



**UREA AND AMMONIA PLANT COMPRESSORS
NEW GENERATION
PRACTICAL COMPREHENSIVE SOLUTIONS**

HIGH EFFICIENCY LARGE-SIZE
Multi-Stage Centrifugal Compressors and
Mechanical Drive Steam Turbines Manufacturer



OVERVIEW

NEW JCM is an experienced manufacturer of complete compression systems based on custom designed equipment for all urea and ammonia plant compressors.

This is to say, apart from multi-stage centrifugal compressors, NEW JCM is also a manufacturer of mechanical drive steam turbines which enables us to meet the related licensor's heat and material balance for the whole fertilizer plant.



NEW JCM Multi-stage horizontally split and barrel type compressors are designed based on API 617 requirements and apply advanced technology to continue to deliver cost-effective products.

The mechanical drive steam turbines are manufactured in accordance with API 612 Standards and are available up to 20,000 rpm and power of 55 MW.

Designing and manufacturing both compressors and steam turbines enables us to achieve optimum integration resulting into peak efficiency and reliability of the train from both process and mechanical points of view.



This demonstrates that the performance and the mechanical integrity are both part of the NEW JCM home grown standards. In this regard, NEW JCM Test Center is well equipped for ASME PTC-10 Performance Test and Mechanical String Test of the coupled compressor and driver trains.

As to the auxiliary systems, NEW JCM designs and manufactures the lube and control oil units. The structural parts are fabricated in our workshop and the pumps, coolers, filters, control valves, accumulators, instruments etc. are all supplied from well-known manufacturers.

Our advanced design and manufacturing technology results in longer running periods and our modular design provides ease of maintenance.

NEW JCM SUCCESS STORY

In October 2012 NEW JCM was awarded the order for four compressor trains for PARDIS 3rd Urea and Ammonia Petrochemical Plant. This is a MEGA plant with a capacity of 2,050 MTPD for Ammonia and 3,250 MTPD for Urea.

The technology provider for the urea unit was STAMICARBON and for the Ammonia unit was KELLOGG.



In order to enhance reliability, efficiency, operability and safety, NEW JCM took into full consideration the LICENSORS' requirements and criteria regarding design and manufacturing.

To verify the compressors' performance, ASME PTC-10 Type II Tests were performed on the Synthesis, NH₃ and Process Air Compressors with successful results.

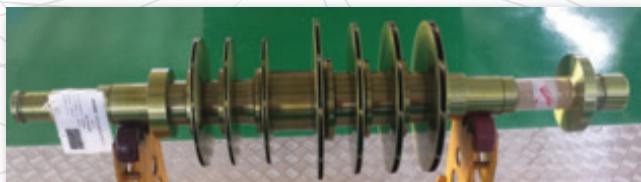
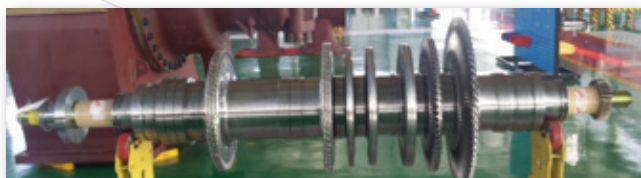
Additionally, to verify the mechanical integrity and simulate the rotor dynamic stability, string tests were also carried out on the CO₂, Synthesis, NH₃ and Process Air Compressor trains including the steam turbine driver, coupling and the (gearbox for the CO₂ Compressor) with successful results. Radial vibrations, shaft movements, bearing temperatures, oil inlet & outlet temperatures were all measured accurately during the tests.

Presently (January 2016), all of the mentioned compressor trains have been installed at Pardis site and are being commissioned.



CO2 COMPRESSORS AND MECHANICAL DRIVE STEAM TURBINES

The CO2 compressor train consisted of a low pressure multi-stage horizontally split casing and a high pressure, multi stage barrel type casing. The 1st stage inlet rated-flow was 62,694 Nm³/h at 1.52 barA. The pressure reached 152.9 barA at the 4th stage discharge. At 65% of the rated capacity the discharge pressure would reach 162.9 barA.



The Steam Turbine, as the driver, was also designed and manufactured in NEW JCM works in accordance with the API 612, 6th Edition Standard. Based on STAMICARBON requirements to meet the heat and material balance, the selected turbine was an induction-extraction condensing type.

