

Appendix D – Dredging Equipment Cut Sheets

Operating Weight: 178,600 lbs (81,000 kg)
SAE Net Horsepower:
with fan pump 495 HP (369 kW)
without fan pump 532 HP (397 kW)
Bucket Range: 2.47 - 5.91 yd³ (1.89 - 4.52 m³)

Engine

Isuzu AH-6WG1XYSS-02 Tier 3 turbocharged diesel engine with electronic fuel control, 6-cylinder, water-cooled, EGR with cooler, air-to-air intercooler, fuel cooler, auto idle-start, neutral safety start, glow plugs, auto warm-up, EPF engine protection, dual stage fuel filtration, remote oil filter, green plug oil drain.

SAE net horsepower

with fan pump 495 HP (369 kW) @ 1,800 rpm
without fan pump 532 HP (397 kW) @ 1,800 rpm
Displacement 15.7 L
Maximum torque 1,660 lbf-ft (2,250 N-m) @ 1,500 rpm
Starter 24V-7.0kW
Alternator 50 amp
Battery 140 amp hours

Cab and Controls

Pressurized cab with climate control a/c and heat with defroster, LCD monitor, illuminated soft-touch switches, low-effort controls pre-wired for auxiliary hydraulics, control pattern changer, sliding LEXAN® MARGARD® windows, safety glass front window with automatic locking system and vandal cover, intermittent windshield wiper with washer, emergency rear window exit, polycarbonate roof hatch with sunshade, shockless cab suspension with four fluid mountings, KAB® reclining air-suspension seat, sliding 4-position tilting control consoles, AM/FM radio, digital clock, dome light, seat belt, coat hook, cup holder, storage compartments, floor mat, footrests, ashtray, 24-volt cigarette lighter, 12-volt outlet, travel alarm, handrail, mirrors.

Four selectable working modes, anti-theft password protection system, on-board self-diagnostic system with memory, auto-idling system, one-touch decelerator, auto power boost, gate lock safety shutoff.

A/C output 18,100 BTU/hr
Heater output 20,150 BTU/hr
Sound level (inside cab) 69.3 dB(A)
Sound level (exterior) 105.8 dB(A)

Hydraulic System

Open-center system, two variable displacement axial piston pumps and one gear pump for pilot controls, main control valve with one 4-spool valve and one 5-spool valve with auxiliary spool - stackable, oil cooler, auto power boost, boom and arm holding valves, o-ring face seals, 6 micron return filter, firewall

Hydraulic Pumps

Maximum flow 2 x 132 gpm (2 x 500 l/min)
Pilot pump maximum flow 7.1 gpm (27 l/min)

Relief Valve Settings

Boom / Arm / Bucket 4,550 psi (314 bar)
in Power-Boost Mode 4,980 psi (343 bar)
Swing circuit 3,840 psi (265 bar)
Travel circuit 4,980 psi (343 bar)

Hydraulic Cylinders

number of cylinders - bore x rod x stroke.
Boom 2 - 7.9" x 5.5" x 74.5"
(200 mm x 140 mm x 1 893 mm)
Arm 1 - 8.5" x 5.9" x 90.2"
(215 mm x 150 mm x 2 290 mm)
Bucket 1 - 7.5" x 5.1" x 61.2"
(190 mm x 130 mm x 1 555 mm)
Bucket (Mass excavator) 1 - 8.5" x 5.9" x 59.8"
(215 mm x 150 mm x 1 520 mm)

Hydraulic Oil Filtration

Return filter 6 micron
Pilot filter 8 micron
Suction screen 105 micron



Swing

Planetary reduction powered by axial piston motor. Internal ring gear with grease cavity for swing pinion. Swing bearing is single-row shear type ball bearing. Mechanical disc swing brake. Auto power swing.

Swing speed 0 - 6.4 rpm
Tail swing 14' 1" (4.30 m)
Swing torque 196,600 lbf-ft. (266.5 kN-m)

Undercarriage

X Pattern carbody with sealed and strutted track chain, sealed rollers and idlers, two-speed independent hydrostatic travel with compact planetary final drive, disc type brakes, adjustable track tension, swivel guard.

Carrier rollers 3 per side
Track rollers 9 per side
Track link pitch 10.24" (260 mm)
Shoes 51 per side
Shoe width 29.5" (750 mm)
Ground pressure 13.92 psi (0.96 bar)

Lubricant and Coolant Capacity

Fuel tank 238.0 gal. (900 liters)
Hydraulic tank 82.0 gal. (310 liters)
Hydraulic system 190.0 gal. (720 liters)
Final drive (per side) 3.65 gal. (13.8 liters)
Swing drive 3.57 gal. (13.5 liters)
Engine oil 13.7 gal. (52 liters)
Cooling system 35 gal. (133 liters)

Travel System

Two-speed independent hydrostatic travel with compact axial piston motors. Hydraulic motor powered output shaft coupled to a planetary reduction unit and track sprocket. All hydraulic components mounted within the width of side frame. Automatic downshift. Spring applied, hydraulically released disc parking brake built into each motor. Each travel motor equipped with counterbalance valve to prevent overspeeding down an incline.

Max. travel speed 1.8 - 2.6 mph (2.9 - 4.2 km/h)
Drawbar pull 127,000 lbf (565 kN)
Gradeability 70% (35°)

Attachment

Excavator Boom (Standard) 27' 7" (8.40 m)
Excavator Boom (Mass) 23' 9" (7.25 m)

Available Arms (Standard)

• 12' 0" (3.66 m) 61,600 lbf (274 kN)
with Auto Power-Boost applied 67,440 lbf (300 kN)
• 14' 7" (4.44 m) 52,160 lbf (232 kN)
with Auto Power-Boost applied 56,880 lbf (253 kN)
• 18' 5" (5.62 m) 43,840 lbf (195 kN)
with Auto Power-Boost applied 48,110 lbf (214 kN)

Bucket Digging Force 74,190 lbf (330 kN)
with Auto Power-Boost applied 81,160 lbf (361 kN)

Available Arms (Mass)

• 9' 9" (2.98 m) 71,260 lbf (317 kN)
with Auto Power-Boost applied 78,010 lbf (347 kN)

Bucket Digging Force 96,670 lbf (430 kN)
with Auto Power-Boost applied 105,660 lbf (470 kN)

*Digging force ratings are based on ISO 6015, "Earthmoving Machinery - Hydraulic Excavators - Tool Forces."

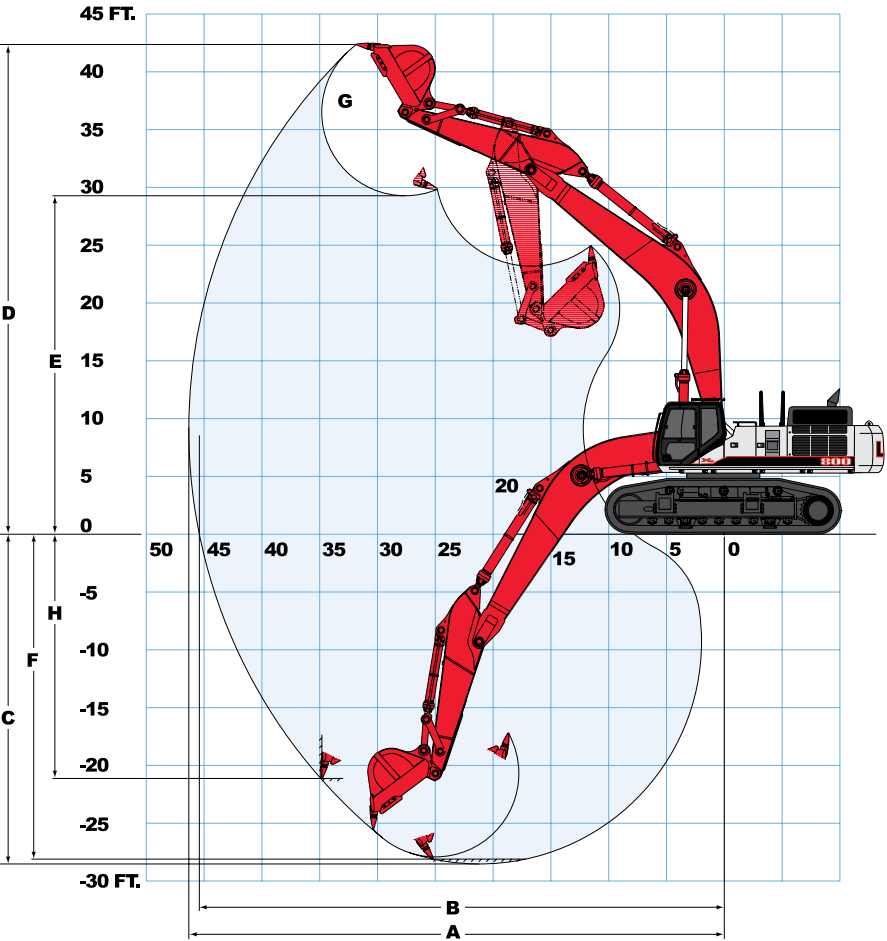
Operating Weight

Standard Excavator - Working weight with 29.5" (750 mm) shoes, 27' 7" (8.40 m) boom, 12' 0" (3.66 m) arm 6,614 lb. (3 000 kg) bucket, 27,600 lb. (12,500 kg) counterweight
..... 178,600 lbs (81,000 kg)

Mass Excavator - Working weight with 29.5" (750 mm) shoes, 23' 9" (7.25 m) boom, 9' 9" (2.98 m) arm 7,628 lb. (3 460 kg) bucket, 27,600 lb. (12,500 kg) counterweight
..... 178,800 lbs (81,100 kg)

