



## USING DESCRIPTION INCLUDING THE FIXATION

# ES 1.02

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*DESCRIPTION D'USAGE, Y COMPRIS LA FIXATION*  
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### **INSTRUCTIONS FOR MOUNTING AND REMOVING OF WHEELS OF COMMERCIAL VEHICLES AND PASSENGER CARS, INCLUDING DIRECTIONS FOR SAFETY AND MAINTENANCE INSPECTIONS.**

#### **1 - GENERAL**

The increases in vehicle speeds together with the reduction of wheel weights and the tight manufacturing tolerances impose particular requirements to be observed by the persons involved in wheel maintenance.

The wheels of motor vehicles are a safety critical item subject to extreme forces. Special attention must be paid to the mounting, removal and maintenance of wheels to ensure safe operation of the vehicle.

This standard sets out the procedures to be adopted, the inspection standards to be observed and the limitation on repairs that are permissible.

Additional information for use, general maintenance and safety requirements and out-of-service conditions are given in ISO 14400.

#### **2 - WHEEL SELECTION**

##### **2.1 - HUB DIMENSIONS**

For correct functioning the wheel disc must exactly correspond to the vehicle axle hub.

The following main characteristics must be adhered to

- a) Diameter of centre hole
- b) Diameter of stud holes
- c) Number and shape of stud holes
- d) The wheel offset or inset.

##### **2.2 - SPIGOT CENTRING**

Wheels for this method of fitting are manufactured to a reduced dimensional tolerance to ensure that the wheel is centred accurately, and the load is transmitted to the hub effectively.

In most cases such wheels have plain cylindrical stud holes and are attached using nuts with a flat seat captive washer as shown in ISO 4107.

Main changes compared to the last issue:

1. 1-General – “Additional information for use ..... are given in ISO 14400” added
2. 5-Safety and Maintenance Directions - paragraph 4 divided and supplements added in new paragraph 5

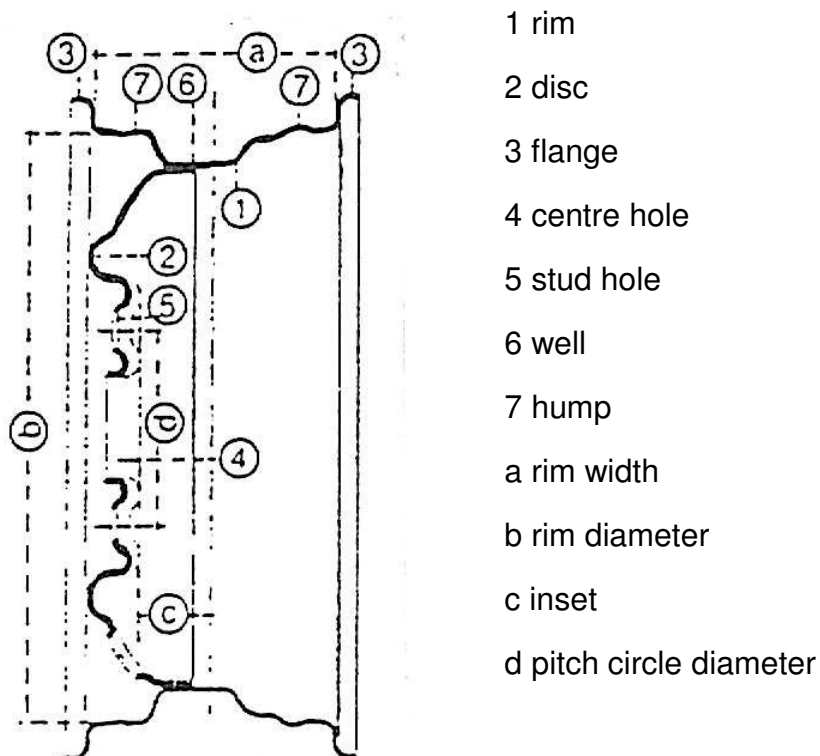
### **2.3 - STUD CENTRING**

Wheels with this method of centring rely on the studs to centre the wheels on the vehicle hub.

This is most commonly achieved by using countersunk stud holes.

Spherical and conical countersink designs are used. Great care must be taken to match the nut and washer to the particular countersink design.

### **2.4 - TECHNICAL DESCRIPTION OF WHEEL CHARACTERISTICS**



## **3 - INSTRUCTIONS FOR THE REMOVAL OF WHEELS**

### **Note: SPECIAL INSTRUCTIONS FOR MULTIPIECE WHEEL RIMS**

It is imperative for safety reasons that where multipiece wheel rims are concerned, for both single and twinned wheels, the tyres must be fully deflated before any removal procedures are commenced.

