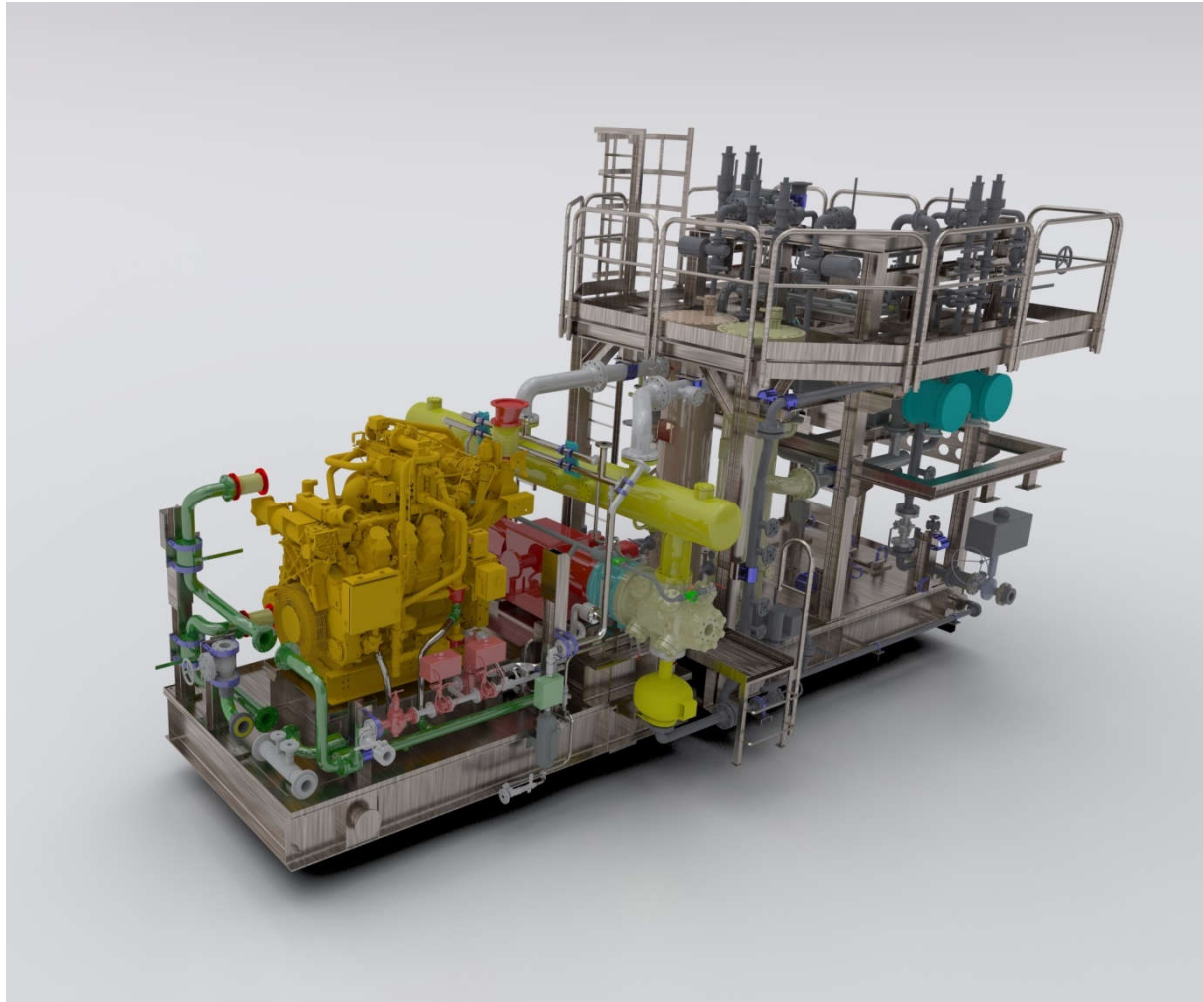


COMPRESSION PACKAGES



Competence at work for Service and Innovation

- ✓ This document presents some Compression Packages engineered by CST
- ✓ With package design, CST delivers all engineering activities to enable the packager to assemble, test, commission, start-up and service complete units
- ✓ Last section of this presentation shows typical engineering deliverables and activities supplied by CST

