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IPS**



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API RP 67 – How is it implemented at your wellsite?

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Agenda

API RP 67

- Purpose & brief history
- Document outline
- Selected sections and applications
- Discussion

Disclaimer

- Time permits only a brief discussion of some aspects of RP67
- This should not be construed as implying that other aspects are any less important
- RP 67 *in its entirety* should be *always* considered in your operations

Purpose(s)

- “prevent the inadvertent initiation of...explosives at the wellsite...”
- “recommendations for safe and secure storage and transportation and handling”
- “requirements for design and manufacture of selected equipment

1 Scope

This publication is applicable to chemical explosives used as an energy source to do work in oil- and gas-producing operations, and more specifically to explosives intended for use inside a wellbore. The purpose of this recommended practice (RP) is primarily to prevent the inadvertent initiation of these explosives at the wellsite but also includes some recommendations for safe and secure storage and transportation and handling, as well as requirements for design and manufacture of selected equipment.

API RP 67

Brief History

- 1994 – 1st ed
 - Introduced several recommendations that have become mainstays
- 2007 – 2nd ed
 - Surface PCE
 - Tractors
 - TCP FH safety requirements
 - Post-9/11 security considerations
- 2019 – 3rd ed (started in 2011)
 - Additional conveyance methods
 - Initiators – category segregation
 - Thermal management (esp. HMX)



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**API RP 67 Recommended Practice for Oilfield Explosives Safety:
Development of Proposed Changes to the Third Edition**

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API RP 67

Document Outline

1. Scope
2. Normative References
3. Terms, Definitions, and Abbreviations
4. General
5. Transportation and Security
6. Surface Equipment
7. Downhole Equipment
8. Time Delays
9. Field Safety Procedures
10. Electric Line-conveyed Operations
11. Tubing-conveyed Perforating Operations
12. Coiled Tubing Perforating Operations
13. Slickline Perforating Operations
14. Special Categories of Explosive Devices
15. Personnel Training

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Key Subsections

4.2 Human Factors

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Oilfield explosives safety incident information collected by the Independent Oilfield Forum for Advancement of Well Perforation Technology, www.perforators.org, indicates that human error is the principle cause of accidents and incidents involving explosives. While API does not endorse any particular websites, there are several websites that include explosives incident databases. To promote safety and safe operations, users are encouraged to anonymously report incidents and near misses, after seeking the advice of their company's legal counsel. Two such sites are:

Key Subsections

6. Surface Equipment
 - 6.2-6.10 address electrical aspects
 - 6.12 addresses pressure aspects (PCE)
7. Downhole Equipment
 - 7.3 Detonators and initiators (both electric and percussion)
 - 7.4 Selective firing perforating gun systems (electrical)
 - 7.5 Detonators with ballistic interrupts
 - 7.6 Downhole firing systems (both electrical and non-electrical)
9. Field safety procedures
 - 9.4 Loading / downloading
 - 9.5 Thermally overexposed explosive devices
10. E-line perforating operations
11. TCP perforating operations
12. CT perforating operations
13. SL perforating operations
14. Special categories
 - 14.1 Setting tools
 - 14.3 & 14.5 Propellant tools
 - 14.4 Bullet guns

If your operation involves...

Electrical initiators

Mechanical initiators

...then the following sections may apply

- Section 6
- Section 7
- Section 9
- Section 10 (likely)
- Section 11 (potentially)
- Section 12 (potentially)
- Section 13 (potentially)
- Section 14 (potentially)

- Section 6
- Section 7
- Section 9
- Section 10 (potentially)
- Section 11 (likely)
- Section 12 (potentially)
- Section 13 (potentially)
- Section 14 (potentially)

Key Questions

What are the different solutions employed across the industry to comply with these highlighted requirements?

When are these used and when are they not used?

Do all service companies and operators interpret the requirements equally?

Are we doing audits of our operations vs. API RP 67?

-What is the place of: Annex E (informative) Wellsite Audit Checklist?

Safety Sub(s) / “*Safety Spacer*”

Is the 10ft of safety spacer being used for all TCP operations?

Is it only being used for certain firing head types?

What about specialized applications, such as running guns below cement retainers etc.?

Do operators request it or push back if its suggested?

11.2.5 Safety Sub(s)

To augment rig crew safety, a safety sub or blank gun section shall be installed between each gun assembly or explosive device and firing head to position the loaded portion a safe distance below the rig floor during arming and disarming operations. The minimum sub length should be 3 m (10 ft). In some cases, a longer sub is required to position the loaded assembly safely below living quarters or other occupied areas. A safety spacer may not be required when running a bottom-up firing system (refer to 11.3.4). The connection between the firing head and the safety sub should be the last connection made up when running in hole.

