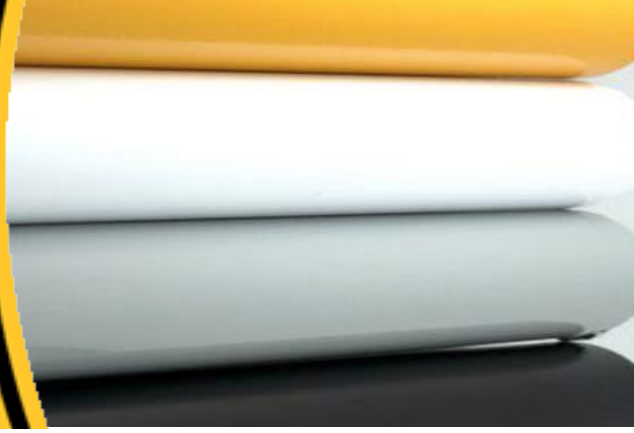
# Bollards that don't cost the earth!

ZERO WASTE technology substantially reduces the cost of installing and maintaining bollards, from ZERO WASTE Foundations, Shock Absorbing Impact Recovery mechanisms, to Advanced Polymer Bollard Covers, our products are designed to outlast and outperform alternative means of protecting for your people & assets.

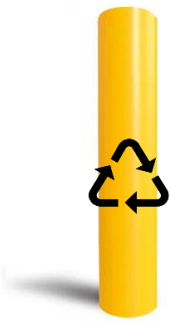


**ADVANCED POLYMER**

Advanced Polymer Bollards 150 mm ⌀ x 1200/1500/1800 L in Safety Yellow have a design life of around 50 years (25 years in direct sunlight).

**IMPACT RECOVERY**

Impact Recovery System makes bollards reusable following even severe impact, greatly improving their lifespan and reducing maintenance.



**COVERS**

Advanced Polymer Bollard Covers 190 mm ⌀ x 1200 H in Safety Yellow have a design life of around 50 years (25 years in direct sunlight).

## Advanced Polymer

Our Advanced Polymer is highly durable material designed to withstand impact from a vehicle and the harsh Australian environment. Polyethylene is an efficient electrical insulator, making it great for applications where safety is paramount. We use a crosslinked UV stabilized HDPE, Ultra-High Molecular Weight Polyethylene (UHMW PE) thermosetting polymer providing excellent impact resistance, and high tensile strength. An in-house QA system is in place to provide reliability and continuity of supply.

### Benefits

Abrasion Resistant
High impact resistance
Low coefficient of friction
Abrasion resistant
Scratch and marking resistant Chemical resistant
Water and moisture resistant
UV Resistantshatter resistant
Long-wearing
Corrosion resistant
UV20 Protection to ASTM D2565
Australian Made
Impact tested to AS/NZS 4766:2006

