

# ***DESIGN TACTICS***

PRODUCT MATERIAL RECYCLABILITY & REUSABILITY

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# SUNGLASSES

## ● Polycarbonate (1x Frame, 2x Eye holder)

Polycarbonate is a recyclable plastic. The usual procedure is to sort, shred, wash, granulate, and compounded for reuse.

The frame was finished with a matte black paint, so the product do not appear as glowing as polycarbonate usually does.

## ● Acrylic (2x Polarized Acrylic Lens)

Acrylic is generally non-recyclable due to it being a thermoset plastic. Of the two main types of acrylic (PMMA & PMA), PMMA is more easily recyclable with the aid of lead. However most recycling centres would not recycle neither acrylic type as it is a type 7 plastic.

Colourant can be added to lenses either before the lens is formed, or by chemically post-coating the finished lens to achieve the desired hue. Sunglasses are normally finished by a layer of anti-reflective material by the end.

## ● Stainless Steel (2x Screw) - Replaceable

Stainless steel is a valuable resource as it is an alloy which contains various useful metals. Steel processing, much like plastics, follows a procedure of shredding, sorting, and blending into chrome steels, nickel alloys, and other types of stainless steel.

For this pair of sunglasses, the stainless steel screws are more likely having a mirror polished finish. It is more shiny and smooth.



### Recyclability:

The frame and eye holder are not so easy to replace. Unless a donor glasses pair is purchased, there is no real way to replace these components. The components could also be repaired with super glue or even tape.

Should the lenses break, they would be relatively easy to replace. Once again there is the option of replacing with a donor pair of lenses or you would have to go to the optometrist for a new pair. The lenses are not repairable.

The stainless steel screws are highly replaceable with purchasable screws. A donor pair of screw glasses is also an option.

### Repairable/Replacable:

For the sunglasses, it would be relatively easier to replace the stainless screws when needed. Purchase new screws, with the help of small screwdrivers, we should be able to replace them by ourselves.

However, to replace the lens or frame is harder to achieve. Usually glass shops provide a service to replace lens, mostly prescribed. Cheap sunglasses like this pair may not be able to achieve this.

# BIC PEN



## **Tungsten (Ballpoint)**

Tungsten is a finite natural resource so recycling all available tungsten is imperative in preserving this limited resource. The process of recycling tungsten is quite similar to recycling most other metals. However there is more incentive to collect tungsten as it is quite valuable due to its rarity.

The ballpoint has a polished finish, so it could be smoothly rotated around, and create continuous lines.



## **Brass (Socket)**

Brass is another highly recyclable metal and involves the same recycling process as most metals. It is valued for its use in many items such as: coins, electronics and wiring, ammunition, jewelry, & various plumbing items.

Socket is polished so the smooth surface is more comfortable for people to touch and hold onto.



## **Carbon black pigment (Ink) - Non Recyclable**

The ink in the pen is the only resource which cannot be recycled. The problem is that it is made of a combination of materials which would be quite difficult to separate. The separation process would not be worth while, thus making the ink unrecyclable.



## **Polypropylene (Tube, Cap and Ends)**

PP is a recyclable plastic and the recycling process is fairly straightforward. The process includes: separation, cleaning, and shredding. These parts requires black tint during process. The material is shaped with through inject-moulding.



## **Rigid Polystyrene (Barrel)**

Polystyrene is another recyclable plastic. It involves the same recycling process as PP. Polystyrene is naturally transparent, material is shaped through inject-moulding.

### **Repairable/Replacable:**

For a Bic Pen, normally is easier to replace the ink tube together with the socket and ballpoint. It would be easy for individually to buy those replaceable tubes and replace them at home.

However, other components are not as easy, because there does not seem to have any shop selling caps or barrels separately. Usually what people do when they are missing parts of a Bic Pen (apart from ink tube) is to buy another new one and exchange parts between them. Or throw the old one directly and start using a new one.



# KLEAN KANTEEN WATER BOTTLE



## ● **Food-grade Silicone** (Lid Seal, Inner Seal) & Spout

Silicone is a part of the rubber family and is primarily comprised of sand and hydrogen in its uncured state. Silicone is not biodegradable and has to be specially treated to be recycled. Most recycling plants, however, do not collect silicone for recycling. Natural coloured silicone is inject-moulded to shape.

## ● **Polypropylene** (Cap)

PP is a recyclable plastic and the recycling process is fairly straightforward. The process includes: separation, cleaning, and shredding. These parts requires black tint during process. The material is shaped with through inject-moulding.

### **Repairable/Replacable:**

It is generally hard to replace parts of a water bottle in real life. Most shops do not provide services of repairing or replacing parts of a broken water bottle. Normally people may abandon the broken water bottle and get a new one as soon as it could not function very well (such as leaking).

## ● **18/8 grade - Stainless Steel** **Powder Coated Finish** (Main Body)

18/8 grade means that it contains 18% chromium (makes it rust resistance), 8% nickel(gives silver shine-like)

Stainless steel is a valuable resource as it is an alloy which contains various useful metals. Steel processing, much like plastics, follows a procedure of shredding, sorting, and blending into chrome steels, nickel alloys, and other types of stainless steel. The main body of this water bottle is stainless steel with coloured powder coating.