

# DFC

*Double Inlet Centrifugal Fan  
Forward Impeller*



DFC 01-12

December 2012



**DOUBLE INLET CENTRIFUGAL FAN  
Forward Impeller**

### PRODUCT FEATURES

The Forward Curve Impeller generates more volume gradient and low pressure gradient than backward curve of the same size but at the expense of lower efficiency. The scooping action of the forward curve generates a high air velocity which in turn give a high dynamic pressure.

### APPLICATIONS

These models are widely used in for the replacements like low pressure HVAC application such as atomising oil burners , automotive heaters, air-conditioners, space heaters, processing machinery, household appliances, window ventilators draft inducers, electronics, transformers and many others.

In general these fans are suitable for supply or extract applications in commercial, process and industrial HVAC systems such as pack- aged air-conditioners.



*Maico Gulf LLC Certifies that the Dynair model DFC series: version S, M and H for the model 200 to 1000 shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.*

### FLOW RANGES

Flow Volume (CMH)	1000 to 100,000
Total Pressure (Pa)	1500



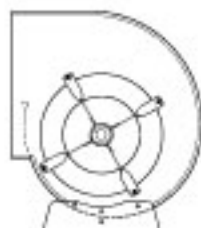
## TYPE / OPERATING LIMIT

Each fan type has its maximum operating speed and power due to its mechanical design. The operating limit of DFC series fan type is design to meet the requirement of class I, II and III limit as defined in AMCA standard 99-2408-69

The DFC series is available in type S, M, H and this series are in accordance with AMCA 99-0098-00 R20.

Model 200 to 250		
Type S	I	Model 710 to 1000
Type M	II	II
Type H	III	III

## CONSTRUCTIONAL FEATURES



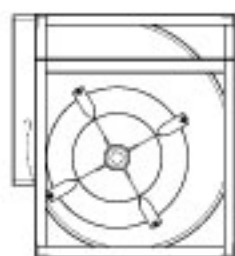
### Type S

This type is supplied with mounting feet and can be mounted in three different orientations. The construction is mainly for OEM application which only subject to testing and approval.

Fan Size : 200 to 250

Volume : 1000 to 50000 m<sup>3</sup>/h

Total Pressure : up to 1400 Pa



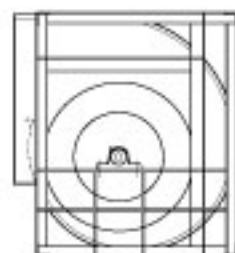
### Type M

This type has a frame fitted on both sides of the fan which gives better strength and rigidity. It allows mounting in four different orientations.

Fan Size : 200 to 710

Volume : 1000 to 50000 m<sup>3</sup>/h

Total Pressure : up to 1400 Pa



### Type H

The structure is similar to type H but utilizes enhanced bearings to support higher dynamic load necessary for the increased performance.

Fan Size : 280 to 1000

Volume : 1500 to 250 000 m<sup>3</sup>/h

Total Pressure : up to 1800 Pa



### *Housing*

*Housings are Factory prefabricated, Formed and reinforced galvanized steel panels to make curved scroll housings with shaped cutoff, spun- metal inlet bell. The housings is fixed with side plates in pittsburg lock form system.*



### *Impeller*

*The Impeller is centrifugal forward curved blades with with high efficiency and manufactured in galvanised sheet steel.*



### *Frame*

*The frame is manufactured with galvanized angular bars for type "M". For type "H", they are manufactured with sections of steel and finished with polyester powder coating.*



### *Shaft*









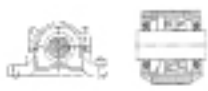
*Shafts are manufactured from C40 carbon steel using an automatic process for positioning and cutting of the keyways. All dimensional tolerances of the shaft are fully checked to ensure a precision fit and then coated with an anti-corrosion varnish after assembly.*



