



U.S. Department  
of Transportation

**Pipeline and Hazardous  
Materials Safety  
Administration**

1200 New Jersey Avenue, SE  
Washington, DC 20590

**DEC 02 2019**

Jesse Rodriguez  
Baker Hughes  
P.O. Box 546  
Bay City, TX 77404

Reference No. 19-0091

Dear Mr. Rodriguez:

This letter is in response to your July 9, 2019, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to labeling requirements for jet perforating guns (JPGs). Specifically, you ask for clarification of labeling requirements when JPGs are palletized and banded together for transportation, and when several JPGs are assembled into a “staged gun-string” prior to use.

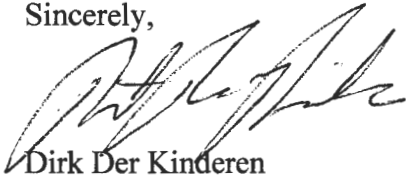
We have paraphrased and answered your questions as follows:

- Q1. You ask whether the individual gun body of a JPG requires a label when palletized and banded together for transport.
- A1. The answer is yes. JPGs, whether classified as a 1.1D or 1.4D explosive, are transported under packaging instruction US 1, found in the Table of Packing Methods in § 173.62. US 1 requires that the motor vehicle transporting the JPG must have a specially built rack or carrying case. This rack or carrying case is the packaging for the JPG. Each rack or carrying case must be labeled in accordance with Part 172, subpart D with the appropriate Division 1.1 or 1.4 label.
- Q2. You ask whether the placement of a single hazard class label on a “staged gun-string” meets the labeling requirements of the HMR.

A2. The answer is yes. The “staged gun-string” would be treated as a single package, and duplicate labeling of each gun body making up the string would not be required in this scenario. It would, however, be permissible for each individual gun body in the string to bear the appropriate Division 1.1 or 1.4 label.

I hope this information is helpful. Please contact us if we can be of further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read 'Dirk Der Kinderen', written in a cursive style.

Dirk Der Kinderen  
Chief, Standards Development Branch  
Standards and Rulemaking Division

Patrick  
19-0091

**January, Ikeya CTR (PHMSA)**

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**From:** INFOCNTR (PHMSA)  
**Sent:** Wednesday, July 10, 2019 3:22 PM  
**To:** Hazmat Interps  
**Subject:** FW: Request for Interpretation - labeling requirements - UN0494 / NA0124  
**Attachments:** PerfGunClassification(2017.09.01).pdf

Hi Alice and Ikeya,

Please see the request for a letter of interpretation below and the attached document.

Thanks,

Robert, HMIC

**From:** Rodriguez, Jesse [mailto:jesse.rodriguez3@bhge.com]  
**Sent:** Tuesday, July 9, 2019 6:49 PM  
**To:** INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>; INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>  
**Cc:** Rodriguez, Jesse <Jesse.Rodriguez3@bakerhughes.com>  
**Subject:** Request for Interpretation - labeling requirements - UN0494 / NA0124

Greetings,

This is a request for interpretation concerning the labeling requirements for UN0494, Jet perforating guns, charged, oil well, without detonator and NA0124, Jet perforating guns, charged oil well, with detonator. See below questions.

- Question 1. Does an individual gun body require a label when not assembled (See Exhibit A) – i.e. when palletized, banded together, for transport?
- Question 2. When several gun bodies are assembled (See Exhibits B and C) (commonly referred to as a “staged gun-string” in the oil field), as one package, does the placement of one label meet the general labeling requirements as outlined in 172.400 and 172.406, or do the individual gun bodies each require a separate label?

**Exhibit A**



Label	Component
A	Gun body
B	Perforator
C	Detonating Cord
D	Explosive Transfer Device (explosive) or Detcord End Seal (non-explosive)
E	Lead Wire
F	Carrier Strip

- Exhibits B and C



Thank you for your response. My contact information including my mailing address is attached to this message below.

Very Respectfully Yours,

Jesse Rodriguez  
Transportation  
North America Land - Southern / GOM  
Baker Hughes, a GE Company  
T: 832-726-8237  
E: [jesse.rodriguez3@bakerhughes.com](mailto:jesse.rodriguez3@bakerhughes.com)  
M: P.O. Box 546, Bay City, TX 77404



# IME

**institute of makers of explosives**

## **Guide to Obtaining DOT Approval of Jet Perforating Guns using AESC/IME Perforating Gun Specifications**

**Version 02**

**Effective Date: September 1, 2017**

1. What is required?

Transportation of Jet perforating guns (hereafter referred to as “perforating guns”) in the USA is subject to the provisions of the Hazardous Materials Regulations (HMR)<sup>1</sup> of the U.S. Department of Transportation (DOT). In the HMR, DOT describes perforating guns as follows:

*Jet perforating guns, charged, oil well, without detonator. Articles consisting of a steel tube or metallic strip, into which are inserted shaped charges connected by detonating cord, without means of initiation.<sup>2</sup>*

As explosive devices, the following DOT requirements, administered by its Pipeline and Hazardous Materials Safety Administration (PHMSA), apply to perforating guns:

- ✦ Classification and approval
- ✦ Registration of parties who offer and/or transport hazardous materials
- ✦ Training of hazmat employees
- ✦ Hazard communication (marking, labeling, placarding and shipping papers)
- ✦ Provision of emergency response information
- ✦ Security plans
- ✦ Packaging of hazardous materials
- ✦ Modal transportation requirements

This document discusses classification and approval of perforating guns, specifically when using AESC/IME Perforating Gun Specifications.