| ASTM or UL test | Property | LDPE | HDPE | UHMW |
|---|---|---|---|---|
| | ***PHYSICAL*** | | | |
| D792 | Density ($lb/in^3$)<br>($g/cm^3$) | 0.033<br>0.92 | 0.035<br>0.96 | 0.034<br>0.93 |
| D570 | Water Absorption, 24 hrs (%) | <0.01 | <0.01 | <0.01 |
| | ***MECHANICAL*** | | | |
| D638 | Tensile Strength (psi) at 72°F | 1,400 | 4,600 | 5,800 |
| D638 | Tensile Strength (psi) at 150°F | 400 | 400 | 400 |
| D638 | Tensile Modulus (psi) | 57,000 | 200,000 | 80,000 |
| D638 | Tensile Elongation at Break (%) | 100 | 400 | 300 |
| D790 | Flexural Strength at Yield (psi) | 1,500 | 4,600 | 3,500 |
| D790 | Flexural Modulus (psi) | 29,000 | 174,000 | 88,000 |
| D695 | Compressive Strength (psi) | 1,400 | 4,600 | 3,000 |
| D695 | Compressive Modulus (psi) | 54,000 | 100,000 | 80,000 |
| D732 | Shear Strength (psi) | - | - | 3,000 |
| D785 | Hardness, Shore D | D45 | D69 | D62-D66 |
| D256 | IZOD Notched Impact (ft-lb/in) | No Break | 1.3 | No Break |
| | ***THERMAL*** | | | |
| D696 | Coefficient of Linear Thermal Expansion<br>(x $10^{-5}$ in./in./°F) | - | 6 | 11 |
| D648 | Heat Deflection Temp (°F / °C)<br>at 66 psi<br>at 264 psi | <br>120 / 48<br>116 / 46 | <br>170 / 76<br>176 / 80 | <br>203 / 95<br>180 / 82 |
| D3418 | Approx. Melting Temperature (°F / °C) | 244 / 118 | 260 / 125 | 275 / 136 |
| - | Max Operating Temp (°F / °C) | 160 / 71 | 180 / 82 | 180 / 82 |
| C177 | Thermal Conductivity<br>(BTU-in/$ft^2$-hr-°F)<br>(x $10^{-4}$ cal/cm-sec-°C) | <br>-<br>- | <br>-<br>- | <br>2.84<br>10.0 |
| UL94 | Flammability Rating | HB | HB< | HB |
| | ***ELECTRICAL*** | | | |
| D149 | Dielectric Strength (V/mil) short time, 1/8" thick | 460-700 | 450-500 | 2300 |
| D150 | Dielectric Constant at 1 MHz | 2.25-2.30 | 2.30-2.35 | 2.30-2.35 |
| D150 | Dissipation Factor at 1 kHz | 0.0002 | 0.0002 | 0.0005 |
| D257 | Surface Resistivity (ohm/square) at 50% RH | > $10^{15}$ | > $10^{15}$ | > $10^{15}$ |
| D495 | Arc Resistance (sec) | 135-160 | 200-250 | 250-350 |

## Sun Resistance:

Our Advanced Polymer Bollards and Bollard Covers are made of a plastic material unlike traditional plastics. Many have seen the effects on plastic objects that are exposed to harmful UV-rays. Over time, they become brittle, chalk and crack as the polymer elongation drops, that is, the structural integrity of traditional plastics.

The natural conclusion is that plastic Bollards won't last long in the Sun. This is just not true, especially not with our Advanced Polymer Bollards and Covers which are made from a blend of HDPE, Ultra-High Molecular Weight Polyethylene (UHMW PE) thermosetting polymer and Rotathene® SUPA UV poly our Advanced Polymer Bollards and Bollard Covers have more than 4.5 times the UV8 protection required by the Australian standards (AS/NZ 4766:2006).

## What is UV Stabilisation?

Many metals will rust and corrode as they weather and wither away. Steel, however, can be strengthening against oxidisation when chromium is added or protected from rust and oxidisation using galvanising. There are different grades of stainless steel. Kitchen sinks, for example, are often made of a high-grade of stainless steel.

Similarly, UV stabilisers are to bollards like what the chromium is to steel. When added to the polymer mix, the plastic is protected against becoming brittle in the Sun. UV stabilizers in the polymer protect the Bollard against the harmful UV rays, preventing it from bulging, warping, or going brittle over time, inhibiting and absorbing the harmful UV light that causes it break down.

So, in the same way that some steels are called stainless, you could similarly label UV stabilised poly a type of "stainless poly". Of course, all material has a finite life. Stainless steel will still rust and corrode, it just takes much longer for this to happen.

## SUPA UV Polyethylene

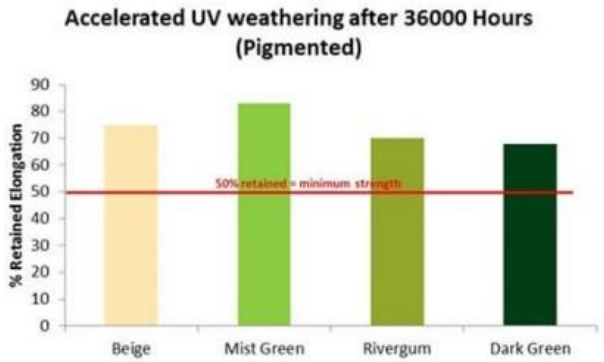
Australia experiences some of the highest levels of UV radiation in the world. As such, leading edge technology is required to ensure our bollards remain reliable and durable for a long time. UV8 level of stabilisation has been considered the minimum required for good long-term protection in Australia. Rotathene® SUPA UV, provides a much higher level of protection than the Australian industry standard (AS/NZ 4766:2006).

