by one.

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NF Forgings Pvt.ltd.	RECOMMENDED INSPECTION & MAINTENANCE MANUAL FOR WD-71-BD UPGRADED HIGH CAPACITY DRAFT GEAR	DOC NO. : NFFPL/71 BD/MM
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		DATE : 18.01.2021

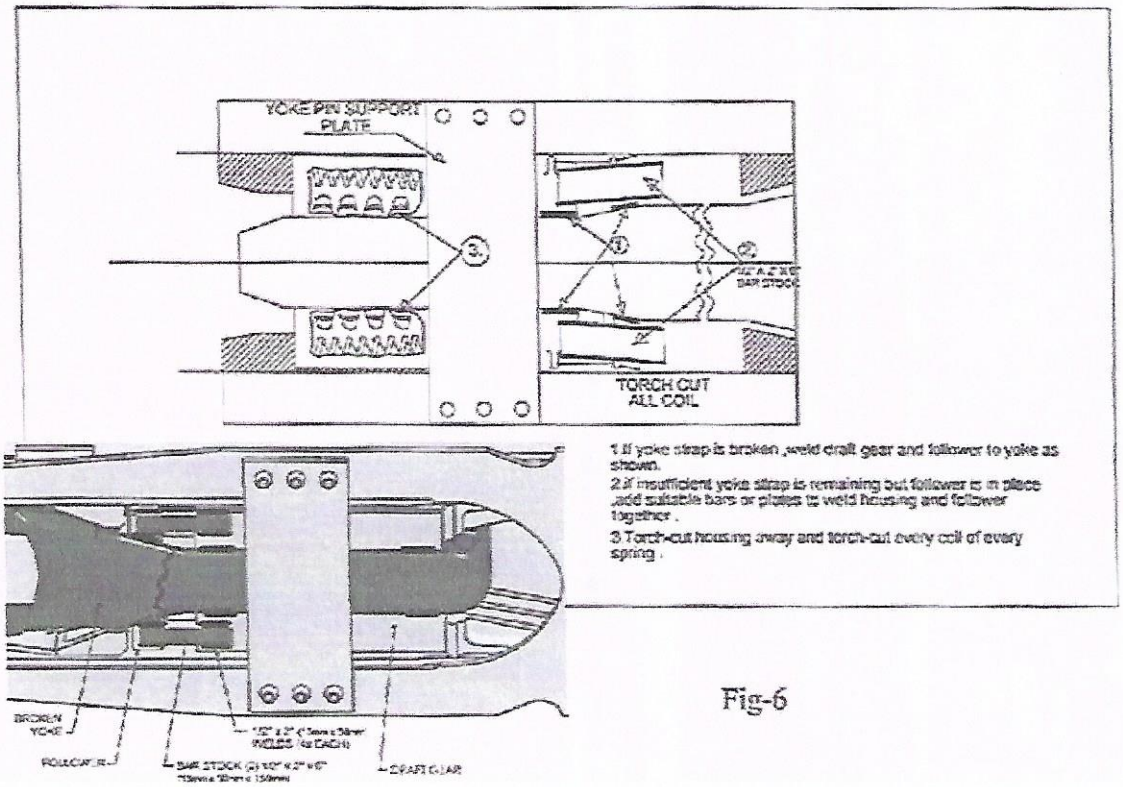


Fig-6

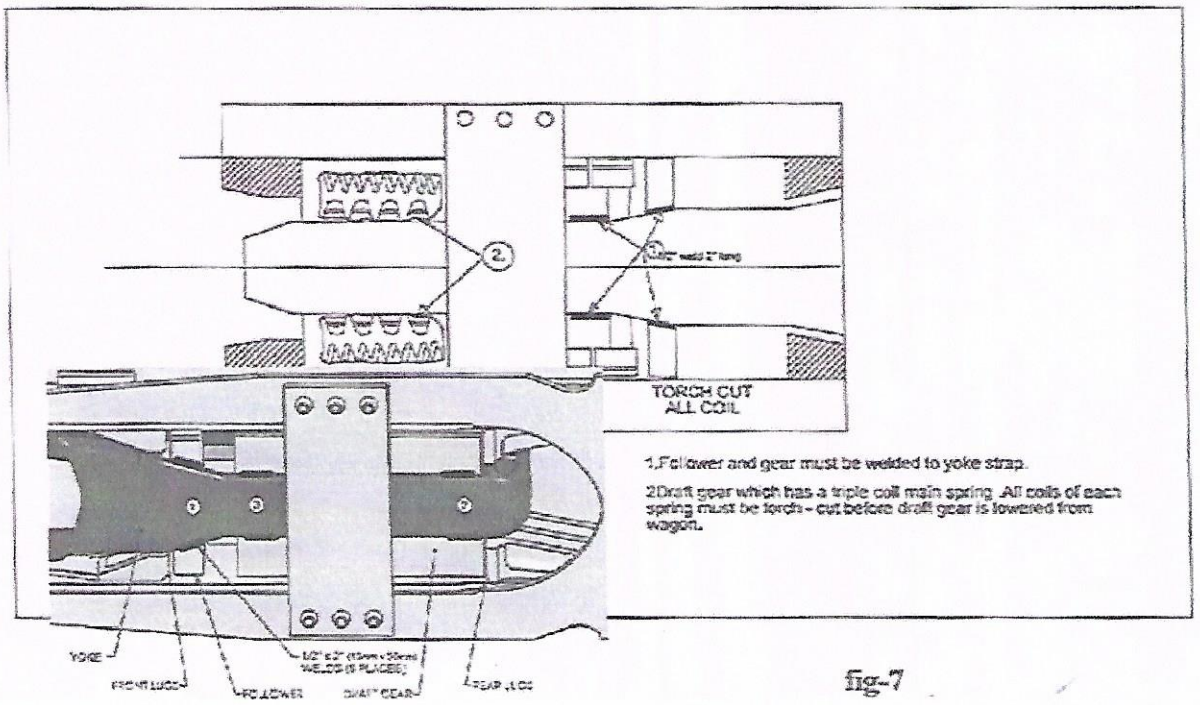


fig-7

C. Where Yoke is broken and follower is missing and Draft Gear is stuck or damaged:

i. First move another wagon against coupler, forcing follower and Draft Gear against rear stop as far as possible.
ii. Cut a section of Yoke strap & Yoke pin to permit installation.
iii. Then coupler is released and is taken out.
iv. All other parts are taken out one by one.
v. Re-assemble after rectification.

D. Where Yoke & Follower are broken and Draft Gear is stuck or damaged:

i. First move another wagon against coupler, forcing follower and Draft Gear against rear stop. Do not remove the Yoke support plates, remove front support plate only. Securely weld Yoke support housing and follower to Yoke strap **(See fig.-4)**. Add a suitable bar sufficient to weld housing and follower both **(See fig.-6).**
ii. Yoke is cut and coupler is taken out.
iii. Now Draft Gear is released and taken out.

NF FORGINGS PVT. LTD. Dhulagarh

SUNIL KR. SHARMA
General Manager
NF FORGINGS PVT. LTD.

PROCEDURE FOR DISMANTLE OF DRAFT GEAR ASSEMBLY

1. Position the Draft Gear in the pad removal press (minimum 200T Capacity), close and lock the safety door and disassemble the pads by pressing through the small window with proper fixture.

