TonerPlas®

FAQ's

Frequently asked questions

Close the Loop
Take Back – Recover – Reuse

What is Tonerplas®?

TonerPlas is a polymer compound that increases asphalt longevity. It is used as a dry mix additive to modify the binder and will improve the mechanical properties of asphalt, by reducing flow and deformation and imparting elasticity in the bituminous binder mastic.

TonerPlas is a manufactured polymer compound – it is not raw waste plastic.
TonerPlas is formulated on a mixture of post-consumer soft plastics and toner (from print industry). Note: toner is a powdered coloured polymer

Why Soft Plastics?

Technical perspective: the polymers in mixed soft plastics are better suited to binder modification because they have a low melting point and better elasticity than conventional hard plastics.
Environmental Perspective: Flexible packaging is the fastest growing packaging group with the lowest recycling rate. Soft plastics are not represented in the kerbside recycling stream, and approximately 450,000 tonne are landfilled in Australia per year (and growing).

Can the plastic used in TonerPlas be recycled back into packaging products or something else?

No, we only use post-consumer mixed soft plastics from the Redcycle (www.redcycle.net.au) and other similar programs. These plastics have very few recycling options because it's not possible to separate by polymer type, and they could contain food residues and other contaminants. NB. Close the Loop's advanced manufacturing line first removes contaminates before shredding, blending, melting, mixing, adding other recycled ingredients of value, and finally pelletising the finished product.

Do you use plastics from the kerbside collection program?

No. Your kerbside collection is for rigid plastics which are all recyclables with existing end markets. Some rigid plastics are often not compatible with bitumen and would simply act as a filler. TonerPlas is a performance enhancing additive and the environmental benefits are huge but secondary.

Does Close the Loop (CtL) test asphalt?

The Close the Loop laboratory is equipped for developing polymer compounds and rheological characterisation (flow behaviour testing by DSR). CtL specialises in comprehensive asphalt binder testing, to understand and characterise the effects of its asphalt additives. For asphalt performance testing, we rely on the partnership of an asphalt company that has a fully equipped asphalt performance test lab.

How is TonerPlas used?

The dry mix method: TonerPlas is designed for direct addition to an asphalt mix plant - continuous drum or batch plant. It is intended to be added with the bitumen and mixed with the preheated aggregate in one stage.
It is fed into the asphalt plant via the additive feed line. This method avoids the expense of pre blending with bitumen in a separate process.

TonerPlas®

FAQ's

Frequently asked questions

Close the Loop
Take Back – Recover – Reuse

Does the asphalt production process need to be adjusted when using TonerPlas?

No. TonerPlas is designed to blend and homogenise into the asphalt and binder matrix under standard asphalt mix conditions. TonerPlas is suitable for both hot and warm mix.
Tonerplas was designed to enhance conventional bitumen such as C170 and C320. It was not designed to replace PMB grades. In some cases TonerPlas may be used to offset a percentage (in the region of 10%) of PMB grades for state road applications - this is an area of ongoing study and product development.

Does TonerPlas replace conventional PMB?

No. TonerPlas is designed to be used with the binder chosen for a particular mix design. It will increase the softening point and enhance elasticity, without significantly affecting low temperature modulus / stiffness. In C170 and C320 bitumen, TonerPlas will significantly enhance the viscoelastic properties.

How recyclable is RAP that contains TonerPlas?

When TonerPlas is introduced into the asphalt mix, it melts and homogenises with, and becomes part of the binder matrix. Like other polymer modified binders (SBS and EVA), the polymers in TonerPlas are thermoplastic and will re-melt in the binder matrix when RAP is reprocessed. The presence of polymer modified binder in the RAP does not necessitate changes to the RAP processing procedures. RAP with TonerPlas is processed as per 'AAPA Reclaimed Asphalt Pavement (RAP) Management Plan'.
https://www.aapa.asn.au/wp-content/uploads/2018/06/AAPA-RAP-Management-plan-12-June-2018.pdf

Does TonerPlas effect the workability of asphalt?

Due to its effect of increasing binder viscosity, TonerPlas may affect workability. Adjustment of the mix design may be required depending on the amount used and other mix design factors.

How many plastic bag equivalents per KM of TonerPlas road?

Every 1 km of road* paved with TonerPlas modified asphalt uses approximately:

- 530,000 plastic shopping bag equivalents
- *Waste toner* from 12,500 printer cartridges

* Top layer wearing course of a standard two lane suburban road

How is the consistency of TonerPlas ensured?

The infeed raw materials are characterised and from known sources.
The advanced manufacturing process ensures that the end product is of a highly consistent nature. During production, TonerPlas is sampled daily and QC tested for critical physical properties that characterise its viscoelasticity, to ensure that its behaviour in asphalt is consistent and predictable.

TonerPlas®

FAQ's

Frequently asked questions

Close the Loop
Take Back – Recover – Reuse

Does using TonerPlas increase the risk of microplastics getting into our waterways and ocean?

No, the NSW EPA have recently approved an Order & Exemption (O&E) for Reconophalt, the Downer asphalt including TonerPlas. The O&E states that the Reconophalt road, including TonerPlas, poses no more risk of microplastics and leachate than a standard asphalt road. The NSW EPA conducted the harshest test regime ever seen in the Australian roads industry to complete this report. You can download a copy here: https://www.downergroup.com/Content/cms/media/2020/Documents/The_Downer_bituminous_pavement_order_and_exemption_2020.pdf

What about leachate from asphalt, is it more toxic where TonerPlas is used?

Leachate was also tested and shown to be no more of a risk when using TonerPlas than from a standard asphalt road.

Fuming Potential

Tonerplas is considered to be very stable and of low fume potential at normal processing temperatures of asphalt, at around 160'C. The soft plastics used to make Tonerplas is predominately from food and retail packaging.

It's important to note that TonerPlas is a melt processed polymer compound, not raw unprocessed plastics. The infeed soft plastics (predominately LDPE) have gone through a process of shredding, cleaning, melting and blending to ensure thorough homogenisation. During the initial processing stage, the soft plastics are processed at high temperature so any volatile compounds are evolved during this stage, along with residual moisture.

Further hot compounding at a lower temperature, blends in the toner and oil to create the final TonerPlas compound.

The other factor is concentration in asphalt, where TonerPlas only exists as a minor component up to 0.75%, therefore based on concentration alone, its contribution to asphalt fumes and odour is very minor.

Past experience by many asphalt plants and paving crews around Australia, including air monitoring, has demonstrated no issues around fuming with regards to asphalt containing TonerPlas

How does TonerPlas fit into the Austroads system?

There are no existing standards for plastics use in asphalt. Current asphalt mix designs are material specific and design specific. TonerPlas is an innovation that sits outside of the current prescriptive specification framework for asphalt mix designs.
For asphalt mixes containing TonerPlas, asphalt manufacturers can register new 'conditional mix designs' with state DOT's. Once a 'conditional mix design' is approved and registered, it can be specified for jobs.

Can I get information from Close the Loop about the amount of soft plastics and toner powder collected in my council area?

Yes. Please email your local council name to steve@closetheloop.com.au and the reason you want the information, and we'll get a report to you by email.

For TonerPlas technical enquiries, please contact:

- Dave Hitzler (Tech Manager) - dhitzler@closetheloop.com.au

For TonerPlas sales enquiries, please contact:

- Steve Morriss at steve@closetheloop.com.au or
- Peter Tamblyn at peter@closetheloop.com.au