

PROTOKOL

o provedených provozních zkouškách "Modifikátoru paliva TMD"

1. Účastníci zkoušek:

a) **pro ČSAD Střední Čechy a.s.**

K Přívozu 2604/23
Mělník
IČ: 25137514
organizovala společnost
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b) **NTS Europe s.r.o.**

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2. Testované autobusy, období zkoušek, aplikace Modifikátoru TMD:

2.1. Testované autobusy:

Pro maximální průkaznost výsledků testů bylo vybráno 5 autobusů se stabilním režimem práce, trasami a vytížeností, jednoho typu, a to:

IVECO BUS CROSSWAY LOW ENTRY

- délka: 14,49 m
- motor: F2CFE612B – 8.710 cm³, 265 kW, automat
- EURO 6 C

2.2. Provozní zkoušky použití Modifikátoru paliva TMD probíhaly průběžně v období 26.09.-10.12.2020.

2.3. Způsob aplikace Modifikátoru paliva TMD:

pro účely zkoušek se Modifikátor paliva TMD vléval v příslušné koncentraci přímo do nádrže autobusů před natankováním paliva. Tento způsob je možné používat i v běžném režimu.

Pro další používání v ČSAD Střední Čechy a.s. se předpokládá modifikování paliva (nafty) přednostně přímo v nádržích vlastních čerpacích stanic.

3. Průběh zkoušek, dosažené úspory a ostatní efekty:

3.1. Průběh zkoušek:

- před aplikací Modifikátoru paliva TMD byla vozidla stažena z běžného provozu;

před a v průběhu aplikace Modifikátoru paliva TMD v příslušném časovém úseku;

- vyhodnocení bylo provedeno rovněž graficky, spolu s příslušnými přehlednými tabulkami jednotlivých provozních hodnot.

3.2. Dosažené úspory:

Typ autobusu SPZ rok výroby	Stav tachometru při zahájení zkoušek km	Počet najetých km v průběhu zkoušek km	Počet dnů zkoušek dny	Ø spotřeba od uvedení do provozu do 28.09.2020 litry	Ø spotřeba během zkoušek od 28.09. až průběžně do 10.12.2020 litry	Úspora litry	Úspora %
IVECO BUS CROSSWAY 4SD 9863 2018	277.550	18.884	51	31,36	30,47	0,88	2,81
IVECO BUS CROSSWAY 4SF 8795 2018	206.157	20.021	72	34,02	31,81	2,21	6,49
IVECO BUS CROSSWAY 4SF 8796 2018	273.638	12.413	38	32,31	31,45	0,87	2,70
IVECO BUS CROSSWAY 4SF 8799 2018	279.218	20.305	59	31,75	30,41	1,34	4,22
IVECO BUS CROSSWAY 4SX 3507 2020	60.851	17.387	52	31,71	29,75	1,97	6,21

3.3. Ostatní efekty (hodnocení řidičů a servisních techniků):

- snadnější studený start, motor hned od začátku jde klidně a plynule;
- autobus má větší kroutící moment (vyšší výkon), jezdí v lepším režimu blíže k "zelené" zóně, tedy šetří motor. Má klidnější, tišší, hladší a plynulejší chod;
- vyčistily se bílé usazeniny z krystalického AdBlue na koncovkách výfuků.

4. Závěry z provozních zkoušek:

Aplikace a provozní zkoušky Modifikátoru paliva TMD splnily účel, jedná se o funkční přípravek, vedoucí k dosažení úspory paliva a zlepšení provozních charakteristik vozidel. Při dlouhodobější aplikaci Modifikátoru paliva TMD se předpokládá další navýšení úspory paliva.

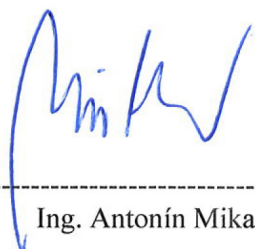
Přílohy:

Grafická provozní charakteristika chodu motorů každého autobusu během zkoušek – 5 x



