U.S. Department of Labor
MSHA
Mine Safety & Health Administration

A&CC Approval Workshop

Mechanical & Engineering Safety Division (M&ESD)

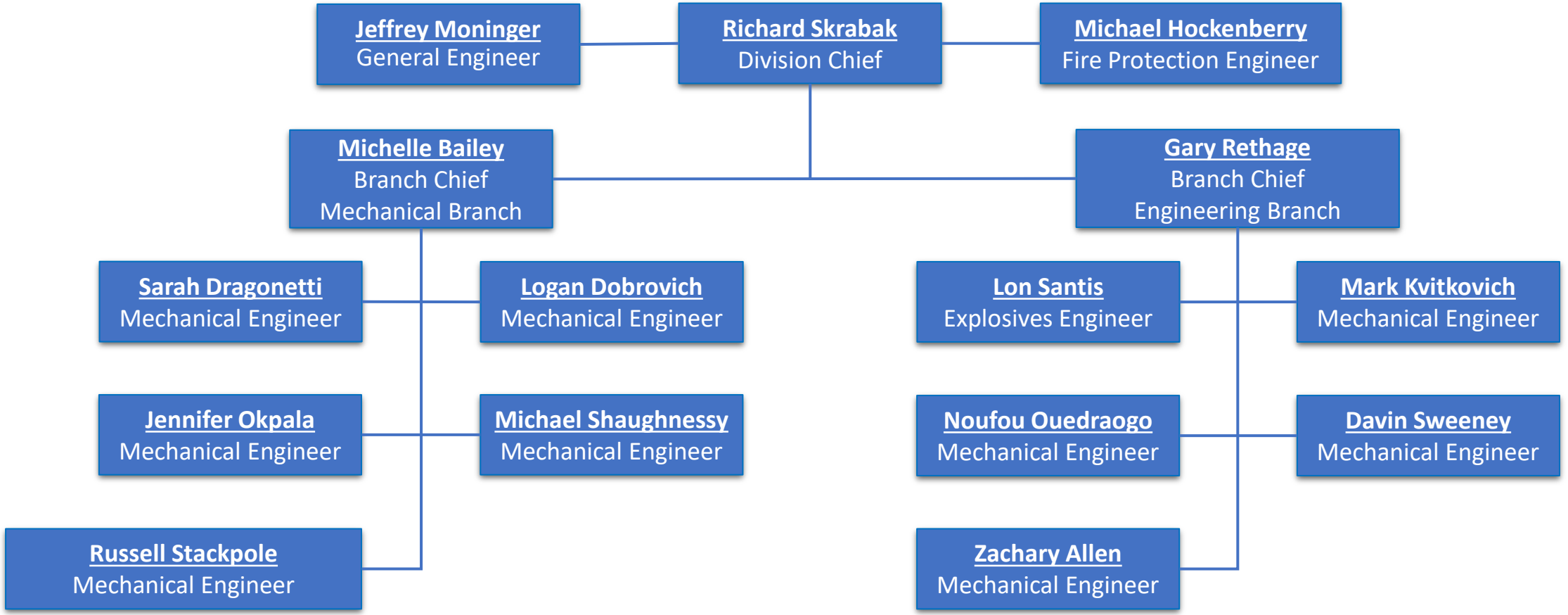
April 16, 2024

U.S. Department of Labor Mine Safety & Health Administration

Overview of M&ESD Presentation

- M&ESD Program Areas
- M&ESD Approval / Certification Programs
  - Diesel Approvals – Brief Overview
  - Certification Group – Detailed Overview
- Ways to Expedite the Approval Process
- Common Discrepancies

M&ESD Organization Chart



M&ESD Program Areas

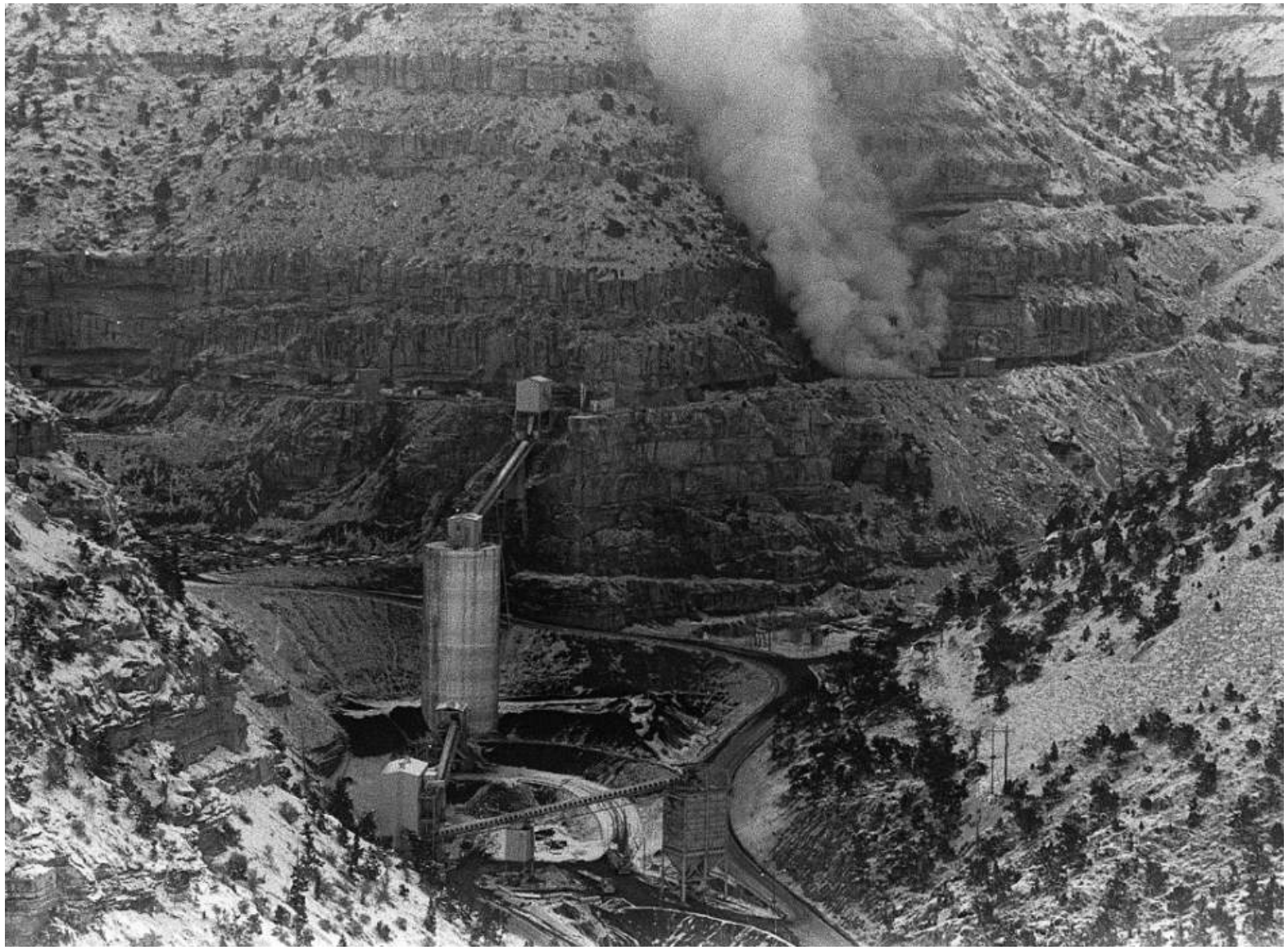
- Part 36: Mobile Diesel-Powered Equipment
- Part 7 Subpart E: Diesel Engines
- Part 7 Subpart F: Diesel Power Packages
- Part 33: Dust Collectors
- Part 15: Explosives and Sheathed Explosive Units
- Diesel Particulate Matter Control Technologies Acceptances

