

Putting the Brakes on Water Pollution:

A story of industry and government collaboration for copper-free brakes

October 6, 2021





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Welcome and Opening Remarks

Today's Speakers

Rachel Urban, U.S. Environmental Protection Agency

Laurie Holmes, Motor & Equipment Manufacturers Association

Leigh Merino, Motor & Equipment Manufacturers Association

Aaron Lowe, Auto Care Association

Don Welsh, Environmental Council of the States

- Background
- Overview of the 2015 Memorandum of Understanding (MOU) on Copper Mitigation In Watersheds And Waterways
- Implementing Responsibilities of the MOU Signatories
- Status and Outcomes of MOU Commitments
- Benefits of MOU / Take-Home Messages
- Q&A

Agenda



About the Presenters

Regulators



U.S. EPA is an independent executive federal agency with a mission to protect human health and the environment.



ECOS

ECOS is an association representing state environmental agency commissioners. Its mission is to improve the capabilities of state environmental agencies and their leaders to protect and improve human health and the environment of the U.S..

Vehicle Suppliers



MEMA is a trade association made up of four divisions representing over 900 motor vehicle parts manufacturer members. Vehicle suppliers innovate, develop, and manufacture original equipment (OE) and aftermarket components and systems for use in passenger vehicles and heavy-duty commercial trucks.

Brake Manufacturers Council (BMC) is an operating council of the Automotive Aftermarket Suppliers Association (AASA), a division of MEMA, that represents the interests of automotive brake component manufacturers.

Automotive Aftermarket and Automakers



Auto Care Association is a trade association representing global companies in the automotive aftermarket. Its mission is to protect and advance the interests of businesses providing aftermarket products and services for all classes of motor vehicles.



Alliance for Automotive Innovation* represents automakers that produce about 99% of the new light-duty vehicles sold in the U.S., Tier 1 suppliers, and technology and mobility companies.

* MOU signatories Alliance of Automobile Manufacturers and Association of Global Automakers merged in January 2020 to become the Alliance for Automotive Innovation.



