CLAIMS

1. A method for measuring the profile of a component in the region of an edge of the component, the method comprising the following steps:

a) determining the position of an edge point of the component;

b) defining a centre line for the component in the region of the edge; and

c) measuring at least one dimension of the component with reference to the centre line.

2. A method as in claim 1, in which in step b) the centre line is defined with an offset.

3. A method as in claim 1 or claim 2, in which step a) comprises the following steps:

aa) measuring the periphery of the component in the region of the edge;

ab) producing two co-ordinate datasets from the measurements, one dataset being produced from the measurements falling to one side of the edge and the other data being produced from the measurements falling to the other side of the edge;

ac) fitting a best-fit curve to each co-ordinate dataset;

ad) determining the intersection point of the two curves;

ae) defining this intersection point to be the edge point.

4. A method as in claim 3, in which the spacing of successive measurements depends on the local curvature of the periphery of the component.

5. A method as in claim 4, in which the spacing is smaller where the curvature is greater.

6. A method as in any of claims 3 to 5, in which step ab) includes the further steps of:

a) defining lower and upper limiting values;

b) excluding from the datasets those points outside the limiting values.

7. A method as in any preceding claim, in which step b) comprises the following steps:

ba) determining the mid-point of the component at a predetermined distance away from the edge;

bb) defining a straight line joining the edge point and the mid-point;

bc) defining the straight line to be the centre line of the component.

8. A method as in any preceding claim, in which in step c) the thickness of the component is measured along a line perpendicular to the centre line.

9. A method as in any preceding claim, in which in step c) the distances from the centre line to the respective two surfaces of the component, along a line perpendicular to the centre line, are measured and compared, to provide an indication of the symmetry of the component.

10. A method according to any preceding claim, and further comprising the following step:

d) comparing the measured dimension or dimensions with design values to determine whether the profile meets predetermined criteria of acceptability.

11. A method according to any preceding claim, and further comprising the following step:

e) in a service-worn component, determining whether sufficient material remains to re-work the component and, if not, calculating the required position and level of material deposition or repair.

12. A method according to any preceding claim, in which the component is an aerofoil or hydrofoil.

13. A method according to any preceding claim, in which the component is a compressor blade for a gas turbine engine and the profile is to be measured in the region of the leading edge of the blade.

14. A method according to any preceding claim, in which the component is an object within a computer-implemented design program.

15. A method substantially as described in this specification, with reference to and as shown in the accompanying drawings.

16. A system for measuring the profile of a component in the region of an edge of the component comprising:

means for determining the position of an edge point of the component;

means for defining a centre line for the component in the region of the edge; and

means for measuring at least one dimension of the component with reference to the centre line.

17. A system as in claim 16, in which the means for determining the position of an edge point of the component comprise:

means for measuring the periphery of the component in the region of the edge;

means for producing two co-ordinate datasets from the measurements, one dataset being produced from the measurements falling to one side of the edge and the other data being produced from the

measurements falling to the other side of the edge;

means for fitting a best-fit curve to each co-ordinate dataset;

means for determining the intersection point of the two curves;

means for defining this intersection point to be the edge point.

18. A system as in claim 17, in which each curve is selected from the list consisting of: circle, ellipse, great circle path on sphere, great circle path on ellipsoid.

19. A system as in claim 17 or claim 18, in which the means for producing two co-ordinate datasets include:

means for defining lower and upper limiting values;

means for excluding from the datasets those points outside the limiting values.

20. A system as in any of claims 16 to 19, in which the means for defining a centre line for the component in the region of the edge comprise:

means for determining the mid-point of the component at a predetermined distance away from the edge;

means for defining a straight line joining the edge point and the mid-point;

means for defining the straight line to be the centre line of the component.

21. A system according to any of claims 16 to 20, and further comprising:

means for comparing the measured dimension or dimensions with design values to determine whether the profile meets predetermined criteria of acceptability.

22. A system according to any of claims 16 to 21, and further comprising:

means for determining, in a service-worn component, whether sufficient material remains to re-work the component and, if not, for determining the required position and level of material deposition or repair.

23. A system substantially as described in this specification, with reference to and as shown in the accompanying drawings.

