



U.S. Department
of Transportation

East Building, PHH – 32
1200 New Jersey Avenue, Southeast
Washington, D.C. 20590

**Pipeline and Hazardous
Materials Safety Administration**

**The US Department of Transportation
Competent Authority for the United States**

CLASSIFICATION OF EXPLOSIVES
FIRST REVISION

Based upon a request by Cartridge Actuated Devices, Inc., 51 Dwight Place, Fairfield, NJ 07004, United States the following items are classed in accordance with Section 173.56, Title 49, Code of Federal Regulations (49 CFR). A copy of your application, all supporting documentation and a copy of this approval must be retained and made available to DOT upon request.

U.N. PROPER SHIPPING NAME AND NUMBER:

Detonator, assemblies, non-electric for blasting, UN0500

U.N. CLASSIFICATION CODE: 1.4S

REFERENCE NUMBER

EX2010020315

PRODUCT DESIGNATION/PART NUMBER

P/N 088011-6.0 in Division 1.4S Packaging

NOTES: This classification is only valid when the detonator assembly has a protective steel shipping cap installed over the output end during transport and is packaged as follows: Inner Packaging - Tubes, fiberboards with a wall thickness not less than 1/8 inches, each containing one detonator assembly pre-wrapped in a static-resistant plastic bag. Intermediate Packaging - Box, fiberboard, each containing not more than five (5) inner packagings sandwiched between two sheets of homosote not less than 1/2 inch thick and restrained from movement by fiberboard top, middle and bottom supports. Outer Packaging - UN 4G fiberboard box, each containing not more than two (2) intermediate packagings. The device in this packaging has been tested by and passed the UN Series 6(d) test requirement in the 5th Revision of the UN Manual of Tests and Criteria.

DATED: 03/07/2011

For Dr. Magdy El-Sibaie
Associate Administrator for Hazardous Materials Safety

TIME DELAY FUSE

DESCRIPTION

The Fike Time Delay Fuse is a chemically generated time delay device used in downhole oil and gas completion operations. They are typically used in Tubing Conveyed Perforating (TCP) operations to initiate detonation of an oilfield detonation cord booster on perforating guns. It is initiated by the Fike Fuse Igniter part number 072130 or equivalent.

The Fike Time Delay fuse is a 6 minute delay and is a direct replacement for existing products. It is intended for use in existing firing heads in the Oil and Gas industry. Other time delays are available in 45 second increments. Please contact Fike for details.



SPECIFICATIONS

Material of Construction:	Carbon Steel, Stainless and Aluminum
Firing Characteristics:	Ignites from Fuse Igniter PN 072130 or equivalent
Delay Time:	Ambient Temp: 6 min +/- 30 sec At 450°F: Approximately 4 minutes
Time/Temp Rating:	200 hours at 425°F
Shipping Classification:	DOT Hazard Class: 1.4S UN Number: UN 0500 Ref Number: EX2010020315 EC Certificate Number: ENB/D/163/10
Shelf Life:	5 years

Note: All information is subject to change without notice. The user must be satisfied with the products suitability for all applications.

APPLICATIONS

- Explosive Trains
- Perforating Guns
- Tubing Conveyed Perforating
- Specialized Applications

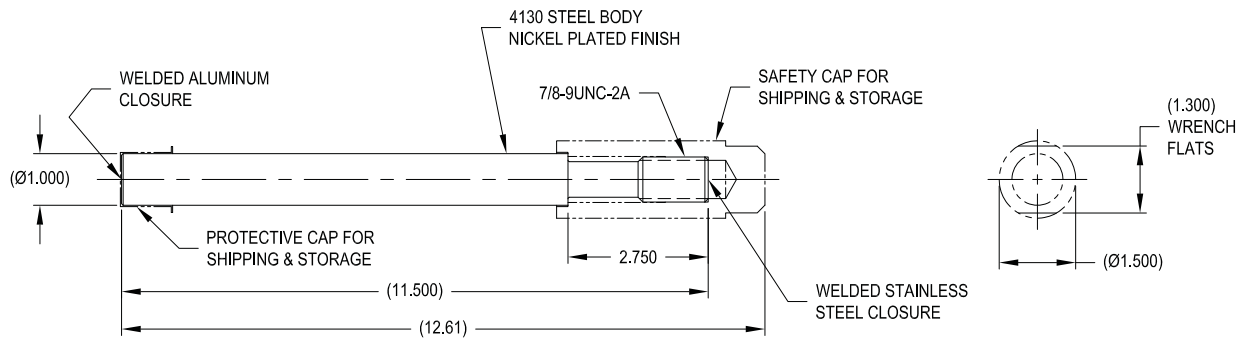
FIKE SERVICES

Fike's oilfield expertise creates a service and support structure that you can trust for your specific pyrotechnic applications