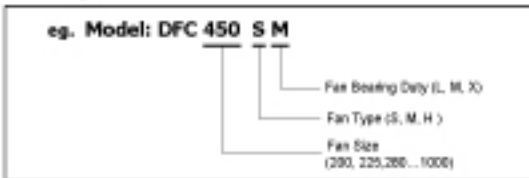
### *Bearings*

*Bearings used are either deep groove ball bearing type with an eccentric locking collar or an adapter sleeve, or spherical roller bearings type sealed at both sides for different duty application as classified in next page:*

## Bearing Details

		Mounted in a rubber housing with spider support		Mounted on Pillow Block Bearing with Side Frame
		S	M	H
Fan Type				
Bearing Duty	SL Light Duty		HL Light Duty 	—
	SM Medium Duty		HM Medium Duty 	HM Medium Duty 
	—	—	—	HX Extra Heavy Duty 

### Bearing References



### Roller Bearing

The bearings are prelubricated and sealed, self-aligning with adapter mount and two piece and this bearing are life time lubricated and maintenance-free.

Roller Bearing Rating Life : AFBMA 9 , L - 50 of 200,000 hours.

Bearings are selected for basic rating fatigue life(L-10) per AFBMA standards in excess of 80,000 hours at maximum operating speed for each pressure class.

### Pillow Block Ball Bearings

The bearings are heavy duty grease lubricated and permanently sealed, self-aligning, pillow block type ballbearing for life and maintenance-free.

Roller Bearing Rating Life : AFBMA 11 , L - 50 of 200,000 hours.

Bearings are selected for minimum L50 life in excess of 200,000 hours at maximum catalogued operating speed for each pressure class.

If re-lubrication is necessary, it is recommended to use lithium base grease suitable for all temperatures within the operational limits.

### Balancing Quality



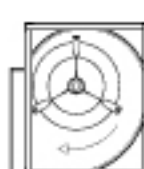
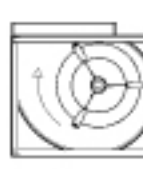

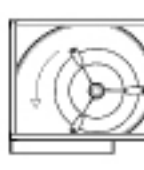

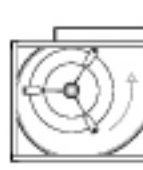
All wheels are statically and dynamically balanced to ISO1940 and AMCA 204 – G2.5 standards. All fans after assembly are trim-balanced to ISO1940 and AMCA 204 – G2.5 standard.

## FAN ROTATION AND DISCHARGE

The rotation and discharge of the fan is in accordance with AMCA standard 99-2406-03. The direction of rotation is determined from the drive side of the fan (refer Fig. below)

CW - clockwise rotation

CCW - counter-clockwise rotation

	90°	180°	270°	360°
CW				
CCW				

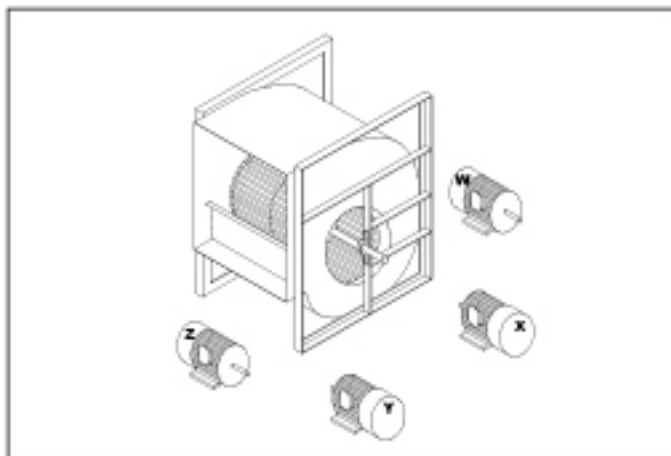
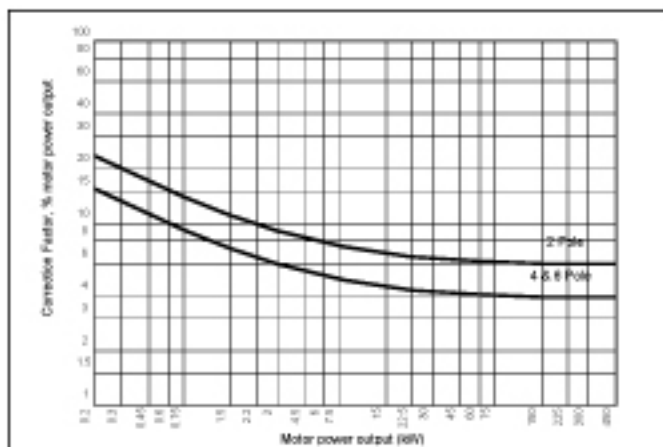