Background



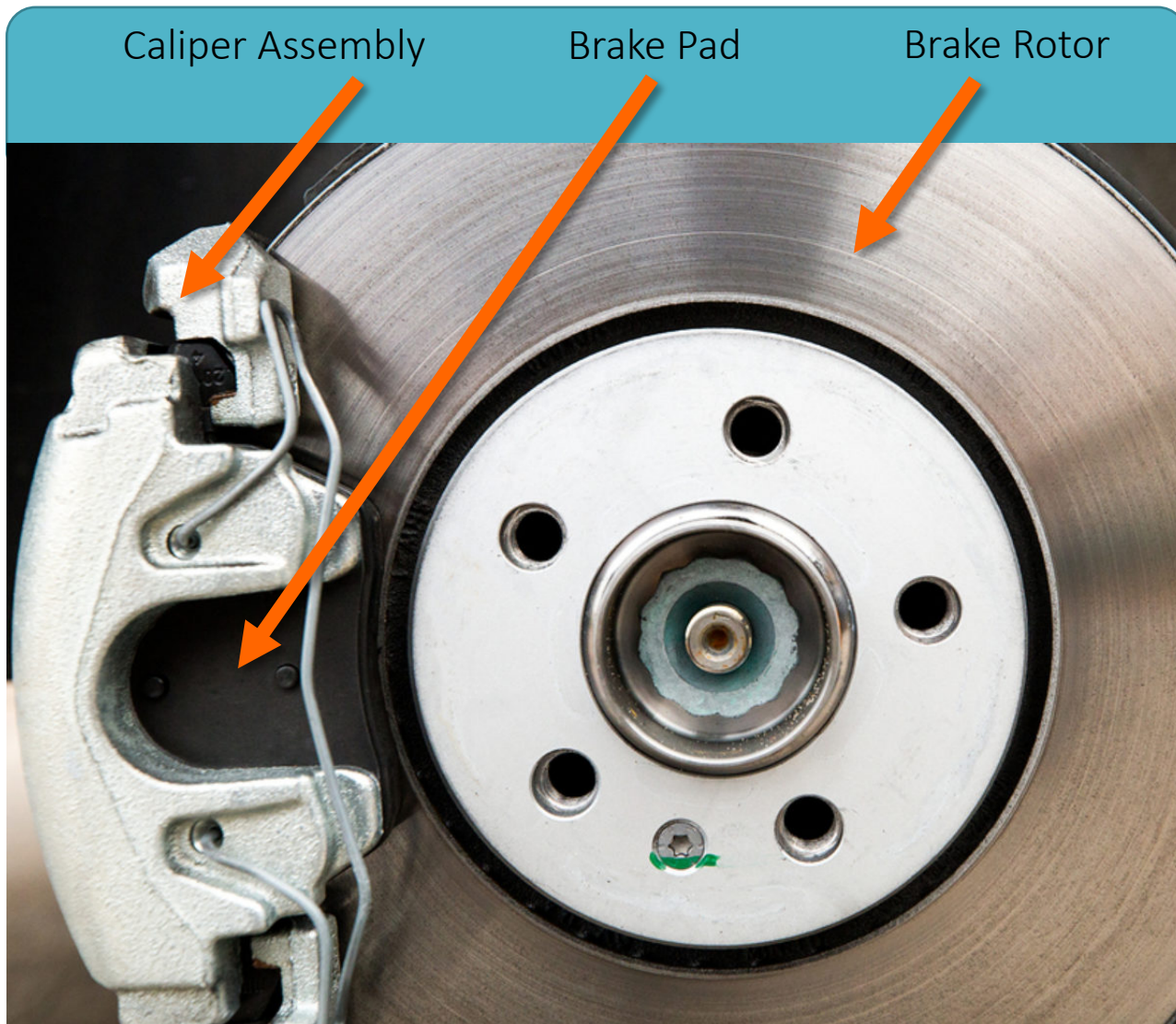
Copper in Stormwater Runoff

Copper found in highway stormwater runoff and identified as a primary pollutant of concern

Copper is an essential nutrient at low concentrations, but is toxic to aquatic organisms at higher concentrations

Some areas observe copper levels exceeding water quality criteria, causing impairments

One source is worn particles from vehicle brake friction materials deposited on roadway surfaces that come into contact with stormwater and discharged into nearby waterways



What Are Brake Friction Materials?

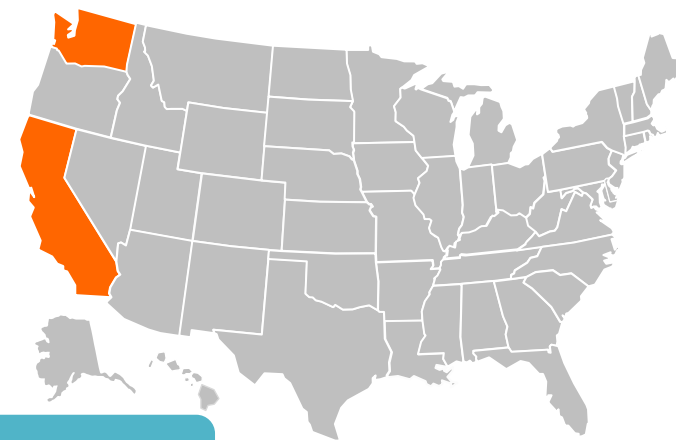
- Commonly known as “Brake Pads”
- Composite Materials of Specific Formulations for Service Application, Safety and Performance
- Safety-critical Products Go Through Multiple Rigorous Testing and Validation Processes

Copper in Brake Pads

- Copper was used in brake pad formulations to address properties such as brake fade, friction, thermal conductivity, and durability
- California and Washington evaluated impact of copper in their respective state's stormwater runoff and identified sources, one of which was from vehicles
- Brake pad product composite formulation is a complex and resource-intensive process; any substitutes must be tested and validated for safety and performance