A.5 Percussion Initiated Systems

A safety sub is a safety spacer or blank gun section, and it shall be installed between each gun assembly (or explosive device) and firing head to position the loaded portion a safe distance below the rig floor during arming and disarming operations. The minimum spacer length should be 3 m (10 ft). In some cases, a longer spacer will be required to position the loaded assembly safely below living quarters or other occupied areas. A safety spacer may not be required when running a bottom-up firing system. The connection between the firing head and the safety spacer should be the last connection to be made up when running in hole.

A safety sub may not be required when running a bottom-up firing system.

Explosive devices in WPCCE

XXXXXX

6.12 Pressure Testing of Wellhead Pressure Control Equipment

6.12.1 Exposure of Explosive Devices to Pressure

Exposure to pressure has the potential to cause explosive devices to auto-initiate. Wellsite pressure testing of wellhead pressure control equipment (WHPCE) should be completed prior to inserting any explosive device into the WHPCE. WHPCE shall never be tested to a pressure exceeding its maximum allowable working pressure (MAWP). MAWP is the pressure at which the equipment was tested at the wellsite prior to the job. Every time the pressure control equipment is disconnected, the MAWP is reset to 0 psi until the connection that was broken is retested.

6.12.4 Equalization of Well Pressure

When preparing to deploy explosive devices into a well under pressure, the pressure equalization should be accomplished using well pressure or an appropriate low-volume/high-pressure pump. The pump should be equipped with adequate over-pressure protection or a device designed to limit the volume of fluid introduced into the WHPCE, such as a choke manifold. The pressure used to equalize the WHPCE shall not exceed 80 % of the pressure rating of the explosive device while at surface.

Qualification of Firing Systems

Are all firing systems we are running compliant with drop test requirements?

Do we know if our TCP percussion detonators meet the 2 ft-lb or 5ft-lb impact force requirement?

Do we always confirm that testing data exists at our planned downhole pressure and temperature?

Is API 19 PT being utilized when selecting firing systems?

7.3.2 Drop Height Requirement

Electric and percussion detonators and initiators shall be designed and manufactured to withstand a drop, without firing, of at least 4.6 m (15 ft) onto a steel plate supported by concrete.

7.3.4 Impact Resistance of Percussion Initiators

Percussion style initiators that will not be exposed to well fluids or pressure shall be designed with a minimum 2 ft-lb no-fire level. Percussion style initiators that will be exposed to well fluids or pressure shall be designed with a minimum 5 ft-lb no-fire level. Impact force shall be applied in the normal firing configuration. The minimum no-fire impact level shall have a probability of not firing of 0.999 at a confidence level of 95 % as determined by test and computation.

7.3.5 Temperature and Pressure Rating

Specifications for the temperature and pressure rating of detonators that will be exposed to the wellbore shall be based on tests that involve the simultaneous application of temperature and pressure.

Surface checking through Wireline

Are we sure this is not being performed in any of our operations?

Is it more likely to occur for 'non-standard' operations with powered tools etc. in the string?

Do our teams understand the risks and consequences involved?

New technology in entering the market which claims to do this safely by design

- Is this compliant with API RP 67 currently?
- Is there scope to review and include this?

10.2.4 Checks Using Unit Power (Check Fire/Hot Check)

A check fire/hot check or any other equipment test using unit power shall not be performed if a gun or explosive device is attached to the cable head.

Warning—Mistakes that occur while performing a check fire/hot check can cause surface detonation-related fatalities.

Check fire/hot checks should be avoided whenever possible. If unit power is used to test cable head or accessory equipment, the cable head and equipment to be tested shall be in clear view of the person applying the power and should be brought into the recorder cab whenever possible. Effective verbal communications shall be established and maintained between the person applying power and the personnel in the area of the cable head and explosive devices. It is essential that the person applying the power knows with certainty, before applying the power, that no gun or explosive device is attached to the cable head.

Emerging Technology – Automated Firing

New technology in entering the market which claims to do this safely by design

-Is this compliant with RP 67 currently?

First gun? What about subsequent guns?

-Is there scope to review and include this in API RP 67?

A.3.3 Firing System

The following apply to surface firing systems.

- a) At least three deliberate actions shall be required to fire the explosive device.
- b) At least one action shall require the use of two hands.
- c) At least one action shall involve a spring-loaded switch.

QUESTIONS?

MAY 13-15



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