M&ESD Program Areas

- Part 18: Explosion-Proof Enclosures
- Part 18: Explosion-Proof and Non-Explosion-Proof Connectors
- Part 7 Subpart C: Battery Assemblies
- Part 7 Subpart J: Electric Motor Assemblies
- Mine Component acceptances:
  - ST&Es (Lighting Systems)

M&ESD Program Areas

- Fire Protection Systems
- Explosives Safety
- Technical Assistance
  - Accident Investigations
  - Training
  - Inspector and Industry Assistance



SOURCE: Al Hartmann | The Salt Lake Tribune

30 CFR Part 7 Approvals

- Testing by Applicant or Third Party
- Applicants Submits Certified Statements
  - Compliance with Design Specifications
  - Compliance with Test Requirements
  - Quality Assurance
- Third party laboratory evaluations
  - Test Observations
  - MSHA observes first test and any additional testing deemed necessary

30 CFR Part 7 - Subpart E: Diesel Engines

- Category A (Permissible)
  - Test with methane / Approval Number 07-EPA**24**000**#**
- Category B (Nonpermissible)
  - Test without methane / Approval Number 07-ENA**24**000**#**
- Modern Diesel Engines incorporate aftertreatment systems included in the engine approval
  - Aftertreatment Drawings and Specifications
  - Aftertreatment Regeneration Details

30 CFR Part 7 - Subpart F Diesel Power Packages

- Requires a Category A Approved Diesel Engine (Concurrent testing)
- Exhaust System
  - explosion proof requirements / exhaust gas cooling / flame and spark arresting / surface temperature controls
- Intake System
  - Explosion proof requirements / intake flame arrester / emergency intake air shut off valve
- Safety Shutdown System
  - high coolant temperature / high exhaust gas temperature / low water shutdown on wet systems

30 CFR Part 36 – Mobile Diesel-Powered Equipment

- Required Forms and Checklists
  - Machine Factory Inspection Form
  - Machine Permissibility Checklist
- Certification Statements
  - Guarding & Hose Routing
  - Operator’s Compartment
  - Fire Suppression/Fire Extinguisher
  - V belts shall be static conducting

30 CFR Part 36 – Mobile Diesel-Powered Equipment

- Total machine approval (brakes, operator safety, etc.)
- Evaluate to Part 75 (Subpart T Diesel-Powered Equipment) requirements
- Machine Inspection
  - Need Completed Factory Inspection Form
  - Permissibility Checklists
  - Exhaust Gas Check
  - Drawing Comparison
- Approval Number 36-CA**24**000**#** (Coal) / 36-NA**24**000**#** (Noncoal)

CERTIFICATION GROUP

Overview of Certification Group Presentation

- 30 CFR – Part 7 – Subpart C – Battery Assemblies
- 30 CFR – Part 18 – Explosion-Proof Enclosures
- 30 CFR – Part 7 – Subpart J – Electric Motor Assemblies
- Important Certification Program Update
- 10 Ways to Expedite the Approval Process
- Common Discrepancies

30 CFR Part 7 - Subpart C Battery Assemblies

Part 7 - Subpart C: Battery Assemblies

- Lead acid machine batteries designs are evaluated for compliance and certified to 30 CFR - Part 7 - Subpart C
- The battery layout, tray design, and electrical specifications must be documented on drawings submitted for evaluation.
- Battery trays and cover must be coated in an MSHA accepted flame-resistant, acid resistant, and electrically insulating material.