Fig. 4 - Motor Position

### Motor Position

The position of the motor for belt drive centrifugal fan is in accordance with AMCA standard 99-2407-03

Location of motor is determined by facing the drive side of fan and designating the positions by letters W, X, Y, or Z. [refer to Fig.4]



### Motor Selection

The power curve shown on each performance curve represents the absorbed power at the shaft of the fan measured in kW.

To determine the power of the motor to be installed, a correction factor as shown in fig. 5 should be applied to compensate for transmission losses.

For conversion to horsepower (HP), use multiplying factor 1.34.

## Dynamic Pressure

The dynamic pressure and outlet air velocity shown on each curve are calculated on the full air discharge area, i.e. ducted outlet conditions.

With free outlet conditions, the velocity pressure is higher. To determine this new value, multiply the velocity pressure of the ducted outlet obtained from the fan curve by the following correction factor "K".

Fan performances calculate with this correction factors are not licensed by AMCA.

$$[ K = 2.6 ]$$

## Performance

The performance data shown on each diagram has been tested and measured in accordance to AMCA Standard

210 – Fig 12 – installation type B (free inlet and ducted outlet conditions).

Ratings are referred to the standard air density with the total pressure as a function of the air volume, using logarithmic scales.

It is essential that, the same installation type and test standards are used at all times, when comparing fan performances.

## Noise

The noise level shown on each diagram refer to the sound power "A-weighted" and the data on the inlet side has been measured in accordance with AMCA Standard 300 diag. 2 - configuration "B". The noise levels of the fans are determined as follows :

Sound power level - ("A" scale):  $L_w(A)$  as catalogue

Octave band spectrum:  $L_w = L_w(A) + L_w \text{ rel. dB}$  [refer to Maico Gulf more details] Sound pressure level:

