

Spectacles

Vision correction devices, also known as glasses or eyeglasses, consisting of glass or hard plastic lenses (CR39 or Polycarbonate) mounted in a frame made of plastic or metal that holds them in front of a person's eyes, typically utilizing a bridge over the nose and legs (known as temples or temple pieces) which rest over the ears. Spectacles are used for vision correction of people with vision impairment due to refractive error. The selection of the lenses for a user depends on what type of vision impairment the user has, such as lens with plus diopters (for hyperopia or presbyopia), or minus diopters (for myopia), lens with spherical correction (for hyperopia, presbyopia or myopia), or lens with cylindrical correction (for astigmatism), and their preference in terms of the material of the lens.

As there are different types of refractive error, there are spectacles that serve different needs accordingly. We can categorize spectacles as spectacles for long distance vision, and spectacles for short distance vision. There are also special purpose spectacles that include filters and protective glasses that are meant to provide protection to eyes during activities that may harm them; these are classified within category 220303 (light / adsorption filters) of the ISO Classification.

Customized spectacles are made according to prescription of individual wearer and are ideal solution for correction of refractive errors.

Ready-made spectacles are spectacles with pre-fitted lenses with same power in both eyes, suitable for a significant proportion of people with refractive errors, particularly Presbyopia.

Self-adjusting spectacles are broadly grouped into two types: 1) liquid-filled systems that utilize the change in shape created when liquid is inserted into or drawn from a flexible membrane; 2) Alvarez type systems that use two lenses moving horizontally relative to each other in order to change spectacle lens power. Both groups of self-adjustable spectacles currently only provide spherical refractive error correction.

Safety spectacles provide eye protection from occupational injuries, infections, exposure to glare or radiation. They are made of break-proof plastic lenses. Nylon frames are usually used for protective eyewear because of their lightweight and flexible properties. Unlike most regular glasses, safety glasses often include protection beside the eyes as well as in front of the eyes.

Spectacles can also provide magnification that is beneficial for people with low vision or any particular educational and occupational needs. An example would be high powered plus lenses fitted in a spectacle frame to provide near vision magnification. Telescopes can also be fitted in spectacles for near and far viewing. The material of a lens can be of different types:

- glass lenses: this is an old traditionally used lens, a low-cost lens that is easily affordable, but its downside is that it is easily breakable and also heavy; due to the fact that a glass lens has a high risk of getting broken at a slight impact and could cause damage to one's eyes, the glass lens is not advisable and very rarely used.
- plastic lenses, more commonly known as CR 39 lenses. It is much lighter than the glass lens, and more impact resistant; these are also low-cost lenses and easily affordable.
- polycarbonate lenses: they are much more impact resistant as compared to glass and CR39 lenses, and much lighter in weight; even though these lenses cost more than the CR39 lenses, they provide a lot of safety to the user; this is why they are mostly recommended for children and people who are engaged in any outdoor physical activity.
- high-index plastic lenses: they are lighter than all the other lens types and considerably more impact-resistant.

- **Product Classification**

- APL (WHO Assistive Product Priority List): 37 (Spectacles; low vision, short distance, long distance, filters and protection)
- ISO 9999:2022: 220306 (Spectacles and contact lenses)

- **Possible configuration variants**

- Concave lenses (thinner in the center and thicker in the periphery: for people with myopia, that is near or shortsightedness).
- Convex lenses (thicker in the center and thinner on the sides: for people with hyperopia, that is farsightedness along with difficulty to see things at a short distance).
- Cylindrical lenses (more curved in one direction: for people with astigmatism, that is far farsightedness along with difficulty seeing things at a short distance).
- Prism lenses (for prism correction in people with strabismus).
- Bifocal lenses (lenses with two sections: the upper section helps focusing on objects at a distance and the lower sections on objects close up).
- Trifocal lenses (lenses with three sections in the lens: the upper section helps focusing on objects at a distance; the middle section helps focusing on objects that are neither very far nor very close; the lower section helps users focusing on objects at a close distance enabling tasks that require close focus such as sewing or reading).
- Progressive multifocal lenses (providing greater flexibility in all kind of tasks whether they need to focus on things at a distance or near-by; the term progressive multifocal means the lens can change its power as the focus changes; unlike bifocal and trifocal lenses, a progressive multifocal lens is a single lens but with an ability to change powers for various focal points).
- Telescopes (for high magnification near and far viewing).

- **Possible accessories or optional components**

- Carrying case.
- Cleaning cloth.
- Nose pads.
- Cleaning liquid.

- **Product goals**

Activities or functions the product is mainly intended to support, according to WHO ICF Classification:

- Seeing [\[b210\]](#).

- **Indicated impairments**

Difficulties the product is mainly intended to address, according to the WHO ICF Classification:

- Seeing [\[b210\]](#) (difficulty due to eye refractive error).

- **Contraindicated impairments**

Difficulties for which the product may be inappropriate:

None specified.