Ing. Vladislav Olejář

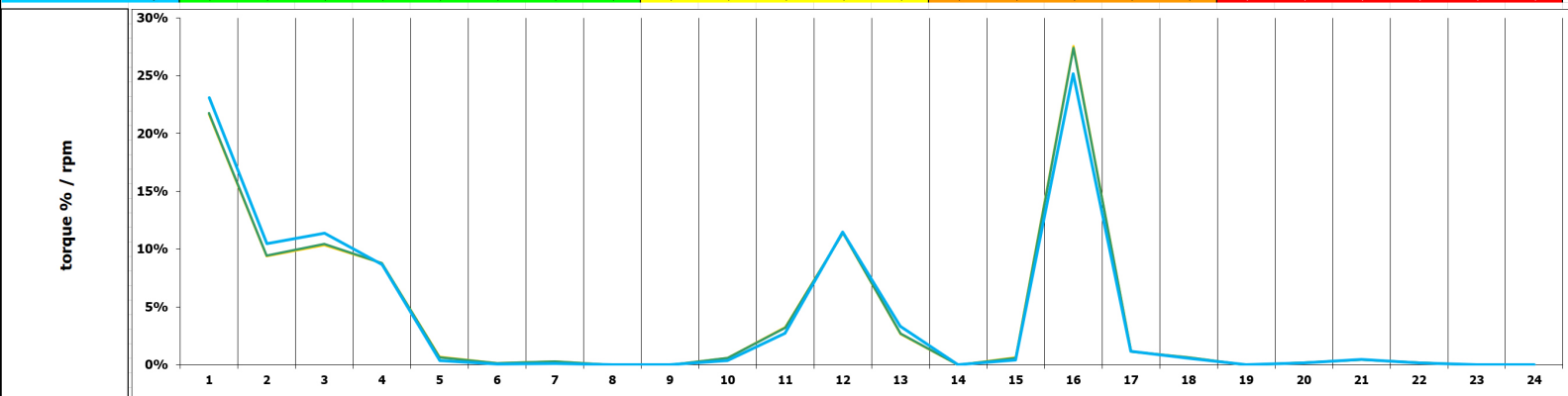
servis Dopravní Techniky, a.s.
K Přívozu 2604/23
27601 Mělník
IČ: 261323 DIČ: CZ24204323 (2)



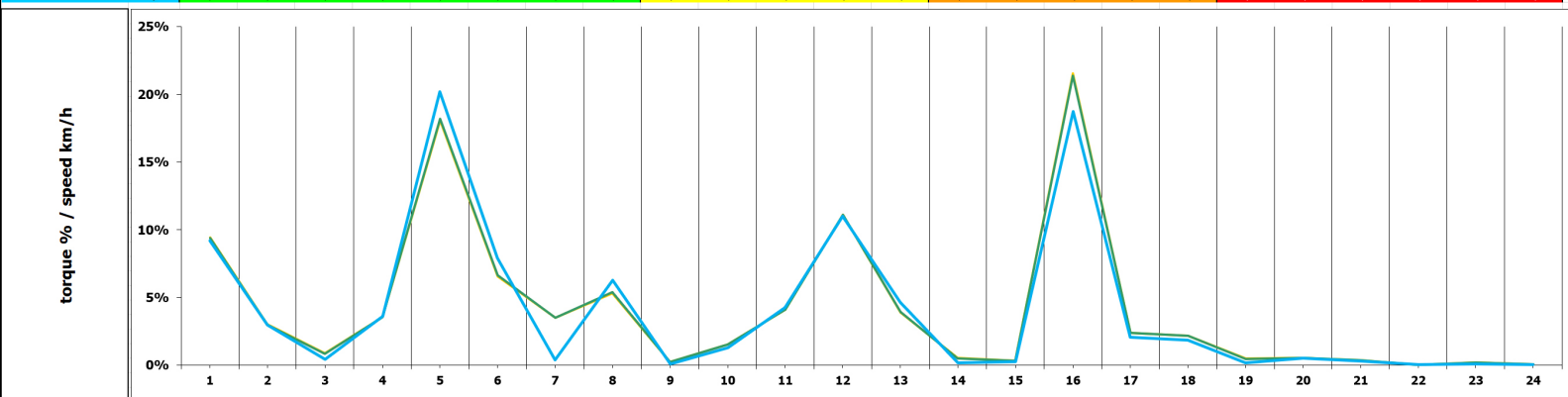
Ing. Antonín Míka

ASD 9863

	rpm																								
	1000..1600 5..15	1000..1600 15..35	1000..1600 35..55	1000..1600 55..75	1600..2200 5..15	1600..2200 15..35	1600..2200 35..55	2200..2500 5..15	2200..2500 15..35	1600..2200 55..75	1000..1600 75..95	400..1000 15..35	400..1000 35..55	2200..2500 35..55	1600..2200 75..95	400..1000 5..15	400..1000 55..75	1000..1600 95..115	2200..2500 55..75	1600..2200 95..115	400..1000 75..95	400..1000 95..115	2200..2500 75..95	2200..2500 95..115	
torque %																									
M035298 - 30/09/2020	31,36	21,66%	9,39%	10,36%	8,78%	0,68%	0,15%	0,31%	0,00%	0,00%	0,58%	3,25%	11,42%	2,64%	0,00%	0,60%	27,56%	1,12%	0,62%	0,00%	0,21%	0,45%	0,18%	0,00%	0,00%
M035298 - 20/11/2020	31,30	21,75%	9,46%	10,43%	8,77%	0,66%	0,15%	0,30%	0,00%	0,00%	0,57%	3,21%	11,42%	2,68%	0,00%	0,60%	27,40%	1,12%	0,61%	0,00%	0,21%	0,45%	0,18%	0,00%	0,00%
30/09/2020 - 20/11/2020	30,47	23,07%	10,45%	11,36%	8,66%	0,38%	0,07%	0,14%	0,00%	0,00%	0,35%	2,74%	11,45%	3,30%	0,00%	0,41%	25,13%	1,14%	0,56%	0,00%	0,18%	0,44%	0,16%	0,00%	0,00%