800 X2 Specific tions

Working Ranges

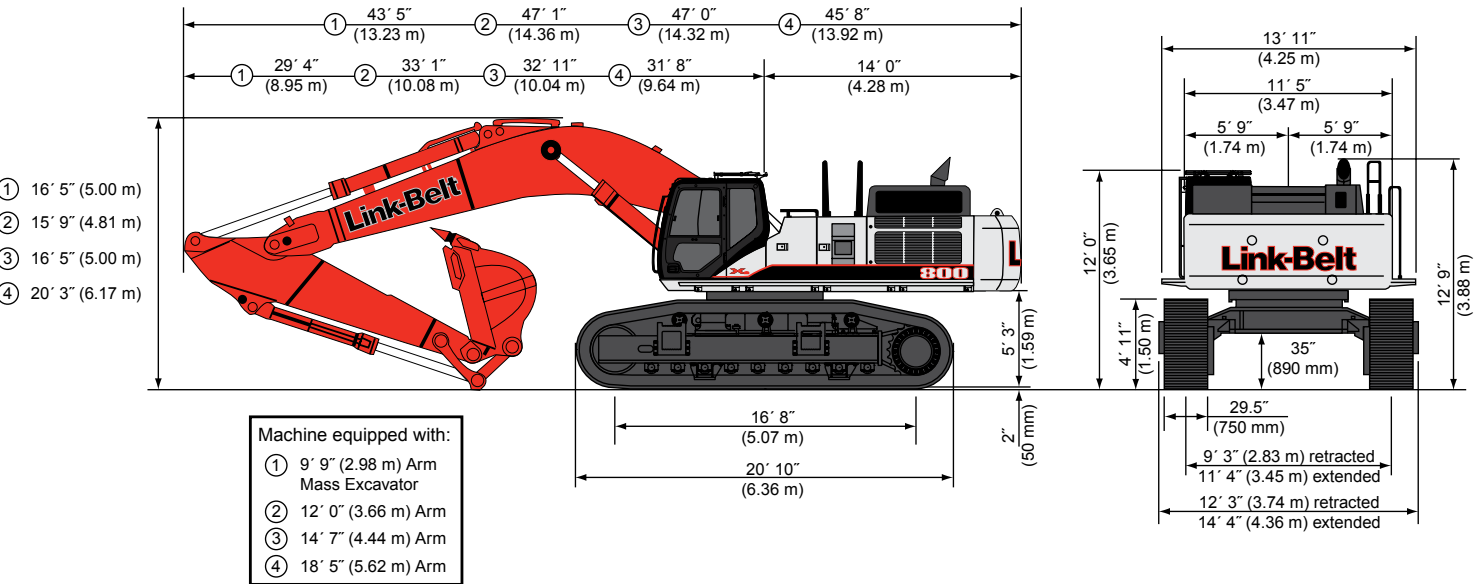


800 X2

| Machine equipped with 27' 7" (8.40 m) boom | 12' 0" Arm (3.66 m) | 14' 7" Arm (4.44 m) | 18' 5" Arm (5.62 m) |
|---|---------------------|---------------------|---------------------|
| A. Maximum reach | 46' 4" (14.12 m) | 49' 0" (14.94 m) | 52' 10" (16.11 m) |
| B. Maximum reach @ ground level | 45' 5" (13.84 m) | 48' 2" (14.68 m) | 52' 0" (15.86 m) |
| C. Maximum dig depth | 28' 6" (8.69 m) | 31' 1" (9.47 m) | 34' 8" (10.56 m) |
| D. Maximum dig height | 42' 4" (12.91 m) | 44' 7" (13.60 m) | 46' 11" (14.30 m) |
| E. Maximum dump height | 29' 3" (8.92 m) | 31' 2" (9.51 m) | 33' 4" (10.17 m) |
| F. Digging depth - 8' (2.44 m) level bottom | 28' 1" (8.57 m) | 30' 9" (9.36 m) | 34' 8" (10.56 m) |
| G. Bucket rotation | 167° | 167° | 167° |
| H. Maximum vertical wall depth | 21' 2" (6.44 m) | 25' 5" (7.75 m) | 29' 11" (9.11 m) |

800 X2 Mass Excavator

| Machine equipped with 23' 9" (7.25 m) boom | 9' 9" Arm (2.98 m) |
|---|--------------------|
| A. Maximum reach | 40' 5" (12.31 m) |
| B. Maximum reach @ ground level | 39' 4" (11.99 m) |
| C. Maximum dig depth | 23' 1" (7.03 m) |
| D. Maximum dig height | 38' 7" (11.76 m) |
| E. Maximum dump height | 25' 11" (7.89 m) |
| F. Digging depth - 8' (2.44 m) level bottom | 22' 7" (6.88 m) |
| G. Bucket rotation | 162° |
| H. Maximum vertical wall depth | 13' 11" (4.25 m) |





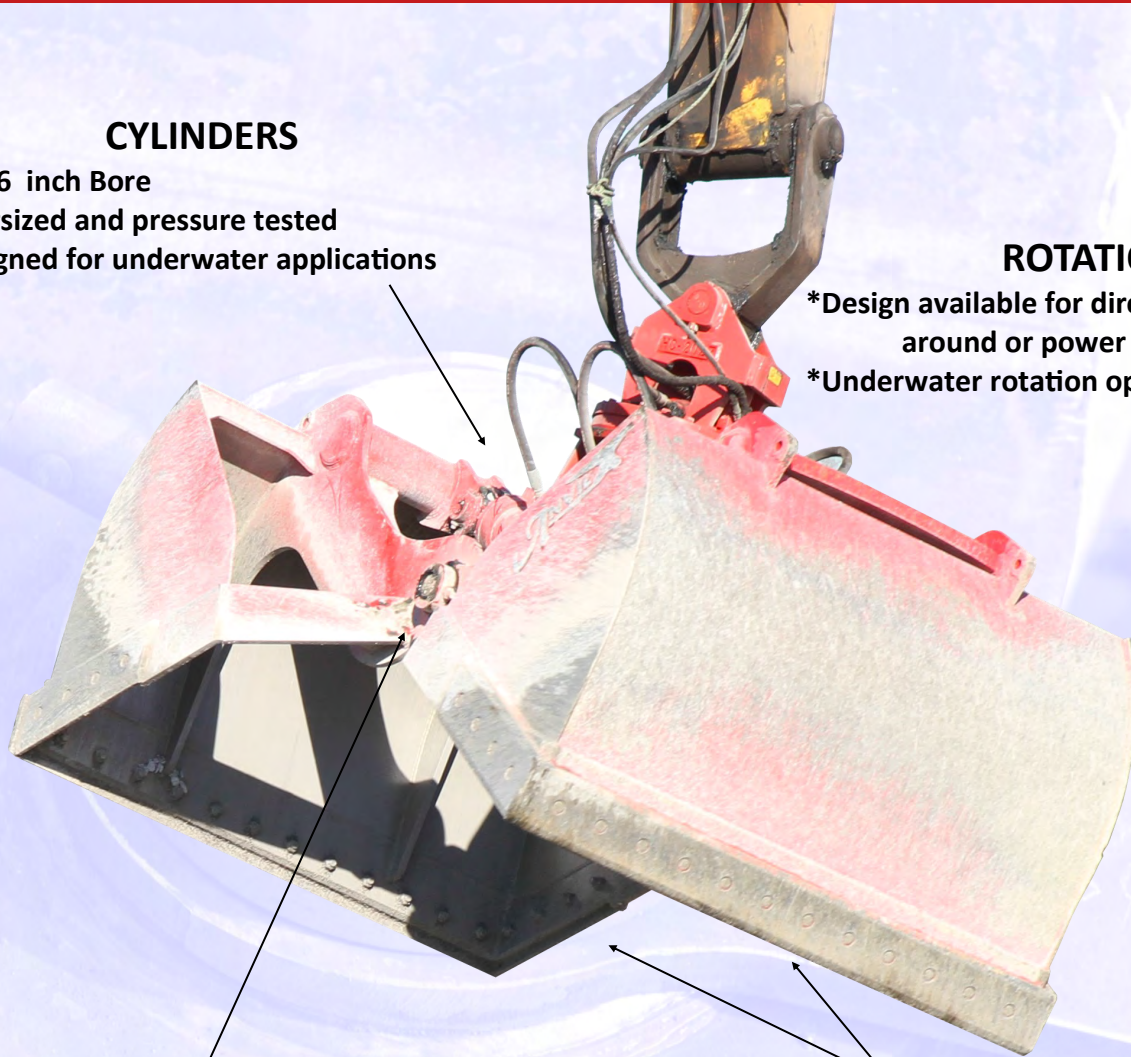
HYDRAULIC CLAMSHELL BUCKET - MODEL HC5 & HC6

CYLINDERS

- * 5 or 6 inch Bore
- * Oversized and pressure tested
- * Designed for underwater applications

ROTATION

- * Design available for direct mount, knock-around or power rotation
- * Underwater rotation option available



PINS & BUSHINGS

- * Pins are machined from 4140 heat treated steel
- * Bushings are extra heavy, thick walled and made of chromium molybdenum 4140/42

OPTIONAL CUTTING EDGES

- * Bolt on reversible bottom and partial side lips
- * Bolt on teeth
- * Rubber sealed lip
- Weld on or Bolt on (Patent No. 9,388,023)
- * Lap sealed lip - weld on only
- * Round Nose
- * Radius Corners

- Material upgrades available for pins, bushings, lips and bowl plates
- Dust or environmental covers available

