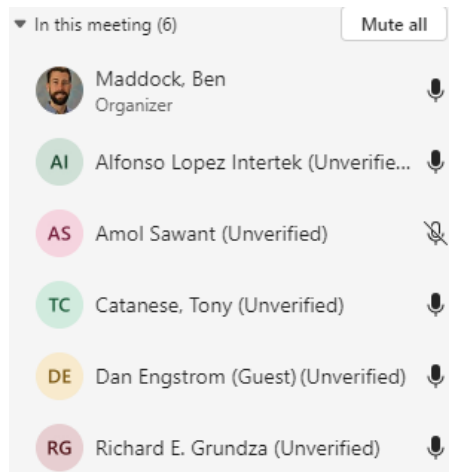


Sequence VH O&H Meeting
May 7th, 2024 at 3PM EST via MS Teams

Attendees:



Overview:

1. Organized Build Workshop Actions
2. Fuel
3. Hardware
4. Operation

Notes:

1. Build Workshop Actions

- Actions that need further discussion have been divided among the labs to seek resolution on. We'll review status in two weeks

Intertek

- 7.8.5.1: Ring grinder bit part number SA-81 CYL S/C
- 7.8.4.1, Step 5: Defines brushes
 - o C30-PHT-731 brush part number

Afton:

- 7.8.4.1 The group to standardize on identical surface analyzer
 - o Suggested Mitutoyo SJ-410 (IIIH)
 - o Define stylus and probe diameter
 - o Define analyzer settings and filters
 - o Two measurements middle and top
- Investigate load calibration options with Sunnen machines

SWRI:

- Fuel temperature control
 - o Labs to investigate on what's typical and where to land
 - o Identify Fuel Rail temp location

- Add to op data study to help guide
- Verify fuel injector prep requirement
 - Hot pink (latest superseded #) are regarded as lower quality

Valvoline:

- Blowby tree cleaning was questioned but no fully explored
 - Hose replacement frequency?
- RAC system VFD option was proposed
- Bore gauge tip diameter definition
 - Poll the labs to identify commonality that may already exist

Lubrizonl:

- Coordinated reference
 - Labs are receptive but timing and logistics could be challenging
 - Pat Lang suggested that a number of engines are built at one lab and then shipped to the others for testing.

Notes:

Lab	How often are brushes changed?	Load	Stokes	Typical Ra (µin)	Piston to Bore (mm)	Top Ring (in)	Bottom Ring (in)	Typical Break-in Blowby (LPM)	Deburr Tool	Notes
Procedure	Undefined	25 to 30	45	8 to 13	0.020 to 0.046	Undefined	Larger than TR	Undefined	Soft stone	
A	?	20 to 25	45	10 to 12	0.025	0.034	0.036	70 to 72	Needle file	Use piston chamfer to drive ring gap size
B	?	30	25	9 to 10	0.040 to 0.046	0.032	0.034	?	Soft stone	
D	With honing fluid, every 15h	28	45	10 to 12	0.030	0.027	0.029	65 to 67	Soft stone	Same ring gap all sizes
E	Never	20 to 25	30	11 to 13	0.038 to 0.045	0.029	0.031	70 to 72	Needle file	Ring gaps vary by size
G	Never	20	10	9 to 10	0.030 to 0.038	0.026	0.028	?	Soft stone	Use piston chamfer to drive ring gap size

- Taper and OOR are non-issues and comparable across labs
- Gaps vary with two groups of similar values
 - A & B closer to mid 30s
 - Rest in mid 20s
- Piston to bore clearance varies widely
- Ra values are on the lower end but also vary
- Strokes/Load to get to the same Ra value vary widely

Lab	Fuel Injector Batch	Comment
Procedure	Undefined	-
A	Purple/Brown	
B	Purple/Brown/Pink	
D	Purple	Have brown but just haven't introduced yet.
E	Purple/Brown	Primarily brown.
G	Purple/Brown	

2. **Fuel**

- Afton received samples from Haltermann before and after AO was replenished to the fuel batch. Afton also testing a sample from the recent shipment of the latest fuel batch and will track AO depletion over time
 - Ben will report out values as soon as they're available
- Afton will also work to formalize a procedure for all analytical labs to use so that they're empowered to perform the same analysis
- Lubrizol sent Haltermann Solutions a sample of their bad fuel with high washed gums to help understand what occurred

3. Hardware

- FCS Order through TEI

- o Valvoline needs to identify piston / ring inventory requirements?

