APPENDIX 4E

MANUFACTURER'S DATA REPORT ON INFLATABLE BERMS

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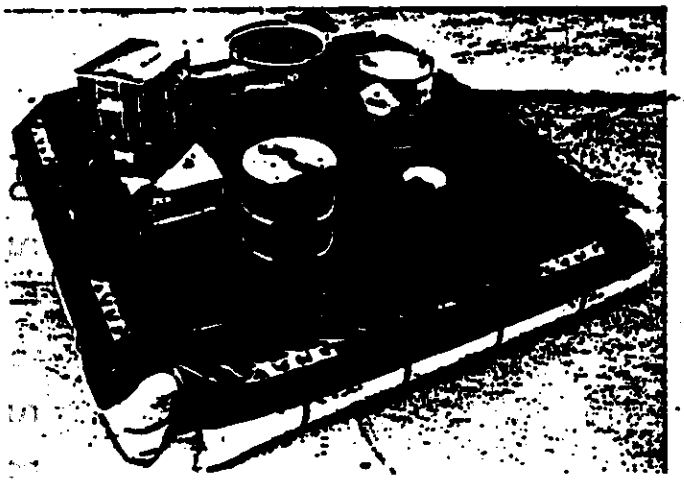
PORT-A-BERM™

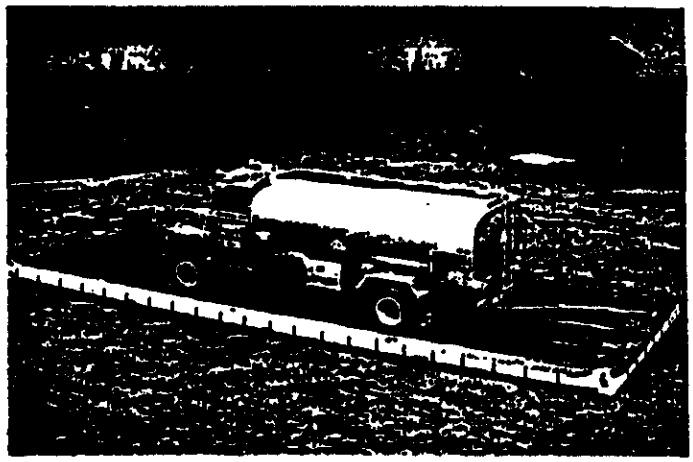
INFLATABLE SECONDARY CONTAINMENT

TECHNICAL DATA SHEET

- Spill Containment
- Leak Collection
- DeCon Operations
- Toxic Waste Isolation



Port-A-Berm contains leaking tanks, drums, barrels, crates, pails etc.



Port-A-Berm confines heavy duty equipment during filling, discharging and cleaning.

STANDARD UNITS AVAILABLE

P-A-B Part No.	Dimensions L x W x H	Max. Capacity	Req'd Air Volume	Single or Dbl. Lined	Empty Weight
125110	10' x10' x17"	750 gal.	70 c.f.	S	100 lbs.
125117	13' x13' x17"	1,800 gal.	80 c.f.	S	150 lbs.
125111	18' x18' x17"	3,400 gal.	130 c.f.	S	200 lbs.
125112	24' x24' x17"	6,100 gal.	170 c.f.	S	280 lbs.
125113	32' x32' x17"	10,800 gal.	230 c.f.	S	440 lbs.
125130	32' x32' x34"	21,600 gal.	920 c.f.	S	580 lbs.
125139	74' x34' x34"	53,400 gal.	1,500 c.f.	S	1,180 lbs.
125151	45' x16' x17"	7,600 gal.	220 c.f.	D	570 lbs.
125154	65' x16' x17"	11,000 gal.	290 c.f.	D	800 lbs.
125158	50' x22' x17"	11,600 gal.	260 c.f.	D	760 lbs.

CUSTOM SIZES TO 300,000 GALLONS AVAILABLE

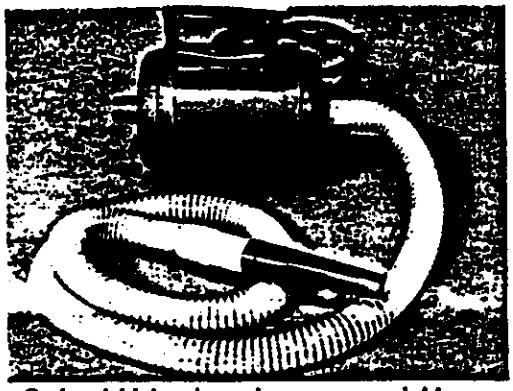
PORT-A-BERM™
THE *ULTIMATE* HAZ-MAT TOOL!

