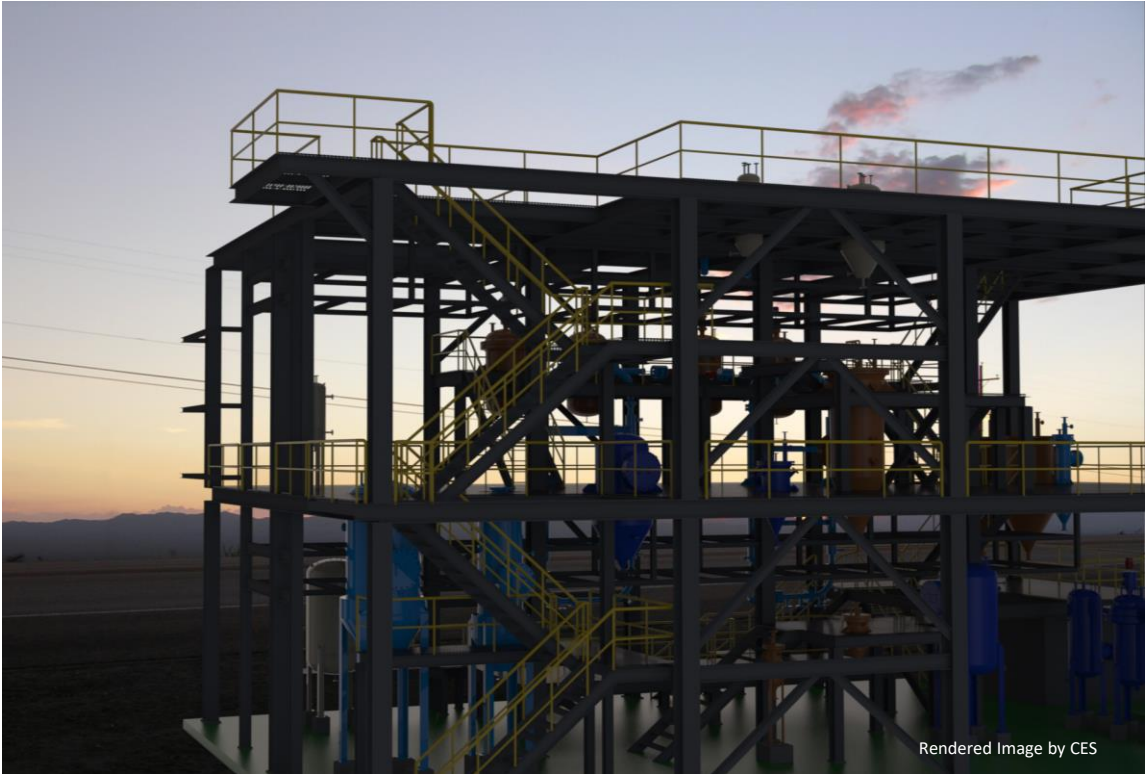


Chemical, Environment & Energy
Total Solution Provider



GENERAL INFO

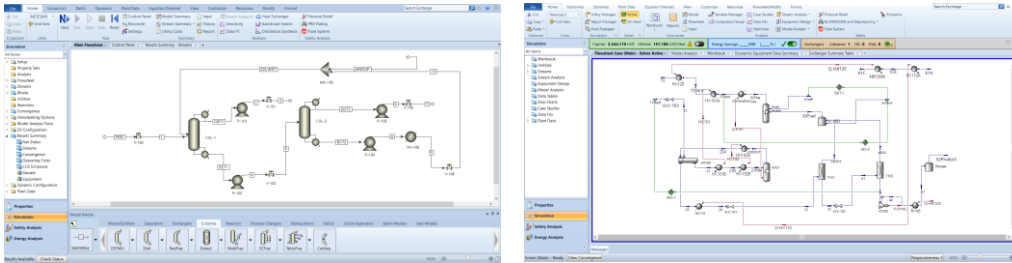


CES Co., Ltd. is a technology specialized company composed of veteran engineers with experience and knowledge. Seven Ph.D.s, four professional engineers and a number of engineers of CES have more than 20-30 years of experience in large corporations/ public enterprises/ research institutes. Since its foundation in 2005, CES has accumulated abundant experience and know-how in various plants from business planning to design/ purchase/ construction/ maintenance. In particular, CES has accumulated lots of experience in polyolefin pilot plants, and recently, it is focusing on securing module design and construction technology. In addition, CES has many technologies in energy related business fields, such as producing H_2 from transportable NH_3 and removing and separating CO_2 .