The following instructions must be adhered to:

\* Prior to removal of wheel, the wheel and tyre of a vehicle has always to be checked for correct position;

\* Instructions for removal of wheel rims for certain types of commercial wheels shown in Annex 1 have to be adhered to;

- \* Correct tools and - if necessary - lubricant has to be used;
- \* For commercial vehicle wheels, even though the tyre pressure is reduced, the operator must not be positioned in front of the wheel and tyre;
- \* Steel hammers must not be used to loosen wheel parts.

#### **4 - MOUNTING INSTRUCTIONS**

##### **4.1 - GENERAL**

Mounting and removal of wheels should be performed by trained personnel only.

The following safety and maintenance instructions have to be adhered to.

##### **4.2 - MOUNTING OF TYRE ONTO WHEEL RIM**

- \* Use a neutral not aggressive mounting paste !
- \* For multipiece rims the correct ring components must be used, particularly
  - i) size of rings
  - ii) system of assembly
  - iii) make of components - small differences between manufactures are criticalThe use of the wrong components can result in catastrophic wheel failure;
- \* Prior to inflation, wheel rings have to be put in correct position;
- \* When inflating tyres, a safety cage or safety chains must be put round the wheel;
- \* During inflation the safety zone has to be maintained;
- \* Inflated tyres or tyres with reduced air pressure must never be worked on with a hammer in order to correct the position of lock rings or loose flange rings;
- \* In the case of incorrect positioning all air has to be let out of tyre and mounting procedure has to be repeated;
- \* The correct air pressure specified for the tyres must be maintained, otherwise damage to tyres and/or fracture of wheel rims is inevitable.

### **4.3 - MOUNTING OF WHEELS TO VEHICLE**

For the mounting of the wheel rims to vehicle the correct position of wheel on hub has to be found.

4.3.1 All mounting parts, such as studs, spherical or conical nuts in different lengths, special parts for steel and alloy wheels must fit exactly to the wheel being mounted and may not be interchanged. Any confusion might entail damage to the stud holes and finally cause the wheel to fail.

4.3.2 Studs and nuts of all disc wheels have to be fastened as prescribed with a torque spanner or with the prescribed hand impact nut runner. Tightening of studs should be across the wheel disc and not round the wheel disc. The torque prescribed by vehicle manufacturers must be adhered to. If the user is in possession of ABE-Provisions, he has to apply the torque mentioned therein.

Because various fittings change their tightness in use, it is imperative to check and to re-tighten wheel nuts after approximately 50 km.

## **5 - SAFETY AND MAINTENANCE DIRECTIONS**

The wheel is a highly stressed component on all vehicles and it is therefore absolutely necessary to handle these parts with care in order to guarantee operational safety and service life.

The following parts are major importance:

- Never use parts of wheels which cannot be identified. Even if they seem to have the correct function, severe damage and accidents may occur without prior warning.
- Always check if wheel and tyre match in type and size before mounting them.
- The air pressure prescribed is to be maintained and regular checks have to be made.
- Studs and nuts that show rust or that are hard to tighten should be replaced.
- The user has to be extremely careful with any lubricant or rust protector. Nuts and studs threads shall be carefully cleaned and should not be lubricated, unless other specifications are given in the manual of the vehicle manufacturer.
- Critical areas have to be checked for fractures and other damages more frequently. The main types of failure of commercial wheels are described in the enclosed Annex 2.

- Defective parts showing
  - abnormal marks of rust and corrosion
  - bent flanges
  - fractures
  - damage of wheel studs or nuts
  - deformation of stud holesmust not refitted and must be replaced.
- If wheel flanges show wear- and tear marks, any burrs must be removed before the tyre is mounted, to avoid damage.
- Damage or rust on the painted surface may be repainted after removal of rust.  
When repainting, it must be borne in mind that in wheel mounting areas and at countersinks the total thickness of coating including base coating should not exceed 50 µm.  
Tightening torque prescribed by the vehicle manufacturer must be maintained.  
Disc wheel nuts have to be tightened in sequence across the wheel disc rather than round the wheel disc using a hand impact nut runner or torque spanner.  
It is recommended to re-tighten nuts after approx. 50 km of operation.
- When wheels are removed, they should be checked closely to ensure that they are in good condition and any fractures or deep scratches should be noted. In order to avoid damage to tyres when being mounted or while in use, any uneven spot should be deburred and covered with lacquer against corrosion.
- For reasons of rigidity and operational safety, mechanical scratches or tear marks may be up to a maximum of 10 % of the thickness of the rim material on the rim flanges, see ES-3.06.
- It is absolutely forbidden and illegal to repair rims, discs and other wheel parts by welding. In particular the repair of stud holes or the replacement of wheel discs must not be undertaken.

#### Note

1. Due to the fact that any kind of disc wheel is considered as a safety part, any disc wheel showing the defects described above and shown in Annex 2 must be scrapped.
2. Repair of such highly stressed parts causes the quality of material to act differently in operation and this may result in breakage.  
There is absolutely no producer's liability accepted on such repaired parts.

#### Enclosures:

Annex 1 - Removing and Mounting Instructions

Annex 2 - Fractures