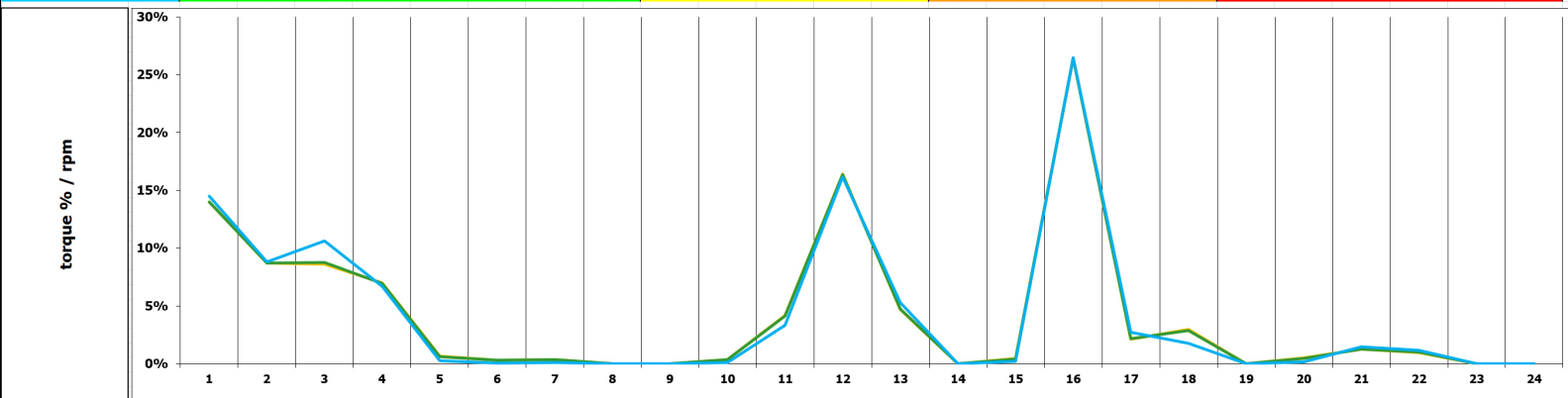


	speed km/h																								
	50..80 5..15	50..80 15..35	80..110 5..15	50..80 35..55	70..90 5..15	70..90 15..35	50..80 55..75	20..50 35..55	80..110 15..35	50..80 75..95	20..50 55..75	-10..20 15..35	-10..20 35..55	80..110 35..55	50..80 95..115	-10..20 5..15	-10..20 55..75	20..50 75..95	80..110 55..75	20..50 95..115	-10..20 75..95	-10..20 95..115	80..110 75..95	80..110 95..115	
torque %																									
M035298 - 30/09/2020	31,36	9,43%	3,02%	0,87%	3,55%	18,08%	6,56%	3,49%	5,33%	0,27%	1,53%	4,10%	11,12%	3,89%	0,53%	0,32%	21,55%	2,39%	2,19%	0,49%	0,57%	0,37%	0,05%	0,22%	0,08%
M035298 - 20/11/2020	31,30	9,42%	3,01%	0,85%	3,56%	18,21%	6,65%	3,50%	5,39%	0,26%	1,52%	4,11%	11,11%	3,94%	0,51%	0,32%	21,37%	2,38%	2,16%	0,47%	0,56%	0,37%	0,05%	0,22%	0,08%
30/09/2020 - 20/11/2020	30,47	9,20%	2,96%	0,45%	3,63%	20,19%	7,90%	0,41%	6,30%	0,11%	1,32%	4,27%	11,00%	4,66%	0,20%	0,27%	18,75%	2,09%	1,84%	0,20%	0,53%	0,32%	0,05%	0,11%	0,05%

