

# R-TANK<sup>®</sup> HS20 LOAD RATING

The R-Tank system is capable of easily supporting AASHTO HS20 and HS25 loads with safety factors of 1.75 or higher. The system has been used in a variety of applications around the world with tremendous success.

## Bearing Capacity

The R-Tank's ultimate design load comes from the results of a compression test performed according to ASTM D 2412 & ASTM F 2418, which are the industry standard tests for loading of underground detention systems. TRI Environmental completed testing, and their report along with a technical note about the test methodology is available to supplement this document.

## Typical Load Calculation

The AASHTO HS20 Standard uses a 32,000 lbs. axle as the design load (two axles at 25,000 lbs. each at depths greater than 38"). To conservatively model the R-Tank's performance under these types of traffic loads numerous factors are considered:

- The axle load is distributed to two sets of dual wheels, each 10" x 20" at 80 psi
- The tire contact area is transferred down through the cover layers at a conservative 1:2 angle (33%) to the top of the R-Tank
- An impact factor is added to account for the movement of the load
- Weight of cover material in a saturated condition is added (130 lbs./cf)



*R-Tank<sup>HD</sup> Located Under Truck Parking Area*



*Unconfined Compression Test*

With these factors in place, the HS-20 load can be modeled and the resulting safety factor determined. The table on page 2 shows how the R-Tank performs at various depths of cover, and it suggests which module should be used. Since most projects are designed for HS-20 loads in parking lots, this table is ideal for most installations.

If you are designing for HS-25 loads, tables for these specific circumstances are available.

### Third Party Verification

Modeling product performance using engineering equations to ensure a successful project is important. But what really matters is product performance in the field. That is why we've done real-world testing with third party agencies who have installed the R-Tank and subjected it to brutal testing.

One test involved installing 18" of sand cover over an R-Tank<sup>LD</sup> module (an R-Tank<sup>SD</sup> should have been used at this depth) without geogrid and driving a 31-ton dump truck over the system. Even in these harsh conditions, the R-Tank has supported the loads, passing every field test that has been done.



R-Tank<sup>LD</sup> Field Testing

### Real World Performance

Your project **REQUIRES** a proven system. With thousands of installations around the world, R-Tank has proven itself again and again as one of the strongest systems available for underground detention/retention. Specify R-Tank and you can be confident your system will support the traffic loads above.



Truck (31 Tons) Backing Over R-Tank<sup>LD</sup>

Call Ferguson today to discuss your project's requirements.

Single Lane Traffic Loading based on stone top backfill:

HS-20 & LRFD Design Tandem Loading - Single Lane Traffic														
Item	Cover Depth (inches)													
	6	12	18	20	30	38	48	60	72	84	96	108	120	144
Axle Load (lbs)	32,000	32,000	32,000	32,000	32,000	25,000*	25,000*	25,000*	25,000*	25,000*	25,000*	25,000*	25,000*	25,000*
Wheel Load (lbs)	16,000	16,000	16,000	16,000	16,000	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
Tire Contact Area (10" x 20" = 200 inch <sup>2</sup> )	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Area of Applied Load at 33% Angle of Repose (inch <sup>2</sup> )	416	704	1,064	1,200	2,000	2,784	3,944	5,600	7,544	9,776	12,296	15,104	18,200	25,256
Unfactored Wheel Loading Applied to R-Tank (psi)	38.46	22.73	15.04	13.33	8.00	8.98	6.34	8.93	6.63	5.11	4.07	3.31	2.75	1.98
Factored Wheel Loading Applied to R-Tank** (psi)	50.36	29.29	19.07	16.82	9.82	10.77	7.38	10.03	7.17	5.33	4.07	3.31	2.75	1.98
Cover Material Pressure at 130 lbs/cf (psi)	0.45	0.90	1.35	1.50	2.26	2.86	3.61	4.51	5.42	6.32	7.22	8.13	9.03	10.83
Total Load Applied to R-Tank (psi)	<b>50.81</b>	<b>30.19</b>	<b>20.42</b>	<b>18.32</b>	<b>12.07</b>	<b>13.63</b>	<b>11.00</b>	<b>14.55</b>	<b>12.59</b>	<b>11.64</b>	<b>11.29</b>	<b>11.44</b>	<b>11.78</b>	<b>12.81</b>
Ultimate Bearing Capacity of R-Tank Unit (psi)	240.20	134.20	42.90	33.40	33.40	33.40	33.40	33.40	33.40	42.90	42.90	42.90	240.20	240.20
Safety Factor***	<b>4.73</b>	<b>4.44</b>	<b>2.10</b>	<b>1.82</b>	<b>2.77</b>	<b>3.04</b>	<b>3.04</b>	<b>2.30</b>	<b>2.65</b>	<b>3.68</b>	<b>3.80</b>	<b>3.75</b>	<b>20.40</b>	<b>18.75</b>

