

Messrs. _____

Manufacturing with unprecedented idea

The brief guide to Hydroforming machine with Hammering impact



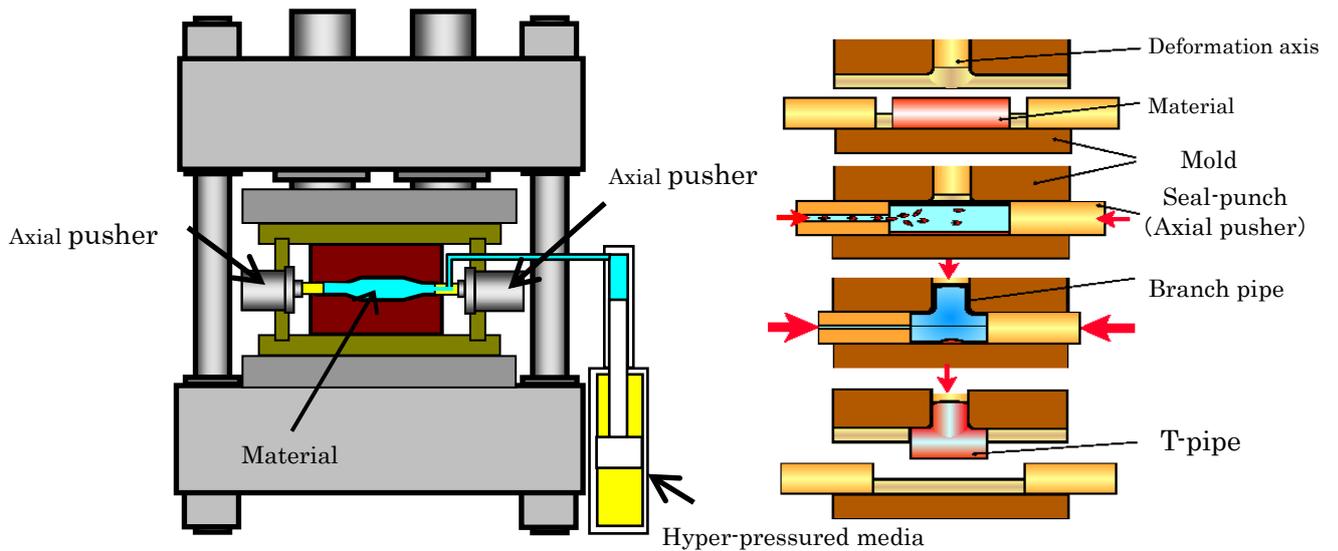
Hydroformed transition vs. pressure given in seconds

Opton Co.,Ltd.

Ver. 2

About hydroforming tube forming ?

Hydroforming is one of the tube-forming processes where a tube material fixed inside the mold is filled liquid and super-pressure is given from both ends of the material to get the material deformed as designed in the mold.



※Hydro-pressured parts (machined by Opton Hydroformers)



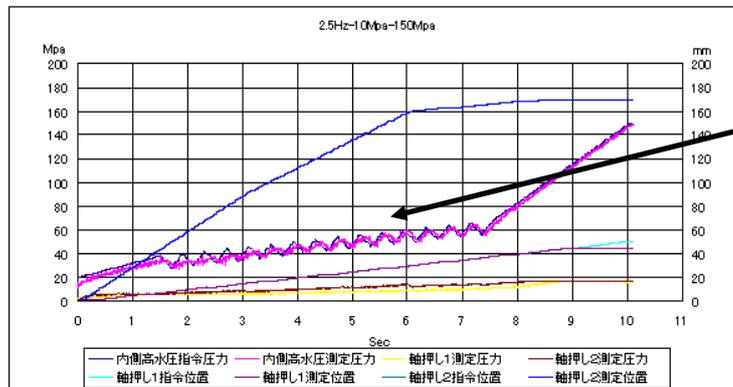
Sized by : $\phi 7 \times t 0.8 \sim \phi 75 \times t 2.6$

Type of Material : Steel, Al, Sus, copper Titan

1. High propagation-rate achieved by hammering-impact process with no wax- applied (and no eventual need of wax removal)

Hammering-impact control is the patented technology of Opton, where hyper-pressure generator with Opton original DDV Servo Pumps embedded works to control pulsation of the fluid media in deforming a pipe material. Thanks to this performance feature, the surface-friction is reduced between the material and mold, bringing easier transition of material thickness, wrinkle prevention, high-precision and –propagation machining.

As standard hydraulic media is enough in place of conventionally-observed solid wax, an operator can save time for pre-machining waxing and post-machined removal in additional saving of material cost.



Thanks to hammering control of hyper-pressured media, surface-friction is reduced to allow easier transition of material thickness.

The data of hammering hydroforming

2. DDV Servo Pump installed for performance at faster and larger propagation rate

The DDV Hybrid Servo Pump installed to the Opton Hydroformer has brought the technical advantages of stable control of all hammering-axes operation as well as fluid temperature, resulted to material propagation at higher rate.