CLAIMS

1. A method for measuring the profile of a component in the region of an edge (20) of the component, wherein the component takes the form of a blade, vane, aerofoil, hydrofoil or similarly shaped component, the method comprising the following steps:

a) determining the position of an edge point (48) of the component, characterised by:

aa) measuring the periphery of the component in the region of the edge (20);

ab) producing two co-ordinate datasets (40,42) from the measurements, one dataset (40) being produced from the measurements falling to one side (26) of the edge and the other data (42) being produced from the measurements falling to the other side (28) of the edge;

ac) fitting a best-fit curve (44;46) to each co-ordinate dataset;

ad) determining the intersection point (48) of the two curves;

ae) defining this intersection point (48) to be the edge point;

b) defining a centre line (52) for the component in the region of the edge using the edge point ; and

c) measuring at least one dimension (56;58;62;64) of the component with reference to a given position on the centre line.

2. A method as in claim 1, in which in step b) the centre line (52) is defined with an offset.

3. A method as in claim 1 or 2, in which in step ac) each curve (44;46) is selected from the list

consisting of: circle, ellipse, great circle path on sphere, great circle path on ellipsoid.

4. A method as in any one of claims 1 to 3, in which the spacing of successive measurements depends on the local curvature of the periphery of the component.

5. A method as in claim 5, in which the spacing is smaller where the curvature is greater.

6. A method as in any of claims 1 to 5, in which step ab) includes the further steps of:

a) defining lower and upper limiting values;

b) excluding from the datasets (40;42) those points outside the limiting values.

7. A method as in any preceding claim, in which step b) comprises the following steps:

ba) determining the mid-point (50) of the component at a predetermined distance away from the edge (20);

bb) defining a straight line (52) joining the edge point (48) and the mid-point;

bc) defining the straight line to be the centre line (52) of the component.

8. A method as in any preceding claim, in which in step c) the thickness (56;58;64) of the component is measured along a line (54) perpendicular to the centre line (52).

9. A method as in any preceding claim, in which in step c) the distances (56,58) from the centre line (52) to the respective two surfaces of the component, along a line (54) perpendicular to the centre line, are measured and compared, to provide an indication of the symmetry of the component.

10. A method according to any preceding claim, and further comprising the following step:

d) comparing the measured dimension or dimensions with design values to determine whether the

profile meets predetermined criteria of acceptability.

11. A method according to any preceding claim, and further comprising the following step:

e) in a service-worn component, determining whether sufficient material remains to re-work the component and, if not, calculating the required position and level of material deposition or repair.

12. A method according to any preceding claim, in which the component is an aerofoil or hydrofoil.

13. A method according to any preceding claim, in which the component is a compressor blade for a gas turbine engine and the profile is to be measured in the region of the leading edge (12) of the blade.

14. A method according to any preceding claim, in which the component is an object within a computer-implemented design program.

15. A system for measuring the profile of a component in the region of an edge (20) of the component, wherein the component takes the form of a blade, vane, aerofoil, hydrofoil or similarly shaped component, the system comprising:

means for determining the position of an edge point (48) of the component, characterised by:

means for measuring the periphery of the component in the region of the edge (20);

means for producing two co-ordinate datasets (40,42) from the measurements, one dataset (40) being produced from the measurements falling to one side (26) of the edge and the other data (42) being produced from the measurements falling to the other side (28) of the edge;

means for fitting a best-fit curve (44;46) to each co-ordinate dataset;

means for determining the intersection point (48) of the two curves;

means for defining this intersection point to be the edge point;

means for defining a centre line (52) for the component in the region of the edge using the edge point ; and

means for measuring at least one dimension (56;58;62;64) of the component with reference to a given position on the centre line.

16. A system as in claim 15, in which each curve (44;46) is selected from the list consisting of: circle, ellipse, great circle path on sphere, great circle path on ellipsoid.

17. A system as in claim 15 or claim 16, in which the means for producing two co-ordinate datasets (40,42) include:

means for defining lower and upper limiting values;

means for excluding from the datasets those points outside the limiting values.

18. A system as in any of claims 15 to 17, in which the means for defining a centre line (52) for the component in the region of the edge (20) comprise:

means for determining the mid-point (50) of the component at a predetermined distance away from the edge;

means for defining a straight line (52) joining the edge point (48) and the mid-point;

means for defining the straight line to be the centre line (52) of the component.

19. A system according to any of claims 15 to 18, and further comprising:

means for comparing the measured dimension or dimensions (56;58;62;64) with design values to determine whether the profile meets predetermined criteria of acceptability.

20. A system according to any of claims 15 to 19, and further comprising:

means for determining, in a service-worn component, whether sufficient material remains to re-work the component and, if not, for determining the required position and level of material deposition or repair.