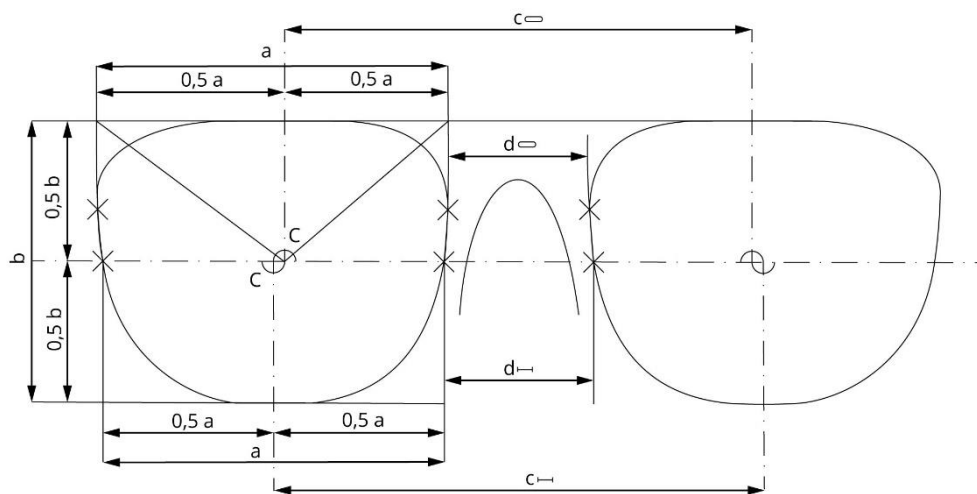


# 3 Spectacle lens minimal diameter calculation

## 3.1 Introduction

Minimal spectacle lens diameter is given from uncut spectacle lens. Possible uncut spectacle lens decentration is dependent on difference between patient's PD and frame size (FS). FS is horizontal distance from one center of the one spectacle's eye size to another. Or the distance from temporal part of the right rim to nasal part of the left rim. We use so called boxing measuring system. Calculation of minimal spectacle lens diameter we can use with rounded or oval frames. In other case we should use centration chart (so called ditest).



Picture 3.1: Measuring system for spectacle frame called boxing system ( $c$  – frame size,  $a$  – horizontal frame eye size,  $b$  – vertical frame eye size,  $d$  – frame nose size,  $C$  – center of frame,  $\square$  – symbol for boxing system,  $H$  – symbol for axis system, Rutrlé 2001)

## 3.2 Goals

- Measure frame size (FS) of the spectacle frame
- Measure patient's right and left PD
- Calculate right and left horizontal decentration
- Calculate minimal diameter of uncut right and left spectacle lens
- Define minimal diameter of uncut spectacle lens with ditest

## 3.3 Equipment

Hand PD ruler, calculator, centration chart (ditest), special pencil on demo-foil, spectacle frame with demo-foil

### 3.4 Methods

#### Measure frame size (FS) of the spectacle frame

Remove demo-foil from spectacle's eye. In plastic frame use heater for optical frames (cellulose acetate, propionate acetate) and in metal frame use screwdriver to open the spectacle eye's lock. Put the spectacle frame with face part on the paper and draw the frame eyes. Further draw rectangles on both frame eyes and draw diagonal lines in it. The point where diagonal lines are crossed is the middle point of the spectacle frame eye.

Alternatively we can measure distance from temporal part of one spectacle eye to nasal part of another spectacle eye. This distance should be equal with frame size.



Picture 3.2: Alternative measurement of frame size (FS)

#### Measure patient's right and left PD

Chose one of methods for measuring of distance PD (direct method, infinity method or digital PD meter) and measure distance right and left PD.

#### Calculate right and left horizontal decentration

Calculate horizontal decentration as difference between half of FS and right PD. Analogically do it for left eye.

