



INSPECTION, MAINTENANCE AND ASSEMBLY MANUAL

**Wheels & Rims for Construction, Earth Moving and Mining
Equipment**



TABLE OF CONTENTS

SECTION – 1

- ✓ Introduction.....02
- ✓ Definition and Construction features.....03

SECTION – 2

- ✓ Identification.....09

SECTION – 3

- ✓ Safety.....13

SECTION – 4

- ✓ Inspection.....17
- ✓ Identification of damaged wheels.....22

SECTION – 5

- 5.1 Tyre mount and demount tools.....26
- 5.2 How to mount the tyre onto SPDC wheel(Tube & tube less).....28
- 5.3 How to demount the tyre onto SPDC wheel(Tube & tube less).....31
- 5.4 How to mount the tyre onto Split wheel(Tube type).....33
- 5.5 How to demount the tyre onto Split wheel(Tube type).....35
- 5.6 How to mount the tyre onto 3 piece rim(Tube less).....38
- 5.7 How to demount the tyre onto 3 piece rim(Tube less).....41
- 5.8 How to mount the tyre onto 5 piece rim(Tube less).....44
- 5.9 How to demount the tyre onto 5 piece rim(Tube less).....48

INTRODUCTION

- ❖ Wheels India Limited, is one of the largest wheel manufacturer with product portfolio covering different applications ranging from wheels for passenger vehicle, light and heavy commercial vehicle, agricultural tractors and wheels for construction and mining equipments. Wheels India have been supplying to major OEMS across the globe for several decades.
- ❖ This manual contains detailed information regarding the design and construction, identification of wheels, instructions regarding safety, service and maintenance and assembly aspects of wheels for construction and mining equipments.
- ❖ This manual shall be read and kept at the point of use for any future reference as necessary. This manual is annotated with safety symbols given here wherever necessary.



Warning



Danger

All concerned are requested to read the “SECTION - 3 Safety”, before starting any work on wheel and tyre.

- ❖ The objective of this manual is to assist the tyre mechanics, installers and the end users of equipments in reducing the risk to health and safety of their employees and the respective equipments.



SECTION – 1

DEFINITION AND CONSTRUCTION FEATURES

DEFINITION

Rim base:

The part of rim assembly on which the tyre is mounted. A typical rim base of multi piece wheel consists of back section, centre band section and gutter section which are welded together.

Rim assembly:

The rim assembly typically comprises of a rim base, flanges, bead seat band and lock ring. A rim assembly is mounted to the equipment by number of wedges or cleats.

Wheel:

The wheel consists of two major parts, namely a) rim base b) disc. Disc is normally welded to rim base.

Disc:

The disc is that part of the wheel, which is used for mounting the wheel to axle hub by set of fasteners. This part is also called nave plate.

Wheel assembly:

The wheel assembly typically comprises of rim base, flanges, bead seat band, lock ring and a disc.

Cold inflation pressure:

The tyre inflation pressure set in accordance with both the tyre and rim manufacturer's recommendation.

Offset:

The distance between the mounting face of the disc and the rim Centre line.

Positive offset:

This is also called inset. The offset will become positive if the mounting face of the disc is outboard(weather side) of the rim Centre line.

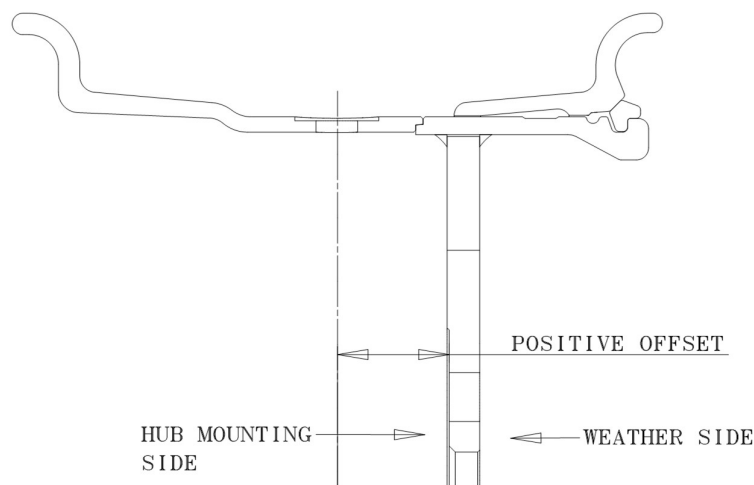


Fig 1

Negative offset:

This is also called outset. The offset will become negative if the mounting face of the disc is inboard (axle side) of the rim centerline.

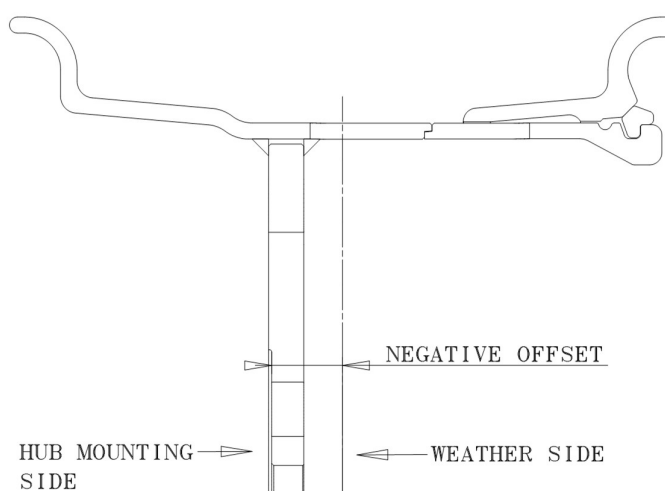


Fig 2

CONSTRUCTION FEATURES

DIFFERENT TYPES OF WHEEL AND NOMENCLATURE

The wheels and rims are classified and identified as given below. The identical features among different types of wheels are not repeated for the sake of brevity of this document.

A) 5-PIECE RIM ASSEMBLY

1. Rim base
2. Flanges (side rings)
3. Disc
4. Bead seat band
5. Bead seat band 5° taper
6. O ring
7. Lock ring
8. Valve slot for tube type rim
9. Gutter section
10. Center band section
11. Back section
12. Lock ring groove
13. O ring groove
14. Valve hole for tube less rim
15. Bead seat band driver pocket
16. Rim base driver pocket
17. Driver key
18. Flange height
19. Knurling
20. Pry bar slot