ONE YEAR WARRANTY AGAINST MANUFACTURER DEFECTS



HYDRAULIC CLAMSHELL BUCKET - MODEL HC5 & HC6

| Heaped Capacity | Height Open | Height Closed | Length Open | Length Closed | Width | Model HC5 Weight | Model HC6 Weight |
|-----------------|-------------|---------------|-------------|---------------|--------|------------------|------------------|
| 2 cu yd | 5' 0" | 7' 8" | 8' 8" | 7' 0" | 4' 2" | 5,600 | |
| 3 cu yd | 5' 4" | 8' 7" | 10' 4" | 7' 3" | 5' 8" | 6,000 | 6,600 |
| 3.5 cu yd | 5' 4" | 8' 7" | 10' 4" | 7' 3" | 6' 0" | 6,250 | 6,850 |
| 4 cu yd | 5' 4" | 8' 7" | 10' 7" | 7' 8" | 6' 2" | 6,600 | 7,100 |
| 4.5 cu yd | 5' 5" | 9' 0" | 10' 7" | 7' 8" | 6' 4" | 6,950 | 7,350 |
| 5 cu yd | 5' 5" | 9' 0" | 11' 1" | 7' 8" | 6' 5" | 7,400 | 8,000 |
| 5.5 cu yd | 5' 7" | 9' 3" | 11' 6" | 9' 0" | 6' 7" | 7,600 | 8,200 |
| 6 cu yd | 5' 7" | 9' 7" | 11' 8" | 9' 0" | 6' 9" | 7,800 | 8,400 |
| 6.5 cu yd | 5' 7" | 9' 7" | 11' 9" | 9' 0" | 7' 4" | 8,200 | 8,800 |
| 7 cu yd | 5' 7" | 9' 9" | 11' 11" | 9' 0" | 7' 11" | | 9,300 |
| 8 cu yd | 6' 0" | 9' 11" | 12' 5" | 9' 4" | 8' 3" | | 10,300 |
| 9 cu yd | 6' 2" | 10' 2" | 13' 3" | 11' 1" | 8' 8" | | 12,000 |

*COMMON SIZES LISTED—ANVIL CAN MANUFACTURE CUSTOM SIZE BUCKETS TO FIT YOUR REQUIREMENTS

* All weights include 360 power rotation, subtract 200lbs for no rotation

REV. 11.4.16

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SALES@ANVILATTACHMENTS.COM

Engine

Isuzu AH-6UZ1XYSS six cylinder, diesel engine turbocharged with air cooled intercooler, electronic fuel injection, 362 Net HP (270 kW) without fan pump, 329 Net HP (245 kW) with fan pump, 4-cycle, water cooled, double element air filter with restriction indicator, EPA Tier III compliant.

SAE net horsepower .. 362 HP (270 kW) @ 1,950 rpm
Maximum torque ... 1,058 ft-lbs. (1 435 N-m) @ 1,435 rpm
Starter 24V
Alternator 50 amp
Air cleaner Double element
Governor Electronic
Battery 128 amp hours

Hydraulic System

Two variable displacement axial piston pumps and one gear pump for pilot controls, one 4 spool valve and one 5-spool valve with auxiliary spool.

Hydraulic Pumps

Two variable volume piston pumps provide power for attachment, swing and travel.

Maximum flow 2 x 95.1 gpm (2 x 360 l/min)
Pilot pump max. flow 7.9 gpm (30 l/min)

Relief Valve Settings

Boom/arm/bucket 4,550 psi (31.4 MPa²)
Swing circuit 4,260 psi (29.4 MPa²)
Travel circuit 4,970 psi (34.3 MPa²)

Hydraulic Cylinders

Young 2-piece..... number of cylinders – bore x rod x stroke

Boom 2 - 7.5" x 5" x 59"
(191 mm x 127 mm x 1 499 mm)
Arm 1 - 7.5" x 5" x 78"
(191 mm x 127 mm x 1 981 mm)

Young 3-piece..... number of cylinders – bore x rod x stroke

Boom 2 - 7.5" x 5" x 59"
(191 mm x 127 mm x 1 499 mm)
Arm 1 - 8.5" x 5" x 71"
(216 mm x 127 mm x 1 803 mm)
Jib 1 - 6.5" x 4" x 53.5"
(165 mm x 102 mm x 1 359 mm)

Control Valve One 4-spool valve for right track travel, boom, bucket, and arm acceleration, and one 5-spool valve for left track travel, swing, boom acceleration, auxiliary spool and arm.

Oil Filtration

Nephron® filter 1 micron
Return and pilot filters 10 micron
Suction screen 105 micron



Cab and Controls

Cab mounted on 6 fluid filled mountings.

Features include safety glass windows, sliding front window with auto-lock. Windshield washer and wiper, heater, air-conditioner, AM/FM radio with auto tuner, floor mat, skylight window and right and rear side mirrors. KAB 515 operators seat with manual weight adjustment, seat height and tilt adjustment, adjustable headrest, backrest angle adjustment, adjustable pivoting arm rests and seat belt. Control pattern selector valve. Reliable soft-touch switches.

Heater output 20,240 BTU/hr (5 100 kcal/hr)
A/C output 18,250 BTU/hr (4 600 kcal/hr)

Swing

Fixed displacement axial piston motor. Internal ring gear with grease cavity for swing pinion. Swing bearing is single-row shear type ball bearing. Swing cushion valve and dual stage relief valves for smooth swing deceleration and stops. Mechanical disc swing brake.

Swing speed 0 – 9.0 rpm
Tail swing 11' 11" (3.62 m)
Swing torque 110,710 lbf-ft. (150.0 kN•m)

Undercarriage

12' 2" (3.72 m) gauge by 17' 9" (5.42 m) tractor type (LC) long undercarriage, 2' 5" (0.73 m) ground clearance, sealed rollers and idlers, H.D. travel motor covers, H.D. center guard, idler mount reinforcement, and double track guides.

Carrier rollers 3 per side
Track rollers 9 per side
Track link pitch 9" (228 mm)
Shoes 50 per side
Shoe width 29.5" (750mm)

Travel System

Variable displacement axial piston motor, two-speed independent hydrostatic travel with compact drive, disc type parking brakes. All hydraulic components mounted within the width of side frame.

Max. travel speed 1.9/3.3 mph (3.1/5.3 km/h)
Gradeability 70%
Traction Force 76,660 lbs. (34 772 kg)

Lubricant and Coolant Capacity

Hydraulic tank 62.61 gal. (237 liters)
Hydraulic system 90.35 gal. (342 liters)
Final drive (per side) 3.96 gal. (15 liters)
Engine 9.51 gal. (36 liters)
Fuel tank 161.41 gal. (611 liters)
Cooling system 10.04 gal. (38 liters)

Attachment Options

Young 2-piece 55' (16.76 m)
Young 3-piece 54' (16.46 m)

Operating Weight

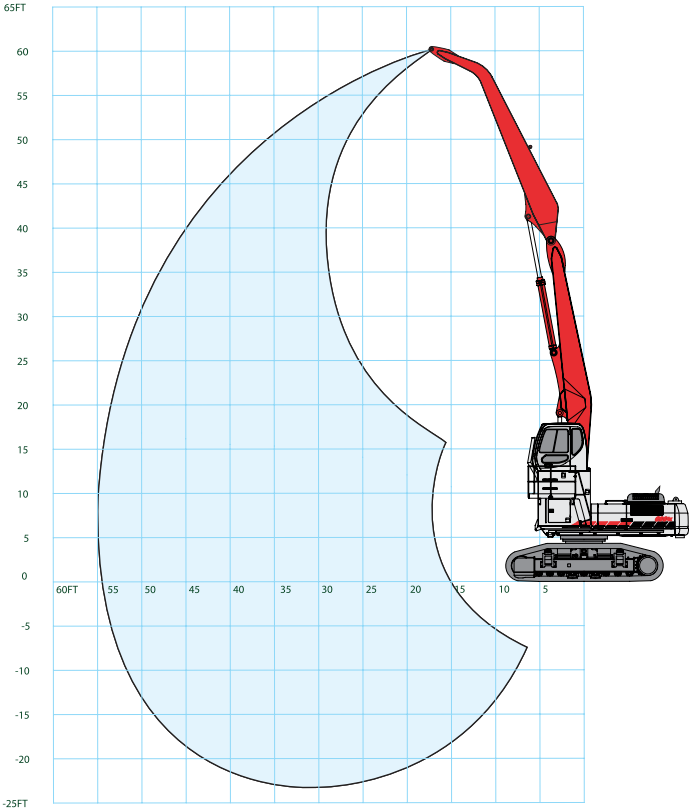
Working weight with 29.5" (750 mm) shoes, 55' 2-piece attachment, 6' cab riser
..... 119,696 lbs. (54 293 kg)

Working weight with 29.5" (750 mm) shoes, 54' 3-piece attachment, 6' cab riser
..... 121,303 lbs. (55 022 kg)

