

Crane Air Conditioning Solution

An often Neglected Core Part at the Steel Industry

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Agenda

- Purpose of Crane AC
- Common problems of Crane AC
- Requirements of Crane AC
- Current status of AC technology
- Outlook on AC development
- Conclusion



Purpose of Crane AC unit

- Providing cooling force for a cabin and / or an e-room
- Dissipation of internal heat loads
- Creating an even cooling supply according to the source of heat
- Elimination of external heat loads from heat conductivity, radiation and convection cause into cabin and e-room by ambient condition
- Creating a good temperature level inside the room for personal and equipment
- Supply of oxygen for operator and service technician



Purpose of Crane AC unit

- Reduction of high relative humidity inside the room
- Prevention of soiling inside the room by ambient pollution
- Protection of equipment from harmful gases and fumes
- Providing heat under cold ambient condition
- Drainage of condensate water from AC operation



Common Problems of Crane AC unit

- Lack of cooling capacity in extreme condition
 - unplanned operation or extreme ambient condition
- Ineffective heat load relief by short circuit of cold air
- Uneven cold air distribution in regard of the existing heat load
- High relative humidity inside the rooms
- Condensate water rise at cold surfaces
- Lack of fresh air supply
 - operator opens windows
 - service team keeps door open



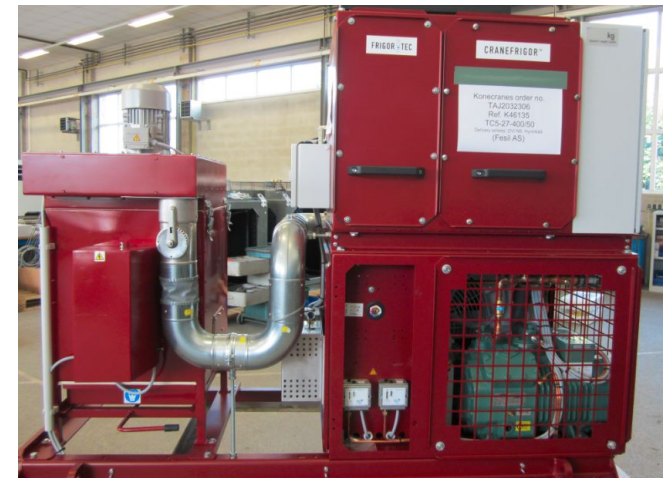
Common Problems of Crane AC unit

- Insufficient protection against shocks and vibration
 - break of pipe connection and damage to components
- Frequent leakage of refrigerants
 - poor quality of pipe work (fixing)
 - lack of vibration protection
 - wrong solder for pipe connection
- High service requirement
 - regular refilling of refrigerant
 - short cleaning intervals
 - frequent replacement of worn parts
- Insufficient air filter system
 - high maintenance effort
 - no protection of harmful or corrosive gasses
 - dust accumulation



Common Problems of Crane AC unit

- High operation cost by inefficient refrigerants
- High global warming potential of refrigerant
- No protection against corrosion
 - pipes
 - heat exchanger
 - frame
 - electronics
- Missing overpressure system
 - accumulation of dust
 - uncontrolled exchange of ambient air
 - humidity intake
 - penetration of corrosive gasses



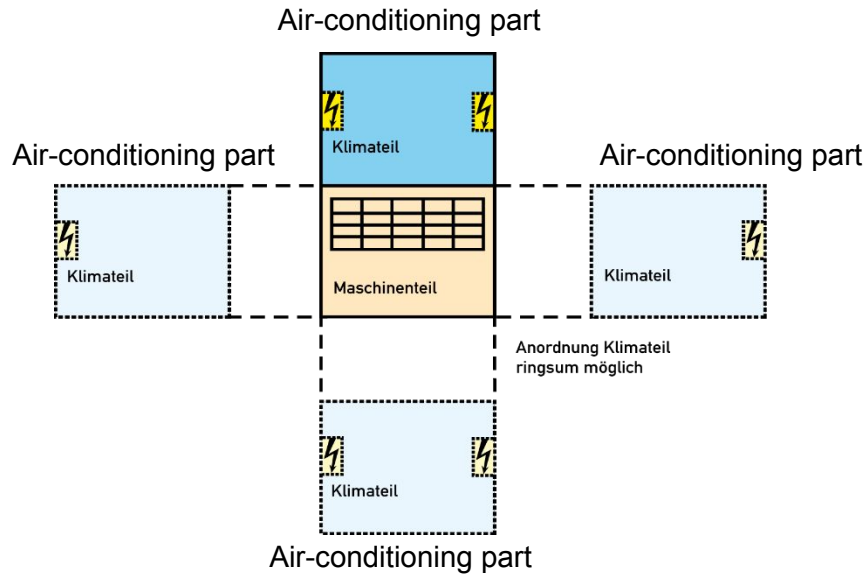
Requirements of Crane AC unit

- Supply of sufficient cooling and heating power according the specification of heat loads and ambient condition
- Reserves to overcome short time extreme condition
- Resistance to condition of crane operation
- Leakage proof cooling cycle
- Resistance against ambient condition
- Environment friendly operation
- Reliable performance according to an operation of 24/7
- Easy to maintain

