

AquaCrate Installation Instructions

Pre-installation notes:

For attenuation systems: position the inflow and outflow connections level with the base of the AquaCrate structure

For infiltration systems: position the inflow connection at the top of the AquaCrate structure.

NB

For traffic with axle weight up to 13 tonnes the minimum cover required is 850mm

For traffic with axle weight up to 10 tonnes the minimum cover required is 650mm

For traffic with axle weight up to 6 tonnes the minimum cover required is 400mm

For traffic with axle weight up to 2 tonnes the minimum cover required is 300mm

For traffic with axle weight up to 1 tonnes the minimum cover required is 250mm

Installation Instructions:

1/. Excavate to the required length, width and depth and level the base. Make sure that the area is enough to allow plant access around sides to compact the backfill material (500mm minimum)

Ensure the base is smooth and level with no sharp protrusions. Check that the slopes are cut back to a safe angle or adequately supported and that a safe access is possible to allow site personnel to enter the excavation.

2/. Inspect the base for soft spots and if any are present, excavate and replace with compacted granular fill material.

3/. Lay 75mm sharp sand bedding layer to the base of the excavation and level off. Lay the geotextile protection fleece (180g non woven, needle punched type GT1900), ensuring a minimum 150mm overlap. This is required for both attenuation and infiltration tanks(soak-aways).

4/. Lay the geomembrane (if tank is for water storage) over the geotextile and sand bedding layer and up the sides of the excavation. Examine the geomembrane for damage and test all welds/ taped joints.

5/. Assemble the AquaCrate units (1m x 1m x 0.4m High) and install within the void in accordance with the installation schedule for correct positioning. Special clips are provided to join the units to prevent displacement (single clips for adjacent units (3 per unit) and double clips for all multi layer applications (1per unit)).

6/. Complete the geotextile and/or geomembrane encapsulation to the sides and top of the installation, ensuring that the protection fleece (if attenuation) has sufficient to overlap by 150mm minimum. The geomembrane should be welded with double seams or taped using double sided tape and inspected for damage, testing the welds/joints as required.

7/. Connect the drainage connections to the installation using proprietary adaptors. Alternatively for infiltration systems use flange adaptors and attach them to the AquaCrate units with self tapping screws. For attenuated systems, it is recommended that all connections and air vent installations are achieved using sealed drainage connections into a preformed socket using proprietary seals “top hats” available to order.

8/. Backfill around the installation with Type 1 or 2 sub base, compacting in 150mm layers, in accordance with the Specification for Highway Works.

9/. Place a 75mm sharp sand protection layer if required over the top of units and continue to backfill as follows:

For trafficked areas (car parks etc):

Type 1 or 2 sub base material compacted in 150mm layers in accordance with the Specification for Highway Works. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

Backfill the sides with granular material (not cohesive)

For landscaped and non-trafficked areas:

Selected “as dug” material with a unit size no more than 75mm compacted to 90% maximum dry density. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

10/. Finalise the pavement construction / landscaping over the Aquacrate system.

Pennine Manufacturing Ltd

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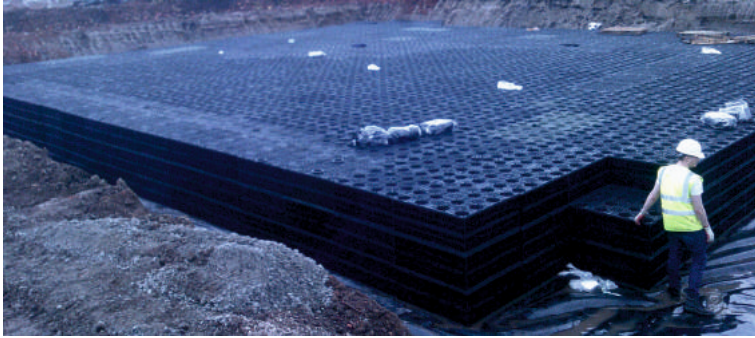
Pennine

AquaCrate400

Loadbearing underground water storage/attenuation system

The Advantages of AquaCrate

- # Assembled ready to install with up to 72M³ on a full load
- # Available in different configurations to meet specific load requirements
- # Available with high load-bearing capability (up to 100tonnes/m² vertical) able for HGV traffic
- # Simple and fast to install with 2.5 units per M³
- # Modular size of 1m x 1m plan x 400mm height ensures great versatility in both size and shape of storage
- # Lightweight units under 25kg removes need for mechanical handling



Uses

- # For permeable infiltration schemes, AquaCrate units should be wrapped in a non-woven needle punched geotextile which allows water discharge through the subsurface whilst preventing the ingress of soil or sand particles
- # For water storage, impermeable geomembrane is used between the geotextile & the crate assembly

Why use Aquacrates?

