## **Friction**





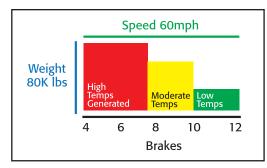
### **Heat Management**

### **Heat Is Your Friend**

There is only one way to safely stop your vehicle. The dynamics of vehicle braking comes down to converting the energy that your vehicle represents – kinetic energy (mass in motion) – into another form of energy – HEAT. This is precisely what the brake system is designed to do. Each brake represents a "heat generator" on the vehicle. The more brakes there are, the higher the capacity the system has to generate heat – it has the ability to convert more kinetic energy into

heat energy. This is why vehicles designed to carry heavier loads have more braking wheel-ends.

A vehicle with a loaded weight of 80,000 lbs traveling at 60 MPH represents an amount of kinetic energy that is the same no matter what kinds of vehicles you are comparing. Ultimately, the same amount of kinetic energy must be converted to heat energy in order to make the stop. Simply put, more brakes means lower temperatures generated at each wheel end to make the stop. Fewer brakes means higher temperatures to make the same stop.



### **Heat Is Your Enemy**

Generating heat is the key to efficient stopping. There are however instances when "unwanted" heat is introduced into the braking equation that makes the job more difficult. Examples of these are:

- Out of adjustment brakes if one or more brakes aren't working properly, the other brakes on the vehicle have to compensate and generate more heat this leads to imbalanced braking and uneven lining wear.
- Steep Grades the effort to control speed while going downhill leads to brakes constantly generating heat with little recovery time this causes brake lining performance to decline resulting in brake fade.
- Aggressive Driving drivers who wait longer to apply the brakes or drive faster generate higher brake temperatures a major factor that reduces the life cycle of brake lining along with safety concerns.
- Over Loaded Vehicles carrying weights beyond brake system design not only sacrifices safety, but also leads to premature wear on braking components including the brake lining.

### **Haldex High Performance Brake Linings - The Premium Solution**

When it comes to high performance braking, it's all about managing heat. Haldex offers the industry's premium solution relative to safe and efficient brake lining performance. The Haldex specification recognizes and accounts for situations when unwanted heat becomes a part of your braking equation. This design utilizes premium compounds that are resistant to high temperatures so you can be assured that no matter the situation, heat is being managed at an extraordinary level.



# **Drum Application Friction Selection Guide**

## **Application Description**

## **Normal-Duty Cycle**

Steep Grades Common, Stop-and-Go/High Speed Stops

**Load Factor** 

**Load Factor** 

Moderate

**Heavy-Duty Cycle** 

Mostly (90%+) Flat Roads Light Stop-and-Go

GG 2020 Extreme Haldex Steer Axle - Haldex GD 2016 **Load Factor** Moderate GD 2016 Load Factor GD 2016 Haldex

Available Brake Power – Low

**GVWR <40,000 LBS** 

2-Axle Dumps

**Potential Load Factor - Low** 

GG COMBO

GG 2020

GD 2016

Haldex

Steer Axle - Haldex GG 2020

Extreme Haldex



**Available Brake Power – Moderate** Potential Load Factor - Moderate **GVWR <65,000 LBS 3-Axle Dumps** 

<b>Load Factor</b>	<b>Load Factor</b>	<b>Load Fact</b>
Low	Moderate	Extreme
Haldex	Haldex	Haldex
GD 2016	GG 2020	GG 2020
Steer A	Steer Axle - Haldex GD 2016	2016

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Load Factor Load Factor	Moderate Extreme	Haldex Haldex	GG 20	
<b>Load Factor</b>	Low	Haldex	Steer A	



Available Brake Power - Moderate Potential Load Factor - High **GVWR <80,000 LBS 4-Axle Dumps** 

Load Factor Extreme	Haldex GZ SEMI	G 2020
Load Factor Moderate	Haldex GC COMBO	Steer Axle - Haldex GG 2020
oad Factor Low	Haldex GG 2020	Steer A

Load Factor Extreme	Haldex GM SEMI	2020/2035	
Load Factor Moderate	Haldex GZ SEMI	Steer Axle - Haldex GC 2020/2035	
Load Factor Low	Haldex GC COMBO	Steer Axle	
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Potential Load Factor - Extreme **Available Brake Power – High GVWR** <120,000 LBS 5/6-Axle Dumps

Haldey voblet		Extreme
	Haldex	Haldex
GD 2016 GG 2	GG 2020	GC COMB
Steer Axle - Haldex GG 2020	- Haldex G	G 2020

Load Factor	Haldex	2020/2035	Load Factor
Extreme	GM SEMI		Extreme
Moderate	Haldex GM SEMI	Steer Axle - Haldex GC 2020/2035	Load Factor Moderate
Load Factor	Haldex	Steer Axle	Load Factor
Low	GZ SEMI		Low
ne	ABO		ıctor ne



Potential Load Factor - Extreme Available Brake Power – High **GVWR** >120,000 LBS 7+-Axle Dumps

<b>Load Factor</b>	<b>Load Factor</b>	<b>Load Fac</b>
Low	Moderate	Extrem
Haldex	Haldex	Halde
GD 2016	GG 2020	CC COM
Steer A	Steer Axle - Haldex GG 2020	2 2020

Haldex High Performance Brake Linings for Dump Applications



Steer Axle - Haldex GG 2020

GC COMBO

**GG 2020** 



750° Effective Range **FMVSS 121 Certified OEM Performance** 23K organic **GD 2016** 