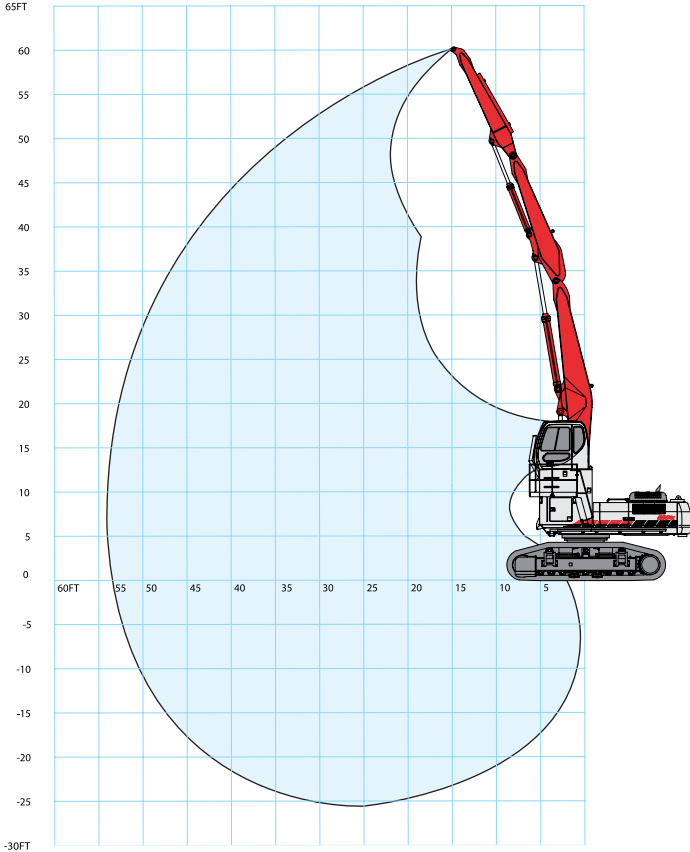
600 LX Tier 3 Material Handler

Working Ranges

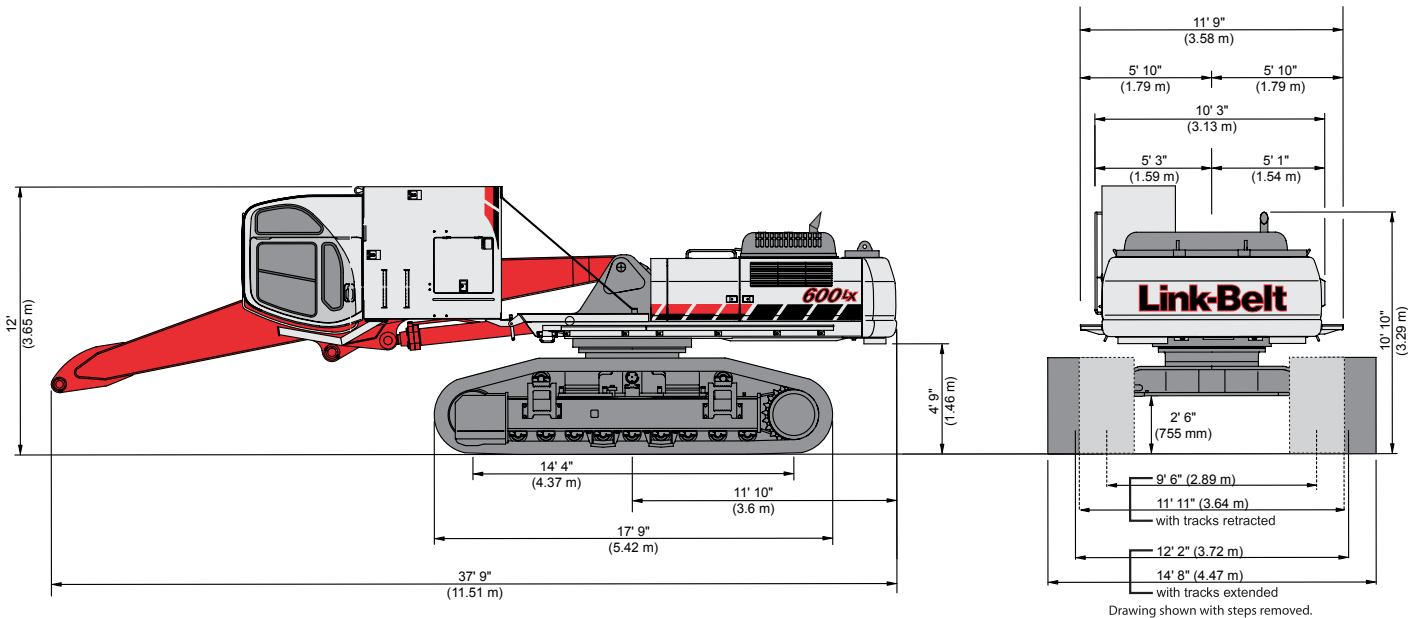
600 LX Material Handler Working Range
with a 55' (16.76 m) 2-piece attachment




600 LX Material Handler Working Range
with a 54' (16.46 m) 3-piece attachment



Travel Dimensions



Flexifloat



CONSTRUCTION SYSTEMS



The Flexifloat Construction System

Robishaw Engineering's Flexifloat Construction System® is a combination of standardized, interlocking flotation modules and modular attachments for use in inland-marine, heavy construction projects such as bridge building, underwater excavation, expedient bridging and material transport. The system is optimally designed for use in shallow water and in locations that are inaccessible to conventional barges and inland-marine construction equipment.

Components of the Flexifloat System are designed and dimensioned for ease of handling, freedom of transport and simplicity of assembly. All units are sized for efficient road-transport by conventional tractor/trailers.

The Flexifloat System incorporates a simple high-strength, integral locking system that enables flotation modules to be interconnected side-to-side, end-to-end or end-to-side. Using ordinary hand tools, construction crews can easily assemble individual modules into larger, custom-shaped assemblies capable of providing the necessary buoyancy and stability for on-deck construction machinery and supplies.

Modular attachments, including ramp and rake sections, anchoring spuds, hydraulic and mechanical winch systems and ancillary attachments allow further customization of assemblies to meet the specific needs of the user.

The Flexifloat Construction System provides flexible and economic solutions to marine construction needs.



Built Tough, Sized for the Job

Flexifloats are precision-built, steel pontoons specifically designed for shallow-draft, inland-marine environments. They are heavily reinforced to withstand repeated use under extreme load conditions. The internal design is optimized to provide high structural rigidity and exceptional deck-bearing capacity.

Flexifloats are manufactured in three different depths, or **Series**. Additionally, there are two standard lengths within each series; full-length **Quadrafloats**, and half-length **Duofloats**. These depth and length combinations permit the user to size and shape a barge to match specific job requirements.



Flexifloats are available in three model series

| Series | Width | Depth | Length | |
|-------------|-------|-------|-----------|--------------|
| | | | Duofloats | Quadrafloats |
| H-50 | 7.5' | 3.8' | 15' | 30' |
| S-50 | 10' | 5' | 20' | 40' |
| S-70 | 10' | 7' | 20' | 40' |

Easy and Economical to Transport

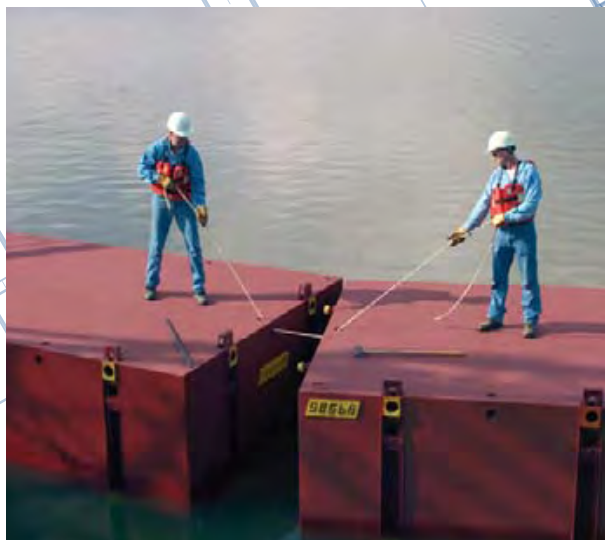
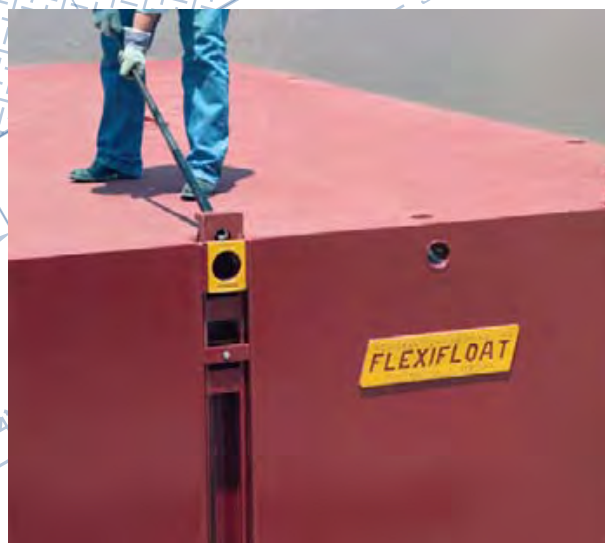
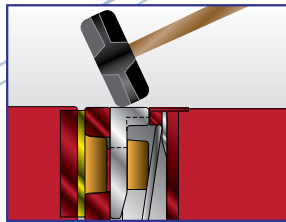
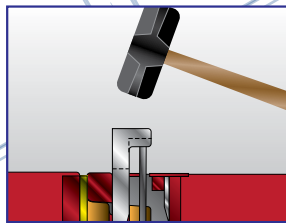
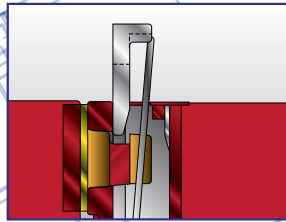
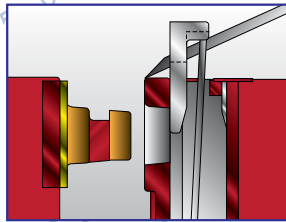
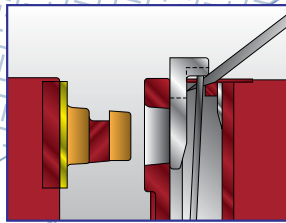
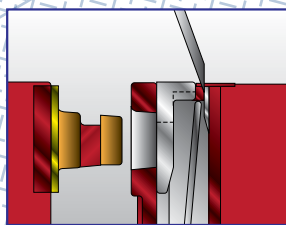
Flexifloats are optimally dimensioned for truck transport either as single or multiple, stacked units. To facilitate handling, a simple, single-point, recessed lifting device is centrally located in the deck of each unit.



Fast Connections, No Loose Parts

Flexifloat sectional barges are connected by a high-strength locking system. Utilizing opposing "male" and "female" locks, the connection is simple, quick and positive. The locking system is completely integral to both modules and attachments and has no separate pins, bolts, or other loose parts which may be lost or damaged.

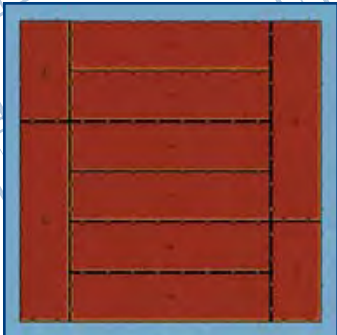
Locks are designed for on-deck operation by inexperienced personnel using ordinary hand tools. The design and manufacture of the locking system is so precise that, once engaged, the connection is near-rigid with no discernible play between modules.



