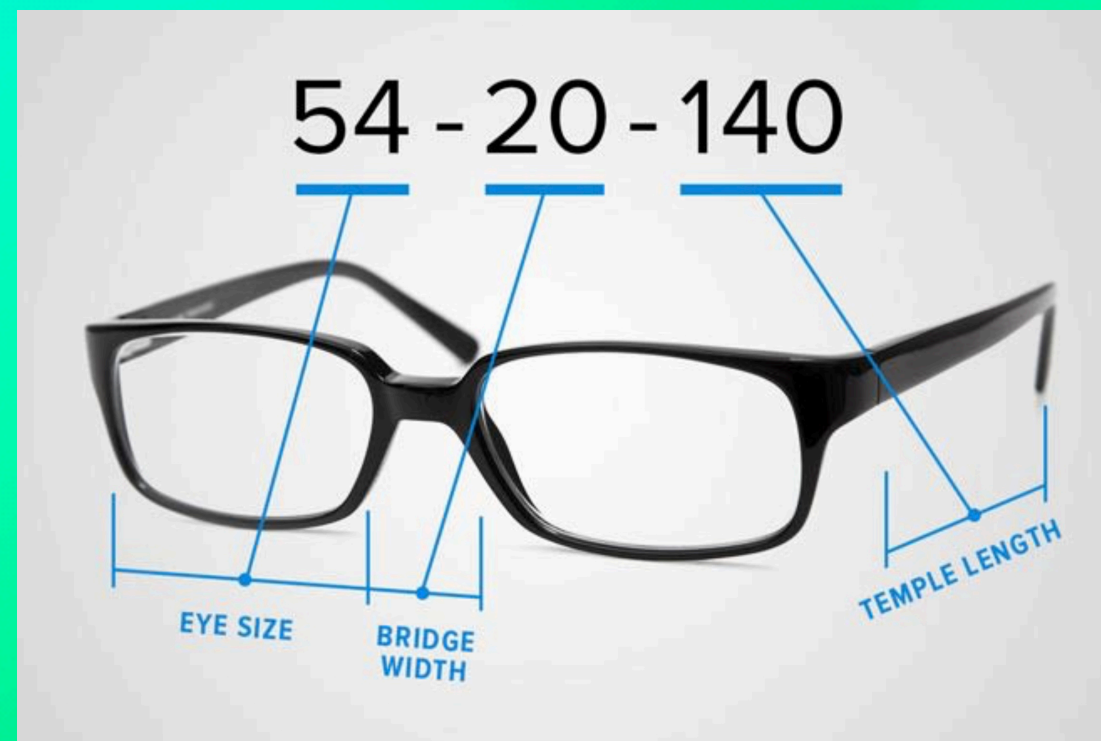


Prepared by
Alaa Mohammed
MSc Optometry

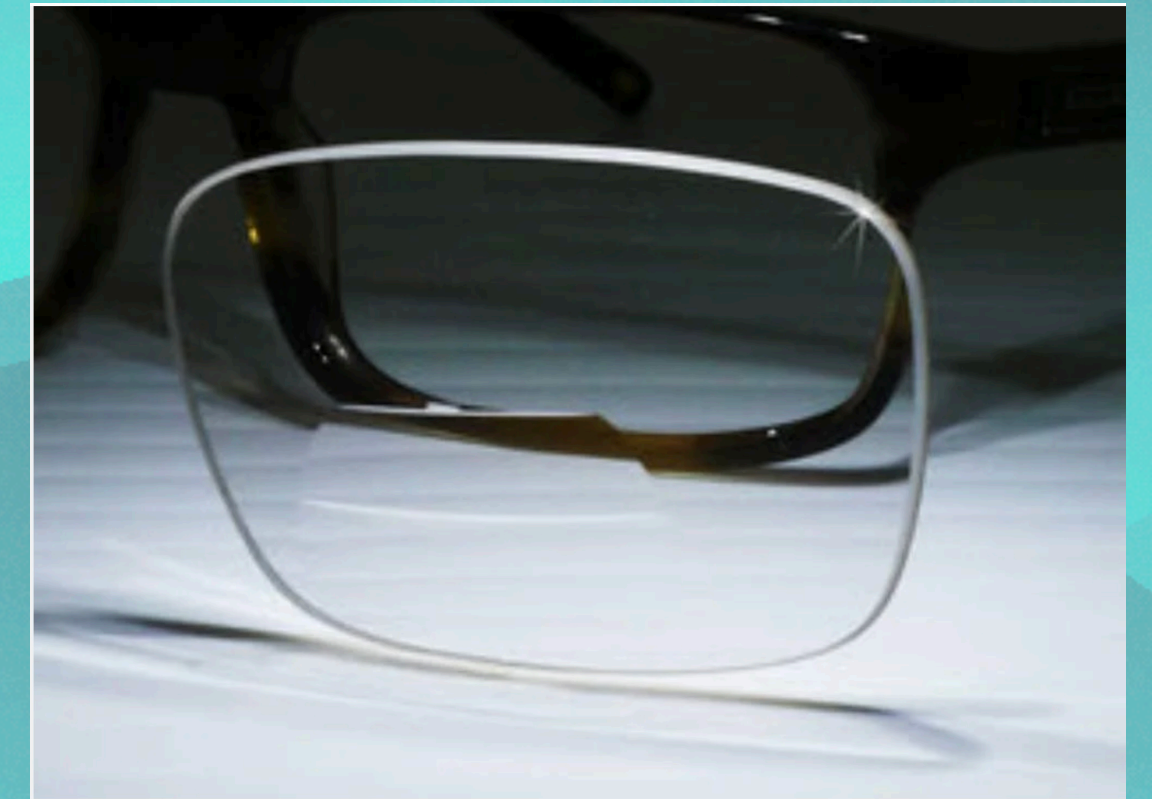
Object
Spectacle

جامعة المستقبل
كلية التقنيات الصحية والطبية
قسم تقنيات البصرية

Spectacle plastic lenses



Spectacle Frames & Measurements



What are plastic spectacle lenses?

Plastic lenses are generally made from a strong material called CR-39, but also are available in a range of hi-index lenses, which are thinner and lighter. While most people prefer the newer plastic lens very transparent that can easily improve vision and increase visual clarity

Polycarbonate versus CR39 plastic lenses

Polycarbonate (PC)

- Organic material with very high breaking strength
- Inherently soft allowing it to absorb impacts, ideal for safety eyewear
- Mechanical strength class "F" (45 m/sec)
- About 20-25% thinner than plastic or glass lenses
- Requires scratch-resistant coating for durability
- Only limited resistance to chemicals and therefore not suited in combination with frameless safety spectacles

CR39 (Plastic)

- Lightweight organic material
- Very good optical performance even for high prescriptions
- Suitable for working with chemicals and paints / varnishes
- Mechanical strength class "S" (falling ball test)
- Good scratch resistance due to hard layer (optional)
- The middle of the lens should always be thicker in order to meet the requirements for tensile strength

GLASS VS PLASTIC LENSES: WHICH IS RIGHT FOR YOU?

GLASS

Pros:

- Mineral glass is highly scratch resistant as it is a very strong lens material.
