

## Oil and Gas: Application Focus

### Condensate Pipeline Dewatering

#### Process Description

Natural gas production often also produces large volumes of hydrocarbon condensate liquids that may be transported tens or even hundreds of kilometers, for delivery or treatment: for example, from remote offshore platforms or FPSOs to processing onshore. When carbon steel pipelines are used and the condensate contains significant volumes of free water or brine and may also be sour due to H<sub>2</sub>S / CO<sub>2</sub>, corrosion often results, leading to shortened pipeline life and significant fouling of onshore facilities. Monoethylene glycol (MEG) may also be entrained if used for hydrate suppression at the well.

Water and MEG removal from condensate is a multistage process. First a primary water separator followed by liquid/liquid coalescers are used for free water and MEG removal. Additional removal of dissolved water can be accomplished by a dissolved water stripper column. If natural gas is also being transported in the same pipeline, the gas may be glycol dehydrated then mixed with the condensate to ensure a dry flow that minimizes pipeline corrosion.

#### Production and Gas Plant Needs

- Achieve consistent water/MEG removal from hydrocarbon condensate

Ensure water removal meets your needs for corrosion protection of your pipeline assets.

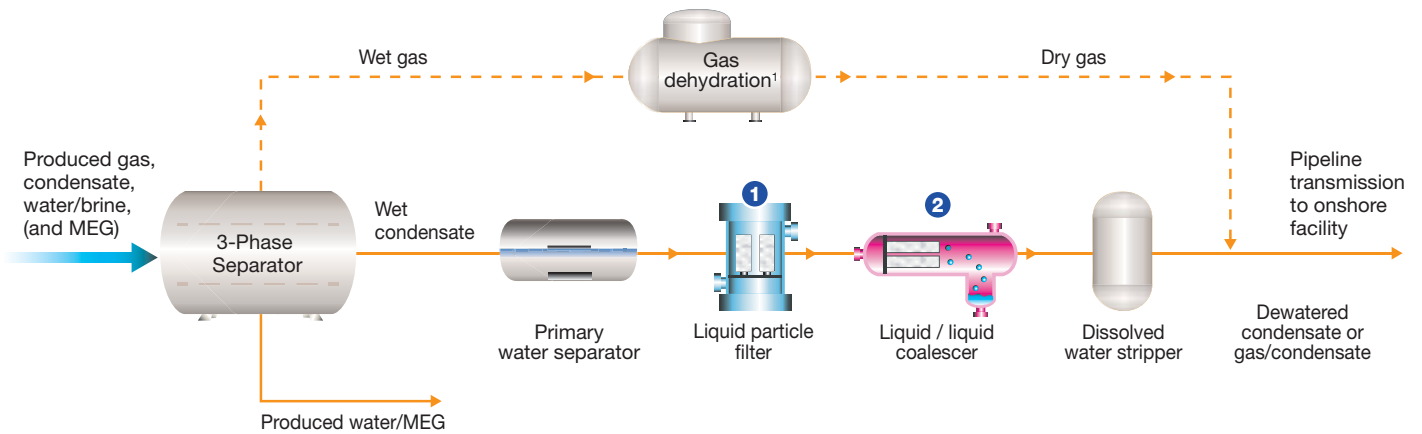


- Use carbon steel pipe while minimizing corrosion risk
- Minimize energy and opex costs on the dissolved water stripper by reducing free water load and fouling
- Achieve downstream opex control and freedom from upsets by minimizing fouling of gas treatment and/or condensate processes from rust and black powder
- Minimize MEG losses, through effective recovery, distillation and reuse

#### Production Challenge/Pall Solution

Challenge	Solution
Minimize corrosion of carbon steel piping due to the presence of free water in the hydrocarbon condensate	<p><b>Reduce capex and corrosion operating costs by effectively removing water contamination from carbon steel pipelines, negating the need for expensive internally coated pipe.</b></p> <p><b>Maximize MEG recovery from the condensate with reliable removal.</b></p> <p><b>Enhance stripper operation by protection from free liquids and solids.</b></p> <p><b>Optimize downstream gas plant, stabilizer and/or fractionator performance and minimize opex by effectively controlling ingress of pipeline corrosion products.</b></p> <ul style="list-style-type: none"> <li>• Conventional glass fiber coalescers will disarm due to surfactants in the condensate — sulfur compounds, additives such as corrosion inhibitors, or well treating chemicals. Disarmed coalescers will let free water downstream, allowing the onset of rapid pipeline corrosion and significant MEG loss.</li> <li>• Cyclones, mesh packs or plate separators may not remove the fine droplet emulsion created by the surfactants. High levels of free water and MEG may be seen downstream along with associated corrosion. If MEG is present in the water, it creates very fine emulsions with poor separation efficiency from glass fiber coalescers and separators described above, leading to corrosion and MEG loss.</li> <li>• <b>High-efficiency AquaSep® EL or AquaSep XS coalescers operate without disarming to provide effective fine emulsion separation to as low as 15 ppmv free water, ensuring minimal water-related pipeline corrosion and maximum MEG recovery.</b></li> </ul>
Minimize MEG losses in the condensate	
Minimize stripper operating costs	

## Process Flow Diagram



<sup>1</sup> Gas dehydration processes will be optimized with the addition of SepraSol™ Plus Liquid/Gas coalescers on the gas inlet and outlet, and Ultipleat® High Flow/Marksman™/Coreless filters on the recirculating glycol. See Glycol Dehydration, brochure FCOGGLYDENa for additional information.

## Key Applications/Filter Recommendations

Application	Pall Product	Advantages	Customer Benefits
1 Prefilters for liquid/liquid coalescer protection	Ultipleat High Flow, Marksman or Profile® Coreless filters to remove incoming solids	Long life of coalescer elements Protection of the dissolved water stripper	<ul style="list-style-type: none"> <li>• Low operating costs</li> <li>• Freedom from fouling-related stripper shutdowns</li> </ul>
2 Free water / MEG removal from condensate	AquaSep EL coalescers for water / MEG removal on high solids condensates AquaSep XS coalescers for water / MEG removal on low solids condensates	Consistent and continuous high efficiency removal of the fine water/brine/MEG emulsions without the risk of element disarming	<ul style="list-style-type: none"> <li>• Low pipeline capex</li> <li>• Improved pipeline opex due to better protection and service life</li> <li>• Reduced stripper energy costs</li> <li>• Optimized MEG recovery and reuse</li> <li>• Controlled downstream plant opex and freedom from upsets due to slugs of pipeline corrosion products</li> </ul>



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