Timeline of State Laws and Regulations for Copper in Brakes



2010

States of California (SB 346) and Washington (SB 6557) enacted legislation requiring manufacturers of brake friction materials to phase out copper and other constituents and restricting the sale of these products over time

2012

Washington adopted its “Better Brakes” Rule

2015

Industry Associations Coordinated with U.S. EPA to Develop a Voluntary Memorandum of Understanding to Phase Out Copper Nationwide

2017

California adopted its “Brake Friction Material Requirements” Rule

Copper-Free Brakes Requirements in Washington and California

Material	Legal Maximum as of:		
	Jan. 1, 2015	Jan. 1, 2021	Jan. 1, 2025
State of WA			
Cu	No limit	5.00 wt%	0.50 wt%
Asbestos, Cr(VI), Pb, Hg	0.10 wt%	0.10 wt%	0.10 wt%
Cd	0.01 wt%	0.01 wt%	0.01 wt%
Ni, Sb, Zn	Currently none		
State of CA	Jan. 1, 2014	Jan. 1, 2021	Jan. 1, 2025
Cu	No limit	5.00 wt%	0.50 wt%
Asbestos, Cr(VI), Pb, Hg	0.10 wt%	0.10 wt%	0.10 wt%
Cd	0.01 wt%	0.01 wt%	0.01 wt%

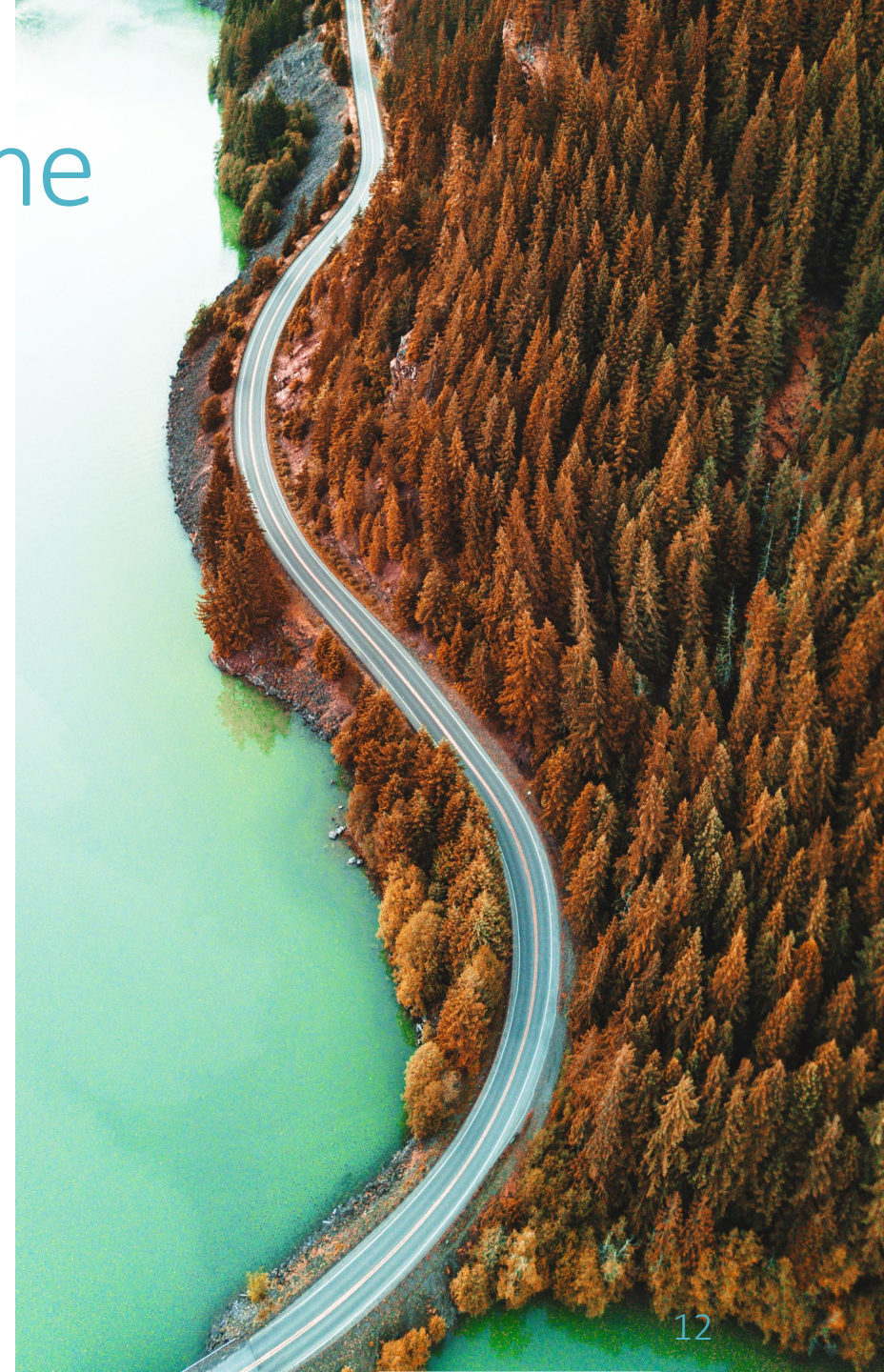
Note: Some exemptions and extensions are permitted for certain applications