Through careful selection of a high-quality Polyethylene base polymer specifically designed for tank use, advanced additives such as UV stabilisers and antioxidants, pigmented "SUPA UV" provides a UV36 level of stabilisation.

## Testing UV Protection Levels in Polyethylene

UV protection levels in polyethylene are assessed under highly controlled conditions of high intensity UV radiation with similar wavelengths to those from the Sun. Samples are removed from the UV weatherometer every few thousand hours and stretched in a tensile tester to determine how much they can still stretch.

This provides the % Elongation of the test sample. This value is compared to the value obtained for the set that was not placed in the weatherometer and recorded on a graph as the % Retained Elongation. The % Retained Elongation decreases as degradation increases. Once the Elongation drops to 50% the poly sample is deemed to have failed. After 36,000 hours of accelerated UV weathering, pigmented SUPA UV poly samples retained well over 50% of their original elongation properties.



**Why wall thickness is key to impact resistance.**

There are numerous “plastic” bollards and covers on the market, but they are NOT impact resistant. Unlike cheap imported “plastic” bollards and bollard covers that are either solid or thin walled, our bollards and bollard covers are Australian made to high quality standards, designed to withstand Australian conditions and withstand impact from vehicles.

Solid plastic bollards (just like wood or steel) have no flexibility redirecting the impact force to the footing and causing damage to the expensive footing. This council installed a cheap bollard in paving on a busy corner, so the bollard was impacted regularly – costing thousands in traffic management, labour, paving, concrete, new bollards and associated costs.

**Don’t make this mistake-** it is costly not only monetarily but also costly for the environment.

Solid steel, recycled plastic or wooden bollards installed in the middle of a road- cause regular damage and expensive maintenance (costing hundreds of thousands (possibly millions) over the life of a development.

Cheap imported Plastic bollards / bollard covers are thin walled quickly fading and becoming brittle over time and if impacted will dent or crack. ZERO bollards and bollard covers have a massive 7 mm wall thickness, (made from a material that will self-recover from impact) making them highly resistant to impact and denting.

**Impact resistance.**

Polyethylene and polypropylene are frequently used in construction, military and industrial applications that require impact resistance and toughness. Impact resistance is the ability of a material to resist both fracture and deformation when temporary force is applied.

**High impact resistant plastics**

Unlike steel Bollards (and most imported plastic Bollards on the market made from old fashioned plastics that over time fade and become brittle), our Bollards have unique properties and benefits that allow them to perform in demanding environments. Whilst the impact resistance of a plastic is temperature-dependent (becoming brittle below 15° , **HDPE** retains its properties in even low temperatures.

**Heavy Duty Design**

Unlike most plastic Bollards on the market with thin 1-3 mm wall thickness, our Bollards and Bollard Covers are rotomolded from a solid piece of Advanced Polymer material, with heavy duty 7 mm walls which ensures that they are structurally sound and robust enough to withstand light impact from a vehicle and self-recover.

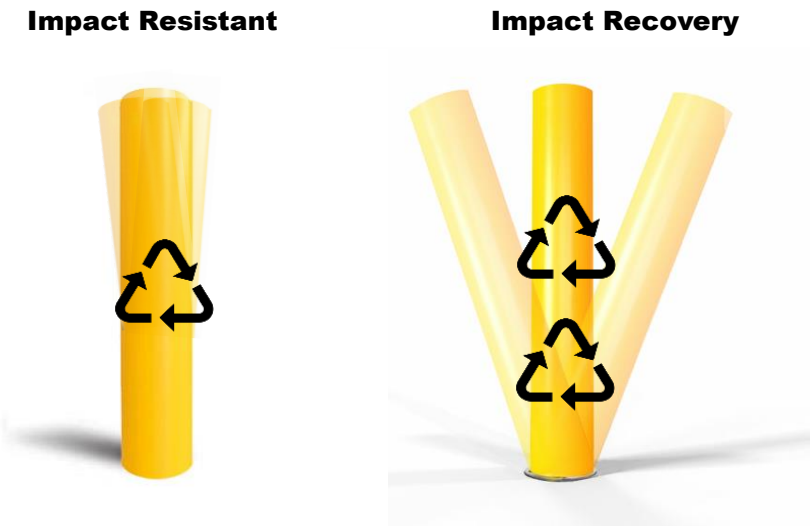
**Looking good is also important to us!**