Size	Quantity
0.125	272
0.250	272
0.375	272
0.500	400

- o Proposed even distribution of existing overstock based on reported need for FCS order

	Lubrizol - Need	Intertek - Need	SWRI - Need	Afton - Need	Ashland - Need	Available Pistons	Available Kits	Lubrizol - Actual of Current	Intertek - Actual of Current	SWRI - Actual of Current	Afton - Actual of Current	Ashland - Actual of Current
PISTON, 0.125 mm	0%	52%	46%	2%	0%	272	34	0	17	16	1	0
PISTON, 0.25 mm	0%	51%	46%	3%	0%	272	34	0	17	16	1	0
PISTON, 0.375 mm	0%	51%	46%	3%	0%	272	34	0	17	16	1	0
PISTON, 0.50 mm	0%	51%	46%	3%	0%	400	50	0	26	23	1	0

- o A concern was raised about where these overstock pistons come from?
 - A set of pistons back in early VH days was rejected due to excessive staining
 - Al volunteered to pursue this topic with TEI/Ford

- King cam bearings were brought up and labs reported no issues

4. Operation

- Honing Data from PM was shared by the TMC and briefly reviewed as a group with no significant follow-up actions defined

- o Labs to review and prepare to discuss in two weeks

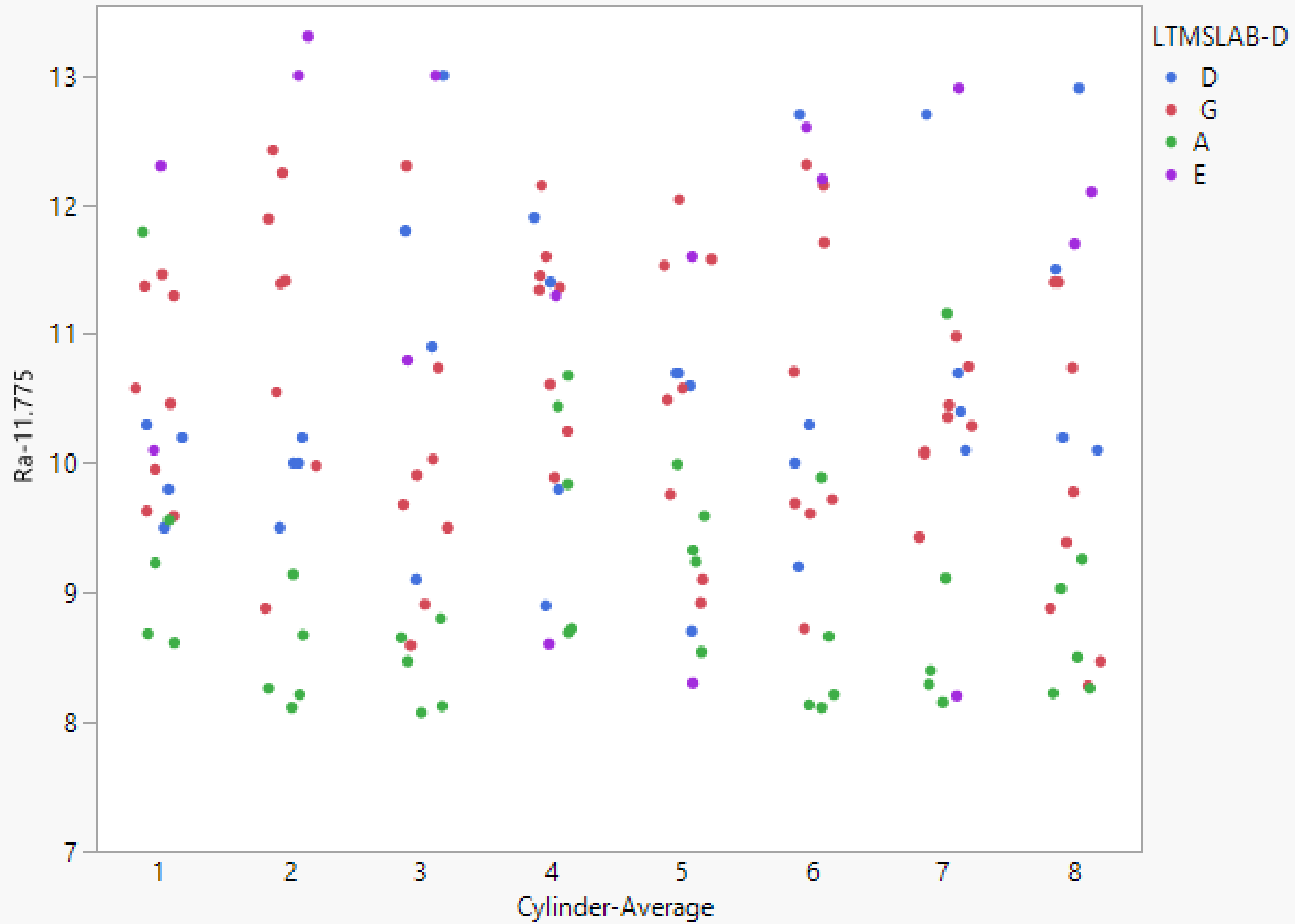
- Operational Data Study: N-10-1 approval matrix vs PM

