



Defence  
Infrastructure  
Organisation

# SAFETY ALERT

# PART A

**Subject: CATASTROPHIC FAILURE OF A PIPEWORK CLAMP CONNECTOR**

**Number: SA 2015/12**

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**Contact if different from above**

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**Who Should Read this:** Top Level Budget Holders, Prime Contractors, Soft Facilities Maintenance Contractors, Grounds Maintenance Contractors, Private Finance Initiatives, Public, Private Partnership and other traditionally procured contracts, Project Managers, Site Estate Authority Teams and Property Managers with responsibility for MOD projects and Property Management Works Services (including the legacy work of EWCs/WSMs). Heads of Establishments and Health and Safety Advisors.

This **Safety Alert** does not necessarily cover all aspects of the subject matter and readers should make themselves aware of other potential issues. Readers should also not rely on DIO Safety Alerts as their only means of becoming aware of safety issues, but they should consult widely across other media to

**When it takes effect:** Immediately

**When it is due to expire:**  
When updated or rescinded.

Health and Safety

**Aim**

1. To bring to the attention of appropriate persons, a Safety Alert issued by the Health and Safety Executive concerning the ‘Catastrophic failure of a pipework clamp connector’ which could pose a risk of serious injury.

## Introduction

2. Compliance with the contents of this Alert will enable compliance with the Health & Safety at Work etc Act 1974, Sections 2 and 3.

3. On MOD Establishments occupied by United States Visiting Forces (USVF) responsibility is jointly held by USVF and DIO(USF). At base level this jointly managed organisation is to take appropriate action to implement the contents of this Alert. Where this Alert contains procedures which differ significantly from USVF practice, DIO (USF) code of practice will be issued.

4. An incident occurred on an offshore production platform in December 2014 where a 1" diameter Vector 'Techlok' pipework clamp connector catastrophically failed causing a gas release. The failure was caused by poor heat treatment during the manufacturing process, which led to failure by cracking. Similar failures have occurred on other small-sized (1", 1 1/2" and 2" diameter) clamp connector segments. Further information can be found at HSE Safety Alert Bulletin No. ED 2-2015: <http://www.hse.gov.uk/safetybulletins/catastrophic-failure-of-a-techlok-clamp.htm?eban=govdel-safety-bulletins&cr=21-Sep-2015>

## Requirement

6. Responsible persons are to identify if they have in use any 2" or below Techlok or Destec 'G' clamp connectors supplied before 2010, or have the potential to be used (for example spares kept in stores) on any of their installations and to verify their fitness for continued service. Verification could be established from supplier records, whereby the material properties of the clamps are fully certified, or by appropriate NDT inspection and hardness tests.

7 Any found to exceed acceptable hardness values must be taken out of service and either destroyed, exchanged or otherwise prevented from reuse. Note that clamp segments may also have been supplied by other vendors along with their main products (e.g. valve assemblies) and duty holders should ensure that these are subject to the same checks.

8. The HSE advise that evidence suggests that clamp segments manufactured after 2010 will not require inspection and hardness checks.

9. The MMO is to notify the DIO Service Delivery Performance Management team, using the DIO SD-Perf Mgt Team (MULTIUSER) account through their respective DIO Service Manager of the location, number and serviceability for each affected asset, and are invited to outline a best value solution for each of the affected assets which will be considered prior to the issue of a **Part B** to this Safety Alert.

10. The available data will be reviewed 14<sup>th</sup> October 2015.

11. Further instructions will follow, if required, with the issue of a **Part B** to this Safety Alert once the extent and scope of the affected estate has been established.

## Background

12. HSE investigation of the December incident on an offshore production platform following the uncontrolled release of gas concluded that the primary cause of the catastrophic pipework clamp failure was due to hydrogen cracking. Evidence from this clamp and others checked later indicates that high hardness, with values in excess of 48-50HRC (Rockwell hardness value), being the underlying cause. High hardness increases the material's susceptibility to cracking in general from reduced ductility.

13. Clamp connector segments are produced by a forging process in a number of foundries in the UK and are manufactured from AISI 4140 alloy steel with a recommended Rockwell hardness value of 22HRC. Investigations revealed that prior to 2010 the clamps, which require quench and temper heat treatment, were not subject to 100% hardness testing. Hence the quality controls were not sufficient to detect components that had received improper heat treatment and lacked ductility.

14. There are a number of suppliers of this type of clamp. Whilst distinguishing the Techlok or Destec versions from the others is possible through raised stamp marks on the hub, this is likely to become increasingly more difficult after a period in service. In such circumstances to ensure fitness for service it will be likely that all small diameter clamp connectors will require hardness checking.

15. Hub Clamp Suppliers (in bold are known to be affected):

**Vector (Techlok)**  
**Destec(G Clamp)**  
Galperti (G Clamp)  
Oceaneering (Grayloc)

16. UK Manufacturers/Foundries (in bold are known to be affected)

**George Dykes**  
Caparo  
Kimber Drop Forgings



Source HSE

Figure 1 Showing Cracking caused by poor heat treatment during manufacturing process

**Ends.**