AST and UST Storage of DEF – What's Best for You?
Outline

• What is SCR & DEF?
• DEF Industry Background
• DEF Market Update
• Storage and Dispensing Equipment Solutions
Why DEF?...2010 EPA Mandate

• Clean Air Act of 1970
• Reduces Harmful NOx (Nitrogen Oxides)
• Technology of Choice – Selective Catalytic Reduction (SCR)
• Stages of Mandate:
  – 2010 All on-road diesel vehicles (Class 1 – 8)
  – 2012 Off-road (Construction, Agriculture & Generators)
  – 2014 Marine (freshwater)
  – 2015 RR locomotives
  – 2017 Marine (Ocean vessels w/ US flags)
Selective Catalytic Reduction (SCR)

\[(\text{NH}_2)\text{CO} + \text{H}_2\text{O}\rightarrow 2\text{NH}_3 + \text{CO}_2\]

Urea + water \rightarrow Ammonia + Carbon dioxide

\[\text{NH}_3 + \text{NO} + \text{NO}_2 \rightarrow \text{N}_2 + \text{O}_2 + \text{H}_2\text{O}\]

Nitrogen Oxides \rightarrow Air + Water
## DEF Material Compatibility

### COMPATIBLE
- Plastics (HDPE, CPVC)
- Rubber
- Stainless Steel (304 & 316)
- Fiberglass

### NOT COMPATIBLE
- Carbon steel
- Iron
- Zinc
- Nickel
- Aluminum
- Copper
- Brass

![Image of materials in jars](image-url)
ISO Certification

ISO Standard 22241 -

1. Quality Requirements
2. Test Methods
3. Handling, Transportation & Storing
4. Refilling Interface
DEF Product Characteristics

- Non-hazardous and non-toxic
- Weighs 9.1 lbs per gallon
  Heavier than Petroleum Products
  Bulk Load <5,000 gallons
- Will freeze at 12°F (-11°C)
- “Leaking and Creeping” tendencies
Many Different Manufacturers…
SHELF LIFE VS TEMPERATURE

Months

Average Temperature (°F)

0 60 80 100 120 140

0 12 24 36
DEF Started with Small Containers...
DEF Progressed to Drums...
DEF Transitioned to Totes…
DEF Has Now Progressed to Bulk Storage...
DEF Dispensing
CRYSTALLIZATION ON NOZZLE IS NORMAL
Where does it go in the Vehicle?
Instrumentation

EXHAUST FLUID
RANGE: 150 MI
Washington DC, 2013...
DEF Equipment Forecast

- Majority of market will be multidrop (minibulk) = Blue1 market strength

DEF Volume by Delivery Format

(in millions of gallons)
BLUE1USA Equipment

Mini-Bulk Systems
BLUE1USA Equipment
Tote Cabinets
BLUE1USA Equipment
Commercial Mini-Bulks

- BUILT-IN
- DISPENSER
- COMPATIBLE W/ ALL CARD READERS
- NARROW FOOTPRINT W/ 500, 750, & 1,000 GAL SIZES
BLUE1USA Equipment

Remote Mini-Bulks

- INTEGRATES w/ ANY 3RD PARTY DISPENSER
- AVAILABLE W/ ECONOMICAL LEVELING FRAME
- 500 - 3,400 GALLON SIZES
BLUE1USA Equipment
Mini-Bulk Construction

• Primary poly tank w/ secondary containment
• Insulated exterior made of 100% composite materials
• Stainless Steel Piping
• Turn-key, pre-wired components
Blue1Box

- Insulated & Non-Insulated
- Narrow, Compact Footprint
- 1,000 Gal Capacity
- Economical
- Perfect for Commercial Fleets
BLUE1USA Equipment

Tote Cabinets
BLUE1USA Equipment

Tote Cabinets

Non-Insulated Exterior

Insulated Exterior
Blue1USA DEF Dispensers
Bulk Storage Solutions

SITE SPECIFIC PRICING
Bulk Storage, 3,000 to 8,400 Gals
CERTIFIED TO UL & CSA ELECTRICAL STANDARDS

Blue1USA
3883 Rogers Bridge Rd.
Suite 205-A
Duluth, GA 30097
770-688-1958
www.blue1usa.com

Model: DEF Mini-Bulk
Electrical: 120/240 V
30 A
60 Hz

Conforms To:
UL 508
Certified To:
CSA C22.2 No14-10
Underground Options for DEF Storage
## WHAT SIZE STORAGE FACILITY DO I NEED?

### DEF STORAGE SYSTEMS

### STORAGE CAPACITY MATRIX AND CALCULATOR

<table>
<thead>
<tr>
<th># VEH</th>
<th>DIESEL GAL/WK</th>
<th>WEEK</th>
<th>MONTH</th>
<th>QUARTER</th>
<th>YEAR</th>
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<tbody>
<tr>
<td>1</td>
<td>385</td>
<td>12</td>
<td>50</td>
<td>150</td>
<td>600</td>
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<tr>
<td>3</td>
<td>1,154</td>
<td>35</td>
<td>150</td>
<td>450</td>
<td>1,800</td>
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<tr>
<td>5</td>
<td>1,923</td>
<td>58</td>
<td>250</td>
<td>750</td>
<td>3,000</td>
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<tr>
<td>8</td>
<td>3,077</td>
<td>92</td>
<td>400</td>
<td>1,200</td>
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<td>115</td>
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<tr>
<td>26</td>
<td>10,000</td>
<td>300</td>
<td>1,300</td>
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<tr>
<td>40</td>
<td>15,385</td>
<td>462</td>
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<td>923</td>
<td>4,000</td>
<td>12,000</td>
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<tr>
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<td>38,462</td>
<td>1,154</td>
<td>5,000</td>
<td>15,000</td>
<td>60,000</td>
</tr>
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</table>

120,000 Miles Per Year
6.00 MPG
3% % DEF per gallon of Diesel

### RECOMMENDED STORAGE CAPACITY

<table>
<thead>
<tr>
<th>DEF USAGE PER PERIOD (GALLONS)</th>
<th>WEEK</th>
<th>MONTH</th>
<th>QUARTER</th>
<th>YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 gal Drum</td>
<td>20+</td>
<td>80+</td>
<td>240+</td>
<td>960+</td>
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<tr>
<td>275 gal Tote</td>
<td>80+</td>
<td>350+</td>
<td>1,400+</td>
<td>5,600+</td>
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<tr>
<td>1,000 - 5,000 gal Mini-Bulk Storage System</td>
<td>160+</td>
<td>700+</td>
<td>2,800+</td>
<td>11,000+</td>
</tr>
<tr>
<td>8,000+ Bulk Storage</td>
<td>1,375+</td>
<td>5,500+</td>
<td>15,500+</td>
<td>62,000+</td>
</tr>
</tbody>
</table>

YELLOW HIGHLIGHTED CELLS CAN BE MODIFIED BY USER
Who is Blue1USA?

- Manufacturer of DEF storage & dispensing equipment
- Providing fleet fueling solutions since 1998
- Corporate Office in Duluth Georgia.
- Manufacturing facility in Little Rock, AR
National Distributor Network

Service and Product Support

- 50 States
- 100 + Branches
- 600 + Service Technicians
- Parts & Service Support
Questions?