

RECOMMENDED POLICY GUIDELINES FOR INTEGRATED AND BUILD-IN FANS

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INTRODUCTION



- This presentation should be considered together with Policy Guidelines for Integrated & Build-In fans Sham Morten Gabr 19012015.pdf

INTRODUCTION



- From “Feelings” to “Standardization” to “Compliant or Non-Compliant”...
- Industry impact...

CRITICAP GAPS



- **RISKY & UNWARRANTED** POLICY GAPS CONCERNING
 - INTEGRATED FANS
 - BUILD-IN FANS

INTEGRATED & BUILD-IN FANS



- **INTEGRATED FANS**

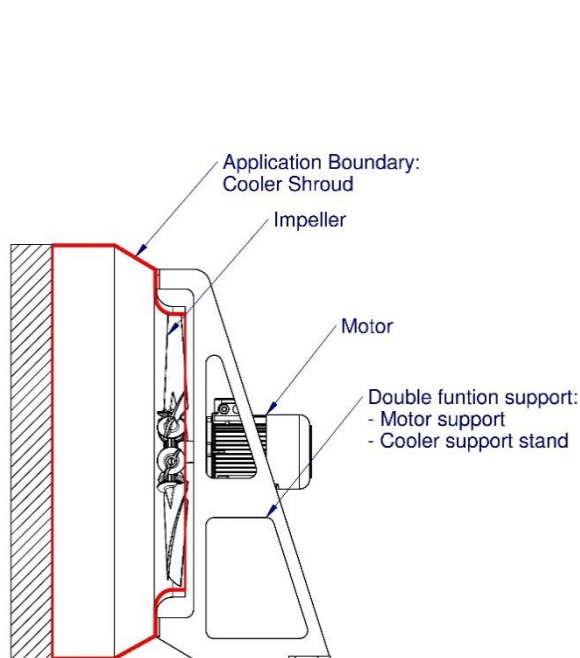
- An configuration of impeller, stator (aerodynamic part), electric motor, transmission or direct drive and possible a variable speed drive integrated into an “other product”

- **BUILD-IN FANS**

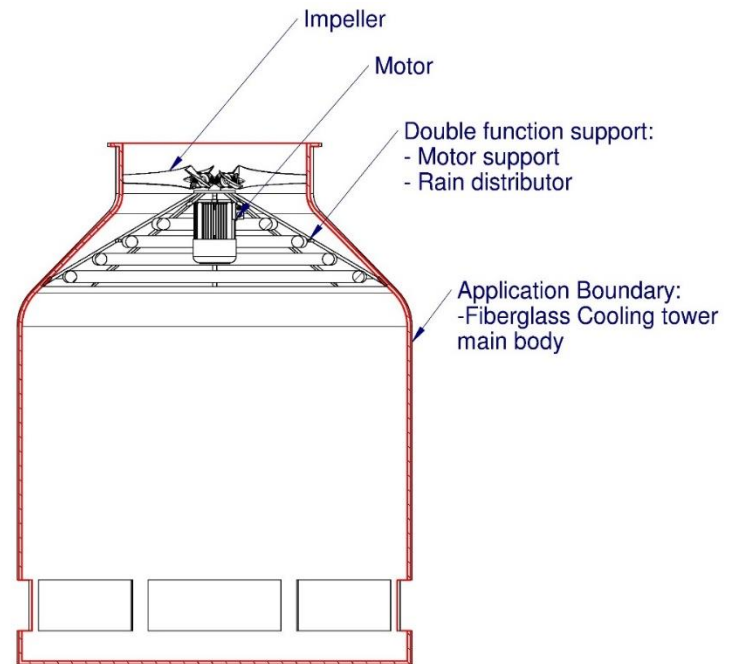
- An configuration of impeller, electric motor, transmission or direct drive and possible a variable speed drive build-in an “other product” such that the system into which it is build-in acts as a housing.

EXAMPLE OF BUILD-IN FANS

The following give example of some non-fan products. Application examples are for guidance and are not exhaustive:



Oil Cooler



Cooling tower

CRITICAP GAPS



- **RISKY & UNWARRANTED** POLICY GAPS CONCERNING
 - INTEGRATED FANS
 - BUILD-IN FANS

AMAZING STAND ALONE FANS OPTIMIZED TOWARDS “BEF”

- Examples are for guidance and are not exhaustive:



