

Q: How does Polyrok react and work with other recycled materials? Recycled water, slag, etc.

A: Made from Polyolefin plastic, Polyrok has no chemical reaction with other materials or admixes. Silica fume has shown excellent interactions with Polyrok. Silica fume is an extremely fine material and helps the cement paste flow into the surface voids of Polyrok. This type of plastic is extremely stable and inert with a well-known and accepted safety profile, handling it and incorporation into concrete will not create any emissions and requires no additional PPE.

Q: Does Polyrok separate or float during vibration compaction?

A: No, the concrete would need to be severely over vibrated to do this.

Q: What vibration testing has been done to reassure that the Polyrok does not float?

A: Lab and field-testing using table and needle vibration have not shown this to be an issue. Polyrok has an SG of 0.85 which is not low enough to stimulate buoyancy in the thick concrete mixture. Over 100 Xray CT scans of cylinder test samples, compacted by table vibration, have shown Polyrok remains evenly distributed (even in percentages above 20%).

Q: Does Polyrok have any urban heat mitigation properties?

A: Yes, a 10% volume of Polyrok blend delivers a 4% reduction in thermal mass.

Q: Will greenhouse gasses form and emit when in warmer environments?

A: Polyolefins are so stable they are used to package the most aggressive chemicals (acids, solvents) and trusted to package the most sensitive of products such as food and pharmaceuticals. Polyolefins would need to be heated above their process temperature of 200C to begin thermally degrading.

Q: What is the pumpability of Polyrok and concrete?

A: Polyrok flows well in pumping equipment with no issues. The aggregate size is 4-8 mm and is lighter than natural, conventional aggregate, making it pump more easily.

Q: What is the likelihood of microplastics lifting and polluting waterways?

A: Polyrok is a coarse aggregate and is totally encapsulated in the cement/sand in standard finished concrete. This means the Polyrok is never exposed to the external environment. Accelerated wear testing, completed by RMIT University, has shown concrete containing just 5% Polyrok has a 11.5% higher abrasion resistance compared to standard concrete.

Q: What is the recyclability of Polyrok without any long term concerns?

A: Recovery of Polyrok from concrete crushing plants is a simple process using an air knife system (standard in most systems) or a zigzag air separator. This process has been a standard requirement for many years due to other plastic components in concrete such as bar chairs, poly film and mould inserts. Polyrok can then be reused as aggregate or for other purposes. Please see video:

<https://www.youtube.com/watch?v=z1mPeAoXLzk>

Q: What's the cost per cube of concrete and are there any government or industry incentives to offset that cost?

A: Polyrok is \$1 per kg, government grants and incentives can be reviewed for the purchase of Polyrok as a sustainable option. This depends on state grants, local government incentives, etc.

Q: What % Polymer is in the concrete mix?

A: Polyrok can be between 1-20% by volume of the coarse aggregate

Q: Is there leaching of microplastics once in-situ?

A: Polyrok is a coarse aggregate and is encapsulated in the cement/sand in standard finished concrete. This means the Polyrok is never exposed to the external environment. Accelerated wear testing, completed by RMIT University, has shown concrete containing just 5% Polyrok has a 11.5% higher abrasion resistance compared to standard concrete.

Q: How does the cost compare to the cost of standard concrete?

A: Polyrok is \$1 per kg, the average addition rate to concrete is 25kg/m³.

Q: Will the recycled plastics be used to make the Coles chiller bags?

A: Soft plastics are collected through REDcycle where they are then distributed to various manufacturing partners, Replas being one of them. For more information on the recycling of soft plastics, please visit the REDcycle website: <https://www.redcycle.net.au/>

Q: Has anyone done material flow analysis? How much soft plastic vs how much concrete? What's the long-term solution?

A: An LCA is planned for the very near future – watch this space.

Q: With the plastic types that are collected through REDcycle - are there any types that have to be sorted out and are still problematic? I know public collection of material can sometimes be 'contaminated' with things that don't suit some of the applications.

At Replas, soft plastic goes through a processing procedure where most contaminated plastics, metals, etc. can be extracted before going into Polyrok/other recycled plastic products. It is imperative we educate and emphasise the importance of proper recycling so there is minimal contamination.

Q: Does soft plastic need to be labelled "REDcycle" for consumers to deposit it in the red cycle bins?

