



Suryoday Technologies – ISO 9001:2015 Co.

Suryoday Technologies

# *General Methodology*

*General Methodology for Hydraulic Tank Jacking Equipment*



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## **MANUAL**

### **A. *Lifting of Tank***

1. Keep the lock plates (top & bottom) on the jacks in closed condition (Inwards).
2. Keeping the ball valve in closed position, start the motor and slowly increase the pressure through the directional control valve.
3. As the pressure increases, the hydraulic oil starts circulating to all the jacks and the jack starts climbing slowly on the trestle box lifting the tank slowly.
4. At the end of the lift (@100 mm stroke length) as the oil pressure stabilizes, release the pressure with the help of ball valve.
5. The jack starts retracting back into the cylinder.
6. Check the movement of all the jacks for uniform lifting/oil leakage etc.
7. In case if any jacks has problem in movement or uneven lifting, close the needle valves on all the jacks except the jack having the problem. Check the Lock plate and jack teeth movement. Give pressure through the power pack and adjust the lifting.
8. After the lifting is over, close the needle valves on the jacks.
9. Repeat the procedure till the required height of placing the shell plate is reached.
10. The total tank is lifted to the required position for placement of the next shell course plates.
11. Start erecting the fabricated shell plates on the structural member and complete the full erection of shell course plates.
12. Align and complete the fit up and welding of the vertical seams of the shell plates
13. Now we have the full shell course plates in full circle.
14. Repeat the process from Sr. No. 1 to Sr. No. 13 till the fabrication of the tank is complete and all the shells have been fitted and welded.

### **B. *Lowering of Tank / Top shell courses***

1. First open all the lock plates on the bottom jack block (the handle will be turned outwards)
2. Give light pressure through the power pack. The jack pistons will slowly come out of the cylinder.
3. Do not release the pressure.
4. Now close the lower lock plates (turn inwards) on the jacks and close the needle valves and release the pressure.



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### **GENERAL METHODOLOGY**

#### **Stage 1 (Figure A)**

1. Tank foundation is completed.
2. After checking the Foundation, tank centre point and tank co-ordinates are marked.
3. Annular plates & tank bottom/base plates erection & welding & vacuum box testing completed as per code.
4. Tank Shell ring location marked on the tank base plates.



**Figure A**

#### **Stage 2 (Figure B)**

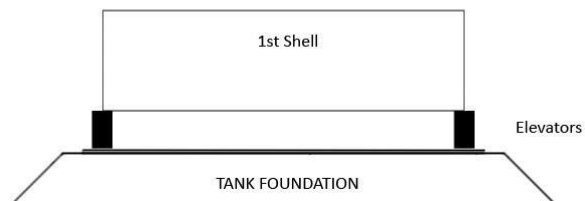
5. Temporary Structural Members are erected at every 3000mm on the tank ring marking. The Shell plates are erected / placed on these Structural Members.



**Figure B**

#### **Stage 3 (Figure C)**

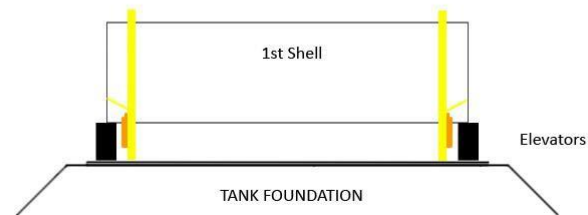
6. Erection & welding of Top most 2 shell course plates (Max 4 m ht) is completed.
7. For fixed roof (cone/dome) tanks, curb angle, roof structures and roof plates erection/welding to be completed.



**Figure C**

#### Stage 4 (Figure D)

8. Required no. of Hydraulic jacking units are assembled and erected and aligned inside the tank as per procedure given from Page nos. 5 to 7.
9. Special cleats (Lifting and Guide) fabricated earlier as per details given are welded to the lowest tank shell.