- o Proposed timing: Labs to provide data in the correct format for analysis by 6/21/2024

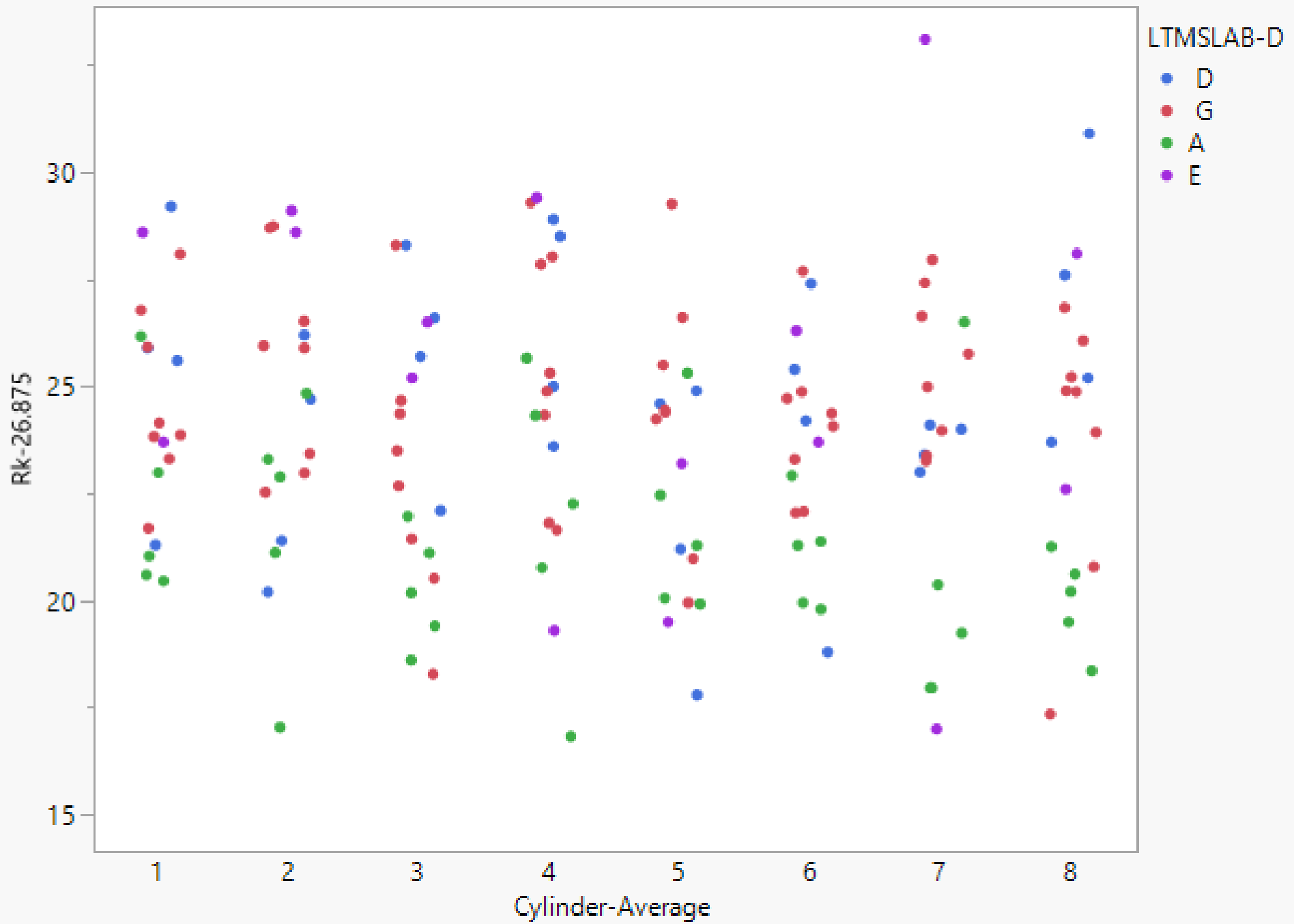
TESTKEY	LTMSLAB	IND	Op Data?
166515-VH	A	931	
169622-VH	G	1011-1	
172588-VH	G	931	
172259-VH	D	1011-1	
172583-VH	A	1011-1	
172589-VH	G	931	
172587-VH	G	940	
172582-VH	A	940	
172584-VH	A	1011-1	
166686-VH	D	931	
171799-VH	D	931	
172585-VH	A	1011-1	
175648-VH	A	931	
175637-VH	G	1011-1	
175640-VH	G	931	
169623-VH	G	1011-1	
175643-VH	G	940	