Further advantages against competitors are less-than-half electricity consumed, machining time needed only 2/3 or less, lower running-cost and environment-friendly operation.



DDV hybrid Servo Pump

Type T HYPER-L HL-70300

Non-leak reversible piston pump :70cc/rev.

AC Servo Motor: 30kw

(Constant rating : torque at 3sec.
instantaneous rating =1: 3)

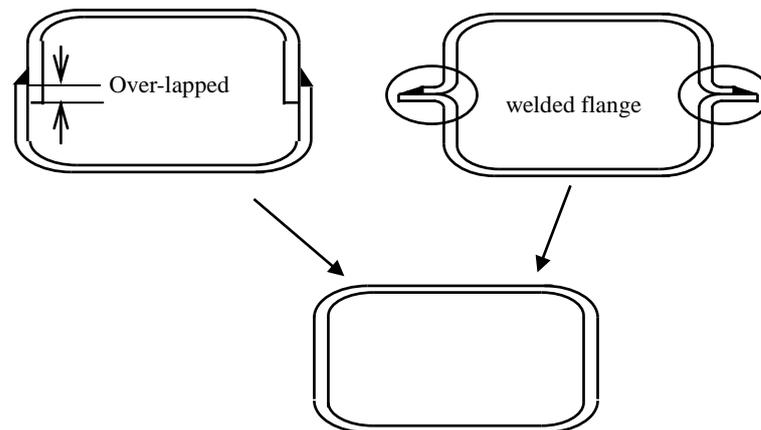
3. Hydroforming just suites to producing the precision part free of double-skinned joint, light-weighted yet with rigidity. Realistic savings can also be claimed for the number of fixing parts needed, product weight and molds/fixtures as well.

The remarkable advantage by hydro-forming deformation is the elimination of cost-involved working process itself given to materials rather than merely-improved processes for saving of the working cost and man-hours. A work piece made welded by two-or-more press-parts in assembly can be replaced by one simple work piece that is prepared in simple process with no welding needed.

Non-joined cross-section of tube normally bears anti-deformed rigidity far higher than the one of pipe made from rolled steel with joint welded. It is also noted that work-hardening effect from hydroforming process brings work piece enhanced in strength.

Additional advantage is less-weight of the produced part becoming available with no flange needed that used to a must for welding and/or assembling joints.

Another high-lighted feature is that the final part is produced with accurate dimension and free of ill-affect from spring-back and welding distortion thanks to hyper pressure media is charged to deform the work piece contained in the rigid mold.



Hydroforming of a whole part in the mold enables reduction of installation parts and/or elimination of welding/assembly works. Light-weighted work piece with reduced parts helps saving of transportation cost and environmental load thanks to the DDV Hybrid Servo Pump embedded for hammering-impact control.

4. Easy deformation for complicated design including edge-formation that are hard to achieve by prevailing press-molding

Hydroforming suites to mold a complicated designed product by the pair of mold, or one as female made with complicated design if needed and the male as the other mainly for distribution of hydraulic media. While press machines of other brands often produce parts of ill-quality having crack etc, Hydroformer ex-Opton can meet high-quality machining thanks to its outstanding-featured hammering-impact control technology imbedded to the machine.

5. Machine sized to 2/3 with DDV hybrid Servo Pump installed for high controlled performance

With Opton original DDV Servo Pump installed for hyper-pressure mechanisms for the mold clamping cylinders and hammering –impact control, the machine size is reduced to 2/3 (in volume-wise) comparing to the type of old version.

Thanks to the DDV Servo Pump installed, Over-load control and high-speed simultaneous control works by utilizing instantaneous characteristics of the servo motor. This allows extracting the machining energy at maximum level to minimize the load given to the machine, leading to the advantages of enhancement of machining speed and accuracy and machine service life as well.

The machine can be installed on the pit-less floor for the machine up to 1000 capacity with the machine height less by 20 % comparing to the press-machine available in the markets.

6. Piercing and burring can also be worked in the mold process.

By devising piercing and burring in the mold, they are worked simultaneously during standard hydroforming process with resulted advantage of investment-saving of the relevant devices.



In starting feasibility study

For starting a study on the Hydroforming machine, followings are offered:

Please pick up any one below that most suites your initial interest.

1. Opton staff visit to an inquirer is offered to make detailed presentation with DVD on a PC.
2. Produced specimen, if available to Opton, will work helpful for our feasibility check at cost-free to an inquirer. Proto-typing production may be met upon the request by the inquirer.
3. The visit is most welcome to Opton's researching center of Hydroforming machine that has been built with strong support by the p r e s t i g e o u s N E D O (New Energy and Industrial Technology Development Organization - a subsidiary unit of Ministry of Economy, Trade and Industry of Japan)
4. Upon possession of inquirer's information including part drawing, images, production volume etc., a feasible plan is prepared to offer by Opton.

Opton stays always ready to meet anyone above