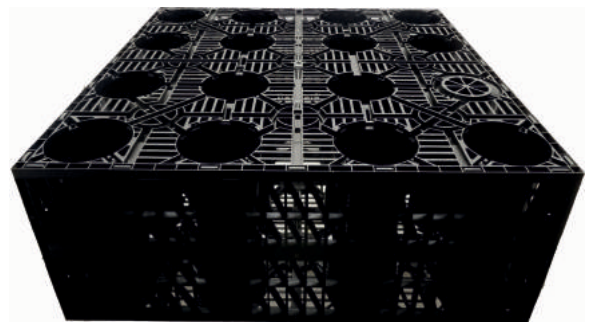
- # Prevents extreme peak flows to main drainage and water purification systems
- # Rainwater is "cleaned" by the geotextile surround
- # Decreases possibility of flooding during heavy rain falls
- # Allows development of difficult sites by using attenuation / water storage
- # Decreases environment problems caused by development
- # For water storage for subsequent use in toilets, watering plants, cleaning vehicles and other grey water usages

Installation Service
with certified
geomembrane
welding available

Design

- # Following assessment of the required water to be stored (see CIRIA C522, R156 & BRE 365) the total number of Aquacrate units can be calculated using 2.5 /m³ (1000 litres). Decide on the best configuration for the characteristics of the site in question and create the "box" accordingly using the length and width dimensions allowing for a 95% void ratio.
- # An Aquacrate tank needs 75mm sharp sand beneath the tank to protect the geotextile. Also use sharp sand on top and around the sides (Depth of sand between 75 and 100mm depending on the size & sharpness of stones in the backfill)
- # Use a silt trap to minimise ingress into the tank and this should be inspected regularly. CCTV/back-jetting points are recommended.

Inspectable systems available



PRODUCT DATA

	AquaCrate400
NOMINAL SIZE	1000 x 1000 x 400mm
CAPACITY	400Litres(2.5 per cu.metre)
UNIT WEIGHT	16kg
VOID RATIO	95.5%
COMPRESSIVE STRENGTH	>200+KN/m ²
LATERAL STRENGTH	>70+KN/m ²

Made from recycled polypropylene & can be recycled at end of use

MADE IN UK TO ISO9001 QUALITY STANDARDS

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AquaCrate Installation Instructions

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For infiltration systems: position the inflow connection at the top of the AquaCrate structure.

NB

For traffic with axle weight up to 13 tonnes the minimum cover required is 650mm

For traffic with axle weight up to 10 tonnes the minimum cover required is 450mm

For traffic with axle weight up to 6 tonnes the minimum cover required is 350mm

For traffic with axle weight up to 2 tonnes the minimum cover required is 300mm

For traffic with axle weight up to 1 tonnes the minimum cover required is 250mm

Installation Instructions:

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Ensure the base is smooth and level with no sharp protrusions. Check that the slopes are cut back to a safe angle or adequately supported and that a safe access is possible to allow site personnel to enter the excavation.

2/. Inspect the base for soft spots and if any are present, excavate and replace with compacted granular fill material.

3/. Lay 75mm sharp sand bedding layer to the base of the excavation and level off. Lay the geotextile protection fleece (180g non woven, needle punched type GT1900), ensuring a minimum 150mm overlap. This is required for both attenuation and infiltration tanks(soak-aways).

4/. Lay the geomembrane (if tank is for water storage) over the geotextile and sand bedding layer and up the sides of the excavation. Examine the geomembrane for damage and test all welds/ taped joints.

5/. Assemble the AquaCrate units (1m x 1m x 0.4m High) and install within the void in accordance with the installation schedule for correct positioning. Special clips are provided to join the units to prevent displacement (single clips for adjacent units (3 per unit) and double clips for all multi layer applications (1per unit)).

6/. Complete the geotextile and/or geomembrane encapsulation to the sides and top of the installation, ensuring that the protection fleece (if attenuation) has sufficient to overlap by 150mm minimum. The geomembrane should be welded with double seams or taped using double sided tape and inspected for damage, testing the welds/joints as required.

7/. Connect the drainage connections to the installation using proprietary adaptors. Alternatively for infiltration systems use flange adaptors and attach them to the AquaCrate units with self tapping screws. For attenuated systems, it is recommended that all connections and air vent installations are achieved using sealed drainage connections into a preformed socket using proprietary seals “top hats” available to order.

8/. Backfill around the installation with Type 1 or 2 sub base, compacting in 150mm layers, in accordance with the Specification for Highway Works.

9/. Place a 75mm sharp sand protection layer if required over the top of units and continue to backfill as follows:

For trafficked areas (car parks etc):

Type 1 or 2 sub base material compacted in 150mm layers in accordance with the Specification for Highway Works. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

Backfill the sides with granular material (not cohesive)

For landscaped and non-trafficked areas:

Selected “as dug” material with a unit size no more than 75mm compacted to 90% maximum dry density. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

10/. Finalise the pavement construction / landscaping over the Aquacrate system.

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AquaCrate414

Loadbearing underground water storage/attenuation system

The Advantages of AquaCrate

- # Assembled ready to install with up to 72M³ on a full load
- # Available in different configurations to meet specific load requirements
- # Available with high load-bearing capability (up to 100tonnes/m² vertical) able for HGV traffic
- # Simple and fast to install with 2.5 units per M³
- # Modular size of 1m x 1m plan x 400mm height ensures great versatility in both size and shape of storage
- # Lightweight units under 25kg removes need for mechanical handling



Uses

- # For permeable infiltration schemes, AquaCrate units should be wrapped in a non-woven needle punched geotextile which allows water discharge through the subsurface whilst preventing the ingress of soil or sand particles
- # For water storage, impermeable geomembrane is used between the geotextile & the crate assembly

Why use Aquacrates?

