



Material Approvals and Quality Assurance Functions April 16, 2024

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





Presentation Overview

- Mission and Program Areas
- Approval Considerations for Materials Product Applicants
- Common Mistakes and How to Avoid Them
- Quality Assurance Functions



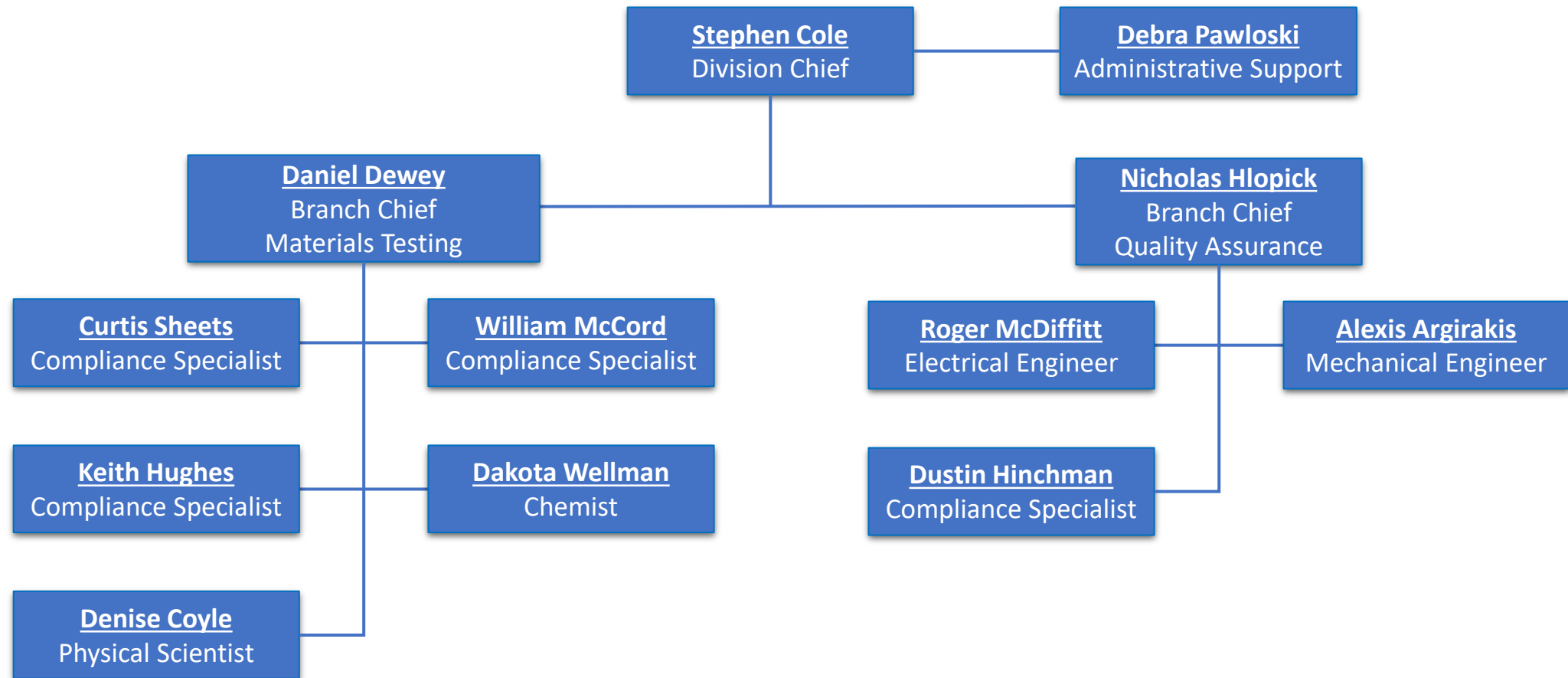


QA&MTD Missions

- Approval of materials used in mining products (MT Branch)
 - The Quality Assurance and Materials Testing Division (QA&MTD) issues approvals of materials used in mining products that conform to the applicable requirements of Title 30 of the Code of Federal Regulations (30 CFR).
- Maintain the integrity of the MSHA Approval (QA Branch)
 - QA&MTD ensures mine equipment manufacturers continue to produce the equipment as it was approved.



