Optimising domestic safety standards for Air Conditioning, Refrigeration & Heat Pumps

Dr Daniel Colbourne

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Introduction

Heightened need to employ safety standards
Widely recognised that current safety standards pose obstructions, mostly with charge size
Identified as a main obstacles to the uptake of low GWP refrigerants in UNEP (2010) and DG Clima (2017)

Basic paper intends to introduce the approach to A5Cs to help widen use of low GWP refrigerants in a safe way
Options and opportunities to improve safety standards internationally and/or nationally
### Obstructive effect of current charge size limits

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<th>nominal capacity [kW]</th>
<th>Conditioned area [m²]</th>
<th>required charge [kg]</th>
<th>R290 max charge [kg]</th>
<th>ceiling</th>
<th>floor</th>
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### E.g., for air conditioners

<table>
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<th>southern</th>
<th>required charge [kg]</th>
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Practically, charge limits are prohibitive and obstructive for HCs.
Need for greater charge sizes
What safety standards and where
Impact of current safety requirements for HCs

Need to improve safety standards
Revision/development process

Proposal → National committee → Proposal

DC → CDV → CD → FDIS

Working group

CD

Counts

FDIS

INTERNATIONAL STANDARD NORME INTERNATIONALE
International/regional committee activities

- SC61D WG16: A2 and A3 refrigerants
- TC86 SC1 WG1: all refrigerants
- SC61C WG4: all flammable refrigerants
- TC182 WG6: all refrigerants
Examples of newly proposed limits

- R290 charge $[g]$
- Room area $[m^2]$
- Current
- Improv tight
- Airflow
- Retained 20% + current

e.g., R290; $h = 2$ m
Standards development process

- Initial proposal
- CDV/DIS
- DC
- FDIS
- CD
Standards development dynamics

Have to be cautious!
No need for naturals!
A commercial threat!
Don’t want to change (again)!
My boss told me to!
Want absolute proof of safety!

Grrrrr!!!
International and national standards

Countries can intervene, develop national standards.
National modifications to safety standards

SNI 06-6500: Published in 2000; currently being improved for flammables

PNS 60335-2-40: Adopted IEC version but with modifications for HCs

CSN 5149: Adopted ISO version with modifications for flammables

Alignment with EN 378: 2016 Part 1 and Part 2

Improved charge limits (airflow, tightness), releasable charge

Improved charge limits, releasable charge, leak simulation test
National modifications to safety standards

- Currently have a national AC&R safety standard?
  - Yes
  - Nationally developed or adopted ISO, IEC, EN, etc.?
    - Yes
      - Adopted
        - National reqts obstructive or favourable for NRs?
          - Obstructive
            - No further action necessary
          - Favourable
            - Follow national procedures to progress to publication
        - Obstructive
          - Request NC to adopt amendments
        - Favourable
          - Request NC to adopt intl or European standard with national modifications
    - No
      - Request NC to adopt amendments
      - Develop initial text for mods e.g., with GIZ Proklima
      - Submit proposal and supporting docs to NC
      - Follow national procedures to progress to publication
Activities within WG under commercial refrigeration, air conditioner and horizontal standards are under development for improved charge size limits

- But progress is extremely slow
- Countries can and should produce interim domestic standard to help accelerate process
Thank you for your attention!