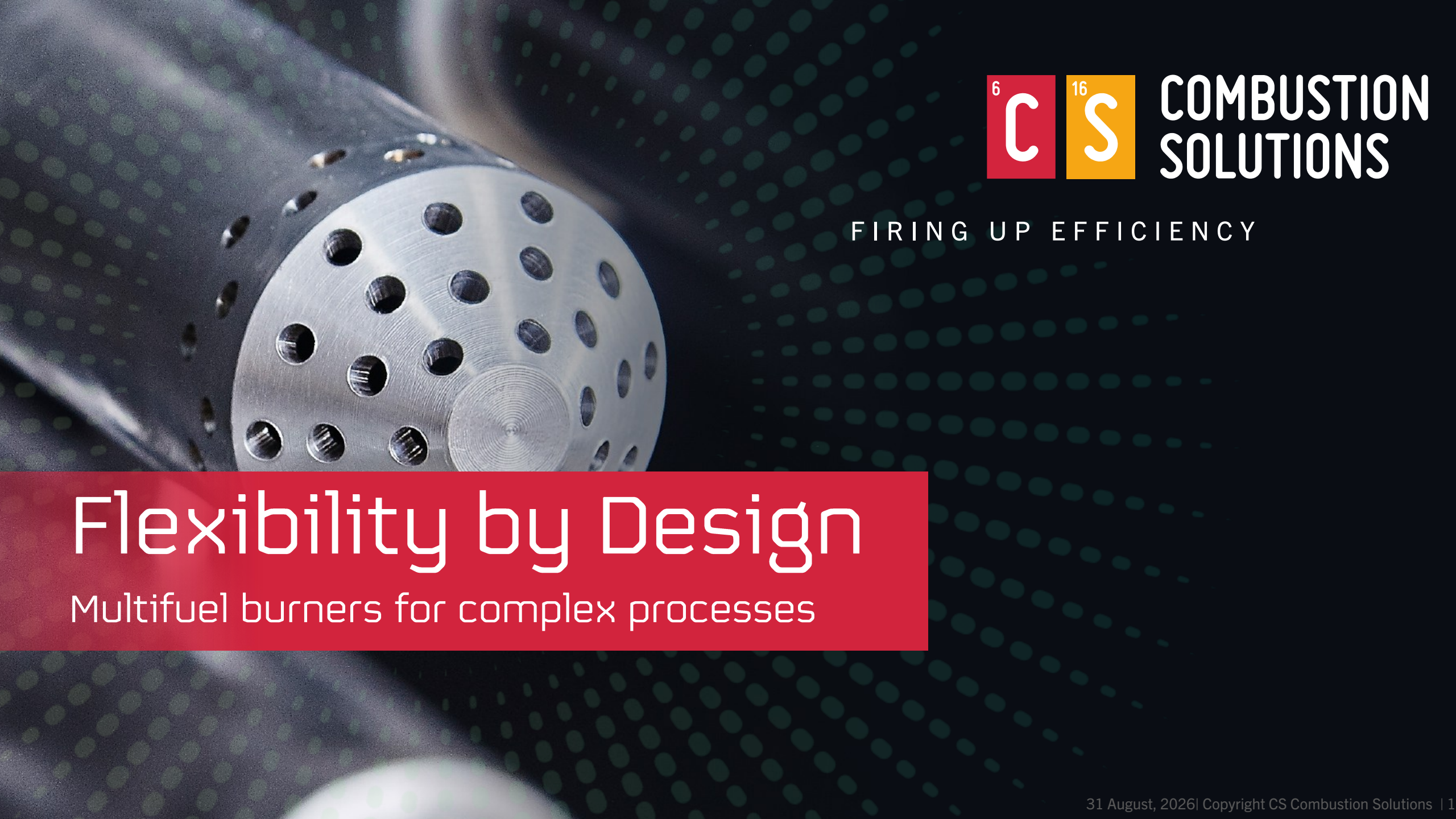


COMBUSTION SOLUTIONS

FIRING UP EFFICIENCY

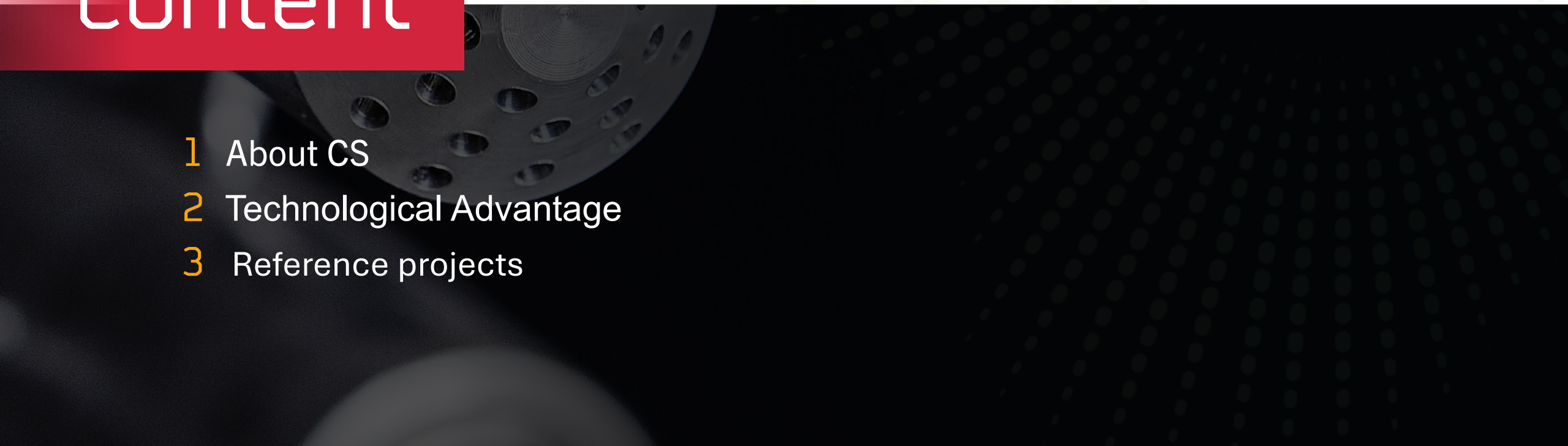
Flexibility by Design

Multifuel burners for complex processes

COMBUSTION SOLUTIONS

FIRING UP EFFICIENCY

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2 Technological Advantage

3 Reference projects

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About Us

- CS is technology leader in combustion and burner technology
- With more than 15 years independent presence on the market and experienced engineers, CS is known as a competent partner for innovative, complex and tailored combustion systems.