INTEGRATED & BUILD-IN FANS CRITICAL **GAPS!**



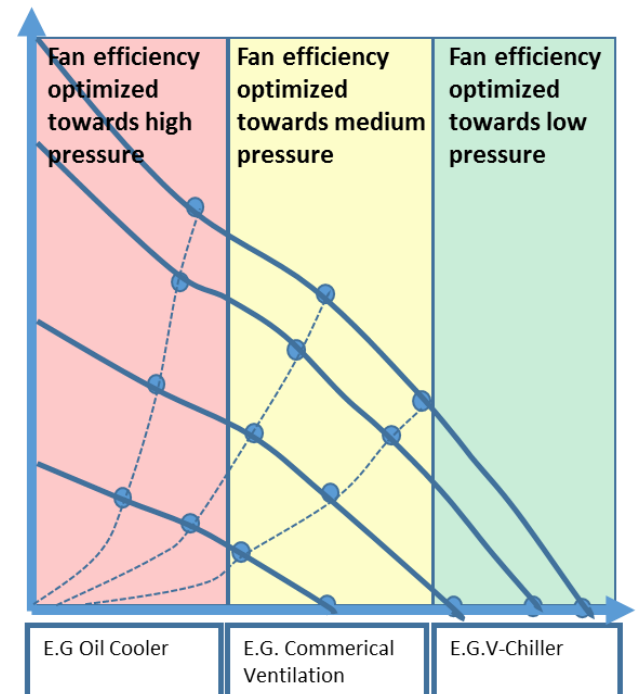
- Fan efficiency optimization and system efficiency optimization are uncoupled cf. “Eurovent 1/12 Sources in Aerodynamic System Resistance and Acoustic Calculation”...

Recommendations

- Minimum efficiency requirements linked to the **final functionality** and **exemptions** or **allowance of difference in testing and installation set-up** for fans. This to counter the complexity of system effects and promote system optimization.
- The fan that in its **optimal configuration** can meet regulated minimum requirements with or without aerodynamic / acoustic parts installed should be **allowed to be corrected** within the system (i.e. change of pitch angle, speed and other characteristics)

INTEGRATED & BUILD-IN FANS CRITICAL GAPS!

- Requested design point may be different from medium pressure..
- Axial fans may be optimized towards either high, medium or low pressure...
 - Different pressure area
 - Shifting of fan curves reducing speed
 - Peak vs. range



Recommendations



- Using either **peak / range efficiency** for different fan types combined with **exemptions for justified application dependent** high and low pressure operating requirements or **using a baseline efficiency that varies** with both airflow and pressure, universally applied to all fan categories.
- Such a metric expressed as a Fan Efficiency Ratio (FER), an energy efficiency metric for fans have recently been developed by AMCA international...

AMAZING IMPROVEMENT OF COMPONENTS

- Examples are for guidance and are not exhaustive:



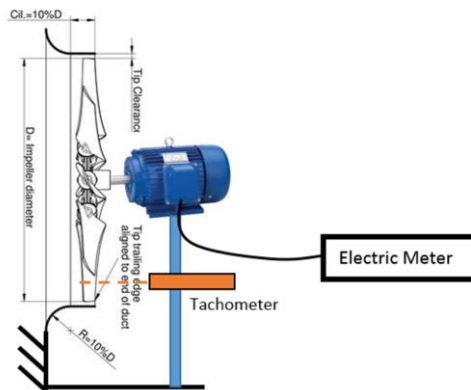
BUILD-IN FANS CRITICAL **GAPS!**



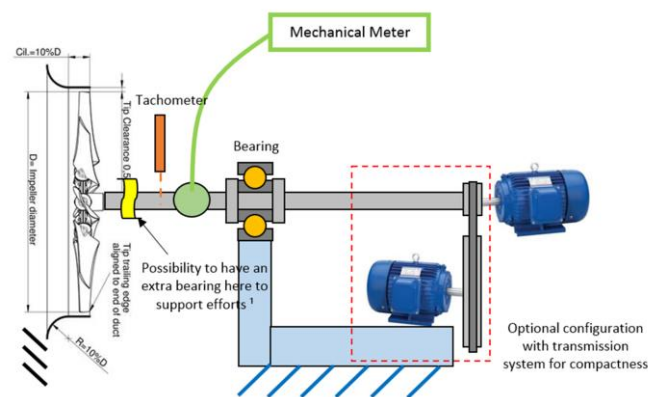
- **Unhoused** driven impellers performance depends on the **system** they are inserted similar to...
- The **housing of stand-alone fans** are **within** the **boundary** of the European Fan Regulation 327/2011 **but the boundary of other products**
- May become **unfit for incorporation** into applications upstream
- **Implementing measures** not yet adequately addressed

Recommendations

- When the final function is not efficiency regulated and / or exempted from the EU Fan Regulation:
 - Assess the conformity of build-in driven impellers based on a lab test-set up relevant for fan efficiency. See appendix D.