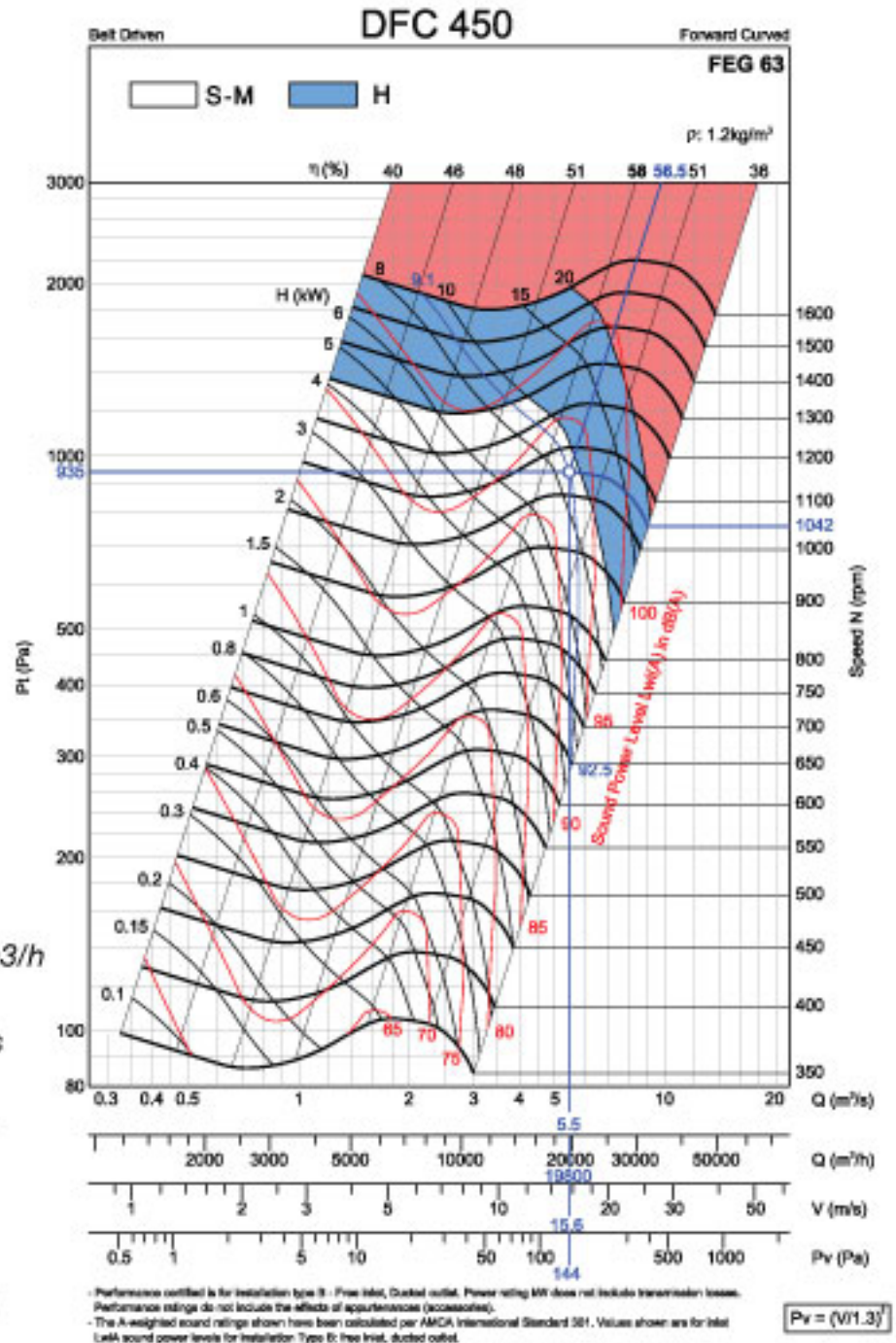
a) free field

$$L_p(A) = L_w(A) - (20 \log_{10} d) - 11$$

b) room conditions

$$L_p(A) = L_w(A) - (20 \log_{10} d) - 7$$

where  $d$  = distance of fan (m)


