DMRC - Faceshield Design and Production:

If you are aiming for your own production or are interested in the requirements and the design implementation, the essential features are summarized below:

End-User requirements:

- One size fits all -> suitable for many head sizes and shapes due to the flexible forehead
- Protection against liquid droplets also from above -> shielding with a screen on top
- Comfortable to wear -> flexible forehead support, fastening mechanism at the side, little affectation of the contact surface
- Easy to sanitize -> corners are rounded, the staircase effect is minimized by using vertical and horizontal surfaces, the visor can be removed quickly (wipe disinfection)

Additional requirements:

- One part if possible -> function integration, no assembly necessary (except headband)
- Integrated fastening mechanism for the headband / apart from the visor no additional parts should be necessary -> ratchet quick fastening for the head band
- Little space required for storage and shipping -> design can be nested inside each other, the visor is removable and does not need to be preformed (tested to at least 0.75 mm PET film)
- Visor is quick and easy to remove / good cleaning -> visor can be assembled and removed in a few seconds
- Visor holds securely (even foils of different thickness) -> by spring preload mechanism on the LS part
- Visor foil is quick and easy to produce -> in the simplest case, a DIN A4 film (e.g. overhead projector film) and a 4-fold hole punch - even distance 80 mm per hole
- Functional visor attachment for all tested punch hole sizes (which vary between 5.3 mm and 6.2 mm depending on the hole-puncher)
- Functional design even with slightly different shrinkage in the LS process depending on component position and height

Requirements for laser sintering:

- Easy to nest (space-saving and thus cost-saving) -> small component spacing only at points of low component volumes (/heat capacities)
- Main load directions of the components in XY plane (bending load) -> use of 30/70 (NP/RP) powder mixture possible

- Minimization of the exposure areas per layer by "staircase step" nesting -> thus also reasonably constant layer time
- Maximize part size with the smallest possible installation space -> on 353 mm height (incl. 6.8 mm bottom layer) 136 masks and 138 head bands fit - higher jobs would theoretically be possible
- If possible, do not place flat component areas in the extreme outer areas of the system -> mainly thin pins reach into the edge areas of the system, no large exposure areas (the boundary box of all components - before applying the scaling factors but including the small pins in the edge areas - is approx. 334 x 334 mm)
- The pyrometer spot of the P396 remains completely free in each layer

Recommendations for manufacturing:

- We recommend to use 50/50 (NP/RP) powder mixture but we have also had good experience with 30/70 (NP/RP) powder mixture
- The process only runs stable if the build temperature is set correctly for every individual EOS P3XX machine.
- We recommend to use a 0.5 mm thick film as visor (we tested PET)
- For best safety, the outer lines of the visor should be 23 × 37 cm
- For still very good safety, a A4 sheet (e.g. overhead projector film) can be used
- The faceshields should be fully cleaned from all adhering powder particles (washing procedure is recommended)

Use, production and distribution of the faceshield and faceshield holder are at your own risk.