OS-407

PORT-A-BERM™

1) Port-A-Berms (P-A-B) may be set up on asphalt, concrete, sand or soil if the surface is well groomed and level. Rough or irregular terrain should be graded and covered with geotextile mat before deploying the P-A-B. Be certain the underlying surface is sufficient to support intended loads without shifting or damaging the P-A-B.

Port-A-Berm collapses into a neat compact bundle, only 1% of its full volume.



Optional high volume, low pressure air blower makes inflating Port-A-Berm quick and easy.

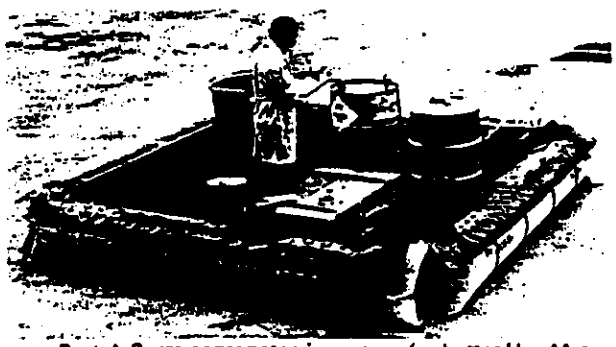
2) Four separate air chamber tubes are provided to form the inflatable berm or dike. These are to be positioned within the liner retention loops and filled with air using the inflation nozzle provided. Use a high volume, low pressure and non-sparking air source. Both the nozzle and each tube are equipped with a 2.5 psi relief valve to prevent over-pressurization.

3) If sharp or abrasive equipment is to be placed within the P-A-B liner, a protective "Type R" sheet or plywood panels should first be laid out inside the P-A-B.

4) Spills collected within a P-A-B should be neutralized or transferred to permanent containers promptly. P-A-B is a <u>temporary</u> holding medium to afford hours or a few days of containment. Chemical resistance data is based on an exposure limit of 7 days duration. Material samples are available for customers' immersion testing.

5) The P-A-B air inflation tubes are constructed of a special reinforced gray elastomer laminate. It is designed to provide abrasion resistance, low temperature flexibility and excellent air retention (low diffusion). However, this material does not exhibit quite the same outstanding chemical resistance as the unique P-A-B black liner material. As much as possible, avoid contact between the inflation tubes and any strong acids, alkalies, ketones or aromatics.

6) Before folding and storing, the Port-A-Berm liner should be thoroughly scrubbed, rinsed and dried.

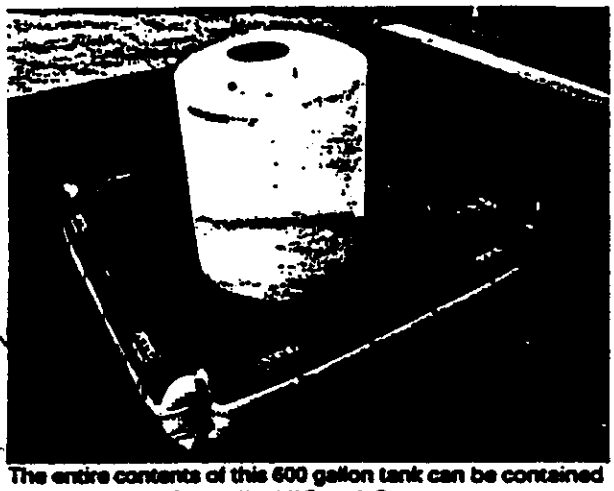


Port-A-Berm segregates inventory for better Haz-Mat accounting during DEP, EPA, and ECRA clean-ups.