- CS is developing long term partnerships with our clients and supporting them to reduce their total cost of ownership

at a glance

- Customized Solutions
- Competent Partner
- Reliable
- Best in Class Design
- ECO friendly Technology
- Flexible

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About Us / What we do

Combustion Engineering



Plant and process optimization & Service



Electrical measurement control and regulation technology



Combustion Calculation



Computational Fluid Dynamics (CFD)



Combustion control engineering



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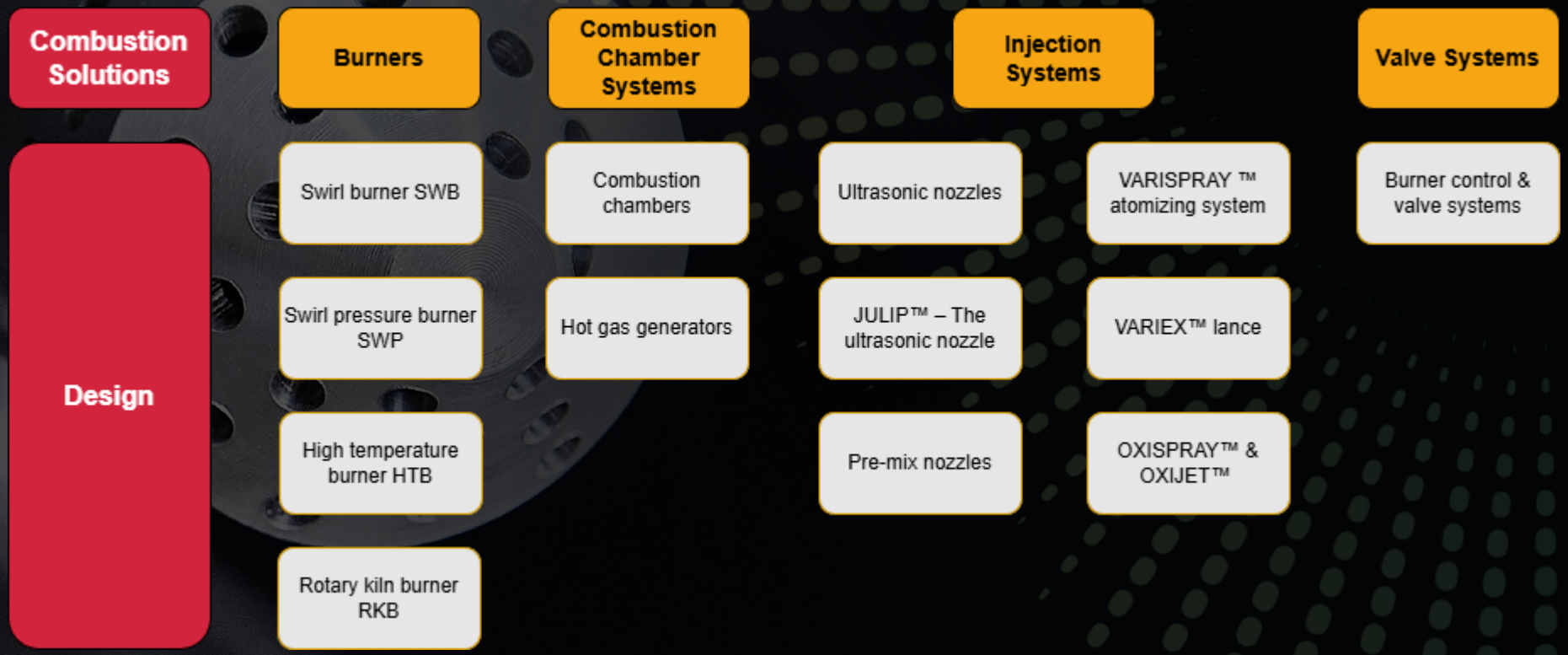
About Us / Industries we serve