- Glass offers excellent optical quality which means you are able to see very clearly with glass lenses when compared to plastic lenses.
- Glass lenses can be thinner than plastic lenses; thinner lenses are obviously more desirable than thick lenses.

Cons:

- Glass shatters on impact which makes it a dangerous material to use, especially in glasses designed for young children or those in sports i.e. football, or rugby.
- Glass lenses can only be fitted in fully rimmed frames which limits the range of products it can be fitted with. Glass cannot be easily tinted so the availability of tints is limited.
- Glass lenses can also be very heavy in comparison to plastic lenses. Rimless or semi rimless frames would not be able to support glass lenses due to its weight.

PLASTIC

Pros:

- Unlike glass which can be very heavy in frames, plastic is much lighter. This makes it easier to fit plastic lenses in all types of frames (full, semi/supra or rimless).
- Any photochromic tints can be applied to a plastic lens. Photochromic lenses will turn dark when there is excessive light and turn lighter with insufficient light.
- Polarized tints can also be applied using plastic lenses, these help to filter the various directions of light reducing the amount of glare. Through polarised lenses, the sea will appear more transparent.
- Plastic lenses are very durable. They are shatter proof, making it a great choice for those who actively participate in sports. If you break or drop your glasses frequently or have young children, plastic lenses would be a perfect choice.