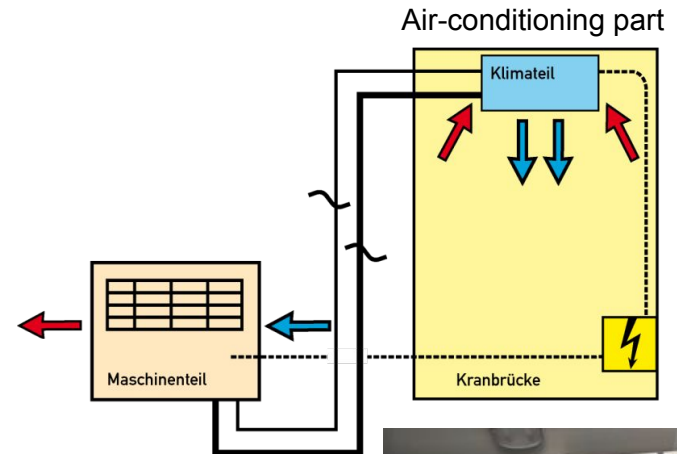


Current status of Crane AC unit

compact device



split device



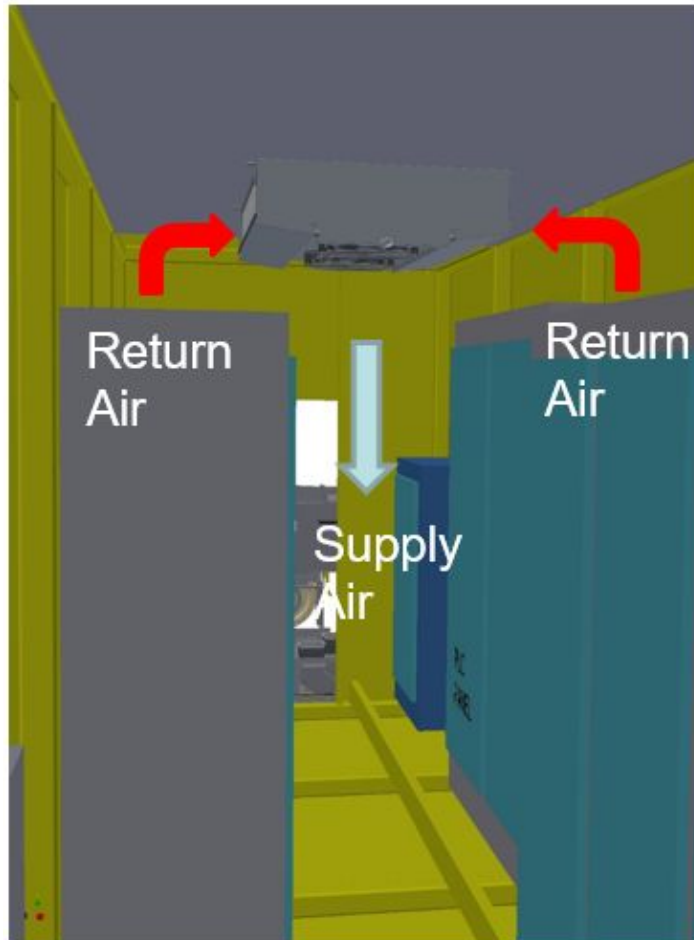
Current status of Crane AC unit

- Vibration and shock absorbing construction for body and pipes
- Solder joints on level of Helium sealed standard
- Material standard of heat exchanger to withstand aggressive condition
- Quality brands of compressor
- Reliable condensate drainage or evaporation



Current status of Crane AC unit

Air flow circulation



Current status of Crane AC unit

Filter / overpressure application



Outlook of AC development

- Readiness for available refrigerants in the future
- Legal requirements and development of new standards
- Environment protection
- Limitation of personnel for operation, service and maintenance
- Online monitoring and reporting, including interaction with specialists
- Spare parts management to minimize stock levels and on-time delivery
- Shift to new green steel solutions for saving of energy and resource
- Longer life cycle with reliable performance



Conclusion

- AC units are a centerpiece of crane operation
- Function and performance are far beyond of just providing cooling
- Use of inadequate technology at a crane cause failures and breakdowns of standard AC units which are made for different applications
- Currents status of AC technology allows a wide range of qualified solutions by expert companies
- Constant evolution of AC units takes place to overcome the challenges by environment and legal condition as well as operational changes and limited manpower



Tailored quality AC units are the resilience of crane operation

Thank you for your attention!

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