2. Take the Draft Gear out of the fixture and remove the remaining components for Inspection. All the components will be in loose condition automatically after removing the pads.

3. Turn the housing upright and take for Inspection of the same. Other components are also taken for Inspection.

Inspection of Draft Gear components after dismantle and procedure for repair and re-assembly:

I. HOUSING CASTING:

a) The inside friction bore walls must be smooth, and the wall thickness must not be less than 20.6mm. Sharp edges due to wear must be removed by grinding. Ground areas should be blended in if they are no more than 1.587mm deep x 25.4mm long in the vertical direction. Replace inserts if they are broken.
b) There must not be any bottom ridging in the bore.
c) Bore taper should be smooth without any concavity.
d) There must be no cracks on the housing. Cracks exceeding 25.4mm in length shall be scrapped. Housing with a total combined crack length exceeding 101.6mm shall be scrapped.
e) There must be no broken lugs on the casting. Housing locking lugs area must be checked carefully for possible cracks.
f) The housing may be checked by Liquid Penetrant Inspection for investigating the presence of any crack.
g) Rear wall flatness is checked with Gauge no. NF/71 BD/G-17 & NF/71 BD/G-18.
h) Maximum outside dimensions must be checked with Box Gauge no. NF/71 BD/G-01.
i) Wall thickness in the bore area must be checked with Gauge no. NF/71 BD/G-06.

j) Maximum top bore diameter should be checked with Gauge no. NF/71 BD/G-02.