- Engineers and application specialists can assist in product applications and technical support.
- Rapid Response – lower costs and shorter lead times with Fike Oilfield products.
- Qualification testing of components under simulated applications and field testing.
- Manufactured by Cartridge Actuated Devices, Inc., a Fike Corporation company and industry leader in pyrotechnic products.

Form No. O.1.11.01-2

DIAGRAMS



ORDERING INFORMATION

Fike P/N	Description
088011-6.0	Time Delay Fuse, 6 Minute

Note: Additional times are available in 45 second increments. Shorter time delays are also available. Contact Fike for more details.





CONTAINER TESTING LABORATORY, INC.
 PACKAGE ENGINEERING • RESEARCH • CONSULTATION • TESTING
 607 FAYETTE AVENUE • MAMARONECK, NEW YORK 10543
 PHONE: (914) 381-2600 • FAX: (914) 381-0143
 contestlab@hotmail.com • www.containertechnologylabs.com

PACKAGING PERFORMANCE UN/IMDG CERTIFICATE

CONTAINER TESTING LABORATORY ID #+AQ

Certification Report #2884
 CTL P. #44542

REQUESTING PARTY:

Mr. Robert Drummond
 Cartridge Actuated Devices, Inc.
 51 Dwight Place
 Fairfield, NJ 07004

1. Product tested: combination packaging, comprising five (5) 2.19 kg (4.8 lbs) average gross weight spiral wound fibreboard tubes with plastic plugs inner packaging, each filled with one (1) 2 kg (4.4 lbs) gross weight steel cylinder installed within an anti-static plastic sleeve secondary containment. Fibreboard tubes are placed vertically within single-wall trapezoidal shaped middle corrugated insert and die-cut openings of top and bottom single-wall die-cut corrugated inserts supported with top and bottom homasote inserts all installed into a single-wall center special slotted fibreboard container (International Box Code 0204) outer packaging with top and bottom cellulose wadding sheets void space filler. The use of other packaging methods or components may render this report invalid.

2. Designated packaging code type: 4G
 Packaging nomenclature: Combination Package
 P/N: 088011-6.0

3. Tests performed:

TEST	SPEC	INTENSITY	RESULTS
Cobb	Para 6.1.4.12.1	153.3 g/m ²	Pass
Drop	Para 6.1.5.3	1.2 meter	Pass
Stacking	Para 6.1.5.6	90 kg	Pass
Vibration	49CFR 178.608	1 hour	Pass

4. Authentication: USA/+AQ2884

5. I certify that the samples of the packaging prepared as for transport, described herein and tested in March 2010 in the manner summarized in paragraph (3) above, successfully pass the tests according to the criteria described in paragraphs 6.1.4.12.1, 6.1.5.3 and 6.1.5.6 as set forth in the UN Recommendations of the Committee of Experts on the Transportation of Dangerous Goods, Chapter 6, and US 49CFR Section 178.608, and that the packages may bear the marking:

U
n 4G / Y 12.2 / S / **
 USA / +AQ2884

** year of manufacture

By: _____ Date: March 16, 2010
 CONTAINER TESTING LABORATORY, INC.
 CERTIFICATION OFFICER



GB Explosives Notified Body, Health & Safety Laboratory, Harpur Hill, Buxton, Derbyshire, SK17 9JN, United Kingdom
Tel: +44 (0)1298 218150 Fax: +44 (0)1298 218180 Email: enb@hsl.gov.uk www.hsl.gov.uk

EC TYPE EXAMINATION CERTIFICATE

NOTIFIED BODY NO: 0519

CERTIFICATE NO: ENB/D/163/10 Issue 1

1. **Product Type:** Detonator
2. **Product Name:** VARIABLE TIME DELAY FUSE as listed in Annex 1 to this certificate.
3. **Manufacturer's Name and Address:** Cartridge Actuated Devices, 51 Dwight Place, Fairfield, New Jersey 07004, USA.
4. **Applicant's Name and Address:** Fike Corporation, 704 S.W. 10th Street, Blue Springs, Missouri, 64015, USA.
5. **Attachments to this Certificate:** Annex 1: products covered by this certificate; Annex 2: list of technical documents examined.