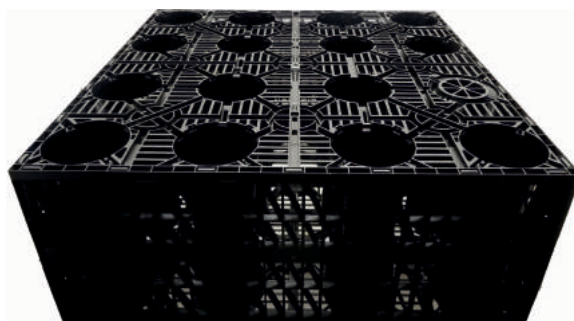
- # Prevents extreme peak flows to main drainage and water purification systems
- # Rainwater is "cleaned" by the geotextile surround
- # Decreases possibility of flooding during heavy rain falls
- # Allows development of difficult sites by using attenuation / water storage
- # Decreases environment problems caused by development
- # For water storage for subsequent use in toilets, watering plants, cleaning vehicles and other grey water usages

**Installation Service
with certified
geomembrane
welding available**

Design

- # Following assessment of the required water to be stored (see CIRIA C522, R156 & BRE 365) the total number of Aquacrate units can be calculated using 2.5 /m³ (1000 litres). Decide on the best configuration for the characteristics of the site in question and create the "box" accordingly using the length and width dimensions allowing for a 95% void ratio.
- # An Aquacrate tank needs 75mm sharp sand beneath the tank to protect the geotextile. Also use sharp sand on top and around the sides (Depth of sand between 75 and 100mm depending on the size & sharpness of stones in the backfill)
- # Use a silt trap to minimise ingress into the tank and this should be inspected regularly. CCTV/back-jetting points are recommended.

Inspectable systems available



PRODUCT DATA

	AquaCrate414
NOMINAL SIZE	1000 x 1000 x 400mm
CAPACITY	400Litres(2.5 per cu.metre)
UNIT WEIGHT	20.1kg
VOID RATIO	94.0%
COMPRESSIVE STRENGTH	>300+KN/m ²
LATERAL STRENGTH	>100+KN/m ²

Made from recycled polypropylene & can be recycled at end of use

MADE IN UK TO ISO9001 QUALITY STANDARDS

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AquaCrate Installation Instructions

Pre-installation notes:

For attenuation systems: position the inflow and outflow connections level with the base of the AquaCrate structure

For infiltration systems: position the inflow connection at the top of the AquaCrate structure.

NB

For traffic with axle weight up to 13 tonnes the minimum cover required is 500mm

For traffic with axle weight up to 10 tonnes the minimum cover required is 400mm

For traffic with axle weight up to 6 tonnes the minimum cover required is 300mm

For traffic with axle weight up to 2 tonnes the minimum cover required is 300mm

For traffic with axle weight up to 1 tonnes the minimum cover required is 250mm

Installation Instructions:

1/. Excavate to the required length, width and depth and level the base. Make sure that the area is enough to allow plant access around sides to compact the backfill material (500mm minimum)

Ensure the base is smooth and level with no sharp protrusions. Check that the slopes are cut back to a safe angle or adequately supported and that a safe access is possible to allow site personnel to enter the excavation.

2/. Inspect the base for soft spots and if any are present, excavate and replace with compacted granular fill material.

3/. Lay 75mm sharp sand bedding layer to the base of the excavation and level off. Lay the geotextile protection fleece (180g non woven, needle punched type GT1900), ensuring a minimum 150mm overlap. This is required for both attenuation and infiltration tanks(soak-aways).

4/. Lay the geomembrane (if tank is for water storage) over the geotextile and sand bedding layer and up the sides of the excavation. Examine the geomembrane for damage and test all welds/ taped joints.

5/. Assemble the AquaCrate units (1m x 1m x 0.4m High) and install within the void in accordance with the installation schedule for correct positioning. Special clips are provided to join the units to prevent displacement (single clips for adjacent units (3 per unit) and double clips for all multi layer applications (1per unit)).

6/. Complete the geotextile and/or geomembrane encapsulation to the sides and top of the installation, ensuring that the protection fleece (if attenuation) has sufficient to overlap by 150mm minimum. The geomembrane should be welded with double seams or taped using double sided tape and inspected for damage, testing the welds/joints as required.

7/. Connect the drainage connections to the installation using proprietary adaptors. Alternatively for infiltration systems use flange adaptors and attach them to the AquaCrate units with self tapping screws. For attenuated systems, it is recommended that all connections and air vent installations are achieved using sealed drainage connections into a preformed socket using proprietary seals "top hats" available to order.

8/. Backfill around the installation with Type 1 or 2 sub base, compacting in 150mm layers, in accordance with the Specification for Highway Works.

9/. Place a 75mm sharp sand protection layer if required over the top of units and continue to backfill as follows:

For trafficked areas (car parks etc):

Type 1 or 2 sub base material compacted in 150mm layers in accordance with the Specification for Highway Works. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

Backfill the sides with granular material (not cohesive)

For landscaped and non-trafficked areas:

Selected "as dug" material with a unit size no more than 75mm compacted to 90% maximum dry density. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

10/. Finalise the pavement construction / landscaping over the Aquacrate system.