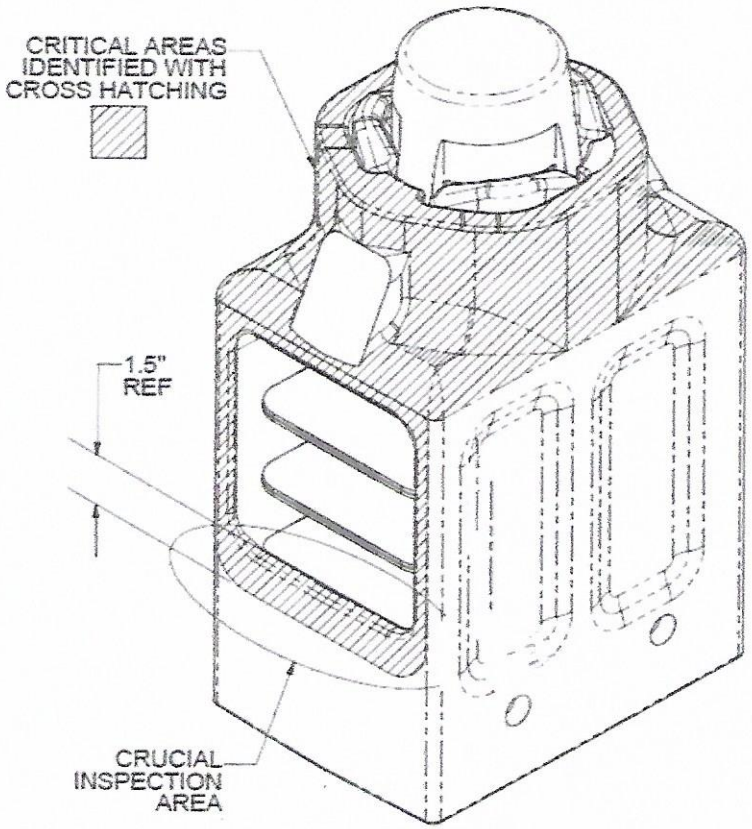
k) Maximum bottom bore diameter is checked with Gauge no. NF/71 BD/G-06.

Housings not conforming to above gauges may either be rejected or rectified considering the requirement.

WELD REPAIR PROCEDURE FOR DRAFT GEAR HOUSING

WELDING PERMISSIBILITY: Welding may be allowed to renew the worn surfaces and minor casting defects at non-critical areas. In case any crack is observed at critical area of more than 1" in length then housing should be rejected. Welding at non-critical area can be done and stress relieving to be given.

All welds should be ground smooth to the surface. Total weld repair on a single housing not to exceed 101.6mm of the total weld length.



WELDING DETAILS AND LIST OF SPECIAL EQUIPMENTS:

Welding should be carried out using MIG Welding process. Following shall be the MIG Welding Parameters:

a) MACHINE PARAMETRES:
DC Amperage: 230A

DC Voltage: 24V

Wire speed: 11.41 inch/ sec max.

b) WIRE PARAMETRES:
Trade Name: ESAB Auto K 400
Specification: AWS ER80S-D2/AWS ER70S-6
Size: Dia. 0.47", 1.2mm

c) SHIELDING GAS PARAMETRES:
Trade Name: INOX / Any other

Composition: Ar85%+CO2 13.5%+O21.5%

Following Special Equipments required for Draft Gear Maintenance:

a) 200 Ton Vertical open press for pre-shortening.
b) Assembly Block / Fixture.
c) Assembly ring
d) 76mm dia. Industrial Magnet with a special long handle.
e) Ram Press Head.
f) 200 Ton Press for Pad Insert.
g) Suitable fixture for inserting the pads.