Solid 7 mm walls also ensure our Bollards and Bollard Covers remain looking good impact after impact. Made suing a durable, versatile thermoplastic that offers fantastic impact resistance and tensile strength. Since its molecules are packed together so tightly, this material boasts incredible toughness and rigidity combined with the ability to absorb impact force.

Unlike steel that will distort when impacted, our Poly Bollard Covers will flex under extreme conditions and recover. If scratched, they are the same colour throughout and when scuffed by vehicle tyres, they can simply be wiped clean. We can even self-recover from light impact, or (when installed using the ZERO WASTE Impact Recovery System) we become re-usable following even the most severe impact.

**SPECS**

Tensile strength at 72°F: 1,400 psi
Tensile modulus: 57,000
Tensile elongation at break: 100%
Flexural modulus: 29,000 psi



**Protection Bollards**

Protection Bollards impact tested to meet AS/NZS 3845.2:2017 Standards for Protection Bollards

- Vehicle Mass 1860 kg
- Speed 10 km/hr
- Installed 350 mm Depth in asphalt.

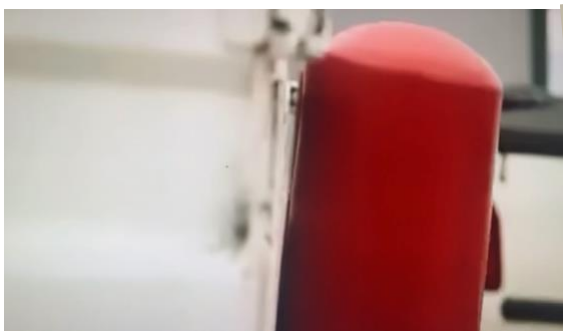
Result of multiple impacts: Bollard did not penetrate or show potential to penetrate the occupant compartment or present an undue hazard to other traffic, pedestrians or personnel in a work zone (e.g. Zero disturbance to footing resulting in zero debris)

Maximum containment level, being passenger vehicles travelling between 0-10 km/hr the Bollard self -recovered following multiple impacts without damage or signs of fatigue, resulting in Zero debris or damage to surrounding foundations.

| SPECIFICATIONS | Bollard Only | Footing |
|---|---|---|
| DIAMETER | 150 mm | 400 mm |
| LENGTH | 1800 mm | 600 mm |
| WEIGHT | 8 kg | |

“Flexible bollards” are meant to protect vehicles from damage when they inadvertently hit a bollard. But being made of a high-density polyurethane these bollards also provide a good level of resistance against bending upon impact and unlike spring loaded bollards they do not rust, corrode or wear out over time becoming “floppy”.

Because this material has excellent memory properties Advanced Polymer Bollards simply “pop back” if hit, without causing serious damage to the car. Usually, you can find those bollards in parking zones, but they can also be used as lane delineators for highways, protection for industrial zones or other heavy traffic areas.



As shown above bollards deflect upon impact and once vehicle moves off the bollard, the bollard self corrects to the upright position slowly and safely without any intervention. Bollards show no sign of reduction in their ability to recover following multiple impacts.

VIEW VIDEO >

# Impact Recovery Option

1. You can surface mount your bollards using our ZERO WASTE reusable base plate or secure inground using our ZERO WASTE Unbreakable ground sockets. Both options continue working impact after impact

2. Unlike spring loaded bollards that over-flex, a heavy-duty resistance core prevents deflection of the bollard beyond 20 degrees when impacted by a vehicle, and with excellent memory properties it self-recovers returning the bollard to upright position following hundreds and hundreds of impacts

3. Unlike springs that quickly wear out, creating dangerous litigation risks, our re-usable energy absorbing ZerO Rings create a permanent shock absorbing cushion that absorb the impact force and self-recover, with no reduction in capacity following hundreds of impacts, greatly improving safety and resilience

4. Our heavy-duty galvanised steel and impact resistant stainless-steel pipe bollards provide an impact resistant surface, but we highly recommend using our advanced polymer bollards to substantially reduce maintenance on your bollards.