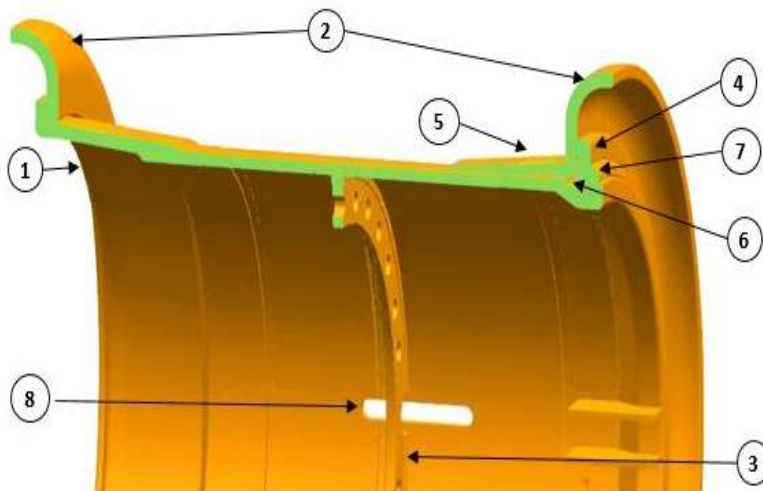


Fig 3 - 5 Piece rim assembly

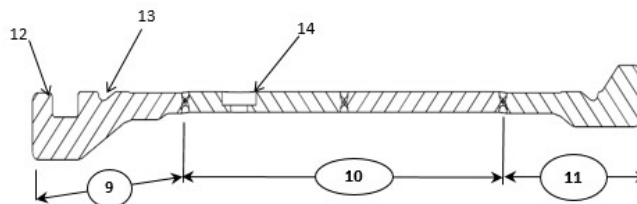


Fig 4 - 5 Piece rim

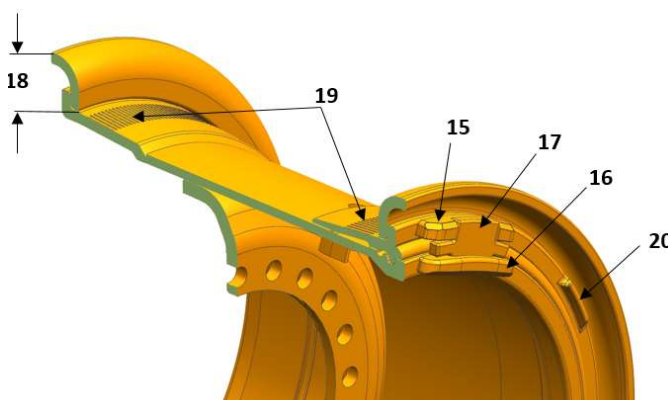


Fig 5 - 5 Piece rim assembly

B) 3-PIECE RIM ASSEMBLY

- 21. Rim base
- 22. Detachable flange
- 23. Lock ring
- 24. O ring groove
- 25. Lock ring groove

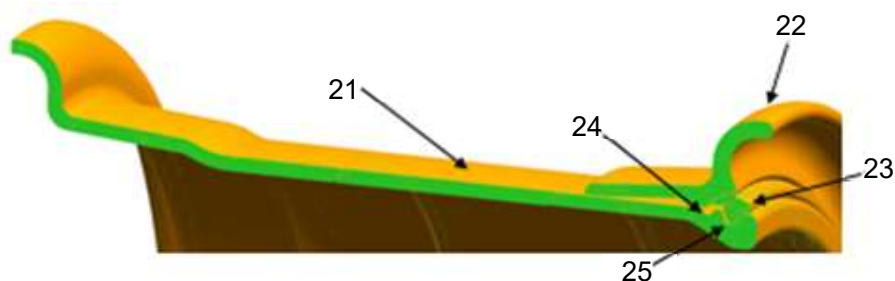


Fig 6 – 3 Piece rim assembly

C) SPLIT WHEEL ASSEMBLY

- 26. Cup
- 27. Valve guard
- 28. Clamping fasteners

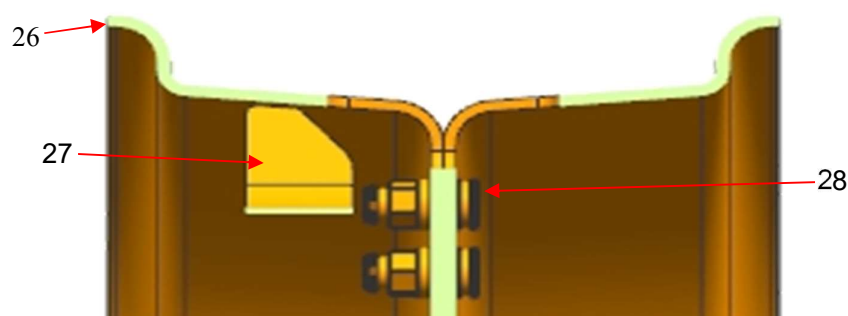
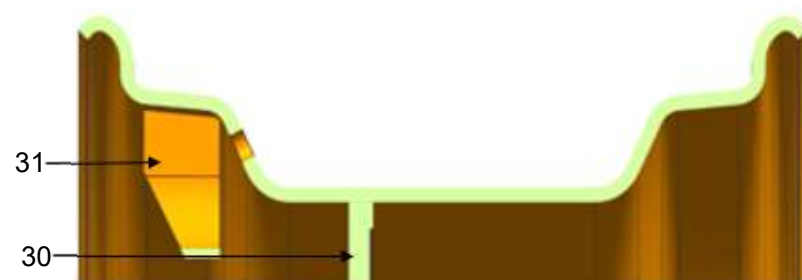
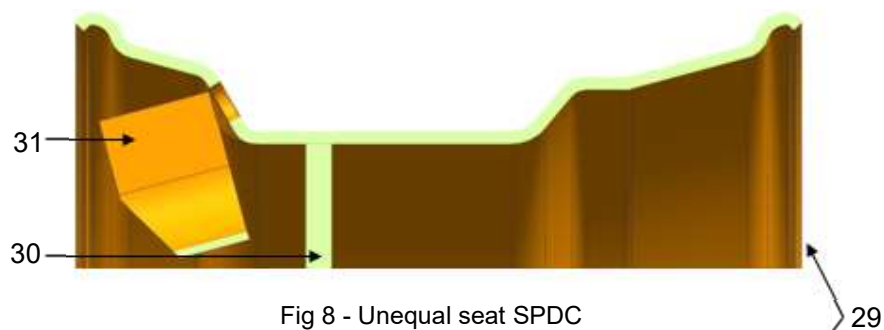


Fig 7- Split wheel assembly

D) SINGLE PIECE DROP CENTRE (SPDC) WHEEL

- 29. Rim base
- 30. Disc
- 31. Valve guard





SECTION – 2

IDENTIFICATION

IDENTIFICATION OF WHEEL/RIM COMPONENTS

Marking details

- The wheel and its components will contain below details in the marking but not necessarily in the same order.
- There may be additional details marked on the wheels based on requirement from the OEM.
- The probable location of the marking is given as below.

Table-1

Parts	Company Name	Date of Manufacture	Country of origin	Size codes
Rim base	WIL	Date in DDMMYY format	INDIA or Made in INDIA	Refer table 4 & 6
Flange/Detachable flange(3P)	WIL	Year and month code as per table 2 & 3		
Bead seat band	WIL	Year and month code as per table 2 & 3		
Lock ring ★	WIL	Year and month code as per table 2 & 3		

★ The lock rings are available in different cross sections. Applicable lock ring cross section and their corresponding wheel size are given in table no 5.