II.INNER FOLLOWER:

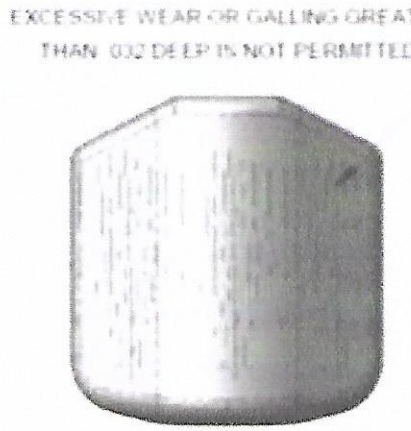
a) All followers must be shot blasted prior to inspection.
b) Dye Penetrant inspection to be carried out. If any crack observed then it should be rejected.
c) Sharp edges due to wear must be blended with the surrounding area. Flatness shall be checked visually. Followers showing distortions shall be rejected.
d) Follower thickness must be checked in the shoe contact areas with Gauge no. NF/71 BD/G-35 & NF/71 BD/G-36.
e) Flange thickness should be checked with Gauge no. NF/71 BD/G-34.
f) If minor welding is required that will be done with proper electrode and the follower to be heat treated again.

III.30° SHOE:

All shoes must be shot blasted prior to visual inspection to identify the following in order to re-use them:

a) No concave wear on any friction surface.
b) No cracks or spalls. DP Test to be carried out for crack detection.
c) Excessive wear or gouges greater than 1/32" (0.8mm) wear on any friction surface (Refer below figure).
d) Apply thickness Gauge no. NF/71 BD/G-24 and flatness Gauge no. NF/71 BD/G-21, NF/71 BD/G-22 & NF/71 BD/G-23.

Replace any shoes that have any of these conditions.

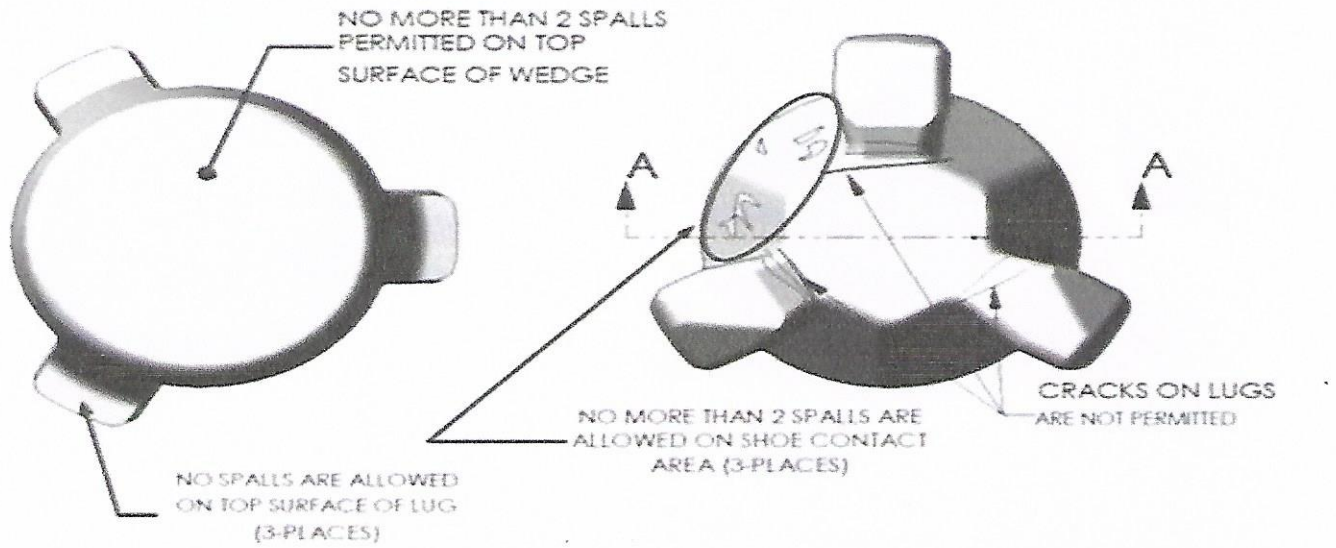


IV.WEDGE:

All wedges must be shot blasted prior to visual inspection which has been returned from service for reconditioning, MPI & DP Test to be carried out for crack detection and the following should be identified:

a) No cracks or severe spalls on the carburized case on the friction or the top of the wedge allowed. Spalls greater than ¼"x ¼" (6mm x 6mm) anywhere on the wedge should be scrapped.
b) Wedges that have more than two spalls on the shoe contact area must be scrapped.
c) Wedges having a spall on the top surface of lug must be scrapped.
d) Wedges having more than two spalls on the top surface of wedge must be scrapped.
e) No abnormal wear on any friction surface.
f) No broken locking lugs.
g) No indication of any crack on the locking lugs.
h) Apply wedge Inspection Gauges no. NF/71 BD/G-26, NF/71 BD/G-27, NF/71 BD/G-28, NF/71 BD/G-29, NF/71 BD/G-30, NF/71 BD/G-31 & NF/71 BD/G-32.