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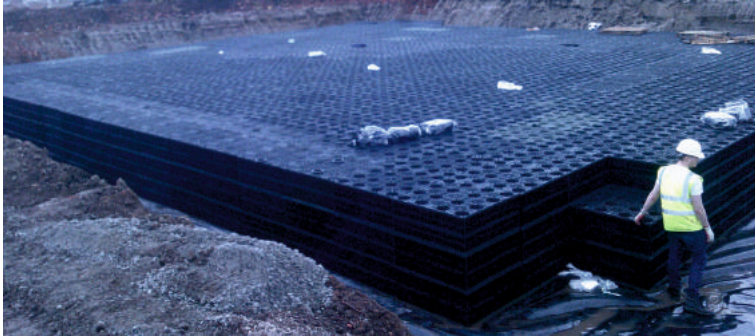
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AquaCrate554

Loadbearing underground water storage/attenuation system

The Advantages of AquaCrate

- # Assembled ready to install with up to 72M³ on a full load
- # Available in different configurations to meet specific load requirements
- # Available with high load-bearing capability (up to 100tonnes/m² vertical) able for HGV traffic
- # Simple and fast to install with 2.5 units per M³
- # Modular size of 1m x 1m plan x 400mm height ensures great versatility in both size and shape of storage
- # Lightweight units under 25kg removes need for mechanical handling



Uses

- # For permeable infiltration schemes, AquaCrate units should be wrapped in a non-woven needle punched geotextile which allows water discharge through the subsurface whilst preventing the ingress of soil or sand particles
- # For water storage, impermeable geomembrane is used between the geotextile & the crate assembly

Why use Aquacrates?

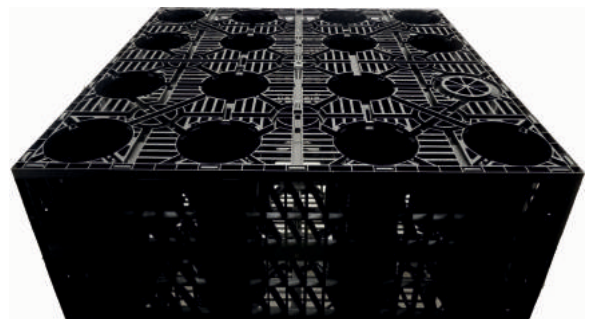
- # Prevents extreme peak flows to main drainage and water purification systems
- # Rainwater is "cleaned" by the geotextile surround
- # Decreases possibility of flooding during heavy rain falls
- # Allows development of difficult sites by using attenuation / water storage
- # Decreases environment problems caused by development
- # For water storage for subsequent use in toilets, watering plants, cleaning vehicles and other grey water usages

**Installation Service
with certified
geomembrane
welding available**

Design

- # Following assessment of the required water to be stored (see CIRIA C522, R156 & BRE 365) the total number of Aquacrate units can be calculated using 2.5 /m³ (1000 litres). Decide on the best configuration for the characteristics of the site in question and create the "box" accordingly using the length and width dimensions allowing for a 95% void ratio.
- # An Aquacrate tank needs 75mm sharp sand beneath the tank to protect the geotextile. Also use sharp sand on top and around the sides (Depth of sand between 75 and 100mm depending on the size & sharpness of stones in the backfill)
- # Use a silt trap to minimise ingress into the tank and this should be inspected regularly. CCTV/back-jetting points are recommended.

Inspectable systems available



PRODUCT DATA

	AquaCrate554
NOMINAL SIZE	1000 x 1000 x 400mm
CAPACITY	400Litres(2.5 per cu.metre)
UNIT WEIGHT	26.1kg
VOID RATIO	92.8%
COMPRESSIVE STRENGTH	>600+KN/m ²
LATERAL STRENGTH	>100+KN/m ²

Made from recycled polypropylene & can be recycled at end of use

MADE IN UK TO ISO9001 QUALITY STANDARDS

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AquaCrate Installation Instructions

Pre-installation notes:

For attenuation systems: position the inflow and outflow connections level with the base of the AquaCrate structure

For infiltration systems: position the inflow connection at the top of the AquaCrate structure.

NB

For traffic with axle weight up to 13 tonnes the minimum cover required is 650mm

For traffic with axle weight up to 10 tonnes the minimum cover required is 500mm

For traffic with axle weight up to 6 tonnes the minimum cover required is 350mm

For traffic with axle weight up to 2 tonnes the minimum cover required is 300mm

For traffic with axle weight up to 1 tonnes the minimum cover required is 250mm

Installation Instructions:

1/. Excavate to the required length, width and depth and level the base. Make sure that the area is enough to allow plant access around sides to compact the backfill material (500mm minimum)

Ensure the base is smooth and level with no sharp protrusions. Check that the slopes are cut back to a safe angle or adequately supported and that a safe access is possible to allow site personnel to enter the excavation.

2/. Inspect the base for soft spots and if any are present, excavate and replace with compacted granular fill material.

3/. Lay 75mm sharp sand bedding layer to the base of the excavation and level off. Lay the geotextile protection fleece (180g non woven, needle punched type GT1900), ensuring a minimum 150mm overlap. This is required for both attenuation and infiltration tanks(soak-aways).

4/. Lay the geomembrane (if tank is for water storage) over the geotextile and sand bedding layer and up the sides of the excavation. Examine the geomembrane for damage and test all welds/ taped joints.

5/. Assemble the AquaCrate units (1m x 1m x 0.4m High) and install within the void in accordance with the installation schedule for correct positioning. Special clips are provided to join the units to prevent displacement (single clips for adjacent units (3 per unit) and double clips for all multi layer applications (1per unit)).

6/. Complete the geotextile and/or geomembrane encapsulation to the sides and top of the installation, ensuring that the protection fleece (if attenuation) has sufficient to overlap by 150mm minimum. The geomembrane should be welded with double seams or taped using double sided tape and inspected for damage, testing the welds/joints as required.

