Claims

1. A rotationally stabilized non-truncated contact lens comprising: an optic zone configured for correcting vision; a peripheral zone surrounding the optic zone and configured for providing rotational stability, wherein rotational stability is achieved optimizing at least three design factors including a non-circularity component, a thickness differential component, and a stiffness profile component.

2. The contact lens of claim 1 wherein the non-circularity component includes a first effective dimension defined by an inscribed diameter fit within the peripheral zone of the contact lens having a first center, and a second effective dimension defined by a circumscribed diameter around the peripheral zone of the contact lens having a second center where the ratio of the first effective dimension to the second effective dimension falls within a range from about 0.6 to about 0.95.

3. The contact lens of claim 1 wherein the thickness differential component having a maximum thickness and a minimum thickness, is defined by the difference between the maximum thickness and the minimum thickness.

4. The contact lens of claim 1 wherein the stiffness profile component can further reduce the thickness differential component up to about 50% without a measurable decrease in rotational stability.

5. The contact lens according to claim 2 wherein the inscribed diameter falls within a range from about 13.5 mm to about 14.5 mm.

6. The contact lens according to claim 2 wherein the circumscribed diameter falls within a range from about 14.0 mm to about 20.0 mm.

7. The contact lens according to claim 3 in which the thickness differential ranges from about 0.1 mm to about 0.4 mm.

8. The contact lens according to claim 2 wherein the ratio of the first effective dimension to the second effective dimension falls within the range from about 0.8 to about 0.95.

9. The contact lens according to claim 8 wherein the shape of the peripheral zone is asymmetric.

10. The contact lens according to claim 8 wherein the first center and second center are coincident.

11. The contact lens according to claim 8 wherein the first center and second center are non-coincident.

12. The contact lens according to claim 11 wherein the non-coincident centers lie on the same horizontal meridian.

13. The contact lens according to claim 11 wherein the non-coincident centers lie on the same vertical meridian.

14. A rotationally stabilized non-truncated contact lens comprising an optic zone configured for correcting astigmatism; a peripheral zone surrounding the optic zone and configured for providing rotational stability wherein the rotational stability is achieved by optimizing a combination of a non-circularity component of the lens, a thickness differential component of the lens, and a stiffness profile component of the lens, wherein the non-circularity component is between about 60% and about 95% of a true circle, the thickness differential component ranges from about 0.1 mm to about 0.4 mm, and the stiffness profile ranges from about 0.021 to about 0.109 MPa x mm^3.

15. The contact lens according to claim 14 wherein the stiffness profile of the lens is configured to smoothly and rapidly transitions from a first stiffness to a second stiffness immediately prior to the onset of a limbal region, wherein the second stiffness is greater than the first stiffness.

16. The contact lens according to claim 15 wherein the stiffness profile of the lens further comprises a stiffness ratio which is minimized, and wherein said stiffness ratio is defined as the sum of the stiffness profile inside the limbal region divided by the sum of the stiffness profile outside the limbal region.

17. The contact lens according to claim 16 wherein the stiffness ratio falls within the range from about 0.55 to about 0.65.

18. A method that optimizes the design of a stabilized contact lens while maximizing comfort on eye comprising the steps of: defining a matrixed set of peripheral geometries having a combination of at least three design parameters including a non-circularity component, a thickness differential component and a stiffness profile component, wherein the non-circularity component is defined as the ratio of the largest inscribed diameter divided by the smallest circumscribed diameter, wherein said ratio ranges from about 60% to about 95% from a true circle and the thickness differential component is defined as the additive thickness to the nominal thickness of the nominal thin portions of the lens wherein said thickness differential ranges from about 0.1 mm to about 0.4 mm and the stiffness profile component is defined as the effective area under the thickness profile curve less the area of the limbus multiplied by the elastic modulus of the lens material wherein said stiffness profile ranges from about 0.021 to about 0.109 MPa x mm^3, wherein the matrixed set includes a combination of at least two design parameters from the group consisting of at least two non-circularity values, a minimum of two thickness differential values, and a minimum of two stiffness profile values; calculating a time for the lens to stabilize on eye for a given set of matrixed values; creating a contour plot showing the time for the lens to stabilize for the values provided in the matrixed set; assessing the contour plot and defining a preferred region based upon at least one of three variables wherein the variables include maximizing comfort which is a function of lens thickness, minimizing time to stabilize, and minimizing manufacturing difficulty which is a function of non-circularity; selecting the peripheral geometry with at least two of the design parameters from the group consisting of a non-circularity component, a thickness differential component and a stiffness profile component

which produces a time to stabilize within the preferred region; and fabricating a contact lens having at least two of the design parameters from the group consisting a selected non-circularity component, a corresponding selected thickness differential, and a selected stiffness profile.