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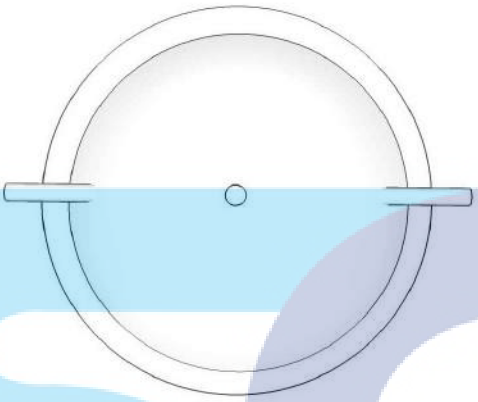
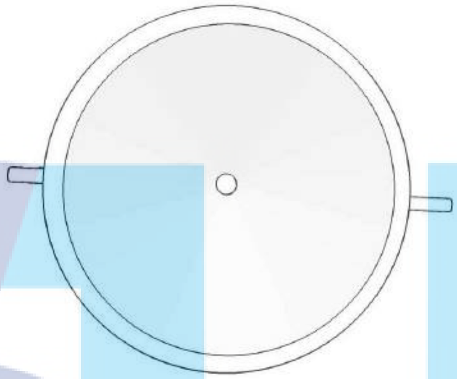
# APPENDICES

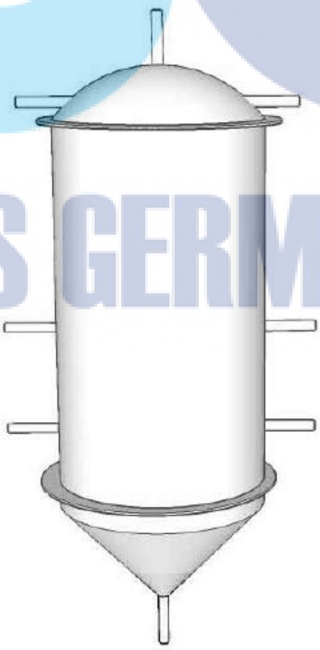
## Appendix 1. 3D model of the prototype



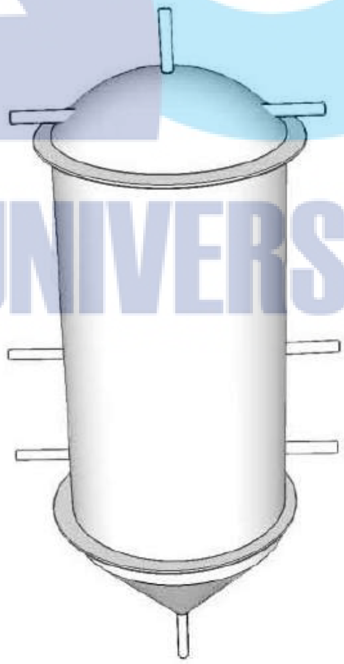
Top view



Bottom view

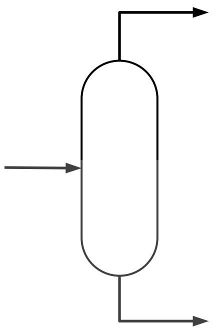


Front view



Tilted front view

## Appendix 2. Distillate mass balance calculation example




| Example of data: | | | | | |
|---|---|---|---|---|---|
| Initial feed volume | = | 1000 ml | Feed concentration | = | 15% |
| Feed lost volume | = | 150 ml | Bottom volume | = | 630 |
| Residual feed volume | = | 50 ml | Bottom concentration | = | 8% |

Sprayed feed volume = initial feed volume – feed lost volume – residual feed volume

Sprayed feed volume = 1000 ml – 150 ml – 50 ml = **800 ml**

Feed ethanol volume = Sprayed feed volume x feed concentration

Feed ethanol volume = 800 ml x 15% = **120 ml**

Bottom ethanol volume = Bottom volume x bottom concentration

Bottom ethanol volume = 630 ml x 8% = **50.4 ml**

Top volume = Sprayed volume – bottom volume

Top volume = 800 ml – 630 ml = **170 ml**

Top ethanol volume = feed ethanol volume – bottom ethanol volume

Top ethanol volume = 120 ml – 50.4 ml = **69.6 ml**

Top ethanol concentration = (Top ethanol volume / top volume) x 100%

Top ethanol concentration = (69.6 ml / 170 ml) x 100% = **40.9%**