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For trafficked areas (car parks etc):

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Backfill the sides with granular material (not cohesive)

For landscaped and non-trafficked areas:

Selected “as dug” material with a unit size no more than 75mm compacted to 90% maximum dry density. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

10/. Finalise the pavement construction / landscaping over the Aquacrate system.

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AquaCrate510

Loadbearing underground water storage/attenuation system

The Advantages of AquaCrate

- # Assembled ready to install with up to 72M³ on a full load
- # Available in different configurations to meet specific load requirements
- # Available with high load-bearing capability (up to 100tonnes/m² vertical) able for HGV traffic
- # Simple and fast to install with 2.5 units per M³
- # Modular size of 1m x 1m plan x 400mm height ensures great versatility in both size and shape of storage
- # Lightweight units under 25kg removes need for mechanical handling



Uses

- # For permeable infiltration schemes, AquaCrate units should be wrapped in a non-woven needle punched geotextile which allows water discharge through the subsurface whilst preventing the ingress of soil or sand particles
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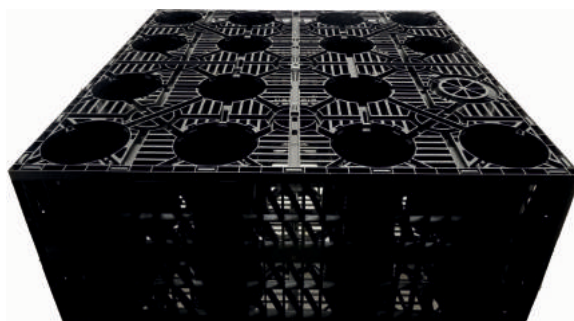
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**Installation Service
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welding available**

Design

- # Following assessment of the required water to be stored (see CIRIA C522, R156 & BRE 365) the total number of Aquacrate units can be calculated using 2.5 /m³ (1000 litres). Decide on the best configuration for the characteristics of the site in question and create the "box" accordingly using the length and width dimensions allowing for a 95% void ratio.
- # Aquacrate is suitable for landscaped and car park areas as well as heavier duty use. As a guide, units require a minimum 0.5m of cover in landscaped areas and 0.75m cover in vehicular areas and need 75mm sharp sand base.
- # Use a silt trap to minimise ingress into the tank and this should be inspected regularly. CCTV/back-jetting points are recommended.

Inspectable systems available



PRODUCT DATA

	AquaCrate510
NOMINAL SIZE	1000 x 1000 x 400mm
CAPACITY	400Litres(2.5 per cu.metre)
UNIT WEIGHT	18.9kg
VOID RATIO	94.7%
COMPRESSIVE STRENGTH	>260+KN/m ²
LATERAL STRENGTH	>70+KN/m ²

Made from recycled polypropylene & can be recycled at end of use

MADE IN UK TO ISO9001 QUALITY STANDARDS

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For trafficked areas (car parks etc):

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Backfill the sides with granular material (not cohesive)

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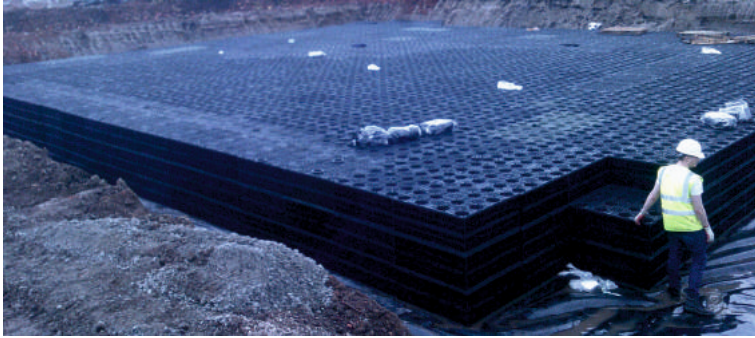
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AquaCrate540

Loadbearing underground water storage/attenuation system

The Advantages of AquaCrate

- # Assembled ready to install with up to 72M³ on a full load
- # Available in different configurations to meet specific load requirements
- # Available with high load-bearing capability (up to 100tonnes/m² vertical) able for HGV traffic
- # Simple and fast to install with 2.5 units per M³
- # Modular size of 1m x 1m plan x 400mm height ensures great versatility in both size and shape of storage
- # Lightweight units under 25kg removes need for mechanical handling



Uses

- # For permeable infiltration schemes, AquaCrate units should be wrapped in a non-woven needle punched geotextile which allows water discharge through the subsurface whilst preventing the ingress of soil or sand particles
- # For water storage, impermeable geomembrane is used between the geotextile & the crate assembly

Why use Aquacrates?