LINK: Acid and Flame Resistant Battery Box Cover Insulation Material Listing

Part 7 - Subpart C: Battery Assemblies

- If battery trays and/or cover are constructed in materials less than the impact tensile strength of AISI 1010 steel, testing listed in 30 CFR § 7.44 must be performed by applicant or third-party.
- For Application Procedures and Checklist: See ASAP 2013 - Application Procedure for Part 7 Battery Assembly Approvals, Subsequent Approvals and Extensions of Approval:
  - Check List located in ‘ENCLOSURE E’

LINK: ASAP 2023 - Part 7 Battery Application Procedures

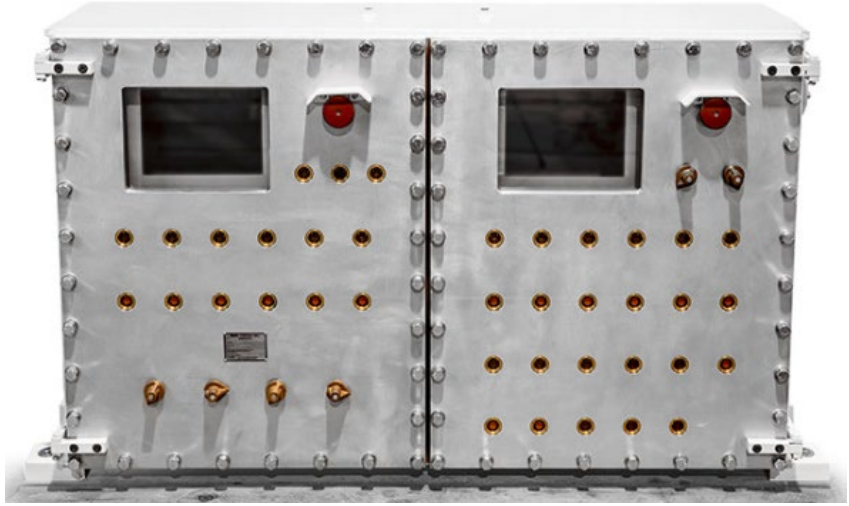
30 CFR Part 18
Explosion-Proof Enclosures

Part 18: Explosion-Proof (XP) Enclosures

- Explosion-proof (XP) enclosures and connectors designs are evaluated for compliance with requirements listed in Part 18 and applicable design criteria.
- XP enclosures and connectors are inspected and tested unless similar to a previously tested enclosure.
    - MSHA performs the inspection, thermal shock, impact, and explosion-testing at this facility.

Part 18: Explosion-Proof (XP) Enclosures

- For Application Procedures and Checklist: See ASAP 2015 - Standard Application Procedures for Simplified Certification, Certifications and Extensions of Certification
  - Check List located in ‘ENCLOSURE E’



MSHA DOES NOT ENDORSE THESE PRODUCTS

SOURCE: Elgin Power Solutions

LINK: ASAP 2015 - Part 18 Certification Application Procedures

Part 18: Explosion-Proof (XP) Enclosures

- Compliance Guides for products are located on the MSHA website.
- These ‘guides’ are valuable resources which contain links to MSHA policies and regulations.

MSHA DOES NOT ENDORSE THESE PRODUCTS
SOURCE: Elgin Power Solutions Matrix

XP Connection Box/Enclosures – Compliance Guide

LINK: XP Connection Enclosures Compliance Guide

XP Plug and Receptacles/Connectors – Compliance Guide

LINK: XP Connector Compliance Guide

UNITED STATES DEPARTMENT OF LABOR

Subscribe to Email Updates SUBMIT SEARCH

Site Map | FAQs | MSHA Forms | Contact Us

Mine Safety and Health Administration - MSHA
- Protecting Miners' Safety and Health Since 1978

Print This Page

Compliance Information Guide for Approval and Certification Center Electrical Safety Division Approval and Acceptance Programs

TYPE OF EQUIPMENT - - X/P Connection Boxes/Enclosures

APPLICABLE REGULATIONS

30CFR Part 18.1 through 18.20
30 CFR Part 18.23
30 CFR Part 18.27 through 18.33
30 CFR Part 18.38 and 18.39
30 CFR Part 18.41, 18.42, and 18.43
30 CFR Part 18.60, 18.62, 18.66, 18.67, and 18.69

Links to Regulations

APPLICATION PROCEDURES

ASAP1005 - RAMP Application Procedures
ASAP2015 - Application Procedures for Certified Enclosures

APPLICABLE POLICIES & TEST PROCEDURES

ACRI2012 - Criteria for Enclosures Containing Electrical Components Embedded in Potting Material
ACRI2102 - Windows or Lens on X/P Enclosures
APOL1009 - Center Cancelation Policy
APOL2048 - Documenting Subassemblies Not Manufactured By Applicant
APOL2151 - Enclosures Having Special Features or Conditions of Use
APOL2152 - External Surface Temperature Tests

UNITED STATES DEPARTMENT OF LABOR

Subscribe to Email Updates SUBMIT SEARCH

Site Map | FAQs | MSHA Forms | Contact Us

Mine Safety and Health Administration - MSHA
- Protecting Miners' Safety and Health Since 1978

Print This Page

Compliance Information Guide for Approval and Certification Center Electrical Safety Division Approval and Acceptance Programs

TYPE OF EQUIPMENT - - X/P Connection Boxes/Enclosures

APPLICABLE REGULATIONS

30CFR Part 18.1 through 18.20
30 CFR Part 18.23
30 CFR Part 18.27 through 18.33
30 CFR Part 18.38 and 18.39
30 CFR Part 18.41, 18.42, and 18.43
30 CFR Part 18.60, 18.62, 18.66, 18.67, and 18.69

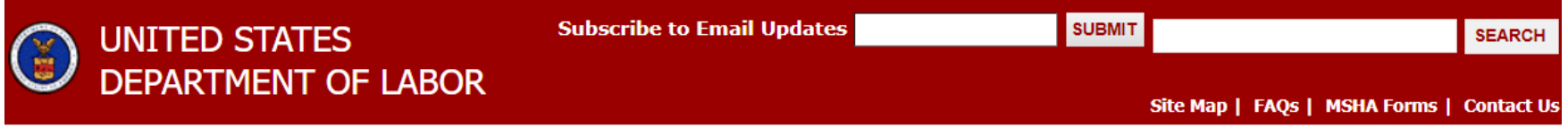
APPLICATION PROCEDURES

ASAP1005 - RAMP Application Procedures
ASAP2015 - Application Procedures for Certified Enclosures