- R-Tank<sup>HD</sup>
- R-Tank<sup>SD</sup>
- R-Tank<sup>UD</sup>
- R-Tank<sup>XD</sup>

\* LRFD Tandem Loading controls at depths of 38" or more.  
 \*\* Includes Dynamic Loading Allowance in Accordance with AASHTO LRFD.  
 \*\*\* In lieu of Live and Dead Load factors, a minimum "Safety Factor" of 1.75 is maintained.



# LOCATIONS & CONTACT INFO

## ASP ENTERPRISES

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# SOLUTIONS WE SUPPLY

## GEOSYNTHETICS

Filter Fabrics  
Stabilization Fabrics

### Geogrids

- Road Grids
- Wall Grids
- Slope Stabilization

### Specialty Fabrics

#### Composite Geomembranes

- GCLs, PVC, HDPE, LLDPE, EPDM, Granular Bentonite

## SEDIMENT CONTROL

### Inlet Protection

- Grated Inlet, Curb Inlet, Area Inlet Protection

### Ditch Checks

- Triangle Silt Dike
- GeoRidge

### Perimeter Protection

- High and Low-Porosity Silt Fence, Straw Wattles, Silt Socks
- Safety Fence

### Flocculants & Water Treatment

- Polymer-Based & Natural Flocculants

### Sediment Basin Skimmers

### Dewatering Bags

### Trackout Control

- FODS
- Rumble Grates

### Turbidity Curtains

## EROSION CONTROL

### Basic Hydraulically Applied Mulches

- Wood
- Paper
- Blends
- Straw

### High-Performance Hydraulically Applied Products

- BFM
- FGM
- Additives & Tackifiers

### Temporary Erosion Control Blankets

- Coir & Jute Mat/Nettings
- Short-Term ECBs
- Extended-Term ECBs

### Permanent Erosion Control Blankets

- Turf Reinforcement Mats
- HP-TRMs
- Anchor Reinforced Vegetation System

### Structural BMPs

- Transition Mats
- Geoweb Cellular Confinement
- Composite Vegetated Armor System
- Flex MSE Vegetated Wall System
- Articulated Concrete Block
- Gabions
- Grout-Filled Geotextile Mats

### Vegetation Establishment

- Native Seed & Turf Seed
- Fertilizers
- Organic Soil Additives
- Stratavault Soil Cells

## STORMWATER MANAGEMENT

### Water Quality

- Inlet Filter Boxes
- Pre-Treatment Chamber
- Nutrient Separating Baffle Boxes
- High-Flow Biofiltration Media
- Hydrodynamic Separators
- Stratavault

### Water Quantity

- Modular Underground Storage Systems
- Chamber Detention Systems

### Drainage

- HDPE Swale Liner
- Pipe & Fittings
- Drainage Composites
- Strip Drain

### Inlet Structures

- PVC
- Drain Basins, In-Line Drains
- Landscape

### Permeable Pavers

- Permeable Articulating Concrete Block
- Grass Pavers
- Gravel Pavers
- Concrete Pavers

## SPECIALTY

### Natural & Synthetic Coir Fiber Logs

### Vegetated Reinforced Soil Slopes

### Soil Anchors

### Root Barrier System

### AquaBlok

### Muscle Wall

We are full line distributors of construction materials for all project types. Contact us for assistance with a project. From specification and development to installation and completion, we're here to help with all of your site solution needs.

**GEOSYNTHETICS | EROSION CONTROL | STORMWATER MANAGEMENT  
SEDIMENT CONTROL | REVEGETATION & SOIL AMENDMENTS**