

Torin-Sifan is fully supportive of the work that has and continues to be undertaken by the consultants and EU with the goal of removing low efficiency fans from the market where known alternative fans with higher efficiencies are understood and proven.

Since the introduction of the first level of requirements in 2013 and the latest requirements effective from January 2015, Torin-Sifan is able to demonstrate the removal from our product ranges of a significant number of fans that are not compliant with the new efficiency requirements and also the development and introduction of fans that do meet the requirements. Without question significant numbers of inefficient fans in the market have been replaced by more efficient alternatives meeting the goal of the Eco Design legislation.

Whilst we support the consultation process and the need to continually remove lower efficiency fans and replace them with higher efficiency options, we believe that the current consultation paper has fallen out of line with the industries understanding of the role of various fan types and what is technically possible with them. It seems we are not recognising the differences of various fan types when installed in application and their impact upon the installed environment of the end user.

Specifically the following key issues are covered overleaf:

1. The role of forward curved centrifugal fans in the market v backward curved variants
2. The slope for forward curved centrifugal fans
3. The timing of change

The Position Of Forward Curved Fans in the Market

From our experience, where a backward curved fan can be successfully used within a given application, it normally is. Product manufacturers are under pressure to comply with both European and local energy efficiency legislation and indeed efficiency levels are seen as a clear sales differentiator between manufacturers in many markets.

Therefore, when a forward curved fan is chosen, it is normally due to the specific requirements of the end user application. Typical examples would be;

- Where space for ventilation is at a premium in a building (e.g. Slim duct & ceiling voids)
- Where noise is a key installation consideration.
- Where there are building regulation requirements.
- An example to demonstrate this would be the installation of a local, ceiling void mounted Fan Coil in a hotel room where space is limited and noise is critical.

We have test data that clearly shows the noise impact of applying a backward curved impeller in a Fan Coil versus a forward curved option. The NR rating of the Fan Coil rose from 35 (f/c) to an unacceptable 42 (b/c) at the same airflow and pressure due to the backward curved impeller having to run twice as fast (1760rpm b/c v 900rpm f/c).

We are also aware in other EU 'Lots' such as Air Heating minimum noise levels have been introduced, where products are installed in close proximity to building occupants.

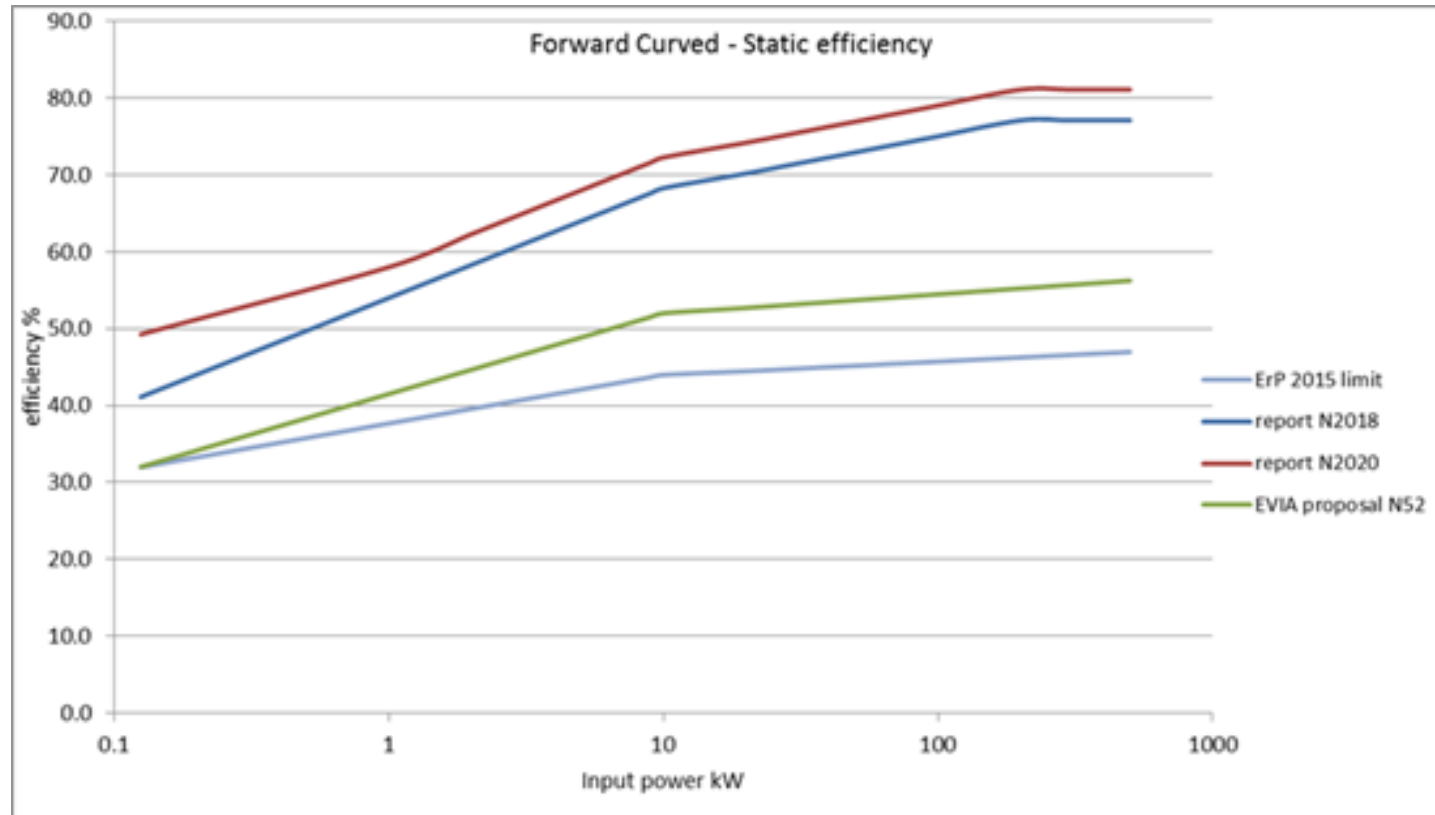
- Whilst it is clear to identify that forward curved fans are an important consideration where space is limited, where space is not limited backward curved fans are the ideal solution. Therefore Forward curved fans are more crucial at lower input powers. EVIA has suggested this is <5kW and we are in full agreement with this. At powers >5kW we do not see a role for forward curved fans.