Early Coordination Informing the Copper-Free Brakes Initiative

States and Industry created and maintained regular dialogue developing legislative and regulatory solutions and strategies to reduce and phase-out copper and other constituents in brake friction materials

During states' rulemakings, industry groups worked collaboratively with states, NGOs, and other stakeholders to address concerns related to the pollutants and to the complexities of implementing the phase-out

These efforts informed the MOU work that we are describing in today's webinar





Memorandum of Understanding

a.k.a. “Copper-free Brakes Initiative”

Overview of the “Copper Free Brake Initiative” MOU



The MOU was the outcome of a cooperative effort between government and industry stakeholders

In January 2015, the U.S. EPA, Environmental Council of the States (ECOS), MEMA/BMC and other key vehicle industry stakeholders signed the [MOU on Copper Mitigation in Watershed and Waterways](#)

The MOU facilitates nationwide industry phase out of copper and other constituents in motor vehicle brake pads that is modeled on the California and Washington requirements

Industry encompassed representatives from manufacture to distribution, ranging from the original equipment and aftermarket brake pad manufacturers, new vehicle manufacturers, and aftermarket distributors and retailers

Signatory Representatives at Signing Ceremony



The MOU signatories include the following: U.S. EPA, Environmental Council of the States (ECOS), Motor & Equipment Manufacturers Association (MEMA) (including its divisions AASA/BMC and HDMA), Auto Care Association, Alliance of Automobile Manufacturers, Association of Global Automakers, Inc. (a merged entity now known as the Alliance of Automotive Innovation), and the Truck and Engine Manufacturers Association (EMA)

Timeline for Nationwide MOU Voluntary Commitments*



	Jan 2015 "A" level	Jan 2021 "B" level	Jan 2025 "N" level
Copper	No Limit	≤ 5.0%	≤ 0.5%
Asbestiform fibers, Pb, Cr(VI), Hg	≤ 0.1%	≤ 0.1%	≤ 0.1%
Cadmium	≤ 0.01%	≤ 0.01%	≤ 0.01%

*All percentage values are by weight.

What Did Signatories Commit To?

