REMA TIP TOP

// ONE BRAND // ONE SOURCE // ONE SYSTEM

TIRE REPAIR TO THE ONE WAY SYSTEM PREMIUM

with M-RCF patches

Repair instructions

Introduction

- Before starting any repair, always inspect the tire in a professional way according to appropriate criteria, such as the general state of the tire, national repair limits etc. before deciding if the tire is repairable. Check the whole tire for further hidden damage.

- Information given in these repair instructions refer only to the use of original REMA TIP TOP products. We recommend using these products.

- A proper repair requires not only the use of high quality repair materials and tools but also an appropriate working environment: for example:

  - ↗ good illumination of the workplace,
  - ↗ periodical cleaning of the workplace and the tools (maintenance),
  - ↗ protection of the repair area against draught and direct sunlight during the repair process,
  - ↗ storage of all products according to the specifications (packaging),
  - ↗ well serviced machines and tools that are in good working order,
  - ↗ well trained staff.

- We reserve the right to change our products and processes in order to carry out technical improvements.

- Always observe the applicable REMA TIP TOP repair charts when selecting the appropriate repair materials.

Content

According to these repair instructions the following patches can be applied:

M-RCF 400 PREMIUM
Repair patch with high quality rayon cord for permanent repair of radial tires of all sizes and applications.

1. General Information

1.1 General safety instructions

Carefully read the operating and application instructions enclosed with the corresponding products/ machines. Always observe the safety instructions.

- Before starting work on large tires, ensure that the tires are secured against turning over, rolling or any other movement. Otherwise, there is a high risk of personal damage with significant injuries.
- When using rotary tools, solvents or any other dangerous tools and substances, always wear safety goggles.
- When working in an environment with a high noise level starting from 85 dB (A) (e.g. near noisy machines or tools), use ear protection according to labour protection regulations. However, an appropriate ear protection is reasonable even at lower figures.
- The use of S1-class safety shoes (toe protection cap, fully closed heel, antistatic and penetration-resistant) is prescribed for the operations described in this manual. These shoes must be equipped with a metal or plastic toe protection cap and a penetration-resistant, antistatic sole.
- When working with sharp-edged tools, hot devices or hot materials, always wear suitable safety gloves.
- When skiving out the injury with a rotary tool or during other work with a risk of projection of hot, pointed or sharp-edged drops, chips and sparks, face protection is recommended.

Safety symbols:


Use eye goggles.


Wear ear protection.


Wear safety shoes.


Wear protective gloves.


Face protection recommended.

- Tire repair equipment and tools have to be in good conditions. They must never be left unattended when in use. Damaged or unserviceable safety equipment such as defective safety switches or similar devices, expose the staff working near them to high risks.
- Working under bad illumination is dangerous. Good illumination and a clean work place are essential conditions for safe work. Reflective jackets are recommended in areas where vehicles are handled.
- Always keep dangerous tools, solutions, etc. out of the reach of children and unauthorized persons.
- Always observe the specific regulations for prevention of accidents from the employer's liability insurance association and the general safety regulations which apply in the countries concerned. In principle, a risk assessment for all activities in the respective working environment must be carried out before the start and adjusted in case of changes.

1. General Information

1.2 Tire repair

Hot/ warm vulcanization
Method of vulcanizing rubber fillings and repair patches on repair areas by means of heat and pressure.

Self -vulcanization
Method of vulcanizing repair patches on injuries at room temperature at least +18°C/ 65°F.

Puncture channel
Hole made by a foreign body penetrating into the tire casing/ belt.

Skive filling
Uncured rubber compound for filling the puncture channel before hot/ warm vulcanization.

Repair patch
Flat, in its dimensions and consistency to the respective damage and tire assignments matched repair agent.

Reinforcement
Textile or steel cord which forms the plies of a tire and is also used in repair patches from a specific size on.

LS (Low Speed)
Low speed – low speed rotary tool with
2 500 – 7 500 RPM preferred for machining rubber.

HS (High Speed)
High speed – high speed rotary tool with
16 000 – 30 000 RPM, preferred for machining steel.

RMA = Retreader Manufacturer Association

1.3 Tire terms

Tread
Plain or grooved rubber composite, which ensures the contact with the road surface. It withstands wear, and also protects the body plies together with the belts from cuts, punctures or any other damage resulting from running conditions. The tread includes the belts (protection plies and working stabilizer belts).