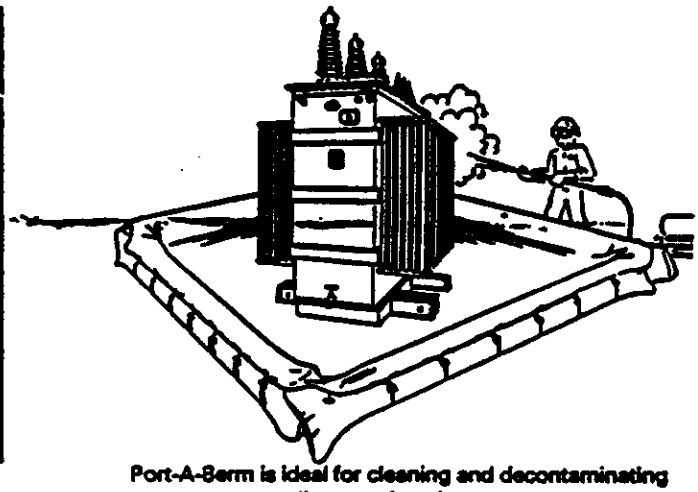
7) The deployed P-A-B is fully effective from 0° F to 140° F. However, folding and unfolding during packing and set-up operations should be performed at 40° F to 120° F to minimize fabric stresses.

8) In high wind environments, it is advisable to fill each tube 1/3 with water and the balance with air or nitrogen. Some make-up air may be necessary due to gas dissolution in water.

9) Rain water, snow, dirt etc. should be promptly and regularly removed from the P-A-B to maximize spill retention volume.



The entire contents of this 600 gallon tank can be contained by a 10' x 10' Port-A-Berm.



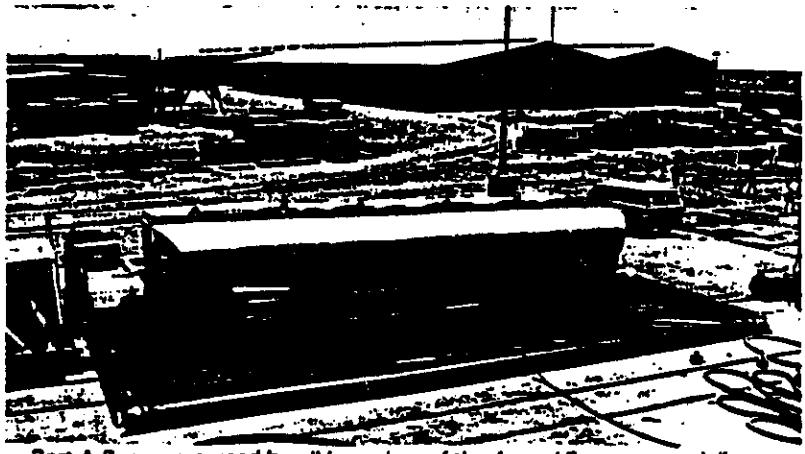
Port-A-Berm is ideal for cleaning and decontaminating all types of equipment.

10) To speed deflation, the P-A-B tubes may be removed from their retention straps and rolled up toward the fill/discharge fitting. Alternatively, they may be suction scavenged with a vacuum.

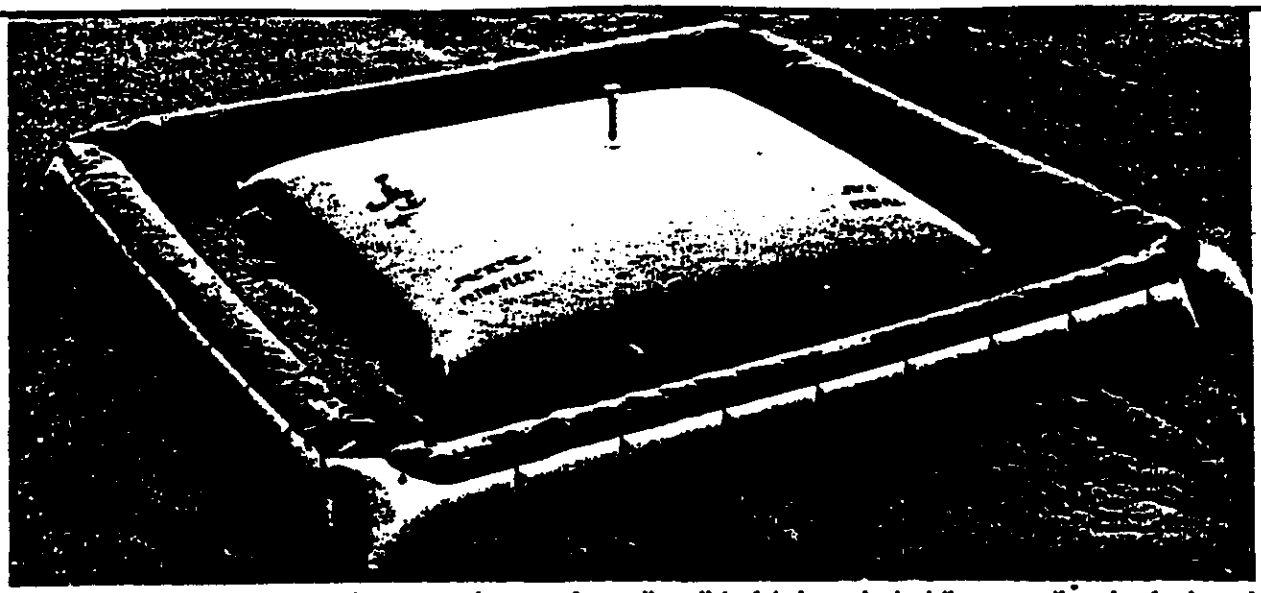
11) The P-A-B liner may be "over-lined" with a thin disposable polyethylene sheeting. This procedure is viable in many cases to eliminate cleaning and drying the primary P-A-B liner after a spill.

