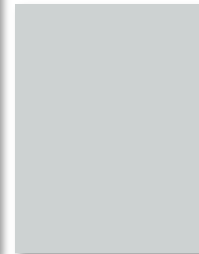
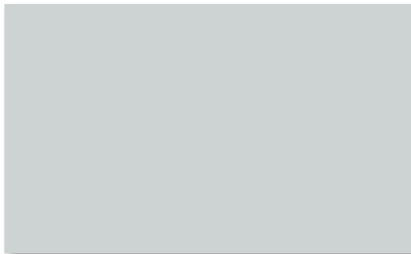
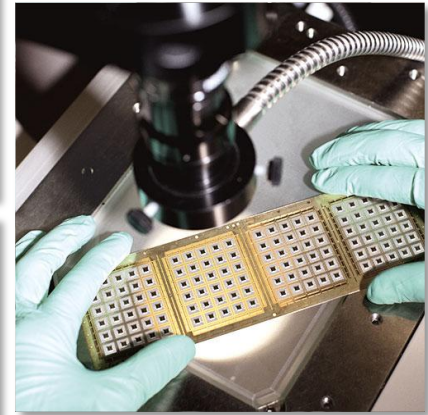
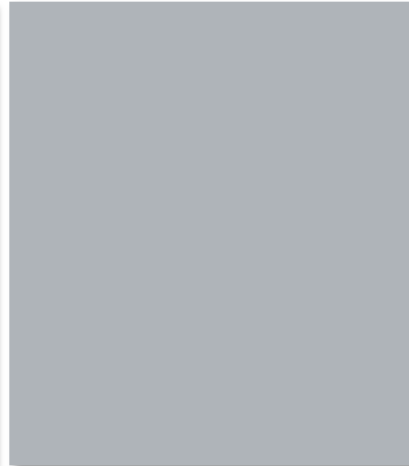
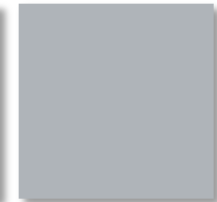


# Role of Adhesives in Reducing Vehicle Mass

Dan Wohletz  
Vice President,  
Technical Sales North America  
March 17, 2015



Excellence is our Passion

# Who we are

Global leading positions in consumer and industrial businesses

## Consumer Businesses

### Laundry & Home Care



**Persil** **Purex** **Pril**

### Beauty Care



Schwarzkopf syoss **Dial**

## Industrial Business

### Adhesive Technologies



**LOCTITE** **BONDERITE.**  
**TECHNOMELT**

# Henkel Automotive

## The Power of Being Everywhere in Every Car

Henkel Solutions ENABLE lightweight, safer, greener and quieter vehicles!

Market Needs

	Sealing & Coating	Assembly Adhesives	Acoustics & Structurals	Engineering Adhesives	Surface Treatment	Cleaners & Lubricants
Powertrain						
Chassis						
Body In White						
HVAC						
Electronics						
Exterior						
Interior						

# Vehicle Lightweighting in North America

- The average vehicle will be 400 pounds lighter by 2025 <sup>2</sup>
- Average materials content of North American light vehicles (pound/vehicle)

	2009 <sup>1</sup>	2010 <sup>1</sup>	2011 <sup>1</sup>	2025 <sup>2</sup>
Regular steel	1,501	1,542	1,458	950
High & medium strength steel	524	559	608	858
Aluminum	324	344	355	550
Plastics/Composites	369	371	377	400
Magnesium	11	11	12	100

<sup>1</sup> American Chemistry Council

<sup>2</sup> Ducker Worldwide

# Adhesives Enable Vehicle Lightweighting



# Impact of Adhesives through the Years

1960s

- Epoxy/plastisols replace welding in hood assembly
- Enhance anti-fluttering

1980s

- Silicones replace hard gaskets in automotive powertrains
- Higher quality and lower cost