**EXAMPLE OF SELECTION**


Air Volume  $Q = 20000 \text{ m}^3/\text{h}$

Outlet Velocity  $V = 13.6 \text{ m/s}$

Dynamic Pressure  $P_d = 114 \text{ Pa}$

Total Pressure  $P_t = 737 \text{ Pa}$

Fan Speed  $N = 828 \text{ rpm}$

Absorbed Power  $W = 6.5 \text{ kW}$

Total Efficiency  $\eta = 62 \%$

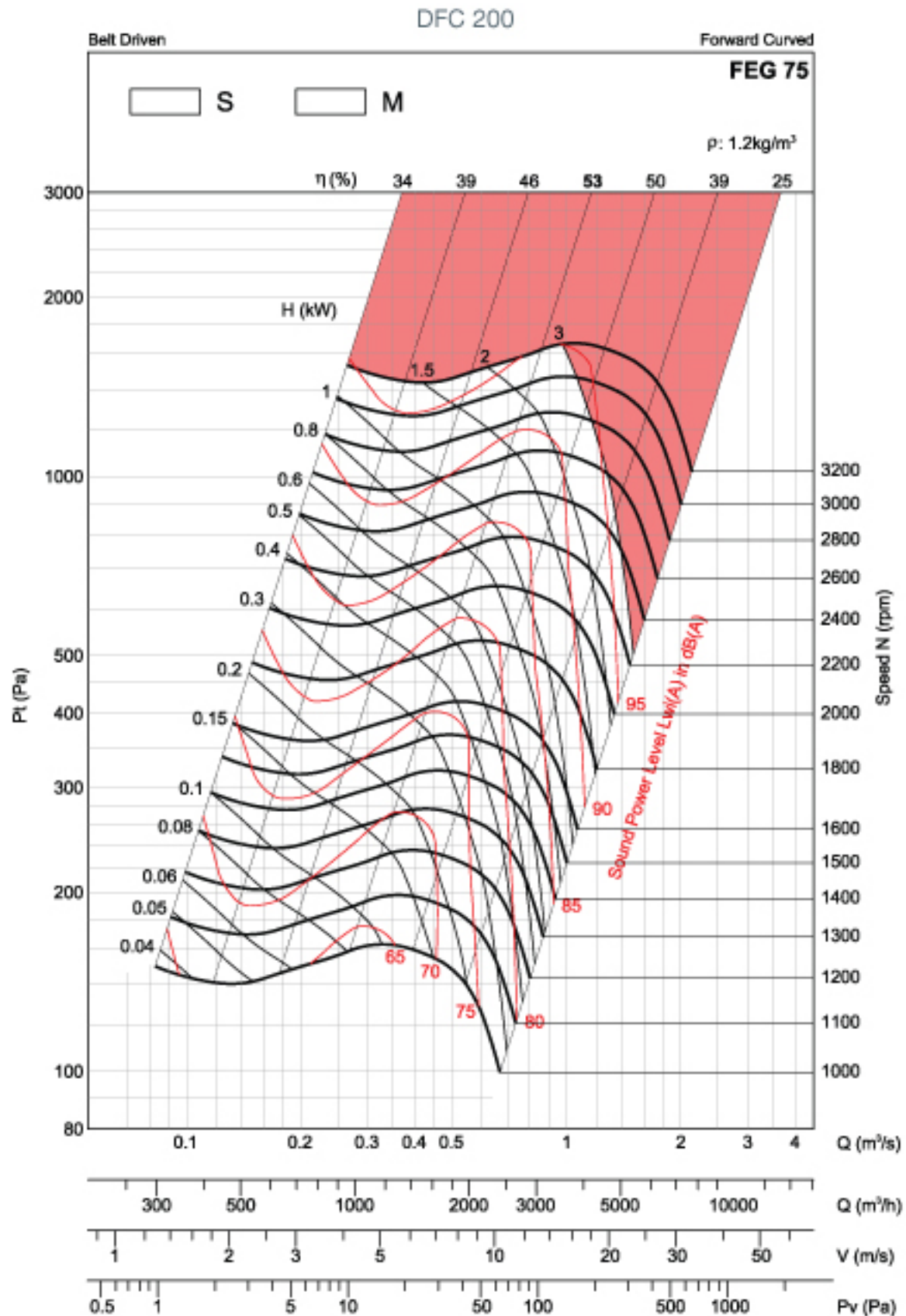
Sound Power Level  $L_w(A) = 95.3 \text{ dB(A)}$