All signatories agreed to promote the nationwide phase-out of copper and other constituents from brake friction materials in accordance with the voluntary timeline and responsibilities noted in the MOU, including:

1. Educate and communicate on the nationwide phase-out of copper and other constituents in brake friction materials
2. Testing brake friction materials for safe alternatives
3. Marking and labeling of brake friction material packaging and products
4. Provide access to the registrar(s)
5. Publish and distribute educational materials
6. Work toward achieving the MOU goals in the stated timeframes



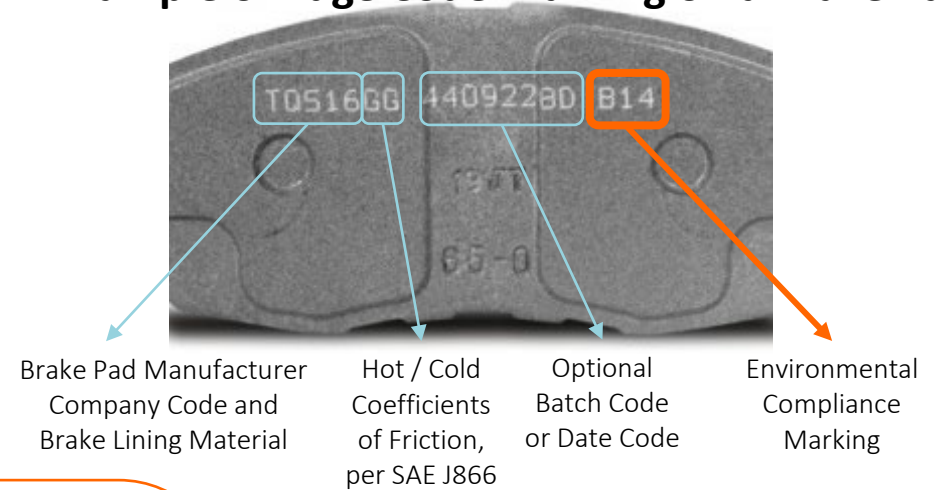
MOU Signatories Committed to Meet Periodically

Meeting goals are to:

- Provide information and monitor progress using existing, related data sets and tools
- Produce summary reports (as appropriate) that include progress made by all parties and are available online for public access.

What Do the Brake Pad and Packaging Markings Mean?

Example of Edge Code Marking on a Brake Pad



LeafMark™ for Packaging



≤ 0.1% Asbestos, Pb
Cr(VI), Hg
≤ 0.01% Cadmium



≤ 5.0% wt
Copper



≤ 0.5% wt
Copper

Washington does require certified products to have a “mark of proof” on both brake pads and on product package labeling.

California does not require package markings, but they do accept and recognize the LeafMark™

Note: The marking and labeling is not in any way affiliated with the EPA.

Who Are Registrars and What Do They Do?

- Third-Party Registrar *a.k.a.* Third-Party Testing Certification Agency
 - Washington and California use different terms for similar function (Note: some requirements vary between the states)
- Registrar posts registered materials on a publicly accessible website
- Brake Pad Manufacturers* are ultimately responsible for friction material compliance and self-certification documentation
 - Brake Pad Manufacturers can certify multiple products that use an identical friction material formulation

** The term "manufacturer" is defined in the National Traffic and Motor Vehicle Safety Act (Safety Act) (49 U.S.C.30102(a)(5)) as: a person (A) manufacturing or assembling motor vehicles or motor vehicle equipment; or (B) importing motor vehicles or motor vehicle equipment for resale.*

Self-Certification Process Overview

Brake Pad Manufacturer submits friction materials to Third-Party Registrar and/or Testing Certification Agency

Registrar certifies compliance to CA and WA requirements and assigns a unique ID code to friction material formulation

Registrar posts compliant friction materials to a publicly available website and submits reports to the State, as stipulated



Implementing Responsibilities under the MOU

Brake Manufacturers Council*



Brake Manufacturers Council

Per the MOU, brake friction material manufacturers agreed to ensure that all brake friction materials will be:

- Compliant with reducing the content of copper and other constituents
- Marked with the appropriate edge code designation (A, B, or N) and the materials' packaging will be marked with the corresponding LeafMark™ certification