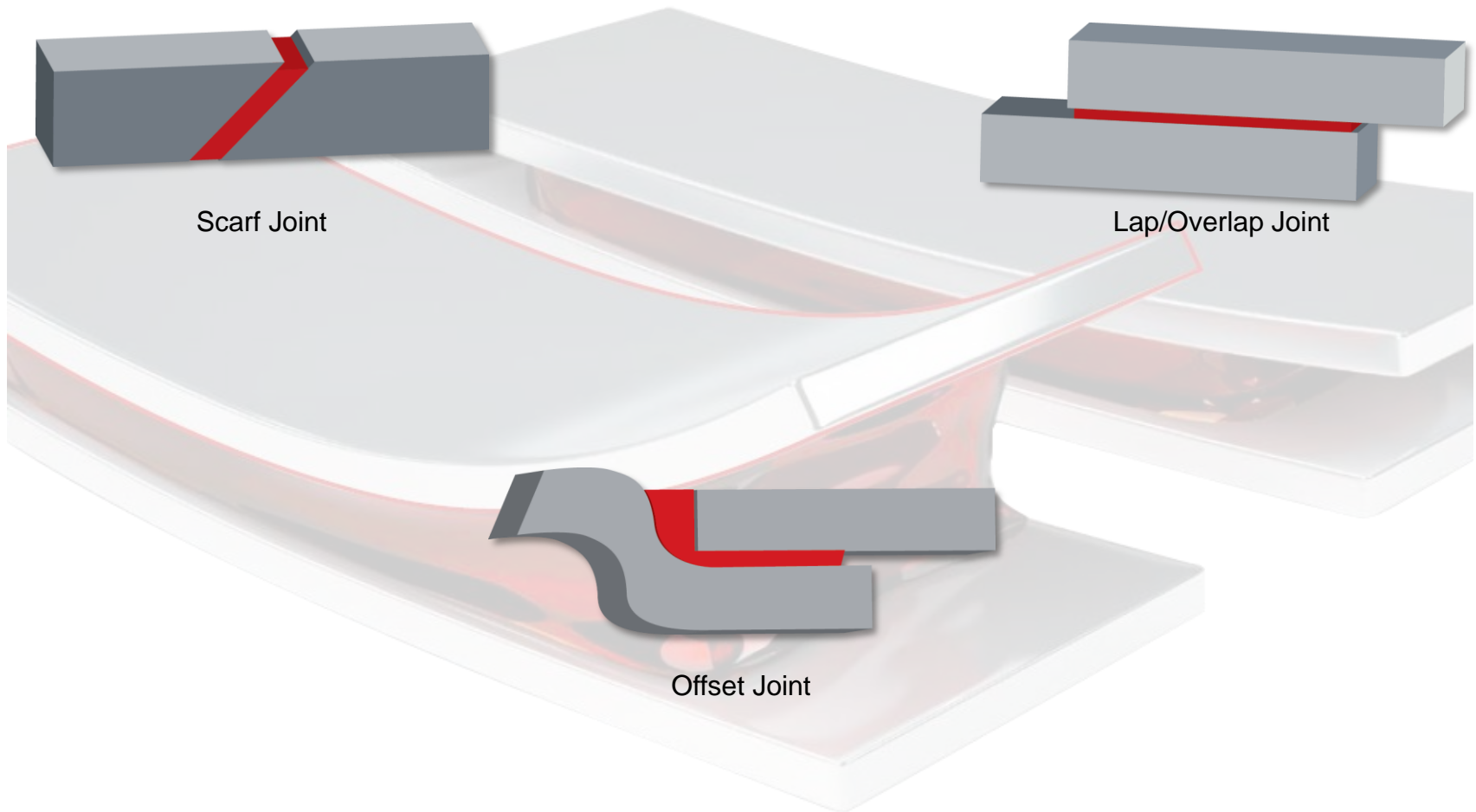
2000s

- Structural adhesives enhance mechanical fastening in vehicle body
- Improve structural integrity