- **Indicated environments**

Specific environments in which the product should be used:

None specified.

- **Contraindicated environments**

Environments in which the product may be inappropriate:

None specified.

- **Other indicated factors**

Other factors or situations the product is intended to address:

- Myopia. Only if used with variants: Concave lenses
- Hyperopia. Only if used with variants: Convex lenses
- Astigmatism. Only if used with variants: Cylindrical lenses
- Strabismus. Only if used with variants: Prism lenses
- Presbyopia. Only if used with variants: Bifocal lenses, Trifocal lenses, Progressive multifocal lenses

- Severe vision loss. *Only if used with variants: Telescopes*
- **Other contraindicated factors**

Other factors or situations in which the product may be inappropriate:
None specified.
- **Points to be considered in product selection**
 - Age of the user: the selection of a frame depends on whether the user is child or adult.
 - Sex of the user: there are different designs of frames catering for the needs of male and female users.
 - Cost of the spectacles: there overall cost must be considered when prescribing them to a person who might face difficulty in purchasing them.
 - Use environment: the type of work the person does or the surroundings where the persons lives must be considered when selecting the appropriate lenses and the spectacles frame.
 - Frame material: the material of spectacle frame is primarily plastic or metal. Within the plastic category, there are various types of plastic that can be used ranging from a material known as Cellulose Acetate or Zyl (a lightweight, inexpensive and colorful material), to Polycarbonate and Nylon. The plastic frame is not as strong as a metal frame and can get broken easily if not cared for. The plastic may also get worn over long time with exposure to various weather conditions, mainly extreme heat. However, unlike metal frames, the plastic frames do not get warm in sunlight or extreme heat. Some people may also have allergic reaction to certain metals and therefore an eye health practitioner needs to check these before prescribing. The metal frame can also be of various metals including titanium, beryllium, stainless steel, aluminum, nickel and copper. Some more expensive options within the metal category are silver and gold, which are obviously not affordable for an ordinary user.
 - Frame style: In terms of style of frames, there are various types of frames that users may prefer depending upon their need, liking or that can be prescribed by an eye practitioner based on a patient's comfort and safety; some of the well-known types of frame styles are full-rimmed frames, semi-rimmed frames, rimless frames and low-bridge frames.
 - Factors Impacting the use of spectacles: even though spectacles are an important device that helps individuals in better seeing, there are several socio-economic factors that may prevent an individual from wearing or using spectacles. These socio-economic factors may include: 1) Cost of spectacles that may not be affordable for many poor people; 2) Spectacles are mostly available in private sector optical shops, which operate as a commercial enterprise outside the health systems; 3) Spectacles need to be prescribed by a trained eye health professional in a clinic equipped with the necessary hardware, however there is a global scarcity of eye health personnel who can undertake good quality refraction; 4) The prescription of the spectacles routinely changes, and client needs to be reexamined yearly for fitting of new spectacles; 5) Communities perceive often spectacles as fashion accessories that affect the cost of spectacles; 6) Community perceptions about women/girls wearing spectacles is sometimes negative and parent avoid getting spectacles for girls due to various socio-economic factors; 7) Another common perception is that spectacle wear makes vision worse; 8) Community or peer pressure that might make an individual embarrassed or uneasy wearing spectacles; 9) Many children have to face bullying or demeaning comments from other students, with regards to their use of spectacles; 10) Lack of, or unavailability of good spectacle provision services in remote areas; 11) Lack of trained spectacle technicians in remote areas.
- **Points to be considered in product fitting**
 - Users need to be trained to properly use their spectacles; on how to ensure the safety of spectacles and saving them from scratches.
 - Users also need to be made aware of the importance of eye health and the use of spectacles or other assistive devices so that they do not get discouraged by other members of their community.
- **Points to be considered in product use**
 - The spectacles when not worn must be kept in a hard case to avoid breakage.
- **Points to be considered in product maintenance / follow-up**
 - The lenses tend to get starched due to dust or friction from surfaces.
 - The users need to be advised on proper method of cleaning the spectacle frames and lenses.
 - The spectacle frame tends to lose adjustment and need to be regularly adjusted so that they maintain the correct placement on the face.
- **Examples of products available on the market**
 - Live product search in the EASTIN website <https://www.eastin.eu/en/searches/products/list?iso=220306>

Source

This Fact Sheet was compiled in 2021 by an international team of experts, to provide the initial knowledge base for a project ("An online system to assist the selection of assistive product") supported by the World Health Organization in 2020-2021 within the GATE Initiative (Global collaboration on Assistive Product). Fact Sheets were compiled for each of the 50 types of products included in the WHO APL (Assistive Product Priority List).

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The project led to a prototype online tool called ASPREX (ASsistive PProduct EXplorer). At the end of the project, it was transferred to a WHO collaborating center (the Global Disability Hub in the UK), in view of possible future developments.