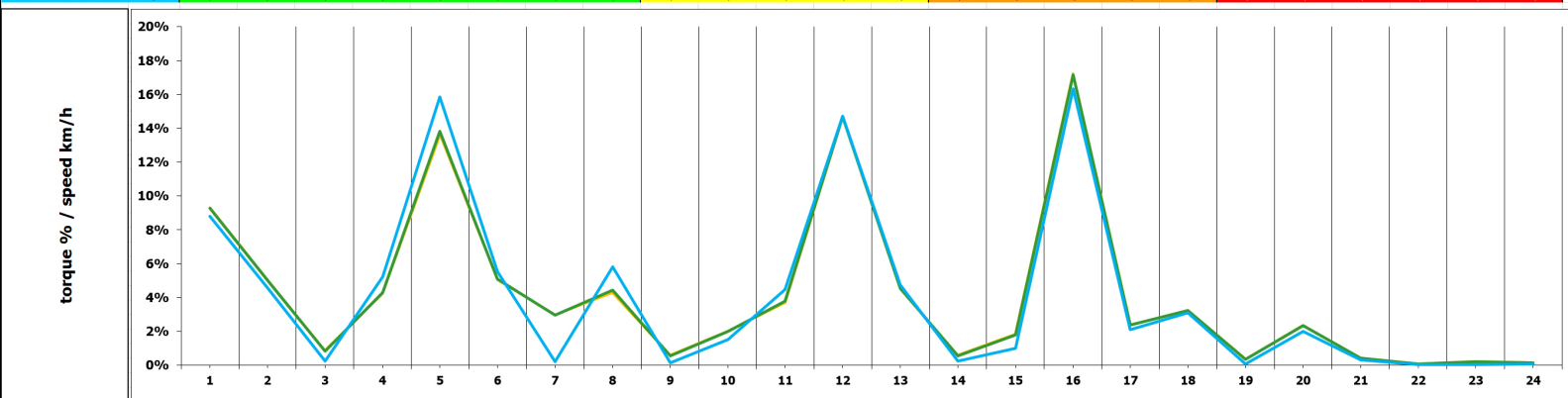


ASF 8795

rpm	torque %																								
	1000..1600 5..15	1000..1600 15..35	1000..1600 35..55	1000..1600 55..75	1600..2200 5..15	1600..2200 15..35	1600..2200 35..55	2200..2500 5..15	2200..2500 15..35	1600..2200 55..75	1000..1600 75..95	400..1000 15..35	400..1000 35..55	2200..2500 35..55	1600..2200 75..95	400..1000 5..15	400..1000 55..75	1000..1600 95..115	2200..2500 55..75	1600..2200 95..115	400..1000 75..95	400..1000 95..115	2200..2500 75..95	2200..2500 95..115	
M035619 - .29/09/2020	34.02	13.96%	8.71%	8.59%	6.98%	0.67%	0.31%	0.36%	0.00%	0.00%	0.36%	4.21%	16.39%	4.70%	0.00%	0.44%	26.39%	2.12%	3.00%	0.00%	0.49%	1.26%	0.98%	0.00%	0.00%
M035619 - .10/12/2020	33.83	14.01%	8.72%	8.78%	6.95%	0.63%	0.29%	0.34%	0.00%	0.00%	0.34%	4.12%	16.36%	4.75%	0.00%	0.44%	26.40%	2.18%	2.89%	0.00%	0.46%	1.28%	1.00%	0.00%	0.00%
29/09/2020 - .10/12/2020	31.83	14.48%	8.80%	10.63%	6.68%	0.27%	0.07%	0.13%	0.00%	0.00%	0.13%	3.33%	16.14%	5.28%	0.00%	0.20%	26.48%	2.72%	1.79%	0.00%	0.15%	1.49%	1.19%	0.00%	0.00%