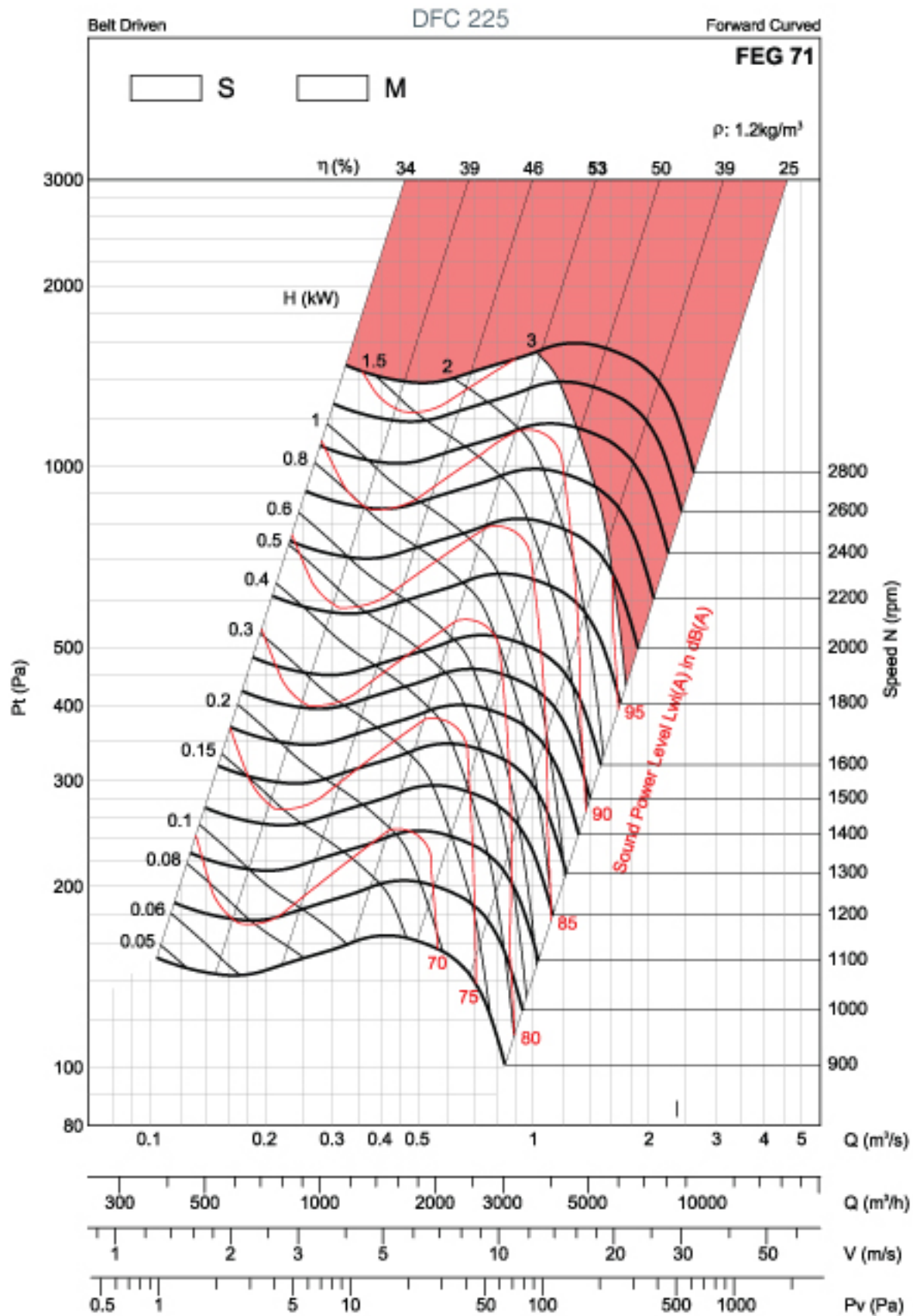
## CENTRIFUGAL FAN ORDERING INFORMATION (S-M)