2. What are the AESC/IME Perforating Gun Specifications?

Before transporting or offering perforating guns for transport, they must be approved by the Associate Administrator of PHMSA<sup>3</sup>. This approval, signified by a Classification of Explosives (also known as EX-letter), sets forth the UN number, proper shipping name, UN division and compatibility

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<sup>1</sup> 49 CFR Subchapter C

<sup>2</sup> 49 CFR 173.59

<sup>3</sup> 49 CFR 173.51

group to be assigned to perforating guns as well as the terms and conditions for the use of said classification.

- Every perforating gun that is transported within the US must be approved by PHMSA before it may be offered for transport.
- Every person (company) that loads perforating guns and either transports them, or offers them for transport, within the US must obtain approval from PHMSA before they do so.

The approval process can be expensive, complicated, and time-consuming, and often requires testing by an approved laboratory before the approval application will be considered by PHMSA. The Association of Energy Service Companies (AESC) and the Institute of Makers of Explosives (IME) have devised the AESC/IME Perforating Gun Specifications (see [Annex 1](#)) to provide a resource for reducing the expense, effort, and time required to obtain classification and approval of perforating guns.

The AESC/IME Perforating Gun Specifications are a series of documents setting forth standardized parameters for various perforating gun systems. These series of documents include a drawing representative of the perforating gun system described, technical details for the system, authorized components of the systems, and compliance requirements that govern the applicability of the perforating gun specification. The perforating gun systems covered by the AESC/IME Perforating Gun Specifications are:

- Ported tube systems (without detonator)
- Tube & strip systems (without detonator)
- Tube & tube systems (without detonator)
- Strip carrier systems (without detonator)
- Wire carrier systems (without detonator)
- Link carrier systems (without detonator)
- Swing carrier systems (without detonator)
- Tube & Tube Kodiak™ system (without detonator)

The AESC/IME Perforating Gun Specifications have been previously reviewed and approved by PHMSA for the use of perforating gun assemblers (see [Annex 2](#)). Approval applications submitted to PHMSA which fall within the parameters of these qualified perforating gun systems may therefore be processed without testing and with a minimum amount of effort and/or delay. Perforating guns that do not meet the parameters of the AESC/IME Perforating Gun Specifications are subject to testing and the applicant must follow the process described in 49 CFR 173.56.

### 3. Classifications available using AESC/IME Perforating Gun Specifications

Classification for perforating guns without detonators affixed to them may be obtained using the AESC/IME Perforating Gun Specifications:

- 3.1. 1.1D – PHMSA will issue approvals for qualifying perforating gun systems as UN0124; JET PERFORATING GUNS, CHARGED; 1.1D.

- 3.2. 1.4D – Excluding the Tube & Tube Kodiak™ system<sup>4</sup>, perforating gun systems that have been approved as UN0124 and that meet the requirements of Special Provision 114<sup>5</sup> and Packing Method US 1<sup>6</sup> may be transported as UN0494: JET PERFORATING GUNS, CHARGED; 1.4D. See [Annex 3](#) for the text of Special Provision 114 and [Annex 4](#) for the text of Packing Method US 1.

#### 4. ATF License/Permit required<sup>7</sup>

Parties who seek authorization of perforating gun systems using the AESC/IME Perforating Gun Specifications are advised that they must also be authorized by the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)<sup>8</sup> to possess explosives and must be in possession of the appropriate ATF license or permit. Within the scope of this document:

- 4.1. Manufacturers must have an ATF type 20 license for each manufacturing location that will be seeking PHMSA approval of perforating guns.
- 4.2. Importers must have an ATF type 23 license for each importing location that will be seeking PHMSA approval of perforating guns.
- 4.3. Dealers must have an ATF type 26 license for each dealing location that will be seeking PHMSA approval of perforating guns.
- 4.4. Users must have an ATF type 33 permit. One type 33 permit per company is valid for all user locations that the company operates within the USA.

#### 5. Approval of perforating gun systems

##### 5.1. General requirements

- 5.1.1. Perforating guns to be approved using an AESC/IME Perforating Gun Specification must be consistent with the configuration in the drawing of the applicable gun system.
- 5.1.2. All explosive components to be loaded into perforating guns must themselves be PHMSA approved. Copies of these approvals must be maintained at each location where jet perforating guns are assembled.

##### 5.2. Approval application

- 5.2.1. A single application must be submitted for each perforating gun system to be approved. For example, if company A plans to utilize ported gun systems, tube/tube gun systems, and strip gun systems, then company A would submit 3 approval applications. Once approved, the classification applies to all locations

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<sup>4</sup> This exclusion is described in Note 5 of the Tube & Tube Kodiak™ specification sheet found in Annex 1.

<sup>5</sup> 49 CFR 172.102

<sup>6</sup> 49 CFR 173.62

<sup>7</sup> This notification is advisory only and is not a PHMSA imposed condition of jet perforating gun approvals issued pursuant to the AESC/IME Perforating Gun Specifications.

<sup>8</sup> U.S. Department of Justice

operated by the applicant (company A) that load the approved perforating gun systems.