Being a notified body in accordance with the GB Statutory Instrument No 2714 (1993) and Directive 93/15/EEC of 5 April 1993 on the harmonization of the provisions relating to the placing on the market and supervision of explosives for civil uses, the Explosives Notified Body certifies that the above type of product has been examined using Module B of the system for attesting conformity and has been found to conform with the manufacturer's specifications for the type and with the relevant requirements of the Statutory Instrument and the Directive.

A handwritten signature in black ink that reads 'P. Shelley'.

Mr P Shelley
Director, GB Explosives Notified Body

28 September 2010

ANNEX 1 TO EC TYPE EXAMINATION CERTIFICATE ENB/D/163/10 Issue 1

P/N 088011, Time Delay Fuse (VTDF)

ANNEX 2 TO EC TYPE EXAMINATION CERTIFICATE ENB/D/163/10 Issue 1

LIST OF TECHNICAL DOCUMENTS EXAMINED

1. Cartridge Actuated Devices (CAD): Sales Drawing of VTDF, 088011, Rev A
2. Cartridge Actuated Devices (CAD): Assembly Drawing of VTDF, 088011, Rev B.
3. Cartridge Actuated Devices (CAD): Assembly Drawing of Input Retainer, 011063, Rev D.
4. Cartridge Actuated Devices (CAD): Assembly Drawing of Load Delay Body, 011089, Rev C.
5. Cartridge Actuated Devices (CAD): Loaded Sleeve, 011066, Rev D.
6. Cartridge Actuated Devices (CAD): Transfer Assembly, 011088, Rev D.
7. Cartridge Actuated Devices (CAD): Output Assembly, 011084, Rev D.
8. Cartridge Actuated Devices (CAD): Shipping Cap, 011091, Rev B.
9. Cartridge Actuated Devices (CAD): Packaging Assembly, VTDF, 001190.
10. Cartridge Actuated Devices (CAD): Standard D.O.T HAZMAT Markings and Labels, 001034-1, Rev A.
11. Cartridge Actuated Devices (CAD): VTDF 088011-6.0 product and Packaging Bill of Materials.
12. Cartridge Actuated Devices (CAD): Validation Test Report on the Packaging Material for the VTDF p/n 088011.
13. Cartridge Actuated Devices (CAD): Test Data Sheets for Acceptance Tests.
14. US Department of Transportation: Classification of Explosives for each item.
15. Explosives Bureau, New Jersey, USA: Classification advice for each item.
16. Cartridge Actuated Devices (CAD): Material Safety Data Sheet for Detonator, assemblies, non-electric for blasting.

17. Cartridge Actuated Devices (CAD): Production Lot Test Procedure for VTDF P/N 088011.
18. Cartridge Actuated Devices (CAD): Operation Sheet for VTDF P/N 088011-6.0.
19. Bureau Veritas: Certificate ISO 9001:2000 Cartridge Actuated Devices (Certificate Number US 09000035).
20. TVU: Certificate ISO 9001:2000 Fike Corporation (Certificate Number 12 100 29739 TMS).
21. Certificates of Compliance of Raw Materials (E3, Annex 3 items 10-17).
22. Cartridge Actuated Devices (CAD): Product Data Sheet, Cartridge Actuated Devices (CAD): Variable Time Delay Fuse (VTDF).
23. Fike Corporation, e-mails to Explosive Notified Body dated 8, 17, 20 and 22 September 2010 and attachments.
24. Cartridge Actuated Devices (CAD): Test Data Sheet for 6-foot drop test (08/19/10).
25. Cartridge Actuated Devices (CAD): Test Data Sheet for production quality control testing (04/27/10-06/17/10).
26. Fike Product Data Sheet for Time Delay Fuse.
27. Cartridge Actuated Devices (CAD): Material Safety Data Sheet, Revision B (09/14/10).



