

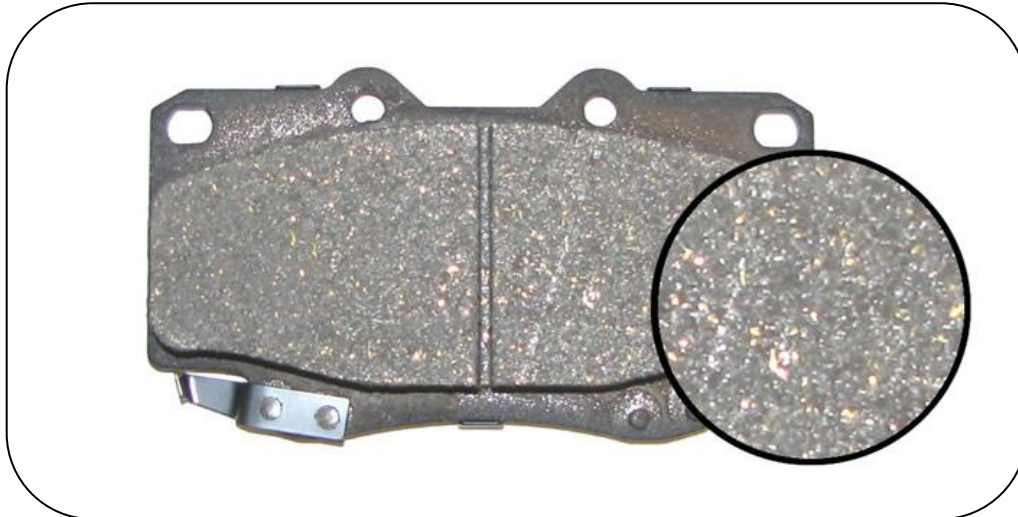


Severe Duty Brake Pads Profile

Perfil de las Pastillas Trabajo Severo



Characteristics



Friction Coefficient FF
Coeficiente de Fricción FF

Low Fade
Bajo Desvanecimiento

Positive Mold Production
Producción por Molde Positivo

Excelent Stopping Power at high temperatures
Excelente Potencia de Frenado a altas temperaturas

Materials: - Carbon Elements
- Steel fiber, cellulose fiber
- Potasium Titane Flake
- Kevlar and Copper

Long Life even extreme driving conditions
Larga duración inclusive en condiciones extremas de manejo

Materiales: - Elementos de carbón
- Fibra de Acero, Fibra de base celulosa
- Hojuela de Potasio Titaniado
- Cobre

Low Dust
Bajo polvo



Physical Properties

a. Physical Properties

Density

	Temperature [°C]	Operation	Remarks
1	R.T.	Weight	In Air
2	R.T.	Weight	In Water

Hardness

	Scale	Rockwell	Penetrator Diameter,mm	Standards Loading [N]	Test Loading [N]
1	R	HRR	12.7	98.07	588.4

pH Value

	Scale	pH Value (Buffer Solution)	Soak Solution
1	0.00~14.00	4.00,6.86,9.18	KCl(aq.3mol/L)

Shear Strength

	Positive Pressure [MPa]	Shear Force [KN]	Loading Ratio [N/s]	Power [KW]
1	0-0.5	0-100	4500±500	1.5

Porosity

	Temperature [°C]	Time [hr]	Remarks
1	90±10	8	In Oil
2	90±10→R.T.	Over 12	In Oil

Impact Strength

	Impact Speed [m/s]	Impact Power [J]	Impact Angel [°]	Sample size [mm]
1	2.9	0.5	150	55*10*6

Physical Properties

b. Physical Properties

Density (g/cm3)	2.90~3.00	Hardness/HRR	50~65
pH Value	7.40~7.60	Shear (N/mm2)	>6.50
Porosity/%	5.95~6.05	Impact (KJ/m2)	1.850~2.250