5.2.2. Applications for approval of perforating guns using AESC/IME Perforating Gun Specifications must:

5.2.2.1. Identify the section of the HMR under which the application is submitted.

5.2.2.2. Identify the applicant.

5.2.2.3. Identify the perforating gun system to be approved.

5.2.2.4. Identify the classification for which approval is desired.

5.2.2.5. Identify the transport modes for which approval is desired.

5.2.2.6. Include a copy of the AESC/IME Perforating Gun Specification that will serve as the basis for approval and contain a certification of adherence to the specifications and requirements contained on that document.

Annex 5 contains an example application that is recommended for use in preparing applications in fulfillment of these requirements.

5.3. Use of approval

Compliance with applicable requirements of the HMR when shipping perforating guns approved using an AESC/IME Perforating Gun Specification is required, including, but not limited to:

5.3.1. Perforating guns cannot be transported or offered for transport until DOT has issued an approval in the form of a Classification of Explosives (EX-letter). A copy of the approval must be on file in every location from which loaded perforating guns are transported or offered for transport.

5.3.2. All perforating guns approved using an AESC/IME Perforating Gun Specification must always meet Packing Instruction US 1 of 49 CFR 173.62 (see Annex 4).

5.3.3. All perforating guns approved as 1.1D (UN0124) using an AESC/IME Perforating Gun Specification must always meet the requirements of Special Provision 114 of 49 CFR 172.102 (see Annex 3) if offered as 1.4D (UN0494).

5.3.4. All shipments of perforating guns approved using an AESC/IME Perforating Gun Specification must:

5.3.4.1. comply with the DOT's shipping paper requirements found in 49 CFR 172, Subpart C;

5.3.4.2. comply with the DOT's marking requirements found in 49 CFR 172, Subpart D;



- 5.3.4.3. comply with the DOT's labeling requirements found in 49 CFR 172, Subpart E; and
- 5.3.4.4. must comply with DOT placarding requirements found in 49 CFR 172, Subpart F.
- 5.3.5. All persons transporting or offering for transport perforating guns approved using an AESC/IME Perforating Gun Specification must comply with the applicable portions of 49 CFR 172, Subparts G (Emergency Response Information), H (Training), and I (Safety and Security Plans).

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**Guide to Obtaining DOT Approval of Jet Perforating Guns  
using AESC/IME Perforating Gun Specifications**

**Annex 1**

**AESC/IME Perforating Gun Specifications**

(see next page)

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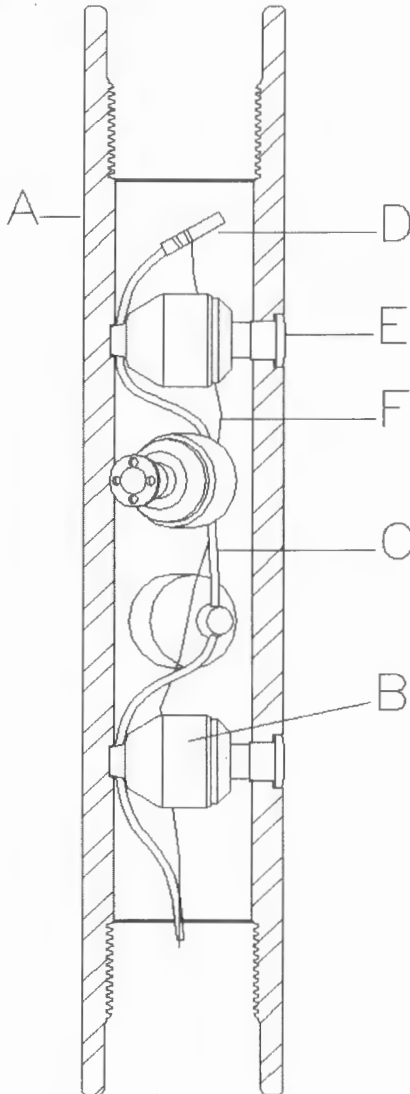


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## Perforating Gun Specification

Ported Tube System (w/o Detonator)

Version: 02 (9/1/2017)



### Gun System Details

	Min	Max
<b>Size</b>		
Length (ft)	0.5	21
Diameter (in)	2.500	6
<b>Perforators</b>		
#/gun	1	81
Device NEW (g)	2	39
Perforating gun NEW (kg)	0.0020	3.1590
<b>Detonating Cord</b>		
ft/gun	0.5	26
Device NEW (g/ft)	3.89	5.18
Perforating gun NEW (kg)	0.0019	0.1347
<b>Explosive Transfer Device (when present)</b>		
#/gun	1	2
Device NEW (g)	0.3	2
Perforating gun NEW (kg)	0.0003	0.0040
<b>Total Gun NEW (kg)</b>	<b>0.0042</b>	<b>3.2977</b>

NEW = net explosive weight

### Gun System Components

Label	Component	Comments
A	Gun body	
B	Perforator	
C	Detonating Cord	
D	Explosive Transfer Device (explosive) or Detcord End Seal (non-explosive)	Optional Optional
E	Alignment Plug & Sleeve	
F	Lead Wire	Optional

### Notes:

- Components B - D (explosive transfer device) must be DOT approved.  
See Section 5.1.2 of Perforating Gun Approval Guide for verification requirements.
- Drawing is a typical representation depicting major components of the specified perforating gun system. Actual details may vary. Additional, non-explosive components may be present (for example: bull plugs, tandem subs, and/or alignment mechanisms). Drawing depicts a single gun. One or more guns may be connected together in tandem during transport.
- Where Special Provision 114 of 49 CFR 172.102 applies, this perforating gun system may be classed, marked, labeled, described, and transported as UN0494 (1.4D).
- Compliance with Packing Instruction US1 of 49 CFR 173.62 is required.
- Perforating guns are to be marked and labeled in accordance with 49 CFR, Part 172 prior to transport.