Location of markings

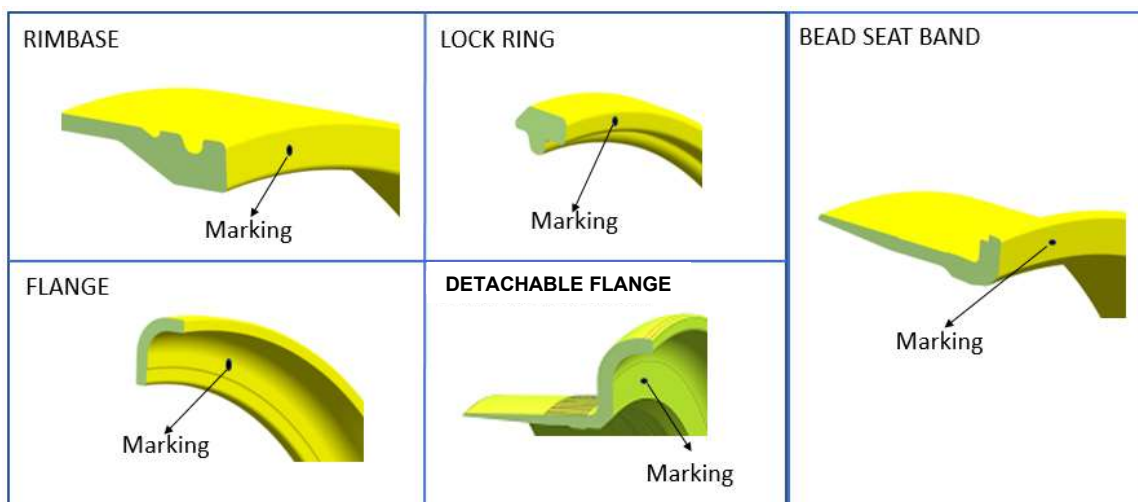


Fig 10

**Year code**

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Z	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R	S	T	U

Table-2

Month code

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
W	H	E	L	S	I	N	D	A	P	V	T

Table-3

Size wheel code for 3P wheel component

Sl no	Wheel size	Rim Base	Detachable flange	Lock ring
		Dimensions in inches		
1	10.00/1.7-24	10.00/1.7-24	1.7x24	24
2	10.00/1.5-25	10.00/1.5-25	1.5x25	25
3	14.00/1.5-25	14.00/1.5-25	1.5x25	25
4	17.00/1.7-25	17.00/1.7-25	1.7x25	25
5	19.50/2.5-25	19.50/2.5-25	2.5x25	25
6	22.00/3.0-25	22.00/3.0-25	3.0x25	25
7	25.00/3.5-25	25.00/3.5-25	3.5x25	25
8	25.00/3.5-29	25.00/3.5-29	3.5x29	29

Table-4

Lock ring cross section


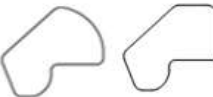


Type	Unique feature	Figure	Applicable wheel sizes in inch							
			24	25	29	33	35	49	51	57
LD	Lock ring		●							
HD	Lock ring			●	●	●	●			
EHD	Lock ring								●	●
EV	Lock ring					●	●	●		

Table-5

**Size wheel code for 5P wheel component**

Table-6

Sl no	Wheel size	Rim Base	Flange	Bead seat band	Lock ring
		Dimensions in inches			
1	10.00/1.5-25	10.00/1.5-25	1.5x25	25	25
2	11.25/2.0-25	11.25/2.0-25	2.0x25	25	25
3	13.00/2.5-25	13.00/2.5-25	2.5x25	25	25
4	14.00/1.5-25	14.00/1.5-25	1.5x25	25	25
5	14.00/2.0-25	14.00/2.0-25	2.0x25	25	25
6	15.00/3.0-25	15.00/3.0-25	3.0x25	25	25
7	17.00/2.0-25	17.00/2.0-25	2.0x25	25	25
8	19.50/2.5-25	19.50/2.5-25	2.5x25	25	25
9	22.00/3.0-25	22.00/3.0-25	3.0x25	25	25
10	25.00/3.5-25	25.00/3.5-25	3.5x25	25	25
11	24.00/3.0-29	24.00/3.0-29	3.0x29	29	29
12	25.00/3.5-29	25.00/3.5-29	3.5x29	29	29
13	27.00/3.5-29	27.00/3.5-29	3.5x29	29	29
14	13.00/2.5-33	13.00/2.5-33	2.5x33	33	33
15	15.00/3.0-33	15.00/3.0-33	3.0x33	33	33
16	17.00/3.5-33	17.00/3.5-33	3.5x33	33	33
17	28.00/3.5-33	28.00/3.5-33	3.5x33	33	33
18	15.00/3.0-35	15.00/3.0-35	3.0x35	35	35
19	17.00/3.5-35	17.00/3.5-35	3.5x33	35	35
20	29.00/3.5-35	29.00/3.5-35	3.5x35	35	35
21	31.00/4.0-35	31.00/4.0-35	4.0x35	35	35
22	17.00/3.5-49	17.00/3.5-49	3.5x49	49	49
23	19.50/4.0-49	19.50/4.0-49	4.0x49	49	49
24	24.00/5.0-51	24.00/5.0-51	5.0x51	51	51
25	26.00/5.0-51	26.00/5.0-51	5.0x51	51	51
26	29.00/6.0-57	29.00/6.0-57	6.0x57	57	57

SECTION-3

SAFETY

Improper handling of rims and wheels can cause serious accidents. Instructions for safe handling of wheels and rims during service, inspection, assembly and disassembly are given in this section of the manual. In case of any doubt in any of these instructions, please ask for expert advices or contact Wheels India Limited.

Every wheel and tyre assembly have its rated load specified. Do not load the wheel and tyre assembly beyond the load rating. Do not inflate the tyre beyond the recommended cold inflation pressure. The fasteners holding wheel or rim assembly to the axle hub to be secured by tightening to recommended torque values. Refer equipment manufacturers manual for rated load, inflation pressure and torque values. This manual is annotated with safety symbol wherever necessary. Definition of each safety symbols are as below. All users of this manual are advised to take note of these instructions and act accordingly.



Indicates immediate hazard, which may result in personal injury or death.










Indicates personal injury or death or property damage, if procedures are not followed.


Safety instruction

The wheel is a highly stressed component of the vehicle that in service may be subjected to extreme forces. Therefore, it is absolutely necessary to check the wheels periodically and to pay particular attention to their mounting, removal and maintenance in order to ensure safe operations and to prevent any possible risk.

General

-  Proper training should be provided to the operating personnel for safe handling of wheels, tyres, and assembly.
-  Necessary personal protective equipment (PPE) namely gloves, helmet, goggles should be used by the operating person.
-  Work procedure should be made available at servicing location and it should be strictly followed.
-  Dual wheel mountable equipment should not be operated with only one wheel fitted.
-  Recommended handling equipment for lifting and assembling wheels with tyres only should be used.
-  Only lubricants approved by the tyre manufacturer shall be used. Vegetable or animal base oils are generally preferred for use as tyre lubricant. Petroleum base oils and lubricants are not recommended as they may chemically attack or otherwise damage tyre beads. Silicon type lubricants should be avoided to reduce the possibility of tyre slippage on the rim. Do not dilute the lubricants beyond the limits specified by the lube manufacturer as it may harm the tyre or rim.
-  Used O-rings shall be discarded and replaced with new O-ring whenever dismantling tyre and rim.