Replace any wedge that has any of these conditions.

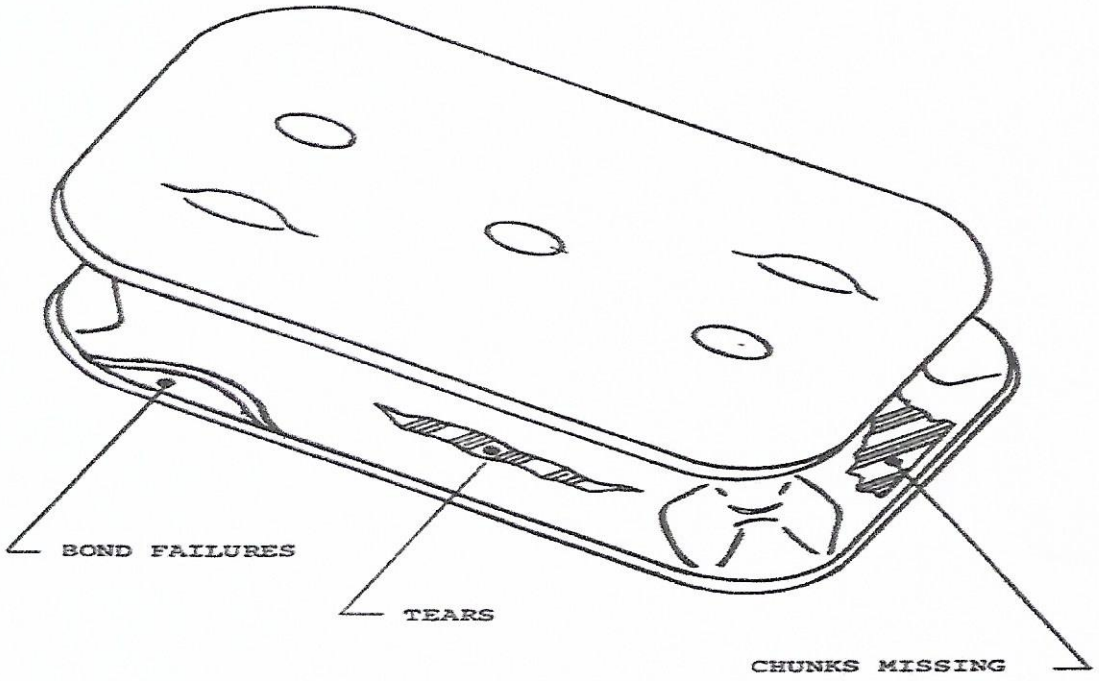


V.ELASTOMER PADS:

a) No tears are allowed. Reject pads with missing material chunks, bond failures or wear into the steel plate edges.
b) Pads are gauged and must not be less than 54mm as measured by a gap Gauge at the middle of each side. Apply Gauge no. NF/71 BD/G-39.
c) Bean (not broken or cracked) steel plates are acceptable as these will straighten during assembly.

Creases and folds are normal and acceptable for reconditioned Draft Gears.

USED PAD VISUAL INSPECTION CRITERIA



REJECTABLE DEFECTS IN ELASTOMER PADS

REASSEMBLY

A. Only new parts or used parts that passed the Inspection should be used in reconditioning gears.

B. Below is the list of parts for each unit:

S. No.	Description	Qty./ Set	Drawing. No.
1	Housing Casting	1	NF - 2051
2	Top Follower	1	NF - 2052
3	Bore Insert	3	NF - 2058
4	30° Shoe	3	NF - 2054
5	Wedge	1	NF – 2053
6	Elastomer Middle Pad	4	NF - 2056
7	Elastomer End Pad	1	NF – 2055

C. Acceptable housings are to be date tagged and loaded onto the conveyer.

D. Gears are to be reassembled with used parts when available. At least one new Elastomer End Pad and two new Elastomer Middle Pads are to be used in each rebuild gear, positioned at the clutch end of the stack.

