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PULTRUSION PIPE STORAGE CONCEPT - UPDATING THE BASIC IDEA - PROCESS SEQUENCE

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Technical task:
The present invention describes a process sequence for the manufacture of a pressure tank for the storage of fuel in a motor vehicle by means of a pultrusion tube storage concept in order to shorten the cycle times and save assembly steps.

Initial situation:
For the production of a pressure tank for the storage of fuel in a motor vehicle, tubular or hose-like semi-finished products are provided. A fibre coating is applied to this semi-finished product by means of a pultrusion process, preferably without deformation of the semi-finished product. This produces a multi-layered, cylindrical, in particular circular-cylindrical, hollow body which has open end faces which must be subsequently closed with end pieces.

Solution:
In the manufacture of the pultrusion tube storage tank, the pultrusion profile is first pressed off. This pipe profile is dimensionally stable, but has not yet finally hardened, so that later deformation under the influence of heat is still possible. The final curing of the pultrusion profile takes place only at the very end when the double-layer pipe store is closed with the end pieces. (see figure 1)
In this process, the PA liner and the thin-walled CFRP profile, which has not yet finally cured and is therefore thermoplastic, are produced continuously and independently of each other. Then the CFRP profile is pushed over the PA liner and sealed with the end pieces. The outer pultrusion profile is not finally cured until the pipe liner is assembled with the end pieces, including closures and valves. As a result, it is positively connected with the other individual parts. The end pieces, which form the tank closure, consist of, for example, metal turned parts. The precisely fitting form closure during final curing, especially when squeezing the pipe cross-section, results in a ZSB formation. The pipe storage tank can be stored compactly in a module directly connected to the car body. (see Figure 2)
This process sequence enables shorter cycle times to be achieved in the manufacture of the tubular accumulators.

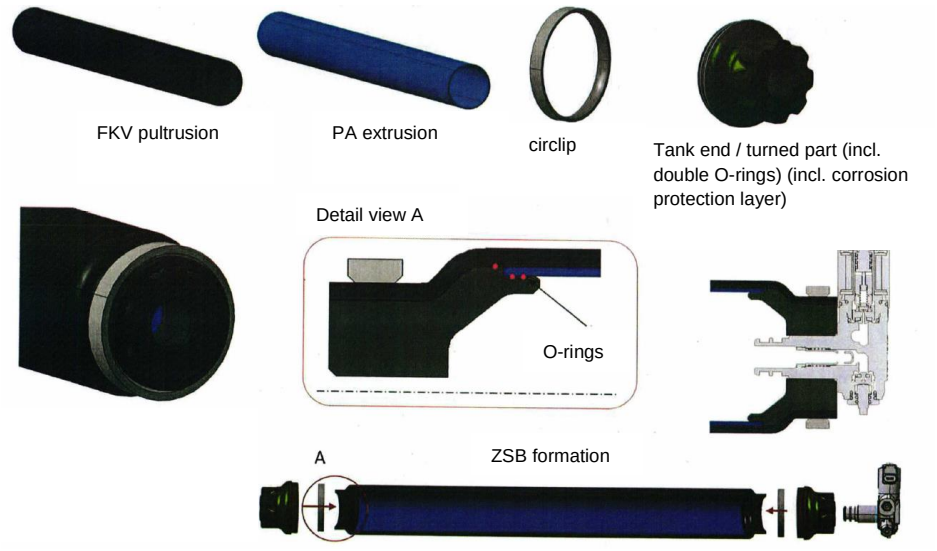

Figure 1

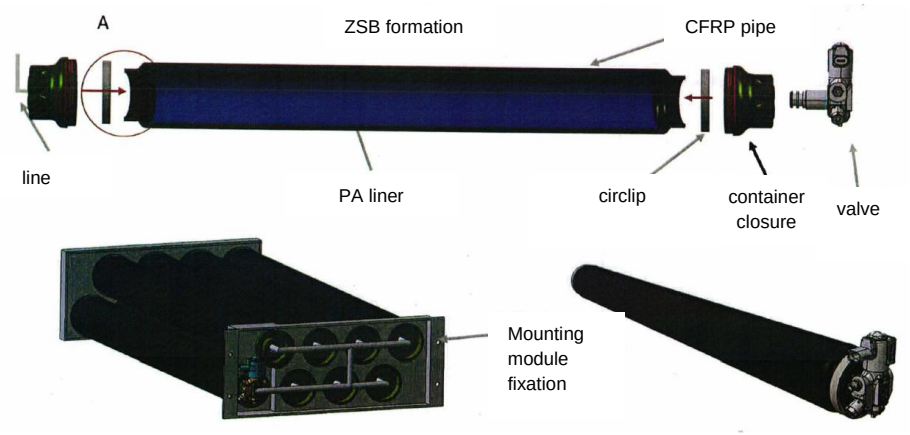

Figure 2

Process sequence:

1. production CFRP profile via pultrusion dimensionally stable but not cured	single part (ET)
2. production of PA liner via extrusion separate	ET
3. Production of end piece via milling/cold press/casting separately	ET
4. production of circlip separate	ET
5. mounting the O-rings on the end piece (left + right)	U-ZSB 1
6. U-ZSB 1 (left + right) is then assembled with the liner	U-ZSB 2
7. U-ZSB 2 is then pushed into the CFK profile	U-ZSB 3
8. U-ZSB 3 is put under pressure, heated and brought into the mould and finally cured	U-ZSB 4
9. U-ZSB 4 is then fitted with a circlip on the left and right side	ZSB
10.ZSB is fitted with valves or connecting lines as required	Sub-assembly

Advantages:

- Liner and CFK profile are manufactured independently of each other
- Final curing of the CFRP profile after assembly of the pipe storage tank including the end pieces and, if necessary, the valves
- Shorter cycle times
- Fewer assembly steps