IMPORTANCE OF HEAT RECOVERY IN GASIFICATION PLANTS

Bruno Bülow

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In 2014, Triton, a private equity group, has taken over Alstom's Auxiliary Components business consisting of three divisions with approximately 1,500 employees and revenues of about 500 million Euro. The name changed – excellence remains.
SCHMIDTSCHE SCHACK | ARVOS GMBH

COMPANY HISTORY

2014  Triton acquires Alstom's Auxiliary Components business

2001  ALSTOM Power Air Preheater GmbH merges into ALSTOM Power Energy Recovery GmbH

2000  merger of the power sectors of Alstom and ABB

1998  GEC ALSTHOM listed at the stock exchange in London, Paris and New York

1995  merger of SHG with SCHACK into SHG-SCHACK GmbH

1931  REKUPERATOR SCHACK GmbH

1989  acquisition of the EVT-Gruppe by GEC ALSTHOM

1979  acquisition by EVT Stuttgart

1956  acquisition by DIDIER AG

1910  Founding of Schmidt’sche Heissdampf-Gesellschaft mbH
FROM KASSEL
WORLDWIDE SUCCESSFUL

ARVOS GMBH | SCHMIDTSCHE SCHACK
350 employees, order intake more than 150 Mio.€/a

Kassel
Headquarter & Workshop
SCHMIDTSCHE SCHACK

Düsseldorf
SCHMIDTSCHE SCHACK

Wexford, PA
SCHMIDTSCHE SCHACK

Kobe, Japan
SCHMIDTSCHE SCHACK

Mumbai
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Own fabrication in Kassel, Germany
## INDUSTRIAL HIGH-PRESSURE/HIGH-TEMPERATURE PROCESSES

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SCHMIDTSCHE SCHACK | ARVOS GMBH
LEADER IN TECHNOLOGY

SCHMIDTSCHE SCHACK HAS SUPERIOR EXPERTISE
IN PROCESS HEAT TRANSFER TECHNOLOGY FOR CHEMICAL,
PETROCHEMICAL AND METALLURGICAL REACTION PROCESSES

e. g. ethylene production

- **Unique product platform:** Oval header/double tube design
- Rapid crack gas cooling to freeze chemical reaction and stabilize the formulated ethylene
- Additional achievement: process heat recovery improves efficiency of the process/plant

SCHMIDTSCHE SCHACK´S APPARATUSES ARE
INTEGRAL COMPONENTS OF PRODUCTION PROCESSES
AND IMPROVE THE EFFICIENCY OF THE PLANT OPERATION
RADIANT SYNGAS COOLER REFERENCES

Cool Water IGCC

Tampa 270MW IGCC
SYNGAS COOLER FOR PARTIAL OXIDATION
SCHMIDT’SCHES®
OVAL HEADER/ DOUBLE TUBE DESIGN

Design Principles - Double Tube

• Well-defined flow paths on both sides
• Intensive cooling of each tube
• Straight tubes
• Vertical downflow
• Low water volume for faster response to load variations
SCHMIDT’SCHEN®
OVAL HEADER/DOUBLE TUBE DESIGN

Special Features

- Gas inlet temperature up to 1.600 °C
- Applicable for high gas and dust load
- Resistant against erosion on tube inlet
- No ferrules
Gas Flow Pattern

Funnel-tube inlets guarantees an equal gas distribution into each individual tube

- Low turbulence
- No gas recirculation
- Limited erosion rate
- No temperature peaks
Steam/Water Side Circulation

- Natural circulation
- The overall mass flow through the system is limited by the pressure drops
Design Principles – Oval Header: Flexible Member

- Mechanical and thermal stresses are reduced by using thin-walled oval headers and tubes.
- Thin-walled systems are more flexible and temperature gradients across the wall thickness are lower.
- Protecting the magnetite layer by mitigating and/or eliminating high thermal and mechanical stresses.
SCHMIDT‘SCHE®
OVAL HEADER/DOUBLE TUBE DESIGN

High turbulence

High steam bubble dislodgement in water tube boilers and Schmidt’sche® TLEs

Long Lifetime

- High flow velocities
- Short residence time
- High dislodgement frequency
- Low temperature amplitudes
SCHMIDT´SCHE® SYNGAS COOLERS
BIGGEST GASIFICATION PLANT WORLDWIDE

Reference: Jamnagar

- 10 Schmidt’sche® Syngas Coolers ordered for the world's biggest gasification plant under construction in India
- Biggest and heaviest Syngas Coolers ever built
- Feedstock: Pet coke/Coal
- Gasification process: CB&I (E-Gas)
- Each syngas cooler has a transportation weight of 700 t and a length of 45 m
- Start-up in 2016
60% of the globally produced plastics are generated by means of Schmidt’sche® Transfer Line Exchangers - 7,000 TLEs delivered
Based on SCS’s success in manufacturing 7000 Schmidtsche® oval header/double tube heat exchangers for ethylene plants, SCS has also been applying this design for syngas coolers for gasification processes.
Retrofit and Design Studies

- Analysis of bottlenecks via recalculation
- Improvement of efficiency and reliability
- Reliable information for financial planning
- Ensuring overall success of a project

SCS's experts are pleased to share their experience with plant owners and operators to identify ways of optimizing the operation of their process heat recovery systems.
SUMMARY

• SCHMIDTSCHE SCHACK has more than 50 years experience in the design and fabrication of Syngas Cooling Systems for gasification processes.

• Well-proven, best fitting and optimized heat transfer solution will be selected and offered for any kind of gasification process.

• Design studies support the project from the very first beginning to find the optimal solution.

• Design, Engineering, Manufacturing and Project Management is in one hand and thus warrants the overall success.
THANK YOU FOR YOUR ATTENTION!

www.schmidtsche-schack.com