Sequence Surface Finish

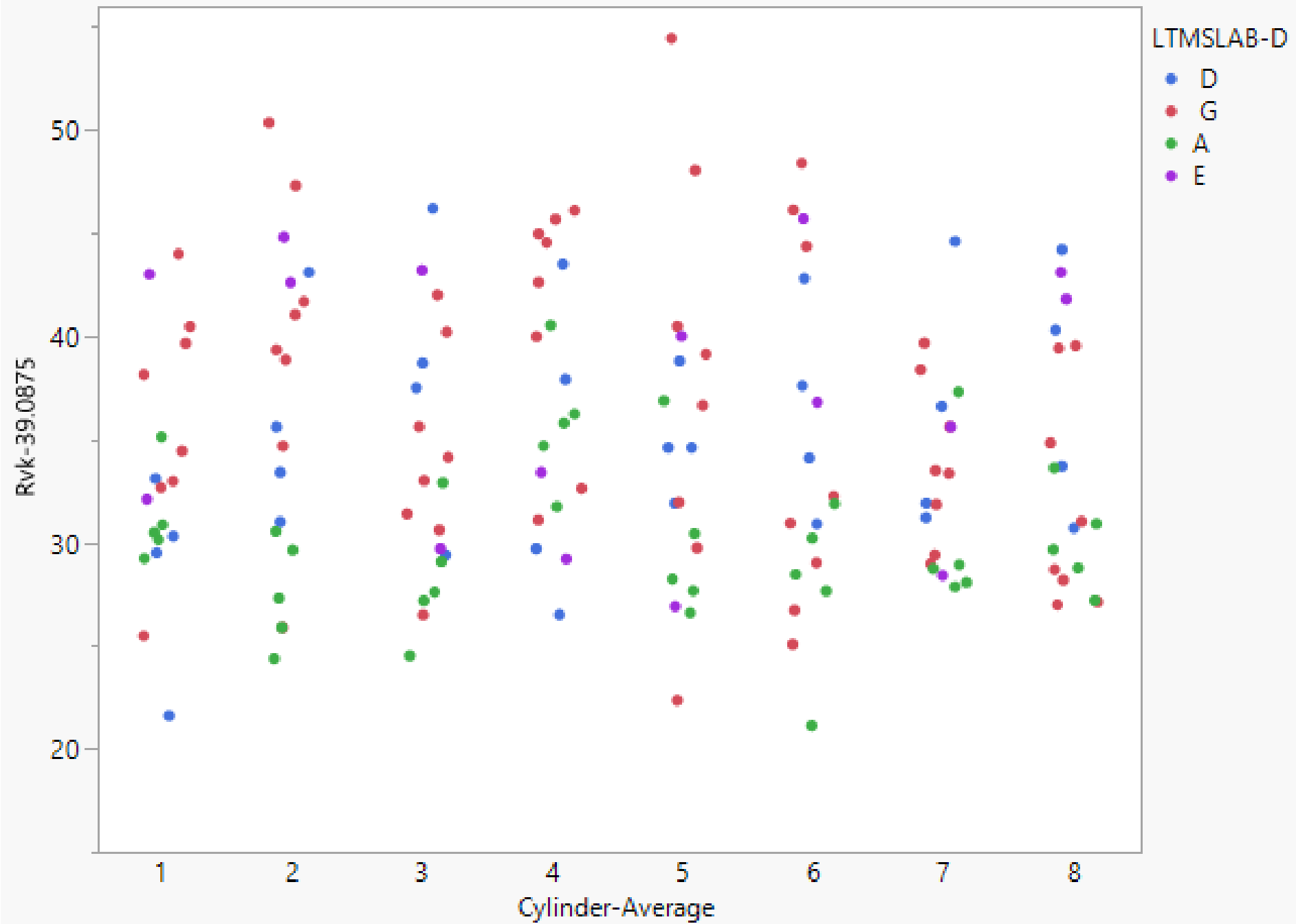
Ra by Cylinder and Lab