E. The wedge is placed into the inverted housing, followed by shoes, then the follower. Place one pre shortening insert between the follower and the inside shoulder on the large window side to stabilize the follower during pad insertion.

F. Lubricate the following surfaces before installing the pads:

1. The pad side of the follower.
2. Both plates of the pad that is preplaced in the bottom of the housing.
3. The inner sidewalls of the housing.
4. The pad plate that rests on the bottom of the assembly fixture.
5. The top plate of the stack in the assembly fixture, which bears against the vertical ram.

NOTE: Acceptable lubricants are:

i. Superior Graphite, #130 Suspension,

ii. Liquid hand soap,

iii Liquid dish detergents.

Any of the above lubricant used must first be tested to make sure it does not have a detrimental effect of the rubber pads.

A. Place an Elastomer End Pad in the bottom of the housing and hold it in place with the special hooks.
B. Place a new Elastomer End Pad into the assembly fixture, followed by two new Elastomer Middle Pads and then two used Elastomer Middle Pads.
C. Install the pads and check the alignment.
D. Move the assembled gear through the rollover mechanism and then to the conveyor system.

TUP HAMMER TEST

Each of repaired Draft Gear is tested as per RDSO Specification WD-71-BD-15. Draft Gears that fail in this test shall be disassembled to determine the cause of failure and corrected, if possible. Reworked Draft Gears are done then resubmitted for hammer testing. Upon successful completion of the tup hammer test, the gear is ready for pre shortening.

PRESHORTENING

Using pre shortening block on the shoes, compress the gear in a press until an insert can clear the shoe and housing lug. Place one pre shortening insert on each wedge lug, below the corresponding housing lug. Release the gear slowly to avoid damaging the inserts. Hit the housing with a small sledge hammer to make sure the Draft Gear is properly extended against the inserts.

FINAL INSPECTION AFTER TUP TEST

After passing the Tup hammer test and pre shortening, each gear shall be checked by a quality assurance inspector for the following characteristics:

A. Pre shortening Inserts Inspection:

1. One insert per lug.
2. Contact with both wedge and housing lugs.
3. Inserts must be intact.

B. Forgings Inspection:

1. Proper components and relationship.
2. No broken pieces.
3. No cracks or spalls exceeding the inspection criteria as given in Page no. 12 & 13.
4. Clutch must be tight.
5. Torch marks are unacceptable.

C. Housings Inspection:

1. No visible cracks allowed in the housing.
2. Weld repairs must be ground smooth.
3. Repair tag must be properly marked and securely fastened in the housing.
4. Torch marks are unacceptable.
5. Mild gouges less than 1/16" deep in the bore or on the lugs, from the assembly operation, are allowable. If however, gouged metal is trapped behind the shoes, it must be removed. If gouges are deeper than 1/16" the gear must be rejected.
6. Dents on the top lug surfaces, from the assembly operation, are allowable if less than 1/32" deep. Those greater than 1/32" but less than 1/16" must be blended in by grinding. Dents greater than 1/16" are cause for rejection.

GAUGE LIST OF HOUSING AND ITS COMPONENTS

S. NO.	GAUGE DESCRIPTION	GAUGE NO.	SKETCH NO.
1.	Housing Box Gauge	G-01	NF/71 BD/G - 01
2.	Cylinder (Top) Bore Diameter Gauge	G-02	NF/71 BD/G - 02
3.	Cylinder Depth Gauge (Under lug)	G-03	NF/71 BD/G - 03
4.	Inside Cylinder Depth Gauge	G-04	NF/71 BD/G – 04
5.	Wedge to Cylinder Lug Clearance Gauge	G-05	NF/71 BD/G – 05
6.	Cylinder Bore Diameter Gauge	G-06	NF/71 BD/G – 06
7.	Inside Tapered Bottom Gauge	G-07	NF/71 BD/G – 07
8.	Cylinder Rim Top Offset Gauge	G-08	NF/71 BD/G – 08
9.	Pad Insert Opening Gauge	G-09	NF/71 BD/G – 09
10.	Inside Cylinder Length Below Shoulder Gauge	G-10	NF/71 BD/G – 10
11.	Cylinder Depth Gauge	G-11	NF/71 BD/G – 11
12.	Cylinder Width Gauge	G-12	NF/71 BD/G – 12
13.	Inside Cylinder Base Flatness Gauge	G-13	NF/71 BD/G – 13
14.	Housing Dimension Over Hex. Flat Gauge	G-14	NF/71 BD/G – 14
15.	118° Bore Face Angle Gauge	G-15	NF/71 BD/G - 15