Inspection

-  If there has been considerable loss of air pressure (less than 80% of recommended pressure) or sudden deflation due to tyre burst, dismantle the wheel rim assembly and determine the cause. Inspect the parts as per instruction given in this manual and replace as instructed.

- ⚠ Re-inflate only if checks are done and the necessary corrective action is taken.
- ⚠ Do not add or remove components or replace components from other manufacturers or otherwise modify a rim in such a way that the product specifications are changed.
- ⚠ Inspect for excessive wear, corrosion, damage, fatigue or cracks.
- ⚠ Always replace any damaged, bent, corroded, cracked, or worn parts.
- ⚠ Do not perform tasks that generate heat such as welding or grinding with tyre. There is possibility to lead a explosion or a fire by excessive tyre pressure.
- ⚠ Carry out visual examination of tyres and rims when conducting regular inspections of vehicles and tyres or during tyre rotation. (preferably once every 2000 hours or depending on the usage pattern).

Servicing and maintenance

- ⚠ When servicing tyres and rims, always start by completely deflating the tyre. In case of dual wheel assembly, deflate both tyres.
- ⚠ Remove the valve core to ensure that all of the air can escape. Insert a wire through the valve stem to ensure there is no block for the air flow.
- ⚠ Do not mix up parts from different rim manufacturers. Identify the components of Wheels India, using the information provided in “SECTION – 2” Identification of this manual.
- ⚠ An improper combination of rim components can cause explosion or separation of the rim and can cause serious injury or death.
- ⚠ Lock ring should have ends over lapping in free state. Lock ring with open ends (ends not touching each other) should not be used. Open end lock ring will not seat properly on the rim and can cause accidents. Refer fig no 11.

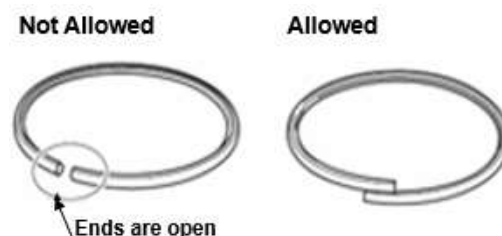


Fig-11

- ⚠ During assembly and inflation, use plastic or aluminium mallet to strike and adjust the components to ensure proper seating. Steel mallet should not be used as they may damage the parts.
- ⚠ DO NOT exceed the air pressure recommended by the tyre manufacturer or OEM.
- ⚠ Ensure that protective equipment is worn when servicing tyres and rims.
(Wear gloves, safety shoes, safety glasses, ear protection, helmet).
- ⚠ When inflating tyres or when deflating tyres, workers must always be outside the range of the hazardous trajectory, shown in the below figure no 13. Exercise extreme caution as the trajectory may widen.
- ⚠ While removing lock ring handle carefully since it may fly off separately.
- ⚠ Do not use a tube in tubeless tyre and wheel rim assembly, if there is a suspicion of air leak across the rim.

Tyre inflation safety cage



Fig-12



Fig-13



SECTION – 4

Inspection

Inspection

All components of the rim assemblies and wheel assemblies shall be inspected for mechanical damage. Suitable non-destructive inspection methods viz. magnetic particle inspection, ultrasonic inspection or dye penetrant inspection shall be employed. Following guidelines shall be referenced for inspection of different wheel components.

Cleaning prior to inspection

Cleaning rim components using a wire brush, such that all the areas to be inspected is free of scale, grease, dirt etc. as their presence may interfere with the inspection results. The wheel rim inspection can be done in two conditions.

(a) Wheel as mounted on the machine

This is also called in service inspection. This inspection can be done on daily basis. During tyre inspections, check that there is no cracking, wear or deformation on the rim components. Loss of air pressure in tubeless tyres can be one indication of cracking. Perform a careful inspection of the gutter section, back section and flange portions as indicated in the figure no 14 below. Any defect or damage found during the inspection shall be identified and suitable corrective action has to be taken.

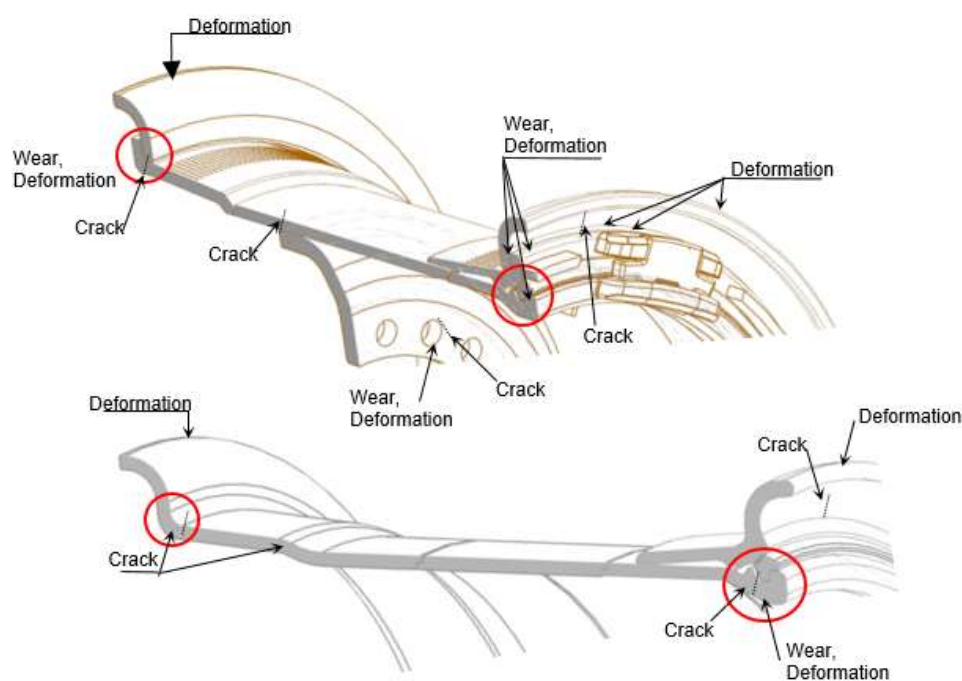


Fig-14

(b) Wheel as dismantled from the machine ⚠

This is also called periodic inspection. The frequency of this inspection shall be decided by taking into account the working conditions and usage pattern at the site. Also, this inspection can be done whenever there is an opportunity to dismantle wheel and tyre assembly from the machine.

Lock ring ⚠

The lock ring shall be visually inspected for cracking, wear, corrosion and deformation in the contact areas with rim base and bead seat ring. The critical areas of lock ring are marked in the figure 15 & 16.

