


|                    |  |  |                 |         |
|--------------------|--|--|-----------------|---------|
| <b>PROJECT :</b>   |  |  | <b>DATE :</b>   |         |
| <b>PROJ. NO. :</b> |  |  | <b>BY :</b>     | S.R. M. |
| <b>CLIENT :</b>    |  |  | <b>REV :</b>    |         |
| <b>UNIT :</b>      |  |  | <b>DOC NO.:</b> |         |

**HORIZONTAL THREE PHASE SEPRATOR SIZING CALCULATION SHEET (SUBMERGED WIER)**


| Input Data                 | Unit   | Vapor | Light Phase | Heavy Phase |
|----------------------------|--------|-------|-------------|-------------|
| Volumetric Flow Rate       | m3/hr  | 13880 | 590.7       | 1003.2      |
| Density                    | kg/m3  | 14.3  | 765         | 1135        |
| Viscosity                  | CP     | 0.012 | 1.53        | 0.6         |
| Particle Dia. Oil in Vapor | micron | 200   |             |             |
| Oil in Water               | micron | 100   |             |             |
| Water in Oil               | micron | 200   |             |             |

| Light Droplet Terminal Velocity |              |              |
|---------------------------------|--------------|--------------|
| $CRe^2$                         | ----         | 15           |
| Drag Coefficient                | ----         | 40.84        |
| <b>Terminal Velocity</b>        | <b>m/sec</b> | <b>0.003</b> |

| Heavy Droplet Terminal Velocity |              |              |
|---------------------------------|--------------|--------------|
| $CRe^2$                         | ----         | 13           |
| Drag Coefficient                | ----         | 48.20        |
| <b>Terminal Velocity</b>        | <b>m/sec</b> | <b>0.004</b> |

| Trial Diameter              |      |       |
|-----------------------------|------|-------|
| Inlet Nozzle Size           | mm   | 576   |
| Hv/D Ratio                  | ---- | 0.4   |
| Vapor Space                 | mm   | 2000  |
| Maximum Liquid Level Height | mm   | 3000  |
| Vessel Cross sectional Area | m2   | 19.63 |

| Heavy Phase Compartment            |            |              |
|------------------------------------|------------|--------------|
| <b>Weir Height</b>                 | <b>mm</b>  | <b>2500</b>  |
| BTM - LILL                         | mm         | 1000         |
| LILL - LIL                         | mm         | 350          |
| LIL - NIL                          | mm         | 600          |
| NIL - HIL                          | mm         | 250          |
| HIL - HHIL                         | mm         | 200          |
| HHIL - Wier                        | mm         | 100          |
| <b>Total Liquid level Height</b>   | <b>mm</b>  | <b>2500</b>  |
|                                    |            |              |
| Light Droplet Rising Time          | min        | 10.1         |
| heavy phase Cross Sec. Area        | m2         | 7.1          |
| Heavy Phase Velocity               | m/sec      | 0.039        |
| Lmin light drop through heavy phas | mm         | <b>23558</b> |
|                                    |            |              |
| <b>Heavy Phase Comp. Length</b>    | <b>mm</b>  | <b>26700</b> |
|                                    |            |              |
| BTM - LILL Hold up Time            | min        | 4.56         |
| LLIL - LIL Hold up time            | min        | 2.36         |
| LIL - NIL Hold up Time             | min        | 4.48         |
| NIL - HIL hold up Time             | min        | 1.96         |
| HIL - HHIL hold up Time            | min        | 1.59         |
| <b>Heavy Phase Hold up Time</b>    | <b>min</b> | <b>6.45</b>  |

|             |  |  |          |         |
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| Light Phase Compartment            |                |             |
|------------------------------------|----------------|-------------|
| BTM - LLLL                         | mm             | 1100        |
| LLLL - LLL                         | mm             | 700         |
| LLL - NLL                          | mm             | 1000        |
| NLL - HLL                          | mm             | 100         |
| HLL - HHLL                         | mm             | 100         |
| <b>Total Liquid level Height</b>   | <b>mm</b>      | <b>3000</b> |
| <b>Light Phase Comp. Length</b>    |                |             |
|                                    | <b>mm</b>      | <b>2500</b> |
| Heavy Droplet Settling time        |                |             |
|                                    | min            | 2.2         |
| Light phase Cross Sec. Area        |                |             |
|                                    | m <sup>2</sup> | 4.2         |
| Light Phase Velocity               |                |             |
|                                    | m/sec          | 0.039       |
| Lmin heavy drop through light phas |                |             |
|                                    | mm             | <b>5087</b> |
| BTM - LLLL Hold up Time            |                |             |
|                                    | min            | 0.83        |
| LLLL - LLL Hold up Time            |                |             |
|                                    | min            | 0.80        |
| LLL - NLL hold up Time             |                |             |
|                                    | min            | 6.15        |
| NLL - HLL hold up Time             |                |             |
|                                    | min            | 1.47        |
| HLL - HHLL hold up Time            |                |             |
|                                    | min            | 1.46        |
| <b>Light Phase Hold up Time</b>    | <b>min</b>     | <b>7.62</b> |

| Vapor Side                         |                |             |
|------------------------------------|----------------|-------------|
| K vlaue                            | m/sec          | 0.140       |
| Terminal Velocity                  | m/sec          | 1.02        |
| Mesh Pad Correction Factor         | ----           | 3.00        |
| Drop out Time                      | sec            | 1.97        |
| Av Cross sectional Area            | m <sup>2</sup> | 7.38        |
| Vapor Velocity                     | m/sec          | 0.52        |
| <b>Lmin light phase thr. vapor</b> | <b>mm</b>      | <b>1027</b> |

|                      |             |              |
|----------------------|-------------|--------------|
| <b>Vessel Length</b> | <b>mm</b>   | <b>31450</b> |
| <b>L/D</b>           | <b>----</b> | <b>6.29</b>  |