### Dangerous Goods Information (as assigned by DOT):

**EX-Number:** As assigned by DOT  
**UN No:** UN0124 (See also Note 3)  
**Description:** JET PERFORATING GUNS, CHARGED  
*oil well, without detonator*  
**Label:** 1.1D (See also Note 3)

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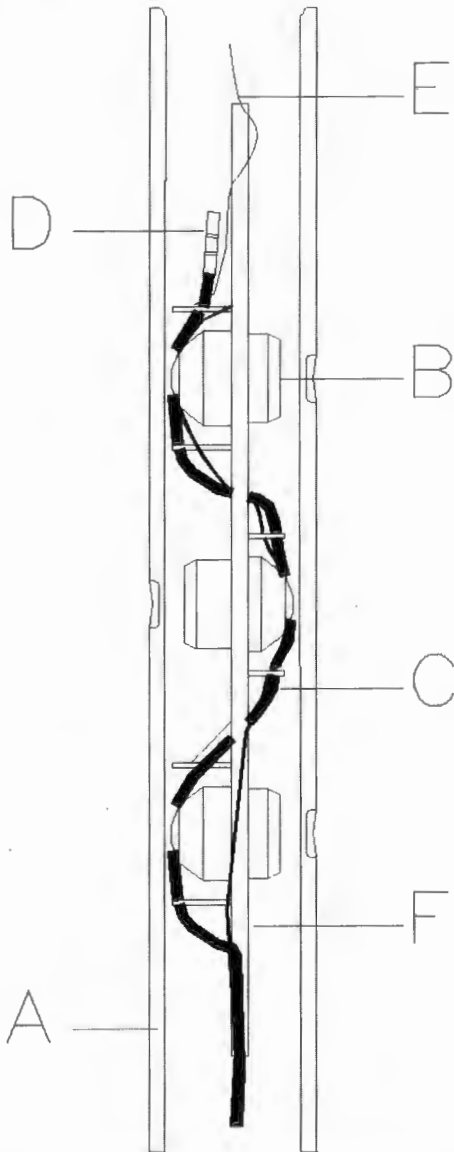


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## Perforating Gun Specification

**Tube & Strip System (w/o Detonator)**

Version: 02 (9/1/2017)



### Gun System Details

	Min	Max
<b>Size</b>		
Length (ft)	1	31
Diameter (in)	1.375	5
<b>Perforators</b>		
#/gun	1	180
Device NEW (g)	1.5	32
Perforating gun NEW (kg)	0.0015	5.7600
<b>Detonating Cord</b>		
ft/gun	1	35
Device NEW (g/ft)	1.62	5.18
Perforating gun NEW (kg)	0.0016	0.1813
<b>Explosive Transfer Devices (when present)</b>	<b>(when present)</b>	<b>(when present)</b>
#/gun	1	2
Device NEW (g)	0.3	2
Perforating gun NEW (kg)	0.0003	0.0040
<b>Total Gun NEW (kg)</b>	<b>0.0034</b>	<b>5.9453</b>

NEW = net explosive weight

### Gun System Components

Label	Component	Comments
A	Gun body	
B	Perforator	
C	Detonating Cord	
D	Explosive Transfer Device (explosive) or Detcord End Seal (non-explosive)	Optional Optional
E	Lead Wire	Optional
F	Carrier Strip	Flat or Spiral

### Notes:

- Components B - D (explosive transfer device) must be DOT approved.  
See Section 5.1.2 of Perforating Gun Approval Guide for verification requirements.
- Drawing is a typical representation depicting major components of the specified perforating gun system. Actual details may vary. Additional, non-explosive components may be present (for example: bull plugs, tandem subs, and/or alignment mechanisms). Drawing depicts a single gun. One or more guns may be connected together in tandem during transport.
- Where Special Provision 114 of 49 CFR 172.102 applies, this perforating gun system may be classed, marked, labeled, described, and transported as UN0494 (1.4D).
- Compliance with Packing Instruction US1 of 49 CFR 173.62 is required.
- Perforating guns are to be marked and labeled in accordance with 49 CFR, Part 172 prior to transport.

### Dangerous Goods Information (as assigned by DOT):

**EX-Number:** As assigned by DOT  
**UN No:** UN0124 (See also Note 3)  
**Description:** JET PERFORATING GUNS, CHARGED  
*oil well, without detonator*  
**Label:** 1.1D (See also Note 3)

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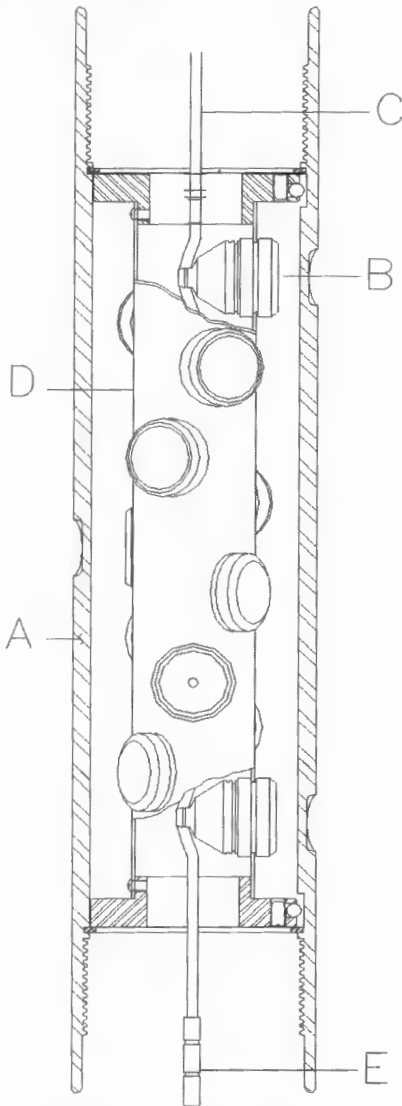