Shoulder
The area where the stepped belt edges are located. It begins at the upper end of the sidewall and ends at the compact belt package. The term denotes a critical repair area, as this area is subject to increased temperatures and irregular movements. This area tends to be a possible area to develop (ply or edge) separations.

Sidewall
This is the area between the bead and the tire shoulder. It determines the flexing behaviour of a tire. It contains the body ply including the extended ply turn-up.

Bead area (NRZ)
The part of the tire which is in contact with the rim. This part anchors the body ply, and seals the tire against the rim. This part of the tire is described as NRZ (non-repairable zone or area). This term refers to the area between the bead toe and the centring rib.

Tire carcass
The radial body ply is the reinforcing support which offers resistance to the compressed air enclosed in the tire. At the same time it transfers the bearing capacity from the rim to the tread and to the bearing belt plies. The build specification according to US standard for new tires is listed under SIDEWALL.

Belt package
The belt package stabilizes the thread and improves the pressure distribution of the ground contact area. Furthermore, it fulfils a protecting function. The build specification according to US standard for new tires is listed under TREAD.

Inner liner
The inner liner is a rubber liner inside of the tire that is impermeable to gas and air. Usually it consists of butyl rubber.

1. General Information

1.4 General rules for tire inspection and repair

- Before starting any repair, check whether it is technically safe and economically viable to repair the tire. Also check the whole tire for very small injuries and further hidden damage. Always examine the tire taking into account also its general state outside the repair area.
- If a small injury is difficult to locate, slowly inflate the tire step by step to the operating pressure, permanently checking the whole tire for any noticeable defects.
- Always demount the tire from the rim in order to check whether repairing it is technically safe and economically viable, and to carry out the repair.
- After preparing the injury, select the appropriate repair materials depending on the size and position of the injury.
- The injury area has to be prepared correctly by means of the appropriate tools. Further damage arising from the injury, which may be found during this operation, also has to be included in the evaluation of the tire's repairability.
- Always observe the country-specific regulations on the repair of pneumatic tires.

2. Repair with M-RCF repair patches according to the one way system

REMA TIP TOP offers the possibility of a tire repair without coating. The repair is done without solution vapors and environmentally hazardous substances. It is faster as a drying time is not necessary. A specific watery suspension is used for cleaning. The initial tackiness is ensured due to heating special types of rubber. In these instructions the different working steps are described in comparison to a classic tire repair with solvent coating. For further instructions for the preparation and filling of injuries as well as the patch selection please check the REMA TIP TOP tire repair manual for repairs according to the 1/2 way system. By omitting the drying time, quality variations won't occur. Before applying repair patches or skive fillings ensure cleanliness of the buffed areas. The different work steps with and without coatings can be combined. The corresponding safety instructions of the coatings have to be observed.

2. Repair with M-RCF repair patches according to the one way system

2.1 General repair instructions

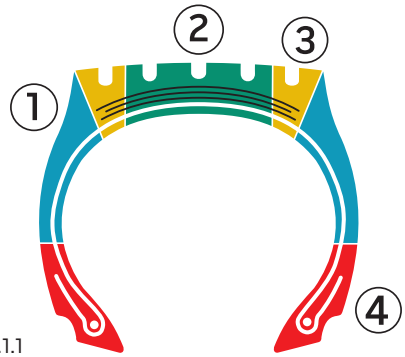
2.1.1 Division of tires into zones (fig. 2.1.1.1)

1) Sidewall

2) Tread

3) Shoulder

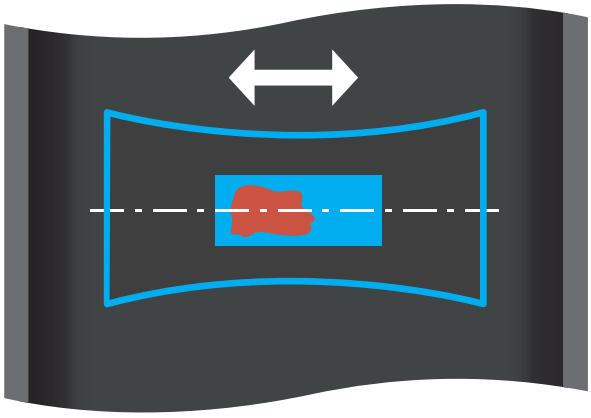
4) Bead (non repairable area)