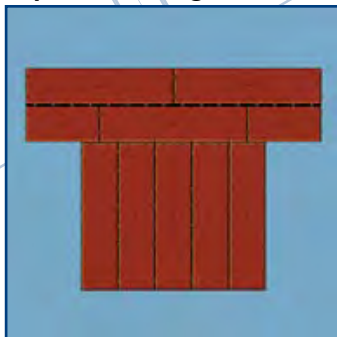
Designed for on-deck connection using ordinary hand tools.

Shaped Assemblies, Strong and Versatile

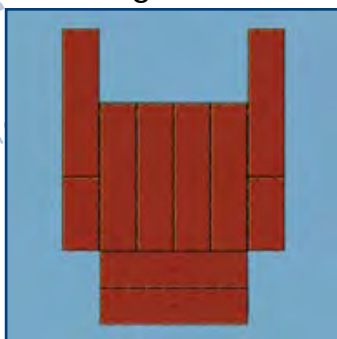
Flexifloat modules are easily connected side-to-side, end-to-end or end-to-side to form larger platforms of various shapes suitable for all types of marine transport and construction applications. Hulls configured with the proper combination of Quadrafloat and Duofoat modules provide significant increases in structural strength and overall barge versatility.



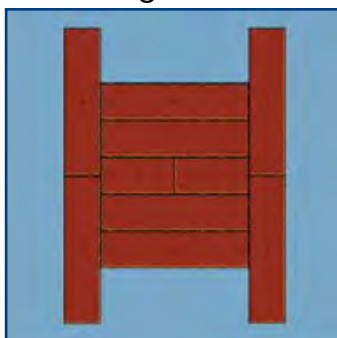
Square Configuration



T – Configuration



U – Configuration



H – Configuration



Easily Add Attachments to Meet Project Requirements

Standardized attachments and accessories are available which may be added to Flexifloat platforms to enhance their operational capability. Attachments are truck-transportable and, in most cases, incorporate the same locking system so that they may be quickly and easily added to any assembly.



Spud Systems



Elevating Systems



Ancillary Attachments



Winch Systems

Whatever the Job

Flexifloat modular barges and attachments can be assembled into floating and elevated platforms that will effectively solve the flotation and bridging problems found in shallow-water marine applications.

There is virtually no limit to the practical application of Flexifloat technology.

Crane Barges

Pile Driving Barges

Dredge Barges

Elevated Platforms

Floating Docks

Expedient Bridging

Ferries & Transports

Drilling Barges



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The Robishaw Value Equation Includes Experience, Free Consultation and Nationwide Inventory.

Robishaw Engineering's staff is uniquely qualified to assist our clients and prospective customers with a comprehensive analysis of their flotation needs and provide recommendations and economical solutions to their marine requirements.

Analysis

Working closely with clients, we develop and analyze information as to the scope of work to be performed, site conditions, access and environmental restrictions, as well as the types, weights and layouts of the equipment to be used.

Design

To insure proper application of the equipment, each Flexifloat assembly is uniquely designed and configured by our engineers to provide the minimum possible draft while maintaining adequate stability and absolute structural integrity under anticipated environmental and operational load conditions.

Field Support

Although Flexifloat equipment requires no special training for assembly and installation, Robishaw engineers are available upon customer request to provide on-site consultation and assistance.

Technical services are available free of charge and backed by qualified, on-site assistance and continuing support. Our business philosophy is based on total dedication and service to our clients, whenever and wherever they require it.

Availability

Flexifloat equipment is available for rental or purchase from in-stock inventories of both new and used equipment. Inventory yards are located throughout the U.S. to reduce transportation time and costs to the user.

Give Us a Call



800.877.1706

www.flexifloat.com

info@flexifloat.com



Appendix E – Safety Data Sheets



SAFETY DATA SHEET

MATERIAL: PORTLAND CEMENT

Section 1 – Product Identification

Product Identifier

Product Name: Portland Cement**Product Codes:** Portland Cement Type I, IA, II, IIA, III, IIIA, IV, IVA, V, VA, White Cement, CSA Type GU, MS, HE, LH, HS.

This SDS covers many products. Individual constituents will vary.

Synonyms: Cement, cement powder, portland cement, hydraulic cement**Product Form:** Solid / powder**Intended Use of Product:** Portland cement is used as a binder in combination with water and aggregates to form concrete. It is also used as a component of masonry mortar and other building and construction materials.

Name, Address and Telephone of Responsible Party

Holcim (US) Inc.
24 Crosby Drive
Bedford, MA 01730
(888) 646-5246

Emergency Contact Information:

CHEMTREC: 1-800-424-9300

Section 2 – Hazards Identification

Classification of the Substance or Mixture

Classification (GHS-US)

Skin Corrosion 1B
Eye Damage 1
Skin Sensitizer 1B
Specific Target Organ Toxicity: Single Exposure (Lungs) 3

Label Elements

Hazard Pictograms



Signal Word

Danger

Hazard Statements

Causes severe skin burns and eye damage
May cause an allergic skin reaction
May cause respiratory irritation

Precautionary Statements

- | | |
|-------------------|--|
| Prevention | Do not breathe dust. Wear protective gloves/protective clothing/eye protection/face protection Wash thoroughly after handling. Do not handle until all safety precautions have been read and understood. |
| Response | If inhaled: Remove person to fresh air and keep comfortable for breathing. Immediately call a poison center/doctor. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a doctor. If on skin: Take off immediately all contaminated clothing. Rinse skin with water. Wash contaminated clothing before reuse. If swallowed: Rinse mouth. Do NOT induce vomiting. Immediately call a poison center/doctor. |
| Storage | Store locked up. |
| Disposal | Dispose of contents/container in accordance with local/state/national regulations. |

Other Hazards

Exposure may aggravate those with pre-existing eye, skin or respiratory conditions or illness.

Section 3 – Composition/Information on Ingredients

| Component/Ingredient | CAS # | Percent Present (Range) |
|---|------------|-------------------------|
| Portland cement | 65997-15-1 | 100 |
| Tricalcium silicate | 12168-85-3 | 20 - 70 |
| Dicalcium silicate | 10034-77-2 | 10 - 60 |
| Tetracalcium aluminoferrite | 12068-35-8 | 5 - 15 |
| Gypsum (Calcium Sulfate) | 13397-24-5 | 2 - 10 |
| Tri-calcium Aluminate | 12042-78-3 | 1 - 15 |
| Limestone (Calcium Carbonate) | 1317-65-3 | 0 - 20 |
| Magnesium oxide | 1309-48-4 | < 1 - 4 |
| Nuisance Dusts (Particulates not otherwise regulated) | None | < 1 - 5 |
| Crystalline Silica (Quartz) | 14808-60-7 | 0 - < 1 |

Other Components

Cement is made from materials mined from the earth and processed using energy provided by fuels. Additional materials, such as fly ash, kiln dust and slag may also be introduced into the cement manufacturing process. A chemical analysis of cement may reveal trace amounts of naturally occurring but potentially harmful chemical compounds such as free crystalline silica, organic compounds, potassium and sodium compounds, heavy metals including cadmium, chromium (including hexavalent chromium), nickel and lead. Other trace constituents may include calcium oxide (also known as free lime or quick lime) and organic compounds from grinding aids such as amine acetate salts, glycols and 1,2-ethanediol.

Section 4 – First Aid Measures

Description of First Aid Measures

- Eyes** Rinse eyes and under lids cautiously with clean water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.
- Skin** Remove contaminated clothing. Remove dry material from skin, but avoid creating dust. Wash with plenty of water. If skin irritation occurs, get immediate medical advice/attention.
- Inhalation** Remove person to fresh air away from dust and keep comfortable for breathing. If coughing persists, obtain medical attention.
- Ingestion** Do not induce vomiting. If subject is conscious, rinse the mouth with water to remove any material and drink plenty of water to dilute any swallowed material. Do not give drink or attempt to force water to an unconscious person. Get medical advice/attention.

Important Symptoms and Effects (Acute and Delayed)

- Eyes** Causes serious eye irritation and may scratch eye surface due to particle abrasion. May cause chemical burns resulting in corneal damage.
- Skin** Causes skin irritation if exposed to moisture on skin creating redness, dryness and itching. Extended exposure to wet material will result in chemical burns to skin, possibly severe.
- Inhalation** May irritate nose and throat if dust is inhaled. Prolonged or repeated inhalation of respirable dust may lead to respiratory tract or lung damage.
- Ingestion** May cause irritation and burns of mouth, throat, stomach and digestive tract if swallowed.

Recommendations for Immediate Medical Care or Special Treatment

Seek immediate medical attention for inhalation of large quantities of dust or exposure of wet material over large areas of skin. Seek immediate medical attention if material comes into contact with eyes and cannot be immediately removed.

Section 5 – Fire Fighting Measures

- General Fire Hazards** None. Material is not considered flammable or combustible.
- Extinguishing Media** Use water or water spray to extinguish any fires involving this material.
- Extinguishing Media to Avoid** None.
- Hazards of Combustion** None.
- Fire Fighting Recommendations** Firefighters should always wear full protective gear to fight any fire. Refer to Section 9 for flammability information.