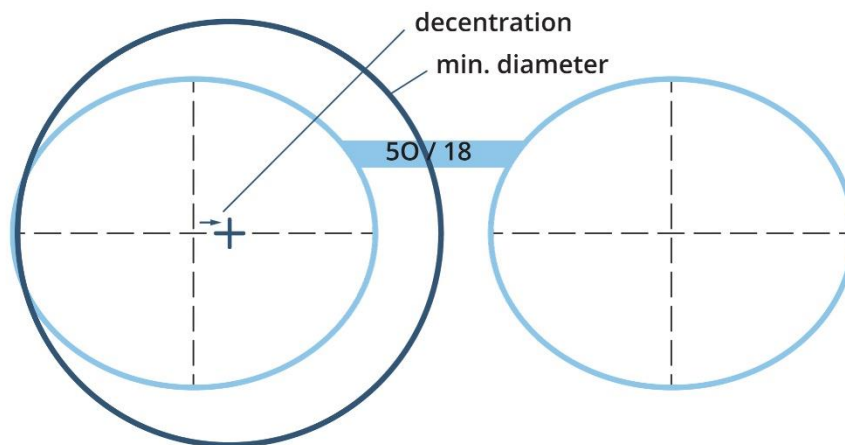
$$d_R = \frac{FS}{2} - PD_R \quad [\text{mm}] \quad (3)$$

#### Calculate minimal diameter of uncut right and left spectacle lens

$$MIN\emptyset SL_R = RS + (2 \times d_R) \quad [\text{mm}] \quad (4)$$

$MIN\emptyset SL_R$                       minimal diameter of the right spectacle lens  
RS                                      rim size (largest diameter)  
 $d_R$                                       right lens decentration

Analogically calculate minimal diameter for the left eye.



Picture 3.3: Minimal spectacle lens diameter calculation (Eyetalk 2013)

### Define minimal diameter of uncut spectacle lens with ditest

Mark pupillary position on spectacle demo-foil for both eyes. Put the spectacle frame with the face part on centration chart (ditest). Define the minimal diameter with help of centration chart.

## 3.5 Results

FS =

PD<sub>D</sub> =

PD<sub>L</sub> =

d<sub>R</sub> (right lens decentration) =

d<sub>L</sub> (left lens decentration) =

RS (rim size) =

MINØSL<sub>R</sub> (spectacle lens) =

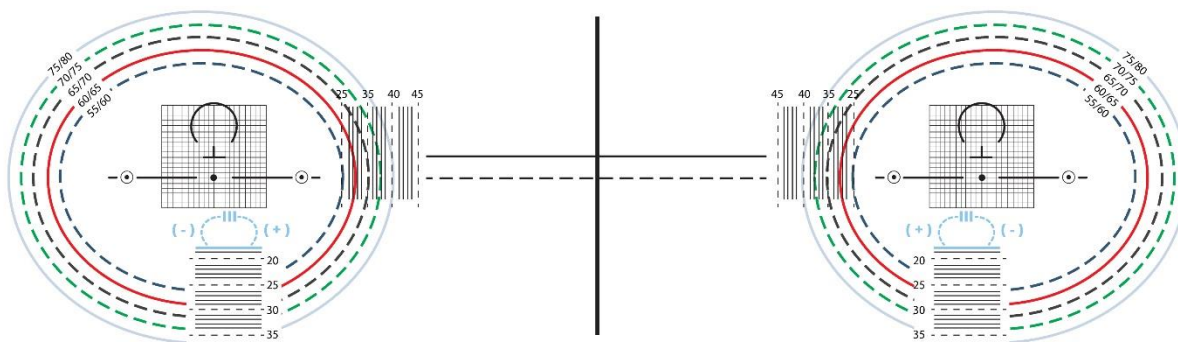
MINØSL<sub>L</sub> (spectacle lens) =

MINØSL<sub>R</sub> (with centration chart) =

MINØSL<sub>L</sub> (with centration chart) =

## 3.6 Discussion

Minimal lens diameter of uncut lens can be calculated if we measure pupillary distance and frame eye distance. Alternatively we can define it with help of centration chart called ditest.



Picture 3.4: Chart for centering of progressive lenses called ditest. We can use it also for determining of minimal lens diameter (in millimeters, Essilor 2013)

### 3.7 Conclusion, notes, comments

Does the minimal lens diameter differ if we compare calculation with graphic method?

Which method is most exact?

Which method is quicker?

Which method would you prefer in your practice?