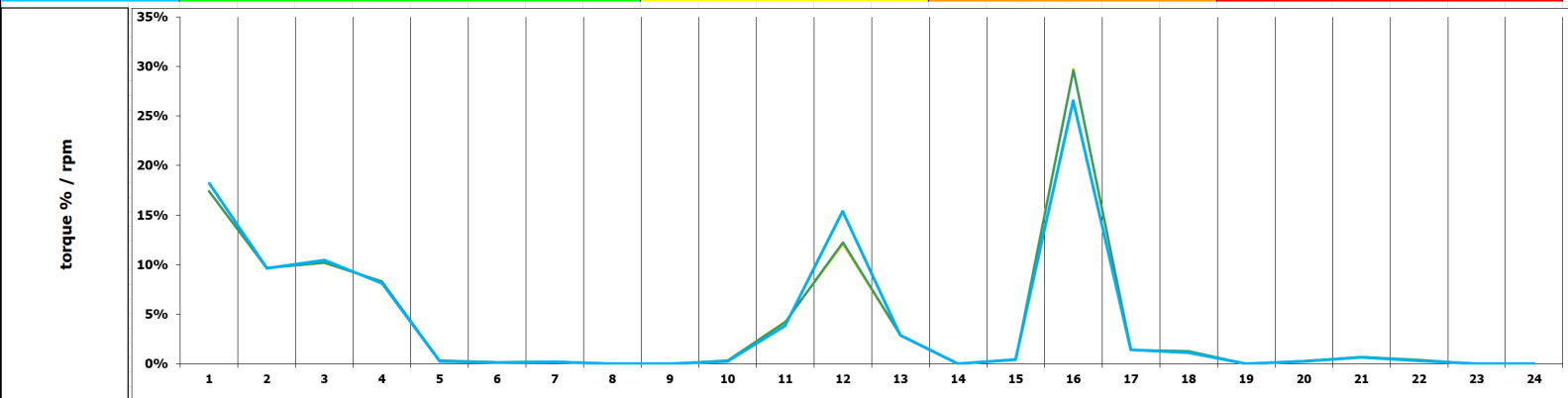


speed km/h	torque %																								
	80..80 5..15	80..80 15..35	80..110 5..15	50..80 35..55	70..30 5..15	70..50 15..35	50..80 55..75	20..50 35..55	80..110 15..35	50..80 75..95	20..50 55..75	-10..20 15..35	-10..20 35..55	80..110 35..55	50..80 95..115	-10..20 5..15	-10..20 55..75	20..50 75..95	80..110 55..75	20..50 95..115	-10..20 75..95	-10..20 95..115	80..110 75..95	80..110 95..115	
M035619 - .29/09/2020	34.02	9.32%	5.06%	0.60%	4.21%	13.61%	5.05%	2.97%	4.30%	0.61%	2.03%	3.71%	14.69%	4.54%	0.60%	1.86%	17.25%	2.41%	3.24%	0.36%	2.36%	0.44%	0.09%	0.22%	0.16%
M035619 - .10/12/2020	33.83	9.27%	5.02%	0.84%	4.31%	13.82%	5.10%	2.96%	4.44%	0.57%	1.99%	3.78%	14.69%	4.56%	0.56%	1.78%	17.16%	2.39%	3.23%	0.34%	2.33%	0.43%	0.09%	0.20%	0.15%
29/09/2020 - .10/12/2020	31.83	8.81%	4.57%	0.26%	5.22%	15.86%	5.56%	0.20%	5.82%	0.16%	1.53%	4.46%	14.71%	4.77%	0.24%	1.02%	16.33%	2.12%	3.12%	0.09%	1.99%	0.32%	0.05%	0.05%	0.07%

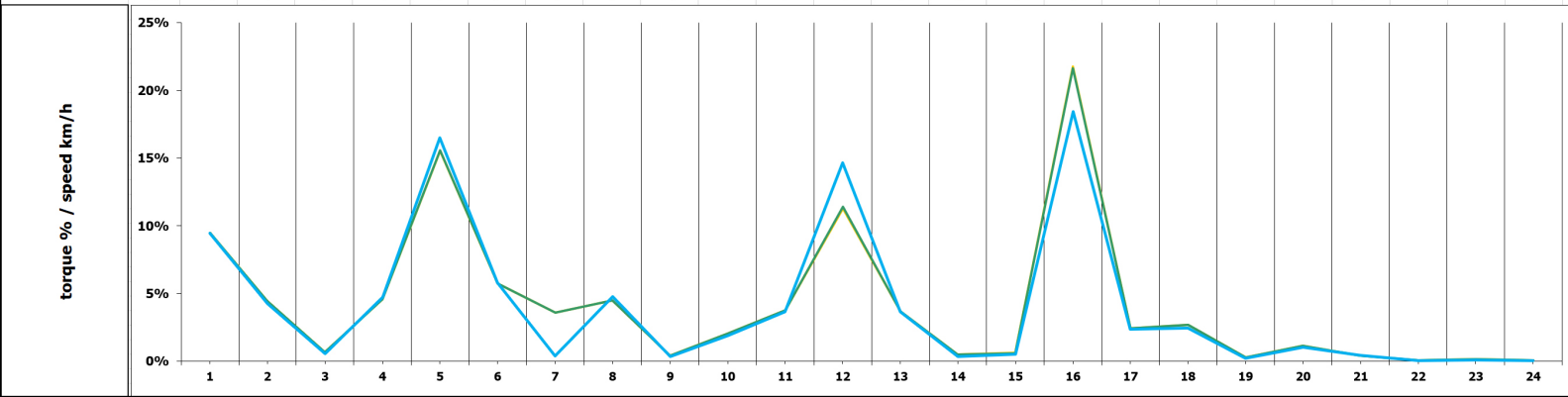


ASF 8796

torque %	rpm		1000..1600		1000..1600		1000..1600		1000..1600		1600..2200		1600..2200		2200..2500		2200..2500		400..1000		400..1000		1000..1600		2200..2500		1600..2200		400..1000		400..1000		2200..2500	
	5..15	15..35	35..55	55..75	75..95	5..15	15..35	35..55	55..75	75..95	5..15	15..35	35..55	55..75	75..95	5..15	15..35	35..55	55..75	75..95	95..115	5..15	15..35	35..55	55..75	75..95	95..115	5..15	15..35	35..55	55..75	75..95	95..115	
M035635 - 29/09/2020	32.31	17.39%	9.66%	10.18%	8.33%	0.34%	0.17%	0.24%	0.00%	0.00%	0.36%	4.24%	12.06%	2.84%	0.00%	0.44%	29.74%	1.41%	1.26%	0.00%	0.26%	0.66%	0.38%	0.00%	0.00%	0.00%	0.26%	0.66%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%
M035635 - 06/11/2020	32.27	17.42%	9.66%	10.19%	8.32%	0.34%	0.17%	0.24%	0.00%	0.00%	0.35%	4.22%	12.21%	2.84%	0.00%	0.44%	29.59%	1.41%	1.25%	0.00%	0.26%	0.66%	0.38%	0.00%	0.00%	0.26%	0.66%	0.38%	0.00%	0.00%	0.00%	0.00%	0.00%	
29/09/2020 - 06/11/2020	31.45	18.18%	9.62%	10.48%	8.08%	0.25%	0.14%	0.17%	0.00%	0.00%	0.27%	3.85%	15.36%	2.89%	0.00%	0.41%	26.51%	1.43%	1.10%	0.00%	0.26%	0.64%	0.30%	0.00%	0.00%	0.26%	0.64%	0.30%	0.00%	0.00%	0.00%	0.00%	0.00%	

