CLAIMS

1. Manufacturing plant (1) for high-pressure ethylene polymerization comprising a layered tubular reactor (100),

the layered tubular reactor (100) comprising interconnected first tubings (7, 7', 9, 9', 11, 11', 107) for conveying a high-pressure reaction mixture, wherein the first tubings are straight first tubes (7, 7') or first bends (9, 9', 11, 11'), wherein the interconnected first tubings form at least one meandering first pipeline (5, 5', 105) and at least one first pressure relief valve (13, 113) is connected to said first pipeline (5, 5', 105),

the layered tubular reactor (100) further comprising interconnected second tubings (207) for conveying a high-pressure reaction mixture, wherein the second tubings are straight second tubes or second bends, wherein the interconnected second tubings form at least one meandering second pipeline (205) and at least one second pressure relief (213) valve is connected to said second pipeline (205),

wherein the at least one first pipeline (5, 5', 105) is arranged in a vertical first layer (3, 103) and the at least one second pipeline (205) is arranged in a vertical second layer (203), and

wherein the first layer (3, 103) is spatially separated from the second layer (203).

2. Manufacturing plant (1) according to claim 1, wherein the manufacturing plant (1) has a flooring (35, 135) and the first pressure relief valve (13, 113) is attached to a first support structure (19) which is fastened to the flooring (35, 135) and/or wherein the second pressure relief valve is attached to a second support structure which is fastened to the flooring (35, 135).

3. Manufacturing plant (1) according to claim 2, wherein the first and second support structures comprise or are concrete slabs and/or metal plates anchored to said flooring.

4. Manufacturing plant (1) according to any of the preceding claims, wherein at least some of the first bends connect straight first tubes arranged at different distances from the flooring (35, 135) and/or wherein at least some of the second bends connect straight second tubes arranged at different distances from the flooring (35, 135).

5. Manufacturing plant (1) according to any of the preceding claims, wherein the first tubings (7, 7', 9, 9', 11, 11', 107) have a first average tube inside diameter and the first bends (9, 9', 11, 11') are shaped in a semicircle having a first centerline radius, wherein the first centerline radius is not more than the tenfold of the first average tube inside diameter and/or

the second tubings (207) have a second average tube inside diameter and the second bends are shaped in a semicircle having a second centerline radius, wherein the second centerline radius is not more than the tenfold of the second average tube inside diameter.

6. Manufacturing plant (1) according to any of the preceding claims, wherein a transit pipe for conveying a high-pressure reaction mixture connects the first layer with the second layer and the first layer and the second layer are arranged side by side and/or next to each other.

7. Manufacturing plant (1) according to any of the preceding claims, wherein the first tubings (7, 7', 9, 9', 11, 11', 107) intersect a first plane along their cavities for conveying a reaction mixture and/or the second tubings intersect a second plane along their tube cavities for conveying a reaction mixture.

8. Manufacturing plant (1) according to any of the preceding claims, wherein the one or more first pipelines (5, 5', 105) are connected to a first scaffold (117) anchored to the flooring (35, 135) and the one or more second pipelines are connected to the first scaffold (117) or to a second scaffold anchored to the flooring (35, 135),

wherein the first pressure relief valve (13, 113) and the second pressure relief valve (213) are spaced apart from said first scaffold (117) and/or second scaffold.

9. Manufacturing plant (1) according to any of the preceding claims, wherein the first pressure relief valve (13, 113) and the second pressure relief valve (213) are connected to a pressure-relief compartment (23, 123) comprising a cooling agent and a vent (25, 125).

10. Manufacturing plant (1) according to any of the preceding claims, wherein the manufacturing plant further comprises interconnected third tubings for conveying a high-pressure reaction mixture and the interconnected third tubings form at least one meandering third pipeline (305), and wherein the manufacturing plant also comprises interconnected fourth tubings for conveying a high-pressure reaction mixture and the interconnected fourth tubings form at least one meandering fourth pipeline (405),

wherein the at least one third pipeline (305) is arranged in a third vertical layer (303) and the at least one fourth pipeline (405) is arranged in a fourth vertical layer (403),

wherein the third layer (303) is spaced at a distance from the first, second and fourth layer (103, 203, 403), and the fourth layer (403) is spaced at a distance from the first, second and third layer (103, 203, 303).

11. Manufacturing plant (1) according to any of the preceding claims, wherein the first layer (3,103) has an upper end (41) pointing away from the flooring (35, 135) as well as a lower end (43) pointing towards the flooring (35, 135) and a stationary first side end (45) and an adaptive second side end (47), wherein the stationary first side end (45) is closer to the first pressure relief valve (13, 113) than the adaptive second side end (47) and/or one first tubing located at the stationary first side end (45) is connected to the first pressure relief valve (13, 113),

wherein the adaptive second side end (47) is mounted in such a way that it can expand and/or stretch away from the stationary first side end (45) when the temperature increases.

12. Manufacturing plant (1) according to any of the preceding claims, further comprising a pre-heater having interconnected pre-heating tubings for conveying a high-pressure reaction gas composition, wherein the pre-heating tubings are straight pre-heating tubes or pre-heating bends, wherein the interconnected pre-heating tubings form a pre-heating pipeline (605) and at least one pre-heating pressure relief valve (613) is connected to said pre-heating pipeline (603),

wherein the pre-heating pipeline (605) is arranged in a vertical pre-heating layer (603) comprising a pre-heating zone,

wherein the pre-heating pressure relief valve (613) is attached to a pre-heating support structure that is fastened to the flooring (35, 135).

13. Manufacturing plant (1) according to any of the preceding claims, wherein the first layer (103) comprises pipelines of at least one first reaction zone and the second layer (203) comprises pipelines of at least one second reaction zone.

14. Method for carrying out an emergency shutdown in a manufacturing plant (1) according to any of the preceding claims, comprising the steps of

I) polymerizing ethylene or copolymerizing ethylene and one or more comonomers at a temperature of 100°C to 350°C and a pressure of 110 MPa to 500 MPa,

II) stopping the feeding of the reaction gas composition into the first pipeline,

III) reducing the pressure within the one or more first pipelines and the one or more second pipelines using the first pressure relief valve (13, 113) and the second pressure

relief valve (213), wherein the first pressure relief valve (13, 113) and the second pressure relief valve (213) release a reaction mixture comprising ethylene into a pressure-relief compartment (123) having a cooling agent.

15. A process for preparing an ethylene polymer in a manufacturing plant according to any of the claims 1 to 13 comprising polymerizing ethylene or copolymerizing ethylene and one or more comonomers at a temperature of 100°C to 350°C and a pressure of 110 MPa to 500 MPa.