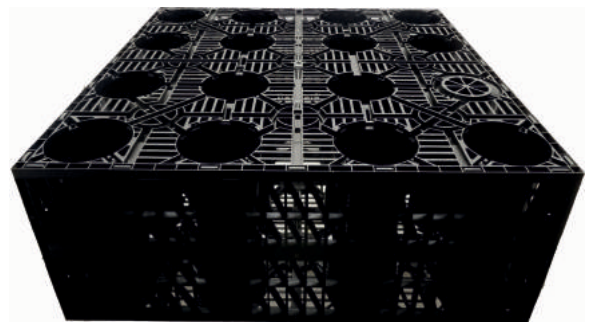
- # Prevents extreme peak flows to main drainage and water purification systems
- # Rainwater is "cleaned" by the geotextile surround
- # Decreases possibility of flooding during heavy rain falls
- # Allows development of difficult sites by using attenuation / water storage
- # Decreases environment problems caused by development
- # For water storage for subsequent use in toilets, watering plants, cleaning vehicles and other grey water usages

**Installation Service
with certified
geomembrane
welding available**

Design

- # Following assessment of the required water to be stored (see CIRIA C522, R156 & BRE 365) the total number of Aquacrate units can be calculated using 2.5 /m³ (1000 litres). Decide on the best configuration for the characteristics of the site in question and create the "box" accordingly using the length and width dimensions allowing for a 95% void ratio.
- # An Aquacrate tank needs 75mm sharp sand beneath the tank to protect the geotextile. Also use sharp sand on top and around the sides (Depth of sand between 75 and 100mm depending on the size & sharpness of stones in the backfill)
- # Use a silt trap to minimise ingress into the tank and this should be inspected regularly. CCTV/back-jetting points are recommended.

Inspectable systems available



PRODUCT DATA

	AquaCrate540
NOMINAL SIZE	1000 x 1000 x 400mm
CAPACITY	400Litres(2.5 per cu.metre)
UNIT WEIGHT	22.7kg
VOID RATIO	93.8%
COMPRESSIVE STRENGTH	>420+KN/m ²
LATERAL STRENGTH	>70+KN/m ²

Made from recycled polypropylene & can be recycled at end of use

MADE IN UK TO ISO9001 QUALITY STANDARDS

Pennine Manufacturing Ltd

Fold Mill, Bradley Lane, Little Lever, Bolton BL2 6RR

Tel 44(0) 1204 361547 Fax 44 (0) 1204 380872

eMail sales@pennineindustries.com

AquaCrate Installation Instructions

Pre-installation notes:

For attenuation systems: position the inflow and outflow connections level with the base of the AquaCrate structure

For infiltration systems: position the inflow connection at the top of the AquaCrate structure.

NB

For traffic with axle weight up to 13 tonnes the minimum cover required is 650mm

For traffic with axle weight up to 10 tonnes the minimum cover required is 450mm

For traffic with axle weight up to 6 tonnes the minimum cover required is 350mm

For traffic with axle weight up to 2 tonnes the minimum cover required is 300mm

For traffic with axle weight up to 1 tonnes the minimum cover required is 250mm

Installation Instructions:

1/. Excavate to the required length, width and depth and level the base. Make sure that the area is enough to allow plant access around sides to compact the backfill material (500mm minimum)

Ensure the base is smooth and level with no sharp protrusions. Check that the slopes are cut back to a safe angle or adequately supported and that a safe access is possible to allow site personnel to enter the excavation.

2/. Inspect the base for soft spots and if any are present, excavate and replace with compacted granular fill material.

3/. Lay 75mm sharp sand bedding layer to the base of the excavation and level off. Lay the geotextile protection fleece (180g non woven, needle punched type GT1900), ensuring a minimum 150mm overlap. This is required for both attenuation and infiltration tanks(soak-aways).

4/. Lay the geomembrane (if tank is for water storage) over the geotextile and sand bedding layer and up the sides of the excavation. Examine the geomembrane for damage and test all welds/ taped joints.

5/. Assemble the AquaCrate units (1m x 1m x 0.4m High) and install within the void in accordance with the installation schedule for correct positioning. Special clips are provided to join the units to prevent displacement (single clips for adjacent units (3 per unit) and double clips for all multi layer applications (1per unit)).

6/. Complete the geotextile and/or geomembrane encapsulation to the sides and top of the installation, ensuring that the protection fleece (if attenuation) has sufficient to overlap by 150mm minimum. The geomembrane should be welded with double seams or taped using double sided tape and inspected for damage, testing the welds/joints as required.

7/. Connect the drainage connections to the installation using proprietary adaptors. Alternatively for infiltration systems use flange adaptors and attach them to the AquaCrate units with self tapping screws. For attenuated systems, it is recommended that all connections and air vent installations are achieved using sealed drainage connections into a preformed socket using proprietary seals "top hats" available to order.

8/. Backfill around the installation with Type 1 or 2 sub base, compacting in 150mm layers, in accordance with the Specification for Highway Works.

9/. Place a 75mm sharp sand protection layer if required over the top of units and continue to backfill as follows:

For trafficked areas (car parks etc):

Type 1 or 2 sub base material compacted in 150mm layers in accordance with the Specification for Highway Works. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

Backfill the sides with granular material (not cohesive)

For landscaped and non-trafficked areas:

Selected "as dug" material with a unit size no more than 75mm compacted to 90% maximum dry density. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

10/. Finalise the pavement construction / landscaping over the Aquacrate system.

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AquaCrate550

Loadbearing underground water storage/attenuation system

The Advantages of AquaCrate

- # Assembled ready to install with up to 72M³ on a full load
- # Available in different configurations to meet specific load requirements
- # Available with high load-bearing capability (up to 100tonnes/m² vertical) able for HGV traffic
- # Simple and fast to install with 2.5 units per M³
- # Modular size of 1m x 1m plan x 400mm height ensures great versatility in both size and shape of storage
- # Lightweight units under 25kg removes need for mechanical handling



Uses

- # For permeable infiltration schemes, AquaCrate units should be wrapped in a non-woven needle punched geotextile which allows water discharge through the subsurface whilst preventing the ingress of soil or sand particles
- # For water storage, impermeable geomembrane is used between the geotextile & the crate assembly

Why use Aquacrates?