GAUGE LIST OF HOUSING AND ITS COMPONENTS

S. NO.	GAUGE APPLICATION	GAUGE NO.	SKETCH NO.
16.	122° Bore Face Angle Gauge	G-16	NF/71 BD/G -16
17.	Housing Base Flatness Gauge	G-17	NF/71 BD/G – 17
18.	Housing Width Flatness Gauge	G-18	NF/71 BD/G – 18
19.	Shoe Back Angle And Radius Gauge	G-19	NF/71 BD/G – 19
20.	Shoe Outside Width Gauge	G-20	NF/71 BD/G – 20
21.	Shoe Face Angle Gauge-1	G-21	NF/71 BD/G – 21
22.	Shoe Face Angle Gauge-2	G-22	NF/71 BD/G – 22
23.	Shoe Face Crown Gauge	G-23	NF/71 BD/G – 23
24.	30" Shoe Thickness Gauge	G-24	NF/71 BD/G – 24
25.	Shoe Back Surface Flatness Gauge	G-25	NF/71 BD/G – 25
26.	Wedge Lug Depth Gauge	G-26	NF/71 BD/G – 26
27.	Wedge Height Gauge (Min.)	G-27	NF/71 BD/G – 27
28.	Wedge Height Gauge (Max.)	G-28	NF/71 BD/G – 28
29.	Wedge Lug Width Gauge	G-29	NF/71 BD/G – 29
30.	Wedge Over Outside Of Wedge Trim And Wedge Lug Gauge	G-30	NF/71 BD/G - 30

GAUGE LIST OF HOUSING AND ITS COMPONENTS

S. NO.	GAUGE APPLICATION	GAUGE NO.	SKETCH NO.
31.	Wedge Angle Gauge	G-31	NF/71 BD/G – 31
32.	Gauge For Length Of Wedge Body	G-32	NF/71 BD/G – 32
33.	Inner Follower Outside Contour Gauge	G-33	NF/71 BD/G – 33
34.	Inner Follower Bottom Flange Thickness Gauge	G-34	NF/71 BD/G – 34
35.	Inner Follower Thickness Gauge	G-35	NF/71 BD/G – 35
36.	Inner Follower Overall Thickness Gauge	G-36	NF/71 BD/G – 36
37.	Inner Follower Bottom Flatness Gauge	G-37	NF/71 BD/G – 37
38.	Inner Follower Radius Gauge	G-38	NF/71 BD/G – 38
39.	Elastomer Pads Unit Gauge	G-39	NF/71 BD/G – 39
40.	Draft Gear Assembly Length Gauge	G-40	NF/71 BD/G – 40
41	Follower Gauges	G-1 to G-5	NF/71 BD/FWG

NF FORGINGS PVT. LTD. Dhulagarh

SUNIL KR. SHARMA
General Manager
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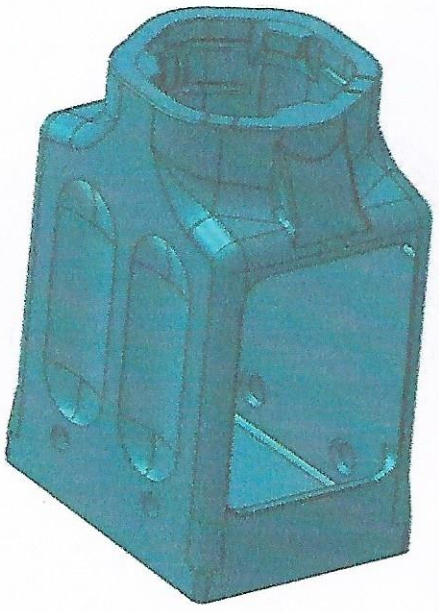
Dhulagarh, Howrah

