

## Affordable safety - A case study

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### 1 Introduction

Safety is generally considered as expensive, although in theory a higher product compliance level should give compensating savings. A case is presented here where real savings can be achieved with proper planning. This may be of some inspiration to those battling with costs.

Certification of all equipment for use in explosive atmospheres is controlled by ARP 0108 - effectively part of legislation as it defines the legal requirements for certification of equipment for use in explosive atmospheres. According to ARP 0108, all explosion-protected (Ex) equipment shall have an IA certificate by an Approved/Accredited test laboratory (ATL).

The case relates to standard motors converted to non-sparking motors (Ex nA) or dust-ignition protection motors (Ext/DIP). There is a large number of these motors in service, many of which that do not have IA certificates for historical reasons.



**Figure 1: Some motors operating in hazardous areas do not have IA certification**

The latest (2017) draft of ARP 0108, instructs that this discrepancy is hazardous and must be resolved (which we can agree with). This means essentially that such motors will have to be certified by an ATL at the first repair after release of ARP 0108 Edition 2. Certification is not only an expensive process but also very slow compared to the 24-hour breakdown recycle service that motor repairers offer.

### 2 A potential solution

A solution can be provided by the use of so-called **standardized conversions** to simplify compliance with the relevant standards.

For a standardized conversion of a TEFC induction motor to non-sparking, the conversion recipe might for instance require that a steel fan and sturdy steel cowl with a radial separation of at least 5mm between fan and cowl must be fitted (if not already in place), eliminating the following potential ignition hazards:

- Static sparking
- Thermic (light alloy) sparking
- Frictional heat and hot particles

- Impact damage on cowl
- and concurrently the tests and assessments associated with evaluation of those ignition hazards.

Using a standardized conversion recipe will have several benefits, such as:

- Limited type testing (ATL testing) should be required, such as for temperature ratings of T4 or better, and ingress protection better than IP54.
- Assessment will be based on a conversion recipe endorsed by the certifying ATL based on a review of the complete set of requirements from the relevant standards. A normal IA certificate will be issued.
- The majority of assessments can be carried out at the repairer's workshop.

The novelty of this approach is simply that the use of a limited number of standardized conversions, components and materials can make certification cheaper and faster.

The anticipated certification procedure is shown below.

	<b>WHAT</b>	<b>BY WHOM</b>
<b>STEP 1</b>	Apply for Certification.	Repairer
<b>STEP 2</b>	Develop standardized conversion recipe.	ATL.
<b>STEP 3</b>	Type Test and Certify converted range (once off). Certificate valid for 10 years.	ATL/Repairer/User.
<b>STEP 4</b>	Draw up conversion procedure, including photos etc. At least x1 per range (range must be identical in design). Ex features must be captured. Checklist.	Repairer with production quality assurance scheme (mark scheme). Note – Other repairers need to do Batch Testing.
<b>STEP 5</b>	Include range in production quality assurance scheme (mark scheme) and list of mark-bearing products.	Repairer/Mark Scheme operator.

### 3 Conclusion

Standardized conversion recipes for Ex nA and Ex t (DIP) motors may offer a safe, cost-effective way to keep these motors in service, provided users, repairers and ATLs cooperate successfully.

Abbreviations

ATL  
Ex nA  
Ex t  
Ex d