

DAIMLER

ASTM 8074 - DD13 Scuffing Test - AAA HD

Suzanne Neal & Patrick Joyce

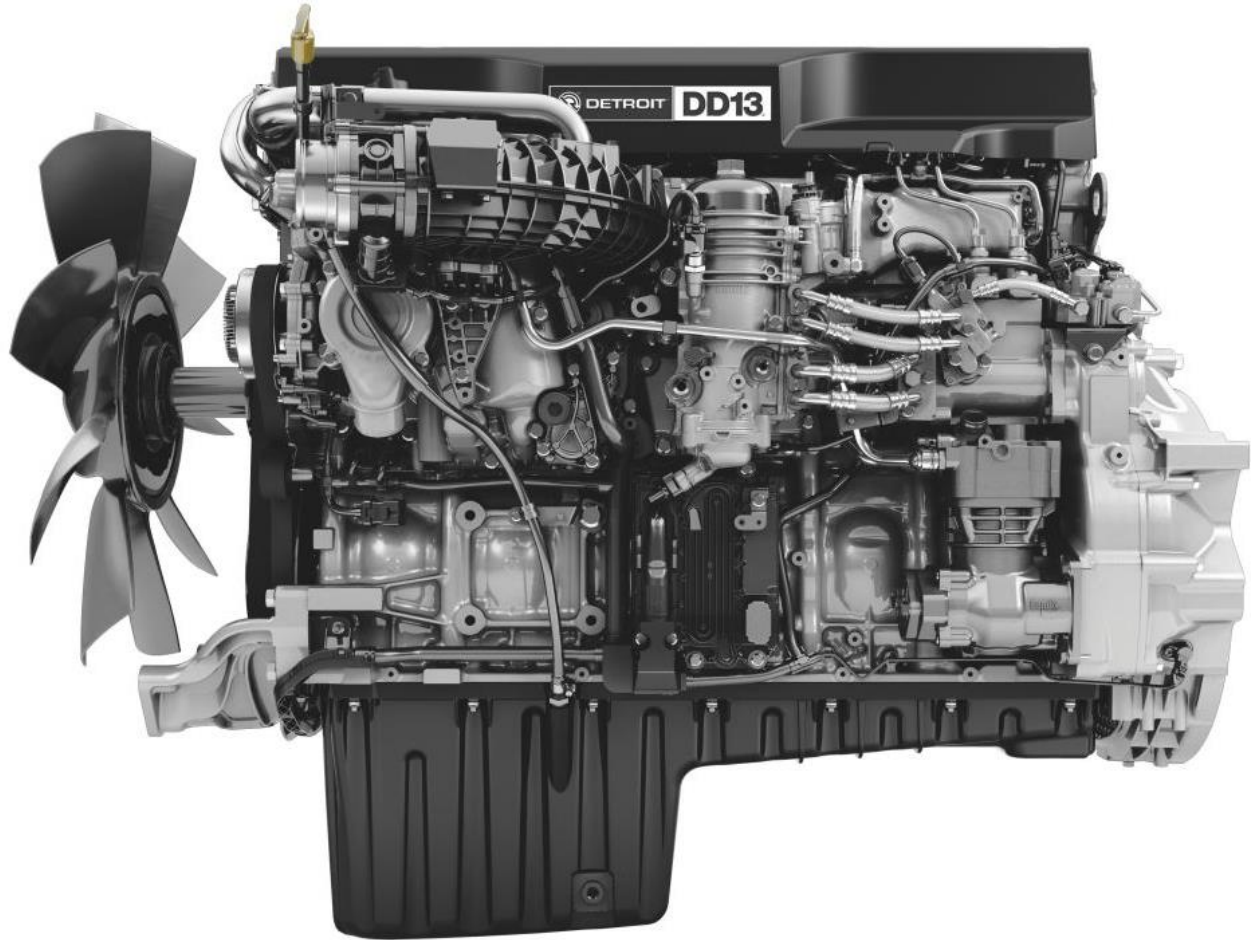
May 31st, 2017

Daimler Trucks

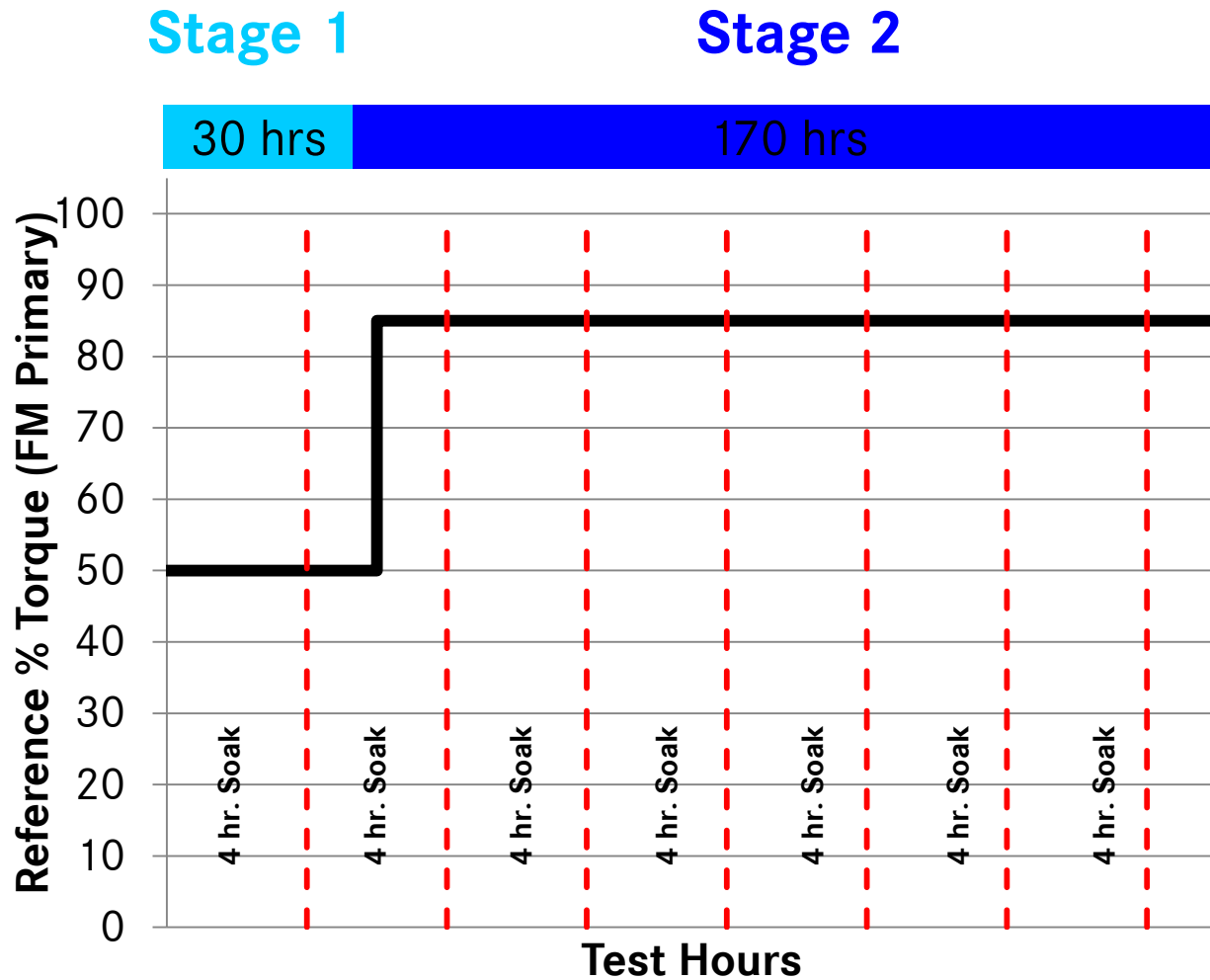


Overview

- DD13 EPA10 MY2013 (FE0) Engine
- In-Line 6 Cylinder, 12.8L
- Special Parts:
 - Carbon Scraper Ring Added
 - Uncoated Top Ring
- Rated Power: 410bhp (1800rpm/1622Nm)
- Rated Torque: 2237Nm (1240rpm)
- Fuel Mass Controlled
- Steady State Test Cycle



