

CLAIMS

1. A manufacturing cell for the automated manufacture of pipe reinforcement components from raw material plates, the cell comprising:
 - a. an input storage for the raw material plates;
 - b. one or more ovens for heating the raw material plates;
 - c. one or more extrusion presses for extruding the heated raw material plates into one or more pipe reinforcement components;
 - d. an output storage for the pipe reinforcement components; and
 - e. a robotic device adapted to automatically access and perform operations at the input storage, at the one or more ovens, at the one or more extrusion presses, and at the output storage.
2. The manufacturing cell of claim 1, further comprising a control room having one or more computer processors for transmitting instructions for the automated manufacturing of the pipe reinforcement components and receiving information from the robotic device.
3. The manufacturing cell of claim 1, wherein said robotic device further comprises at least one optical recognition device for determining the identify, size, and shape of a raw material plate.
4. The manufacturing cell of claim 1 further comprising at least one of a cooling station, a shot blast station, a CNC machining station, an automated welding station, and an automated painting station.
5. Any of the manufacturing cells of claims 1 to 5, wherein the pipe reinforcement components are split tee components, spherical tee components, or full encirclement saddle components.
6. An automated method for manufacturing pipe reinforcement components, the method comprising the steps of:
 - a. retrieving a raw material plate;

- b. moving the raw material plate to an oven and inserting the raw material plate into the oven for heating;
 - c. retrieving the heated raw material plate from the oven after heating;
 - d. moving the heated raw material plate to an extrusion press;
 - e. extruding the heated raw material plate to form one or more pipe reinforcement components; and
 - f. retrieving the extruded pipe reinforcement components;
- wherein steps a. through f. are performed by a robotic device.
7. The automated method of claim 6, further comprising the step of determining the identity, size, and shape of a raw material plate using one or more optical recognition devices on the robotic device.
8. The automated method of claim 6, further comprising the steps of:
- g. shot blasting the one or more pipe reinforcement components;
 - h. machining one or more pipe reinforcement components using a CNC machining station;
 - i. welding a flange on the pipe reinforcement component if it has a branch; and
 - j. painting one or more pipe reinforcement components.
9. The automated method of claim 6, wherein the oven is an induction oven.
10. The automated method of claim 9, wherein the combination of said induction oven and the robotic device decreases the time needed to manufacture the split tee, spherical tee and/or FES components by 75% compared to methods that do not use the induction oven and the robotic device.
11. Any of the automated methods of claims 6 to 9, wherein the pipe reinforcement components are split tee components, spherical tee components, or full encirclement saddle components.

12. A pipe reinforcement component made from a process comprising the steps of:
- a. retrieving a raw material plate;
 - b. moving the raw material plate to an oven and inserting the raw material plate into the oven for heating;
 - c. retrieving the heated raw material plate from the oven after heating;
 - d. moving the heated raw material plate to an extrusion press;
 - e. extruding the heated raw material plate to form one or more pipe reinforcement component; and
 - f. retrieving the extruded pipe reinforcement component and placing it on a storage station,
- wherein at least one of the steps a. through f. are performed by a robotic device.
13. The pipe reinforcement component made from the process of claim 12, further comprising the steps of:
- g. shot blasting the one or more pipe reinforcement components;
 - h. machining one or more pipe reinforcement components using a CNC machining station;
 - i. welding a flange on the pipe reinforcement component if it has a branch; and,
 - j. painting one or more pipe reinforcement components.
14. The pipe reinforcement components made from the process of claim 12, wherein the measurement precision of the pipe reinforcement components is 90% greater than the measurement precision of a pipe reinforcement components not made using a robotic device.
15. The pipe reinforcement components made from the process of claim 12, wherein the oven is an induction oven.
16. A pipe reinforcement component made from any of the processes in claims 12 to 15, wherein split tee components, spherical tee components, or full encirclement saddle components.