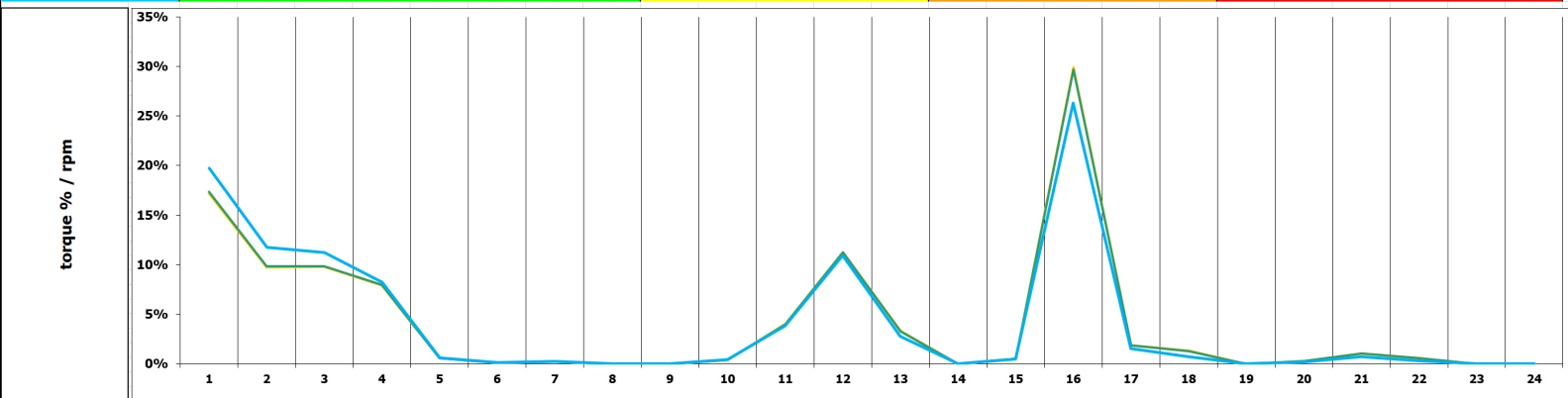


torque %	speed km/h		80..80		80..110		50..80		20..30		20..50		50..80		20..30		20..50		80..110		80..110		50..80		20..30		20..50		80..110		80..110		50..80		20..30	
	5..15	15..35	35..55	55..75	75..95	5..15	15..35	35..55	55..75	75..95	5..15	15..35	35..55	55..75	75..95	5..15	15..35	35..55	55..75	75..95	95..115	5..15	15..35	35..55	55..75	75..95	95..115	5..15	15..35	35..55	55..75	75..95	95..115			
M035635 - 29/09/2020	32.31	9.49%	4.45%	0.66%	4.59%	15.55%	5.76%	3.61%	4.51%	0.42%	2.07%	3.78%	11.27%	3.67%	0.49%	0.61%	21.79%	2.42%	2.70%	0.30%	1.16%	0.43%	0.08%	0.15%	0.06%	0.30%	1.15%	0.43%	0.08%	0.15%	0.06%	0.06%	0.06%	0.06%	0.06%	
M035635 - 06/11/2020	32.27	9.49%	4.44%	0.66%	4.60%	15.60%	5.76%	3.60%	4.52%	0.41%	2.06%	3.77%	11.42%	3.67%	0.49%	0.61%	21.64%	2.42%	2.68%	0.30%	1.15%	0.43%	0.08%	0.15%	0.06%	0.30%	1.15%	0.43%	0.08%	0.15%	0.06%	0.06%	0.06%	0.06%	0.06%	
29/09/2020 - 06/11/2020	31.45	9.48%	4.27%	0.57%	4.75%	16.52%	5.83%	0.41%	4.76%	0.37%	1.89%	3.67%	14.64%	3.66%	0.38%	0.52%	18.45%	2.39%	2.45%	0.21%	1.04%	0.44%	0.07%	0.12%	0.03%	0.21%	1.04%	0.44%	0.07%	0.12%	0.03%	0.03%	0.03%	0.03%	0.03%	