2.1.1.1

Patch center (fig. 2.1.1.2)

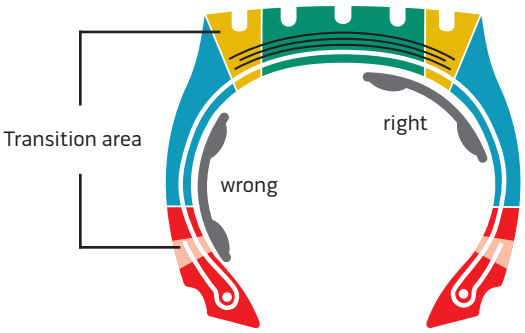
The centre of the patch is identical to the centre of the injury. Do not shift the patch in the axial direction, only in the marked radial area shown on the patch template.



2.1.1.2

2.1.2 Flexing area (fig. 2.1.1.3)

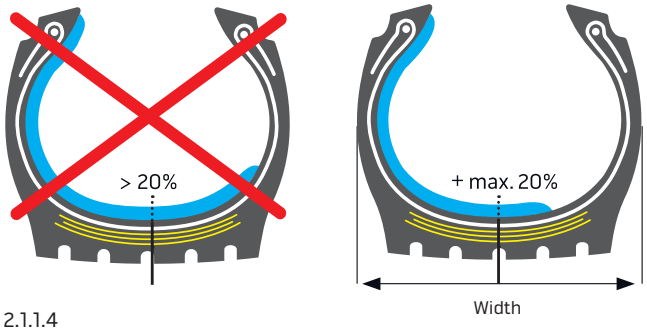
When applying repair patches to radial tires, make sure that the cord ends of the repair patch do not end in the flexing area of the tire due to the risk of fatigue breakage in the repair patch. If the whole injury is still within the recess of the patch template, the repair patches can be shifted out of the flexing area in the radial direction. The cord ends lie beneath the raised cover at the patches' ends. The hole for hanging up the template indicates the cord ends' position. The tire flexing areas are at the end of the body ply turn up and in the transition area between the shoulder and the sidewall.



2.1.1.3

2.1.3 Bridge patch (fig. 2.1.1.4)

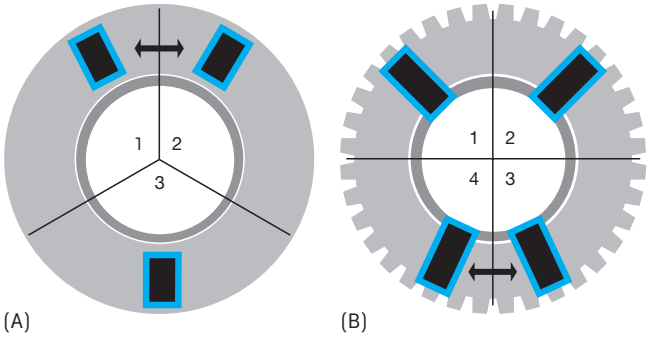
A patch may extended from the bead, a maximum of 20% across the middle of the tire width.



2.1.1.4

2.1.4 Distance check between the injuries (Abb. 2.1.1.5)

Only one repair is allowed for each ply cord.
In a passenger car and transport tires divided into three parts, only one repair patch in every part is allowed. In a truck tire divided into four quarters, only one repair patch in every quarter is allowed.



(A) (B)

2.1.1.5

2.1.5 Distance check between the injuries

In passenger cars and transport tires, the axial distance between two repairs must be at least 15 cm/ 6".
The minimum distance between two repair patches is equal to the width of the larger patch.

2. Repair with M-RCF repair patches according to the one way system

2.2 Cleaning the liner

- Note and record all tire data.
- Locate and mark the injured spot on the tire. (fig. 2.2.1)
- Demount the tire correctly.
- Remove the foreign body without causing any further damage to the tire. Screws should be screwed out of the tire.
- Check the whole tire inside and outside.
- Check that the tire can be generally repaired. According to relevant assessment criteria such as the overall condition of the tire, national repair limits etc. Also check the whole tire including existing repairs for further hidden damage.
- Apply RCF DRY BUFFER to the injury in an area larger than the repair patch required. Then use a brush, strongly rub it over this area in order to clean it. (fig. 2.2.2)
- Finally use a cloth without fluff to remove any residue. (fig. 2.2.3)
- Remove all debris by vacuum. (fig. 2.2.4)

2.2.1

2.2.2

2.2.3

2.2.4

↗ **Note:** The procedure described above guarantees that silicone, graphite or other mould release agents are removed completely from the inner liner. Prepare the injured area an area larger as the repair patch requires.

