

Automotive Applications for Magnetic Materials

Introduction

The magnet is one of many products that modern society takes for granted.

Ask any person today what does a magnet look like? Their reply is usually “red and horseshoe shaped”, this opinion stemming from TV cartoons and from remembered basic school magnetic lessons. In reality, the truth is that magnets are not usually painted red and are anything but horseshoe shaped!

Magnets today are used in a vast array of products from Fridge magnets to Dentistry and from Loudspeakers to Space research. New applications for magnetic materials grow exponentially every few years.

This is certainly true in the Automotive sector. The modern Automotive market demands an increasing degree of sophistication in both the control and comfort of its products. Today’s cars have electric motors for door mirror positioning, window lift, seat positioning, and engine cooling fans. In addition Air Conditioning, ABS and anti-skid, multi speaker radio and CD s systems are today not just encountered in prestige products but are fitted as standard on most models. The average modern car contains upwards of two hundred magnets covering all these applications.

In future, Drive by wire, Electrical steering, Braking systems, Climate control, and Headlight positioning, coupled with the planned move to adopt higher voltages in automotive electrics will ensure the dramatic growth trend in Automotive magnetic material usage continues.

Current Applications

Most current applications fall into five broad categories: -

- 1) Motor Applications**
- 2) Sensing Applications**
- 3) Actuators**
- 4) Instrumentation**
- 5) Loudspeakers**

1.Motor Applications

Typical common applications include

Power steering motors
Starter motors
Alternators
Engine Cooling fans
Windscreen Wipers

Washer pumps
Fuel pumps
Antenna lift
Window actuation
Heat and Air conditioning motors
Seating position motors
Sunroof motors
ABS pumps
Engine water pumps
Headlight positioning – *Must be used to control the beam height of Gas Discharge Headlamps but could be linked to steering to point in the chosen direction.*

2.Sensing Applications

These include

ABS and anti skid systems
Headlight position
Steering
Road Speed
Inertia sensing (Crash/Airbag)
Throttle
Engine speed (Crankshaft)
Remote locking/unlocking
Tyre pressure sensing
Alarm and security

3.Actuators

Anti skid
Suspension (both active and self leveling)
Throttle
Airbag

4.Instrumentation

Dashboard instruments - *including speed, engine speed, temperature, oil pressure etc.*

5. Loudspeakers

Sound systems
Navigation and information systems
Anti noise system – *currently being used in commercial aviation but could make the transition to Automotive usage in the near future*
Car Alarm Sounders.