INDUSTRIES WE´RE FIRING UP	Refinery	Chemicals & Pharma	Petrochemicals	Metallurgy & Mining	Pulp & Paper	Fertilizer	Future Industries
Applications	Oxygen enrichment	Caprolactam/ Oleum production, SO_2	Residue combustion in polymer production	Urban Mining – pyrolysis combustion	CNCG combustion	Phosphate fertilizer production	Power-to-X-NH3 exhaust gas combustion
	Cracking Unit – Hot gas generator	Residue incineration	PSA exhaust gas combustion in H_2 production	Roaster/smelter conversion	SO_2 production for bleaching		Hydrogen combustion
	Visbreaker combustion		Energy generation through residue combustion	leaching – sulphuric acid production	Viscose – sulphuric acid production from H_2S gases		NH_3 as fuel
	Desulphurisation in the Claus process		Offgas combustion in syngas production	Low-calorific gas combustion (BFG/coke oven gas)			Synfuel & ReOil Pyrolysis gas combustion
	Desulphurisation in the wet gas sulphuric acid process (WSA)						
	Alkylation – Spent acid regeneration						

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About Us / Combustion Solutions



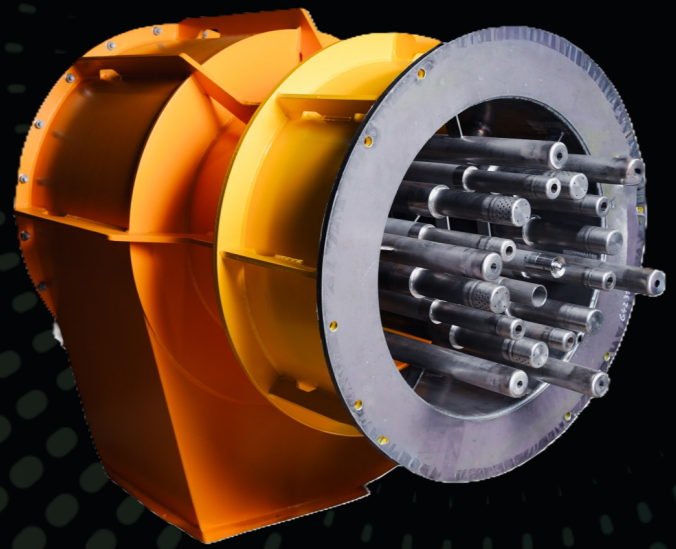
COMBUSTION SOLUTIONS

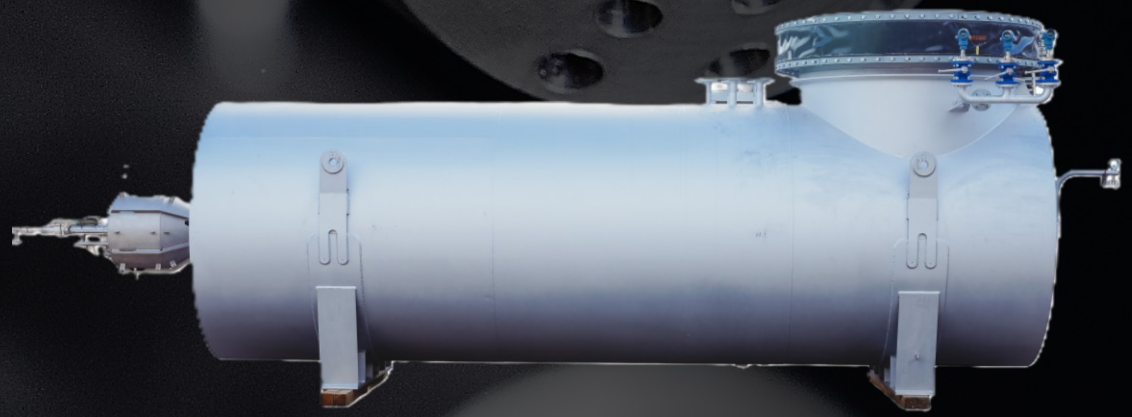
FIRING UP EFFICIENCY

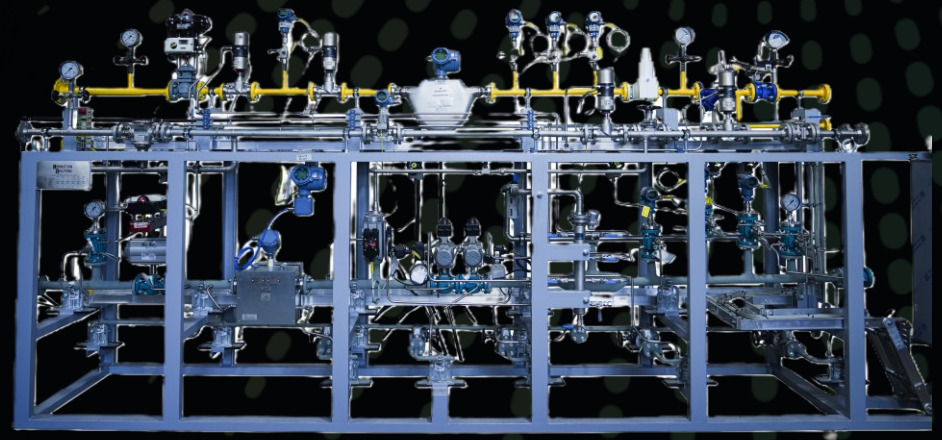
About Us / Typical Products







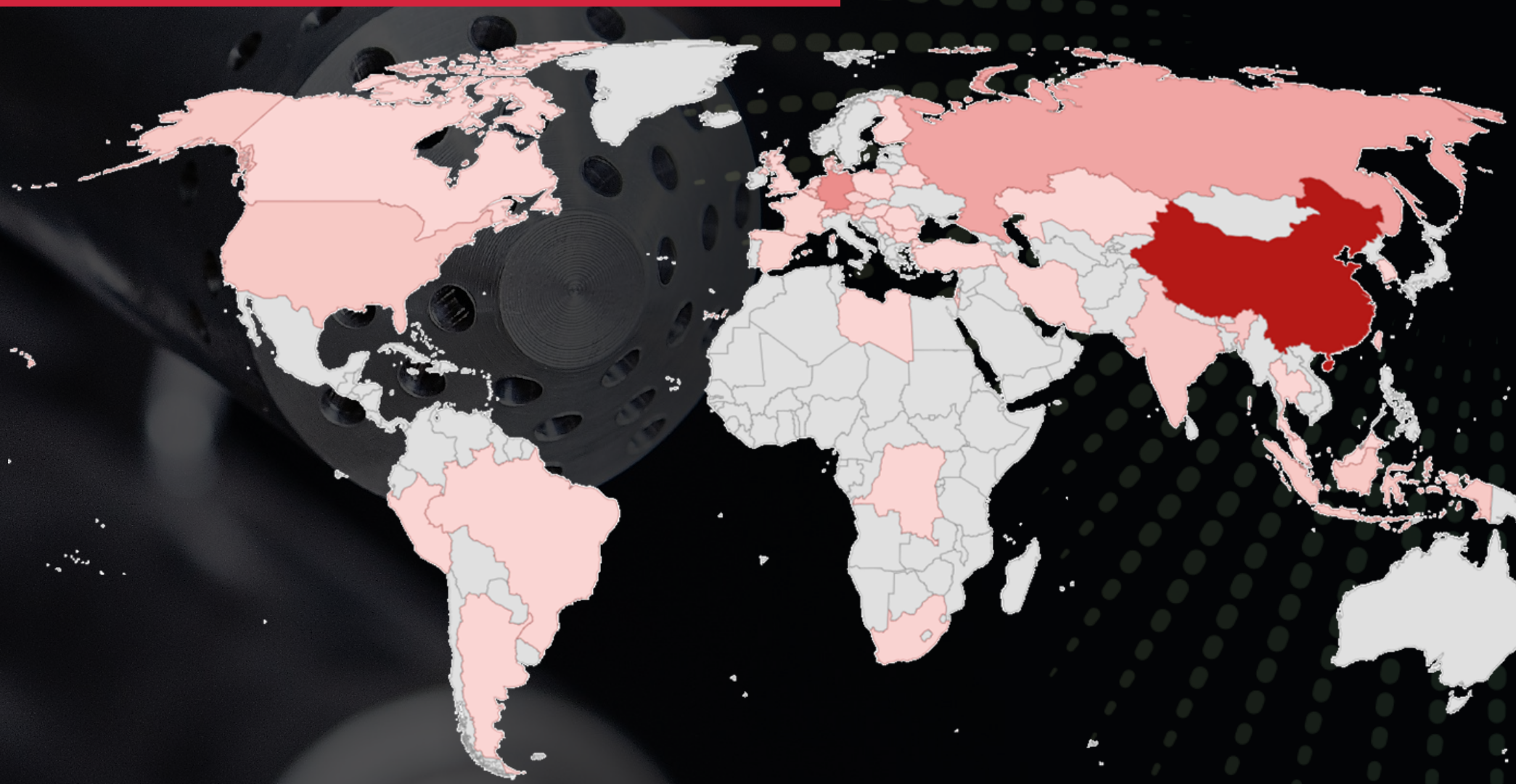




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Selected references by country