Test Cycle



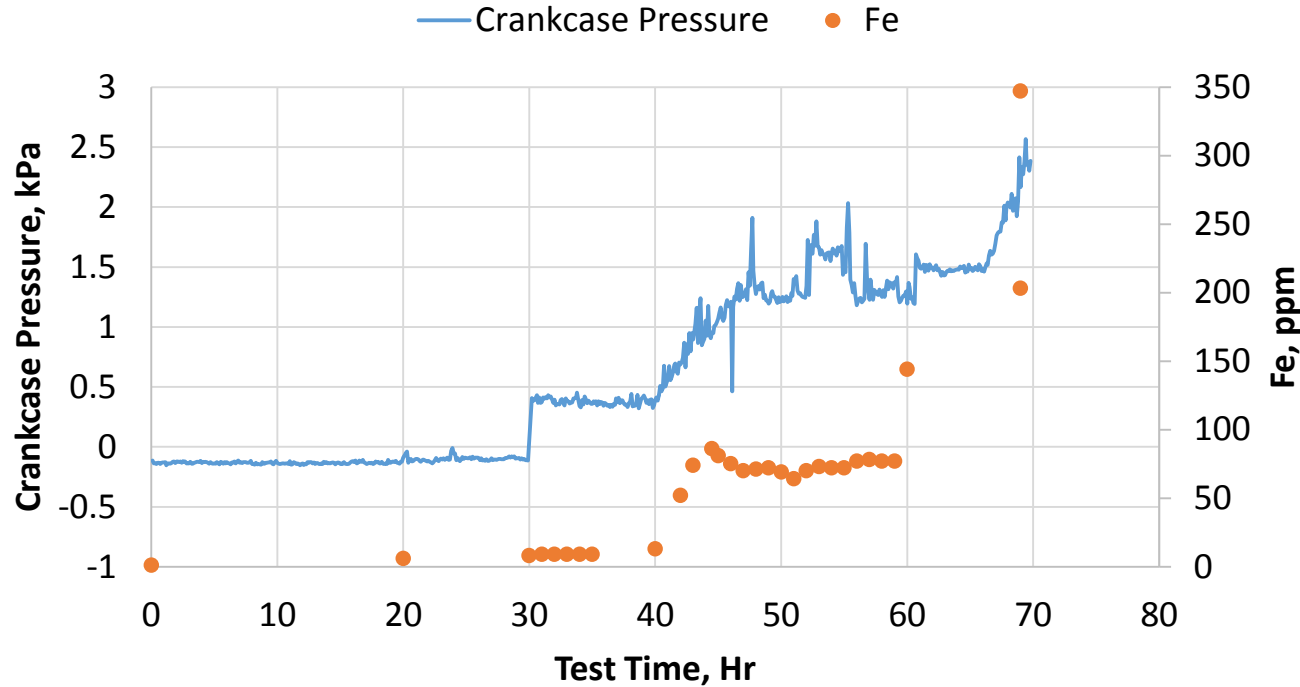
Test Hours	Stage
0 h to 20 h	1
4 h soak	
20 h to 30	1
30 h to 40 h	2
4 h soak	
40 h to 60 h	2
4 h soak	
60 h to 80 h	2
4 h soak	
80 h to 100 h	2
4 h soak	
100 h to 120 h	2
4 h soak	
120 h to 140 h	2
4 h soak	
140 h to 160 h	2
4 h soak	
160 h to 180 h	2
4 h soak	
180 h to 200 h	2

Transition to Stage 2 at 30 h

Parameters Being Reviewed to Determine a Scuffing Event

Parameters (During Test)	Parameters (After Test)
ICP (Iron, ppm)	Visual Inspection of the Liner and Rings
Crankcase Pressure	Ring weight loss

