WITT&SOHN
IGW Ventilatoren

Summary
of
Industrial fans – Tolerances, methods of conversion and technical data presentation

ISO 13348:2006 (E)

This is only a summary of some of the main points of the above standard to be used for training purpose only. For a complete standard please contact the ISO copyright office or your local vendor.

Points covered in the summary

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- Information to be provided by the contracting parties
- Guide for fan tolerance grades
- Manufacturing tolerances
- Operation at other than optimum efficiency
- Illustration of manufacturing tolerances
- Combined measuring and manufacturing tolerances
- Summary

Information to be provided by the contracting parties

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	Purchaser	Supplier	Documentation	Marking
Volume flow rate	X	(X)	X	X
Total or static pressure increase	X	(X)	X	X
Distribution of pressure losses (inlet/ outlet)	X			
Absolute pressure at the inlet	X			
Density at the inlet	X			X
Temperature at the inlet	X			X
Dust/ vapour/ mist content	X			
Max Sound power level in dB(A)	X			
Max. vibration level	X			
System charateristic if required	X			
Speed cycles	X			
Other specific requirements	X			
Tolerance grade		**Acc. to this standard**		
Absorbed power		X	X	X
Fan speed		X	X	X
Exact scope of supply		X	X	
Major dimensions		X		
Total mass of assembly		X		O
Important design features		X		
Motor output power		X		O
Installation, operation & maintenance instructions		X	X	
Fan power at different operating condition		O		
Sound power in dB(A)		O		
Fan efficiency		O		
Vibration values		O		
Balance quality		O		
Mass moment of inertia		O		
Starting torque curve		O		
Drawing of principal dimensions			X	
Name of manufacturer				X
Model				X
Order and/or serial number				X
Year of manufacture				O
Max operating temperature				O
Max rotational speed				O
Max power				O

Key
X = Provided by
(X) = Confirmed by
O = Optional

Guide for fan tolerance grades

Tolerance grade (air and noise)	Typical application	Material of and manufacturing processes used for, major aerodynamic components	Approx. min. power [a] kW
AN1	Mining (e.g. main fan), process engineering, power stations (e.g. exhaust fan), wind tunnels, tunnels, etc.	Machined in some places, cast (high accuracy)	➢ 500
AN2	Mining, power station, wind tunnels, tunnels, process engineering, air conditioning	Sheet material, partly machined, cast (medium accuracy)	➢ 50
AN3	Process engineering, air conditioning, industrial fans, tunnels, power station fans and industrial fans for harsh (abrasive or corrosive) conditions	Sheet material, cast (medium to low accuracy) , special surface protection (e.g. hot-dip galvanizing).	➢ 10
AN4	Process engineering, ships fans, agriculture, small fans, power station fans and industrial fans for harsh (abrasive or corrosive) conditions	Sheet material, special surface protection (e.g. rubber coating).	□□□

[a] For each class, a recommendation has been given only for the lower power limit; an upper limit is not essential. For example, even if the power is greater than 500 kW, any one of the grades may be assigned.