QA&MTD Staff



Approved Materials Products

Approvals have a separate section of Code detailing requirements

- Ventilation Controls
 - Brattice Cloth/Mine Curtains
 - Ventilation Tubing/Ducting
- Conveyor belts
- Cables
 - Electrical/Trailing Cables
 - Signal Cables
 - Conduit
 - Splices
- Hydraulic Fluid
- Battery Box Insulation
- Fire Suppression hose, fire hose liner
- Lifelines
- Grommets/Compressible materials for Explosion-Proof Enclosures and Motors



Voluntarily Accepted Materials Products

There is no CFR section for these products

Solid Products Acceptance

Similar hazard to an approved product

- Hoses, hose sleeves
- Belt line accessories
- Strata support/geo grids
- Chute liner
- Shield leg pocket filler

Requirements similar to approvals

Hazards similar to approved products' hazards



Suitable Materials Products

A test standard is *required*, but no regulation part exists



- Ventilation controls (non-traditional)
 - Stoppings
 - Overcasts, undercasts
- Sealants on ventilation controls
 - Air sealing
 - Coatings on wood man-doors, timber
- Belt splices
 - “Splicing of any approved conveyor belt must maintain flame-resistant properties of the belt” §75.1731 (d)

Approval Process

- Manufacturer prepares application
- Estimation and authorization
- Sampling, testing, and review of application documents
- MSHA prepares and delivers failure or approval letter
- MSHA documents files and issues fee



Approval Process

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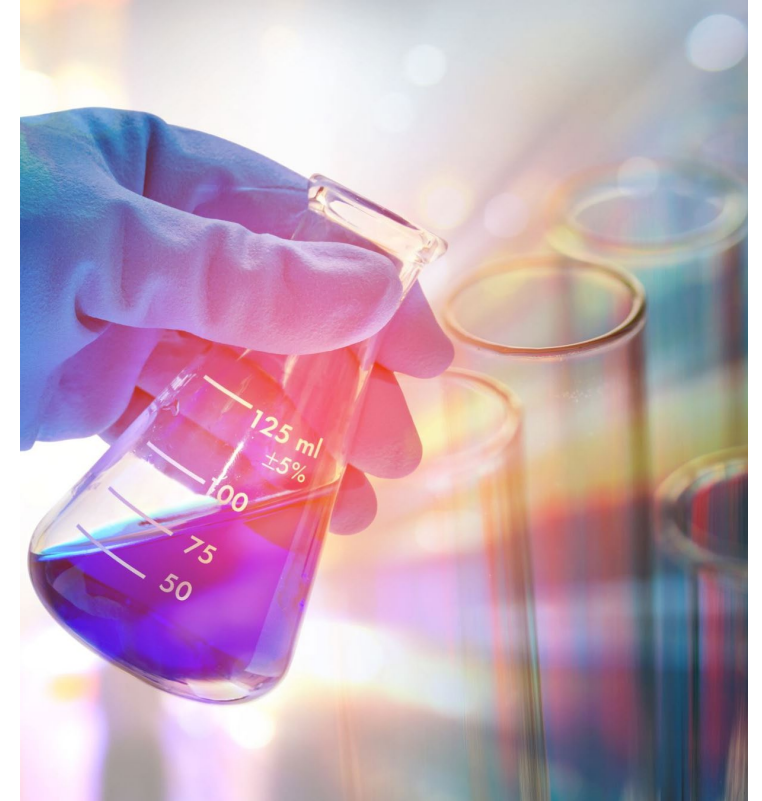
Manufacturer Prepares Application

- Consult with MSHA
 - Use correct application form, based on intended use
 - Information about any changes to the application process
 - Sampling and testing details
 - Unofficial cost estimate
- Manufacturer reviews application procedure
 - It answers many common questions
 - It states what MSHA does and what you need to do
- Use application forms from MSHA
 - Typically at the end of the application procedure, ask if you can't find them