Links to Application Procedures

APPLICABLE POLICIES & TEST PROCEDURES

ACRI2012 - Criteria for Enclosures Containing Electrical Components Embedded in Potting Material
ACRI2102 - Windows or Lens on X/P Enclosures
APOL1009 - Center Cancelation Policy
APOL2048 - Documenting Subassemblies Not Manufactured By Applicant
APOL2151 - Enclosures Having Special Features or Conditions of Use
APOL2152 - External Surface Temperature Tests



Mine Safety and Health Administration - MSHA

Print This Page

APPLICABLE POLICIES & TEST PROCEDURES

ACRI2012 - Criteria for Enclosures Containing Electrical Components Embedded in Potting Material
ACRI2102 - Windows or Lens on X/P Enclosures
APOL1009 - Center Cancelation Policy
APOL2048 - Documenting Subassemblies Not Manufactured By Applicant
APOL2151 - Enclosures Having Special Features or Conditions of Use
APOL2152 - External Surface Temperature Tests
APOL2155 - Flat Washers on X/P Equipment
APOL2163 - Listing Cables & Cable Ranges
APOL2166 - Maximum Cable Ampacity
APOL2168 - Explosion Testing of Alternate Materials
APOL2174 - Attaching Hose Conduit on Potted Solenoids
ASOP 2111 - Inspection of Explosion-proof (XP) Electrical Enclosures
ASTP2130 - Polycarbonate Surface Temperature Tests
ASTP2131 - Thermal Shock Tests on Windows/Lens
ASTP2132 - Lens Impact Test
ASTP2137 - Explosion Testing Per 18.62
Program Policy for 18.69
Program Policy for 18.20
Program Policy for 18.30
Program Policy for 18.4
Program Policy for 18.6
Program Policy for 18.61
Program Policy for 18.68
Program Policy for 18.41
Program Policy for 18.37
Program Policy for 18.50

Links to Policies & Test Procedures

30 CFR Part 7 – Subpart J Electric Motor Assemblies

Part 7 – Subpart J: Electric Motor Assemblies:

- Explosion-proof (XP) motors and pumps are evaluated for compliance and approved to Part 7, Subpart J and applicable design criteria.

- XP motors and pumps are tested by applicant or third party.
  - MSHA may elect to witness testing at full cost to the applicant.
  - List of labs located on MSHA website under Explosion Testing of Electric Motor Assemblies
  - New labs performing testing MSHA will likely elect to witness testing.

LINK: MSHA - Technical Support - Approval and Certification Center - Test Laboratories

(Not endorsed or Approved by MSHA, but listed as a convenience)

Part 7 – Subpart J: Electric Motor Assemblies:

- For Application Procedures and Checklist: See ASAP 2017 - Standard Application Procedure for Part 7 Motor Approvals, Extension of Approvals, and Subsequent Approvals
  - Check List located in 'ENCLOSURE E'

LINK: ASAP 2017 - Part 7 XP Motor Application Procedures

- Compliance Guides for products are located on the MSHA website.

XP Motor – Compliance Guide
LINK: XP Motor Compliance Guide

XP Pump – Compliance Guide
LINK: XP Pump Compliance Guide

Important Certification Program Update

Important Certification Program Update

- Beginning in Fall of 2023, new grommet materials are flame tested through our Quality Assurance and Materials Testing Division.
- Grommet materials flame-resistant acceptances are to be submitted by the grommet material manufacturers.
  - The grommet material manufacturer will receive an MSHA Acceptance number.
- This acceptance program is only for flame-resistant acceptance.
  - Enclosure and motor manufacturers must specify the grommet acceptance number under their XP certifications to use grommet material.
  - Explosion testing will be performed under XP certifications.

Important Certification Program Update

- For Application Procedures: See ASAP 5017 - Application Procedures for Acceptance of Grommet/Compressible Materials in Explosion-Proof Enclosures and Motors
- For further information please contact MSHA's Approval & Certification Center – Quality Assurance and Materials Testing Division.

Daniel Dewey – Materials Testing Branch Chief
EMAIL: dewey.daniel@dol.gov
PHONE: 304-547-2083

LINK: Application Procedures for Acceptance of Grommet/Compressible Materials in Explosion-Proof Enclosures and Motors

10 Ways to Expedite the Approval Process

10 Ways to Expedite the Approval Process

1. The A&CC offers free consultation prior to submission of an application where you may discuss your proposed design and obtain assistance.
2. Ensure all required documentation is included with original application.
3. Use the checklist provided in the applicable application procedure.
4. The more accurate and complete the documentation for the application, the timelier the application can be evaluated.
5. RAMP Application Letters should include detail description of all changes and explanation of why these changes are equivalent or better than original design.