A: For a full list of what soft plastics can and cannot be recycled through REDcycle, please visit their website: <https://www.redcycle.net.au/what-to-redcycle/>

Q: Does the polymer mix of say ratio of PE/PP/PET effect the end properties of the concrete - i.e. moisture?

A: Polyrok is primarily made from Polyolefins (PP/PE), these polymers are not hydroscopic so ratios will have no effect.

Q: Does it matter if paper labels are stuck on soft plastics when used in this process?

A: It is important all soft plastics are recycled correctly through the REDcycle program. Small amounts of paper are ok – please visit the REDcycle website for more information: <https://www.redcycle.net.au/what-to-redcycle/>

Q: Can Replas recycle a triplex material containing foil into Polyrok?

A: Multilayer packaging with foil is not ideal, though small amounts will process ok.

Q: Common feedback from consumers is that the soft plastic collection points are not widely available. What is the plan to improve it considering Polyrok will demand more material?

A: Replas are the manufacturers, not the collection point for soft plastics. To find your nearest REDcycle collection point, please visit the REDcycle website: <https://www.redcycle.net.au/where-to-redcycle/>

Q: What is the performance difference between pure concrete and concrete mix with Polyrok?

A: When used at a replacement percentage of 10% by volume of coarse aggregate, testing in laboratories and commercial batching plants shows the concrete performs to the same standards as conventional concrete.

Q: What happens to the plastic separated from the concrete in the recycling of concrete process? Does that get captured and then re-used?

A: Recovery of Polyrok from concrete crushing plants is a simple process using an air knife system (standard in most systems) or a zigzag air separator. This process has been a standard requirement for many years due to other plastic components in concrete such as bar chairs, poly film and mould inserts. Polyrok can then be reused as aggregate or for other purposes. Please see video:

<https://www.youtube.com/watch?v=z1mPeAoXLzk>

Q: What processing is required by Replas to prepare the polyolefin recovered to prepare it for use in Polyrok?

A: The Replas manufacturing facility has an efficient processing procedure for the soft plastics before it is used in Polyrok or other recycled products.

Q: REDcycle currently limit non-polyolefin content in soft plastics for collection. Will this still be the case or would limits on substrates such as PET and Nylon content be revised to higher contents?

A: For information on REDcycle and their soft plastic collection, please visit their website:

<https://www.redcycle.net.au/>

Q: For the construction industry, has there been any testing of Polyrok in structural elements such as suspended slabs or pre-cast panels?

A: Currently, Polyrok is being used in structural slabs and being trailed in other structural elements. Continued testing and research with industry and RMIT University and will produce further data into structural applications.

Q: Is there advantage in having REDcycle bins in schools?

A: At present, the RED Group is not set up to offer collection services to schools, day care centres or other businesses due to logistical reasons. Red Group encourages everyone to utilise their existing network. Please see [Schools and the REDcycle Program](#) for information on running a soft plastic recycling scheme at your school.

Q: How will industry minimise increased demand for soft plastics if we see a large-scale shift toward use of Polyrok in concrete? Is Polyrok seen as a transition product whilst we look for alternatives to soft plastics?

A: Polyrok currently finds a home for the most problematic plastic waste, soft plastic. Until that shift is made, Polyrok will continue to be a fit for purpose, scalable solution for soft plastics.

Q: What studies have been done on the long-term breakdown of the polymer when recycled back into concrete products?

A: Polyolefin plastics have a known stability profile that been thoroughly researched and documented. The two main modes of degradation to polyolefins are oxygen (air) and UV (sunlight), neither of which are present inside concrete. A stable lifetime of hundreds of years would be expected in this environment.

Q: What is the story behind the \$3m Federal grant?

A: Please visit this link for a full breakdown of the Cooperative Research Centre Projects (CRC-P): <https://www.minister.industry.gov.au/ministers/porter/media-releases/47-million-grants-boost-research-collaboration-manufacturing>

Q: Operation Clean Sweep - will this be a priority to sign up and give further confidence to the consumer in the circular recycling plastic industry?

A: OCS is being considered by the Replas board to ensure all program requirements are met.

Q: Are mix designs created by Replas? or is it a direct replicant for current aggregates?

A: Polyrok is a direct replacement for mineral aggregate in concrete. It is intended to work directly with existing mix designs or for concrete manufactures to develop their own specialist mixes.