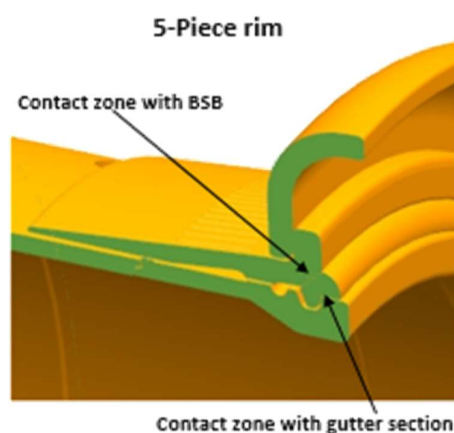


Fig-15

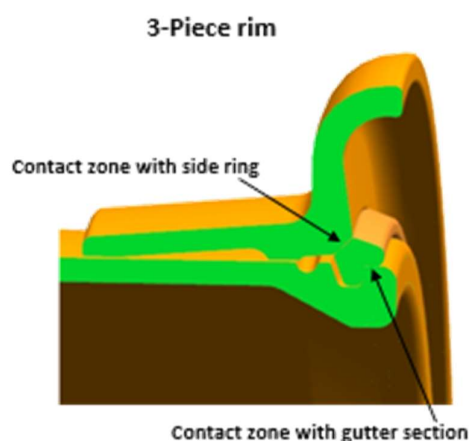


Fig-16

Bead seat band ⚠

The bead seat band shall be visually inspected for cracks, wear and corrosion in the areas in contact with the lock ring, flange, tyre bead and rim base or any weld. The area of the bead seat band with which the flanges are in contact, as well as any weld for driver pockets on the bead seat band, should be subjected to magnetic particle testing.

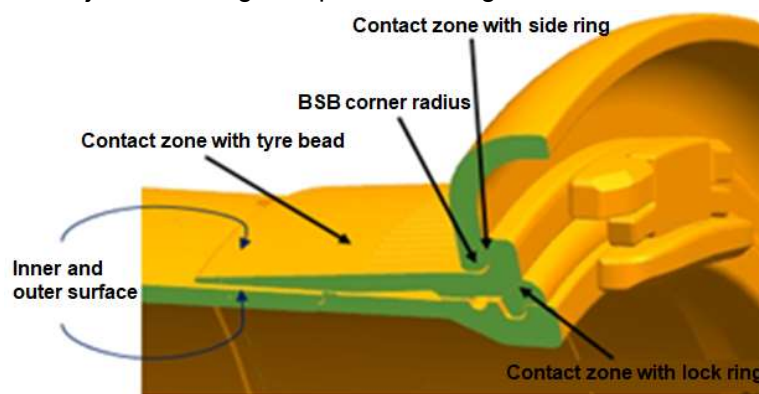


Fig-17

Flanges ⚠

The area of the flanges which are in contact with the bead seat band or rim base, tyre as well as any butt weld, or other form of weld on the flange, shall be subjected to visual inspection for wear, cracking, fretting, corrosion, deformation or damage. Corner radius region of detachable flange shall be subjected to magnetic particle inspection.

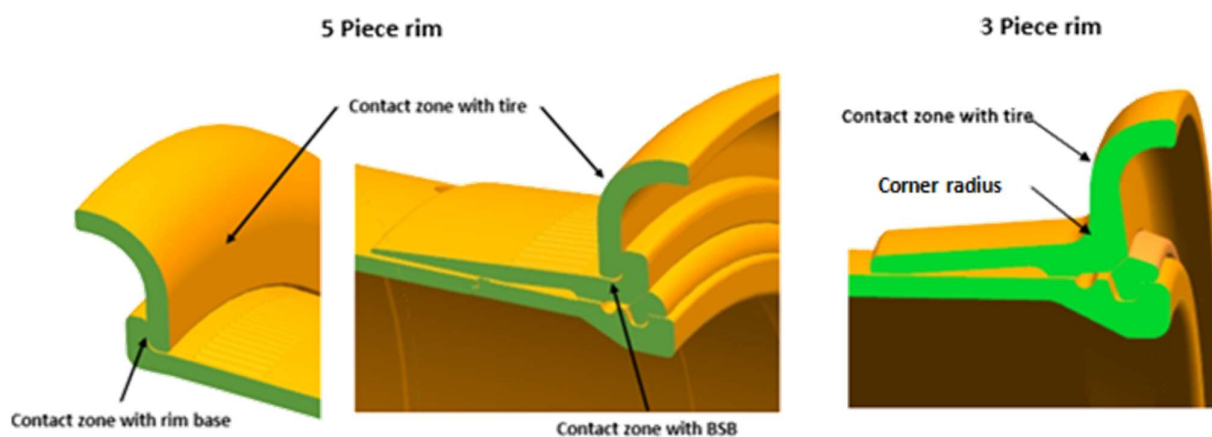


Fig-18

Rim base ⚠

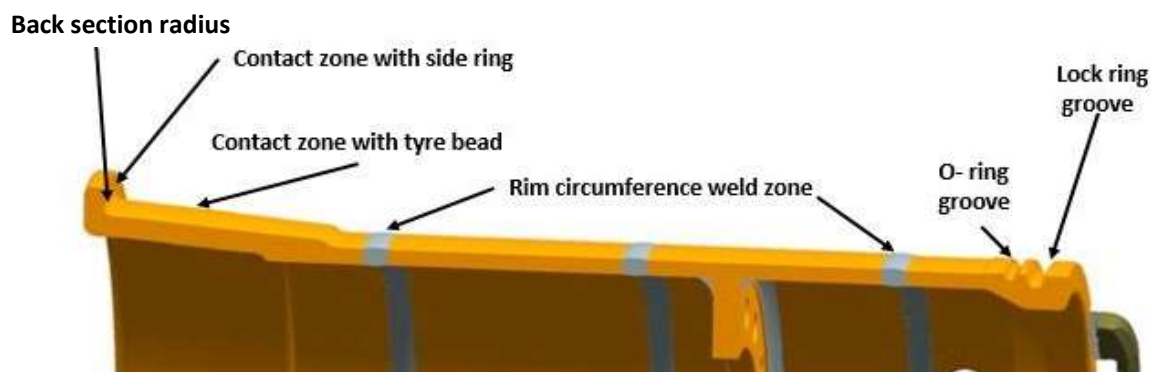


Fig-19

The area of the rim base in contact with any flange, bead seat band or lock ring shall be subjected to visual inspection for wear, cracking, fretting, corrosion or damage. The valve spud hole or slot shall be checked for corrosion, out of roundness and cracking. In addition, the area across the inside surface of the rim base shall be visually inspected for corrosion.

The demountable (28-degree taper) mounting face of the rim base shall be verified that it is in a suitable condition for fitment. For wheel assemblies, the disc shall be examined for out of roundness in the holes, and cracking between the holes and at circumferential welds. The following sections of the rim base viz, the area in contact with the flanges and the back-section fillet radius, lock ring groove, O – ring groove, any transverse weld, any circumferential weld shall be subjected to magnetic particle testing. The extent of damage in case of weld defect shall be determined by ultrasonic inspection.

Wear on lock ring groove

Use wear gauges to check lock ring groove wear in the rim base. Place the wear gauge such that the shaded surfaces of the gauge abut closely to the rim gutter outside diameter and rear face of the lock ring groove as shown in the figures 20. Take appropriate actions when the measured wear gap is between 1.5 to 2.00 mm.