END USER: Italian Gas Storage Operator
N. of UNITS: 2
SERVICE: Early injection
COMPRESSOR: Reciprocating type – GE Gemini FS 606
DRIVER: Gas Engine – Waukesha 16v 275 GL
START-UP YEAR: 2010
POWER: 3300 kW
CAPACITY: 30.000 Nm³/h
SUCT./DISCH. PRESS.: 24 / 220 barg
GAS TYPE: Natural gas
CAPACITY CONTROL: Speed variation & valve unloaders
AUXILIARY ITEMS: Process gas Aircooler
Acoustic enclosure
Fire & gas detection system
Unit control panel



END USER:	Italian gas producer
N. of UNITS:	1
SERVICE:	Gas booster compressor
COMPRESSOR:	Reciprocating – GE Gemini DS 602
DRIVER:	Electric Motor
START-UP YEAR:	2012
POWER:	800 kW
CAPACITY:	12.000 Nm ³ /h
SUCT./DISCH. PRESS.:	4 / 16 barg
GAS TYPE:	Natural gas
CAPACITY CONTROL:	Variable speed drive Valve unloaders Recycle valves
AUXILIARY ITEMS:	Gas scrubbers Process gas air cooler Acoustic enclosure Process valves Fire & gas detection system Unit control panel



END USER:	African Oilfield
N. of UNITS:	1
SERVICE:	Fuel Gas Booster Compressor
COMPRESSOR:	Reciprocating – GE Gemini DS 602
DRIVER :	Electric Motor
START-UP YEAR:	2012
POWER:	400 kW
CAPACITY:	3.000 Nm ³ /h
SUCT./DISCH. PRESS.:	1,5 / 30 barg
GAS TYPE:	Natural gas
CAPACITY CONTROL:	Recycle Valves
AUXILIARY ITEMS:	Gas scrubbers Process gas air cooler Process valves Fire & gas detection system Unit control panel



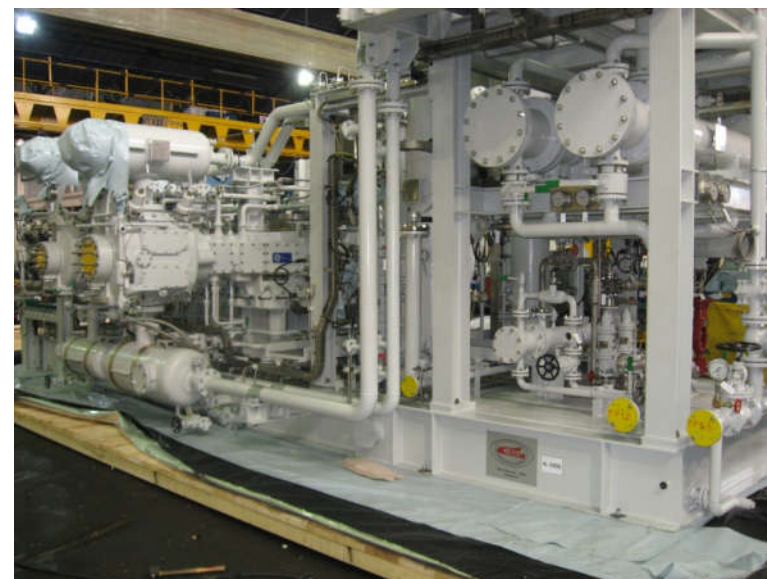
END USER:	Kuwaitian Boosting Station
N. of UNITS:	3
SERVICE:	Fuel gas booster compressor
COMPRESSOR:	Reciprocating – GE Gemini ES 602
DRIVER:	Electric Motor
START-UP YEAR:	2013
POWER:	1.200 kW
CAPACITY:	37.000 Nm ³ /h
SUCT./DISCH. PRESS.:	22 / 42 barg
GAS TYPE:	Natural Gas
CAPACITY CONTROL:	Recycle valves
AUXILIARY ITEMS:	Gas scrubbers
	Process gas / air cooler
	Process valves
	Fire & gas detection system
	Unit control panel