- **For further instructions for the preparation of injuries as well as the patch selection please check the REMA TIP TOP tire repair manual for repairs according to the 1/2 way system.**

2. Repair with M-RCF repair patches according to the one way system

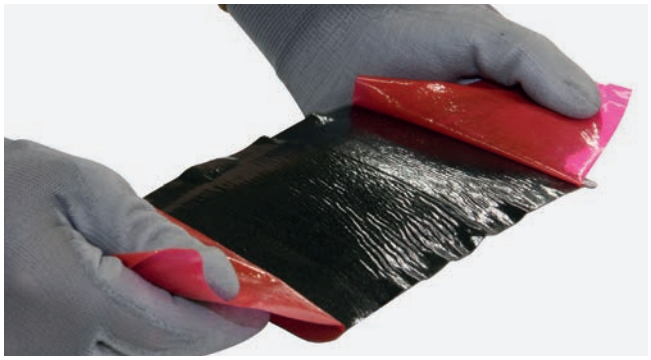
2.3 Preheating the repair patch

- Use a marking pen and mark the centre of the selected patch in order to facilitate the positioning of the patch.
- Relax the tire beads
  (do not spread the beads or put under pressure).
- Draw cross hairs which will help to centre the patch unit. These must run through the middle of the injury, slightly beyond the edge of the patch placement area. (fig. 2.3.1)

2.3.1

- Remove the protective foil on both sides up to the edges, then fold it back to protect the bonding surface. (fig. 2.3.2)

  After preheating, the protective foil stitches pretty much to the patch, when not being removed before.



2.3.2

- Put the patch on the RCF-system-box with the bonding surface facing down and close the box. (fig. 2.3.3)

2.3.3

- Set the correct preheating time on the time-switch. **For successful repair, it is necessary to observe the correct preheating time.** (fig. 2.3.4)

  10 minutes when box was switched out before
  7 minutes when box is already preheated

- Switch on the box and the heating module will operate. After the heating time, a signal light and a sound signal will appear.

2.3.4

↗ **Note:** Due to the preheating, the patch is sticky enough to be applied without the use of cement thereby protecting the environment.

A patch can be reheated up to three times in case of any delay occurred during the application.

2. Repair with M-RCF repair patches according to the one way system

2.4 Buffing the liner

- Use a tire marking pen (or a piece of chalk) and template to mark the liner area to be buffed.
  (fig. 2.4.1 und fig. 2.4.2)
  The use of templates is a must to locate the patch unit accurately. There are special plastic templates for easy drawing of the patch available. In addition, templates are printed on the respective patch packaging and must only be cut out at the marked locations.

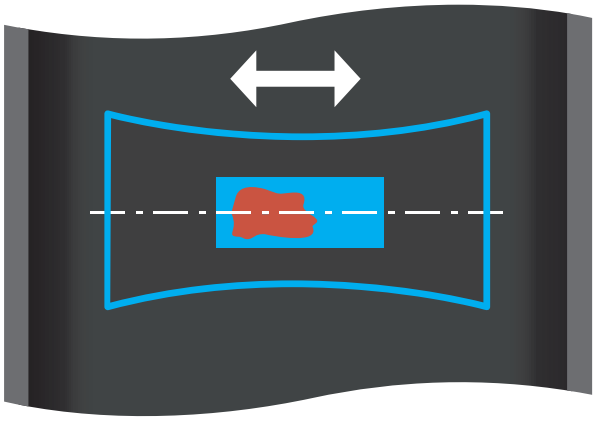
2.4.1

2.4.2

↗ **Note:** Patches may be shifted in the radial direction in order to position the patch cord covers to the transition areas. The damage has to be positioned within the marked contours of the template.
(fig. 2.4.3)

The patch may not be shifted in the axial direction. Tread repair patches may not be shifted at all.

For RAD patches, the applied arrow points in bead direction, for Thermopress raw patches in running direction.