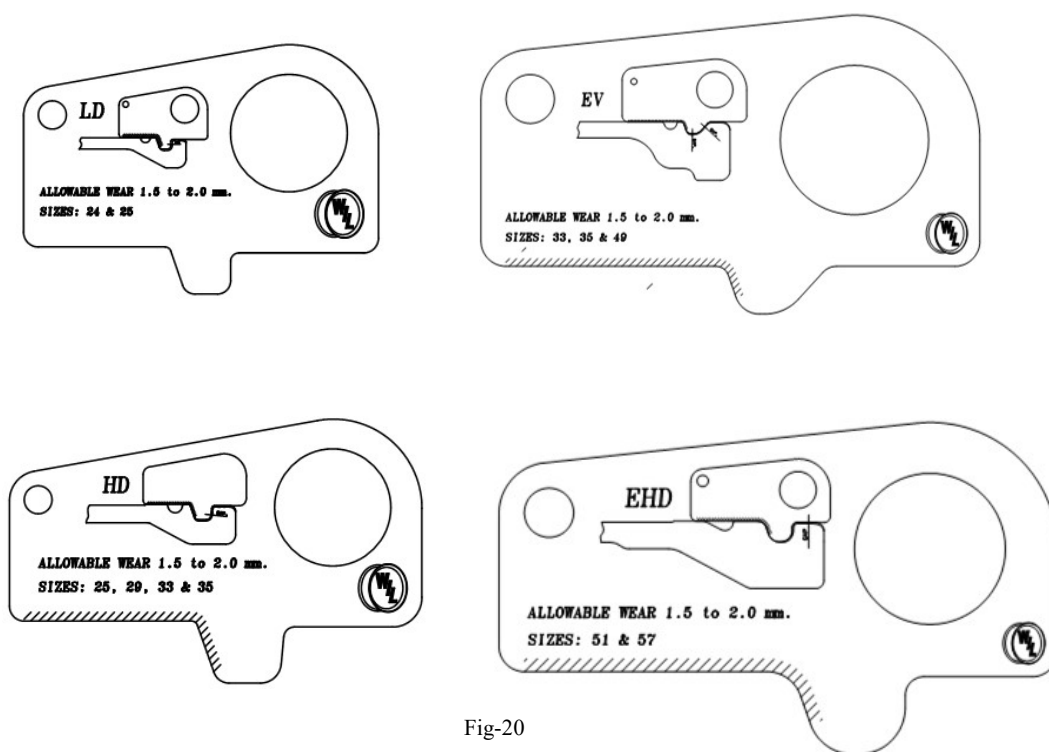


Fig-20

Wheel disc ▲

The area around wheel disc welds shall be subjected to both a visual inspection and magnetic particle testing. Mounting holes should be inspected for out of roundness and circumferential cracking.

Rim base inspection ▲

Always verify the actual product for the weld zones of rim components as they vary by construction.

After inspection ▲

- If any problems are found as a result of inspection, take appropriate measures to correct them.
- For installation and removal of rim drivers, valve guards, etc. or to perform other repairs, obtain approval from your WIL rim dealer and be sure to remove the tyre before carrying out any work.

Notice

It is recommended that tyre pressure records are updated to ensure early detection of air leaks which may be caused by cracks in rim components.

Identification of damaged wheel/rim ▲

- Any wheel rim component identified with cracks, deformation and rendered unusable shall be clearly marked and disposed, so that they are prevented from re-use.
- Lock rings with open ends in free state shall be clearly marked and disposed.

Surface treatment and painting ▲

- Recoat parts with anti-corrosive oil or paint as necessary.
- Anti-corrosive oil and paint may contain toxic ingredients. Follow the instructions provided by the manufacturers of the anti-corrosive oil or paint.
- The lock ring, O ring groove and other mating parts of the rim components shall be clean and free off corrosion.
- Any sharp edge or burr which have arisen during service or handling shall be properly de-burred.
- A fresh coat of paint shall be applied over the exposed bare metal surface to prevent corrosion.
- Where necessary the parts shall be coated with primer and finish paint to enhance the usable life of the parts.

Marking and reporting ▲

The repaired wheel rim assembly shall be permanently marked near the valve hole region. This will help for future investigation in case if the particular wheel undergoes frequent repair. Also, a record of rim maintenance history detailing the location and extent of repairs shall be maintained by the user for any future reference.

Storage ▲

If the rims are stored as tyre and rim assembly, they should be stored at a pressure determined through a proper risk assessment. The surface upon which the tyre and rim or wheel assembly is to be stored should be a well-compacted level all-weather surface. The orientation of the tyre and rim or wheel assembly should be such that any unplanned movement is avoided. Tyres and rim or wheel assemblies stored in open conditions suffer damage or deterioration. Tyres and rim or wheel assemblies which are to be stored for long periods should be protected to prevent deterioration or damage.

Typical defects that require the parts replacement ▲










- Cracks in the wheel disc face, in particular the bolt holes area and the ventilation holes.
- Deformations or abnormal imprints in the seats of the bolts / stud's fixings.
- Leaks in tubeless tyres derived by micro-cracks in the rim or by wear and tear marks on the rim-tyre matching surface.
- Bent rim flanges (generally due to impacts against obstacles).
- Circumferential cracks on the back-section flange or at the gutter in the base of multipiece rims.
- Fracture, deformation of detachable flanges, bead seat band, flanges of multi piece rim.
- Twisted rings, open lock rings, it is not allowed to perform any technical modification on the wheel.
- The repair of a damaged rim or disc by heating, by welding, by addition or removal of material is absolutely forbidden.
- No guarantee on repaired parts is acceptable, since such changes may introduce additional stresses in critical, high stressed areas.
- Wear on rim flanges (top of the flanges) can be tolerated up to a maximum of 10 % of the initial thickness of the rim material.
- Wear on lock ring grooves, lock rings shall be inspected, using Wear gauges.








SECTION-5
ASSEMBLY AND DISASSEMBLY

5.1 Tyre mount and demount tools

Table no 7

Tools description	Sample represented image
Valve core removal tool	
3 piece rim bead breaker of suitable tonnage and stroke.	
5 piece rim bead breaker of suitable tonnage and stroke.	
Tyre inflator(200 psi)	
Plastic hammer(450g)	
Wire brush	
Tyre lever for tyre mount & demount	
Lifting sling	
Tyre seating blocks	

Set of open type wrenches for valve spanner. (13mm/14mm/17mm/24mm/27mm/30mm)	
Material handling equipment (Fork lift, Tyre handler, Crane, Hoist)	
Compressor with sufficient air output (40 m ³ /h at 12 bar)	
Tyre lubricant (Vegetable or animal base grease)	
Tyre inflation cage	

Assembly / Disassembly of tyre and wheel

5.2 How to mount the tyre onto SPDC wheel assembly (Tubed & tube less)



Fig-21

5.2.1 Required tools

Refer Table no 7.