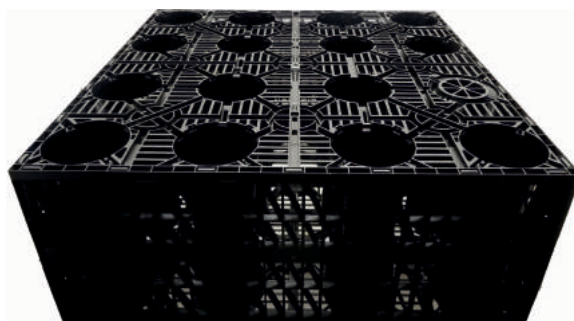
- # Prevents extreme peak flows to main drainage and water purification systems
- # Rainwater is "cleaned" by the geotextile surround
- # Decreases possibility of flooding during heavy rain falls
- # Allows development of difficult sites by using attenuation / water storage
- # Decreases environment problems caused by development
- # For water storage for subsequent use in toilets, watering plants, cleaning vehicles and other grey water usages

**Installation Service
with certified
geomembrane
welding available**

Design

- # Following assessment of the required water to be stored (see CIRIA C522, R156 & BRE 365) the total number of Aquacrate units can be calculated using 2.5 /m³ (1000 litres). Decide on the best configuration for the characteristics of the site in question and create the "box" accordingly using the length and width dimensions allowing for a 95% void ratio.
- # An Aquacrate tank needs 75mm sharp sand beneath the tank to protect the geotextile. Also use sharp sand on top and around the sides (Depth of sand between 75 and 100mm depending on the size & sharpness of stones in the backfill)
- # Use a silt trap to minimise ingress into the tank and this should be inspected regularly. CCTV/back-jetting points are recommended.

Inspectable systems available



PRODUCT DATA

	AquaCrate550
NOMINAL SIZE	1000 x 1000 x 400mm
CAPACITY	400Litres(2.5 per cu.metre)
UNIT WEIGHT	24kg
VOID RATIO	93.4%
COMPRESSIVE STRENGTH	>500+KN/m ²
LATERAL STRENGTH	>70+KN/m ²

Made from recycled polypropylene & can be recycled at end of use

MADE IN UK TO ISO9001 QUALITY STANDARDS

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AquaCrate Installation Instructions

Pre-installation notes:

For attenuation systems: position the inflow and outflow connections level with the base of the AquaCrate structure

For infiltration systems: position the inflow connection at the top of the AquaCrate structure.

NB

For traffic with axle weight up to 13 tonnes the minimum cover required is 650mm

For traffic with axle weight up to 10 tonnes the minimum cover required is 450mm

For traffic with axle weight up to 6 tonnes the minimum cover required is 350mm

For traffic with axle weight up to 2 tonnes the minimum cover required is 300mm

For traffic with axle weight up to 1 tonnes the minimum cover required is 250mm

Installation Instructions:

1/. Excavate to the required length, width and depth and level the base. Make sure that the area is enough to allow plant access around sides to compact the backfill material (500mm minimum)

Ensure the base is smooth and level with no sharp protrusions. Check that the slopes are cut back to a safe angle or adequately supported and that a safe access is possible to allow site personnel to enter the excavation.

2/. Inspect the base for soft spots and if any are present, excavate and replace with compacted granular fill material.

3/. Lay 75mm sharp sand bedding layer to the base of the excavation and level off. Lay the geotextile protection fleece (180g non woven, needle punched type GT1900), ensuring a minimum 150mm overlap. This is required for both attenuation and infiltration tanks(soak-aways).

4/. Lay the geomembrane (if tank is for water storage) over the geotextile and sand bedding layer and up the sides of the excavation. Examine the geomembrane for damage and test all welds/ taped joints.

5/. Assemble the AquaCrate units (1m x 1m x 0.4m High) and install within the void in accordance with the installation schedule for correct positioning. Special clips are provided to join the units to prevent displacement (single clips for adjacent units (3 per unit) and double clips for all multi layer applications (1per unit)).

6/. Complete the geotextile and/or geomembrane encapsulation to the sides and top of the installation, ensuring that the protection fleece (if attenuation) has sufficient to overlap by 150mm minimum. The geomembrane should be welded with double seams or taped using double sided tape and inspected for damage, testing the welds/joints as required.

7/. Connect the drainage connections to the installation using proprietary adaptors. Alternatively for infiltration systems use flange adaptors and attach them to the AquaCrate units with self tapping screws. For attenuated systems, it is recommended that all connections and air vent installations are achieved using sealed drainage connections into a preformed socket using proprietary seals “top hats” available to order.

8/. Backfill around the installation with Type 1 or 2 sub base, compacting in 150mm layers, in accordance with the Specification for Highway Works.

9/. Place a 75mm sharp sand protection layer if required over the top of units and continue to backfill as follows:

For trafficked areas (car parks etc):

Type 1 or 2 sub base material compacted in 150mm layers in accordance with the Specification for Highway Works. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

Backfill the sides with granular material (not cohesive)

For landscaped and non-trafficked areas:

Selected “as dug” material with a unit size no more than 75mm compacted to 90% maximum dry density. Compaction equipment on top of the system not to exceed 2,300kg per sq.metre.

10/. Finalise the pavement construction / landscaping over the Aquacrate system.