Compressibility

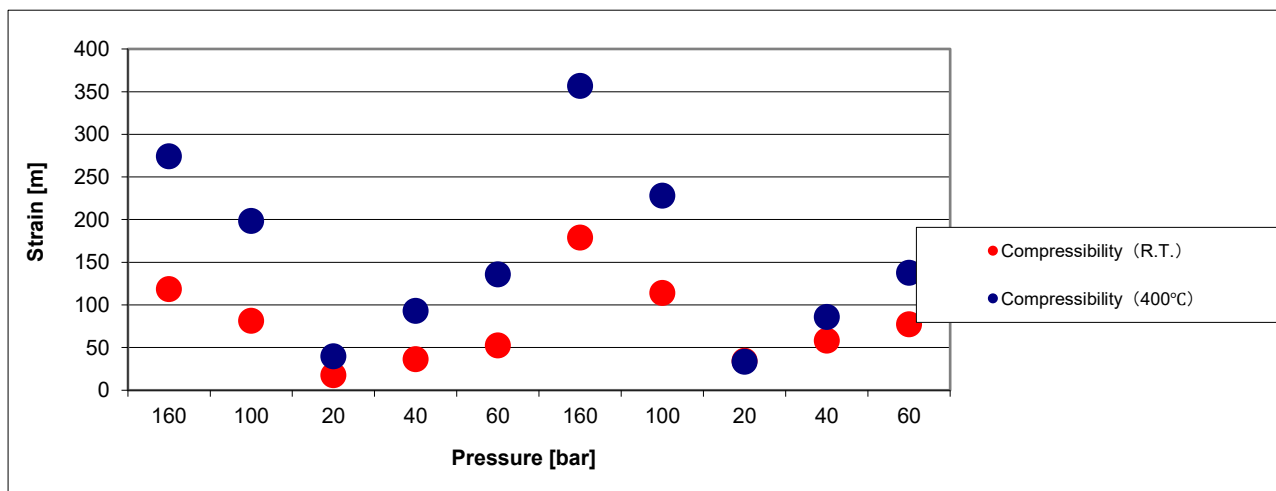
	Load Increment Ratio [Mpa/sec]	Initial Loading [Mpa]	Test Loading [Mpa]	Cycle
1	8±1	0.5	2~16	3

Compressibility (R.T.)

Load/bar	160	100	20	40	60	160	100	20	40	60
Cycle	3↓	3↑	3↑	3↑	3↑	1↓	1↑	1↑	1↑	1↑
Mean Value	[μm]	[μm]	[μm]	[μm]	[μm]	[μm]	[μm]	[μm]	[μm]	[μm]
	118.5	81.1	17.5	36.1	52.5	178.9	114.0	34.2	57.9	77.0

Compressibility (400°C)

Load/bar	160	100	20	40	60	160	100	20	40	60
Cycle	2↓	2↑	2↑	2↑	2↑	1↓	1↑	1↑	1↑	1↑
Mean Value	[μm]	[μm]	[μm]	[μm]	[μm]	[μm]	[μm]	[μm]	[μm]	[μm]
	274	198.3	39.8	92.9	135.8	356.6	227.9	33.2	85.8	137.4



SAE J-661 Chase Test

Test Request #:
108091-2-1

Customer Ref:
XBP Severe Duty FF

SAE J661 Rev Feb 1997 Brake Lining Quality Test

Test Information

Customer Name	International Motor Products, Inc.
Requestor	Rodolfo Lopez
Program Number	J661noinsp
Test Coordinator	Eric DeJules
Test Equipment	Chase Machine 5531
Test Dates	01/17/2023 - 01/24/2023
Datalogger	3.51
Template Version	1.78

Setup Details

Sample Material	XBP Severe Duty FF
Sample Size	1 inch x 1 inch
Sample Manufacturer	International Motor Products, Inc.
Test Pressure	150 psi

Sample Test Summary

Normal Friction Coefficient	0.545	Pass
Normal Friction Class	G	
Hot Friction Coefficient	0.482	Pass
Hot Friction Class	G	
Minimum Bold Coefficient	0.484	Pass
Max Variation Below Average for Bold Readings	0.044	Pass
Max % Variation for Bold Readings	8.10%	Pass

Pass / Fail

Pass

Comments:

Processed by:	Eric DeJules (313) 625-4000	Title:	Test Engineer	Date:	01/26/2023
Reviewed by:	Radoslaw Markiewicz (313) 625-4000	Title:	Laboratory Manager	Date:	01/26/2023

Data applicable to the materials tested and parameters agreed by customer. Valid if signed by the test engineer. Report can be copied in full. Bilateral uncertainty of measurements 0.63% of FS. Coverage factor of 2. Confidence of 95%. Details available upon request.