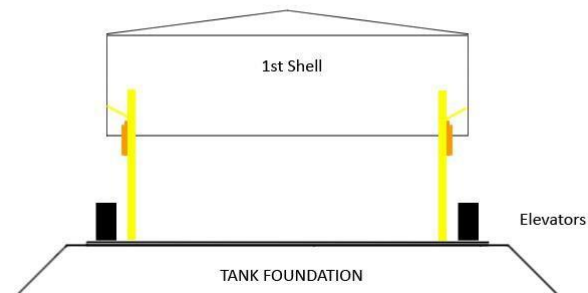


**Figure D**

10. Hydraulic jacking units are connected to the shell cleats and the Hydraulic Power pack is connected with the jacks through Hydraulic Hoses.

#### Stage 5 (Figure E)

11. On operating the hydraulic power pack, the hydraulic oil starts circulating through hoses to all the jacking units and as the oil pressure increases all the jacks start climbing/ lifting together to complete 1 operation of @ 100 mm lift.
12. On completion of 1 cycle all the jacks stay at the lifted position on the jack rod due to a special grip mechanism in the jacking units.



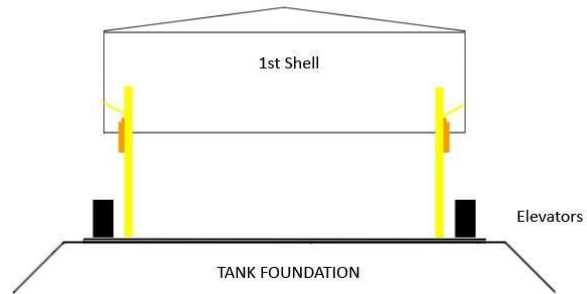
**Figure E**

13. The pressure is released from the hydraulic power pack
14. The operation is repeated till the height of erection for placement of next shell is achieved.



**Stage 6 (Figure F)**

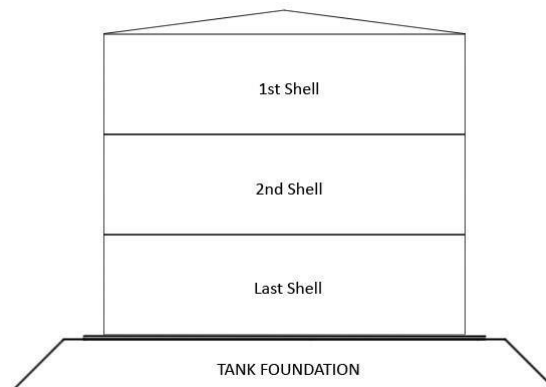
15. Next Shell plate erection and vertical seam welding is completed and the lifted shell plates are lowered by the jacking units to align with the new shell plate and welding is completed.
16. Jacking units are lowered. Cleats are removed and welded to the next shell plates and the operation from Sr. no. 6 to 12 is repeated and the tank erection is completed.



**Figure F**

**Stage 7 (Figure G)**

17. Erection of spiral staircase, wind girder and other structural supports and radiography and cleaning of shell can be completed simultaneously as the erection of the shell is in progress.



**Figure G**



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**Note:**

1. PLEASE NOTE THAT TANK CONSTRUCTION USING HYDRAULIC TANK JACKING SYSTEM IS CARRIED OUT IN REVERSE ORDER. I.E. YOUR TOP MOST SHELL, ON WHICH YOUR HAND-RAILS, LANDING PLATFORM AND OTHER APPERTUNANCES ARE FITTED, COMES FIRST IN THE FABRICATION & ERECTION SERIES. THIS WAY, YOUR LOWER MOST SHELL WILL BE FABRICATED AND ERECTED IN THE END.
2. For tanks below 30m  $\varnothing$ , place them at a distance of 3.14 meters. If the  $\varnothing$  of the tank increases over 30 meters, kindly contact us for the distance between 2 jacks as it requires a series of calculations to derive the same.
3. Please note that once the base plate and stay pipes of the jacks are fitted, they are **not** to be moved/removed/refitted until the whole tank height is complete.