** Also includes commitments from MEMA, AASA, and HDMA*

Industry Education, Outreach & Factsheets about Requirements

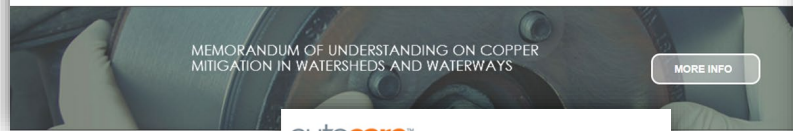
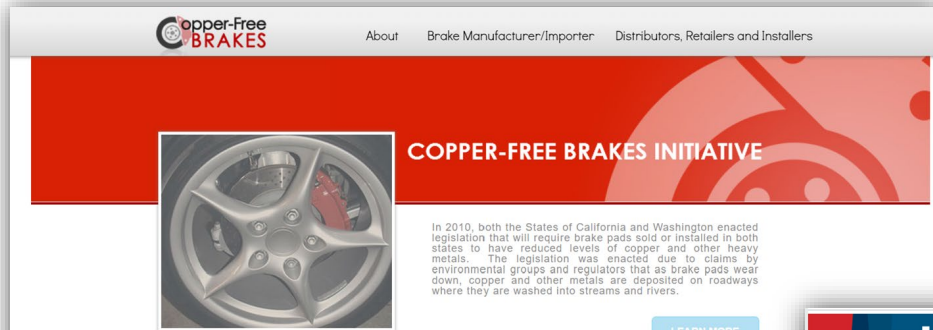
Phase-in Compliance

Industry Reformulation, R&D, Testing

Registrar & LeafMark™ Education

Collaborative Govt-Ind Guidance & FAQs

Automotive Aftermarket Distributors and Retailers



Articles for Association Publications

Compliance Assistance for Members

LeafMark™ Education & Awareness

Copper-Free Brakes Website

AAPEX Trade Show Info Sessions

Passenger Vehicle Manufacturers



Auto Innovators and its member companies have worked diligently to understand the specification in the MOU and to assist in any way possible to achieve success with this voluntary commitment.

Automakers have:

- Continued to tout the benefits of the MOU for providing a cost-effective, consistent and holistic approach to managing the content of brake friction materials
- Worked diligently with their OE brake friction material suppliers to design, test and procure brake pads meeting the MOU's specifications
- Taken this commitment seriously -- the MOU remains an important and useful tool in providing a coordinated approach on the rollout of lower copper brake pads
- Worked quickly to resolve and address supply chain challenges related to the COVID pandemic

Industry Education & Associations' Member Outreach

Phase-in Compliance

Work with Brake Friction Manufacturers

U.S. Environmental Protection Agency



“EPA is proud to partner with the automotive industry and the states to reduce the use of copper in motor vehicle brake pads, which means less of this material running off our roads and into our nation's waterways,” said Stan Meiburg, then acting deputy administrator for EPA. “The environment and public health in our country will benefit from this type of collaboration between the public and private sector.”*



Promote and Inform about the Phase Out of Constituents in in Brake Pads
Cu, Asbestiform fibers, Cd, Cr(VI), Pb, Hg



Establish webpage about initiative, references, links and contact information for reporting registrars/agents



Promote as the federal
“Copper-Free Brake Initiative”

* 2015 – Copper-Free Brake Initiative MOU Signing Ceremony

Environmental Council of the States



E C O S

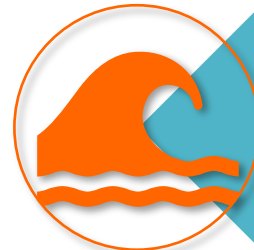
“ECOS is proud to be part of an agreement that will make a meaningful contribution to improved water quality across the nation. This effort shows how states, the federal government, and industries can work together to develop innovative, non-regulatory ways to reduce pollution.”