12) P-A-B part numbers between 125150 and 125160 designate a special Port-A-Berm with an added bottom ply. They are intended to collect spills and overflow from wheeled vehicles, tank trucks, ISO tank-containers and light aircraft.

13) Custom sized P-A-B systems are available on special order. Heights to 50 inches and lengths up to 100 feet are possible for a 300,000 gallon maximum capacity.



Port-A-Berms are used by all branches of the Armed Forces, especially at Army and Navy Maintenance Depots.



Port-A-Berm provides secondary containment for collapsible fabric tanks holding gasoline, jet fuel, toxic wastes, hazardous chemicals, contaminated water, etc.

GENERAL CHEMICAL RESISTANCE
7-DAY MAXIMUM EXPOSURE (ROOM TEMP.)
PORT-A-BERM LINER

A = little or no effect B = minor to moderate effect C = severe effect

Acetic Acid (5%)	B	Methyl Ethyl Ketone	C
Ammonium Phosphate	A	Mineral Spirits	A
Animal Oils	A	Motor Oil	A
Aqua Regia	C	Naptha	A
ASTM Fuel A&B	A	Nitric Acid (5%)	B
Benzene	B	Nitric Acid (50%)	C
Calcium Chloride Soln.	A	Perchloroethylene	C
Calcium Hydroxide	A	Phenol	C
Chlorine Solution (20%)	A	Phenol Formaldehyde	B
Ammonium Hydroxide (Conc.)	A	Phosphoric Acid (50%)	A
Corn Oil	A	Phthalate Plasticizer	C
Crude Oil	A	Potassium Chloride	A
Diesel Fuel	A	Potassium Sulphate	A
Ethyl Acetate	C	Salt Water (15%)	A
Ethanol	A	Sea Water	A
Furfural	C	Sodium Acetate Solution	A
Gasoline	B	Sodium Bisulfite Solution	A
Glycerine	A	Sodium Hydroxide (60%)	A
Hydraulic Fluid (Mineral)	A	Sodium Phosphate	A
Hydrochloric Acid (50%)	A	Sulphuric Acid (50%)	A
Hydrofluoric Acid (50%)	A	Tanic Acid (50%)	A
Hydrofluorosilic Acid (30%)	A	Toluene	B
Isopropyl Alcohol	A	Transformer Oil	A
JP-4 Jet Fuel	A	Turpentine	A
Kerosene	A	Urea Formaldehyde	A
Linseed Oil	A	Vegetable Oil	A
Magnesium Chloride	A	Water (200° F)	A
Magnesium Hydroxide	A	Xylene	B
		Zinc Chloride	A

ATL® PORT-A-BERM™ Liner System
Aero Tec Laboratories Inc.
Spear Road Industrial Park Ramsey, NJ 07446 USA
TEL: 201-825-1400 FAX: 201-825-1962 TLX: 642-730 ATL INC

TOLL FREE
800-526-5330

AERO TEC LABORATORIES INC.

March 20, 1992

Westinghouse
Attn: Mr Don Scully

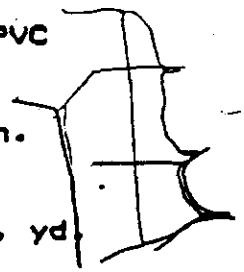
Dear Don,

Below is a list of the physical properties that you requested for our ATL 524-B, the material used as the liner for the Port-A-Berm. ATL 524-B is a coated fabric consisting of a very strong polyester cloth coated with a chemical resistant rubber-like coating. We have found that the coating will stand up to most chemicals, especially in short term exposure as is typical with a Port-A-Berm.

