

# Penetration Safety: Penetration Permit

Department: Electrical Safety Support Group

Program: Penetration Safety

Owner: Program Manager, Electrical Safety Officer, Perry Anthony (Ext. 2039)

Authority: ES&H Manual, Chapter 44, Penetration Safety

## Instructions

A penetration permit is required for all Class 2 penetrations and for those Class 1 penetrations where the hazards and controls are not documented in a routine or non-routine job hazard analysis and mitigation document (JHAM) or similar work authorization document.<sup>1</sup>

*Class 1 penetrations* are defined as any penetration made into hollow walls, hollow ceilings, or hollow floors, or a penetration into solid materials to a depth of 2.0 inches or less; *Class 2 penetrations* as any deeper than 2.0 inches or all the way through solid materials.

All penetrations within a radiologically controlled area (RCA), a radioactive material management area (RMMA), or part of radiation shielding (for example, the Accelerator Housing Structure, End Station A Hall, Klystron Gallery Floor) require a penetration permit with the "Radiological Safety" section of the permit completed by the Radiation Protection Department in ES&H. Please allow two days for Radiation Protection Department review.

In addition a radiation safety work control form (RSWCF) is required for all penetrations that meet any of the following conditions:<sup>2</sup>

- Into or through non-concrete radiation shielding
- Into concrete radiation shielding, with penetration exceeding 2 inches in diameter
- Into concrete radiation shielding, with penetration exceeding 6 inches deep
- Into concrete radiation shielding where penetration is not re-filled with a dense material (e.g. concrete or steel)
- All the way through concrete radiation shielding

Contact the area safety officer for more information.

The completed penetration permit must be kept at the worksite during task. Upon completion of work send the penetration permit to the Electrical Safety Support Group, Mail Stop 20.

## Pre-planning

Workers will evaluate hazards and controls as required for the penetration work to be performed.

Check behind walls, under floors, or through false ceilings to attempt to locate hidden utilities or other hazards (such as asbestos). In most industrial environments, electric wiring is run in metal conduit. However, it is possible for Romex cable or other soft-surfaced electrical wiring to be present within hollow walls of some buildings, especially in some transportable buildings.

Verify metal stud locations by measuring from adjacent studs or by using detection equipment to determine that the metal is not an electric conduit or gas pipe.

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1 "Job Hazard Analysis", <http://www-group.slac.stanford.edu/esh/general/hazanalysis/jham.htm>

2 For the form and procedure, see Guideline 14, "Configuration Control of Radiation Safety Systems", *SLAC Guidelines for Operations* (SLAC-I-010-00100-000), <https://www-internal.slac.stanford.edu/ad/addo/qfo/qfoindex.html>

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If it is suspected that hidden hazards exist at the point of penetration, relocate the work if possible. If the work cannot be relocated, use non-destructive testing (NDT) devices (ground penetrating radar, x-ray, magnetic, induction, conductive, or other devices and methods) to determine whether additional hazards exist. For hollow structures a pilot hole may be useful to look for hidden utilities. If the penetration is to be made into a solid load-bearing wall, use NDT before performing the penetration to ensure that it does not interrupt wall reinforcement.

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Work Request # (if applicable): \_\_\_\_\_ Date Permit Submitted: \_\_\_\_\_

**General Information**

Area/location	Date(s) work will be performed	Job description (location of penetration, material to be penetrated, tools, etc)
Responsible line manager or designee Name/Organization)	Phone #	Other information (e.g., depth of penetration, etc)