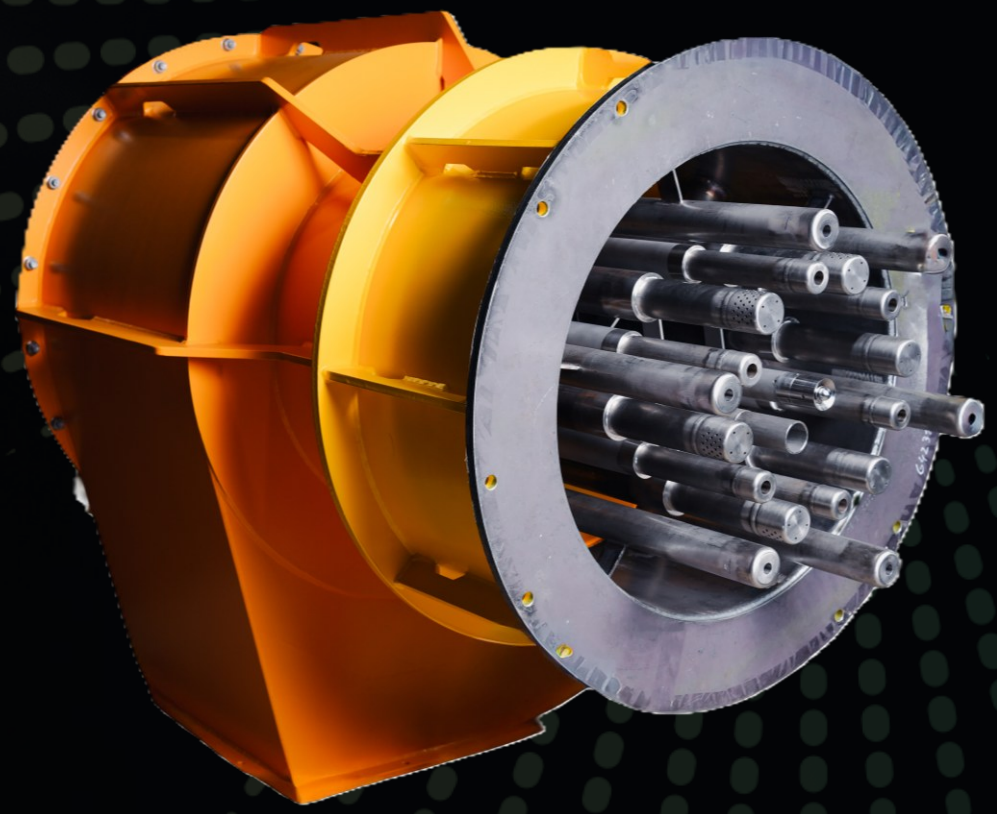


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Multifuel burner – Key features