Section 6 – Accidental Release Measures

| | |
|-------------------------------|--|
| Precautions | Avoid creating dust. Prevent material from entering sewers, drains, ditches or waterways. |
| Personal Protection | Wear respiratory protection and protective eyewear/clothing to avoid eye or skin contact. |
| Emergency Procedures | Ventilate area and avoid creating dust. Remove unnecessary persons from area. |
| Containment Procedures | Barricade solid material to prevent additional spillage. |
| Clean Up Procedures | Scoop or vacuum up spilled material while avoiding dust creation. Scoop up wet material and place in approved container. Allow wet material to harden before disposal. |

Section 7 – Handling and Storage

| | |
|--------------------------------|--|
| Safe Handling Practices | Avoid contact with skin or eyes. Avoid breathing dust. Use only in well ventilated areas. Wear appropriate personal protective equipment to prevent eye or skin contact and use respiratory protection equipment if dusty or in poorly ventilated areas. |
| Safe Storage Measures | Store in well-ventilated areas away from moisture and incompatible materials. If stored in containers, keep containers closed when not in use. |
| Incompatible Materials | Water/moisture exposure will cause material to generate heat. Keep away from fluoride compounds, strong acids, alkalines, and oxidizers. Cement dissolves in hydrofluoric acid, producing corrosive silicon tetrafluoride gas. |

Section 8 – Exposure Controls & Personal Protection

Exposure Limits for Individual Components (T= Total Respirable [PNOC/PNOR], R=Respirable fraction, I=Inhalable-aerosol)

| Component | OSHA PEL | ACGIH TLV | NIOSH REL |
|-------------------------------|--|-----------------------------|---|
| Portland cement | 15 mg/m ³ (T); 5 mg/m ³ (R) | 1 mg/m ³ (R) | 10 mg/m ³ (T); 5 mg/m ³ (R) |
| Tricalcium silicate | 15 mg/m ³ (T); 5 mg/m ³ (R) | Not listed | 10 mg/m ³ (T); 5 mg/m ³ (R) |
| Dicalcium silicate | 15 mg/m ³ (T); 5 mg/m ³ (R) | Not listed | 10 mg/m ³ (T); 5 mg/m ³ (R) |
| Tetracalcium aluminoferrite | 15 mg/m ³ (T); 5 mg/m ³ (R) | Not listed | 10 mg/m ³ (T); 5 mg/m ³ (R) |
| Gypsum (Calcium Sulfate) | 15 mg/m ³ (T); 5 mg/m ³ (R) | 10 mg/m ³ (T) | 10 mg/m ³ (T); 5 mg/m ³ (R) |
| Tri-calcium Aluminate | 15 mg/m ³ (T); 5 mg/m ³ (R) | Not listed | 10 mg/m ³ (T); 5 mg/m ³ (R) |
| Limestone (Calcium Carbonate) | 15 mg/m ³ (T); 5 mg/m ³ (R) | 10 mg/m ³ | 10 mg/m ³ (T); 5 mg/m ³ (R) |
| Magnesium oxide | 15 mg/m ³ | 10 mg/m ³ (I) | Not established |
| Nuisance Dusts (PNOR) | 15 mg/m ³ (T); 5 mg/m ³ (R) | 10 mg/m ³ | Not established |
| Crystalline Silica (Quartz) | 10 mg/m ³ (R) / (% SiO ₂ + 2) 30 mg/m ³ (T) / (% SiO ₂ + 2) | 0.025 mg/m ³ (R) | 0.05 mg/m ³ (R) |

Exposure Controls

Engineering Controls Use outdoors in well-ventilated areas; otherwise employ natural or mechanical ventilation to maintain exposure within applicable limits.

Personal Protection Avoid contact with skin or eyes. Avoid creating or breathing dust.

Face and Eyes Safety glasses with side shields or protective goggles should be worn while using this product. For extremely dusty conditions, non-vented goggles or goggles with indirect venting are recommended. Avoid contact lens wear when using this product.

Body Long sleeved shirts and trousers should be worn while using this material. Wear water-proof boots. If working in dusty conditions, impervious over garments are recommended.

Respiratory If exposure levels cannot be maintained below acceptable limits, suitable particulate-filtering facemasks or respirators approved by MSHA/NIOSH should be worn in accordance with the user's respiratory protection program and OSHA/MSHA guidelines.

Hands Protective gloves with wrist/arm cuffs should be worn to avoid direct contact with skin.

Section 9 – Physical and Chemical Properties

| | | | |
|-------------------------------|-----------------------|---|---------------------------|
| Physical State | Solid, powder | Specific Gravity | 3.1 – 3.2 |
| Appearance & Color | Grey/off-white powder | Flash Point/Method | None. Not flammable. |
| Odor | None | Auto Ignition Temperature | Not determined |
| pH | >12 (in water) | Lower Flammability Limit | Not applicable |
| Boiling Point | Not applicable | Upper Flammability Limit | Not applicable |
| Solubility (Water) | Slight (<5%) | Octanol/H₂O Coefficient | Not determined |
| Evaporation Rate | Not applicable | Viscosity | Not applicable |
| Melting Point | Not determined | Freezing Point | Solid at room temperature |
| Vapor Density | Not applicable | Explosion Risk: Static | Not considered a hazard |
| Vapor Pressure | Not applicable | Explosion Risk: Shock | Not considered a hazard |

Section 10 – Stability and Reactivity

| | |
|-------------------------------|---|
| Reactivity | Reacts with water creating heat and calcium hydroxide. |
| Chemical Stability | Stable at standard temperature and pressures. |
| Hazardous Reactions | None. Hazardous polymerization will not occur. |
| Conditions to Avoid | Moisture or wetting will cause exothermic heating as product cures. |
| Incompatible Materials | Avoid contact with strong acids, oxidizers, aluminum and ammonium salts. |
| Decomposition Hazards | Reacts with water to form calcium hydroxide which can irritate/damage skin. Cement dissolves in hydrofluoric acid, producing corrosive silicon tetrafluoride gas. |

Section 11 – Toxicological Information

Product: Portland cement

| | |
|--|--|
| Acute Toxicity | Not classified. |
| LD50/LC50 Data | Not classified. |
| Skin Corrosion/Irritation | Causes irritation or chemical burns if exposed to moisture on skin. |
| Critical Eye Damage/Irritation | Causes serious eye injury due to chemical burns or mechanical irritation. |
| Respiratory or Skin Sensitization | Not reported/no data available. |
| Germ Cell Mutagenicity | Not reported/no data available. |
| Teratogenicity | Not reported/no data available. |
| Carcinogenicity | Material contains trace amounts of crystalline silica, which may cause lung cancer through repeated or prolonged exposure to dust. |
| Specific Organ Toxicity (Single Exposure) | Not reported/no data available. |
| Specific Organ Toxicity (Repeated Exposure) | May cause damage/disease to lungs through repeated or prolonged exposure. |
| Reproductive Toxicity | Not reported/no data available. |
| Aspiration Respiratory Hazard | Not reported/no data available. |
| Symptoms: Inhalation | Coughing, sneezing, mucous discharge and dyspnea. Extended contact may lead to chemical burns. |
| Symptoms: Skin Contact | Redness and itching. Extended contact may lead to chemical burns. |
| Symptoms: Eye Contact | Redness and itching. Extended contact may lead to corneal abrasion/ulceration. |
| Symptoms: Ingestion | Irritation and chemical burns of mouth and throat. |
| Other Toxicological Information | No additional data available. |

| Components | Toxicity | Carc: IARC | Carc: NTP | Carc: OSHA |
|---|---|------------|------------|------------|
| Portland cement (refer to Section 16 for more information) | No data | Not listed | Not listed | Not listed |
| Tricalcium silicate | No data | Not listed | Not listed | Not listed |
| Dicalcium silicate | No data | Not listed | Not listed | Not listed |
| Tetracalcium aluminoferrite | No data | Not listed | Not listed | Not listed |
| Gypsum (Calcium Sulfate) | Oral LD50 Rat >2000 mg/kg | Not listed | Not listed | Not listed |
| Tri-calcium Aluminate | No data | Not listed | Not listed | Not listed |
| Limestone (Calcium carbonate) | Oral LD50 Rat 6450 mg/kg | Not listed | Not listed | Not listed |
| Magnesium oxide | Oral LD50 Rat 810 mg/kg | Not listed | Not listed | Not listed |
| Nuisance Dusts (PNOR) | No data | Not listed | Not listed | Not listed |
| Crystalline Silica (Quartz) (refer to Section 16 for more information) | Oral LD50 Rat >22,500 mg/kg LC50 Carp >10,000 mg/L (72 hr) | Group 1 | Known | Not listed |

Section 12 – Ecological Information

| | |
|---|--|
| General Ecotoxicity | Not classified. |
| Persistence and Degradability | Not reported/no data available. |
| Bioaccumulation Potential | Not reported/no data available. |
| Mobility in Soil to Groundwater | Not reported/no data available. |
| Environmental Fate | Not reported/no data available. |
| Other Environmental Precautions or Information | Avoid release to the environment. Prevent material from entering sewers, drains, ditches or waterways. |

Section 13 – Disposal Considerations

| | |
|-----------------------------------|--|
| Disposal Methods | Dispose as an inert, non-metallic mineral in accordance with applicable federal, state, and local regulations. |
| Special Considerations | Avoid creation or breathing dust during disposal. Avoid contact with skin and eyes. Refer to Section 8 for personal protection measures. |
| Other Disposal Information | Prevent material from entering sewers, drains, ditches or waterways. |

Section 14 – Transport Information

| | |
|---------------------------------|----------------------|
| Proper Shipping Name | N/A – not regulated. |
| Hazard Class | N/A – not regulated. |
| UN Shipping ID Number | N/A – not regulated. |
| Packing Group | N/A – not regulated. |
| Environmental/IMDG Codes | N/A – not regulated. |

Section 15 – Regulatory Information

Federal

This product contains one or more chemical components or ingredients that may require identification and/or reporting under SARA Section 302, SARA Section 311/312/313, CERCLA and/or TSCA. An examination of the components of this product should be conducted by a qualified environmental professional to determine if such identification or reporting is required by federal law.

- Components: Portland cement, Silica (Crystalline)

State

This product contains one or more chemical components or ingredients that are included or listed on the hazardous substances lists for one or more of the following states: California, Maine, Minnesota, New Jersey, Pennsylvania and Rhode Island. An examination of the components of this product should be conducted by a qualified environmental or safety and health professional to determine the specific requirements for those states.