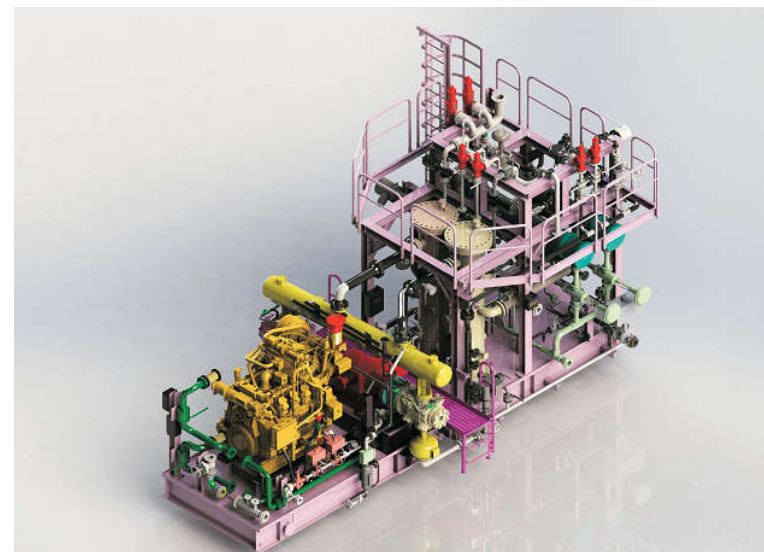
END USER:	Taiwanese Petrochemical Plant
N. of UNITS:	1
SERVICE:	Off-gas compressor
COMPRESSOR:	Reciprocating – GE/NP 2HA/2
DRIVER:	Electric Motor
START-UP YEAR:	2013
POWER:	200 kW
CAPACITY :	1.400 Nm ³ /h
SUCT./DISCH. PRESS.:	Atm / 14 barg
GAS TYPE:	H ₂ Rich + HC
CAPACITY CONTROL:	Valve Unloaders, Recycle Valves
AUXILIARY ITEMS:	Gas scrubbers Heat exchangers Nitrogen rack x packing press. Process valves Unit control panel



END USER:	Taiwanese Petrochemical Plant
N. of UNITS:	1
SERVICE:	Hydrogen Off-gas Compressor
COMPRESSOR:	Reciprocating – GE/NP 4HA/3
DRIVER :	Electric Motor
YEAR OF START-UP:	2013
POWER:	260 kW
CAPACITY:	2.200 Nm ³ /h
SUCT./DISCH. PRESS.:	2.8 / 15 barg
GAS TYPE:	H ₂ Rich + HC
CAPACITY CONTROL:	Valve unloaders & recycle valves
AUXILIARY ITEMS:	Gas scrubbers Heat exchangers Nitrogen rack x packing press. Process valves Unit control panel



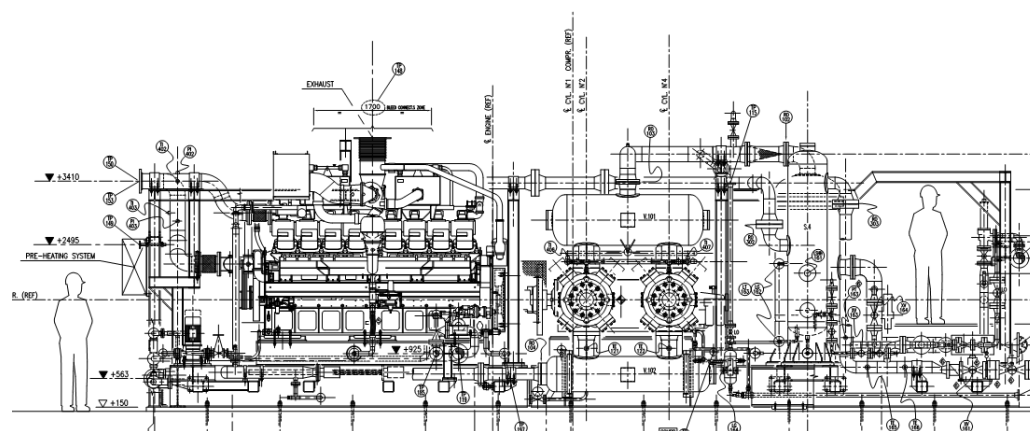
END USER:	African Oilfield
N. of UNITS:	1
SERVICE:	Wellhead associated gas compressor
COMPRESSOR:	Reciprocating – GE Gemini DS 502
DRIVER:	Gas Engine – Caterpillar G3508B
YEAR OF START-UP:	2014
POWER:	515 kW
CAPACITY:	3.200 Nm ³ /h
SUCT./DISCH. PRESS.:	7 / 82 barg
GAS TYPE:	Natural gas + N ₂ + CO ₂
CAPACITY CONTROL:	Speed variation Valve unloaders Recycle valves
AUXILIARY ITEMS:	Gas scrubbers Heat exchangers Process valves Unit control panel