Submitting Formulations

- CAS number, generic name, IUPAC name
 - We need to know clearly what it is
 - Specific enough to be reproducible
- ID-numbers for proprietary suppliers
 - Free process – they send us the formulation and we assign an identifier you use
 - No testing – testing and fees are only on final product
- Security
 - You may use mail or drop it off at the Center
 - MSHA keeps these records confidential



Example Formulation - Acceptable

Compound 1337 Formulation* - Confidential			
Name	CAS	Amount (Percent)	Tolerance (\pm Percent)
Vibranium	123-45-678	75	1
6,7,8,9,10-flouro ethane	98-765-432	10	2
Mithril, grade A	111-222-33	10	2
Unobtainium, 99.99+% purity	-	2.5	5
NYXALON surfactant	67-999-76	2.5	5
-	-	-	-
Total	-	100	-

* Fictitious substances and CAS numbers used in example



Example Formulation – Not Acceptable

Hose Cover Formulation* - Confidential!

Name	CAS	Amount (Percent)	Tolerance (\pm Percent)
TOBAGAN-brand resin	-	70-90	15
plasticizer	-	10-30	20
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Total	-	-	-

* Fictitious substances and CAS numbers used in example



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Estimation and Authorization

- You can skip this step if you prepare a pre-authorization statement with your application
- MSHA sends an estimate based on the rates at the time the application is received
- Estimate includes
 - In-house testing
 - Labor for witnessing third-party testing (if needed)
 - Shipping costs (samples) **are not included**-at applicant's expense
 - Hotel, flight, *per diem*, and labor costs for witnessing **are not included** – charged afterward
- If you are representing (or represented by) another party
 - Establish who will be paying before the application
 - Ensure correct party authorizes payment
- We require a tax identification number - EIN and DUNS are most common



Estimation and Authorization

- Billing after MSHA has finished with the application and issued an approval, failure, or cancelation letter
 - MSHA will contact you
 - Cost will be at or below authorized amount
- Consultation is free
 - Formal work and fees will not begin without signed authorization
 - The modification procedure includes a pre-authorization amount that will cover most modification requests
- MSHA will re-estimate if there are unforeseen costs and cannot finish with the application under the original estimate



Estimations - New or Unique Products

- New or unique (in purpose or design)
 - Using a material type where it has not been previously used
 - Products performing a new function where hazards lead to categorizing them as an existing one
- MSHA may request a demonstration or additional documentation
 - Demos are typically at the manufacturer or the Approval & Certification Center
 - Sale documentation, videos of use, etc.
- Discussing these topics at the consult avoids unexpected costs or conclusions
- QA&MTD may involve the Applied Engineering Division (AED)



Authorization – Application Tracking

- Tracking number (PAR Number)
 - When you submit an application, supply your own tracking number - six alphanumeric digits
 - Issued after an application is formally submitted
 - MSHA's tracking number has a PAR ##### format (ex: PAR 112255)
- Application priority
 - Applications that are authorized to bill have priority over consults prior to authorization
 - **Warning:** If a PAR number has not been issued, your application is being tracked by email only. After there is a PAR, it is in our tracking system
 - If time is your concern, get an application in and a PAR assigned





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Sampling

- Sample size and specimen number are determined by the test procedure
 - Sample – group of specimens tested for a pass/fail result
 - Specimen – a single piece of tested product
- Consult with MSHA for sample and specimen details
 - Example: for hoses, a sample of outside material is used, not finished hose
 - Example: multiple samples may be needed to approve a range of options
 - Example: discuss details such as unravelling of woven materials
 - **Warning:** Incorrect samples may increase costs and processing time, or may require you to send them again



Sampling

- MSHA will test samples representing extremes and/or worst-case scenario
 - Example (range): maximum and minimum wall thickness of a hose
 - Example (worst-case): 14 AWG electrical cable