10 Ways to Expedite the Approval Process

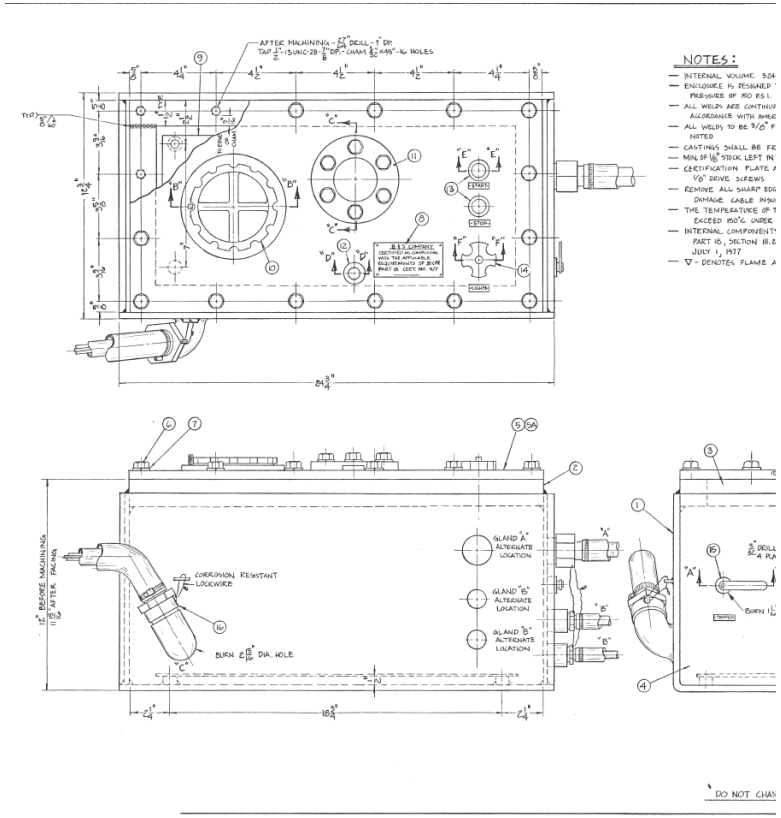
6. If requesting waiver of testing, the justification of waiver must be included in the application letter.
7. Keep drawings, documents, reports, and files submitted clear and concise.
8. Stay organized with drawing submissions throughout the approval process and do not resend unmodified drawings.
9. When responding to a discrepancy list or questions, communication with the investigator goes a long way.

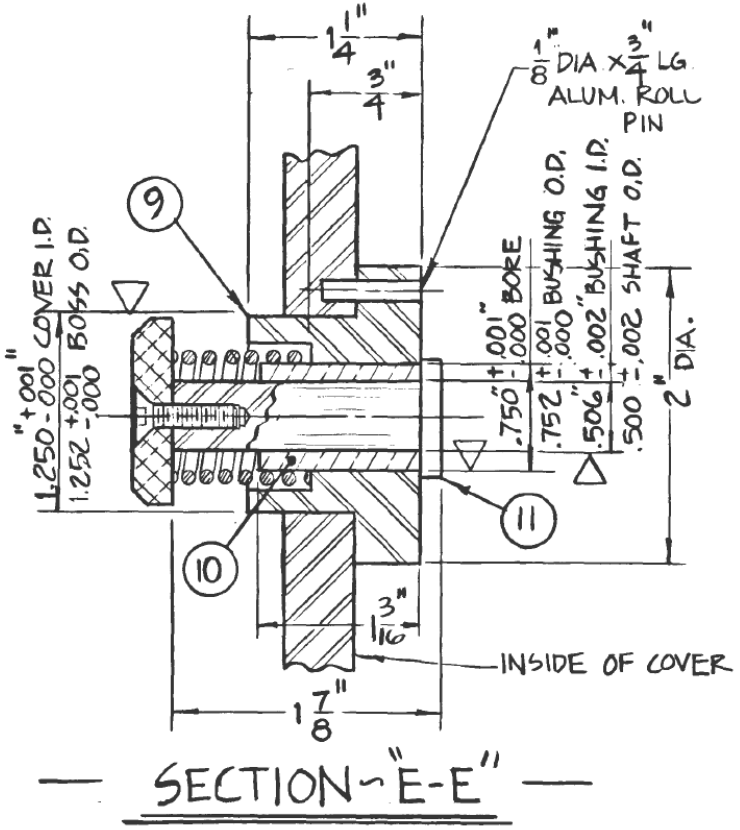
10 Ways to Expedite the Approval Process

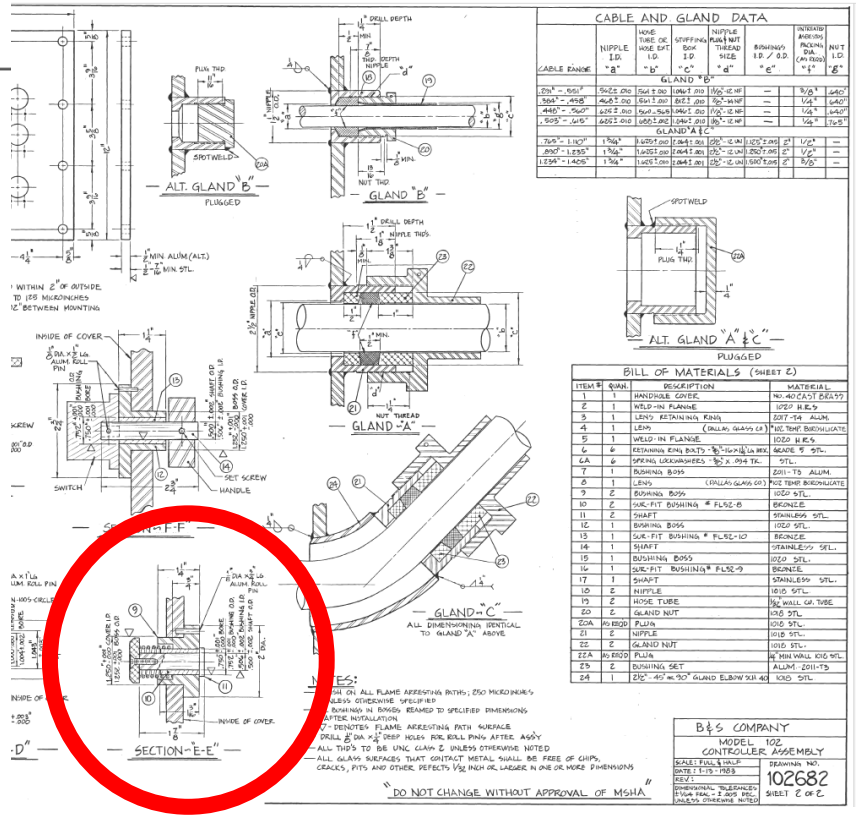
10. Submit drawings in MSHA specific “simplified certification” format instead of submitting manufacturing drawings.