## We get knocked down, but we get up again. You're never going to keep us down!

Unlike spring-loaded bollards, ZERO WASTE Bollards cannot be deflected by hand, remaining perfectly aligned safe and secure year after year. When impacted by a vehicle they deflect to a max of 20 degrees and self-recover. When severely impacted (truck or utility vehicle) replacements take less than 5 minutes and the bollard, expensive concrete footings and ZerO Rings are reusable impact after impact, saving thousands over the life of a development.


**Upon Low Impact**

Bollards remain rigid and appear to be solid inground bollards but when impacted by a vehicle they absorb the impact force deflecting a maximum of 20 degrees and self-recovering, with no diminished capacity following hundreds of impacts.

**Severe Impact**

When severely impacted instead of the entire footing being dislodged, the inner resistance core bends allowing the bollard to fold but not be dislodged- preventing any further forward movement of the vehicle and enabling fast reinstatement.

**Fast efficient replacements**

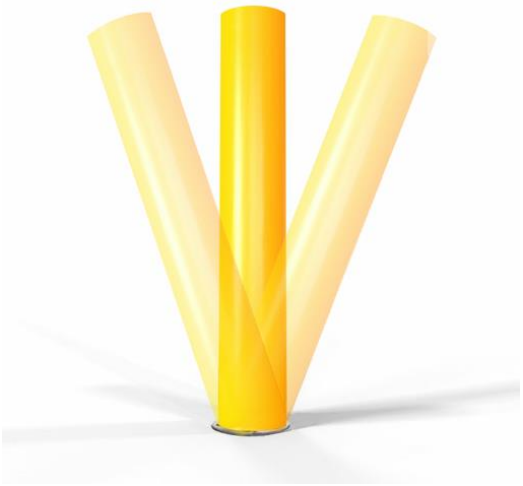
Replacements are simple Following severe impact bollard is easily removed (resistance core replaced) and reinstated in around 5 mins Bollards and ZerO Rings are re-usable impact after impact.

# Inground or Surface Mounting options

ZERO WASTE Unbreakable ground sockets (350 or 650mm depth) can be installed when pouring concrete footings by simply positioning upright, protecting expensive footings from damage for the life of a development – Impact after impact.

Bollards are simply dropped into position (no pins or padlocks) “automatically” locking in using friction, which ensures they remain safe and secure perfectly aligned impact after impact, year after year.

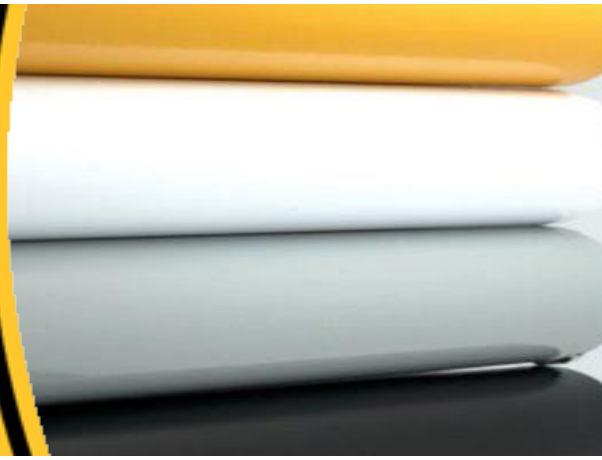
Surface Mount base plate is heavy duty round base plate (to evenly distribute the impact force) secured using quality recessed and galvanised concrete anchors and are reusable impact after impact.



# Select your bollard.

Durable Poly bollards (Std unit Safety Yellow, but available in almost any colour- ask for a colour chart) and can be polished for high shine.

Available in 3 lengths 1250/1500/1800 mm with Dome moulded cap



# Select your installation method.

1. Directly inground
2. Surface Mounted using the Impact Recovery System
3. In-ground using the 350 mm Depth Impact Recovery System
4. In-ground using the 650 mm Depth Impact Recovery System

MORE INFO >

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