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## Perforating Gun Specification

Tube & Tube System (w/o Detonator)

Version: 02 (9/1/2017)



### Gun System Details

	Min	Max
<b>Size</b>		
Length (ft)	0.75	31
Diameter (in)	1.375	10
<b>Perforators</b>		
#/gun	1	744
Device NEW (g)	1.5	61
Perforating gun NEW (kg)	0.0015	45.3840
<b>Detonating Cord</b>		
ft/gun	1	35
Device NEW (g/ft)	1.62	5.18
Perforating gun NEW (kg)	0.0016	0.1813
<b>Explosive Transfer Devices</b>	<b>(when present)</b>	<b>(when present)</b>
#/gun	1	8
Device NEW (g)	0.3	2
Perforating gun NEW (kg)	0.0003	0.0160
<b>Total Gun NEW (kg)</b>	<b>0.0034</b>	<b>45.5813</b>

NEW = net explosive weight

### Gun System Components

Label	Component	Comments
A	Gun body	
B	Perforator	
C	Detonating Cord	
D	Carrier Tube	
E	Explosive Transfer Device (explosive) or Detcord End Seal (non-explosive)	Optional Optional
F	Lead Wire	Optional (not shown)

### Notes:

- Components B - C & E (explosive transfer device) must be DOT approved. See Section 5.1.2 of Perforating Gun Approval Guide for verification requirements.
- Drawing is a typical representation depicting major components of the specified perforating gun system. Actual details may vary. Additional, non-explosive components may be present (for example: bull plugs, tandem subs, and/or alignment mechanisms). Drawing depicts a single gun. One or more guns may be connected together in tandem during transport.
- Where Special Provision 114 of 49 CFR 172.102 applies, this perforating gun system may be classed, marked, labeled, described, and transported as UN0494 (1.4D).
- Compliance with Packing Instruction US1 of 49 CFR 173.62 is required.
- Perforating guns are to be marked and labeled in accordance with 49 CFR, Part 172 prior to transport.

### Dangerous Goods Information (as assigned by DOT):

**EX-Number:** As assigned by DOT  
**UN No:** UN0124 (See also Note 3)  
**Description:** JET PERFORATING GUNS, CHARGED  
*oil well, without detonator*  
**Label:** 1.1D (See also Note 3)

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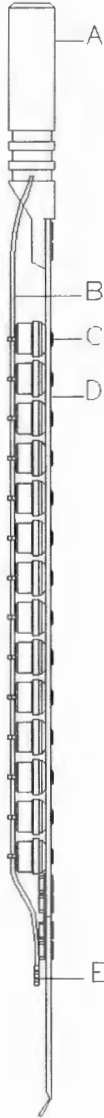


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# Perforating Gun Specification

## Strip Carrier System (w/o Detonator)

Version: 02 (9/1/2017)



### Gun System Details

	Min	Max
<b>Size</b>		
Length (ft)	1	24
Diameter (in)	1.375	3.5
<b>Perforators</b>		
#/gun	1	144
Device NEW (g)	2	39
Perforating gun NEW (kg)	0.0020	5.6160
<b>Detonating Cord</b>		
ft/gun	1	28
Device NEW (g/ft)	2.59	5.18
Perforating gun NEW (kg)	0.0026	0.1450
<b>Explosive Transfer Devices</b>	<b>(when present)</b>	<b>(when present)</b>
#/gun	1	2
Device NEW (g)	0.3	2
Perforating gun NEW (kg)	0.0003	0.0040
<b>Total Gun NEW (kg)</b>	<b>0.0049</b>	<b>5.7650</b>

NEW = net explosive weight

### Gun System Components

Label	Component	Comments
A	Adapter	Optional
B	Detonating Cord	
C	Perforator	
D	Carrier Strip	Flat, Twisted, or Zig-Zag
E	Explosive Transfer Device (explosive) or Detcord End Seal (non-explosive)	Optional Optional
F	Lead Wire	Optional (not shown)

### Notes:

- Components B - C & E (explosive transfer device) must be DOT approved. See Section 5.1.2 of Perforating Gun Approval Guide for verification requirements.
- Drawing is a typical representation depicting major components of the specified perforating gun system. Actual details may vary. Additional, non-explosive components may be present (for example: bull plugs, tandem subs, and/or alignment mechanisms). Drawing depicts a single gun. One or more guns may be connected together in tandem during transport.
- Where Special Provision 114 of 49 CFR 172.102 applies, this perforating gun system may be classed, marked, labeled, described, and transported as UN0494 (1.4D).
- Compliance with Packing Instruction US1 of 49 CFR 173.62 is required.
- Perforating guns are to be marked and labeled in accordance with 49 CFR, Part 172 prior to transport.