    - Assembly-type drawings instead of individual component part drawings.
    - These assembly drawings depict the actual configuration of the enclosure and include all dimensions critical to the requirements of 30 CFR, Part 18 or Part 7, including welding notes, materials and tolerances.
    - Noncritical dimensions and specifications, such as those relating to mounting feet and non-essential internal details are not required and should be omitted to gain the full benefit of the simplified procedure.

10 Ways to Expedite the Approval Process







These are for visual demonstration only. These drawings are not reflective of all MSHA requirements.

Common Discrepancies

COMMON DISCREPANCIES

1. Not having all drawings referenced by each other. If this does not occur, then a drawing list detailing all drawings must be submitted and serve as the controlled top-level drawing with all drawings referencing to see the drawing number of the drawing list.

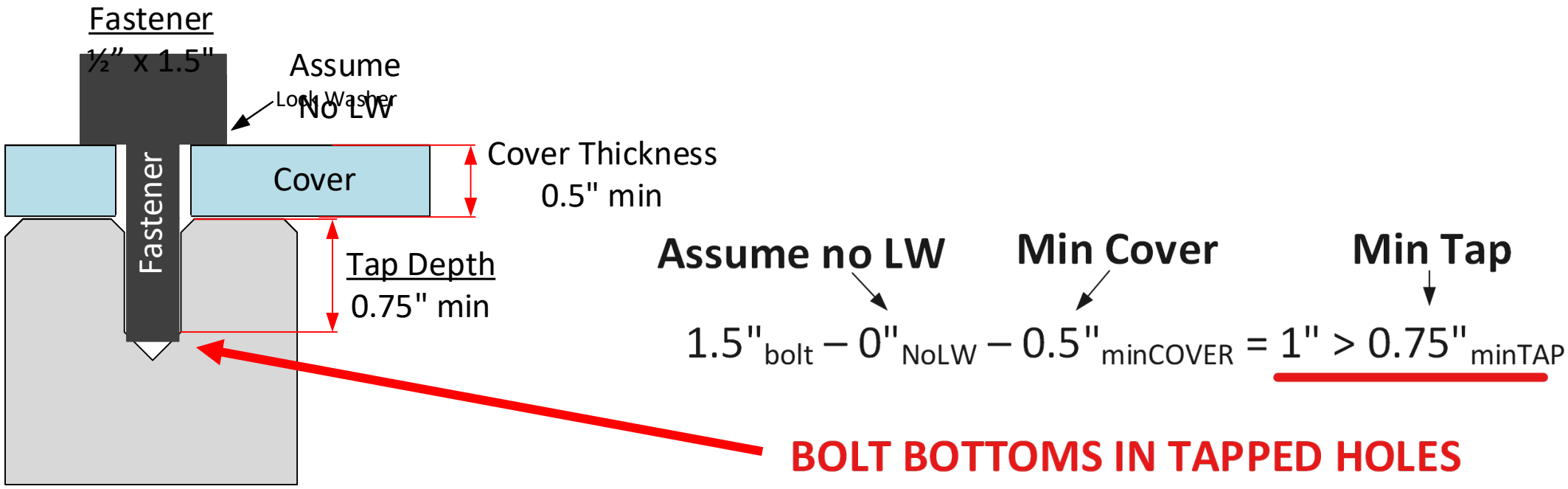
2. Not documenting on the drawings, the specific material type for critical parts. (i.e. walls, covers, component parts)

INCORRECT (not specific)	CORRECT (specific)
Steel	A36 Steel
Polycarbonate	Plaskolite Tuffak GP-V
Aluminum	6061-T6 Aluminum

3. Not submitting material data sheets for critical parts.

COMMON DISCREPANCIES

4. Not reviewing and addressing all points in the Lens Criteria – ACRI 2102.
5. Not verifying that bolts do not bottom in tapped holes when washers are removed. *[30 CFR §18.32(d)]*



LINK: ACRI 2102 - Lens Criteria

COMMON DISCREPANCIES

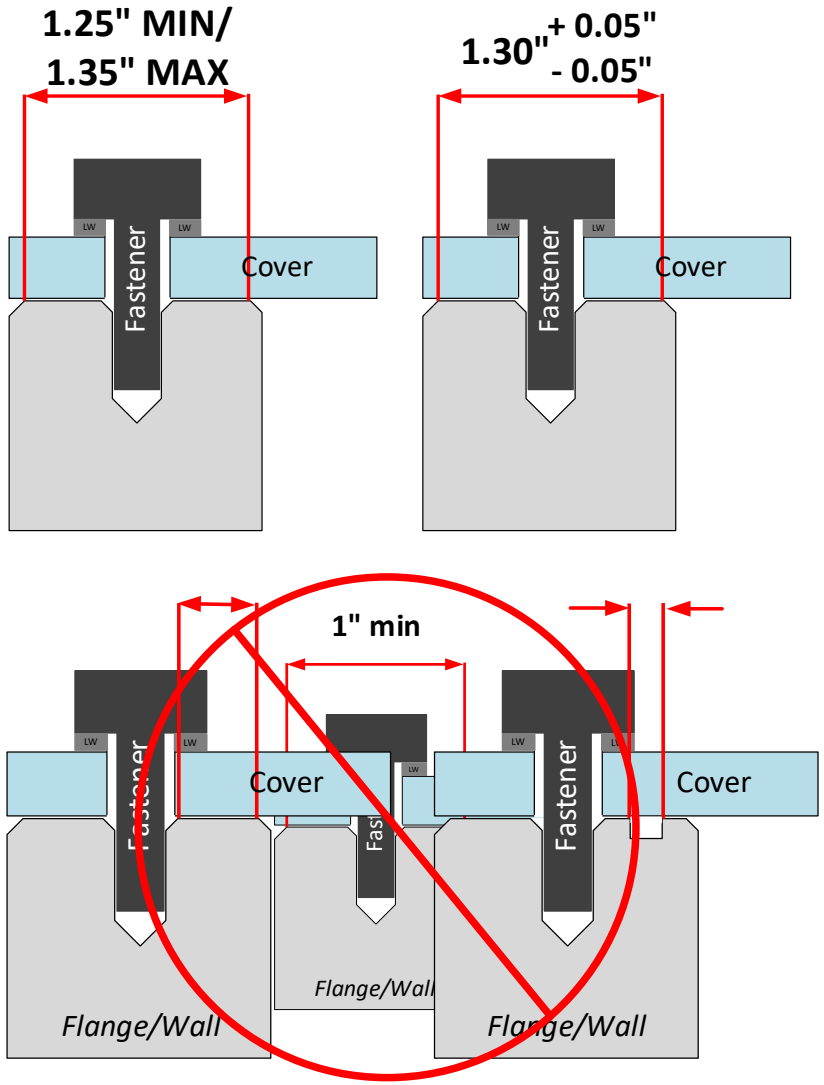
6. Not adequately documenting flamepaths.

