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Status update on Ecodesign for fans, and upcoming EU policies of relevance for the fan industry

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Directorate General for Energy
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II. Revised motors and VSD regulation

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I. Policy context
Current Energy and Climate Framework

2020
- 20% GHG
- 40% GHG

2030
- 20% RES
- ≥ 30% RES
- 20% EE
- 32.5% EE

Energy Union Governance
National Energy and Climate Plans (NECPs)
POLITICAL GUIDELINES FOR THE NEXT EUROPEAN COMMISSION 2019-2024

‘A Union that strives for more - My agenda for Europe - by candidate for President of the European Commission Ursula von der Leyen’

1. A European Green Deal (extracts)

I want Europe to strive for more by being the first climate-neutral continent.

To help us achieve our ambition, I will propose a European Green Deal in my first 100 days in office. This will include the first European Climate Law to enshrine the 2050 climate neutrality target into law.

We are on track to meet our ambitious Paris Agreement goals and 2030 targets. But we need to go further and faster if we are serious about climate neutrality in 2050.

We will be a world leader in circular economy and clean technologies
Mission letter to Commissioner designate for energy, Kadri Simson

“To become the world’s first climate-neutral continent, Europe must reduce emissions further and faster, and by at least 50% for 2030 [current objective is 40%]. Given energy production and use accounts for 75% of the EU’s emissions, energy will have a central role to play in the European Green Deal.

I want you to focus on the rapid implementation of energy-efficiency and renewable-energy legislation. […]

You should ensure Europe follows the energy-efficiency-first principle across the board. …”

EU policy framework for energy efficiency

Energy Efficiency Directive 2012/27/EU
Updated 2018/2002

New Directive 2018/844

Energy Labelling
New Regulation 2017/1369 (replacing Directive 2010/30/EU)

Ecodesign Directive 2009/125/EC

Tyre Labelling
Regulation 2009/30/EU
Being revised

Revised as part of the 2016 'Clean energy for all’ package

Financing Energy Efficiency
European Structural Investment Fund; Horizon 2020; LIFE + funding; European Fund for Strategic Investments; Member State programmes; etc.
Ecodesign and energy labelling

- **Ecodesign**: setting minimum efficiency (and other) requirements for energy-related products, which they have to meet before being placed on the EU market.
- First rules date from 1992, currently almost 30 product groups covered.
- **Energy labelling**: providing information on energy efficiency and other performance criteria to consumers.
- First labels date from 1979; currently 15 product groups covered.
Ecodesign and Energy labelling – Expected Results

- Delivers close to **half of the 20% energy efficiency target** for 2020
- 175 Mtoe primary energy savings per year by 2020, i.e. the annual primary **energy consumption of Italy**
- 320 Mt CO₂ equiv. greenhouse gas emission reduction; i.e. around **25% of EU 2020 reduction target**
- Savings of around **€ 500 per household per year**
- **€ 55 billion extra revenue** for industry, wholesale and retail sector

The 2019 Ecodesign and energy labelling package: 17 new/revised measures for 11 products!
Adopted in March/October 2019

<table>
<thead>
<tr>
<th>Product Group</th>
<th>New or (R) Review</th>
<th>Ecodesign</th>
<th>Energy Labelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Entreprise servers</td>
<td>New</td>
<td>(EU) 2019/424</td>
<td></td>
</tr>
<tr>
<td>2. Electric motors and VSDs</td>
<td>R</td>
<td>(EU) 2019/1781</td>
<td></td>
</tr>
<tr>
<td>3. EPS (Electronic Power Supplies)</td>
<td>R</td>
<td>(EU) 2019/1782</td>
<td></td>
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<tr>
<td>4. Power transformers</td>
<td>New</td>
<td>(EU) 2019/1783</td>
<td></td>
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<tr>
<td>5. Welding equipment</td>
<td>New</td>
<td>(EU) 2019/1784</td>
<td></td>
</tr>
<tr>
<td>6. Commercial refrigeration</td>
<td>New</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>7. Domestic refrigeration</td>
<td>R</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>8. Lighting products</td>
<td>R</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>9. Electronic displays and TV</td>
<td>R</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>10. Dishwashers</td>
<td>R</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>11. Washing machines</td>
<td>R</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Published 25 October 2019

Expected publication: 5 December 2019
II. Revised motors and VSD regulation
Electric motors: Review of regulation 640/2009

- New text voted by Member States on 14 January 2019
- Scrutiny by EP and Council: ended in May 2019
- Adoption: 01/10/2019
- Publication: 25/10/2019
  

- Repeals Regulations (EC) 640/2009
- Application date: 1 July 2021
- Includes variable speed drives
## Scope and energy efficiency levels: more ambition!