### Dangerous Goods Information (as assigned by DOT):

**EX-Number:** As assigned by DOT  
**UN No:** UN0124 (See also Note 3)  
**Description:** JET PERFORATING GUNS, CHARGED  
*oil well, without detonator*  
**Label:** 1.1D (See also Note 3)

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## Perforating Gun Specification

**Wire Carrier System (w/o Detonator)**

Version: 02 (9/1/2017)



### Gun System Details

	Min	Max
<b>Size</b>		
Length (ft)	3	70
Diameter (in)	1.000	2.125
<b>Perforators</b>		
#/gun	1	150
Device NEW (g)	0.5	39
Perforating gun NEW (kg)	0.0005	5.8500
<b>Detonating Cord</b>		
ft/gun	1	72
Device NEW (g/ft)	2.59	5.18
Perforating gun NEW (kg)	0.0026	0.3730
<b>Total Gun NEW (kg)</b>	<b>0.0031</b>	<b>6.2230</b>

NEW = net explosive weight

### Gun System Components

Label	Component	Comments
A	Adapter	Optional
B	Detonating Cord	
C	Perforator	
D	Carrier Wire	Two or more
E	Detcord End Seal (non-explosive)	Optional
F	Lead Wire	Optional

### Notes:

- Components B - C must be DOT approved. See Section 5.1.2 of Perforating Gun Approval Guide for verification requirements.
- Drawing is a typical representation depicting major components of the specified perforating gun system. Actual details may vary. Additional, non-explosive components may be present (for example: bull plugs, tandem subs, and/or alignment mechanisms). Drawing depicts a single gun. One or more guns may be connected together in tandem during transport.
- Where Special Provision 114 of 49 CFR 172.102 applies, this perforating gun system may be classed, marked, labeled, described, and transported as UN0494 (1.4D).
- Compliance with Packing Instruction US1 of 49 CFR 173.62 is required.
- Perforating guns are to be marked and labeled in accordance with 49 CFR, Part 172 prior to transport.

### Dangerous Goods Information (as assigned by DOT):

**EX-Number:** As assigned by DOT  
**UN No:** UN0124 (See also Note 3)  
**Description:** JET PERFORATING GUNS, CHARGED  
*oil well, without detonator*  
**Label:** 1.1D (See also Note 3)

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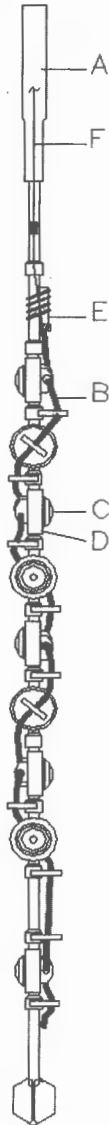


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## Perforating Gun Specification

Link Carrier System (w/o Detonator)

Version: 02 (9/1/2017)



### Gun System Details

	Min	Max
<b>Size</b>		
Length (ft)	1	30
Diameter (in)	1.250	2.5
<b>Perforators</b>		
#/gun	1	180
Device NEW (g)	2	39
Perforating gun NEW (kg)	0.0020	7.0200
<b>Detonating Cord</b>		
ft/gun	1	34
Device NEW (g/ft)	5.18	5.18
Perforating gun NEW (kg)	0.0052	0.1761
<b>Total Gun NEW (kg)</b>	<b>0.0072</b>	<b>7.1961</b>

NEW = net explosive weight

### Gun System Components

Label	Component	Comments
A	Adapter	Optional
B	Detonating Cord	
C	Perforator	
D	Charge Holder	Two or more
E	Detcord End Seal (non-explosive)	Optional
F	Lead Wire	Optional

### Notes:

- Components B - C must be DOT approved. See Section 5.1.2 of Perforating Gun Approval Guide for verification requirements.
- Drawing is a typical representation depicting major components of the specified perforating gun system. Actual details may vary. Additional, non-explosive components may be present (for example: bull plugs, tandem subs, and/or alignment mechanisms). Drawing depicts a single gun. One or more guns may be connected together in tandem during transport.
- Where Special Provision 114 of 49 CFR 172.102 applies, this perforating gun system may be classed, marked, labeled, described, and transported as UN0494 (1.4D).
- Compliance with Packing Instruction US1 of 49 CFR 173.62 is required.
- Perforating guns are to be marked and labeled in accordance with 49 CFR, Part 172 prior to transport.

### Dangerous Goods Information (as assigned by DOT):

**EX-Number:** As assigned by DOT  
**UN No:** UN0124 (See also Note 3)  
**Description:** JET PERFORATING GUNS, CHARGED  
*oil well, without detonator*  
**Label:** 1.1D (See also Note 3)

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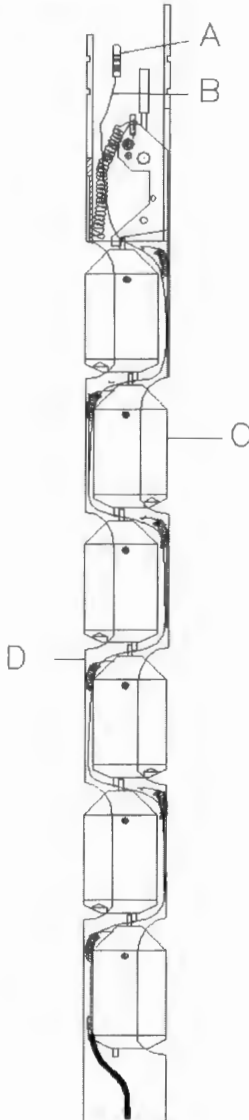


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## Perforating Gun Specification