<u>Flamepath Issues #1</u>

All flamepath dimensions must be listed as:

- minimum/maximum, or
- nominal plus tolerances.

This also includes other flamepath dimensions, such as o-ring groove details and bolt hole locations.



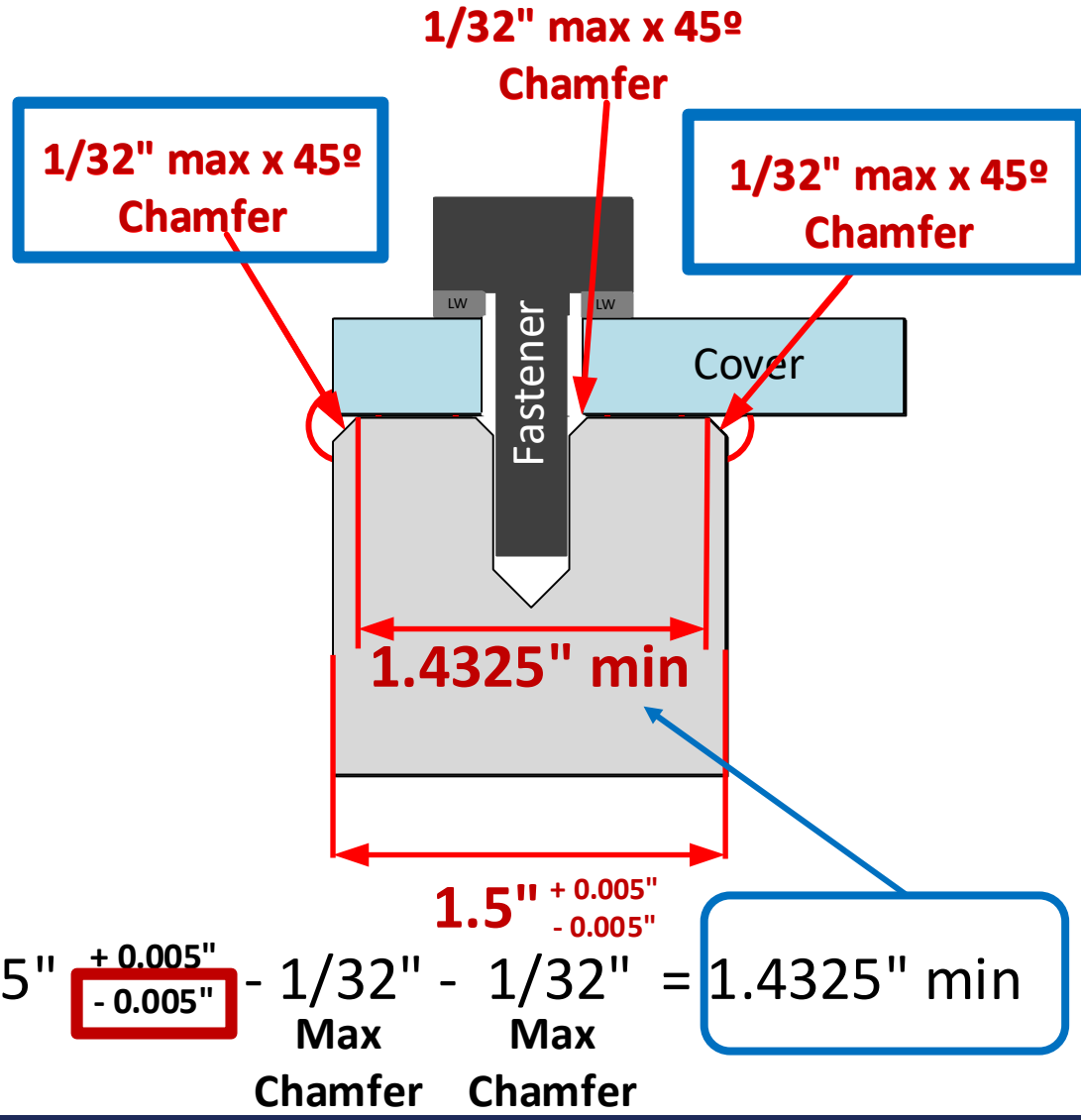
COMMON DISCREPANCIES

6. Not adequately documenting flamepaths.

Flamepath Issues #2

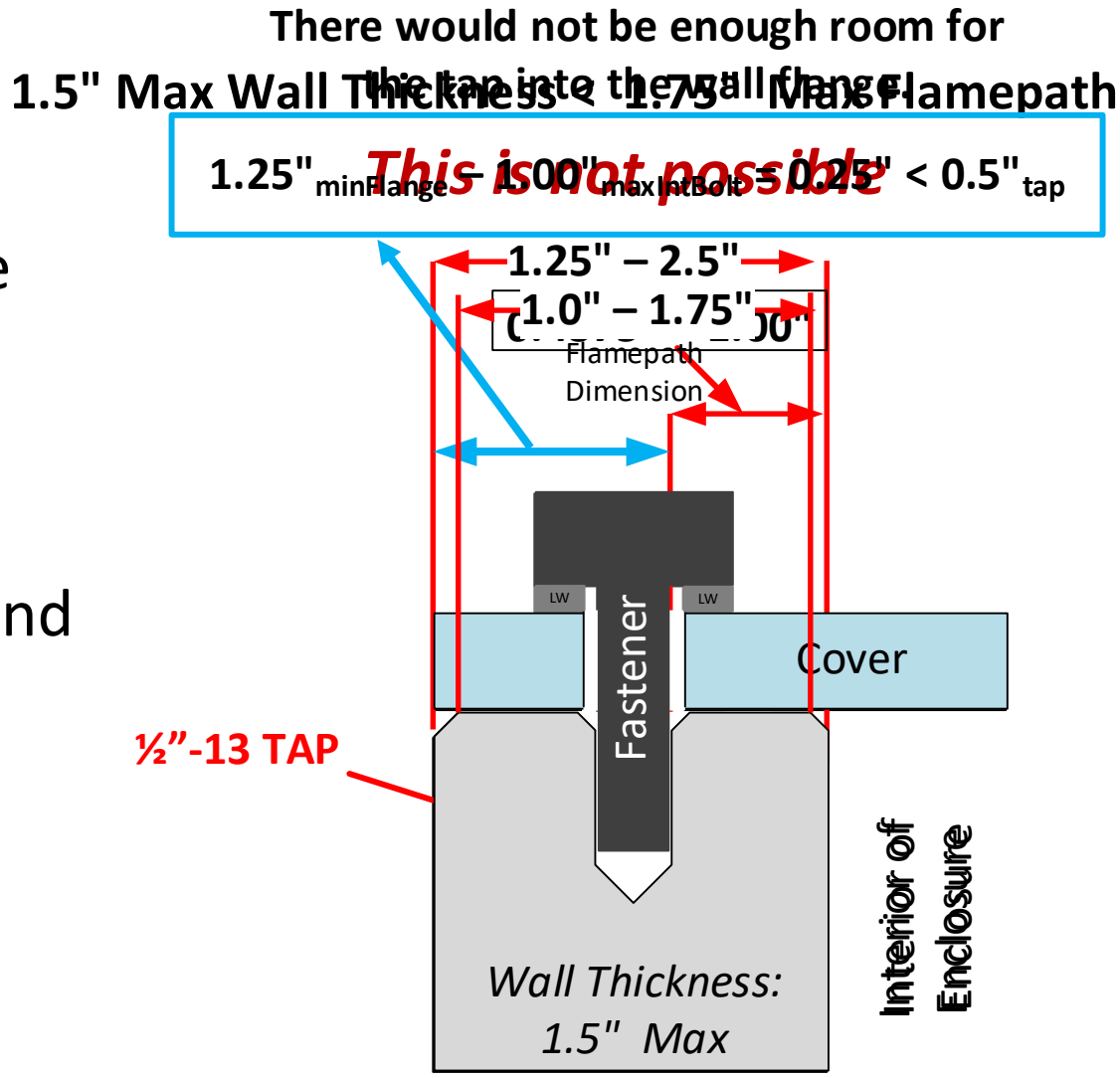
Not listing maximum chamfers or accounting for them in flamepath calculations.

- Chamfers and bolt hole finishing must be shown in flamepath details.
- Chamfer size must be specified.
- Maximum chamfer size must be considered when calculating flamepaths.



COMMON DISCREPANCIES

6. Not adequately documenting flamepaths.



Flamepath Issues #3

Dimensions should be representative of the manufacturing drawings and should be checked by the manufacturer before submitting.

- Being generic with dimensions usually end up with dimensions contradicting each other.
- Worst case design will be required for testing purposes.

COMMON DISCREPANCIES

7. Not adequately justifying changes to design and test waivers when requested.
   - Manufacturers should do their review prior to submitting application to determine if waiving of testing is viable.
   - Application letter must document the justification for why changes to design or new design testing should be waived.
   - The certification or approval number of the original tested enclosure or motor must be listed in the application test waiver request.
   - If there are any questions related to design changes or test waiving questions, reach out for a consultation prior to submitting application.