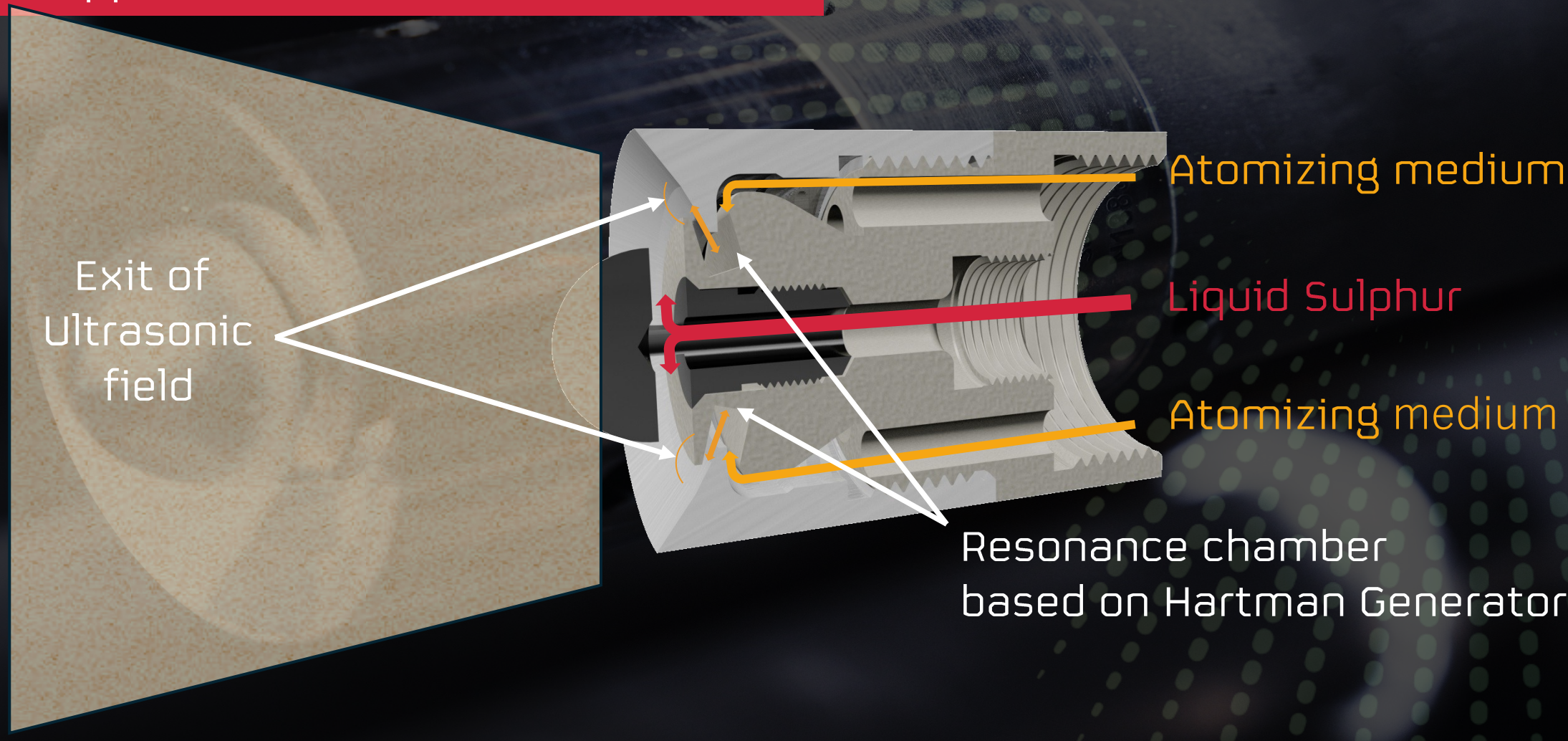
- Turndown ratio of >1:20 for fuels, 1 – 80MW
- Low maintenance nozzles, also for high-viscose liquids & particles
- Best in class atomization (<100µm)
- Low pressure needed (~1 bar)
- Innovative materials for increased lifetime / reduced maintenance



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CS-Approach - Ultrasonic atomization

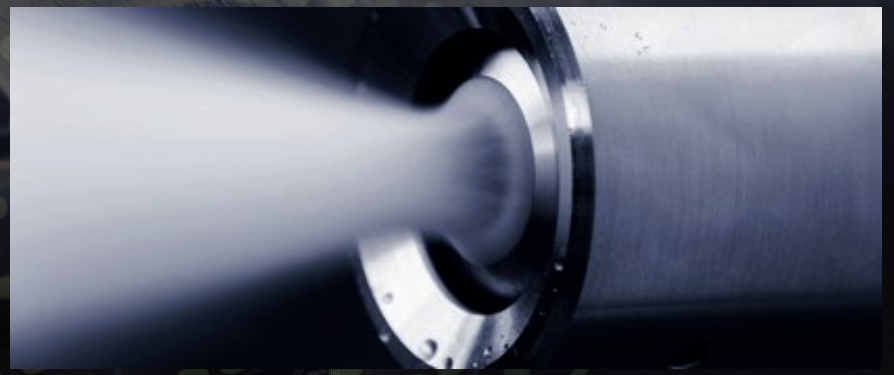


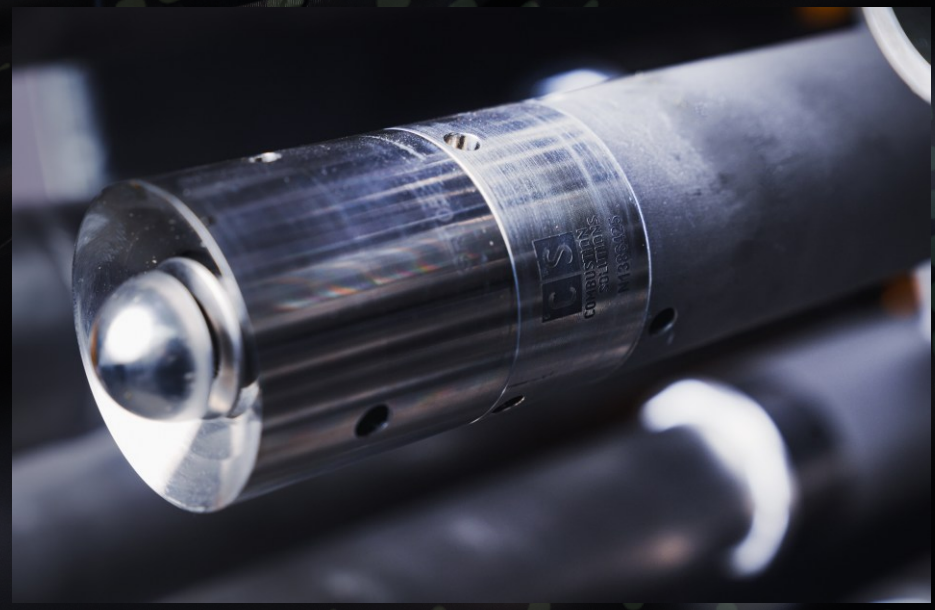
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Advantage - Ultrasonic atomization