SPECIALTY OF CES

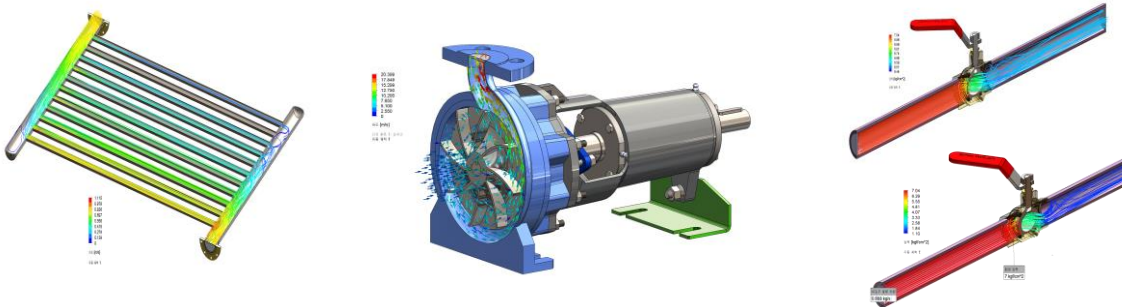
1. Process Analysis / Simulation

Process analysis and simulation is the primary job of a process engineer, but understanding and generating results in complex processes has never been so simple. CES' talented engineers with rich experience in laboratories, schools, large corporations and engineering can perform reliable process models and accurate simulations in a short period of time.



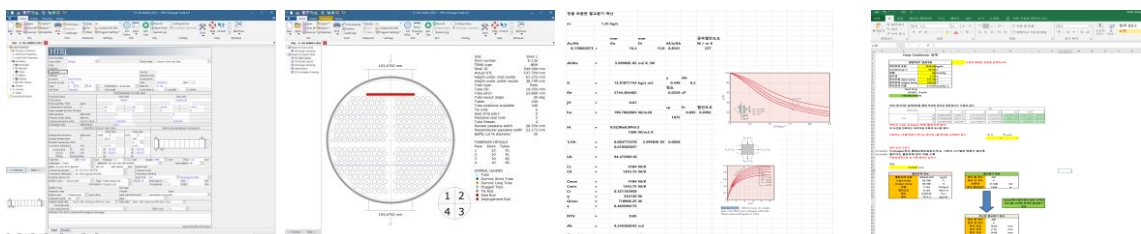
2. Heat Transfer / Flow Analysis

CES has many senior staff majoring in heat transfer or hydrodynamics. CES also has computational fluid analysis technology based on 3D modeling and provides the best solution to customers through accurate calculation and engineering analysis.



3. Heat Exchanger Design / Thermal Rating

CES has extensive experience with various types of heat exchangers. Shell & Tube type heat exchangers quickly produce reliable results by experienced HTRI experts, and special types of heat exchangers that cannot be calculated by HTRI can be interpreted by referring to specialized books or research papers.



4. PSV Calculation

CES has extensive process design experience and has been able to review scenarios for a variety of devices, including PSV/ PRV/ Rupture Disk/ Breather valve. This experience has enabled CES to successfully carry out PSV related projects with BASF, GS Caltex and Intec to name a few. So, if you need Rupture Disc Sizing, Back pressure Review, Flare Load Summary, and other calculations and analysis related to PSC, CES is your best choice. Please feel free to contact us.