Fan Details	
<b>■ Fan type</b>	<input type="checkbox"/> DIDW <input type="checkbox"/> SESW
<b>■ Impeller type</b>	<input type="checkbox"/> Forward Curved <input type="checkbox"/> Backward Curved <input type="checkbox"/> Others : _____ (Please State)
<b>■ Model &amp; size e.g. FDA 560 C</b>	<input type="checkbox"/> Model : _____ (If known)
<b>■ Drive type - belt, direct, coupling (if differ from standard)</b>	<input type="checkbox"/> Belt <input type="checkbox"/> Direct <input type="checkbox"/> Coupling <input type="checkbox"/> Others : _____ (Please State)
<b>■ Arrangement (1 &amp; 3 for bare shaft fan; 4, 8 &amp; 12 for complete with drive system)</b>	<input type="checkbox"/> Bare fan <input type="checkbox"/> Complete with drive system
<b>■ Rotation &amp; Discharge e.g. CCW 270</b>	<input type="checkbox"/> CW <input type="checkbox"/> CCW <input type="checkbox"/> 90 <input type="checkbox"/> 180 <input type="checkbox"/> 270 <input type="checkbox"/> 360
<b>■ Motor position (refer to diagram) e.g. W</b>	<input type="checkbox"/> W <input type="checkbox"/> X <input type="checkbox"/> Y <input type="checkbox"/> Z
<b>■ Air Flow Rate</b>	Q : _____ <input type="checkbox"/> L/S <input type="checkbox"/> m <sup>3</sup> /h <input type="checkbox"/> m <sup>3</sup> /min <input type="checkbox"/> m <sup>3</sup> /s <input type="checkbox"/> cfm
<b>■ Pressure (static &amp; total)</b>	SP : _____ TP : _____ <input type="checkbox"/> Pa <input type="checkbox"/> mmH <sub>2</sub> O <input type="checkbox"/> inWG
<b>■ Fan RPM (if specified)</b>	Max. : _____ Min. : _____
<b>■ Noise level</b>	<input type="checkbox"/> dB <input type="checkbox"/> dBA Lw : _____ Lp : _____ at Distance : _____ m <input type="checkbox"/> free field <input type="checkbox"/> room condition <input type="checkbox"/> corner / wall
<b>■ Ambient temperature</b>	<input type="checkbox"/> Temp. : _____ °C
<b>■ Air density, if differ from standard</b>	<input type="checkbox"/> Density : _____ kg/m <sup>3</sup> <input type="checkbox"/> Altitude : _____ m
Motor Details	
<b>■ Power</b>	<input type="checkbox"/> KW : _____ <input type="checkbox"/> HP : _____
<b>■ No. of Poles / RPM</b>	<input type="checkbox"/> 2P <input type="checkbox"/> 4P <input type="checkbox"/> 6P <input type="checkbox"/> 8P <input type="checkbox"/> Others : _____ (pls state RPM)
<b>■ Voltage</b>	<input type="checkbox"/> 220V <input type="checkbox"/> 415V <input type="checkbox"/> 380V <input type="checkbox"/> 440V <input type="checkbox"/> 400V <input type="checkbox"/> Others : _____
<b>■ Phase</b>	<input type="checkbox"/> 1φ <input type="checkbox"/> 3φ
<b>■ Frequency</b>	<input type="checkbox"/> 50 Hz <input type="checkbox"/> 60 Hz
<b>■ Frame size</b>	<input type="checkbox"/> IEC : _____ <input type="checkbox"/> NEMA : _____ <input type="checkbox"/> Others : _____
<b>■ Make, if specified</b>	<input type="checkbox"/> Brand : _____ <input type="checkbox"/> Mfr. : _____ <input type="checkbox"/> Country : _____
Fittings Detail	
<b>■ Accessories</b>	<input type="checkbox"/> Inspection door <input type="checkbox"/> Drain plug <input type="checkbox"/> Flexible duct <input type="checkbox"/> Inlet vane control  <input type="checkbox"/> Vibration Isolators: <input type="checkbox"/> Rubber <input type="checkbox"/> Spring <input type="checkbox"/> Floor-mount <input type="checkbox"/> Ceiling-hang  <input type="checkbox"/> Silencers : <input type="checkbox"/> With pod <input type="checkbox"/> Without pod <input type="checkbox"/> Inlet <input type="checkbox"/> Outlet <input type="checkbox"/> Both inlet & outlet  <input type="checkbox"/> Counter-flanges : <input type="checkbox"/> Flat <input type="checkbox"/> L-type <input type="checkbox"/> U-type <input type="checkbox"/> Inlet <input type="checkbox"/> Outlet
Special Features	
<b>■ Other Requirements</b>	<input type="checkbox"/> Painting <input type="checkbox"/> Powder coating <input type="checkbox"/> Hot-dipped galvanizing  <input type="checkbox"/> Spark-resistant <input type="checkbox"/> Corrosion-resistant <input type="checkbox"/> Heat-resistant, temp. _____ °C <input type="checkbox"/> Smoke Spill, Max. temp. _____ °C for _____ Hr