– Bob Martineau
Former Commissioner

Tennessee Department of Environment and Conservation



Encourage its member states to review and understand Copper-Free Brake Initiative



Collaborate and assist states to develop materials and tools to reduce copper and other constituents in their local watersheds and waterways



Work with its member states to share information about the Initiative’s progress



Status and Outcomes of MOU Commitments

Making Progress

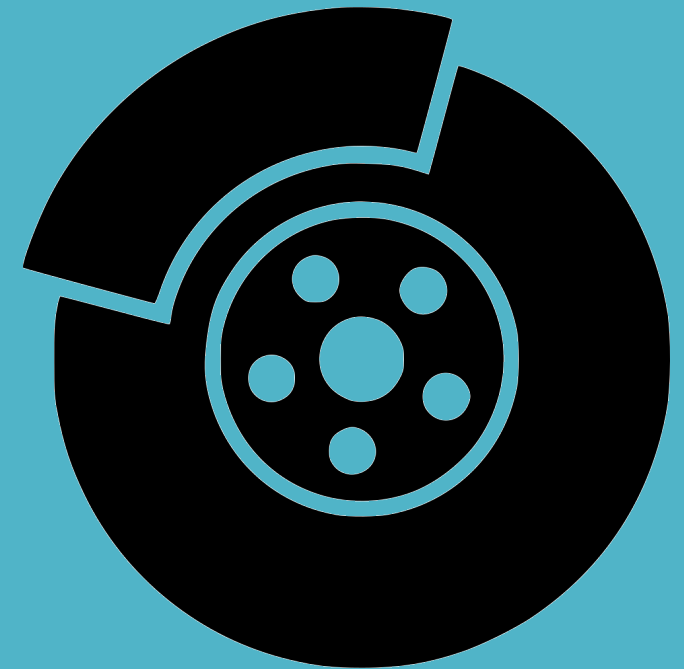
As a result of the MOU, brake friction material manufacturers have expended significant resources to:

- Research, Develop, Reformulate, Test, and Certify Alternatives to Copper
- Register and Mark Compliant Brake Friction Material Formulations
- Aligned with “A” Level Brake Pads (*Asbestos, Cr(VI), Pb, Hg, Cd*)
- Aligned with “B” Level Brake Pads (*no more than 5.0% Cu*)
- Early Alignment with “N” Level Brake Pads (*no more than 0.5% Cu*)

Status of Registered Brake Friction Material Formulations



As of September 2021, more than **75%** of current registered brake friction materials are ahead of target dates meeting the “N” level of $\leq 0.5\%$ by weight Copper



Source: Washington’s NSF Certification Website

http://info.nsf.org/certified/friction_materials/listings.asp

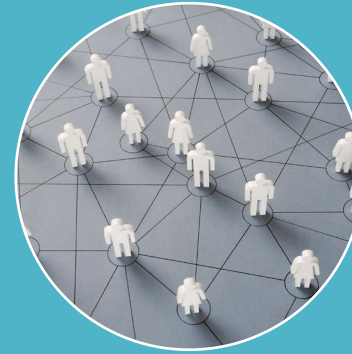
Anticipated Future Outcomes



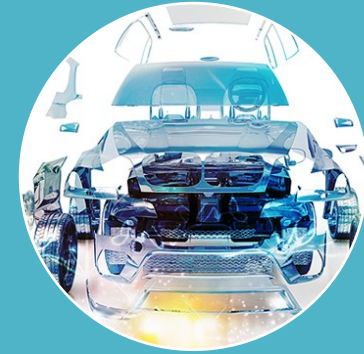
Brake Pad
Manufacturers on
Track for Full “N”
Level Compliance
by 2025



Ongoing Outreach
to Aftermarket
Retailers and
Service
Technicians



Ongoing
Collaboration
Among All
Signatories



New Vehicles
Designed with
Compliant
Brake Pads

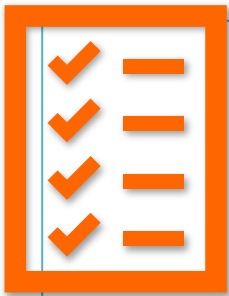
Decreased copper content in stormwater and our nation's waterways