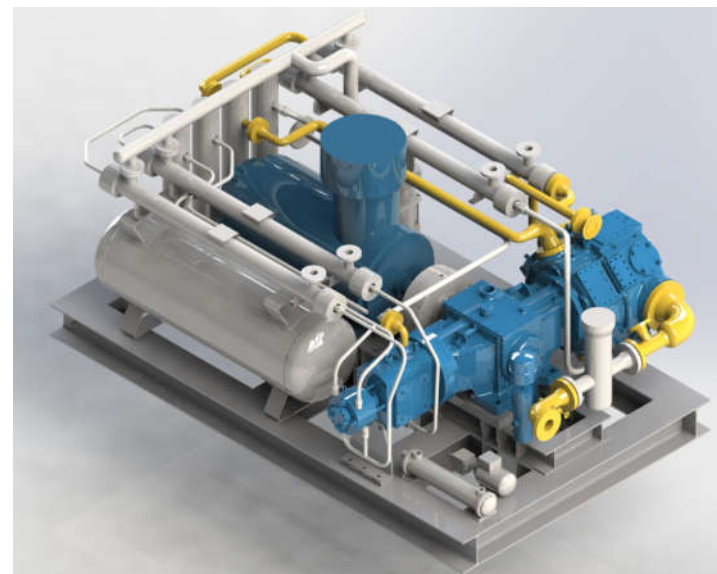
END USER: African Oilfield
N. of Units: 1
SERVICE: Flash gas compressor
COMPRESSOR: Reciprocating – GE Gemini DS 602
DRIVER: Electric Motor
START-UP YEAR: 2014
POWER: 550 kW
CAPACITY: 8.000 Nm³/h
GAS TYPE: Treated natural gas
SUCT./DISCH. PRESS.: 5 / 40 barg
CAPACITY CONTROL: Valve unloaders, Recycle valves, Clearance pockets
AUXILIARY ITEMS: Gas scrubbers
Process gas air cooler
Process valves
Unit control panel



END USER:	Serbian Refinery
UNIT:	2
SERVICE:	CO ₂ compression
COMPRESSOR:	Reciprocating – GE Gemini ES 604
DRIVER:	Gas Engine – WAUKESHA P9390 GSI
START-UP YEAR:	2014
POWER:	1.500 kW
CAPACITY:	7.500 Nm ³ /h
SUCT./DISCH. PRESS. :	2 / 90 barg
GAS TYPE:	CO ₂
CAPACITY CONTROL:	Speed variation, Recycle valves
MAIN ITEMS:	Gas scrubbers Process gas air cooler Process valves Unit control panel



END USER: Russian Customer
UNIT: 1
SERVICE: Natural gas compression
COMPRESSOR: Balanced opposed reciprocating,
type: CST CNG-2
DRIVER: Electric Motor
START-UP YEAR: 2018
POWER: 200 kW
CAPACITY: 1.000 Nm³/h
SUCT./DISCH. PRESS. : 6 / 250 barg
GAS TYPE: CH₄
MAIN ITEMS:
Baseplate and accessories
Process gas air coolers
Process gas scrubbers
Process valves
Blowdown tank



TYPICAL ACTIVITIES DELIVERED BY CST FOR COMPRESSION PACKAGES

SYSTEM ENGINEERING

- Functional diagrams (P&I, PFD)
- Equipment list & procurement specifications
- Heat&Mass balance (Hysys)
- Support to Hazop & SIL assessment
- Test Procedures (MRT & Performance)

PROJECT ENGINEERING AND MANAGEMENT

- Project management & planning
- Customer technical interface
- Inspection & test compliance
- Kick-off & Project review meetings
- Supply chain management

INSTRUMENT & CONTROL ENGINEERING

- Instrument Index & Datasheets
- Control, safety & shutdown valves (sizing & specifications)
- Pneumatic, hydraulic, primary hook-up diagrams
- Control logic narrative
- Control System Block Diagram



PIPING & STRUCTURAL

- System Layout
- Equipment 3D model
- Foundation footprint
- Isometric diagrams

FIELD SERVICES & SPECIAL ANALYSES

- Supervision to shop inspection, erection, commissioning & start-up
- Support to performance test
- Operation & Maintenance training
- Torsional analysis
- Acoustic and mechanical piping analysis (Api 618)