**Swing Carrier System (w/o Detonator)**

Version: 02 (9/1/2017)



### Gun System Details

	Min	Max
<b>Size</b>		
Length (ft)	1	15
Diameter (in)	1.375	2.125
<b>Perforators</b>		
#/gun	1	61
Device NEW (g)	11	36
Perforating gun NEW (kg)	0.0110	2.1960
<b>Detonating Cord</b>		
ft/gun	1.8	25
Device NEW (g/ft)	2.59	3.89
Perforating gun NEW (kg)	0.0047	0.0973
<b>Total Gun NEW (kg)</b>	<b>0.0157</b>	<b>2.2933</b>

NEW = net explosive weight

### Gun System Components

Label	Component	Comments
A	Detcord End Seal (non-explosive)	Optional
B	Detonating Cord	
C	Perforator	
D	Carrier	

### Notes:

- Components B - C must be DOT approved. See Section 5.1.2 of Perforating Gun Approval Guide for verification requirements.
- Drawing is a typical representation depicting major components of the specified perforating gun system. Actual details may vary. Additional, non-explosive components may be present (for example: bull plugs, tandem subs, and/or alignment mechanisms). Drawing depicts a single gun. One or more guns may be connected together in tandem during transport.
- Where Special Provision 114 of 49 CFR 172.102 applies, this perforating gun system may be classed, marked, labeled, described, and transported as UN0494 (1.4D).
- Compliance with Packing Instruction US1 of 49 CFR 173.62 is required.
- Perforating guns are to be marked and labeled in accordance with 49 CFR, Part 172 prior to transport.

### Dangerous Goods Information (as assigned by DOT):

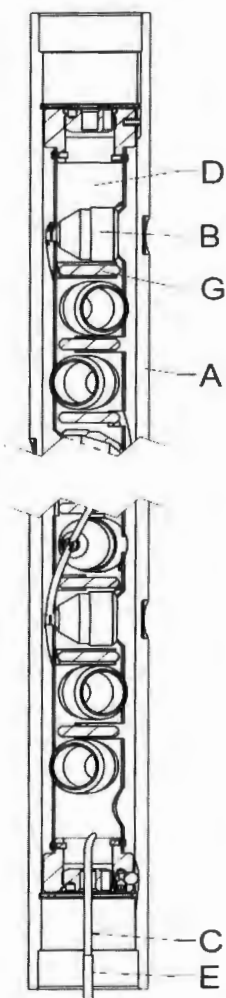
**EX-Number:** As assigned by DOT  
**UN No:** UN0124 (See also Note 3)  
**Description:** JET PERFORATING GUNS, CHARGED  
*oil well, without detonator*  
**Label:** 1.1D (See also Note 3)

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## Perforating Gun Specification

Tube & Tube Kodiak™ System (w/o Detonator)  
Version: 02 (9/1/2017)



### Gun System Details

	Min	Max
<b>Size</b>		
Length (ft)	0.75	21
Diameter (in)	1.563	4.5
<b>Perforators</b>		
#/gun	1	80
Device NEW (g)	1.5	39
Perforating gun NEW (kg)	0.0015	3.1200
<b>Detonating Cord</b>		
ft/gun	1	25
Device NEW (g/ft)	1.62	5.18
Perforating gun NEW (kg)	0.00162	0.1295
<b>Explosive Transfer Devices (when present)</b>		
#/gun	1	2
Device NEW (g)	0.3	2
Perforating gun NEW (kg)	0.0003	0.0040
<b>Kodiak Disks</b>		
#/gun	1	60
Kodiak Disk NEW (g)	5.0000	110.0000
Perforating gun NEW (kg)	0.0050	6.6000
<b>Total Gun NEW (kg)</b>	<b>0.0084</b>	<b>9.8535</b>

NEW = net explosive weight

### Gun System Components

Label	Component	Comments
A	Gun body	
B	Perforator	
C	Detonating Cord	
D	Carrier Tube	
E	Explosive Transfer Device (explosive) or Detcord End Seal (non-explosive)	Optional Optional
F	Lead Wire	Optional (not shown)
G	Kodiak Disk	See note 6

### Notes:

- Components B - C, E (explosive transfer device), & G must be DOT approved.  
See Section 5.1.2 of Perforating Gun Approval Guide for verification requirements.
- Drawing is a typical representation depicting major components of the specified perforating gun system. Actual details may vary. Additional, non-explosive components may be present (for example: bull plugs, tandem subs, and/or alignment mechanisms). Drawing depicts a single gun. One or more guns may be connected together in tandem during transport.
- Compliance with Packing Instruction US1 of 49 CFR 173.82 is required.
- Perforating guns are to be marked and labeled in accordance with 49 CFR, Part 172 prior to transport.
- Perforating guns approved pursuant to this specification are not eligible for shipment as 1.4D under Special Provision 114. 1.4D classification of perforating guns containing Kodiak™ Disks are subject to prior approval by the U.S. Department of Transportation.
- Must be approved under EX2008040541.