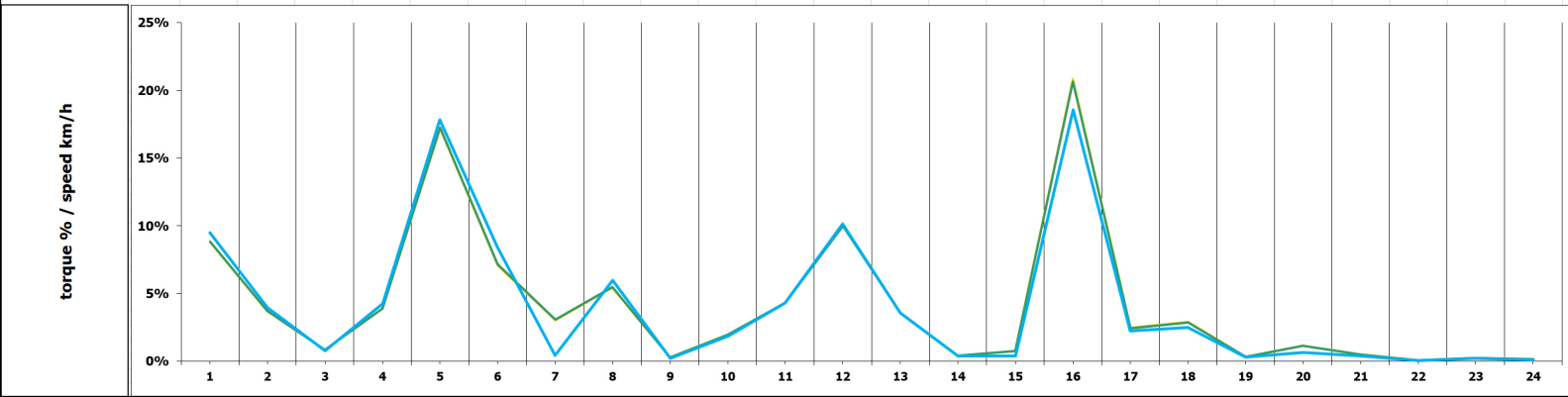


ASF 8799

torque %	rpm		1000..1600		1000..1600		1000..1600		1000..1600		1600..2200		1600..2200		2200..2500		2200..2500		400..1000		400..1000		1000..1600		2200..2500		1600..2200		400..1000		400..1000		2200..2500	
	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35		
M035610 - 28/09/2020	31,75	17.17%	9.73%	9.76%	7.93%	0.59%	0.13%	0.24%	0.00%	0.00%	0.37%	4.01%	11.24%	3.33%	0.00%	0.52%	29.89%	1.86%	1.33%	0.00%	0.26%	1.04%	0.58%	0.00%	0.00%	0.00%	0.25%	1.02%	0.56%	0.00%	0.00%			
M035610 - 26/11/2020	31,68	17.34%	9.86%	9.85%	7.95%	0.59%	0.13%	0.24%	0.00%	0.00%	0.37%	4.00%	11.22%	3.29%	0.00%	0.51%	29.66%	1.84%	1.29%	0.00%	0.25%	1.02%	0.56%	0.00%	0.00%	0.25%	1.02%	0.56%	0.00%	0.00%				
28/09/2020 - 26/11/2020	30,41	19.75%	11.73%	11.22%	8.23%	0.60%	0.12%	0.24%	0.00%	0.00%	0.41%	3.81%	10.91%	2.78%	0.00%	0.46%	26.29%	1.51%	0.74%	0.00%	0.17%	0.71%	0.30%	0.00%	0.00%	0.17%	0.71%	0.30%	0.00%	0.00%				