2.4.3

- Remove all vent grooves with a Silver Class contour disc until the surface is even.

- Then, buff the entire surface so that this area will be even. Only slightly press the buffing tool and avoid to hold it on the same place by constant movement. A buffed surface according to RMA 2-3 is recommended for patch application. (fig. 2.4.4)

2.4.4

↗ **Note:** If during the buffing process, any problem is noted with the liner such as looseness or soft smearing, it is recommended to remove the liner from the patch placement area. (see section: Liner removal)

Avoid waiting time between buffering and patch application.

2. Repair with M-RCF repair patches according to the one way system

2.5 Patch application

- Clean the injury area with a brass bristled brush, and remove all dust by vacuum. Never use compressed air to remove buffing dust, always use a vacuum together with a brass cleaning brush.

- After the preheating time, switch off the RCF preheating plate.

- Use the patch while **still in the warm state.**
  Due to the preheating, the patch is sticky enough to be applied without the use of cement.

  Relax the tire beads before applying the patch (do not spread the beads or put under pressure). Position injury at the 6 o'clock position.

- Align the patch correctly inside the tire with cross hairs. **(fig. 2.5.1)**

2.5.1

- Start removing the protective foil from centre first, then stitch from centre working outwards. Make sure the whole of the patch area is stitched down. **(fig. 2.5.2)**

2.5.2

  Final stitching to include the patch border area. Remove the protective foil from the top of the patch. **(fig. 2.5.3)**

2.5.3

- Record any required data on patch unit using the marking pen. **(fig. 2.5.4)**

2.5.4

2. Repair with M-RCF repair patches according to the one way system

2.6 Skive filling

↗ **Note:** RUBBER MTR-RCF is not recommended for use on the tread with road contact because washouts may occur in the repaired area. Here, it is possible to use RUBBER MTR-UNI or RUBBER MTR-EXT without cement on an adhesive layer made of RUBBER MTR-RCF in the area of the tire profile.

For a good adherence of the skive edge to the tire, the edge around the injured area has to be buffed 2mm. To fill the injured area you have to pay attention to cleanliness, without dust particles which reduce the adherence. These measures improve the adherence of skive filling.

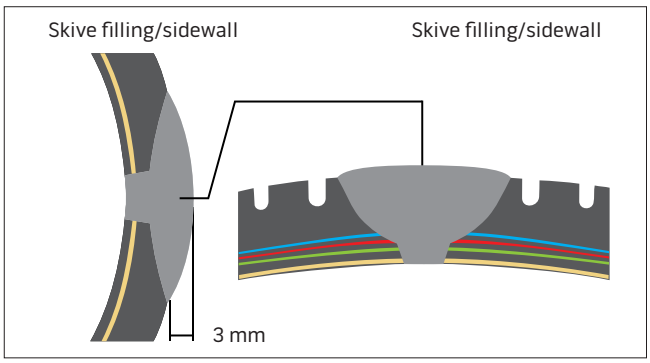
- Extrude RUBBER MTR-RCF directly onto the injured area. (fig. 2.6.1)
  No previous use of cement is required. A rubber temperature of 80°C must be ensured.

2.6.1

- Roll on a regular basis to avoid air pockets. (fig. 2.6.2)

2.6.2

- The skive filling must be slightly elevated, (2-3 mm) to compensate for the flow process.
  (fig. 2.6.3)



2.6.3

- Cover the surface of the skive filling with heat resistant film to prevent adherence of dirt or to prevent equipment parts on the rubber filling.
  (fig. 2.6.4)

↗ **Note:** Close open tread grooves around the skive filling in the area of the tread with suitable material to avoid a spreading of the skive filling.

2.6.4

2. Repair with M-RCF repair patches according to the one way system

2.7 Curing

- Cure within a Vulcstar vulcanizer, an autoclave, or another curing system, according to the one-way system. (fig. 2.7.1)

  Always follow completely manufacturer's instructions for use of the particular curing equipment.