# Adhesives Enable Joining of Mixed Materials



# The Chemistry of Adhesives

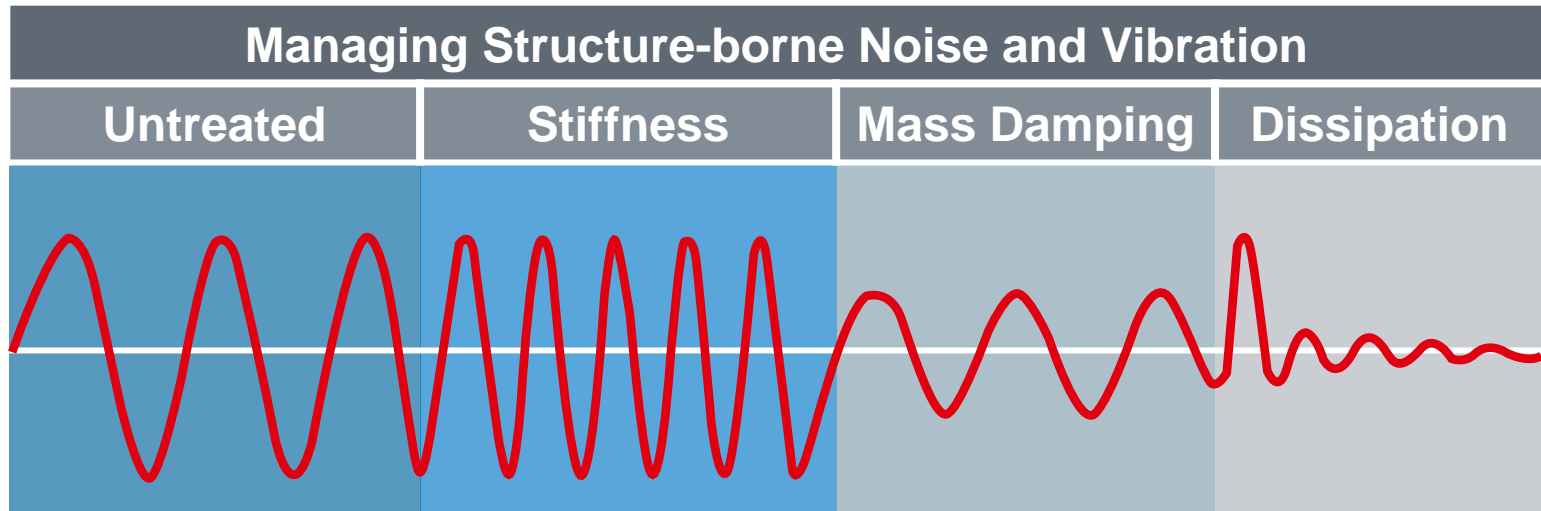




# Using Adhesives to Improve Safety and Comfort



# Adhesives Deliver a Quieter Driving Experience



Henkel's Liquid Applied Sound Deadeners

# Adhesives Enable Mass Production of Composites

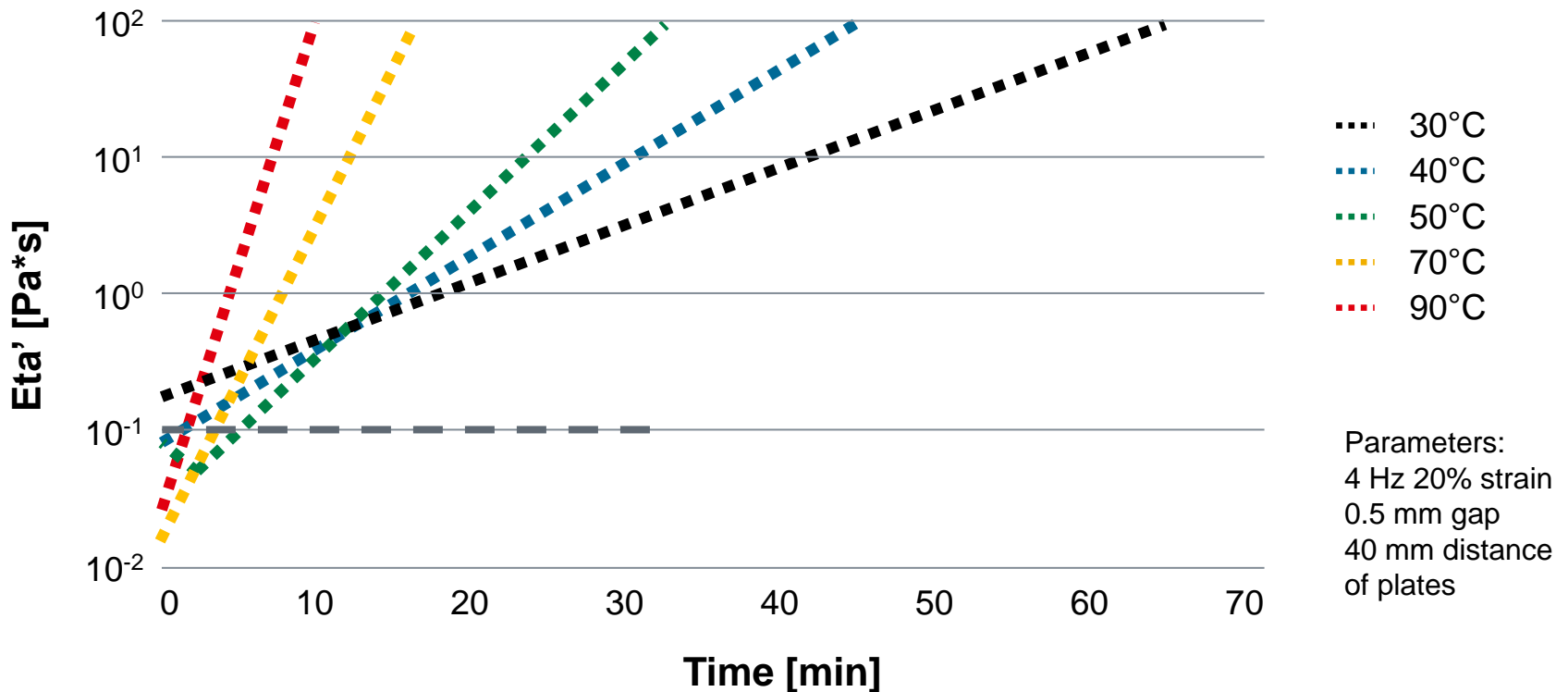
Composites have the potential to reduce vehicle weight up to 60 percent.

Source: Oak Ridge National Laboratory



# Improving Composite Processing Speed Using Polyurethane-based Material

- **Very low viscosity** allows fast injection – injection speed: 50-100 g/sec
- **Fast curing resin** – accelerator enables tailored cure profile
- **Lower exothermy** compared to epoxy resins



# Collaboration in Vehicle Lightweighting

Apx. 27  
pounds of  
adhesives  
today per  
vehicle

Across  
industries,  
adhesive  
growth is  
between 4 and  
5 percent a year



Sources: Wall Street Journal and IHS