Job	Size Calculation Sheet of Pressure Safety Valve for Steam Service	Client	BASF
Client	Unit : A11	PSV Tag No. : YD 4715	Rev. No. : 1
PSV Tag No.	Unit : A11	PSV Tag No. : YD 4715	Rev. No. : 1
PSV Tag No.	Unit : A11	PSV Tag No. : YD 4715	Rev. No. : 1

2. Calculate the Size of PSV

Given : $A = 1.0725 \text{ inch}^2 = 694.35 \text{ mm}^2$

Select an "J" orifice pressure relief valve (4.287) in² = 830.32 mm²

PSV Size : 2.2.3 $A_{PSV} = (830.32 \text{ mm}^2)$

3. Calculate the Rated Capacity (Line Sizing Capacity) of PSV by using selected Orifice Area, A_{PSV}

$W = A_{PSV} \cdot 190.4 \cdot \sqrt{P_1 \cdot K_d \cdot K_c \cdot K_v \cdot K_{w1}}$

$W = 3,237.08 \text{ kg/hr} > 2,707.00 \text{ kg/hr} \text{ O.K.}$

$W_{max} = 3,237.08 \text{ kg/hr}$

Input Sheet	
1. Possible Causes of System Overpressure/Overfilling/Overfilling	
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5. Lab. Engineering (Related to Chemical, Environmental and Energy fields)

Need a lab? Laboratory engineering at CES does not end with simply manufacturing or importing equipment. CES has a professional manpower who has worked in the laboratory for a long time, and based on that experience, CES designs and produces efficient and productive laboratories for our clients, and provide relevant advice or job training.



6. Modular Plant

The latest trend in the plant industry is 'Module design'. Modular plants can shorten the construction period from on-site civil engineering works, and minimizing on-site construction leads to the advantages of securing safety and improving quality. CES has a lot of know-how such as 3D modeling technology for module plant design/construction.



7. Customized Engineer Training

CES' experienced engineers are ready to share the skills and know-how accumulated over 20-30 years. If you need any training or advice from the whole project to complex engineering knowledge, please feel free to contact CES., Co Ltd.

MAJOR PERFORMANCE

#	CUSTOMER	PROJECT	LOCATION	CAPACITY	CONTRACTOR
1	Doosan Heavy Industry	IGCC-WSA Project	Tean, Korea	Clean Gas 19,200kg/hr	EP & Construction Supervising
2	Dongsung Hichem	High Purity N-Hexane Project	Yeosu, Korea	N-Hexane 5,000ton/yr	EPC Turnkey
3	Ylem Technology	PB-I Project	Yeosu, Korea	PB-I 10,000ton/yr	EPC Turnkey
4	LTC	Solvent Recovery Project	Hwaseong, Korea	Solvent Recovery 830kg/hr	EPC Turnkey
5	RIST	CO ₂ Recovery Demo Plant	Pohang, Korea	Process Gas 1,200kg/hr	EPC Turnkey
6	RIST	DMC Project	Pohang, Korea	UREA 40kg/hr	EPC Turnkey
8	POSCO Engineering	CO ₂ Separator Project	Gwangyang, Korea	Process Gas 1,200kg/hr	EPC Turnkey
9	Samsung Engineering	NH ₃ Stripping Project	Asan, Korea	NH ₃ 1,500kg/hr	EPC Turnkey
10	SIBUR	PSC Pilot Project (Polyolefin)	Russia		Basic Engineering
11	SIBUR	SOP Pilot Plant	Russia		Basic Engineering

PERFORMANCE OF NATIONAL PROJECTS

#	CLIENT	PERIOD	PROJECT
1	Korea Evaluation Institute of Industrial Technology	2016 10/01 ~ 2019 09/30	Engineering Education System of Integrated Design by Case Based Plant Process and Safety
2	Korea Institute of Energy Technology Evaluation and Planning	2017 05/01 ~ 2020 04/30	Development of LNG-grade Synthetic Natural Gas Production Technology Based on Coal Gasification
3	Korea Institute of Energy Technology Evaluation and Planning	2018 06/01 ~ 2021 05/31 (ongoing)	Development of Hydrogen Production And Purification System Using Ammonia Cracking
4	Korea Evaluation Institute of Industrial Technology	2020 08/01 ~ 2022 12/31 (ongoing)	Development of the Ethylene Oligomerization Technology for the Selective Production of 1-Hexene/1-Octene



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The company name, **CES**, embodies its philosophy. **CES** is not limited to simply 'Construction' and 'Engineering', but also to faithfully providing all the related 'Services' to customers. All the employees of CES Co., Ltd. promise to do their best to provide the best quality and perfect service with gratitude for their customers.