**Class 1 Penetration Checklist**

*Hollow walls, ceilings or floors, or 2 inches or less into solid material*

	Yes	N/A
Checked other side of walls, under floors, or through false ceilings for hazards?	_____	_____
Verified stud locations?	_____	_____
Non-conductive tools to be used?	_____	_____
Masonry bits and hand tools to be used for initial penetration?	_____	_____
Drill bit stops or short drill bits (2 inches or less) to be used for solid material?	_____	_____
Electrical tools equipped with GFCIs or double insulated?	_____	_____
GFCIs tested?	_____	_____
Appropriate PPE specified (see page 3) and obtained?	_____	_____
PPE inspection(s) up to date?	_____	_____
Penetration is within a radiologically controlled area or a radioactive material management area? <i>If yes, complete the "Radiation Safety" portion of the form.</i>	_____	_____
Penetration is part of accelerator shielding (for example: the Accelerator Housing Structure, End Station A Hall, Klystron Gallery Floor)? <i>If yes, complete the "Radiological Safety" section of the form.</i>	_____	_____
A Radiation Safety Work Control Form (RSWCF) is required for all penetrations that meet any of the following conditions (contact the area safety officer for more information):	_____	_____
<ul style="list-style-type: none"> <li>• Into or through non-concrete radiation shielding</li> <li>• Into concrete radiation shielding, with penetration exceeding 2 inches in diameter</li> <li>• Into concrete radiation shielding, with penetration exceeding 6 inches deep</li> <li>• Into concrete radiation shielding where penetration is not re-filled with a dense material (e.g. concrete or steel)</li> <li>• All the way through concrete radiation shielding</li> </ul>		
Checklist completed by: _____	Date: _____	

Complete "Hazards and Required Controls" section.

**Class 2 Penetration Checklist**

*Greater than 2 inches into solid material*

	Yes	N/A
Reviewed historical records, engineering plans, and drawings?	_____	_____
Area responsible person/designee, customer/requester, or other personnel consulted?	_____	_____
Visually inspected proposed location of penetration?	_____	_____
Checked other side of walls, under floors, or through false ceilings for hazards?	_____	_____
De-energized and locked/tagged-out energy sources as required?	_____	_____
NDT used to determine if additional hazards exist?	_____	_____
<i>If yes, list results under "Hazards."</i>	_____	_____
NDT used to determine wall reinforcement?	_____	_____
Electrical tools equipped with GFCI or double-insulated?	_____	_____
GFCIs tested?	_____	_____
Appropriate PPE specified (see page 3) and obtained?	_____	_____
PPE inspection(s) up to date?	_____	_____
Short drill bits used or equipment marked to limit penetration depth?	_____	_____
Penetration is within a radiologically controlled area or a radioactive material management area. <i>If yes, complete the "Radiological Safety" section of the form.</i>	_____	_____
Penetration is part of accelerator shielding (for example: the Accelerator Housing Structure, End Station A Hall, Klystron Gallery Floor)? <i>If yes, complete the "Radiological Safety" section of the form.</i>	_____	_____
A Radiation Safety Work Control Form (RSWCF) is required for all penetrations that meet any of the following conditions (contact the area safety officer for more information):	_____	_____
<ul style="list-style-type: none"> <li>• Into or through non-concrete radiation shielding</li> <li>• Into concrete radiation shielding, with penetration exceeding 2 inches in diameter</li> <li>• Into concrete radiation shielding, with penetration exceeding 6 inches deep</li> <li>• Into concrete radiation shielding where penetration is not re-filled with a dense material (e.g. concrete or steel)</li> <li>• All the way through concrete radiation shielding</li> </ul>		
Checklist completed by: _____	Date: _____	

Complete "Hazards and Required Controls" section.

**Hazards and Required Controls**

*May reference JHAM or AHA if hazards/controls are documented there*

**Hazards**

Type and size of energy sources present (including results from NDT, if used):

Hazards specific to the tools that will be used:

Work environment hazards (such as moisture, lead, asbestos, etc.):

Other hazards:

**Controls**

Procedural requirements:

Types and classification of PPE:

Other controls:

Complete the "Radiological Safety" section if appropriate, and complete the Review, Approval, and Authorization section at the end of this form.

### ***Radiological Safety***

#### **Radiological Survey, RP Field Operations Group, Ext. 4299**

*This section to be completed by RP if the penetration will be within a radiologically controlled area, radioactive materials management area, or accelerator housing. Please allow two days.*

Pre-work survey required       Radiological HEPA vacuum cleaner required

Additional requirements for this penetration:

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Penetration does not need special requirements. .

Checked by: \_\_\_\_\_

Date: \_\_\_\_\_

### ***Review, Approval, and Authorization***

Any deviation from the scope of work identified on this permit requires re-validation of this permit. This penetration permit expires 30 days after issuance.

#### **Class 1 & 2 Authorizations**

I have discussed the hazards and controls with the workers and verified that they are trained/qualified to perform the work.

\_\_\_\_\_  
Responsible line manager/designee signature

DATE: \_\_\_\_\_

#### **Additional Authorization for Class 2**

\_\_\_\_\_  
Area responsible person (e.g. area or building manager)

DATE: \_\_\_\_\_