CLAIMS

1. A system (10) for in-line treatment of thread (20) for use with a thread consuming unit (15), comprising:

a treatment unit (100) comprising at least one discharge device (150) comprising at least two nozzles (152a-f), arranged along the at least one thread (20), being configured to dispense one or more coating substances onto the at least one thread (20) when activated;

a light detection system (60) for illuminating the at least one thread (20) in order to receive light which is reflected from the at least one thread (20) when said at least one thread (20) is illuminated; and

a control unit (190) configured to:

receive data from the light detection system (60), and determine the position of the thread (20) in relation to the at least one discharge device (150) and/or at least one of the nozzles (152a-f) based on the received data.

2. The system (10) according to claim 1, wherein light detection system (60) is arranged on a downstream side of the discharge device (150) along the travel direction of the at least one thread (20).

3. The system (10) according to claim 1 or 2, wherein the light detection system comprises at least one light source (62) and at least one sensor (64).

4. The system (10) according to any one of claims 1 to 3, wherein the control unit (190) is further configured to:

control and/or evaluate the operation of the treatment unit (100) based on said received data.

5. The system (10) according to claim 4, wherein the operation of the treatment unit (100) is controlled by adjusting the position of at least one of the nozzles (152a-f).

6. The system according to any one of claim 1 to 5, wherein the system (10) is configured to be arranged in a first position and a second position, wherein the control unit (190) is configured to determine if the system is in the first position or in the second position based on the input from the light detection system (60).

7. The system (10) according to claim 6, wherein the system (10) is configured to be arranged in a first position and a second position by arranging at least one of the nozzles (152a-f) and/or the thread (20) in a first position or in a second position.

8. The system (10) according to claims 6 or 7, wherein in the first position at least one of the nozzles (152a-f) and the at least one thread (20) are aligned, and wherein in the second position the at least one of the nozzles (152a-f) and the at least one thread (20) are unaligned.

9. The system (10) according to any one of claims 6 to 8, wherein the at least one of the nozzles (152a-f) is movable relative the at least one thread (20) between the first and the second position.

10. The system (10) according to any one of claims 6 to 9, wherein if the control unit (190) has determined that the system is in the first position, the control unit (190) is further configured to:

determine the nozzle position of at least one of the nozzles (152a-f) at the time when the treatment unit (100) is dispensing one or more coating substances onto the at least one thread (20), and

store said nozzle position.

11. The system (10) according to any one of claims 6 to 9, wherein if the control unit (190) has determined that the system is in the second position, the control unit (190) is further configured to:

determine that a nozzle (152a-f) of the treatment unit (100) is no longer dispensing one or more coating substances onto the at least one thread (20),

determine the position of that nozzle (152a-f) at that time, and

store said nozzle position.

12. The system (10) according to claim 10 and 11, wherein the control unit (190) is further configured to:

determine a centre point of the at least one thread (20) by calculating the average of the stored nozzle positions, and

alter the position of at least one of the nozzles (152a-f) based on the centre point value.

13. The system (10) according to claim 10 and 11 or 12, wherein the control unit (190) is further configured to:

determine the angle of the at least two nozzles (152a-f) in relation to the at least one thread (20) based on the stored nozzle positions,

alter the position of the at least two nozzles (152a-f) based on the angle.

14. The system (10) according to any one of claims 6-13, wherein the control unit (190) is further configured to:

determine at least one property of the one or more coating substances dispensed onto the at least one thread (20) based on the input from the light detection system (60).

15. The system (10) according to claim 14, wherein the control unit (190) is further configured to:

compare said at least one determined property against at least one predetermined property, and

generate an alarm signal if said at least one determined property and the at least one predetermined property does not match within a tolerance limit.

16. The system (10) according to claim 3, wherein the sensor (64) is an optical sensor.

17. The system (10) according to claim 16, wherein the optical sensor (64) is one of a monochrome sensor, a colour sensor or a spectrophotometer.

18. The system (10) according to any of the preceding claims, wherein the nozzles (152a-f) are inkjet nozzles.

19. The system (10) according to any of the preceding claims, wherein the coating substance is a colouring substance.

20. The system (10) according to any of the preceding claims, further comprising a thread consuming unit (15).

21. The system (10) according to claim 20, wherein the thread consuming unit (15) is an embroidery machine, a sewing machine, a knitting machine, a weaving machine, a tufting machine, a thread winding machine, and or any combination thereof.

22. A method for providing in-line treatment of at least one thread (20), comprising:

providing a treatment unit (100) comprising at least one discharge device (150) comprising at least two nozzles (152a-f), arranged at different positions relative the at least one thread (20), said at least one thread (20) being in motion in use, each nozzle being configured to dispense one or more coating substances onto the at least one thread when activated;

providing a light detection system (60) for illuminating the at least one thread (20) in order to receive light which is reflected from the at least one thread (20) when said at least one thread (20) is illuminated, and

providing a control unit (190) configured to receive data from the light detection system (60), and determine the position of the thread (20) in relation to the at least one discharge device (150) and/or at least one of the nozzles (152a-f) based on the received data.

23. The method according to claim 22, wherein the system is configured to be arranged in a first position and in a second position, wherein in the first position at least one of the plurality of nozzles (152a-f) and the at least one thread are aligned, and wherein in the second position at least one of the plurality of nozzles (152a-f) and the at least one thread are unaligned, wherein the method further comprises:

determining if the system is in the first position or in the second position based on the input from the light detection system (60).

24. The method according to claim 23, wherein the method further comprises:

determining the nozzle position of at least one of the nozzles (152a-f) at the time when the treatment unit (100) is dispensing one or more coating substances onto the at least one thread (20), and

determining the nozzle position of at least one of the nozzles (152a-f) at the time when the treatment unit (100) is no longer dispensing one or more coating substances onto the at least one thread (20).