- Allows big particles, self cleaning
- Wide range of materials possible
- No moving parts
- Less abrasion
- Increased control range
- Spray pattern adjustable

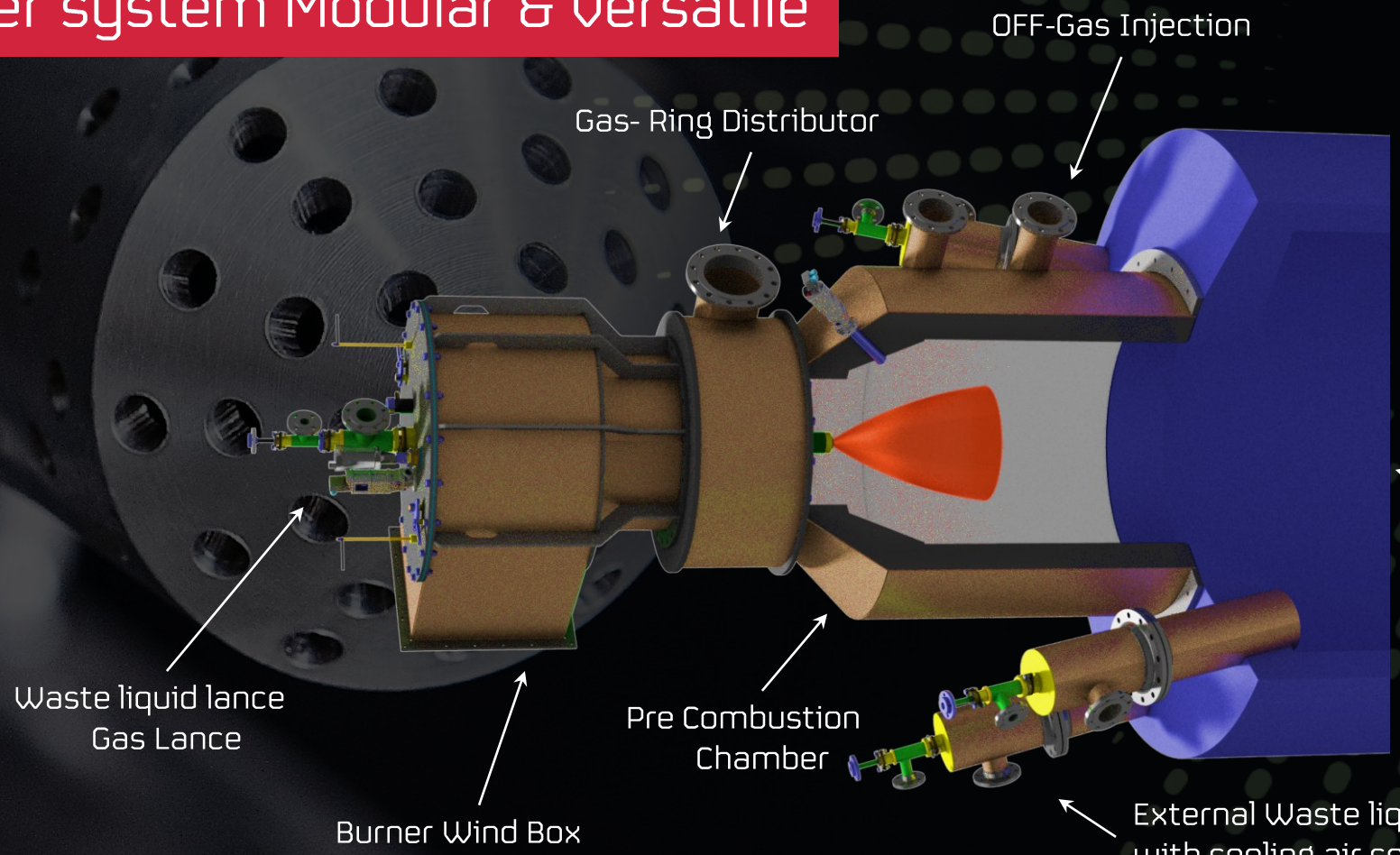




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CS burner system Modular & versatile



