

Justification:
Information
(Design & Maintenance)

**Private Owner
Circular Letter
426 Issue 2**

This document is the property of Network Rail.

It shall not be reproduced in whole or in part, nor disclosed to a third party, without the written permission of the Owner.

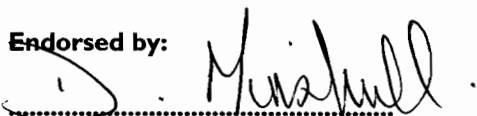
© Copyright 2006 Network Rail.

Title

**Friction Grip
Fasteners -
Alternative to Hot
Rivets**

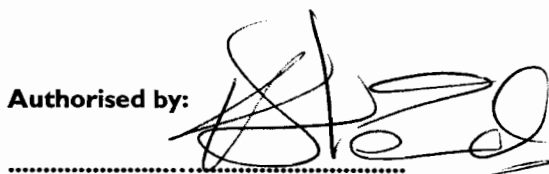
ENDORSEMENT & AUTHORISATION

Endorsed by:



D. Minshull, Senior Standards Engineer

Authorised by:



K. Stannard, Vehicle Conformance Engineer

1. **INTRODUCTION**

POCL 426, Issue 2 updates the requirements and contact details applicable to friction grip fasteners that may be used as an alternative to either hot rivets or black bolts.

2. **INSTRUCTION**

2.1 **Background**

Friction grip fasteners correctly installed develop sufficiently high clamping force to carry the normal working load via the friction developed between the contacting surfaces. As such, friction grip fasteners are only subject to tensile stresses.

Friction grip fasteners require only a clearance hole through the assembly and no special fitting is required. The friction grip generated by the fastener is more reliable than a hot riveted joint. This is because, during assembly a hot rivet is presumed to deform to completely fill the hole through the components and rely upon its shear strength.

2.2 **Types of friction grip fastener**

Friction grip fasteners fall into two basic types i.e. lock-bolts and friction grip bolts. The recommended type is the lock-bolt because it is installed using a special tool that will not complete its operation of closing the fastener unless all the requirements are correctly met. Hence the process is much more controlled and the potential for operator errors in installation is reduced. Two types of lock-bolt are recommended and available from Alcoa Fastening Systems in imperial sizes as follows:

1). **Huck C6L[®] Lockbolt**

(BS 7805 Part 1: 1997 'Swaged collar grooved rivets up to 10mm')

These are a general purpose fastener available in $\frac{3}{16}$ " , $\frac{1}{4}$ " , $\frac{5}{16}$ " and $\frac{3}{8}$ " diameters. They are used for securing components not subject to continuous high stress. For example, galvanised steel panels and light alloy bodies.

2). **Huck C50L[®] Lockbolt**

(BS 7805 Part 2: 'Swaged collar grooved rivets 12.7mm to 34.9mm')

These are a high tensile fastener available in $\frac{1}{2}$ " , $\frac{5}{8}$ " , $\frac{3}{4}$ " , $\frac{7}{8}$ " , 1" , $1\frac{1}{8}$ " and $1\frac{3}{8}$ " diameters and are suitable for securing components subject to continuously high stresses. For example, axleguard to solebar.

A third type of lock-bolt is also available from Alcoa Fastening Systems in metric sizes as follows:

3). **Metric Huck-Fit MHF[®] (Grade 10.9) Lockbolts**

These fasteners are available in 12mm, 14mm 16mm and 20mm diameter with both round and hexagonal head. Note: The hexagonal head allows for removal.

2.3 Description and installation

Lock-bolts consist of a pin and a metal collar. The pin has a plain shank, followed by locking grooves and is completed by a breakneck and a series of pull grooves on the pintail. The pin is inserted through the holes in the two components to be joined and the metal collar pushed over the locking grooves. The installation tool locates onto the pull grooves (on the pin tail) to pull the pin fully into the hole.

This action clamps the components together and the metal collar is swaged (by the tool) into the annular grooves when the correct clamping load is obtained. The pin tail breaks off to complete the operation.

For sizes up to and including $\frac{3}{8}$ " diameter either pneumatic or hydraulic installation tools may be used. For $\frac{1}{2}$ " diameter and above only use hydraulic.

Note: It is important that the hole is no larger than $\frac{1}{16}$ " in diameter than that of the lock bolt used. In the case of elongated or oval holes this restriction shall apply to the maximum dimension. Failure to comply will result in insufficient clamping force being generated. If holes greater than $\frac{1}{16}$ " in diameter are present it is possible to use hardened washers to overcome the problem.

2.4 Checks to ensure correct installation

It is important that lock-bolts are correctly installed to ensure the integrity of the finished assembly by checking the following:

- a). The lock-bolt is not inclined by more than 5° to the perpendicular axis through the joint.
- b). The pin tail is broken off not more than $\frac{1}{8}$ " above, nor $\frac{1}{4}$ " below the top of the installed locking collar.

2.5 Further technical information

It should be noted that ranges of lock-bolts suitable for Aluminium and also Stainless Steel applications are also available if required. Requests for further technical information regarding lock-bolts or their installation tools should be addressed to the manufacturer:

Alcoa Fastening Systems (Alcoa.com)
Unit C
Stafford Park 7
Trelford
Shropshire
TF3 3BQ

Customer services
Tel: 01952 290011

2.6 Approval and use of other types of friction grip bolts

Owners wishing to use other types of friction grip fasteners shall apply formally to the Senior Standards Engineer, PWRA Management Group. Where friction grip fasteners are used as an alternative to either hot rivets or black bolts it is the responsibility of the Owner to ensure that the integrity of the assembled components is adequate.

3. **SCOPE**

This instruction applies to all PWRA vehicles that operate on Network Rail Controlled Infrastructure.

4. **IMPLEMENTATION**

This document shall be implemented immediately.

In the event of any query arising, or clarification required, please contact:

Senior Standards Engineer
PWRA Management Group
Room 225 Derwent House
rtc Business Park
London Road
Derby
DE24 8UP