The present invention relates to an iron based brazing material comprising an alloy consisting essentially of: 15 to 30 wt% chromium (Cr); 0 to 5.0 wt% manganese (Mn); 15 to 30 wt% nickel (Ni); 1.0 to 12 wt% molybdenum (Mo); 0 to 4.0 wt% copper (Cu); 0 to 1.0 wt% nitrogen (N); 0 to 20 wt% silicon (Si); 0 to 2.0 wt% boron (B); 0 to 16 wt% phosphorus (P); optionally 0.0 to 2.5 wt% of each of one or more of elements selected from the group consisting of carbon (C), vanadium (V), titanium (Ti), tungsten (W), aluminium (Al), niobium (Nb), hafnium (Hf), and tantalum (Ta); the alloy being balanced with Fe, and small inevitable amounts of contaminating elements; and wherein Si, B and P are in amounts effective to lower melting temperature, and Si, B, and P are contained in amounts according to the following formula: Index = wt% P + 1.1 x wt% Si + 3 x wt% B, and the value of the Index is within the range of from about 5 wt% to about 20. The present invention relates also to a method of brazing article of stainless steel, and an article of stainless steel.
1. An iron based brazing material comprising an alloy consisting essentially of:

   (i) 15 to 30 wt% chromium (Cr);
   (ii) 0 to 5.0 wt% manganese (Mn);
   (iii) 15 to 30 wt% nickel (Ni);
   (iv) 1.0 to 12 wt% molybdenum (Mo);
   (v) 0.1 to 4.0 wt% copper (Cu);
   (vi) 0 to 1.0 wt% nitrogen (N);
   (vii) 0 to 20 wt% silicone (Si);
   (viii) 0 to 2.0 wt% boron (B);
   (ix) 0 to 16 wt% phosphorus (P);

   optionally one or more of elements selected from the group consisting of carbon (C), vanadium (V), titanium (Ti), tungsten (W), aluminium (Al), niobium (Nb), hafnium (Hf), and tantalum (Ta), wherein the amount of each element is within the range from about 0.0 to about 2.5 wt%; the alloy being balanced with Fe, and small inevitable amounts of contaminating elements; and wherein Si, B and P are in amounts effective to lower melting temperature, and Si, B, and P are contained in amounts according to the following formula: Index = wt% P + 1.1 x wt% Si + 3 x wt% B, and the value of the Index is within the range of from about 5 wt% to about 20 wt%.

2. The brazing material according to claim 1, wherein the contaminating elements are any one of carbon (C), oxygen (O), and sulphur (S).

3. The brazing material according to claim 1 or 2, wherein chromium is within the range from about 18 to about 26 wt% or nickel is within the
range of from about 16 to about 26 wt% or molybdenum is within the
range from about 2.0 to about 12.0 wt%, or combinations thereof.

4. The brazing material according to claim 1, 2 or 3, wherein silicone is
within the range from about 8.0 to about 12 wt% or boron is within the
range from about 0.1 to about 1.0 wt% or phosphorus within the range
from about 5.0 to about 14 wt%, or combinations thereof.

5. The brazing material according to any one of the preceding claims,
wherein silicone is within the range of from about 8.0 to about 12 wt%
and boron is within the range of from about 0.1 to about 1.5 wt%.

6. The brazing material according to any one of the preceding claims,
wherein silicone is within the range of from about 2.5 to about 9.0 wt%
and phosphorous is within the range of from about 2.5 to about 9.0 wt%.

7. The brazing material according to any one of the preceding claims,
wherein the alloy contain an amount of chromium (Cr), an amount of
nickel (Ni), and an amount of molybdenum (Mo), which being defined by
the formula (wt% Cr + wt% Ni + wt% Mo) ≥ 33 wt%.

8. The brazing material according to any one of the preceding claims,
wherein the alloy is produced by gas-atomising or water-atomising or
melt-spinning.

9. An iron-based brazing material comprising an alloy containing three or
more elements of the group consisting of iron (Fe), chromium (Cr), nickel
(Ni), copper (Cu) and molybdenum (Mo), and the alloy also contains one
or more melting point decreasing elements selected from the group
consisting of silicon (Si), boron (B), and phosphorus (P), wherein the alloy
contains an amount of chromium (Cr), an amount of nickel (Ni), and an amount of molybdenum (Mo), which being defined by the formula (wt% Cr + wt% Ni + wt% Mo) \geq 33 \text{ wt\%}, and the melting point decreasing elements in amounts defined by the formula Index = wt\% P + 1.1 \times \text{ wt\% Si} + 3 \times \text{ wt\% B}, wherein the value of the Index is within the range of from about 5 wt\% to about 20 wt\%, with the proviso that Cu being present.

10. A method of brazing articles of stainless steel, comprising the following steps:

(i) applying the brazing material according to claims 1 to 9 to parts of stainless steel;

(ii) optionally assembling the parts;

(iii) heating the parts from step (i) or step (ii) in a non-oxidizing atmosphere, a in reducing atmosphere, in vacuum or combinations thereof, up to a temperature of at least 900\(^\circ\)C, and brazing the parts at the temperature of at least 1070\(^\circ\)C for at least 15 minutes;

(iv) and optionally repeating one or more of step (i), step (ii) and step (iii).

11. The method of brazing according to claim 10, wherein the parts in step (iii) are preheated to a temperature below 1120\(^\circ\)C before brazing at a temperature within the range from 1150\(^\circ\)C to 1250\(^\circ\)C for at least 30 minutes.

12. The method of brazing according to claim 10, wherein the parts in step (iii) are preheated to a temperature below 1040\(^\circ\)C before brazing at a temperature within the range from 1050\(^\circ\)C to 1150\(^\circ\)C for at least 15 minutes.
13. A brazed article obtained by the method according any one of claims 10 to 12.

14. The brazed article according to claim 13, wherein the article is plate heat exchanger.

15. A paste comprising the iron-based brazing material according to any one of claims 1 to 9 and an aqueous binder system or an organic binder system, water-based, oil-based or combinations thereof, wherein the oil-based binder could be polymers such as poly (met) acrylate, biopolymers such as cellulose derivatives, starches, waxes, or combinations thereof.