Can Forward Curved Fans be Directly Replaced by Backward Curved

The answer is No.

- Forward curved fans are smaller than other fan types for a given duty
- Airflow can be as much as 2.5x that of a similar size backward curved impeller
- Forward curved fans produce more pressure v similar sized backward curved impellers
- To match airflow/ pressure, backward curved fans have to run far faster which results in higher noise levels
- To address a mixture of airflow/ pressure or noise much larger backward curved impellers are needed, though application space will not allow for this.
- If space is not negotiable, more backward curved fans may need to be fitted in tandem to achieve the required airflow – a negative impact on input power/ efficiency.
- If we force product manufacturers to build larger products to accommodate backward curved fans and force building regulations to demand more space to accommodate larger fans, what are the negative carbon effects of increased materials processing v the efficiency benefit of the backward curved fan?
- The technical, building regulation & nett carbon benefit implications of replacing forward curved fans with backward curved fans are wide ranging as put simply you can't easily replace a forward curved fan with a backward curved fan and the forward curved fan does have specific advantages v the backward curved option in end user application.

- Accepting the argument that forward curved fans provide an excellent option for products that are installed in space restricted, noise sensitive environments, it is clear the slope proposed by the consultants is impossible for forward curved fans.
- The consultants slope would not allow for any forward curved fans to still be sold.
- Therefore, we need a separate slope specific for forward curved fans as we have had thus far within the regulation, recognising the value they bring to specific applications and ensuring they can still be chosen where needed, as we do for other fan types Axial etc;
- In this regard, we fully support the EVIA proposed slope and N52 level. This allows for the use of forward curved fans where needed, but also ensures that the efficiency level required is highly challenging and reflective of the best available technology for forward curved fans.
- See EVIA Slope overleaf



- The EVIA slope is challenging and reflects best available technology
- We also support the EVIA position that forward curved fans are only sustainable up to 5kW

As Fan producers we are currently in a cycle of change. Changes to product designs, associated changes to tooling, production equipment, motor technology with vast amounts of laboratory testing time being allocated.

To ensure the changes proposed are sustainable for the fan industry both in time and finance, we firmly believe that the next change should not take place until 2020 and believe 2018 does not provide enough time for the industry to manage the changes needed.