Jig with direct driving



The driving system test method

AMAZING IMPROVING UNDERSTANDING OF “ASSOCIATIONS”

- Examples are for guidance and are not exhaustive:



INTEGRATED & BUILD-IN FANS CRITICAL GAPS!

- One is that producers of non-fan products with fans incorporated and/or driven impellers build in generally have **test equipment** for testing their products final functionality but not for fans incorporated/build-in.
- Another is that while, direct measurement is preferred, the **large variety of fan system configurations** makes this impractical together with.
- **Tailor made products** may disappear and **available product ranges** adequate for different required operational duty points may also disappear

Recommendations



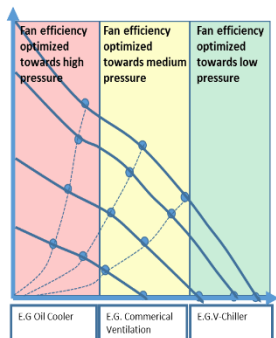
- Promote **a method to estimate** the input power and overall efficiency
- Take into account the **actual association between parts** i.e. take into account the real motor data and motor shaft load.
- See appendix E.

RECOMMENDED POLICY GUIDELINES FOR INTEGRATED & BUILD-IN FANS

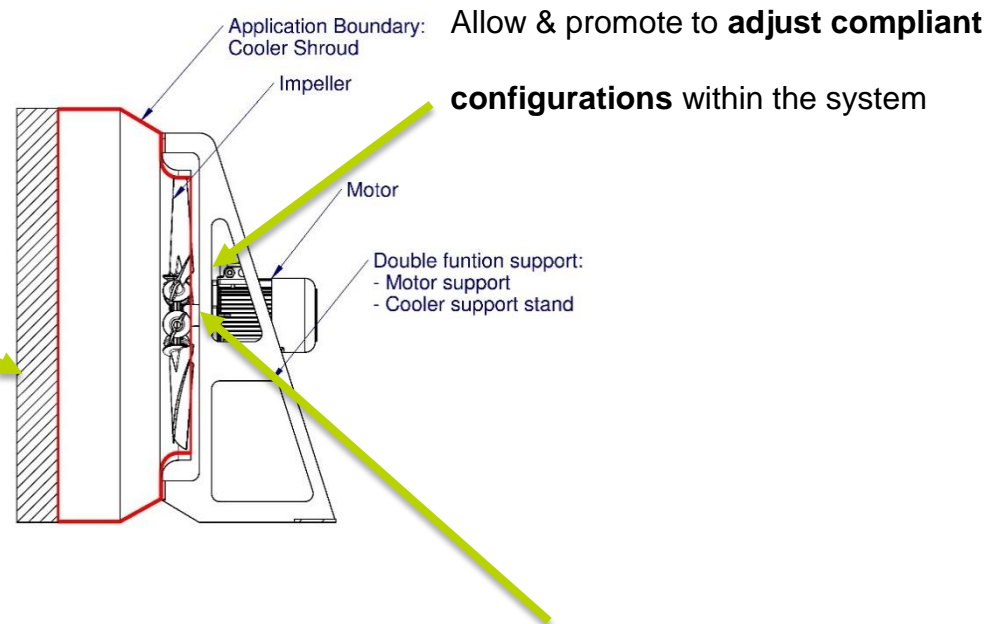
- Minimum efficiency requirements linked to the **final functionality** and **exemptions** or allowance of **difference in testing and installation set-up** for fans.
- Allow & promote to **adjust compliant configurations** within the system
- Using either **peak / range efficiency for different fan types** combined with **exemptions** for justified application dependent high and low pressure operating requirements or using a **baseline efficiency that varies** with both airflow and pressure, universally applied to all fan categories.
- Assess the conformity of **build-in driven impellers** based on a **lab test-set up** relevant for fan efficiency.
- Promote a **method to estimate** the input power and overall efficiency taking into account the **association between parts**.

RECOMMENDED POLICY GUIDELINES FOR INTEGRATED & BUILD-IN FANS

- Minimum efficiency requirements linked to the **final functionality** and **exemptions** or allowance of **difference in testing and installation set-up** for fans (Integrated & Build-In Fans).
- Assess the conformity of **build-in driven impellers** based on a **lab test-set up** relevant for fan efficiency (Build-In Fans).



Using either **peak / range efficiency** for different fan **types** combined with **exemptions** for justified application dependent high and low pressure operating requirements or using a **baseline efficiency that varies** with both airflow and pressure, universally applied to all fan categories.



Promote a **method to estimate** the input power and overall efficiency taking into account the **association between parts**.

RECOMMENDED POLICY GUIDELINES FOR INTEGRATED AND BUILD-IN FANS



THANKS FOR YOUR ATTENTION