SAE J-661 Chase Test

Test Request #:
108091-2-1

Customer Ref:
XBP Severe Duty FF

Test Number							Manufacturer: International Motor Products, Inc. Material: XBP Severe Duty FF			
	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5					
	108091-2-1	108091-2-4	108091-2-5	108091-2-6	108091-2-7					
Initial Baseline										
Application	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5					
1	0.589	0.457	0.454	0.508	0.429					
20	0.617	0.444	0.480	0.492	0.449					
First Fade										
Temp (°F)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5					
200.0	0.614	0.457	0.479	0.501	0.463					
550.0	0.453	0.392	0.356	0.416	0.374					
(or Temp @ 10min)										
First Recovery										
Temp (°F)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Average	Norm/Hot			
500.0	0.514	0.466	0.413	0.444	0.436	0.454				
400.0	0.541	0.485	0.435	0.472	0.458	0.478	Hot			
300.0	0.568	0.500	0.466	0.492	0.480	0.501	Hot			
200.0	0.586	0.502	0.485	0.516	0.484	0.515				
Wear										
Application	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5					
1	0.575	0.504	0.490	0.501	0.492					
100	0.507	0.504	0.518	0.507	0.483					
Second Fade							Max Var.			
Temp (°F)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Average	< Average	Norm/Hot	% Var	
200.0	0.524	0.545	0.544	0.569	0.540	0.544	0.020	Normal	4%	
250.0	0.544	0.538	0.567	0.566	0.515	0.546	0.031	Normal	6%	
300.0	0.550	0.557	0.551	0.567	0.501	0.545	0.044	Normal	8%	
350.0	0.555	0.555	0.569	0.568	0.526	0.554	0.029	-	5%	
400.0	0.545	0.545	0.556	0.555	0.521	0.544	0.023	Normal	4%	
450.0	0.528	0.518	0.539	0.539	0.511	0.527	0.016	Hot	3%	
500.0	0.514	0.503	0.520	0.512	0.502	0.510	0.008	Hot	2%	
550.0	0.503	0.491	0.493	0.485	0.484	0.491	0.007	Hot	2%	
600.0	0.483	0.455	0.457	0.453	0.444	0.458	0.014	Hot	3%	
650.0	0.434	0.382	0.383	0.378	0.382	0.392	0.013	Hot	3%	
(or Temp @ 10min)										
Second Recovery							Max Var.			
Temp (°F)	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Average	< Average	Norm/Hot	% Var	
600.0	0.470	0.438	0.442	0.429	0.440	0.444	0.015	-	3%	
500.0	0.491	0.450	0.464	0.456	0.457	0.463	0.014	Hot	3%	
400.0	0.513	0.472	0.486	0.486	0.488	0.489	0.017	Hot	3%	
300.0	0.516	0.489	0.520	0.509	0.514	0.509	0.021	Hot	4%	
200.0	0.489	0.513	0.517	0.536	0.524	0.516	0.027	-	5%	
Final Baseline										
Application	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5					
1	0.530	0.527	0.523	0.541	0.503					
20	0.581	0.517	0.528	0.532	0.511					

