

WE CLAIM:

1. A vehicle wheel disk manufactured from a disk material of a flat plate, the vehicle wheel disk comprising:

a hub coupling portion, a disk flange and a hat connecting the hub coupling portion
5 and the disk flange,

the disk flange extending straight in an axial direction of the disk in a cross section taken along a radially extending plane of the disk,

the hat including a hat top protruding outwardly in the axial direction of the disk, a radially inner hat portion connecting the hat top and the hub coupling portion and a radially
10 outer hat portion connecting the hat top and the disk flange,

wherein a first thickness-reduced portion smaller in thickness than the disk material is formed at the radially outer hat portion.

2. A vehicle wheel disk according to claim 1, wherein a second thickness-reduced
15 portion smaller in thickness than the disk material is formed at the disk flange.

3. A vehicle wheel disk according to claim 1 or claim 2, wherein the disk flange includes a thick disk flange portion located at at least an inner end portion of the disk flange in the axial direction of the disk and at least a portion of the disk flange in a circumferential
20 direction of the disk.

4. A vehicle wheel disk according to any one of claims 1 - 3, wherein a vent window is formed at the radially outer hat portion, and the first thickness-reduced portion is formed at a portion of the radially outer hat
25 portion spaced outwardly from the vent window in a radial direction of the disk.

5. A vehicle wheel disk according to any one of claims 2 - 4, wherein the second thickness-reduced portion is provided at an entirety of the disk flange in the axial direction of the disk.

6. A manufacturing method of a vehicle wheel disk for manufacturing a wheel disk

for a vehicle from a disk material,

wherein the wheel disk comprises:

a hat including a hat top, a radially outer hat portion and a radially inner hat portion;

a disk flange;

5 a first disk position (D1) located outer than the hat top in a radial direction of the disk and inner than the disk flange in the radial direction of the disk;

a second disk position (D2) located at a boundary between the radially outer hat portion and the disk flange;

10 a third disk position (D3) located at an inner end of the disk flange in an axial direction of the disk; and

a fourth disk position (D4) located inner than the second disk position (D2) in the axial direction of the disk and outer than the third disk position (D3) in the axial direction of the disk,

15 the disk flange extending straight in the axial direction of the disk in a cross section taken along a radially extending plane of the disk,

wherein the disk material includes:

a first material position (M1) corresponding to the first disk position (D1);

a second material position (M2) corresponding to the second disk position (D2);

a third material position (M3) corresponding to the third disk position (D3); and

20 a fourth material position (M4) corresponding to the fourth disk position (D4),

the method comprising:

a first step for ironing a portion or an entirety of a disk material portion from M1 to M2 to a cylindrical portion having a thickness smaller than a thickness of the disk material portion before ironing; and

25 a second step for changing a diameter of at least one of a disk material portion between M2 and M3 and a disk material portion at M1 so that the disk material portion between M2 and M3 becomes larger in diameter than the disk material portion at M1.

7. A manufacturing method of a vehicle wheel disk according to claim 6, wherein
30 at the second step, both the disk material portion between M2 and M3 and the disk material portion between M1 and M2 are enlarged in diameter.

8. A manufacturing method of a vehicle wheel disk according to claim 6 or claim 7, wherein at the first step, a disk material portion from M2 to M4 or from M2 to M3 is also ironed.

9. A manufacturing method of a vehicle wheel disk according to claim 8, wherein at the first step, at least a disk material portion between M3 and M4 is formed to a thick portion larger in thickness than a disk material portion adjacent to the thick portion or a first thickness-reduced portion which is formed at the radially outer hat portion and is smaller in thickness than the disk material.

10. A manufacturing method of a vehicle wheel disk according to any one of claims 6 - 9, further comprising a third step conducted after the second step, for forming the disk material portion between M2 and M3 to a final disk flange configuration.

11. A manufacturing method of a vehicle wheel disk according to claim 10, wherein at the third step, at least a portion of the disk material portion from M2 to M4 or from M2 to M3 is ironed.

12. A manufacturing method of a vehicle wheel disk according to any one of claims 6 - 11, wherein
the wheel disk includes a hub coupling portion, and
the disk material includes a hub coupling portion-corresponding portion and a hat corresponding portion, the hat corresponding portion including a hat top corresponding portion, a radially outer hat portion-corresponding portion and a radially inner hat portion-corresponding portion,

the manufacturing method of a vehicle further comprising a step conducted before the first step, for pre-forming the hub coupling portion-corresponding portion, the radially inner hat portion-corresponding portion and the hat top corresponding portion of the disk material.

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