- Testing is destructive
 - If specimens are small, you may want to send extra
- Do not send samples before authorization
 - We may need something different
 - Untested waste adds to overhead

Shipping Samples

- MSHA address
 - Attention: <Primary Contact>
 - Approval and Certification Center
 - 765 Technology Dr.
 - Triadelphia, WV 26059
- You may deliver samples in person
- International shipping
 - We suggest the use of a courier with tracking
 - Customs
 - Declare the samples as not of commercial value or low value (destructive testing)
 - Send to a US destination and then have them forward the samples to MSHA
 - **Warning:** MSHA will not provide a tax ID for items stuck in customs
 - Informal Entry - Customs and Border Patrol (CBP) - Article Number 000001118



Testing - General

- Tests are destructive
 - Tell us if you wish to see/obtain a post-test specimen
 - MSHA cannot readily store materials post-test
- For voluntary testing and new product designs
 - MSHA may select appropriate testing under ASAP 5001 (Solid Products) applications
 - MSHA may adapt testing methods for new product designs, if they can not be tested conventionally
- You may visit to witness
 - We may also record video of testing



Testing by Third Party or Applicant

- Part 7 Products and suitable ventilation control products
 - Cables, brattice cloth, ventilation tubing
 - Ventilation controls and sealants for ventilation controls
- MSHA accepts results on a per-report basis
 - MSHA does not certify the lab itself
 - List of previous labs – on application procedures
- MSHA witnesses when labs are first used, and reserves the right to witness any testing without cost to MSHA



Testing by Third Party or Applicant - Reports

- Example report on application documents
 - Contains the minimum information MSHA needs
 - Lab may use it, or reformat if the information remains accessible
- All information is needed on each report
 - Each report must stand alone to justify the approval
- The report must describe the sample to ensure the testing was appropriate
- Only Part 7 defines quality standards for testing, suitability testing is held to the same standards as applicable
- ASTM Reports for suitability evaluations are subject to MSHA interpretation
 - Specimen variability
 - Mining-specific considerations, such as application temperature and moisture



Pass/Fail Criteria – Conveyor Belts

- Test Conditions
 - Marinite chamber
 - 200 fpm airflow
 - 5 min. ignition, methane burner
- Observes propagation to the end of the belt
- No time requirement
- Undamaged full width must remain to pass



Pass/Fail Criteria – Conveyor Belts

Pass

Fail



Pass/Fail Criteria – Hydraulic Fluids

- Wick test
 - Cycle based
- Each cycle is 0.5 second exposure to flame



Pass/Fail Criteria – Hydraulic Fluids

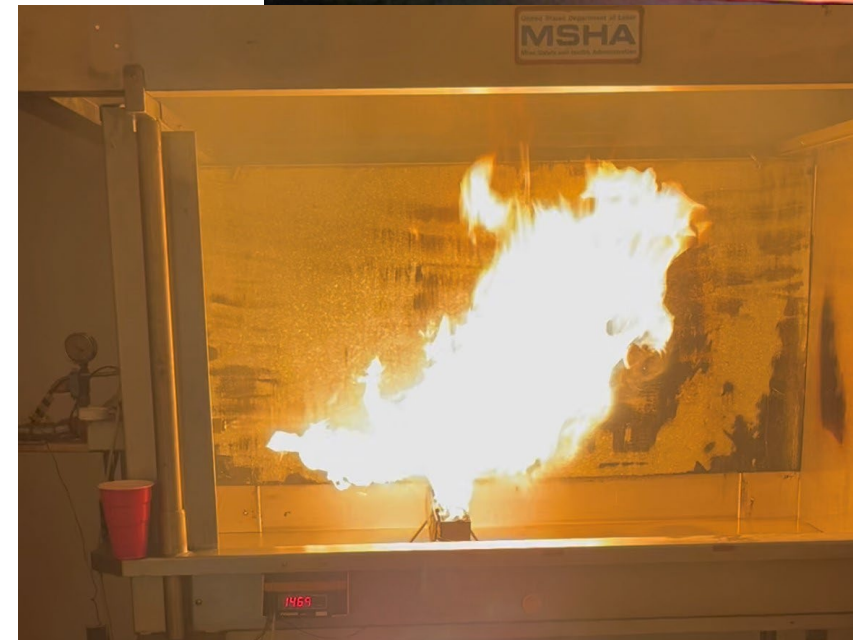
- Different periods of time (in hours) in oven at 65 °C prior to wick test
- Example: 0 hour
- Minimum average to pass: 24 cycles