SAE J-661 Chase Test

Test Request #:
108091-2-1

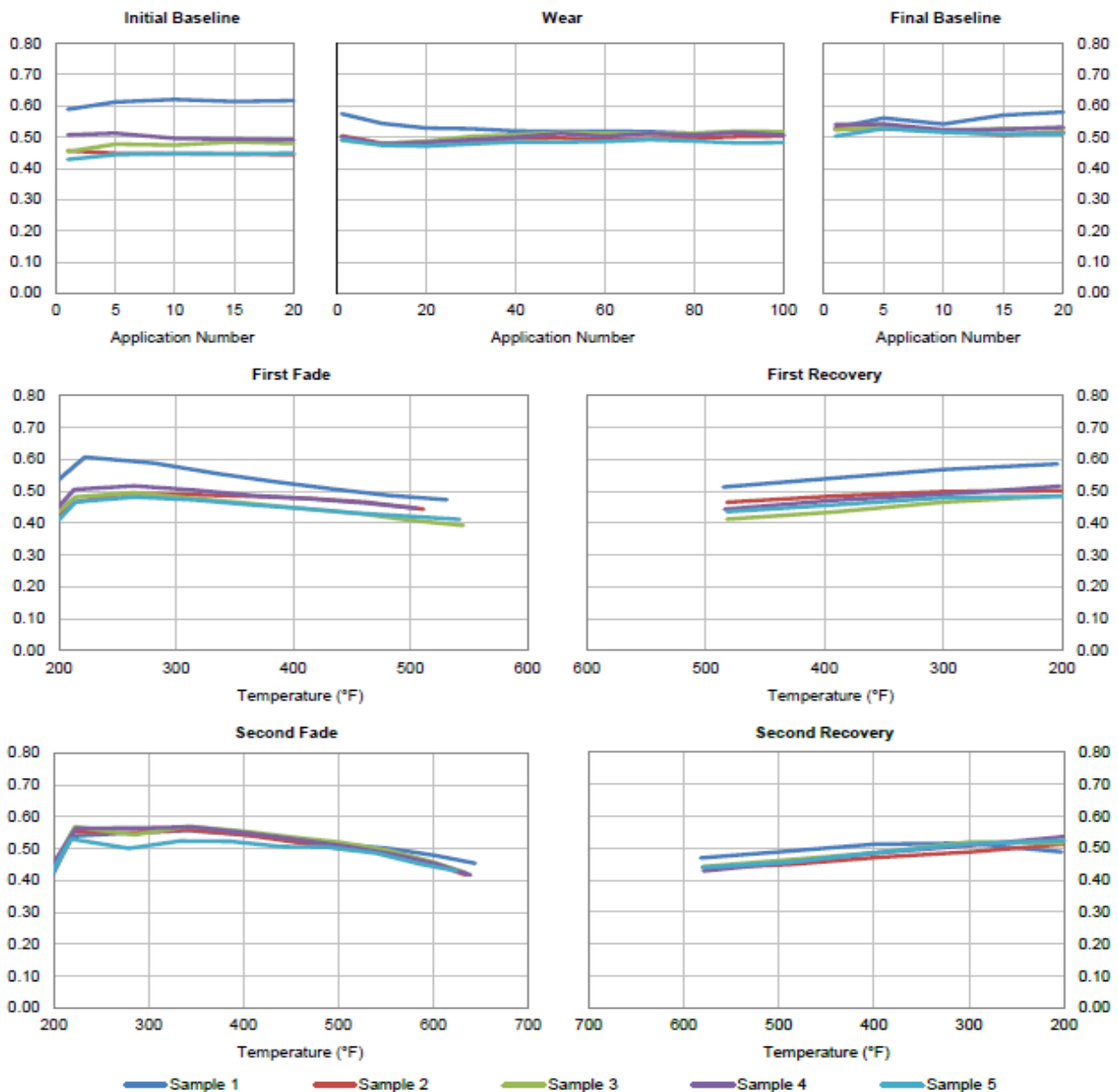
Customer Ref:
XBP Severe Duty FF

Manufacturer: International Motor Products, Inc.
Material: XBP Severe Duty FF
Test Pressure: 150 psi

Test Dates: 01/17/2023 - 01/24/2023

Summary of 5 Samples

Coefficient of Friction



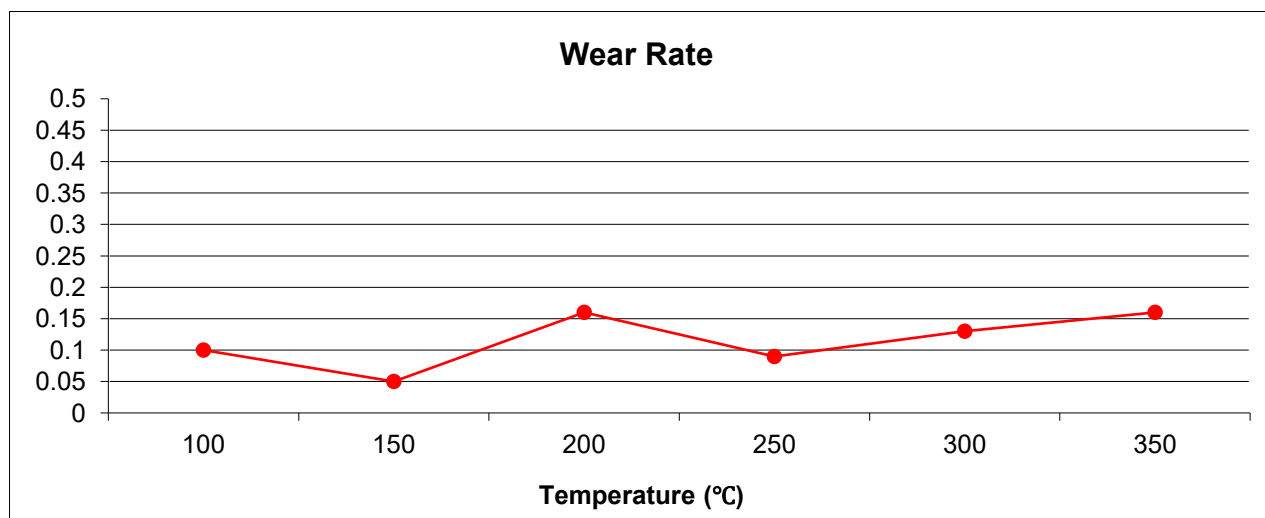
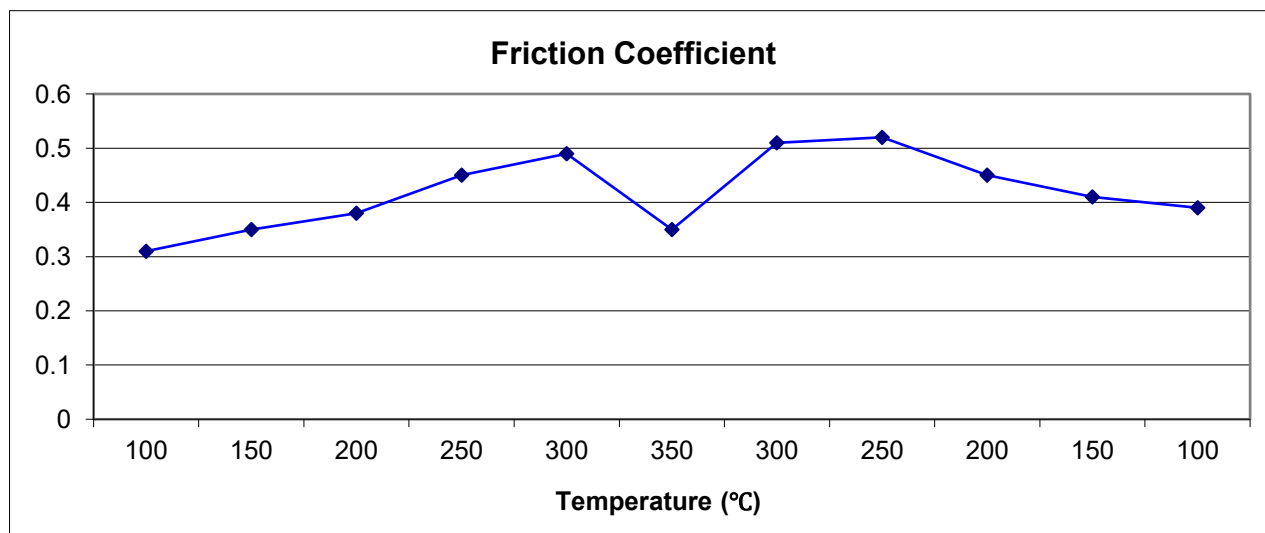
Friction and Wear - Constant Speed