### Summary table:

<table>
<thead>
<tr>
<th>Scope</th>
<th>2017</th>
<th>2018...2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AC induction motors ( \leq 1000 , V )</strong></td>
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</tr>
<tr>
<td>0.75-375 kW</td>
<td>3 phase, 2/4/6 poles</td>
<td>IE2+VSD/IE3</td>
<td></td>
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<tr>
<td>0.75-1000 kW</td>
<td>3 phase, 2-&gt;8 poles</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>( \geq 75 , \text{kW} )</td>
<td>2/4/6 poles, excl. ATEX, non-integr. brake and Ex eb</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>0.12-0.75 kW</td>
<td>3 phase 2-&gt;8 poles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \geq 0.12 , \text{kW} )</td>
<td>1 phase</td>
<td></td>
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<tr>
<td>0.12-1000 kW</td>
<td>Incre. safety Ex eb 2-&gt;8 poles</td>
<td></td>
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<tr>
<td>ATEX and non-integr. brake motors</td>
<td></td>
<td></td>
<td></td>
<td>No more exempt</td>
<td></td>
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<tr>
<td><strong>Variable speed drives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.12-1000 kW</td>
<td>3-phase</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Current requirements 640/2009</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Requirements new regulation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Color legend:
- Current requirements 640/2009
- Requirements new regulation
New/updated provisions:

- Information requirements for both motors and drives, including efficiency at additional load points to enable extended product approach.

- Anti-circumvention provisions (similar to other new/revised regulations) e.g., the manufacturer shall not place on the market products designed to be able to detect they are being tested.

- Targeted exemptions, incl. 7 years exemption for motors that substitute identical motors integrated in products (spare parts)

Estimated benefits (by 2030):

- Extra energy savings of 10 TWh/yr and GHG emission reduction of 3,2 MtCO₂eq./yr;

- Extra savings on annual end-user expenditure of EUR 1,3 billion and additional business revenue of EUR 0,3 billion per year.
Provisions to facilitate inspection of large motors
(originating from the EU-funded INTAS project on testing of large fans and large transformers)

Motors with a rated power output of 375 to 1 000 kW:

- MSAs may decide to undertake the verification procedure at the premises of manufacturers, using its own testing equipment.

- If factory acceptance tests are planned MSAs may decide to use witnessed testing during these factory acceptance tests to gather test results which can be used to verify compliance.

- MSAs may request a manufacturer to disclose information on any planned factory acceptance tests relevant for witnessed testing.
III. Status update on Ecodesign for fans
Current regulation (EU) No 327/2011

- Sets minimum energy efficiency requirements for fans driven by motors
- Scope: rated electric power input ≥125 W and ≤500 kW at BEP, including those integrated in other energy-related products
- Targeted exemptions (e.g. designed specifically for gas temperature > 100 °C)
- Aim: improving penetration of high-efficiency industrial fans in the EU market.
- 2 tiers, 1 January 2013 and 1 January 2015.
- Distinguishes 7 fan categories:
  - 'Axial fan'
  - 'Centrifugal forward curved' & 'Centrifugal radial bladed' fans
  - 'Centrifugal backward curved fan without housing'
  - 'Centrifugal backward curved fan with housing'
  - 'Mixed flow fan'
  - 'Cross flow fan'
- "Special purpose fans" used in specific applications benefit from a correction factor of 5% or 10%.
- Mandatory information requirements including energy efficiency.
Minimum Fan Efficiency, Static (cat. A,C) per 1.1.2015
Estimated impact of current regulation

28 TWh
Why the review? What is the purpose?

Recital 14: The review should in particular consider:
- setting technology-independent requirements
- potential of use of VSD
- reduce exemptions
- consider fans below 125 W

Article 7: review of Regulation no later than 4 years (CF April 2015)
- assess feasibility of reducing number of fan types
- consider reducing the scope of exemptions, including allowances for dual use fans

+ other relevant issues/topics:
- Scope for increasing requirements, jet fans, etc.
A long process …

- **April 2014**: Ecodesign Work Plan
- **April 2015**: Review study, Consultation Forum on draft measure, Impact assessment + Opinion of RSB, Inter-service consultation
- **Now**: 4 week Feedback mechanism

**Ecodesign (implementing acts) procedure**
- Notification To World Trade Organisation (60 days)
- Regulatory Committee (discussion and vote)
- Scrutiny European Parliament & Council
- Adoption by European Commission
- Publication in the Official Journal

**April 2014**
- 12-week Open Public Consultation & 4-week feedback on Inception Impact Assessment

**April 2015**
What is envisaged?

- Improved **fan definition** with clear boundaries (FprEN 17166)
- Reduction of the number of **fan types**, improved definitions of fan types and simpler calculations (less equations)
- **Jet fans** explicitly added to the scope.
- **Dual use fans**: allowance of 10% (instead of 5% now)
- **Exemptions**: no exemption removed, but:
  - Improve the definition of emergency fans and refer to F300 fire safety class.
  - Clarify/improve the exemption for fans specifically designed to operate in toxic, highly corrosive or flammable environments or when abrasive substances are being handled.
  - Alignment with the motors regulation (e.g. threshold temperatures).
  - Other targeted exemptions considered.
‘Not final assembly’ provisions removed, but the performance of an incomplete fan (impellers, motorized impellers or bare shaft fans) shall be determined in one or more configuration(s) of a complete fan. The exact configuration(s) that has (have) been subject to the conformity assessment shall be described in the documentation.