- Components: Portland cement, Limestone (calcium carbonate), Gypsum (calcium sulfate), Silica (Crystalline)

The state of California requires the following statement (Proposition 65) in regards to this material:

- WARNING! This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Section 16 – Other Information

Date of last revision: May 2, 2015

Prepared and reviewed by: Holcim (US) Inc. Occupational Safety & Health

Additional information regarding portland cement:

Wet portland cement can cause caustic burns to unprotected skin, sometimes referred to as cement burns. Cement burns may result in blisters, dead or hardened skin, or black or green skin. In severe cases, these burns may extend to the bone and cause disfiguring scars or disability.

Employees cannot rely on pain or discomfort to alert them to cement burns because cement burns may not cause immediate pain or discomfort. By the time an employee becomes aware of a cement burn, much damage has already been done. Accordingly, the safest method to use portland cement is to avoid contact with exposed skin completely. Cement burns can get worse even after skin contact with cement has ended. Any employee experiencing a cement burn is advised to see a health care professional immediately.

Skin contact with wet portland cement can also cause inflammation of the skin, referred to as dermatitis. Signs and symptoms of dermatitis can include itching, redness, swelling, blisters, scaling, and other changes in the normal condition of the skin. Contact with wet portland cement can cause a non-allergic form of dermatitis (called irritant contact dermatitis) which is related to the caustic, abrasive, and drying properties of portland cement.

In addition, hexavalent chromium [Cr(VI)] which may be found in portland cement in trace amounts, can cause an allergic form of dermatitis (allergic contact dermatitis, or ACD) in sensitized employees who work with wet portland cement. When an employee is sensitized, that person's immune system overreacts to small amounts of Cr(VI), which can lead to severe inflammatory reactions upon subsequent exposures. Sensitization may result from a single Cr(VI) exposure, from repeated exposures over the course of

months or years, or it may not occur at all. After an employee becomes sensitized, brief skin contact with very small amounts of Cr(VI) can trigger ACD. ACD is long-lasting and employees can remain sensitized to Cr(VI) years after their exposure to portland cement has ended. Medical tests (e.g. skin patch tests) are available that can confirm whether an employee has become dermally sensitized to Cr(VI).

Employees who work with wet portland cement and experience skin problems, including seemingly minor ones, are advised to see a health care professional for evaluation and treatment. In cement-related dermatitis, early diagnosis and treatment can help prevent chronic skin problems.

Additional information regarding crystalline silica:

The major concern is silicosis, caused by the inhalation and retention of respirable (extremely small) crystalline silica dust particles. Silicosis can exist in several forms. Chronic or ordinary silicosis (often referred to as simple silicosis) is the most common form of silicosis, and can occur after many years of exposure to relatively low concentrations of airborne respirable crystalline silica dust. Complicated silicosis or progressive massive fibrosis (PMF) may be associated with decreased lung function and may be disabling. Advanced complicated silicosis or PMF may lead to death. Advanced complicated silicosis or PMF can result in heart disease secondary to the lung disease. Acute silicosis can occur with exposures to very high concentrations of respirable crystalline silica over a very short time period, sometimes as short as a few months. The symptoms of acute silicosis include progressive shortness of breath, fever, cough and weight loss. Acute silicosis can be fatal.

IARC: The overall IARC evaluation was that "crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1)." The IARC evaluation noted that "carcinogenicity was not detected in all industrial circumstances studies. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs."

NTP: The National Toxicology Program (NTP), in its Thirteenth Annual Report on Carcinogens, classified "silica, crystalline (respirable)" as a known human carcinogen.

OSHA: Crystalline silica (quartz) is not regulated as a human carcinogen by the Occupational Safety and Health Administration.

Other important information:

While the information provided in this document is believed to provide a useful summary of the hazards of portland cement, the information in this document cannot anticipate and provide all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

The data furnished in this document do not address hazards that may be posed by other materials when mixed with portland cement. Users should review other relevant safety data sheets before working with this product.

The information presented in the Safety Data Sheet is based on current knowledge and publications and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be interpreted as guaranteeing any specific property of the product.

SELLER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY HOLCIM (US) INC., EXCEPT THAT THE PRODUCT SHALL CONFORM TO CONTRACTED SPECIFICATIONS.

--END OF SAFETY DATA SHEET--





2440 Dayton Xenia Rd, Suite D
Beavercreek, OH 45434
888-431-0218
www.mintekresources.com

Safety Data Sheet (SDS)

OSHA Hazard Communication Standard 29 CFR 1910.1200. Prepared to GHS Rev03.

| Section 1. Identification | | |
|---|--|--|
| Product Name Calciment® | Distributor Mintek Resources, Inc. PO Box 340187 Beavercreek, OH 45434 | Telephone 937-431-0218 Office 937-431-1305 Fax 800-424-9300 CHEMTREC |
| Chemical Name Calcium Oxide, Calcium Carbonate, Calcium Hydroxide | | |
| Uses Soil Stabilization, De-Watering, Solidification, Fixation, Neutralization, Desulphurization, Agriculture, Cement | | |

| SECTION 2. HAZARDS IDENTIFICATION | |
|--|------------------------|
| Classification of the substance or mixture | |
|  | GHS03 Exclamation Mark |
|  | GHS05 Corrosion |
| Signal word Danger | |
| Hazard-determining components of labeling Calcium Oxide, Calcium Carbonate, Calcium Hydroxide | |
| Hazard Statements H303 May be harmful if swallowed H315 Causes skin irritation H319 Causes serious eye irritation H335 May cause respiratory irritation | |
| Precautionary statements P101 If medical advice is needed, have product container or label at hand | |

| | |
|------|--|
| P102 | Keep out of reach of children |
| P280 | Wear protective gloves, clothing, eye protection |
| P281 | Use personal protective equipment as required |
| P284 | Wear respiratory protection |

| Section 3. Composition | | | | |
|-----------------------------|-------------------------------------|-------|------------|----------------------------------|
| Component | Formula | % Wt. | CAS No. | PEL |
| Calcium Carbonate | CaCO ₃ | 0-30 | 1317-65-3 | 10 mg/m ³ |
| Calcium Oxide | CaO | 20-80 | 1305-78-8 | 2 mg/m ³ |
| Calcium Hydroxide | Ca(OH) ₂ | 0-10 | 1305-62-0 | 5 mg/m ³ |
| Calcium Magnesium Carbonate | CaMg(CO ₃) ₂ | 0-30 | 16389-88-1 | 10 mg/m ³ |
| Crystalline Silica Quartz | SiO ₂ | 0-10 | 14808-60-7 | 0.1 mg/m ³ respirable |
| Aluminum Oxide | Al ₂ O ₃ | 0-15 | 1344-28-1 | 10 mg/m ³ |
| Ferric Oxide | Fe ₂ O ₃ | 0-5 | 1309-37-1 | 15 mg/m ³ |
| Magnesium Oxide | MgO | 0-60 | 1309-48-4 | 5 mg/m ³ |
| Sulfur | SO ₃ | 0-10 | 7704-34-9 | 10 mg/m ³ |

| SECTION 4. First-Aid Measures | |
|-------------------------------|--|
| Effects: | |
| Inhalation: | Acute: Irritation, sore throat, cough, sneezing. Chronic: Persistent coughing and breathing problems. Long-term exposure to silica can cause a chronic lung disorder, silicosis. |
| Eyes: | Acute: Severe irritation, intense tearing, burns. Chronic: Possible blindness when exposure is prolonged. |
| Skin: | Acute: Removes natural skin oils, blotches, itching and superficial burns in case of sweating. Chronic: No known effects. |
| Ingestion: | Acute: Sore throat, stomach aches, cramps, diarrhea, vomiting. Chronic: No known effects. |
| Treatments: | |
| Inhalation: | Move victim to fresh air. Seek medical attention if necessary. If breathing has stopped, give artificial respiration. |
| Eyes: | Immediately flush eyes with large amounts of water for at least 15 minutes. Pull back the eyelid to make sure all the lime dust has been washed out. Seek medical attention immediately. Do not rub eyes. |
| Skin: | Flush exposed area with large amounts of water. Seek medical attention immediately. |
| Ingestion: | Give large quantities of water or fruit juice. Do not induce vomiting. Seek medical attention immediately. Never give anything by mouth if victim is rapidly losing consciousness or is unconscious or convulsing. |

SECTION 5. Fire-Fighting Measures

Flash Point: Non-flammable

Autoignition Temperature: Non-flammable

Inflammability Limits: None, Non combustible solid, but will support combustion by liberation of oxygen

Explosion Risk: None by itself, but heat produced by reaction with strong acids can generate steam and pressure

Hazardous Combustion Products: Decomposes to produce calcium oxide (CaO), which can react with water to produce steam and pressure

Extinguishing Media: Use dry chemical fire extinguisher. Do not use water or halogenated compounds, except that large amounts of water may be used to deluge small quantities of lime kiln dust. Use appropriate extinguishing media for surrounding fire conditions.

Fire Fighting Instructions: Keep personnel away from and upwind of fire. Wear full fire-fighting turn-out gear (full Bunker gear), and respiratory protection (self-contained breathing apparatus).

SECTION 6. Accidental Release Measures

Individual and collective precautions: Avoid creating conditions which release dust – use mechanical vacuums to remove dust from work spaces.

Avoid inhalation of Dust: Wear respiratory protection – minimum NIOSH N-95 Dust Mask.

Cleaning methods (Leaks & Spills): Use personal protective equipment (eyes, skin and inhalation, see Section 8). Use dry methods (vacuuming, sweeping) to collect spilled materials. Avoid generating dust. For large spills, evacuate area downwind of clean-up area operations to minimize dust exposure. For small spills, store spilled materials in dry, sealed plastic or metal containers. Dust residue on surfaces may be washed with water.

