

NEW EQUIPMENT & SYSTEM APPROVAL PROFORMA

Ref: 08-08-11-073

Note: the prompts given below are only a guide to the information required for approval. Dependent on the type of equipment or system that requires approval delete any section that is not applicable or include additional information if necessary. Mandatory fields are marked with an asterisk (*).

1 Equipment or System to be approved *

19mm and 22mm DogScrews™ and 16mm LockScrews™ (Pandrol/Ajax)

2 Determination of Need *

Dog spikes may fail due to deteriorating timber condition. The rail needs to be refastened to the sleeper. The DogScrew™ and LockScrew™ are a patented alternative to a dog spike.

3 Relevant Standards

AS 1085.18 2002 Railway Track Material - Screw spikes and threaded inserts:

AS 1085.18 2002 contains a detailed drawing of the Pandrol DogScrew™ in Appendix G, FIGURE G7 SPECIALIZED THREAD SCREW SPIKE.

However Pandrol's own test results show that the DogScrew™ does not conform to the specified pull out tests in AS 1085.18 2002 .

AS 1085.8 2002 Railway Track Material Part 8 DogSpikes

As the DogScrew™ does not comply with AS 1085.18 2002 it can only to be considered as an alternative to a DogSpike. It meets the requirements of this standard.

ARTC COP

4 Significant Change or Not (as determined by the Manager Standards) *

This change in equipment or system is assessed as MINOR

5 Review Panel (as determined by the Manager Standards) *

- John Furness - Manager Standards
- Tim Calver - Standards & Technical Services Engineer
- Karen Bendall - Track & Civil Consultant

6 Equipment Suitability

Durability

The manufacture claims that these screws extended Sleeper Life (these claims have not been verified by ARTC). Third party tests results have been presented by Pandrol however they were not truly independent as the test specimens were 'prepared' by Pandrol. It is reasonable to believe Pandrol's claim that:

- Fibre splitting and bending prevalent at the steel/timber interface is minimized courtesy of the special thread profile. This reduces the opportunity for moisture to rot the sleeper
- Water penetration is prevented because the round screw shank totally seals the hole
- Timber splitting during insertion is reduced because the lateral forces generated can be up to three times less than those caused by hammering dog spikes or lock spikes into the sleeper
- Damage to the bottom of the sleeper is eliminated because there is no need for the hole to be drilled right through the timber.

A Dog spike is literally a square/or round peg in a round hole. A DogScrew™ is a round threaded peg in a round hole.

The Dog spike has been used on several parts of ARTC track in NSW and anecdotally the DogScrews™ are performing well and out performing Dog Spikes.

7 Safety

Screws allow safer and easier insertion methods than spikes. This lowers the risk of injuries

Dog spikes are traditionally hit in by a steel mallet or jack hammer. This method of insertion is labourious and can cause the dog spikes to ricochet and fly off. The jack hammer can be used, while this is easier it is also very heavy.

DogScrews™ and LockScrews™ can be inserted using pneumatic drivers (rattle guns) or by a semi-automated hydraulic machine that can be pushed along the track.

Existing high production equipment can be converted to suit Dogscrew™

A special extraction device has been developed to remove screws that have been damaged by derailment.

8 Economics

DogScrew™ are more expensive than dog spikes. The cost benefit will depend on how much longer the DogScrew™ hold the track.

9 **Product Overview**

DogScrew™

- Invented by AJAX fasteners, promoted by Pandrol
- 19mm or 22mm screw with a shallow double pitch thread
- Has a flange with a radius so it can fix rail straight to sleeper (i.e. without baseplate)
- Has a patented "wave" thread Form to "reduce damage" to sleeper during insertion
- Designed as an improvement replacement to dog spikes but should not be put in an old dog spike hole
- Has better pull-out resistance than a dog spike, but has less pull-out resistance than a Coach Screw.
- Holds rail onto the sleeper and sleeper plates to the sleeper

LockScrew™

Is basically the same as a DogScrew™ but:

- has a smaller head flange so that it can be used with specific baseplates
- 16mm diameter screw with a shallow double pitch thread
- Holds rail onto the sleeper and sleeper plates to the sleeper

10 **Approval ***

These products are approved as an alternative to Dog Spikes.

N.B. As these products do not pass the Australian standard for screw spikes, they are not approved as an alternative to screw spikes.

11 **Conditions of Approval ***

All DogScrews™ and LockScrews™ should be inserted in accordance with Pandrols guidelines for installation.

That the supplier remains accredited to ISO 9001 - for the manufacture of these particular products. ARTC reserves the right to conduct its own audits of the manufacture and supply of these components - subject to Australian Standards and normal audit procedures.

12 **Possible Suppliers**

DogScrews™ and LockScrews™

Pandrol

PO Box 6086
Blacktown Business Centre NSW 2148
T: 02 9852 2500
F: 02 9671 7875

Ajax Fasteners

76-78 Mills Road
Braeside, Victoria 3195
T: 03 9586 6666
F: 03 9587 7901

Screw Spikes

Epitech Products Pty Ltd

39 Victoria Street
Smithfield NSW 2164
T: 02 9604 8822
F: 02 9609 7032

ARSC

GPO Box 59
Melbourne, Victoria 3001
Toll Free: 1800 099 788
F: 03 9436 2025

13 **Sign off**

ARTC office use only

Review Panel:

John Furness

Tim Calver

Karen Bendall

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Date:

Date:

Date:

[Handwritten dates]
22/11/07
22/11/07
22 Nov 2007