Q: On flexibles - any requirement/necessity around rinse, dry and then store drop off to avoid contamination? Current we don't have this option to choose under conditional recyclable drop down in PREP/ARL.

A: For more information on REDcycle and the recycling of soft plastics, please visit the REDcycle website: <https://www.redcycle.net.au/>

Q: Is there a plan to do pickups of soft plastic from schools?

A: At present, the RED Group is not set up to offer collection services to schools, day care centres or other businesses due to logistical reasons. Red Group encourages everyone to utilise their existing network. Please see [Schools and the REDcycle Program](#) for information on running a soft plastic recycling scheme at your school.

Q: How resistant to damage (abrasive and corrosive) attacks is the solution? Especially for acid washes?

A: Polyolefins are so stable they are used to package the most aggressive chemicals (acids, solvents) and trusted to package the most sensitive of products such as food and pharmaceuticals. Polyolefins would need to be heated above their process temperature of 200C to begin thermally degrading.

Q: What's the impact on fire rating or flammability requirements?

A: At 10%/VOL coarse aggregate, Polyrok would have no impact on fire rating or flammability ratings.

Q: When you do an exposed concrete finish, is there any danger in releasing particles of plastic into the waterways and environment?

A: Polyrok is a coarse aggregate and is totally encapsulated in the cement/sand in standard finished concrete. This means the Polyrok is never exposed to the external environment. Accelerated wear testing, completed by RMIT University, has shown concrete containing just 5% Polyrok has a 11.5% higher abrasion resistance compared to standard concrete.

Q: Are there any adverse effects on the Polyrok product with other concrete additives such as Zypex for dealing with water migration?

A: Made from Polyolefin plastic, Polyrok has no chemical reaction with other materials or admixes. Silica fume has shown excellent interactions with Polyrok. Silica fume is an extremely fine material and helps the cement paste flow into the surface voids of Polyrok. This type of plastic is extremely stable and inert with a well-known and accepted safety profile, handling it and incorporation into concrete will not create any emissions and requires no additional PPE.

Q: Can Polyrok be produced as a decorative aggregate in a variety of sizes and colour choices?

A: Polyrok has been successfully used in exposed and ground polished concrete. Unfortunately, due to the nature of the variable colour of soft plastics packaging, the colour of Polyrok is predominantly grey.

Q: Is there any impact on structural integrity when subjected to high temperature, particularly over the summer months?

A: Polyolefins have an average service temperature of approximately 93°C and would need to be heated above their process temperature of 200C to begin thermally degrading. This would not be an issue in a normal concrete installation.

Q: What is the process that is used to convert the thin plastic film to the solid little chunks of plastic.

A: Polyrok is produced in an efficient proprietary process that minimises energy consumption.

Q: Will the technology be available to other Australian manufactures?

A: Polyrok is a scalable solution and manufacturing arrangements with others will be a consideration in the future.

Q: Polyrok trials have been down in Victoria - does this mean in future soft plastics are going down there from all over the country or does it make more sense to have sites across the country due to logistics etc.

A: In the future, Replas would like to build plants up the east coast of Australia to produce Polyrok.

Q: Have similar programmes/technology been developed overseas? How is their journey?

A: We are not aware of any successful technology being developed overseas using soft plastics. It appears that similar projects have seen significant drop in concrete performance.

Q: In what capacity is Polyrok delivered to concrete plants? Straight out of truck? Bags (size?) Pallets?

A: Polyrok is sold in 500kg bulker bags to concrete plants. Other packaging options can be accommodated on application.

Q: What is the competition for the same solution?

A: We have not found a similar solution that uses soft plastics or any other problematic waste plastics.

Q: Where does the pulling out of 'contaminants' occur?

A: At the Replas manufacturing plant, soft plastic material goes through a processing procedure to eliminate as many contaminants as possible.

Q: Who are the suppliers we need to get in contact if we would like to trial it in a project? Would you also know the Carbon footprint of the product?

A: Please visit the Replas website for a list of concrete plants suppliers who have installed and hold Polyrok. An LCA is currently being undertaken, the results to be available soon.

Q: Can an IBC be made from Polyrok which will contain a liquid which has 10% propionic acid?

A: Polyrok polymer is unsuitable for this application

Q: Can you share some information on how we could get involved in specifying Polyrok in our business? Minimums, timing etc.

A: Please contact our sales team to discuss technical information, lead times, etc.

1800 REPLAS or sales@replas.com.au