I have enclosed a Port-A-Berm installation instruction sheet for your perusal, unfortunately we have no specific instructions regarding the positioning of a truck in the Berm.

ATL TYPE R (524-B) PORT-A-BERM LINER MATERIAL SPECIFICATIONS

COATING	Modified PVC
REINFORCEMENT	Polyester
COLOR	Black
TENSILE	275 lb./in.
TEAR	60 lb.
PUNCTURE	120 lb.
WEIGHT	30 oz./sq. yd.



If there are any questions or problems or if you need any further information please don't hesitate to call.

Sincerely,

Albert S. Baris
V.P. Research and Development

ASB/asb

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AERO TEC LABORATORIES INC.

Technical Data Sheet

ATL PORT-A-BERM INSTALLATION PROCEDURE

CAUTION

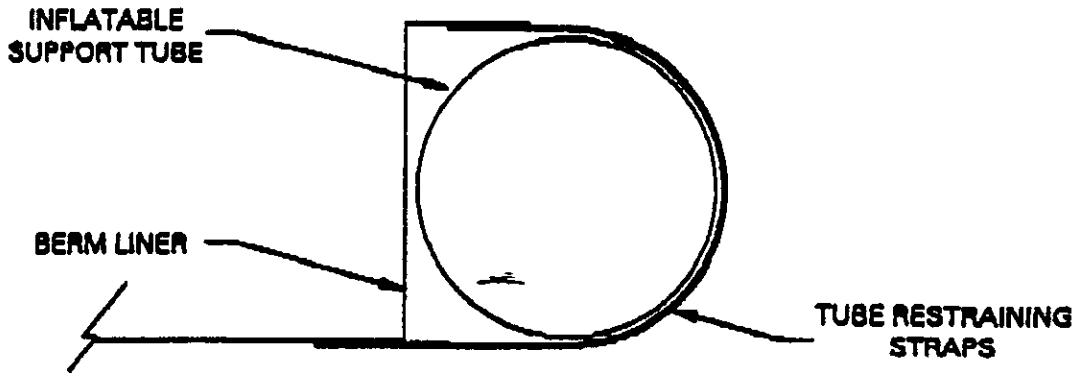
The ATL Port-A-Berm is intended for the temporary containment of materials in emergency situations. Short term resistance to most industrial chemicals may be expected, although customer verification of specific compatibilities is required.

SITE PREPARATION

The Port-A-Berm installation site should be smooth, level and free of any objects that may puncture either the Support Tubes or the Liner. A Ground Cloth may be located under the Port-A-Berm for added protection.

SET-UP

The Port-A-Berm was designed with ease of on-site installation in mind. The first step is to remove the Port-A-Berm Liner (black) from it's shipping container. NOTE: DO NOT PULL THE LINER BY THE TUBE RESTRAINING STRAPS. Center the Liner on the prepared site and unfold it. The next step is to insert the the uninflated Tubes (grey) into the Liner Tube Restraining Straps. The Tubes, if folded in half lengthwise first, will slide easily through the straps along the sides of the Liner. Once the four Tubes have been installed and centered on the sides of the Liner they may be inflated. The Tubes are inflated through the red capped valves, one per Tube. To inflate the tubes the red cap is turned one full revolution counter clockwise and a low pressure air source (max 1 psi) is applied . When the Tubes are filled to their full diameter the air source is removed and the red cap is tightened. The Port-A-Berm is now ready for use. Note: fast deflation may be accomplished by removing the red cap completely.



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"INNOVATION THROUGH INVOLVEMENT"

April 7, 1992

Weather Resistance of Plasticized Polyvinyl Chloride

The *Encyclopedia of Chemical Technology*, volume 18, page 148 (Kirk-Othmer 1982) contains test data on the weather resistance of plasticized polyvinyl chloride (PVC). The test used 0.5-millimeter thick, unbacked sheet PVC containing 1 part carbon black per hundred parts rubber. The sample was continuously exposed to solar radiation at Miami, Florida. The sample was oriented to be facing due south at a 45 degree angle to the horizontal. The following results were obtained:

- Micro-Masland cold cracking at 0 °C (32 °F) (modified from ASTM D 1790-62) did not occur for 5 years
- 180 degree bend failure (cracking at room temperature) did not occur after 15 years
- final failure (severe discoloration, cracking, and tearing) did not occur after 15 years.