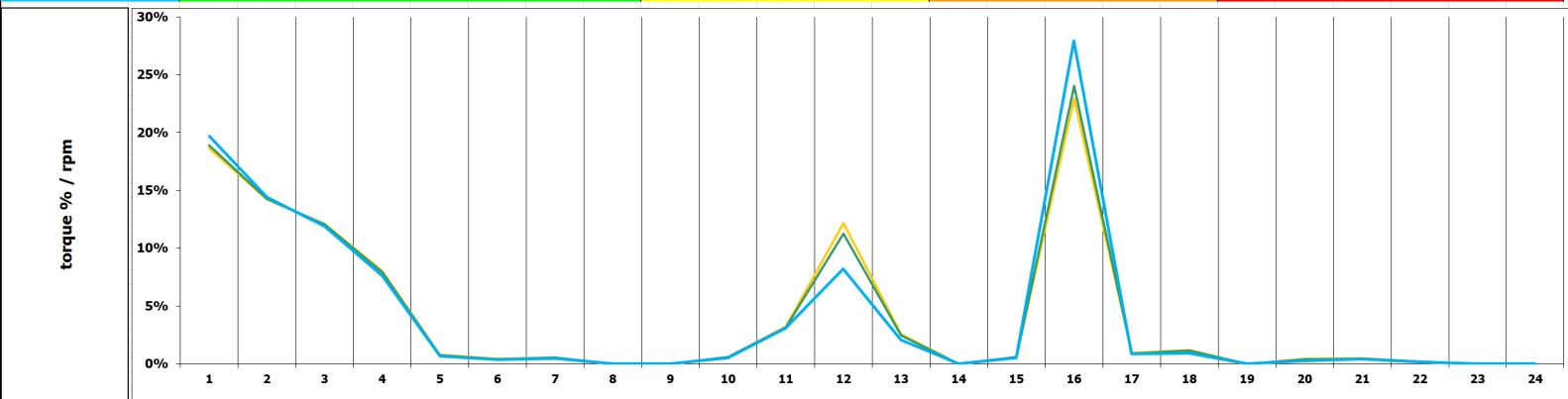


torque %	speed km/h		80..80		80..110		50..80 35..55		20..30		20..50 15..35		50..80 55..75		20..30 35..55		80..110 15..35		50..80 75..95		20..50 55..75		-10..20 15..35		-10..20 35..55		80..110 35..55		50..80 95..115		-10..20 5..15		-10..20 55..75		20..50 75..95		80..110 55..75		20..50 95..115		-10..20 75..95		-10..20 95..115		80..110 75..95		80..110 95..115	
	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35	5..15	15..35						
M035610 - 28/09/2020	31,75	8.82%	3.73%	0.84%	3.89%	17.20%	7.09%	3.05%	5.44%	0.28%	1.95%	4.32%	10.00%	3.57%	0.43%	0.78%	20.82%	2.47%	2.89%	0.32%	1.17%	0.50%	0.07%	0.23%	0.15%	0.32%	1.14%	0.49%	0.07%	0.23%	0.15%																	
M035610 - 26/11/2020	31,68	8.86%	3.74%	0.83%	3.91%	17.24%	7.18%	3.07%	5.48%	0.28%	1.95%	4.32%	10.01%	3.57%	0.43%	0.75%	20.67%	2.46%	2.87%	0.32%	1.14%	0.49%	0.07%	0.23%	0.15%	0.32%	1.14%	0.49%	0.07%	0.23%	0.15%																	
28/09/2020 - 26/11/2020	30,41	9.49%	3.96%	0.78%	4.25%	17.83%	8.43%	0.46%	5.99%	0.23%	1.87%	4.30%	10.14%	3.59%	0.41%	0.41%	18.56%	2.23%	2.51%	0.33%	0.65%	0.40%	0.04%	0.21%	0.11%	0.33%	0.65%	0.40%	0.04%	0.21%	0.11%																	



MSX 3507

torque %	rpm		rpm		rpm		rpm		rpm		rpm		rpm		rpm		rpm		rpm		rpm		rpm		rpm		rpm		rpm		
	1000..1600 5..15	1000..1600 15..35	1000..1600 35..55	1000..1600 55..75	1600..2200 5..15	1600..2200 15..35	1600..2200 35..55	2200..2500 5..15	2200..2500 15..35	1600..2200 55..75	1000..1600 75..95	400..1000 15..35	400..1000 35..55	2200..2500 35..55	1600..2200 75..95	400..1000 5..15	400..1000 55..75	1000..1600 95..115	2200..2500 55..75	1600..2200 95..115	400..1000 75..95	400..1000 95..115	2200..2500 75..95	2200..2500 95..115	400..1000 5..15	400..1000 15..35	400..1000 35..55	400..1000 55..75	400..1000 75..95	400..1000 95..115	
M042649 - 29/09/2020	31.71	18.66%	14.22%	12.12%	8.03%	0.78%	0.42%	0.54%	0.00%	0.00%	0.60%	3.18%	12.15%	2.54%	0.00%	0.60%	22.90%	0.92%	1.20%	0.00%	0.45%	0.47%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
M042649 - 20/11/2020	31.28	18.88%	14.26%	12.07%	7.93%	0.76%	0.41%	0.52%	0.00%	0.00%	0.58%	3.16%	11.27%	2.43%	0.00%	0.58%	24.02%	0.91%	1.14%	0.00%	0.41%	0.45%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	
29/09/2020 - 20/11/2020	29.75	19.65%	14.39%	11.88%	7.59%	0.68%	0.36%	0.48%	0.00%	0.00%	0.51%	3.09%	8.21%	2.06%	0.00%	0.51%	27.92%	0.88%	0.93%	0.00%	0.27%	0.40%	0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	



torque %	speed km/h		speed km/h		speed km/h		speed km/h		speed km/h		speed km/h		speed km/h		speed km/h		speed km/h		speed km/h		speed km/h		speed km/h		speed km/h		speed km/h		speed km/h	
	50..80 5..15	50..80 15..35	80..110 5..15	50..80 35..55	70..90 5..15	70..90 15..35	50..80 55..75	20..50 35..55	80..110 15..35	50..80 75..95	20..50 55..75	10..20 15..35	10..20 35..55	80..110 35..55	50..80 95..115	10..20 5..15	10..20 55..75	20..50 75..95	80..110 55..75	20..50 95..115	10..20 75..95	10..20 95..115	80..110 75..95	80..110 95..115	40..60 5..15	40..60 15..35	40..60 35..55	40..60 55..75	40..60 75..95	
M042649 - 29/09/2020	31.71	9.48%	6.90%	1.07%	5.57%	14.21%	7.29%	3.40%	4.82%	0.81%	1.58%	3.52%	11.89%	3.93%	0.88%	0.67%	17.62%	2.13%	2.02%	0.49%	0.97%	0.43%	0.08%	0.23%	0.12%	0.00%	0.00%	0.00%	0.00%	0.00%
M042649 - 20/11/2020	31.28	9.58%	6.82%	1.04%	5.55%	14.41%	7.30%	3.37%	4.79%	0.79%	1.55%	3.49%	11.02%	3.82%	0.86%	0.63%	18.67%	2.08%	2.02%	0.47%	0.93%	0.41%	0.08%	0.21%	0.10%	0.00%	0.00%	0.00%	0.00%	
29/09/2020 - 20/11/2020	29.75	9.94%	6.92%	0.92%	5.49%	15.11%	7.32%	0.51%	4.68%	0.72%	1.48%	3.41%	7.99%	3.43%	0.80%	0.46%	22.30%	1.91%	2.01%	0.40%	0.82%	0.34%	0.06%	0.17%	0.05%	0.00%	0.00%	0.00%	0.00%	