Table: Cycles before sustained flame	
Specimen	Cycles
Control	<5
1	32
2	26
3	28
4	89
5	27
Average	40



Pass/Fail Criteria

- Fluid is heated and sprayed over several ignition sources
- Spray Test
 - Less than 6 seconds of propagation
 - Or no ignition
- Propagation is spreading of burning volume away from the ignition source



Pass/Fail Criteria – Brattice Cloth



- Test Conditions
 - Marinite chamber
 - 25 or 60 second ignition, impinged burner
 - 3 specimens still air
 - 3 specimens moving air (125 fpm)
- Length – no single specimen shall propagate the full 4-foot length
- Time
 - No single specimen shall visibly burn longer than 2 min.
 - Time – no sample of three shall have an average longer than 1 min.



Pass/Fail Criteria - Cables

- Signal
 - Fiber optic, less than 14 AWG
 - Burner, 30 second ignition
- Electrical
 - 14 AWG and greater
 - Burner, 60 second ignition and 5x current
- Smaller cables of either or both types are typically tested, depends on size range
 - Typically worst-case scenario
- Length – 6 inches or less
- Time – pass/fail
 - Signal – 60 second
 - Electrical – 240 second

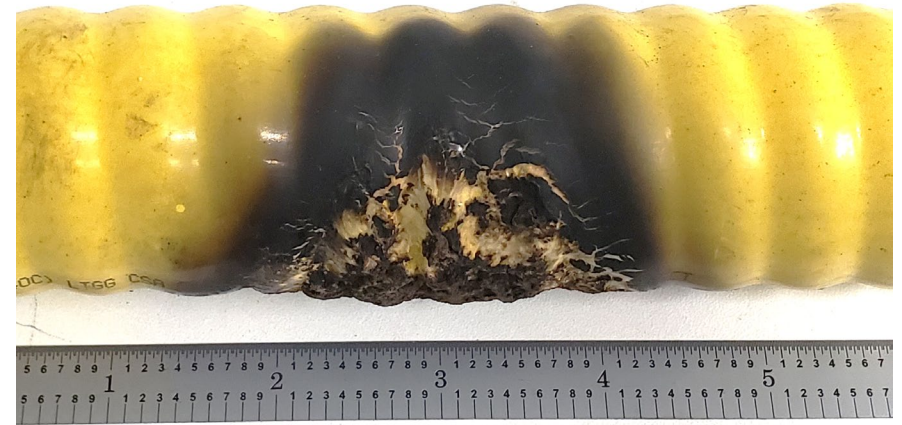


Pass/Fail Criteria - Cables



Pass - Electrical

Pass - Signal



Application Review

- Description of the product
 - Must correspond with the sample sent for testing
 - Dimensions/ranges clearly described to ensure testing is sufficient
- Additional considerations
 - Instructions for products with end-user chemical reactions, such as splices
 - Amperage rating of cables for testing
 - Special considerations for the mine environment
- Interpretation of results
 - Result within error range of pass/fail point
 - High variability between specimens
 - Atypical results, new product designs and how they performed



Application Review

- MSHA will contact you for:
 - Missing information
 - Clarification of details
 - Discussion of test results
- Supplementary documentation
 - Instructions, etc. depending on application type
 - Sales documents, demonstration information, etc. for new product types
- Third-Party Testing
 - Scheduling and ensuring they know what information MSHA will need
 - Reviewing the report
- Testing status
 - MSHA tests first when samples are available, then proceeds with the rest of the application
 - If failure, MSHA proceeds to failure letter. If pass, review the rest of the application materials
 - Saves you time and money