2.7.1

↗ Note:

- When vulcanizing **with mechanical pressure** (for example exerted by inner covers or tubes), the patch has to be pasted with talcum to prevent the envelopes/ tubes from adherence. (fig. 2.7.2)

- When vulcanizing **without mechanical pressure** (for example within the ARC system), the patch's edges and all buffed areas next to the patch have to be pasted with RCF SEALER-PLUS. (fig. 2.7.3)

2.7.2

2.7.3

- Check the skive filling immediately after removing the tire from the vulcanizing machine. In order to do so, press the tire probe into the skive filling. If it leaves a durable mark (rubber not fully vulcanized), the whole curing process will have to be repeated. If gas bubbles are found upon inspection, the repair has to be repeated. (fig. 2.7.4)

- Check whether the patch has been applied correctly with no air or gas entrapment under it.

2.7.4

2. Repair with M-RCF repair patches according to the one way system

2.8 Final inspection

- Allow the tire to cool to ambient temperature.
- Inspect the complete tire, including the inside and the patch repair unit.

↗ **Note:** When vulcanizing with mechanical pressure (for example exerted by inner covers or tubes), the patch's edges and all buffed areas next to the patch have to be pasted with RCF SEALER-PLUS. (fig. 2.8.1)

2.8.1

- Grind skive filling in mounted condition with max. 1 bar filling pressure to match the original contour of the tire. First, you can use the 65 mm contour disc to grind the elevation of the skive filling. For finishing, however, the grinding tool ES45 with fine grain is recommended. (fig. 2.8.2)

2.8.2

- Reprofile tread pattern according to the original profile. (fig. 2.8.3)

↗ **Note:** Inspect the complete tire, including the inside and the patch repair unit before returning the tire to normal service.

2.8.3

3. Additional work – liner removal if necessary

3.1 Liner removal (if necessary)

If any problem is noted with the liner such as looseness or soft smearing, remove the liner completely from the patch placement area.

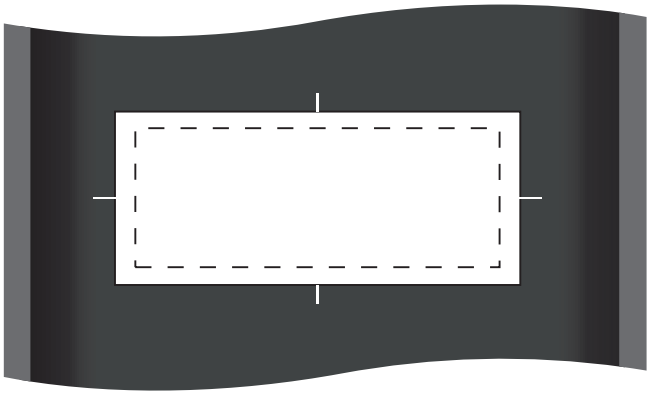
- Mark the inner liner area that has to be buffed with a pen or chalk and the appropriate patch template. The use of templates is a must to locate the patch unit accurately. Special plastic templates for easy drawing on the patch are available.
  In addition, the patch templates are printed on the packaging of the patches. Just cut the templates out in the marked areas in order to be able to use them.

- Remove the patch template and mark a secondary line approx 20 mm inside the original markings. (fig. 3.1.1)

- Carefully remove the inner liner within the inner drawing by using a dome rasp type Silver Class.
  Make sure that the radial body ply is not damaged.
  After the removal of the inner liner a buffed surface should show according to RMA 2-3. (fig. 3.1.2)

- Now buff the remaining 20 mm outer edge (fig. 3.1.3 und fig. 3.1.4).
  Focus on producing a transition or gradual ramp to the liner level. The tool direction of rotation will be important. Do not rotate the buffing tool against the inner liner edge..

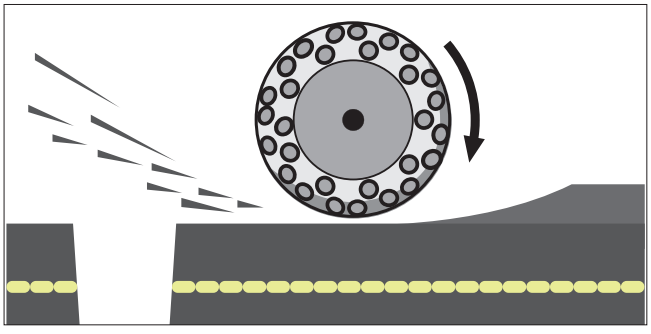
↗ **Note:** It is not necessary to double the patch after removing the inner liner completely.



3.1.1

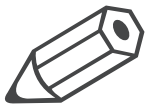
3.1.2

3.1.3



3.1.4

Notes



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