AGENDA

- Report from Certification in 2019
  - Participants
  - Facts and Figures
  - Testing
  - Check of Published Data
  - Audits

- Certification Software Development

- Summary
Report from Certification in 2019
COMPRESSOR CC MEMBERS

BITZER Kühlmaschinenbau GmbH
Danfoss Commercial Compressors
Emerson Climate Technologies
Frascold S.p.A
GEA Bock GmbH
Officine Mario Dorin S.p.A.
Tecumseh Europe S.A.
TÜV SÜD (notified bod)

J. Pfaffl
C. Dumas
L. Bravenec
M. Perri
M. Polzer (Convenor)
L. Fanetti
F. Finet
P. Schnepf

In alphabetical order of Company Name
CONDENSING UNIT CC MEMBERS

BITZER M. Koffler
Danfoss G. Renevier
Dorin L. Fanetti
Embraco J. Sedliak
Emerson R. Cap / F. Rinne
Epta: Costan / Misa R. Antonini
Frascold M. Perri / M. Bertolussi
GEA Bock O. Friess
SCM Frigo V. Disanto
Tecumseh F. Guy
Teko A. Wirsching
Zanotti / Technoblock M. Sfragara
TÜV SÜD (notified body) P. Schnepf
Dr.-Ing. Norbert Kämmer on board as of October 2018

- VP Engineering with Emerson Climate Technologies until September 2015

Christian Desjardins semi-retired end of 2018

- Leading Part to build up the Condensing Unit Certification Program
- Was working for 4 Years as ASERCOM Senior Delegate
- Supporting Norbert Kämmer
CERTIFICATION FIGURES 2019 – COMPRESSORS AND CONDENSING UNITS

Certified Products

- 168 sets of data submitted in 3 batches
- 133 compressors and condensing units certified
- On average 8% of submitted products are tested
- 1007 certified products active
# Certification Figures 2019 – Condensing Units

<table>
<thead>
<tr>
<th></th>
<th>Total Entries</th>
<th>Listed Units</th>
<th>Checked Units</th>
<th>Certified Units</th>
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<tr>
<td>BITZER</td>
<td>1206</td>
<td>897</td>
<td>218</td>
<td>91</td>
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<tr>
<td>Danfoss</td>
<td>789</td>
<td>618</td>
<td>127</td>
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<td>Embraco</td>
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<td>Emerson</td>
<td>727</td>
<td>293</td>
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<td>35</td>
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<tr>
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<td>1281</td>
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<td>48</td>
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<tr>
<td>GEA Bock</td>
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<td>31</td>
<td>33</td>
<td>21</td>
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<td>Tecumseh</td>
<td>530</td>
<td>267</td>
<td>219</td>
<td>44</td>
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<td>Teko</td>
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<td>7</td>
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<tr>
<td>Technoblock</td>
<td>514</td>
<td>399</td>
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<tr>
<td>Zanotti</td>
<td>608</td>
<td>447</td>
<td>144</td>
<td>17</td>
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<td><strong>SUM</strong></td>
<td><strong>6286</strong></td>
<td><strong>4233</strong></td>
<td><strong>1654</strong></td>
<td><strong>399</strong></td>
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CHECK OF PUBLISHED DATA (ASERCOM CHECKED)

- **Internal Market Surveillance checks**
  - 355 Condensing Units have been checked by the Senior Delegate in 2019
  - 1654 Units have been checked in total

- **Checked data are**
  - Availability of the Ecodesign product datasheet
  - Data from the Ecodesign datasheet
PUBLISHED DATA ON THE ASERCOM WEBSITE

- Data available on the ASERCOM website (asercom.org)
  - ASERCOM published 6286 sets of condensing unit data on its website
  - Advanced search and filter functions are available to find certified products
  - Filter options for cooling capacity, refrigerant or application

Certified Condensing Units

Filter list by

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Refrigerant</th>
<th>Type</th>
<th>Application</th>
<th>Voltage</th>
<th>Status</th>
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<tbody>
<tr>
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<td>- Any -</td>
<td>- Any -</td>
<td>- Any -</td>
<td>- Any -</td>
<td>Certified</td>
</tr>
</tbody>
</table>

Cooling Cap* between 5.1 and 10.1 kW

*Cooling Cap at to/tamb = -10°C/32°C or -35°C/32°C
COMPRESSOR AND CONDENSING UNIT CONFORMITY TESTS 2019

- 8 Condensing units have been tested out of 168 submitted units
- 6 Compressors have been measured in ASERCOM and independent labs
- 4 External labs qualified and in use (ISO 17025 accreditation)
REGULAR LABORATORIES’ AUDITS

- 4 Audit done by TÜV in 2019 (6th round since 2005):
  - BITZER Schkeuditz April 2019
  - Tecumseh Lyon in October 2019
  - Danfoss Trevoux October 2019
  - Frascold Milano November 2019

- The test stands comply with the EN standard and ASERCOM rules
OUTLOOK – CERTIFICATION IN 2020

- 3 Batches scheduled for compressors in 2020
  - Batch 52, January in Brussels
  - Batch 53, April
  - Batch 54, November

- 1 Batch scheduled for condensing units
  - Batch 10, May in Munich
Certification Software Development
CERTIFICATION SOFTWARE TOOLS

Used for
Engineering -> Data Processing -> Certification
ONGOING SOFTWARE DEVELOPMENT FOR ASEVACU

Board approved further software development projects for 2020

- Tool for CO$_2$ gas cooler unit system simulation
  - Including gas cooler simulation
- Microchannel heat exchanger modul
NEW REFRIGERANT LIBRARY
ASEREP II

- Common, unique and consistent refrigerant properties data base, used by all European compressor manufacturers
- Rapid processing speed for state of the art controller and web applications
- Processes all upcoming and existing like HFO’s and
CERTIFICATION SOFTWARE TOOLS

- Several Software tools developed by ASERCOM
  - ASEVALCU
    - Assists engineering by calculating and pairing different condenser fans, compressors and new refrigerants
    - Generates performance data for documentation and catalogues
    - Supports certification process
  - ASEVAL
    - Assists creating compressor performance data and documentation
    - Supports certification process
  - ASEREP II
    - ASERCOM refrigerant library for all upcoming and existing refrigerants to be used in engineering, certification and the official selection software products of the manufacturers
TRUSTED CERTIFICATION SINCE 1999

- Open scheme, large coverage, reliable
- Transparent unit overview for consumers
- Trustworthy information to the market supported by 3rd party review
- Software tools developed for
  - Condensing Unit development
  - Generation of performance data for catalogues
  - Submission of performance data for condensing units and compressor certification
  - Refrigerant data for certification, engineering and selection software products