

A GUIDE TO COMMERCIAL VEHICLE BRAKE SHOE RE-LINING

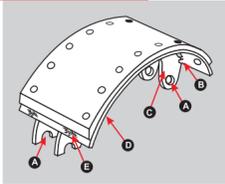
1 SAFE WORKING PRACTICES

- Although a dust free working environment is always the safest practice the handling of Ferodo linings is not subject to any health and safety requirements.
 - However, the following regulations do apply if additional machining, drilling or brake servicing activities are carried out in the workshop.
 - The Control of Substances Hazardous to Health Regulations 1988 (COSHH).
 - The Environmental Protection Act 1990 (E.P.A.) Part 1.
- [Further information on this subject is available on request]. Regulations apply to U.K. only. In other countries the relevant statutory requirements should be referred to.

2 INITIAL INSPECTION OF SHOES

Brake shoes must not be re-lined if they exhibit any of the following faults:

- A** Excessive wear around shoe tip abutment or pivot areas.
- B** Broken welds.
- C** Distortion of shoe webs.
- D** Distortion of shoe platform areas.
- E** Excessive corrosion.



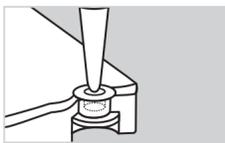
3 REMOVAL OF LININGS FROM SHOES

- Never 'drill-out' the rivets as this may cause damage to the brake shoe holes. [Exception see note 1].
- Note 1: German standard fully-tubular rivets should be removed using a special extraction punch (Fully-Tubular Rivet Extractor).



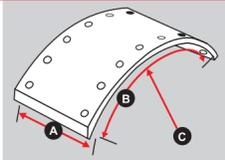
If a service tool is not available, the clenched head of the rivet may be removed by drilling or chiselling. [Extreme care must be taken to ensure the brake shoe rivet holes are not damaged during this operation].

- Always use correct diameter rivet extraction punch.



4 IDENTIFICATION OF BRAKE LINING(S)

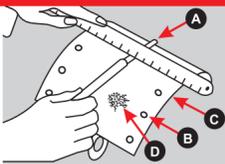
- With the lining(s) removed from the shoe the lining(s), (A) width, (B) inside length and (C) radius dimensions can be accurately measured.
- Reference can then be made to the Ferodo catalogue for identification of the correct part number.



5 FURTHER INSPECTION OF USED SHOES

With the lining/s removed from the shoe, further inspection is now possible. Particular attention must be made to the following areas:

- A** Concavity of shoe platform
- B** Rivet hole size
- C** Shoe platform condition
- D** Corrosion



[The clearance between the rivet shank and the shoe hole must not exceed 0.020" (.50mm)]

SHOE PLATFORM WIDTH	VV
Up to 100mm (4")	.25mm (.010")
125-150mm (5-6")	.50mm (.020")
175mm or more (7"+)	.75mm (.030")

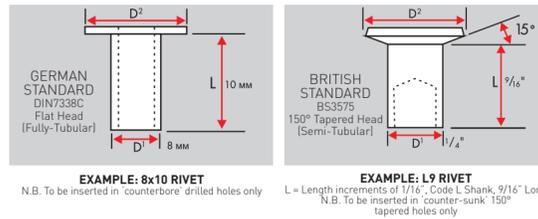
6 BRAKE SHOE PREPARATION

All Ferodo linings are manufactured to precise machining tolerances. The correct attachment of the friction material to the brake shoes can only be achieved when the metalwork components have undergone a cleansing operation. This consists of:

- Degrease - The removal of grease and associated debris.
- Shot blast (not aluminium shoes) - Removal of rust and shale build-up.
- Paint - To provide protection against corrosive attack.

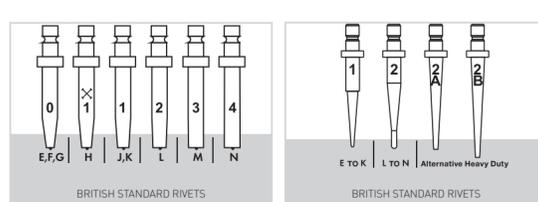
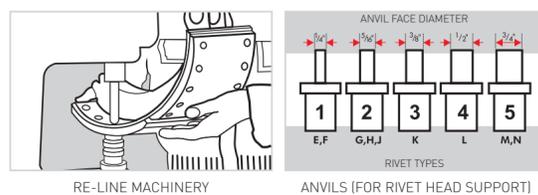
7 RIVET FASTENERS (TYPES)

Various types of rivet fasteners are used to re-line commercial vehicle shoes. British Standard (semi-tubular) and German Standard (fully-tubular) are the most popular. Copper, steel or brass are suitable rivet materials.



EXAMPLE: 8x10 RIVET N.B. To be inserted in 'counter-bore' drilled holes only
EXAMPLE: L9 RIVET L = Length increments of 1/16", Code L Shank, 9/16" Long N.B. To be inserted in 'counter-sunk' 150° tapered holes only

8 RIVETING EQUIPMENT



RIVETING PUNCHES FOR BRITISH STANDARD (SEMI-TUBULAR) AND GERMAN STANDARD (FULLY-TUBULAR) HOLLOW RIVETS
EXTRACTION PUNCHES FOR BRITISH STANDARD (SEMI-TUBULAR) RIVETS

RIVET SHANK DIA.	RECOMMENDED PUNCH	RIVET SHANK DIA.	RECOMMENDED EXTRACTOR
4mm	1 or x1	4mm	4mm Hollow Extractor
5mm	1	5mm	5mm Hollow Extractor
6mm	2	6mm	6mm Hollow Extractor
8mm	3	8mm	8mm Hollow Extractor
10mm	4	10mm	10mm Hollow Extractor



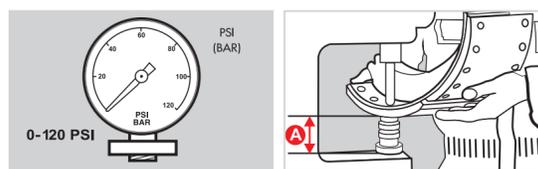
RIVETING PUNCHES FOR GERMAN STANDARD FULLY-TUBULAR HOLLOW RIVETS
EXTRACTION PUNCHES FOR GERMAN STANDARD FULLY-TUBULAR (HOLLOW) RIVETS
ALL THE ABOVE PART NO. SPECIFICATIONS ARE APPLICABLE TO BRYDEN RE-LINE EQUIPMENT

It is of paramount importance that all re-line equipment is checked for serviceability.