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AquaCrate580

Loadbearing underground water storage/attenuation system

The Advantages of AquaCrate

- # Assembled ready to install with up to 72M³ on a full load
- # Available in different configurations to meet specific load requirements
- # Available with high load-bearing capability (up to 100tonnes/m² vertical) able for HGV traffic
- # Simple and fast to install with 2.5 units per M³
- # Modular size of 1m x 1m plan x 400mm height ensures great versatility in both size and shape of storage
- # Lightweight units under 25kg removes need for mechanical handling



Uses

- # For permeable infiltration schemes, AquaCrate units should be wrapped in a non-woven needle punched geotextile which allows water discharge through the subsurface whilst preventing the ingress of soil or sand particles
- # For water storage, impermeable geomembrane is used between the geotextile & the crate assembly

Why use Aquacrates?

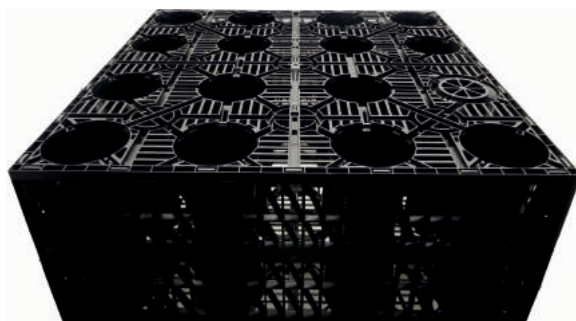
- # Prevents extreme peak flows to main drainage and water purification systems
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**Installation Service
with certified
geomembrane
welding available**

Design

- # Following assessment of the required water to be stored (see CIRIA C522, R156 & BRE 365) the total number of Aquacrate units can be calculated using 2.5 /m³ (1000 litres). Decide on the best configuration for the characteristics of the site in question and create the "box" accordingly using the length and width dimensions allowing for a 95% void ratio.
- # An Aquacrate tank needs 75mm sharp sand beneath the tank to protect the geotextile. Also use sharp sand on top and around the sides (Depth of sand between 75 and 100mm depending on the size & sharpness of stones in the backfill)
- # Use a silt trap to minimise ingress into the tank and this should be inspected regularly. CCTV/back-jetting points are recommended.

Inspectable systems available



PRODUCT DATA

	AquaCrate580
NOMINAL SIZE	1000 x 1000 x 400mm
CAPACITY	400Litres(2.5 per cu.metre)
UNIT WEIGHT	27.8kg
VOID RATIO	92.4%
COMPRESSIVE STRENGTH	>680+KN/m ²
LATERAL STRENGTH	>70+KN/m ²

Made from recycled polypropylene & can be recycled at end of use

MADE IN UK TO ISO9001 QUALITY STANDARDS

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AquaCrate Installation Instructions

Pre-installation notes:

For attenuation systems: position the inflow and outflow connections level with the base of the AquaCrate structure

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NB

For traffic with axle weight up to 13 tonnes the minimum cover required is 500mm

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For traffic with axle weight up to 1 tonnes the minimum cover required is 250mm

Installation Instructions:

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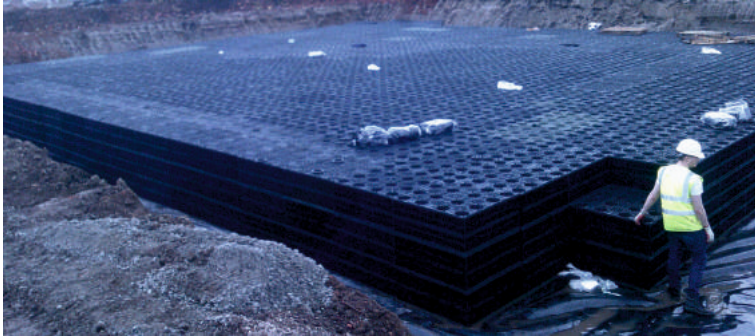
eMail sales@pennineindustries.com

AquaCrate590

Loadbearing underground water storage/attenuation system

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- # Assembled ready to install with up to 72M³ on a full load
- # Available in different configurations to meet specific load requirements
- # Available with high load-bearing capability (up to 100tonnes/m² vertical) able for HGV traffic
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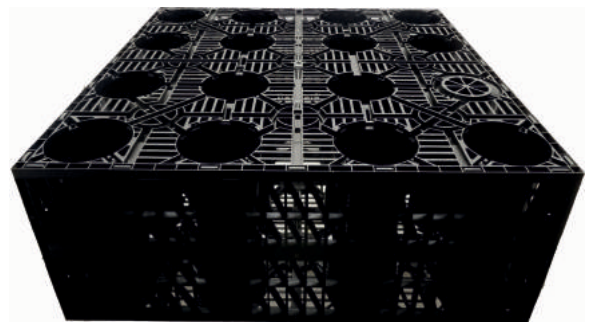
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Design

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- # Use a silt trap to minimise ingress into the tank and this should be inspected regularly. CCTV/back-jetting points are recommended.

Inspectable systems available



PRODUCT DATA

	AquaCrate590
NOMINAL SIZE	1000 x 1000 x 400mm
CAPACITY	400Litres(2.5 per cu.metre)
UNIT WEIGHT	29.0kg
VOID RATIO	92%
COMPRESSIVE STRENGTH	>750+KN/m ²
LATERAL STRENGTH	>70+KN/m ²

Made from recycled polypropylene & can be recycled at end of use

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