BLEED RESISTANT, OIL-EXTENDED OLEFIN BLOCK COPOLYMER COMPOSITION WITH SURFACE-ACTIVE AGENT

BACKGROUND

[0001] Olefin block copolymers (OBC) are useful for producing soft compounds such as soft touch articles. The block architecture of the OBC results in good tensile strength, compression set and temperature resistance. To make soft touch compositions (*i.e.*, compositions with a low durometer value and/or a low Shore A hardness value), OBC is mixed with an oil. As the amount of oil is increased, so too increases the likelihood of oil-bleed. Oil-bleed is problematic because it produces undesirable haptics in articles fabricated from these compounds.

[0002] A need therefore exists for a soft, oil-extended OBC composition with reduced oil-bleed.

SUMMARY

[0003] The present disclosure is directed to oil-extended OBC compositions with reduced, or no, oil-bleed. The present compositions contain a surface-active agent that is an oil-bleed inhibitor. The presence of the surface-active agent maintains the softness of the composition, and simultaneously reduces, or eliminates, oil-bleed.

[0004] The present disclosure provides a composition. In an embodiment, the composition is an oil-extended olefin block copolymer composition and includes an olefin block copolymer, an oil, and a surface-active agent.

[0004a] In a first aspect, there is provided an oil-extended olefin block copolymer composition comprising: an olefin block copolymer that is an ethylene/α-olefin multi-block copolymer; from 30 wt% to 70 wt% of an oil; and a surface-active agent comprising a functional group, the surface-active agent selected from the group consisting of a fluorosurfactant and a polysiloxane surfactant.

[0005] The present disclosure provides another composition. In an embodiment, the composition is an oil-extended olefin block copolymer composition and includes an olefin block copolymer, an olefin-based polymer, an oil, and a surface-active agent.

[0005a] In a second aspect, there is provided an oil-extended olefin block copolymer composition comprising: an olefin block copolymer that is an ethylene/α-olefin multi-block copolymer; from 70 phr to 250 phr of an oil; from 0.05 phr to 5 phr of a surface-active agent comprising a functional group, the surface-active agent selected from the group consisting of a fluorosurfactant and a polysiloxane surfactant; and the composition has a Shore A hardness from 5 to 50 and a normalized oil-bleed index of less than or equal to 30 after three

weeks at 23°C calculated according to the following equation: Normalized Oil-Bleed index = 100• (%grey scale sample - %grey scale control)(100 - %grey scale control).

[0005b] In a third aspect, there is provided an oil-extended olefin block copolymer composition comprising: an olefin block copolymer that is an ethylene/α-olefin multi-block copolymer; an olefin-based polymer; an oil; and a surface-active agent comprising a functional group, the surface-active agent selected from the group consisting of a fluorosurfactant and a polysiloxane surfactant.

[0006] An advantage of the present disclosure is the provision of a soft, oil-extended OBC composition with reduced, or no, oil-bleed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Figure 1 shows examples of various grey scales used for the normalized oil-bleed index in accordance with an embodiment of the present disclosure.

DETAILED DESCRIPTION

The present disclosure provides an oil-extended olefin block copolymer (OBC) composition. An "oil-extended OBC composition," as used herein, is an OBC composition that contains an (i) OBC and (ii) at least 25 wt % oil, based on the total weight of the composition. In

CLAIMS

What is claimed is:

1. An oil-extended olefin block copolymer composition comprising:

an olefin block copolymer that is an ethylene/α-olefin multi-block copolymer;

from 30 wt% to 70 wt% of an oil; and

a surface-active agent comprising a functional group, the surface-active agent selected from the group consisting of a fluorosurfactant and a polysiloxane surfactant.

2. The composition of claim 1 wherein the olefin block copolymer has a density from 0.85 g/cc to 0.88 g/cc.

3. The composition of any of claims 1-2 comprising from about 30 wt % to 70 wt % olefin block copolymer, from 30 wt % to 70 wt % oil, and from 0.01 wt % to 2.0 wt % surface-active agent.

4. The composition of any of claims 1-3 wherein the surface-active agent is a fluorosurfactant.

5. The composition of any of claims 1-3 wherein the surface-active agent is a polysiloxane surfactant.

6. The composition of any of claims 1-5 having a Shore A hardness from 5 to 50.

7. The composition of any of claims 1-6 having a normalized oil-bleed index of less than 30 after 1 week at 23°C calculated according to the following equation: Normalized Oil-Bleed index = 100* (%grey scale sample - %grey scale control)(100 - %grey scale control) .

8. The composition of any of claims 1-7 having a normalized oil-bleed index (NOBI) of less than 30 after 3 weeks at 23°C calculated according to the following equation: Normalized Oil-Bleed index = 100* (%grey scale sample - %grey scale control)(100 - %grey scale control).

9. An oil-extended olefin block copolymer composition comprising:

an olefin block copolymer that is an ethylene/α-olefin multi-block copolymer;

from 70 phr to 250 phr of an oil;

from 0.05 phr to 5 phr of a surface-active agent comprising a functional group, the surface-active agent selected from the group consisting of a fluorosurfactant and a polysiloxane surfactant; and

the composition has a Shore A hardness from 5 to 50 and a normalized oil-bleed index of less than or equal to 30 after three weeks at 23°C calculated according to the following equation: Normalized Oil-Bleed index = 100• (%grey scale sample - %grey scale control)(100 - %grey scale control).

10. The composition of claim 9 comprising 150 phr oil.

11. The composition of any of claims 9-10 comprising from 0.5 phr to 5 phr surface-active agent.

12. An oil-extended olefin block copolymer composition comprising:

an olefin block copolymer that is an ethylene/α-olefin multi-block copolymer;

an olefin-based polymer;

an oil; and

a surface-active agent comprising a functional group, the surface-active agent selected from the group consisting of a fluorosurfactant and a polysiloxane surfactant.

13. The composition of claim 12 wherein the olefin-based polymer is a propylene homopolymer.

14. The composition of any of claims 12-13 comprising from 10 wt % to 40 wt % olefin block copolymer;

from 5 wt % to 25 wt % propylene homopolymer;

from 15 wt % to 60 wt % oil; and

from 0.01 wt % to 2.0 wt % surface-active agent.

15. The composition of claim 12 wherein the olefin-based polymer is a high density ethylene-based polymer.