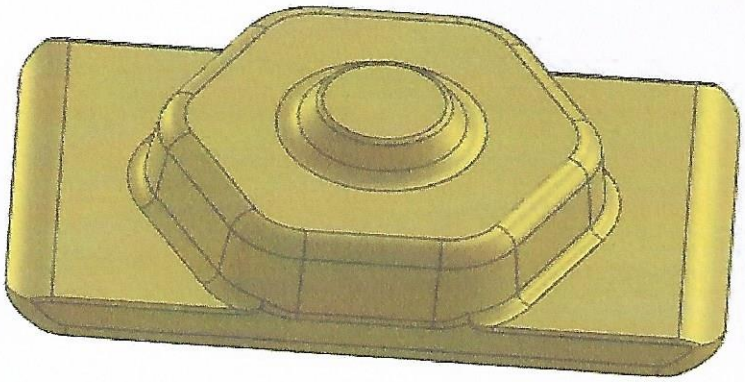
LIST OF SPARES FOR DRAFT GEAR COMPONENTS

S. No.	Qty./ Set	Description	Drawing. No./ Part No.
1	1	Housing Casting	NF – 2051
2	1	Inner Follower	NF – 2052
3	3	Bore Insert	NF – 2058
4	3	30° Shoe	NF – 2054
5	1	Wedge	NF – 2053
6	4	Elastomer Middle Pad	NF – 2056
7	2	Elastomer End Pad (Top)	NF – 2055

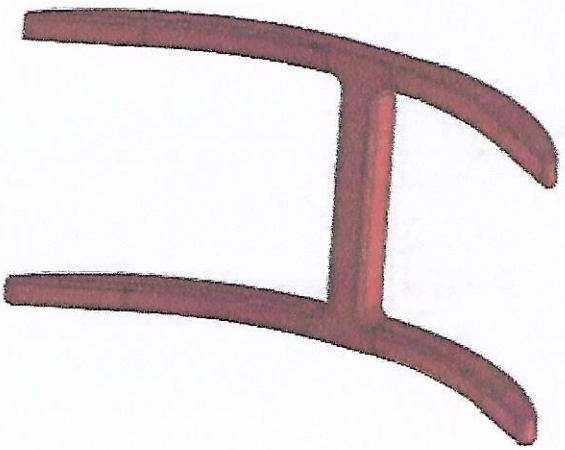
1. **Housing Casting** (Drawing No.: NF - 2051)



2. Inner Follower (Drawing No.: NF - 2052)

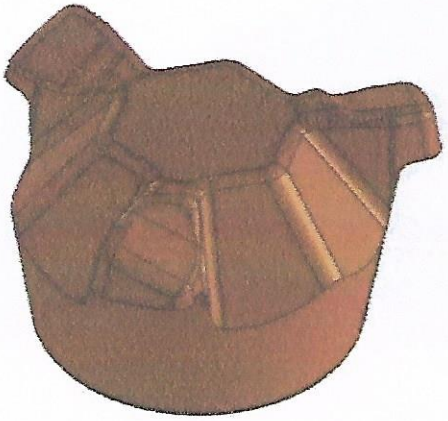


3. Bore Insert (Drawing No.: NF - 2058)

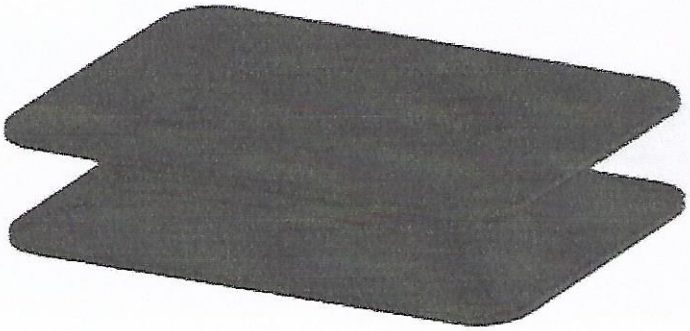


4. 30° Shoe (Drawing No.: NF - 2054)

5. Wedge (Drawing No.: NF - 2053)



6. **Elastomer Middle Pad** (Drawing No.: NF - 2056)



7. **Elastomer End Pad** (Drawing No.: NF – 2055)