The above ultraviolet exposure conditions should be at least as severe as those found at the Hanford Site. Therefore, significant degradation to the berms due to weathering at the pilot plant is not expected.

Chemical Resistance of Polyvinyl Chloride

Polymer Science & Engineering, second edition, volume 9, pages 362-3 (Mark et al. 1987) contains a table titled "Resistance of Plastic Against Chemicals." This table shows that at 25 °C (77 °F), PVC generally has good chemical resistance but is subject to attack by aromatic solvents, chlorinated solvents, esters, and ketones. The 242-A Evaporator process condensate could potentially contain chemicals from all of these classes. However, there are three mitigating factors that would significantly decrease any potential chemical attack of the berm.

- The concentration of these chemicals in the 242-A Evaporator process condensate has always been very low. The combined organic contaminant level will in all likelihood be less than 100 parts per million (0.01 percent).
- The berm will be inspected daily during use, and will be emptied out promptly upon detection of any liquid.
- The berm is designed for much more severe service. It is used to provide secondary containment for aviation fuel leaks. The PVC is modified with Elvaloy (a product of the E. I. Dupont de Nemours & Company) to increase its chemical resistance.

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April 7, 1992

Inflatable Berm Liner Stress Analysis

Purpose

The purpose of this analysis is to calculate the maximum acceleration that a loaded tank trailer can attain before the berm liner will fail in shear. The analysis was performed by Westinghouse Hanford Company engineering personnel.

The maximum stress on the berm liner occurs during acceleration during starting. The failure mode is assumed to be shear of the PVC polymer coating under the driven axle. No credit is taken for the polyester fiber reinforcement.

Assumptions

1. The tensile strength of general, non-rigid PVC is taken as 1000 psi as referenced in the *Materials Journal* (December 1989, page 168). This is a conservative assumption because the listed range of tensile strength is 1000-3500 psi.

relate to strength of PAB

2. The shear strength is taken as 50 percent of the tensile strength. This is a conservative estimate because the shear strength is 60 to 70 percent of the tensile strength for most materials.

3. The loaded weight of the combined tractor and trailer is 78,000 lbs.

4. The weight over the driven wheels is 17,000 lbs.

5. The tire pressure is 125 psi gage.

Calculations

1. Contact area (A) of the driven wheels: A = 17,000 lbs /125 psi = 136 square inches

2. Mass (m) of the tractor and trailer: m = 78,000 lbs force/32.2 ft/sec^2 = 2422 lbs force - sec^2/ft

3. Force needed to accelerate the tractor and trailer to an acceleration (a) is equal to the reaction shear force in the berm (F). $F=m \cdot a$ then $a=F/m$.

4. Shear in the ~~berm~~ (τ) is equal to the reaction force (F) distributed divided by the area of contact (A) of the driven tires. $\tau = F/A$ then $F=\tau \cdot A$

5. Combining statements 3 and 4: $a = F/m = \tau \cdot A/m$.

6. Assuming that the maximum shear allowable is 500 psi, the maximum allowable acceleration can be calculated as follows:

$a = \tau \cdot A/m$ = (500 psi)(136 square inches) / (2422 lb force-sec^2/ft) = 28 ft/sec^2.

Conclusions

As shown in the calculations in Step 6, stress failure occurs in the liner at an acceleration of 28 ft/sec^2. Stopping is not a concern because the stress would be distributed between 5 axles, instead of the 1 axle assumed for acceleration.

Operating procedures will limit truck speed to 5 mph maximum. The maximum acceleration or deceleration is limited to 5 mph/sec. Five mph/sec is equivalent to:

(5 mph/sec)x(5280 ft/mi)/(3600 sec/hr) = 7 ft/sec^2.

The 7 ft/sec^2 is well below the maximum allowable acceleration of 28 ft/sec^2 calculated above.

The 5 mph speed limit will provide a safety factor of approximately 4.

Abbreviations

ft = feet

ft/mile = feet per mile

ft/sec^2 = feet per second squared

in^2 = square inches

lbs = pounds

mi = mile

mph = miles per hour

psi = pounds per square inch

sec/hr = seconds per hour

sec^2/ft = seconds squared per foot