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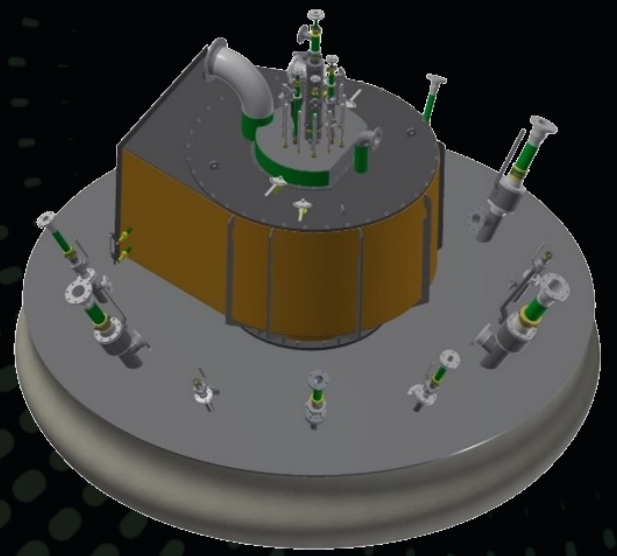
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Selected References - Multifuel combustion unit

- For a total of >30 different fuels
- Staged air (λ= 0.8) to reduce NOx formation
- Secondary air injection after completed evaporation of waste liquids
- Complex combination of internal & external lances

Scope of Supply

- 1x Burner SWB 80
- 8x External lances
- 1x Salt melting burner
- Concept design & process calculation
- Valve trains



Plant type:	Boilerplant in Chemical Industry
CS partner:	Oschatz Power, Germany
Operator:	Wanhua Chemical Group
Location:	Yantai, China
Burner capacity:	85 MW
Operating temperature:	> 1.100 °C
Fuel consumption:	13 gas fuels
	19 liquid fuels
	1 solid fuel (TDI tar powder)
Delivery:	September 2017
Start-up:	2018

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Selected References – Multifuel combustion unit

- Further developed design with satellite burners, to manage huge energy input
- for a total of >30 different fuels
- Newly developed dual-ring distributor for big WG flow with low pressure loss

Scope of Supply

- 1x Burner SWP 70
- 4x Satellite burners
- 3x External lances
- 1x Salt melting burner
- Concept design & process calculation



Plant type:	Boilerplant in Chemical Industry
CS partner:	Raschka Guangzhou Engineering & Technology Co., Ltd
Operator:	Wanhua Chemical Group
Location:	Yantai, China
Burner capacity:	75 MW
Operating temperature:	1.400 °C
Fuel consumption:	19 gas fuels
	13 liquid fuels
Delivery:	November 2023
Start-up:	2024

COMBUSTION SOLUTIONS

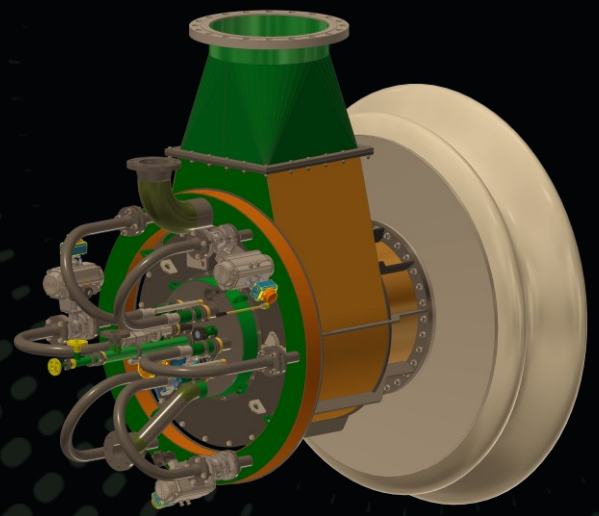
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Selected References – Burner Retrofit

- Increased Turndown for gaseous waste to 1:20
- Optimized flame detection
- Reduced OPEX for wastewater injection by using newly developed CS pre-mixing nozzles SR-P

Scope of Supply

- New burner and lance equipment (turndown ratio 1 : 20 for gas waste/Tail Gas)
- New flame scanners, type Lamtec UV & IR
- New SR-P type ultrasonic nozzles for atomization of waste liquids
- Concept design & process calculation



Plant type:	Process Plant in Chemical Industry
Customer:	-
Operator:	-
Location:	SIngapore
Burner capacity:	28 MW
Operating temperature:	1.200 °C (stage 1) / 1.000 °C (stage 2)
Fuel consumption:	Tail Gas 2.000 Nm^3/h
	NH3 Vent 645 Nm^3/h
	NH3 Neutralization 58 Nm^3/h
	MMP Liquid Residue 500 kg/h
Delivery:	August 2023
Start-up:	November 2023

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Conclusion

Various possibilities supporting plants to

- Increase capacity
- Increase uptime
- Reduce operating costs

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Big Thanks

to all who are open
to innovation & improvements.