### Dangerous Goods Information (as assigned by DOT):

EX-Number: As assigned by DOT  
UN No: UN0124  
Description: JET PERFORATING GUNS, CHARGED  
oil well, without detonator  
Label: 1.1D

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**Guide to Obtaining DOT Approval of Jet Perforating Guns  
using AESC/IME Perforating Gun Specifications**

**Annex 2**

**PHMSA Approval of AESC/IME Specifications**

This document may be retrieved from the following:

<https://www.ime.org/uploads/public/PHMSA/PHMSAApprovalJPGStandard2017.09.01.pdf>

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## **Guide to Obtaining DOT Approval of Jet Perforating Guns using AESC/IME Perforating Gun Specifications**

### **Annex 3<sup>9</sup>**

#### **Text of Special Provision 114 of 49 CFR 172.102 (as of February 15, 2017)**

114 Jet perforating guns, charged, oil well, without detonator may be reclassified to Division 1.4 Compatibility Group D (1.4D) if the following conditions are met:

- a. The total weight of the explosive contents of the shaped charges assembled in the guns does not exceed 90.5 kg (200 pounds) per vehicle; and
- b. The guns are packaged in accordance with Packing Method US 1 as specified in §173.62 of this subchapter.

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<sup>9</sup> This text is provided here as a convenience to the reader; however, the version published in the currently effective CFR is the version that applies to use of the AESC/IME Perforating Gun Specifications.

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## **Guide to Obtaining DOT Approval of Jet Perforating Guns using AESC/IME Perforating Gun Specifications**

### **Annex 4** **Text of Packing Method US 1 of 49 CFR 173.62** **(as of February 15, 2017)<sup>10</sup>**

1. A jet perforating gun, charged, oil well may be transported under the following conditions:
  - a. Initiation devices carried on the same motor vehicle or offshore supply vessel must be segregated; each kind from every other kind, and from any gun, tool or other supplies, unless approved in accordance with §173.56. Segregated initiation devices must be carried in a container having individual pockets for each such device or in a fully enclosed steel container lined with a non-sparking material. No more than two segregated initiation devices per gun may be carried on the same motor vehicle.
  - b. Each shaped charge affixed to the gun may not contain more than 112 g (4 ounces) of explosives.
  - c. Each shaped charge if not completely enclosed in glass or metal, must be fully protected by a metal cover after installation in the gun.
  - d. A jet perforating gun classed as 1.1D or 1.4D may be transported by highway by private or contract carriers engaged in oil well operations.
    - (i) A motor vehicle transporting a gun must have specially built racks or carrying cases designed and constructed so that the gun is securely held in place during transportation and is not subject to damage by contact, one to the other or any other article or material carried in the vehicle; and
    - (ii) The assembled gun packed on the vehicle may not extend beyond the body of the motor vehicle.
  - e. A jet perforating gun classed as 1.4D may be transported by a private offshore supply vessel only when the gun is carried in a motor vehicle as specified in paragraph (d) of this packing method or on offshore well tool pallets provided that:
    - (i) All the conditions specified in paragraphs (a), (b), and (c) of this packing method are met;
    - (ii) The total explosive contents do not exceed 90.8 kg (200 pounds) per tool pallet;
    - (iii) Each cargo vessel compartment may contain up to 90.8 kg (200 pounds) of explosive content if the segregation requirements in §176.83(b) of this subchapter are met; and

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<sup>10</sup> This text is provided here as a convenience to the reader; however, the version published in the currently effective CFR is the version that applies to use of the AESC/IME Perforating Gun Specifications.

(iv) When more than one vehicle or tool pallet is stowed "on deck" a minimum horizontal separation of 3 m (9.8 feet) must be provided.



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**Annex 5**

**Example Application Format**

(see next page)

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Date

Optional document ID

Associate Administrator for Hazardous Materials Safety  
Pipeline and Hazardous Materials Safety Administration  
U.S. Department of Transportation  
Office of Approvals and Special Permits, PHH-32  
East Building  
1200 New Jersey Avenue, SE  
Washington, DC 20590-0001

Subject: Approval Application – Perforating Gun  
System using AESC/IME Perforating Gun  
Specification (Ver. 02, Effective: 9/1/2017)

Dear Associate Administrator:

Application for an explosives approval as described below is submitted. In compliance with 49 CFR 107.705, the following information is provided:

**A. Section under which application is made**

49 CFR §173.51(a), §173.56(b)(1), and §173.58

**B. Approval, registration, or exemption number**

EX-number to be assigned.

**C. Name, address, and telephone number of the applicant**

Applicant Name:	
Applicant Mailing Address:	
Contact Name:	
Contact Phone Number:	
Contact Fax Number:	
Contact E-mail Address:	

**D. Product Identification**

The product to be approved is described as (check only one entry and, if "Other" checked, fill in blank):

Please use Applicant Name (Section C) + System Name + Division (Section D)

Other (please specify): \_\_\_\_\_

## E. System to be Approved and Classification Sought

Approval of the following AESC/IME Perforating Gun Specification Gun System (check only one entry):

- Ported tube systems
- Tube & strip systems
- Tube & tube systems
- Strip carrier systems
- Wire carrier systems
- Link carrier systems
- Swing carrier systems
- Tube & tube Kodiak™ system

Classification sought:

UN0124, 1.1D, Jet Perforating Guns, Charged, *Oil Well*

## F. Proposed duration of approval

Consistent with current DOT policy.

## G. Transport mode(s) affected

Check all that apply:

- Highway
- Cargo-only Rail
- Vessel

## H. Certification

By my signature below, I certify that I have reviewed the AESC/IME Perforating Gun Specification indicated in Section D above and confirm that my perforating gun system meets the graphical representation, the technical specifications, and compliance requirements contained thereon.

Sincerely,

Name  
Title

Attachments: AESC/IME Perforating Gun Specification (Ver. 02, Effective 7/31/2017)