Scuffing Event Example



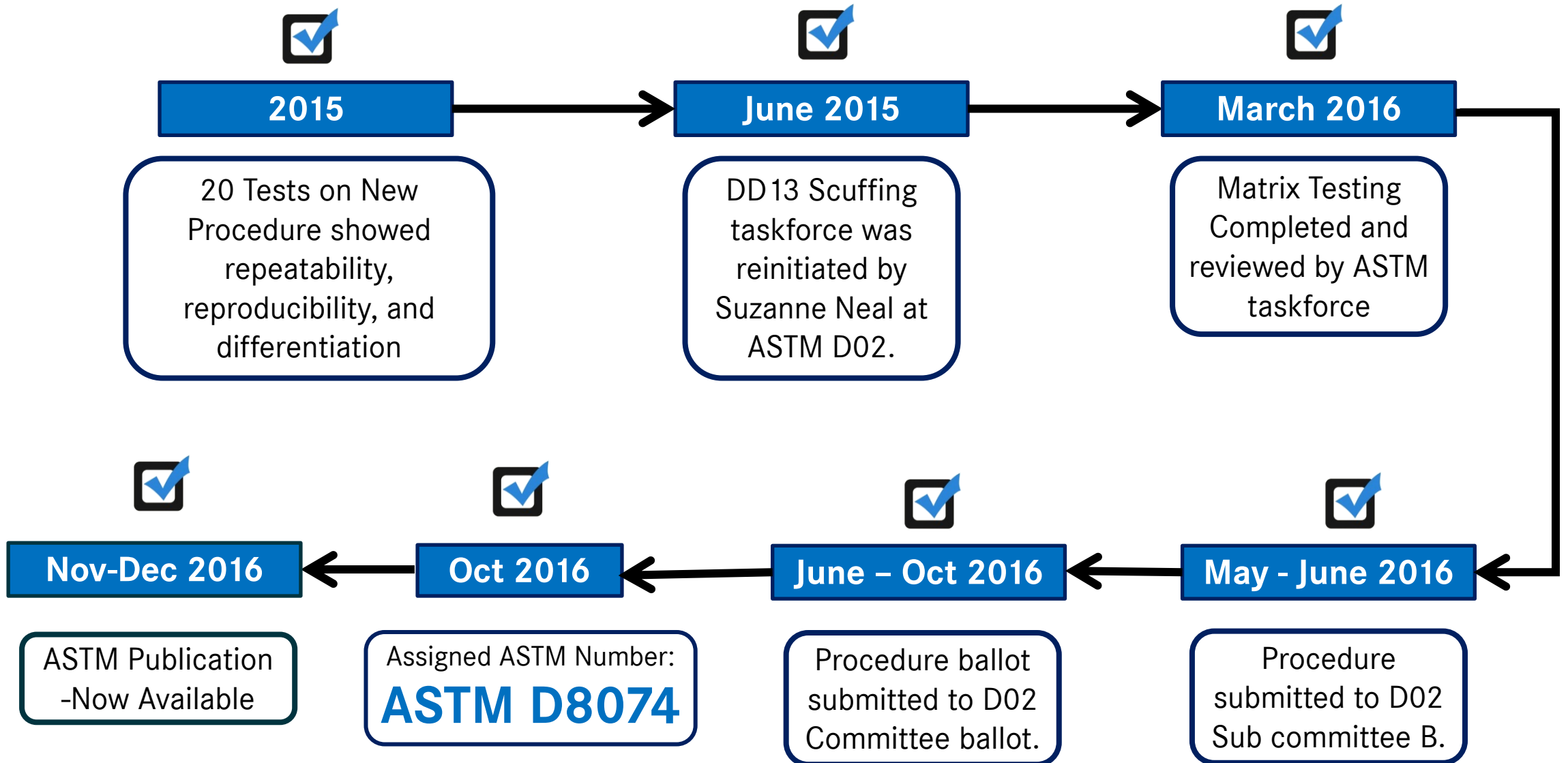
DD13 Scuffing Test History

API Proposal	<ul style="list-style-type: none">• Proposed to be an API Test for PC-11• Test Cycle (Alternating Load), Scuffing determined by Crankcase Pressure/Blowby• Test was decided to <u>not</u> be included in the API category.
Continued Development 2015	<ul style="list-style-type: none">• Daimler continued to develop the test with the three participating labs• The test cycle was changed from:<ul style="list-style-type: none">• Alternating Load to Steady State & increased sampling intervals• 20 Runs were completed on Low and High Reference Oils• Oil C ~ 31 Hrs• Oil D ~ 200 Hrs• These oils were used because of field experience
Proposal to ASTM June 2015	<ul style="list-style-type: none">• Daimler presented data to ASTM and asked for a taskforce to be formed.• Taskforce included anyone who would like to join:<ul style="list-style-type: none">• OEMs/Additive/Oil/Test Labs/ TMC/ Statisticians
DD13 Taskforce	<ul style="list-style-type: none">• Taskforce created matrix testing to show repeatability and reproducibility.• Using Oil C~ 31 hours and the new reference Oil TMC 864-1• Taskforce held build workshops/rating workshops

