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# Produced Water Treatment with Deoiling Hydrocyclones: Misconceptions & Corrections

SPE-213033-MS  
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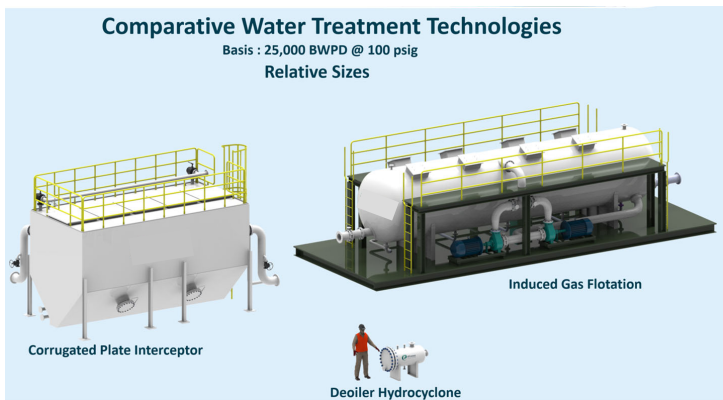
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- Deoiling Hydrocyclone Overview and Operation
- **Misconception #1: Liner Design**
- **Misconception #2: Interchangeability with other PWT Equipment**
- **Misconception #3: Emulsion Treating**
- **Misconception #4: Gas-Condensate Systems**
- **Misconception #5: Turndown Flexibility**
- **Misconception #6: Pumped System Design**

### Deoiling Hydrocyclone

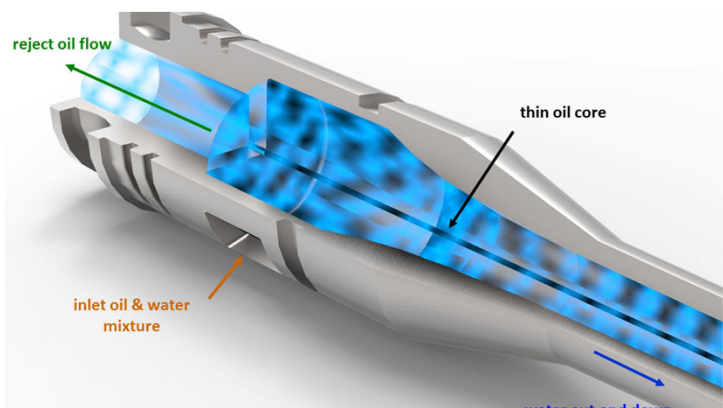
- Smallest footprint per treated volume
- No moving parts
- Near instantaneous residence time
- Insensitive to motion
- Smallest mechanical impact



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### Deoiler Operation

- Hydrocyclone principles and design
- Requires pressure differential ratio (PDR)
- Finite flow range
- 2-3 vol. % oil reject stream
- Critical droplet size removal



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### Deoiler Performance

- Liner turndown range
- Droplet removal efficiency
- Oil reject flow

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### Misconception #1

All liners are the same

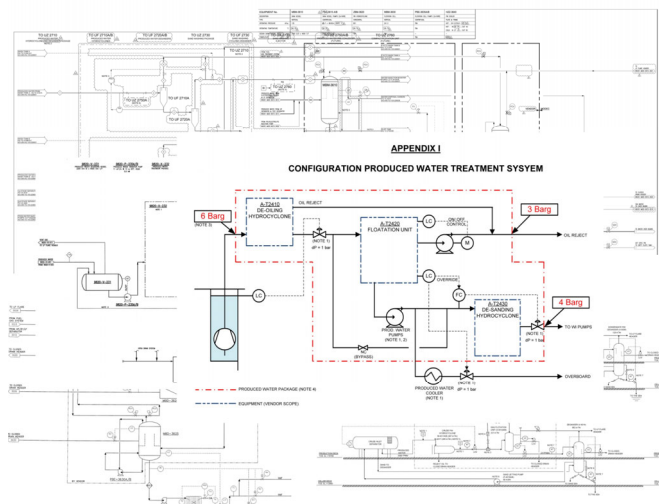
- Diameter and length
- Modular vs. integral
- Material of construction
- Packing profile
- Plugging prevention
- Proper inlet and cone profile

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### **Misconception #2** Interchangeable with other PWT devices

- Best in natural high P/T source
  - Do not put in sump with cold, chemical water
1. Water outlet of separator before LCV
  2. Water outlet of separator before LCV
  3. Water outlet of separator before LCV



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### **Misconception #3** Cannot treat emulsions

- Stable emulsions require more than mechanical treating
- Need heat or chemicals
- Remove stabilizing agent
- Deoilers can treat unstable or broken emulsions
- Field test unit

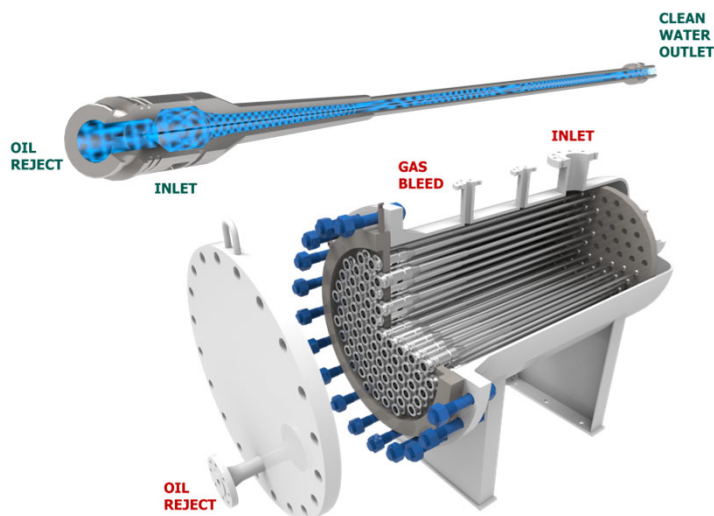


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### Misconception #4 Don't work in gas- condensate systems

- G-C systems are often high P & T
- May have free gas
- Free gas removed in vessel package, not liner
- Gas may break out after reject

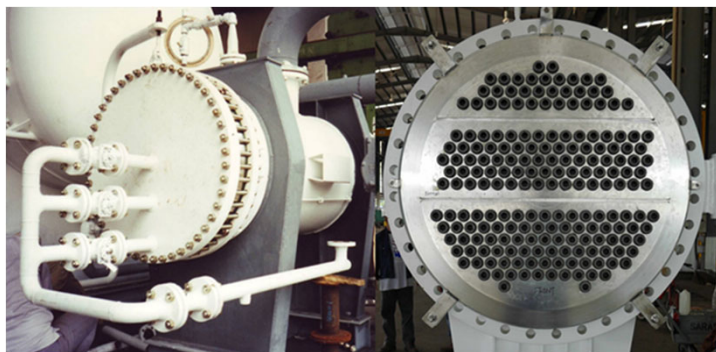


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### Misconception #5 Turndown flexibility

- Do not need to match production and treating rates (2-3 second res. time)
- Change liners/blanks
- Vessel sparing
- PACS™ for on-line



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### Misconception #6 Pumped systems

- Low shear pump, or...
  - Centrifugal pump...
1. Single stage, closed impeller
  2. <1800 rpm
  3. Max.  $\Delta P$  of 100 psi
  4. >75% efficiency
  5. Constant flow (recycle)



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### Final Thoughts

- Most important PWT device since 1980s
- Mature product
- Not a solution for everything
- Best performing device when used properly



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