b. Friction and wear

Equipment Name: Constant speed tester

Standard Applied: GB5763-2008

Test Temperature (°C)	Friction Coefficient	Coefficient appointed	Wear Rate 10-7cm ³ / (N·m)	Test Temperature (°C)	Friction Coefficient		Wear Rate 10-7cm ³ / (N·m)
					Warming	Cooling	
100	0.25-0.65	0.35±0.08	0-0.50	100	0.31	0.39	0.10
150	0.25-0.70	0.35±0.10	0-0.70	150	0.35	0.41	0.05
200	0.25-0.70	0.35±0.10	0-1.00	200	0.38	0.45	0.16
250	0.25-0.70	0.35±0.10	0-1.50	250	0.45	0.52	0.09
300	0.25-0.70	0.35±0.12	0-2.00	300	0.49	0.51	0.13
350	0.25-0.70	0.35±0.12	0-2.50	350	0.35		0.16



SAE J-2522 DYNAMOMETER BRAKE EFFECTIVENESS

Vehicle			Sample Model	D787-7656
			Engine Size	2.0 L
			Required Load	529 Kg
			Required Inertia	55.2 Kg·m2
			Piston Diameter	56.6 mm
			Effective Radius	112.0 mm
Dynamometer Brake				
Characteristic Values μ			AVG	MIN
Char. Value	(6.1)	μ_{avg}	0.375	
Char. Value	(6.2)	μ_{avg}	0.349	
Char. Value	(6.3)	μ_{0p6}	0.350	
Speed/pressure	(6.4.3)	μ_{v120}	0.334	
Speed/pressure	(6.4.5)	μ_{vmax}	0.238	
Char. Value	(6.5)	μ_{0P6}	0.279	
40°C Brake Apply	(6.6)	μ_{T40}	0.267	
Second Motorway	(6.7)	μ_{Mw2}	0.234	
Char. Value	(6.8)	μ_{0P18}	0.332	
Fade 1	(6.9)	μ_{F1}		0.162
Char. Value	(6.10)	μ_{0P18}	0.385	
Temperature	(6.12)	T500/ μ_{T300}		0.259
Char. Value	(6.13)	μ_{0P18}	0.324	
Fade 2	(6.14)	μ_{F2}		0.283
Char. Value	(6.15)	μ_{0P18}	0.328	
Nominal μ		μ_{avg}	0.306	