**Testing methods:**

- tests may be conducted with the geometrical equivalent of the stator’s (housing) inner surface;
- scaled model testing allowed for large fans (impeller > 1 m diam)
- non-essential elements may be removed.

**Market surveillance of large fans**: same as for motors (see above)

**Anti-circumvention**: same as for motors (see above)

**Circular economy (repairability-recyclability):**

- Allow spare part fans on the market for 7 years
- Marking of plastics parts >50 g in order to facilitate identification of their recycling potential.
**Energy efficiency requirements:** as proposed at the CF in 2014.

<table>
<thead>
<tr>
<th>Fan type</th>
<th>Measurement category</th>
<th>Pressure</th>
<th>$N$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axial</td>
<td>A, C static</td>
<td></td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>B, D total</td>
<td></td>
<td>0.64</td>
</tr>
<tr>
<td>Forward curved &lt;5kW and backward inclined centrifugal fans</td>
<td>A, C static</td>
<td></td>
<td>0.52</td>
</tr>
<tr>
<td></td>
<td>B, D total</td>
<td></td>
<td>0.57</td>
</tr>
<tr>
<td>Other centrifugal fans</td>
<td>A, C static</td>
<td></td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td>B, D total</td>
<td></td>
<td>0.67</td>
</tr>
<tr>
<td>Mixed flow</td>
<td>A, C static</td>
<td></td>
<td>0.57+0.07·($\alpha$–45)/25</td>
</tr>
<tr>
<td></td>
<td>B, D total</td>
<td></td>
<td>0.67</td>
</tr>
<tr>
<td>Crossflow</td>
<td>B, D total</td>
<td></td>
<td>0.21</td>
</tr>
<tr>
<td>Jet fans</td>
<td>E See text</td>
<td></td>
<td>0.50</td>
</tr>
</tbody>
</table>

For **jet fans** the same equations are used (see next slide), but the efficiency parameter is the jet-fan impeller efficiency $\eta_r(T)$. Instead of the electrical power input $P_e$ the equations shall use the mechanical power supplied to the impeller of the fan $P_r$ (in kW). $\eta_r(T)$ is calculated as $q_v(T) \cdot \Delta p(T)/P_r = 0.5[ T_m/(\rho \cdot A_2) ]^{0.5} \cdot T_m/P_r$

+ Special considerations for HPLV fans (High Pressure Low Volume fans):
New requirements – example for axial fans

Axial - Static

\[ \eta_{\text{min}} = 0.0456 \ln(P_e) - 0.105 + N \]
\[ \eta_{\text{min}} = 0.011 \ln(P_e) - 0.026 + N \]
\[ \eta_{\text{min}} = 0.0274 \ln(P_e) - 0.0633 + N \]

\[ \eta_{\text{min}} = 0.0078 \ln(P_e) - 0.0188 + N \]
Estimated impact of the revision

Industrial fan electricity consumption (in TWh/yr)

- BAU
- CF

28 TWh
IV. Market surveillance in the EU
EU market surveillance framework

**General principles:** Regulations 765/2008 & 2019/1020, covering all product legislations (from safety of toys to chemicals etc.)

- EU Member States are in charge of market surveillance
- They designate Market Surveillance Authorities (MSAs), for each product legislation (can be at national or regional level)
- Manufacturers issue a Declaration of conformity + "CE marking" + technical documentation (other systems exist e.g. third party certification)
- Compliance is required when the product is placed on the market (or put into service). Verified e.g. through:
  - Sampling products in shops
  - Borders checks (collaboration with customs)
  - Ordering online
  - Purchasing to manufacturers
  - Documentation checks and products testing
  - Etc.
For Ecodesign:

- MSAs are typically:
  - Ministry that also oversees several other regulations, or
  - Energy Agency that also takes market surveillance on board
- National or regional level (with coordination at national level)
- With different legal powers, procedures, ...
- With or without Energy Labelling
- With or without other (related) competences (low voltage directive, EMC ...)

=> Some inspectors deal with many different regulations
How to ensure coherence and effective collaboration?

- Administrative Cooperation Groups (ADCOs) supported and financed by the EU

- Collaboration across legislations through:
  - ADCO chairs meetings
  - Expert Group on the Internal Market for Products

- ICSMS database with inspection results.

- New regulation 2019/1020 => EU product compliance Network (capacity building, training, joint actions, Union testing facilities, ...)

- EU-funded Joint actions
EU funded Joint Actions
Thank you for your attention!

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The view expressed in this presentation are those of the policy officer in charge, and do not necessarily represent those of the Commission.