5.2.2 Mounting

- Inspect the tyre and rim and ensure they are free from any damage.
- Lubricate the whole rim surface flange to flange as well as the tyre bead.

It is recommended that the tube be lubricated where it contacts the rim and tyre bead.

As a minimum, the inside (rim side) and side walls should be slightly lubricated with oil.

Tyre must be mounted before the lubricant dries.

- Always keep the valve hole side of the rim on top side, when the rim is placed on the floor. In case of unequal seated, rim profiles, narrow end kept on the top side.

5.2.3 Mounting first tyre bead



Fig-22

a) For tubed tyres

- Place the tyre concentrically on the rim flange. Press the lower bead over the rim flange into the rim well. Consider the direction of tyre rotation as needed.
- Progressively, push the whole bead over the flange and into the rim well. In event of difficulties use a suitable tyre lever.
- Insert tube in to tyre and assemble/insert the tube and flap. Inflate small amount of air (not more than 3 psi) to round out the tube.
- Insert carefully the valve stem into the valve hole.

b) For tubeless tyres

- Assemble valve before in to rim. Ensure the valve is centred on the hole and fitted properly.
- Place the tyre concentrically. Consider the tyre tread direction, whenever necessary.
- Progressively push the whole bead.

5.2.4 Mounting second tyre bead

- Press the second bead of tyre.
- Progressively push the whole bead using a tyre lever.



Fig-23

5.2.5 Inflation



Fig-24

- Ensure the valve core assembled inside the valve. Place the tyre assembly vertically inside a tyre cage and start inflation.
- Follow the safety rules. In case of difficulty (tyre bead has not overcome the valve base) place the wheel on the ground. Lift the bead in the valve area using a lever.
- Inflate up to 10 psi and check if the beads are seated proper.
- Deflate the air and inflate again. This is to avoid folding or tearing of tubes inside the tyre during inflation.
- When the tyre is correctly positioned, ensure the presence of valve core and inflate the tyre to the prescribed air pressure.

5.3 How to demount the tyre from SPDC wheel assembly (Tubed & tubeless)

5.3.1 Deflation

- Deflate the tyre completely by removing the valve core and ensure there is no air.

5.3.2 Demounting (Tube type)



Fig-25

- Place tyre and wheel assembly flat on an appropriate floor.
- In case of unequal seat rim profile, start with the narrow seat side. Insert the curved end of the tyre tool in between tyre and rim flange. Apply pressure to push the tyre and unseat the bead. Push the tyre in to the well by prying at every 20 cm interval.
- Turn over the assembly. Unseat the tyre bead of this side as explained above.
- Remove the tube and flap.
- Engage 2 flat levers spaced at 20cm on either side of the valve.
- Keeping one lever in position, work on tyre bead using another lever, so that it comes over the rim flange. Repeat these steps to remove the tyre bead from the rim.
- Separate the wheel from tyre.

5.3.3 Demount (Tubeless tyre)



Fig-26

- Place the tyre and wheel assembly flat on an appropriate floor.
- Stand on tyre. Use curved end of the tyre prying tool in between tyre and flange to break the bead.
- If necessary apply lubricant on tyre bead and flange of the wheel.
- Unseat the tyre bead on its entire circumference.
- Turn over the assembly. Unseat the bead of this side as explained above.
- Engage 2 flat levers spaced at 20cm on either side of the valve.
- Keeping one lever in position, work on tyre bead using another lever, so that it comes over the rim flange. Repeat these steps to remove the tyre bead from the rim.
- Separate the wheel from tyre.

5.4 How to mount the tyre onto split wheel assembly (Tube type)

5.4.1 Required tools

- Refer Table no 7.

5.4.2 Stud welded male cup

- Inspect the tyre and rim and ensure they are free from any damage.
- Lubricate the whole rim surface as well as the tyre bead.
- Place the bolt welded male cup on a wooden block, such that threaded portion projects upwards.



Fig-27

5.4.3 Tyre assembly



Fig-28

- Place a tyre on the rim as shown figure 28.
- Insert the tube in between the tyre and wheel, ensure tube stem valve is assembled through the rim and valve slot side.

5.4.4 Female cup assembly

- Place the female cup and align to the bolts as shown figure 29.
- Align the U-slot in female cup to the rim air-valve hole as shown in figure 29.



Fig-29

5.4.5 Female cup tightening



Fig-30

- Align the hub mounting holes & hub diameter on both top & bottom cups using a fixture (or at least align the hub mounting holes at four places using guide pins / bolts). Ensure there is no gap between top & bottom mounting faces after tightening nuts, cup nuts as per recommended torque and sequence.

5.4.6 Inflation

- Inflate the tyre by placing the assembly vertically in air-inflating cage.
- Inflate up to 3 psi and check if the beads are seated proper.
- Deflate the air and inflate again. This is to avoid folding or tearing of tubes inside the tyre during inflation.

5.5 How to demount the tyre from split rim (Tube type)

5.5.1 Deflation

- Prior to demounting tyre from rim, release all air by removing the valve core housing with the valve tool.

5.5.2 Set up the tyre and rim

- After fully releasing the air, place the tyre and rim on the floor with the nut side facing up.



Fig-31

5.5.3 Detach tyre bead seat from female cup

- Insert the bead breaker between the tyre bead and the female cup. Unseat the bead from the female cup by using the lever to push the tyre down around the entire circumference.



Fig-32

5.5.4 Remove stud nuts

- Use the power tool/wrench for loosening the nuts.
- Remove all nuts in studs and check the tyre is free from the assembly.



Fig-33

5.5.5 Remove female cup

- Use the tyre lever to remove the female cup.



Fig-34

5.5.6 Turn over tyre and male cup

- Use lifting equipment to turn over the tyre and male cup and place them on the ground.

5.5.7 Detach tyre bead from male cup

- Insert the tyre bead breaker between the tyre bead and the male cup.
- Lubricate on the male cup for quick bead removal.
- Push down the tyre around the entire circumference and detach tyre bead from the male cup.



Fig-35

5.5.8 Remove male cup

- Use the lifting equipment to remove the male cup.



Fig-36

5.6 How to mount the tyre onto 3 piece rim

5.6.1 Required tools

- Refer Table no 7.

5.6.2 Set up rim base and install valve

- Place rim base on a raised platform such that flange and tyre upon inflation do not touch the ground.
- Install the appropriate valve for the rim.



Fig-37

5.6.3 Mount tyre on rim base

- Lubricate only the surfaces of the rim in contact with the tyre (the tapered parts of the rim and the detachable flange, plus the toe end on the detachable flange).
- Lubricate the tyre beads, from the bead & toe to the centering rib above the bead.
- Place tyre on rim base with the help of tyre handling equipment, taking into account the direction of rotation as needed.



Fig-38

5.6.4 Fit detachable flange

- Insert detachable flange into rim base and fit edge section to tyre bead.



Fig-39

5.6.5 Fit O-ring

- Apply lubricant to new O-ring, which should be clean, dry and not twisted, install it in the O-ring groove.