Cons:

- Plastic lenses offer lesser optical quality than glass. However, there are more refractive indexes available with plastic lenses. This means it's available to all prescription strengths from low to high.
- Plastic lenses scratch easily due to their soft surface which is why a scratch resistant coating is applied immediately to these lenses.
- Plastic lenses can also be thicker than glass however there are thin plastic lenses available but mainly ideal for higher prescriptions.

Advantages of plastic lenses:

1. **Lightweight:** Plastic lenses are lighter than glass lenses, making them more comfortable to wear for extended periods of time.
2. **Impact resistant:** Plastic lenses are less likely to shatter or break upon impact than glass lenses, making them a safer choice for sports and other physical activities.
3. **Affordable:** Plastic lenses are generally less expensive than other types of lenses, making them a popular choice for those on a budget.
4. **Easy to tint:** Plastic lenses can be easily tinted to provide additional protection from the sun or to create a custom look.

Disadvantages of plastic lenses:

1. **Less scratch-resistant:** Plastic lenses are more prone to scratches than glass lenses, which can affect their longevity and clarity.
2. **Less clear:** Plastic lenses may not be as clear as glass lenses, particularly in higher prescriptions, which can affect visual acuity.
3. **Thicker:** Plastic lenses may be thicker than other types of lenses, particularly in higher prescriptions, which can affect the appearance of the eyewear.
4. **Prone to distortion:** Plastic lenses may cause more distortion, particularly in wraparound or curved frames, which can affect visual acuity.

Polycarbonate lenses

Polycarbonate lenses are a type of plastic lens that are widely used in eyewear due to their many advantages over other types of lenses. However, they also have some disadvantages that should be considered when selecting eyewear.

Advantages of polycarbonate lenses:

1. **Impact resistant:** Polycarbonate lenses are highly impact-resistant, making them a popular choice for sports and other physical activities.
2. **Lightweight:** Polycarbonate lenses are lighter than glass lenses, making them more comfortable to wear for extended periods of time.
3. **Scratch resistant:** Polycarbonate lenses are more scratch-resistant than plastic lenses, making them more durable and long-lasting.
4. **UV protection:** Polycarbonate lenses offer 100% UV protection, which helps to protect the eyes from harmful UV rays.

Disadvantages of polycarbonate lenses:

1. **More expensive:** Polycarbonate lenses are generally more expensive than plastic lenses, which can be a drawback for those on a budget.
2. **Prone to distortion:** Polycarbonate lenses may cause more distortion, particularly in higher prescriptions or in wraparound or curved frames, which can affect visual acuity.
3. **Less clear:** Polycarbonate lenses may not be as clear as glass lenses, particularly in higher prescriptions, which can affect visual acuity.
4. **Thicker:** Polycarbonate lenses may be thicker than other types of lenses, particularly in higher prescriptions, which can affect the appearance of the eyewear.

High index lenses

High index lenses are a type of lens material that is designed to be thinner and lighter than traditional plastic or glass lenses. They offer several advantages over other types of lenses, but they also have some disadvantages that should be considered when selecting eyewear.

Advantages of high index lenses:

1. **Thinner and lighter:** High index lenses are significantly thinner and lighter than traditional plastic or glass lenses, making them more comfortable to wear for extended periods of time.
2. **More attractive:** High index lenses are thinner and more aesthetically appealing, which can improve the appearance of eyewear.
3. **Better optical quality:** High index lenses are designed to provide better optical quality than traditional plastic or glass lenses, resulting in sharper, clearer vision.
4. **UV protection:** Many high index lenses come with built-in UV protection, which helps to protect the eyes from harmful UV rays.

Disadvantages of high index lenses:

1. **More expensive:** High index lenses are generally more expensive than traditional plastic or glass lenses, which can be a drawback for those on a budget.
2. **Prone to distortion:** High index lenses may cause more distortion, particularly in higher prescriptions or in wraparound or curved frames, which can affect visual acuity.
3. **Less impact resistant:** High index lenses may be less impact resistant than other types of lenses, which can be a drawback for those who engage in sports or other physical activities.
4. **Limited availability:** High index lenses may not be available in all prescriptions or lens styles, which can limit the options for those with specific needs or preferences.