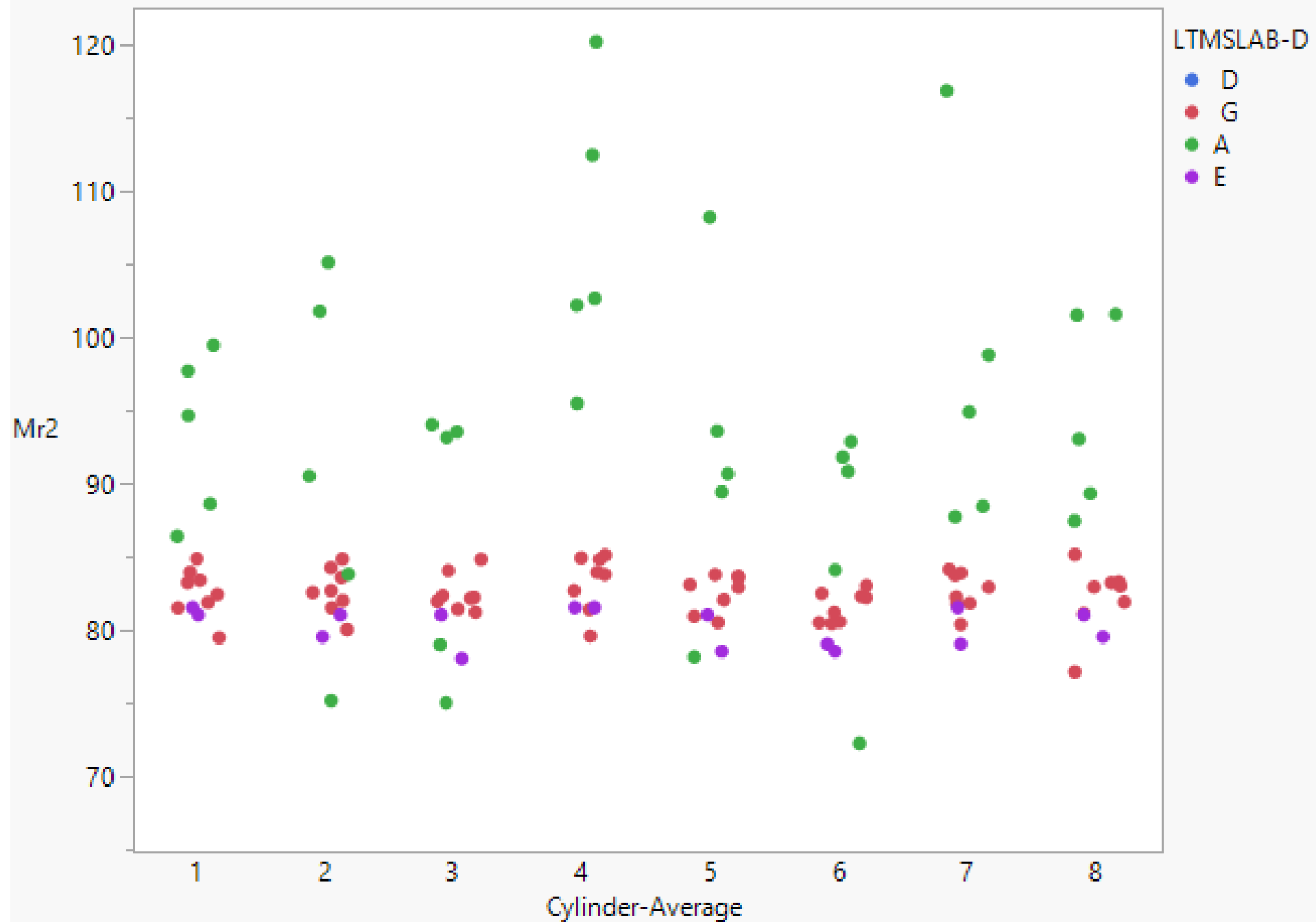
Rk by Cylinder and Lab



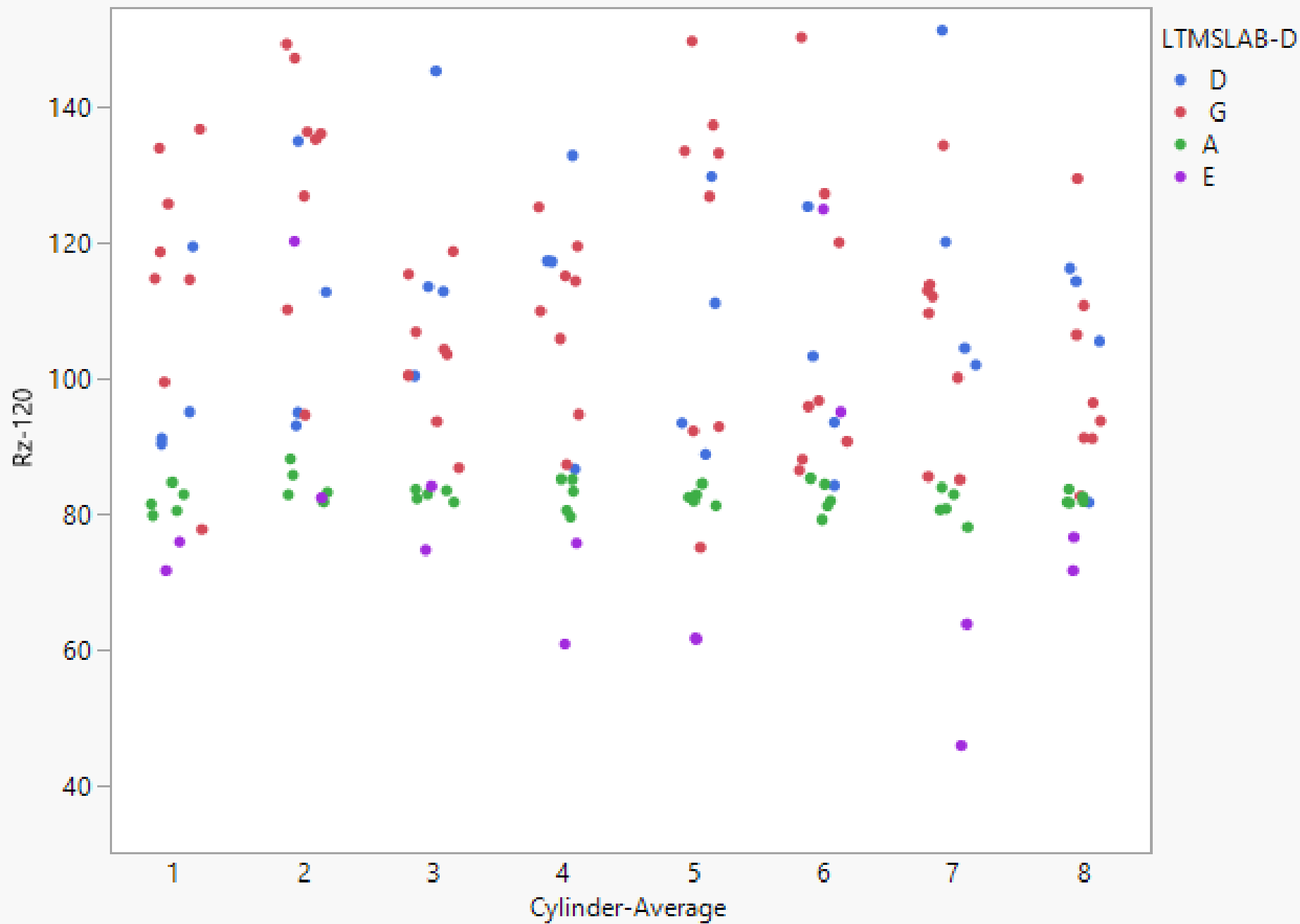
Rvk by Cylinder and Lab



Mr2 by Cylinder and Lab



Rz-120 vs. Cylinder-Average



2nd Ring Gap by Cylinder and Lab