Fig-40

5.6.6 Fit lock ring ⚠

- Place one end of the lock ring into the lock ring groove in the rim base. Use the tyre lever to successfully install the lock ring around the entire circumference.



Fig-41

- Starting opposite the locking ring gap, lightly tap the locking ring with a soft metal or hard plastic hammer in both directions back to the locking ring gap to ensure the locking ring is clamped into the locking ring groove.

5.6.7 Inflating the tyre and rim

- Place tyre and rim inside a tyre inflation safety cage, then inflate tyre. During inflation, keep away from the tyre.
- While inflating the tyre, raise the air pressure up to 10 psi and watch, if the rim components are seated correctly. If not, immediately stop the air inflation process. Deflate completely and disassemble the components.
- Check that the different components (joint, valve base, valve) are air tight by spraying soapy water on them. The appearance of bubbles indicates a leak.
- Check and clean the mating surfaces. Remove any foreign particles if any that interfere with complete assembly. Resume the assembly process only after the cause of the problem is removed.

5.7 How to demount tyre from 3-piece rim

5.7.1 Release all air

- Prior to demounting tyre from rim, release all air by removing the valve core housing with the valve tool.

5.7.2 Set up the tyre and rim

- After fully releasing the air, place the tyre and rim on the ground with the gutter side facing up.



Fig-42

5.7.3 Detach tyre bead seat from detachable flange

- Insert the bead breaker between the tyre bead and the loose flange. Unseat the bead from the loose flange by using the bead breaker and lever to push the tyre down around the entire circumference.



Fig-43

5.7.4 Remove lock ring

- Use the tyre lever to lift one end of the locking ring from the locking ring groove.
- With a second tyre lever continue to dislodge the locking ring around the circumference of the rim until the locking ring is free from the assembly.



Fig-44

5.7.5 Remove O-ring

- Use the tyre lever to push down on the detachable flange, so that the O-ring may be removed. Remove the O-ring.



Fig-45

5.7.6 Remove detachable flange

- Use the tyre lever to remove the detachable flange.



Fig-46

5.7.7 Turn over tyre and rim

- Use lifting equipment to turn over the tyre and rim, and place them on the ground

5.7.8 Detach tyre bead from rim base and remove rim base

- Insert the bead breaker and lever between the tyre bead and the rim base.
- Push down the tyre around the entire circumference and detach tyre bead from the rim base.
- Remove the rim base.



Fig-47

5.8 How to mount tyre onto 5-piece rim

5.8.1 Required tools

- Refer Table no 7.

5.8.2 Set up rim base and install loose flange

- Place rim base on a raised platform, such that flange and tyre upon inflation do not touch the ground.
- Place the loose flange on back section of the rim collar.



Fig-48

5.8.3 Install valve

- Install the appropriate valve for the rim.

5.8.4 Mount tyre on rim base

- Lubricate only surfaces of the rim which comes in contact with the tyre (the tapered parts of the rim and the bead seat band, plus the toe end on the bead seat band).
- Lubricate the tyre beads, from the bead toe to the centring rib above the bead.
- Place tyre on rim base with the help of suitable tyre handling equipment, taking into account the direction of rotation as needed.



Fig-49

5.8.5 Fit loose flange

- Place the loose flange over the tyre.



Fig-50

5.8.6 Install bead seat band

- Place the bead seat band on the flange and insert the bead seat taper portion in the gap between tyre and rim.
- Use the tyre lever to push in the bead seat band so that its edge fits with the tyre bead.



Fig-51

5.8.7 Fit O-ring

- Apply lubricant to new O-ring, which should be clean, dry and not twisted and install it in the O-ring groove.



Fig-52

5.8.8 Fit lock ring

- Place one end of the lock ring into the lock ring groove in the rim base. Use the tyre lever to successfully install the lock ring around the entire circumference.



Fig-53

- Starting opposite the locking ring gap, lightly tap the locking ring with a soft metal or hard plastic hammer in both directions back to the locking ring gap to ensure the locking ring is clamped into the locking ring groove.

5.8.9 Install driver key

- For rims set with a driver key, install the driver key and ensure the pocket in bead seat band is in alignment upon inflation.



Fig-54

5.8.10 Confirm that rim components are assembled correctly

- Make sure that the combinations (matching), facings, and positions of rim components are correct.

5.8.11 Inflating the tyre and rim

- Place the tyre and rim inside a tyre inflation safety cage, then inflate tyre. During inflation, keep away from the tyre.
- While inflating the tyre, raise the air pressure up to 10 psi and check, if the rim components are seated correctly. If not, immediately stop the air inflation process. Deflate completely and disassemble the components.
- Check that the different components (joint, valve base, valve) are airtight by spraying soapy water on them. The appearance of bubbles indicates a leak.
- Check and clean the mating surfaces. Remove any foreign particles if any that interfere with complete assembly. Resume the assembly process only after the cause of the problem is removed.

5.9 How to demount tyre from 5-piece rim

5.9.1 Release all air

- Prior to demounting tyre from rim, release all air by removing the valve core housing with the valve tool.

5.9.2 Set up tyre and rim

- After releasing the air, place the tyre and rim on the ground with the gutter side facing up.



Fig-55

5.9.3 Unseat the tyre bead from the bead seat band

- Mount bead breaker on bead seat band. Lubricate with oil for quick bead seat removal.
- Operate the bead breaker, push down the side ring, and unseat the tyre bead from the bead seat band.



Fig-56

5.9.4 Remove driver key

- For rims fitted with a driver key, remove the driver key by moving the bead seat band inside.



Fig-57

5.9.5 Remove lock ring



Fig-58

- Use a tyre lever to force the bead seat band free from the locking ring.
- Use the tyre lever to leave out one end of the locking ring from the locking groove.
- With a second tyre lever, continue to dislodge the locking ring around the circumference of the rim until the locking ring is free from the assembly.

5.9.6 Remove O-ring

- Use the tyre lever to push down on the bead seat band so that the O-ring is freed.
- Remove O-ring.



Fig-59

5.9.7 Remove bead seat band

- Use lifting equipment to raise and remove the bead seat band.



Fig-60

5.9.8 Remove loose flange

- Use lifting equipment to remove the loose flange.



Fig-61

5.9.9 Turn over tyre and rim

- Use lifting equipment to turn over the tyre and rim and place them on the ground.

5.9.10 Unseat the tyre bead from the rim base

- Mount bead breaker on rim base.
- As in Step 3, operate the bead breaker, Lubricate with oil for quick bead seat removal, push down the side ring, and unseat the tyre bead from the bead seat band.

5.9.11 Remove rim base

- Use the lifting equipment to remove the rim base.

5.9.12 Remove side ring

- Use the lifting equipment to remove the loose flange.

**Wheels India Ltd****Registered office**

21, Patullos road,
Chennai – 600002.
Tamil nadu, India
Phone: 044-28522745.

Padi Plant

MTH road, Padi,
Chennai, Tamil nadu,
India – 600050
Phone - 044-26234300.

Sriperumbudur plant

No 449/A1, Singaperumal koil road,
Pondur village, Sriperambudur,
Tamil nadu, India - 602105.
Phone – 044-27163014.