COMMON DISCREPANCIES

7. Not adequately justifying changes to design and test waivers when requested.

Test Waivers Tips

- Waivers can only be based upon a certification/approval that has been explosion tested and owned by manufacturer requesting the waiver.
- The tested design must be previously certified and tested to MSHA requirements.
- If there are barriers includes in the design (i.e. between Stator and Connection Box of Motor) or other design stipulations which require additional testing the test waiver will typically be denied.
- Volume difference between new design and tested design cannot be greater than ± 10%

COMMON DISCREPANCIES

7. Not adequately justifying changes to design and test waivers when requested.

Test Waivers Tips

- The new design needs to be equivalent or better than the tested design.

  Some example of areas we look at:

  - Wall, Cover, Flange Thickness
  - Material Strengths
  - Flamepaths - lengths, clearances and design
  - Bolt – size, spacing and thread engagement
  - Previously tested and accepted components (i.e. lens assemblies, glands, etc.)

QUESTIONS?

CONTACT INFORMATION

Rich Skrabak – Division Chief

Email: skrabak.richard@dol.gov

Office: 304-547-2053

Jeffrey Moninger – Presenter

Email: Moninger.jeffrey@dol.gov

Office: 304-547-2324

Michelle Bailey – Branch Chief

Email: Bailey.Michelle.S@dol.gov

Office: 304-547-2047

Sarah Dragonetti – Presenter

Email: dragonetti.sarah@dol.gov

Office: 304-547-2318

Gary Rethage – Branch Chief

Email: rethage.gary@dol.gov

Office: 304-547-2308

Logan Dobrovich – Presenter

Email: dobrovich.logan@dol.gov

Office: 304-547-2080