Benefits and Take-Home Messages

Benefits of MOU Process

Government Perspectives



Model for Voluntary Approaches Related to Source Control / Pollution Prevention



Avoids Some Potential Regulatory Duplication and Saves Regulator Resources



Can Be Replicated for Other Environmental Challenges



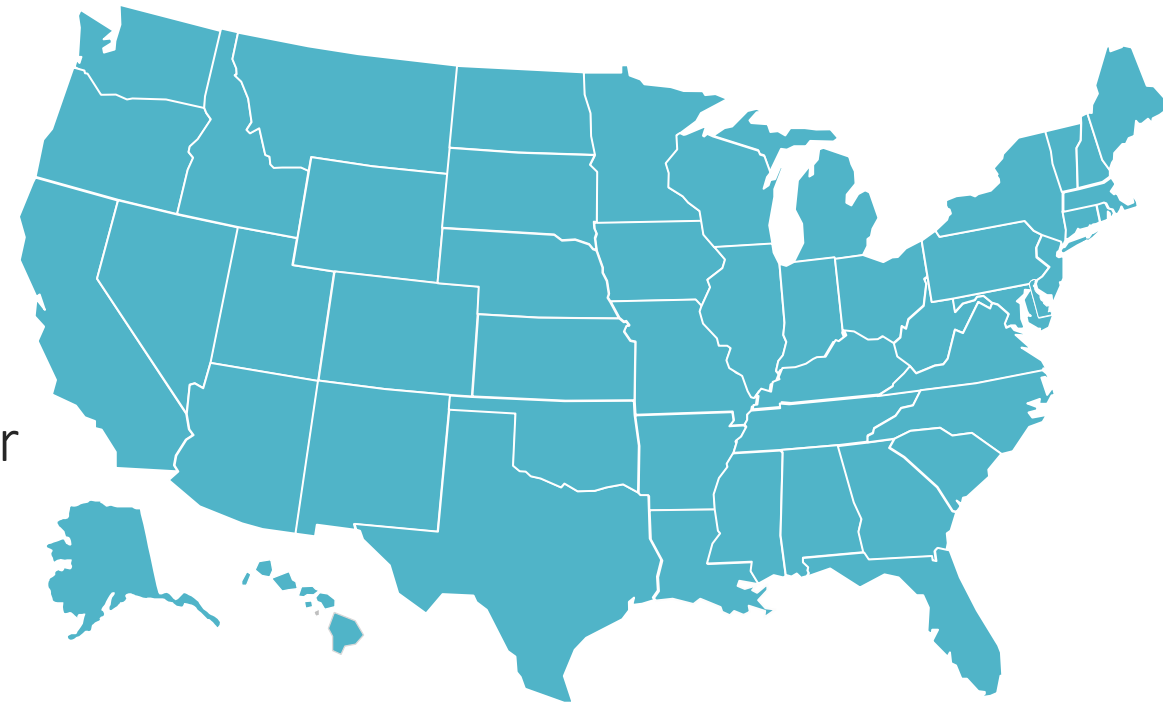
Tools like MOUs Enhance Stakeholder Collaboration and Result in Creative Solutions

Benefits of MOU Process

Industry Perspectives

A transparent, voluntary, nationwide industry phase-out:

- Prevents a 50-state patchwork of unaligned standards, compliance deadlines, and sell through dates.
- Avoids costly and complicated compliance
- Reduces confusion along supply chain and for end users
- Enhances collaboration, communication and problem-solving between government and industry stakeholders



Take-Home Messages

- A national-scale MOU can provide a transparent framework for voluntary source control efforts that benefit waters throughout the country
- The transparency, consistency, and certainty provided by a national-scale MOU are important for brake manufacturers, system suppliers, new vehicle manufacturers, aftermarket wholesalers and retailers, and service technicians and other end-users
- This MOU provides one model for developing source control efforts in other consumer products

Questions?

www.epa.gov/npdes/copper-free-brake-initiative