DD13 Scuffing Test History

DD13 Taskforce	<ul style="list-style-type: none"> • Matrix data was reviewed by Statisticians/TMC and was determined that the test has repeatability and reproducibility.
Procedure Development	<ul style="list-style-type: none"> • Procedure development occurred during the taskforce meetings • Terry Bates
Procedure Submitted to ASTM	<ul style="list-style-type: none"> • Procedure was submitted May/June 2016 to Sub Committee B (Part of D02) <ul style="list-style-type: none"> • → Passed • Procedure was submitted June/October to Main Committee D02 <ul style="list-style-type: none"> • → Passed • DD13 Scuffing Test was issued an ASTM Number <ul style="list-style-type: none"> • D8074
Daimler Surveillance Panel	<ul style="list-style-type: none"> • Once the procedure was published, a Surveillance Panel was formed <ul style="list-style-type: none"> • Daimler Surveillance Panel <ul style="list-style-type: none"> • DD13 Scuffing Test D8074 • Members of the Daimler Surveillance Panel Include <ul style="list-style-type: none"> • OEMs/Additive/Oil/Test Labs/ TMC/ Statisticians

DD 13 Scuffing Test Timeline Update



General Information

- **DD13 Scuffing Test ASTM Number:**
 - ASTM 8074 number was defined Q4 2016
- **Specifications that use DD13 Scuffing Test:**
 - DFS 93K222
 - DFS 93K223
 - MB Specs
- **Reference Oil:**
 - TMC 864-1
- **Surveillance Panel Labs**
 - SWRI/Intertek/Lubrizol
- **Part Supply/Measurements For Assembly**
 - TEI Engineering
- **Report Forms**
 - Available on TMC Website

ASTM Website - 11/23/2016

Products and Services / [Standards & Publications](#) / Standards Products

ASTM D8074 - 16 ⓘ

Standard Test Method for Evaluation of Diesel Engine Oils in DD13 Diesel Engine

Active Standard **ASTM D8074** | Developed by Subcommittee: [D02.B0](#)

Book of Standards Volume: [05.05](#)

Format	Pages	Price	
 PDF	49	\$72.00	ADD TO CART
 Hardcopy (shipping and handling)	49	\$72.00	ADD TO CART

Reprints and Permissions

Permissions to reprint documents can be acquired through Copyright Clearance Center ⓘ

[VISIT COPYRIGHT CLEARANCE CENTER](#) 

[ASTM License Agreement](#)

[Shipping & Handling](#)

[MORE D02.B0 STANDARDS](#)

[RELATED PRODUCTS](#)

[STANDARD REFERENCES](#)

Recommended

[Standards Tracker](#)

[Standards Subscriptions](#)

Daimler Surveillance Panel

Initiated	ASTM June 2016
Chairman	Patrick Joyce – Lubrizol Corporation
Secretary	Jose Starling – Southwest Research Institute
OEM Representative	Suzanne Neal – Daimler
TMC Representative	Sean Moyer
Next Meetings	Phone Call - Monday June 19th 2:00 PM – 2:30 PM Detroit Time Day 1 - Build Workshop – Wednesday June 21 st @ Lubrizol Wickliffe OH Day 2 - Build Workshop – Thursday June 22 nd @ Lubrizol Wickliffe OH • Phone Call – Thursday June 22 nd 1:00 PM – 3:00 PM Detroit Time Day 3 - Build Workshop – Friday June 23 rd @ Lubrizol Wickliffe OH

Test Status & Parts Availability

- **Status of the Test**

- Available,
- Test labs are planning reference more test stands. Waiting for all batched parts to be available.

- **Parts Availability**

- Referencing new batch of top rings
 - ~ 2200
 - ~ 366 Engine Builds (6 Top Rings per engine)
- Referencing new batch of Pistons
 - ~ 1600 Pistons
 - ~ 266 Engine Builds (6 Pistons per engine)
- In Progress - Batched liners to TEI
 - ~ Planned order quantity 2000 Liners
 - ~ 333 Engine Builds (6 Liners per engine)

Link to TMC (Test Monitoring Committee) Website

Description	Website Link
ASTM DD13 Scuffing Test Folder on TMC Website	ftp://ftp.astmtmc.cmu.edu/datadict/dd13/current/forms/pdf/
ASTM DD13 Scuffing Test – TMC Form	ftp://ftp.astmtmc.cmu.edu/datadict/dd13/current/forms/pdf/fillable.pdf

Link to ASTM D8074

Description	Website Link
ASTM D8074	https://www.astm.org/Standards/D8074.htm