CARTRIDGE ACTUATED DEVICES, INC.
51 DWIGHT PLACE FAIRFIELD, NJ 07004

REVISION: A DATE: 031010

HAZARDOUS CHEMICAL MATERIAL SAFETY DATA SHEET
(Conforms to the requirements of 29 CFR 1910.1200)

I. PRODUCT IDENTITY: Detonator, assemblies, non-electric for blasting
1.4S, UN0500, EX-2010020315
(Time Delay, P/N 088011-6.0)

CARTRIDGE ACTUATED DEVICES, INC.	<u>24 HOUR EMERGENCY PHONE #</u>
51 Dwight Place.	<u>IN U.S.A.: 800-424-9300</u>
Fairfield, N.J. 07004	<u>OUTSIDE U.S.A.: 202-483-7616 CALL COLLECT</u>
Prepared by CAD Engineering	<u>FIRE, SPILL, EMERGENCY ONLY</u>
Telephone Number: 973-575-1312	
Material(s) described is/are:	Electro-Pyrotechnic device and by-products of initiation.

II. HAZARDOUS INGREDIENTS AND EXPOSURE LIMITS: N/A
Chemical and common name of Hazardous chemical ingredients:

	CAS. No.
Titanium	007440-32-0
Potassium Perchlorate	007778-74-7
Zirconium	7704-99-6
Ferric Oxide	1309-37-1
Diatomaceous Earth	99439-28-8
Tungsten	7440-33-7
Barium Chromate	10294-40-3
Silver Azide	013863-88-2
Hexanitrostilbene	20062-22-0

III. PHYSICAL AND CHEMICAL CHARACTERISTICS

Boiling point: N/A	Solubility in water: N/A
Specific gravity: N/A	
Vapor Pressure @ 20°C negligible	pH: N/A
% Volatile: negligible	Evaporation rate: NONE

IV. FIRE, EXPLOSION AND REACTIVITY HAZARD DATA

DANGER Extremely Flammable --EXPLOSIVE--
Keep away from heat and keep shunted.

Flash point:	N/A
Flammable Limits:	N/A
Auto-ignition temperature:	350° F
Extinguishing media:	Water, Dry Chemical
Special Fire-Fighting procedures:	Do not fight fires directly involving explosives.
Grounding Procedure:	Insure that the device is shunted and handlers are grounded
Stability Considerations:	NONE
Incompatibility:	shock, flame, friction and static sources.
Hazardous decomposition products:	None
Hazardous products of combustion:	High temperature flame, carbon monoxide, carbon dioxide, nitrogen oxides, hydrogen chloride, and oxides of titanium.
Hazardous Polymerization:	None



CARTRIDGE ACTUATED DEVICES, INC.
51 DWIGHT PLACE FAIRFIELD, NJ 07004

REVISION: A DATE: 031010

V. HEALTH HAZARD DATA:

Emergency and First Aid Procedure:

Treat burns and any laceration by cleaning and applying sterile bandages.
Transport individual for further medical treatment.

Primary Route of Entry Inhalation of gas after initiation.

Cancer Information None

Reported effects on Humans Respiratory irritant

Other None

VI. SPILL AND LEAK PROCEDURES

Steps to be taken if material is spilled: (applies only if cartridge is ruptured)

Clean spill after liberally wetting down the material with solvent (Acetone, Butyl Acetate, Alcohol or Water) by wiping material up with paper towels or with a cotton rag. Keep a fire extinguisher present.

Waste Disposal Method:

Disposal must be in accordance with local, state, and Federal regulations.
Call Cartridge Actuated Devices for assistance, if needed.

VII. APPLICABLE CONTROL MEASURES:

Appropriate Hygienic Practices: N/A

Personal Protective Equipment: Safety glasses & grounding devices (ground straps and/or conductive footwear). When firefighting, wear NIOSH approved gas respirator.

Work Practices: Avoid high temperatures. Keep the Cartridge shunted & wear protective equipment.

Handling and Storage precaution: Recommended storage, 70° F., keep shunted.

Engineering Controls: Work with unit in a shielded area, keep shunted until installed.

Protective Measures during Repair and Maintenance:

Eliminate static discharge sources. Avoid flame or high heat. Shield device when working with it.

DISCLAIMER: The above information was taken from various published and unpublished sources and is believed to be accurate and to represent the best information currently available to us. However, we make no warranty, expressed or implied, of the accuracy of such information, and assume no liability resulting from its use. Users should make their own investigation to determine suitability of the information for their particular purposes.

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CARTRIDGE ACTUATED DEVICES, INC.
51 DWIGHT PLACE FAIRFIELD, NJ 07004

REVISION: A DATE: 031010
DISASSEMBLING.

Net Reactive Material Content: 33.16 grams per unit