Special consideration was paid to the steam turbine design and materials of construction by using Titanium material for the last two stages of the turbine to improve the resistance of the condensing section against corrosion and water droplet erosion leading to an extended life of the turbine.

Turbine Specification

Model: 5MXL-7

Induction-Extraction Condensing type

Rated Power: 15,883KW @ 8,623rpm

Compressor Specification

CO2 LP Compressor Model: 6H-6B six stages (back to back), Horizontally Split Type

CO2 HP Compressor Model: 3V-7B seven stages (back to back), Barrel Type

PROCESS AIR COMPRESSOR AND MECHANICAL DRIVE STEAM TURBINE

The Air compressor train consisted of a low pressure multi-stage horizontally split casing and a high pressure, multi stage barrel type casing. The 1st stage inlet rated-flow was 92,420 Nm³/h at atmospheric pressure. The pressure reached 38.25 barA at the 4th stage discharge. This compressor was also designed to run at 40% of normal capacity as well as N₂ recycle conditions.



The Steam turbine, as the driver, was also designed and manufactured in NEW JCM works in accordance with the API 612, 6th Edition Standard. Based on KELLOGG requirements to meet the heat and material balance, the selected turbine was an induction condensing type.

Special consideration was paid to the steam turbine design and materials of construction by using Titanium material (TC4) for the last two stages of the turbine (Stages 6 & 7) to improve the resistance of the condensing section against corrosion and water droplet erosion leading to an extended life of the turbine.

Turbine Specification

Model: 6MXL-7

Induction Condensing type

Rated Power: 17,679 KW @ 6,173 rpm

Compressor Specification

Air LP Compressor Model: 9H-4B four stages
(back to back) Horizontally Split Type

Air HP Compressor Model: 7V-8B eight stages
(back to back) Barrel Type

NH₃ COMPRESSOR AND MECHANICAL DRIVE STEAM TURBINE

The NH₃ compressor train consisted of a low and a high pressure multi-stage horizontally split casings. The 1st stage inlet rated-flow (Cold Product) was 26,841 Nm³/h at 0.98 barA. The pressure reached 19.1 barA at 4th stage discharge. There were also three side streams before stages 2, 3 & 4.



The Steam Turbine, as the driver, was also designed and manufactured in NEW JCM works in accordance with API 612, 6th Edition Standard. Based on KELLOGG requirements to meet heat and material balance the selected turbine was a back pressure type.

Turbine Specification

Model: 5BH-4
Back pressure type
Rated Power: 12,322 KW @ 7,867 rpm

Compressor Specification

NH₃ LP Compressor Model: 7H-6S six stages
(Tandem) Horizontally Split Type
NH₃ HP Compressor Model: 7H-7C seven stages
(Tandem) Horizontally Split Type

SYNTHESIS GAS COMPRESSOR AND MECHANICAL DRIVE STEAM TURBINE (DOUBLE SHAFT END)

The Synthesis Gas compressor train consisted of a low and a high pressure multi-stage barrel type casings. The 1st stage inlet rated flow was 278,500 Nm³/h at 29.6 barA. The pressure reached 178.1 barA at the 4th stage discharge. This compressor was also designed to run at 65% of rated capacity with a discharge pressure of 162.9 barA.



The Steam turbine, as the driver, was also designed and manufactured in NEW JCM works in accordance with API 612, 6th Edition Standard. Based on KELLOGG requirements to meet the heat and material balance, the selected turbine was an extraction condensing type.

Special consideration was paid to the steam turbine design and materials of construction by using Titanium material for the last stage of the turbine (stage 7) to improve the resistance of the condensing section against corrosion and water droplet erosion leading to an extended life of the turbine.

Synthesis Gas compressor is a high speed machine where speed variations affect the compressor performance drastically. So, the steam turbine had to be designed to achieve the best efficiency range for the compressor during the operation.

Turbine Specification

Model: 5EH7-BD

Extraction Condensing Type

Rated Power: 26,410 KW @ 10,170 rpm

Compressor Specification

SYN LP Compressor Model: 5V-8B, eight stages
(back to back) Barrel Type

SYN HP Compressor Model: 5V-8S, eight stages
(Tandem) Barrel Type

NEW JCM

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