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Letter Preparation and Delivery

- MSHA will proceed to prepare your approval or failure letter when:
 - Application is straight-forward and complete
 - Test results are definitive
- Failure Letters:
 - Contain test data describing the failure
 - Contact MSHA if you need further information
 - MSHA prefers to send the failure letter vs. repeat testing in most cases



Letter Preparation and Delivery

Cancelation Letters

- MSHA will send a letter confirming that you have canceled an application
- If an estimated application has not been authorized to bill by you within 30 days, MSHA may cancel it
- **Warning:** If there is chargeable work on an authorized application, MSHA will still charge a fee after the canceled application is closed



Letter Preparation and Delivery

Approval Letter

- Documents MSHA has approved your material/product
- Both digital and physical copies are official
- Provides your approval and file numbers
- Lists what CFR and technical requirements you are to meet



Marketing an approved product

- MSHA will list the approval online, but the letter is issued first
- MSHA's record of what is approved is the official record - you may direct a customer to MSHA to confirm approval
- You can market with terms from the letter such as 'approved', 'accepted', or 'certified'. Do not use terms such as 'sponsored' or 'endorsed'
- MSHA's logo is for MSHA use only

Approval Clauses

- You must meet the listed clauses to maintain your approval
- Example clause topics
 - Labeling
 - Usage
 - 30 CFR quality assurance
 - 30 CFR technical requirements
 - 30 CFR audit requirements
 - Notify MSHA of changes
 - Notify MSHA of change in ownership



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Filing and fees

- MSHA will check that the record is complete and store files
 - Generally, MSHA will not need to contact you for this part
 - MSHA may contact you in the case of a corrupted file
- Submitting the completed filing prompts other parties to:
 - Store the official records
 - Update the website
 - Issue the fee
- Filing is counted as part of the billable work, so the exact cost is not known until it is complete



Fee Payment

- Methods
 - Check – Recipient on invoice
 - Money order
 - Credit Card
 - Pay.gov portal - Make an account and re-use banking options established there
 - **Warning:** We do not accept direct wire transfers, such as SWIFT
- Estimation and payment is in United States Dollars (USD)



Markings

- Required to be marked on the product
- Required to be “permanent”
 - Last the lifetime of the product
 - Discuss with MSHA if you will have issues meeting this requirement to discuss alternatives
- Modify approvals to keep the same number when making minor changes
- Use the approval number to discuss the product with MSHA
- The approval number is not the PAR number



Maintaining Your Approval

- Meet approval clauses, meet CFR requirements
- Audits
 - MSHA will audit products at any time for cause, such as a problem in the field
 - MSHA conducts warehouse and mine site audits that may find a problem with a product
- Scheduled audits
 - Products under Parts 6, 7, and 14 are under regularly scheduled audits
 - MSHA charges for the cost of conducting audit review/testing
 - Products are subject to audit *only when they have been produced* – set aside an audit portion and price in the cost of the test from the previous year
 - Not more than once per year



Questions and Contacts

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Application and Testing Links:

[Approval and Certification Center - Application Approval Home Page](#)

[Approval and Certification Center - Standard Test Procedures \(STPs\)](#)