9 THE CORRECT 'SETTING-UP' PROCEDURE FOR YOUR RE-LINE MACHINE

Re-line (Air pressures)
The pressure settings vary according to the design of machine being used and rivet type. Pressure gauges should be calibrated at regular intervals.

Anvil Height Settings (A)
Refer to machine manufacturers recommendations. [Further advice on machine pressure settings and anvil height is available on request].



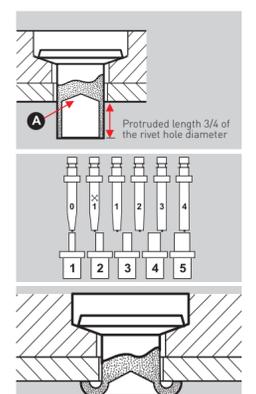
10 CLENCHING THE RIVETS

- Ensure that the correct rivet type is fitted.

BRITISH STANDARD - BS3775 Semi-tubular copper & copper coated steel			GERMAN STANDARD - DIN 7338C Fully-tubular copper coated & zinc coated steel				
DIAMETER CODE	SHANK DIAMETER D1	HEAD DIAMETER D2	DIAMETER CODE	SHANK DIAMETER D1	HEAD DIAMETER D2		
E	1/8"	3.2mm	7/32"	5.6mm	4	4mm	7.5mm
F	9/64"	3.6mm	19/64"	7.5mm	5	5mm	9.5mm
G	5/32"	4.0mm	5/16"	7.9mm	6	6mm	11.5mm
H	11/64"	4.4mm	5/16"	7.9mm	8	8mm	15.5mm
J	3/16"	4.8mm	3/8"	9.5mm	10	10mm	19.5mm
K	7/32"	5.6mm	27/64"	10.7mm			
L	1/4"	6.4mm	15/32"	11.9mm			
M	5/16"	7.9mm	9/16"	14.3mm			
N	3/8"	9.5mm	5/8"	15.9mm			

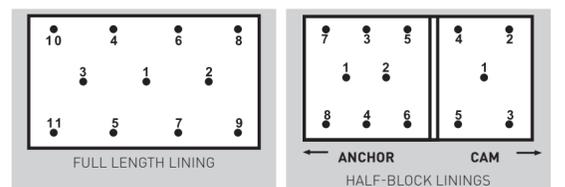
SPECIAL RIVETS				
TYPE	SHANK DIAMETER D1	HEAD DIAMETER D2	LENGTH L	APPLICATION
S290	0.234" 5.9mm	0.468" 11.9mm	0.547" 13.9mm	Semi-tubular, 150° tapered head, brass-plated mild steel rivet for the re-line of selected trailer shoes

- The length of the rivet should protrude through the shoe platform 3/4 of the rivet hole diameter. [Note: on British Standard rivets the solid portion of the rivet shank should be in line with the shoe platform inner radius]. See note (A)
- Check using rivet protrusion gauge
- Select the appropriate sizes of rim punch & anvil, making sure that they are in a serviceable condition.
- The rivet turn-over should be neatly rolled.



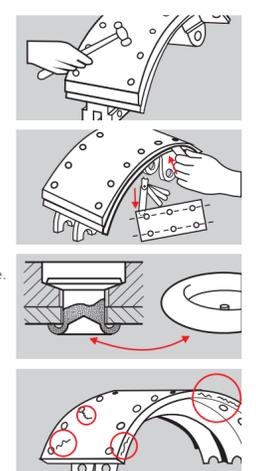
11 RIVET CLENCHING SEQUENCE

The correct rivet clenching sequence is to start with the central rivet hole areas, and work diagonally outward. It is recommended that a traceability tag should be added in one of the central rivet hole locations.



12 FINAL INSPECTION OF THE LINED SHOE ASSEMBLY

- A Lining Security**
May be checked by lightly tapping the friction material with a metallic instrument. A high pitched response denotes secure lining. A dull thud denotes insecure lining.
- B Lining / Shoe Gaps**
Gaps must not exceed .015mm (.006") beyond the rivet hole line. This should be checked with a feeler gauge.
- C Rivet Turn-Over**
Check that the roll-over is neat and secure.
- D Friction Material Fractures**
Check the outer surface and lining edges for fractures.
- E Traceability Tag**
Check tag is secure and in position.



EXAMPLES OF POOR BRAKE RE-LINE PRACTICE

- 1 Incorrect rivet length fitted (Too long)
- 2 Incorrect rivet length fitted (Too short)
- 3 Incorrect rim punch used (Too small diameter)
- 4 Incorrect rim punch used (Too large diameter)
- 5 Damage to brake shoes caused by drill or extraction punch
- 6 Brake lining fractures caused by poor shoe support
- 7 Excessive shoe/lining gaps
- 8 Excessive brake shoe corrosion
- 9 Brake shoe platform/web distortion
- 10 Excessive wear at shoe abutment points