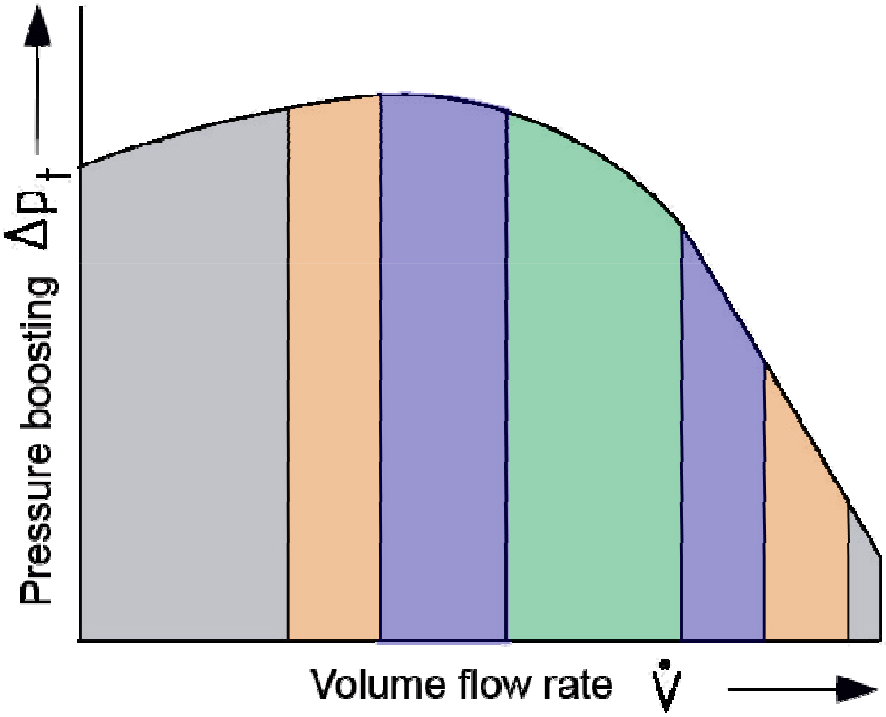
Manufacturing tolerances

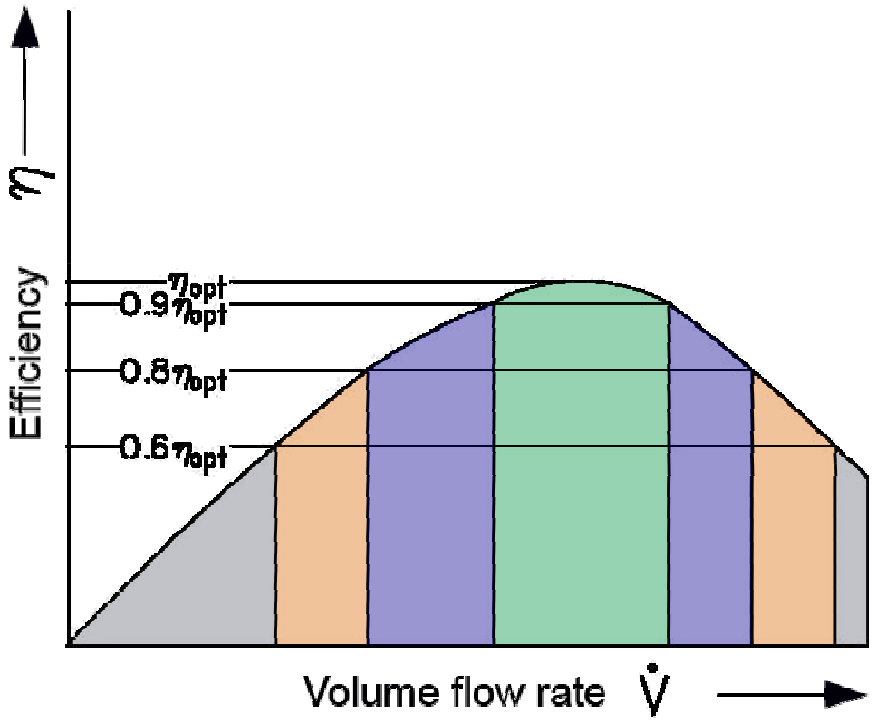
Parameter	Tolerance grade (air and noise)				Additional information
	AN1	AN2	AN3	AN4	
Volume flow rate, q_V	± 1 %	± 2,5 %	± 5 %	± 10 %	
Fan pressure p_F	± 1 %	± 2,5 %	± 5 %	± 10 %	
Power, P_r [a, b]	+ 2 %	+ 3 %	+ 8 %	+ 16%	Negative deviations are permissible.
Efficiency, η	- 1 %	- 2 %	- 5 %	- 12 %	$\Delta_\eta = t_\eta$ i.e. the value of t_η is identical with the permissible tolerance of the efficiency. Positive deviations are permissible.
A-weighted sound power level, L_{WA} [c]	+ 2 dB	+ 3 dB	+ 4 dB	+ 6 dB	$\Delta_{L_{WA}} = t_{L_{WA}}$ The value of $t_{L_{WA}}$ is a permissible tolerance of the sound power level. Negative deviations are permissible.

Operation at other than optimum efficiency

η	Tolerance grade
0,9 – 1,0	Tolerance grade according to the table
0,8 – 0,9	One tolerance grade lower
0,6 – 0,8	Two tolerance grades lower
0,6 <	Three tolerance grades lower

Illustration of manufacturing tolerances





Key

- Accuracy class for optimal η-range $\eta \geq 0{,}9\eta_{opt}$
- One grade lower, accuracy class for $0{,}8\eta_{opt} \leq \eta < 0{,}9\eta_{opt}$
- Two grades lower, accuracy class for $0{,}6\eta_{opt} \leq \eta < 0{,}8\eta_{opt}$
- Three grades lower, accuracy class $\eta < 0{,}6\eta_{opt}$