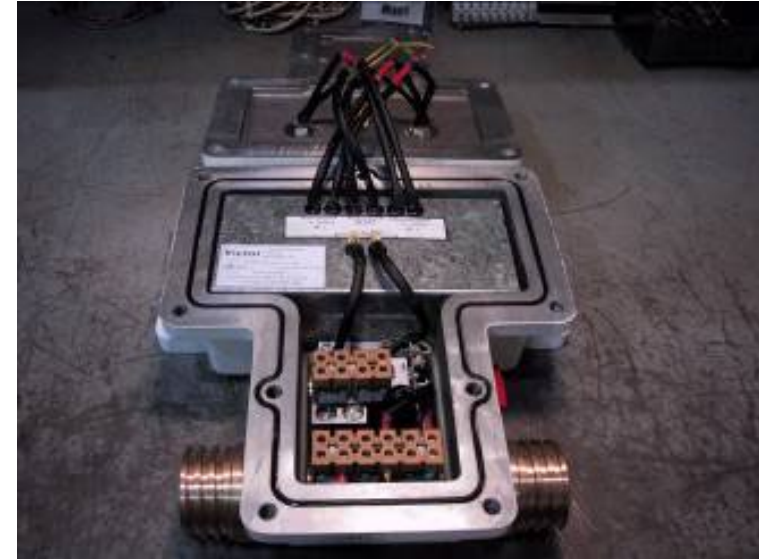
Quality Assurance Objectives

- Maintaining the integrity of all MSHA approved products
- Examine mining equipment to ensure it conforms to the drawings and specifications on file at the Approval & Certification Center (A&CC).
- Address product field complaints, remove defective products from service if necessary, and work to improve manufacturer's quality systems.
- Support MSHA Enforcement and Headquarters Initiatives



QA Programs

- Product Audits
- Equipment/Machine Audits
- Field Complaints
- Product Corrective Actions
- Technical Assistance
- Product Transfer/Retirement/Revocation



QA&MTD Assistance

- Establish a single point of contact
- Coordinate agency response
- Evaluate Corrective Action Plans
- Monitor recalls or retrofits
- Provide feedback to the complainant



Approved Product Audits

- 200+ products per year
- All areas of the U.S. (mines from each district)
- Products from all manufacturers, all types of approved products
 - Field audits
 - Post-approval in-house testing (fees charged)
 - Part 6 – Independent lab-tested
 - Part 7 – Battery insulation, brattice, cables, refuge alternatives, electric motors, diesel engines and power packages
 - Part 14 – Conveyor belts



Field Equipment/Machine Audits



- Visit warehouses, mines, and manufacturing facilities
- Examine new and old machines for conformance
 - Ensure they meet the requirements of 30 CFR
 - Approval documentation
- Examine permissible enclosures, electric motors, etc.
- Work with mine operators and manufacturers to resolve issues



Field Complaints

- Types
 - Non-conforming product
 - Improper use of product
 - Product performance issues
 - Safety issues on non-approved equipment
 - Assistance with technical issues



- Sources
 - Mine operators
 - Federal or state inspectors
 - Manufacturers
 - Approval holders
 - Other agencies
 - Individuals

Risk Assessment Matrix

	Likelihood				
Severity	Almost Certain	Likely	Possible	Unlikely	Negligible
Catastrophic	Critical	Critical	Major 1	Major 2	Minor
Severe	Critical	Major 1	Major 1	Major 2	Minor
Moderate	Major 1	Major 1	Major 2	Major 2	Minor
Marginal	Major 2	Major 2	Major 2	Minor	Minor
Insignificant	Minor	Minor	Minor	Minor	Minor





Corrective Actions for Non-Conformance

QA Actions

- Demonstrate or Achieve (D or A) Letter



Approval Holder Corrective Actions

- Retrofit product
- Recall product
- Rework or repair product
- Stop product sales
- Revoke approval (voluntary)
- Retire approval
- Update approval documentation
- New approval application

Additional QA Actions in Response to Corrective Action

- Quality control plan (QC manual)
- Manufacturing process review
- Manufacturing monitoring



Product Transfer/Retirement/Revocation

- Provide a point of contact and support for manufacturers receiving a transfer of an approved product
- Ensure the manufacturer understands the requirements for the approved product they have acquired
- Process approved product retirement
- Revocation for failure to meet technical requirements



Enforcement Assistance

QA&MTD can aid MSHA Enforcement with:

- Permissibility inspections
- Approval related questions
- Specialist knowledge
- Training on a variety of topics



Maintain Quality at the Center

- Internal Review
 - Conducted to evaluate the program area procedures and processes in place at the A&CC
- Calibration Program
 - Facilitation of instrument calibration performed by an outsourced calibration service
- Maintain A&CC documentation systems



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