Precautions for the protection of the environment: May not be released into surface waters without controls (increases pH).

Waste Disposal: Dispose according to federal, provincial/state and local environmental regulations.

SECTION 7. Handling and Storage

Handling: In open air or in ventilated places, avoid skin and eye contact, avoid creating airborne dust.

Storage: Store in dry places sheltered from humidity. Keep away from acids. Keep out of reach of children.

SECTION 8. Exposure Controls/Personal Protection

Exposure Limits:

Calcium Carbonate: 15 mg/m³ (total dust), 5 mg/m³ (respirable) (OSHA); 10 mg/m³ (ACGIH, O. Reg. 833);
Calcium oxide: 5 mg/m³ (OSHA); 2 mg/m³ (ACGIH, O. Reg. 833);
Calcium Magnesium Carbonate: 10 mg/m³ (ACGIH, OSHA)
Calcium Magnesium Oxide: 2 mg/m³ (ACGIH, OSHA)
Magnesium Carbonate: 15 mg/m³ (total dust), 5 mg/m³ (respirable) (OSHA); 5 mg/m³ (ACGIH, O. Reg. 833); 10 mg/m³ (ACGIH, O. Reg. 833);
Calcium Hydroxide: mg/m³ (total dust), 5 mg/m³ (respirable) (OSHA); 5 mg/m³ (ACGIH, O. Reg. 833)
Magnesium oxide: 15 mg/m³ (OSHA); 10 mg/m³ (ACGIH, O. Reg. 833)
Silica (crystalline quartz): 2.5 mg/m³ (total dust), 0.8 mg/m³ (respirable) (OSHA); 0.5 mg/m³ (respirable – ACGIH); 0.1 mg/m³ (O. Reg. 845)

Engineering Controls: Use ventilation and dust collection to control exposure to below applicable limits.

Respiratory Protection: Wear NIOSH N-95 Dust Mask.

Eye Protection: Eye protection (chemical goggles, safety glasses and/or face shield) should be worn where there is a risk of lime exposure. Contact lenses should not be worn when working with lime products.

Hand Protection: Use clean dry gloves.

Skin Protection: Cover body with suitable clothes (long sleeves shirts and trousers). Use over the ankle waterproof caustic resistant footwear.

SECTION 9. Physical and Chemical Properties

| | |
|----------------------------|---|
| Appearance: | Solid, white/tan/gray powder |
| Odor: | Odorless |
| Odor Threshold: | NA |
| pH: | 12.4 pH graduated solution at 25° C |
| Melting Point: | 1410° C |
| Boiling Point: | 1565° C |
| Flash Point: | NA |
| Evaporation Rate: | NA |
| Flammability: | NA |
| Upper/Lower Flammability | NA |
| Vapor Pressure (+t°) | Non volatile. |
| Vapor Density (air=ml): | Non volatile. |
| Relative Density: | 720-1130 kg/ m ³ |
| Solubility in Water: | 0.100 – 1.125g/100g – reactive with water to product Ca(OH) ₂ with large amounts of heat |
| Partition coefficient: | NA |
| Auto-Ignition Temperature: | NA |
| Decomposition Temperature: | 580°C |
| Viscosity: | NA |

SECTION 10. Stability and Reactivity

| | |
|--|---|
| Stability: | Stable products, not very soluble. |
| Decomposition temperature: | 580°C, forms calcium oxide (CaO) and water. |
| Reactivity: | Reacts with acids to form calcium salts while generating heat. Reacts with carbon dioxide in air to form calcium carbonate. |
| Conditions to avoid: | Vicinity of incompatible materials. |
| Incompatible materials: | Acids; reactive fluoridated, brominated or phosphorous compounds; aluminum (may form hydrogen gas), reactive powdered metals; organic acid anhydrides; nitro-organic compounds; interhalogenated compounds. |
| Hazardous decomposition products: | Calcium oxide (CaO). |

SECTION 11. Toxicological Information

| | |
|--------------------------|--|
| Toxicity: | LD ₅₀ oral (rat) for calcium hydroxide is 7340 mg/kg. This product is not listed by MSA, OSHA, or IARC as a carcinogen, but this product may contain crystalline silica, which has been classified by IARC as (Group 1) carcinogenic to humans when inhaled in the form of quartz or cristobalite. No reported Carcinogenicity, Reproductive Effects, Teratogenicity or Mutagenicity. |
| Exposure Limits: | Refer to Section 8. |
| Irritancy: | Can cause severe irritation of eyes, skin, respiratory tract and gastrointestinal tract. |
| Chronic Exposure: | Inhalation of silica can cause a chronic lung disorder, silicosis. |

SECTION 12. Ecological Information

Alkaline substance that increases pH to 12.4 in a saturated water solution at 25°C.
Calcium hydroxide gradually reacts with CO₂ in air to form calcium carbonate (CaCO₃).
Calcium carbonate is ecologically neutral.
Uncontrolled spillage in surface waters should be avoided since the increase pH could be detrimental to fish.
Harmful to aquatic life in high concentration.

SECTION 13. Disposal Considerations

Dispose according to federal, provincial/state and local environmental regulations.

SECTION 14. Transportation Information

Classification: TDG: Not listed for ground transportation
HMR: Not listed for ground transportation

TDG: Transportation of Dangerous Goods Regulation (Canada)

HMR: Hazardous Materials Regulation (USA)

SECTION 15. Regulatory Information

Symbol: WHMIS Rating
D2A, E
NFPA RATING
HEALTH-3 SPECIFIC HAZARD – ALK FLASH POINTS-0 REACTIVITY-1
HMIS RATING
HEALTH-2 SPECIFIC HAZARD – ALK FLASH POINTS-0 REACTIVITY-1

SECTION 16. Other Information

Original Prepared: 05/13/13

Revision Date: 07/15/13

Revision #: 0

Calciment can be removed from vehicles using rags dampened with dilute vinegar. After applying dilute vinegar, vehicles (especially chrome surfaces) must be washed with water.

The information contained herein is believed to be accurate and reliable as of the date hereof. However, Mintek Resources, Inc. makes no representation, warranty or guarantee as to results or as to the information's accuracy, reliability or completeness. Mintek has no liability for any loss or damage that may result from use of the information. Each user is responsible to review this information, satisfy itself as to the information's suitability and completeness, and circulate the information to its employees, customers and other appropriate third parties.

Appendix F – Trudeau Mining Permit



PERMIT

Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:

TRUDEAU SAND & GRAVEL INC
PO BOX 235

SARANAC LAKE, NY 12983-0235
(518) 891-1940

Facility:

TRUDEAU SAND PIT
NYS RT 313 MILES NE OF SARANAC LAKE

(V)
SARANAC LAKE, NY 12983

Facility Location: in ST ARMAND in ESSEX COUNTY

Facility Principal Reference Point: NYTM-E: 572.2 NYTM-N: 4913.8

Latitude: 44°22'26.0" Longitude: 74°05'37.5"

Authorized Activity: The mining of sand and gravel with material processing on lands owned by the permittee. Approved operations will affect 39.4 acres over the permit term. The affected area is a portion of a 96 acre life of mine area, as identified in the approved mined land use plan.

Permit Authorizations

Mined Land Reclamation - Under Article 23, Title 27

Permit ID 5-1544-00011/00002

(Mined Land ID 50085)

Renewal

Effective Date: 7/23/2016

Expiration Date: 7/22/2021

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: KEVIN R BLISS, Deputy Regional Permit Administrator


Address: NYSDEC Region 5 Warrensburg Sub-Office
232 Golf Course Rd
Warrensburg, NY 12885

Authorized Signature: _____

Kevin R. Bliss

Date 7/6/16

THIS PERMIT AMENDS PERMIT 90-71CR5, ISSUED JULY 25, 2011
THIS IS A TWO-SIDED DOCUMENT

| | |
|---|--|
|  <p>Adirondack Park Agency</p> <p>P.O. Box 99, 1133 NYS Route 86 Ray Brook, New York 12977 Tel: (518) 891-4050 Fax: (518) 891-3938 www.apa.ny.gov</p> | <p>APA Project Permit 90-71CR6</p> |
| <p>In the Matter of the Application of</p> <p>TRUDEAU SAND AND GRAVEL, INC.</p> <p>for a permit pursuant to § 809 of the Adirondack Park Agency Act and 9 NYCRR Parts 577</p> | <p>Date Issued: December 6, 2016</p> <p>To the County Clerk: This permit must be recorded on or before February 6, 2017. Please index this permit in the grantor index under the following names:</p> <p>1. Trudeau Sand and Gravel, Inc.</p> |

SUMMARY AND AUTHORIZATION

This permit amends Permit 90-71CR5 to authorize continuation of a commercial sand and gravel extraction in an area classified Rural Use and Industrial Use, by the Official Adirondack Park Land Use and Development Plan Map in the Town of St. Armand, Essex County.

This amended permit shall expire unless recorded in the Essex County Clerk's Office on or before February 6, 2017, in the names of all persons listed above and in the names of all owners of record of any portion of the project site on the recordation date.

The project shall be undertaken in compliance with all conditions stated herein. Failure to comply with this permit is a violation and may subject the permittee, successors, and assigns to civil penalties and other legal proceedings.

This amended permit does not convey any right to trespass upon the lands or interfere with the riparian rights of others in order to undertake the authorized project, nor does it authorize the impairment of any easement, right, title or interest in real or personal property. Nothing contained in this amended permit shall be construed to satisfy any legal obligations of the permittee to comply with all applicable laws and regulations or to obtain any governmental approval or permit from any entity other than the Agency, whether federal, State, regional or local.

PROJECT SITE

1. The project site is a 122± acre vacant parcel of land located on the west side of NYS Route 3, 3± miles north of the Village of Saranac Lake in the Town of St. Armand, which is owned by Trudeau Sand and Gravel, Inc., the applicant. It is