Combined measuring and manufacturing tolerances

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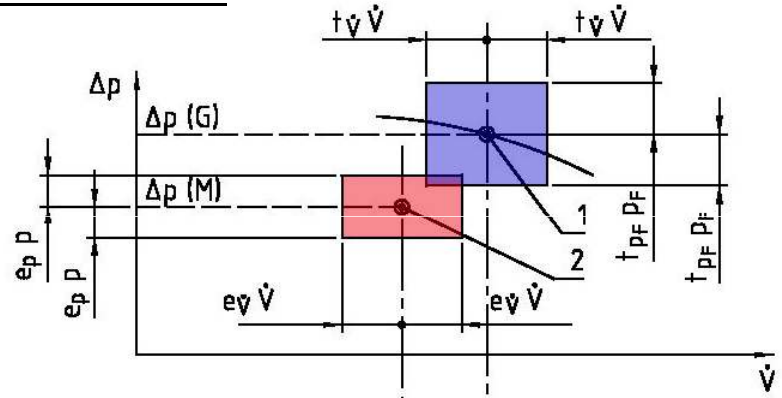
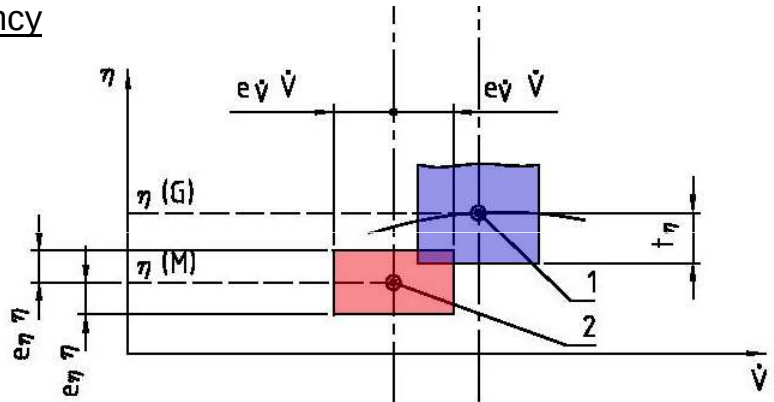
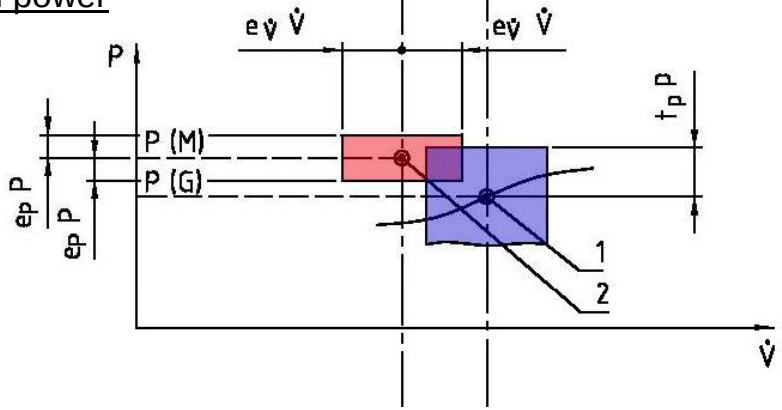
Pressure increase



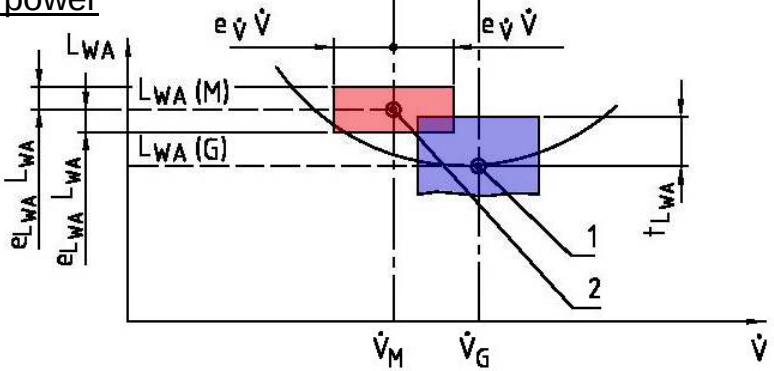
Efficiency



Fan power



Sound power



Value row rate

Key

1 = agreed operating point

2 = measured value (actual operating point)

NOTE 1 = „t“ tolerance specified for the operating point

NOTE 2 = „e“ measurement uncertainly

Summary

- The standard clearly defines the responsibility of providing information of the contracting parties.
- The type of application, materials and the power used defines the tolerance grades.
- Each tolerance grade has its specific manufacturers tolerance values for the key operating parameters.
- The tolerance grades are reduced outside the optimal efficiency area.
- The uncertainty of the measurement and the manufacturers tolerances are additive.