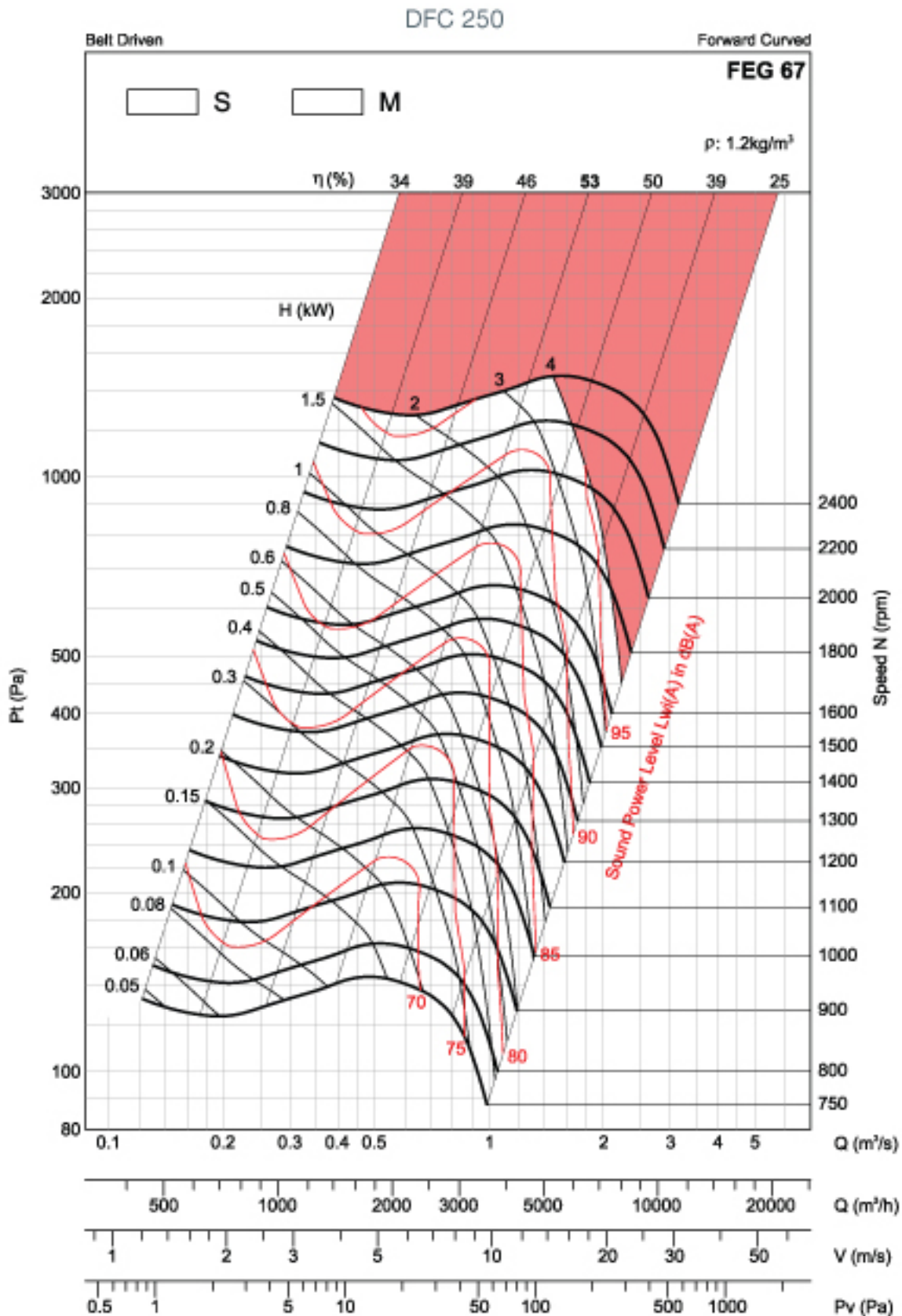
- Performance certified is for installation type B - Free inlet, Ducted outlet. Power rating kW does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).  
 - The A-weighted sound ratings shown have been calculated per AMCA International Standard 331. Values shown are for inlet L<sub>wA</sub> sound power levels for installation Type B: free inlet, ducted outlet.

$$P_v = (V/1.3)^2$$



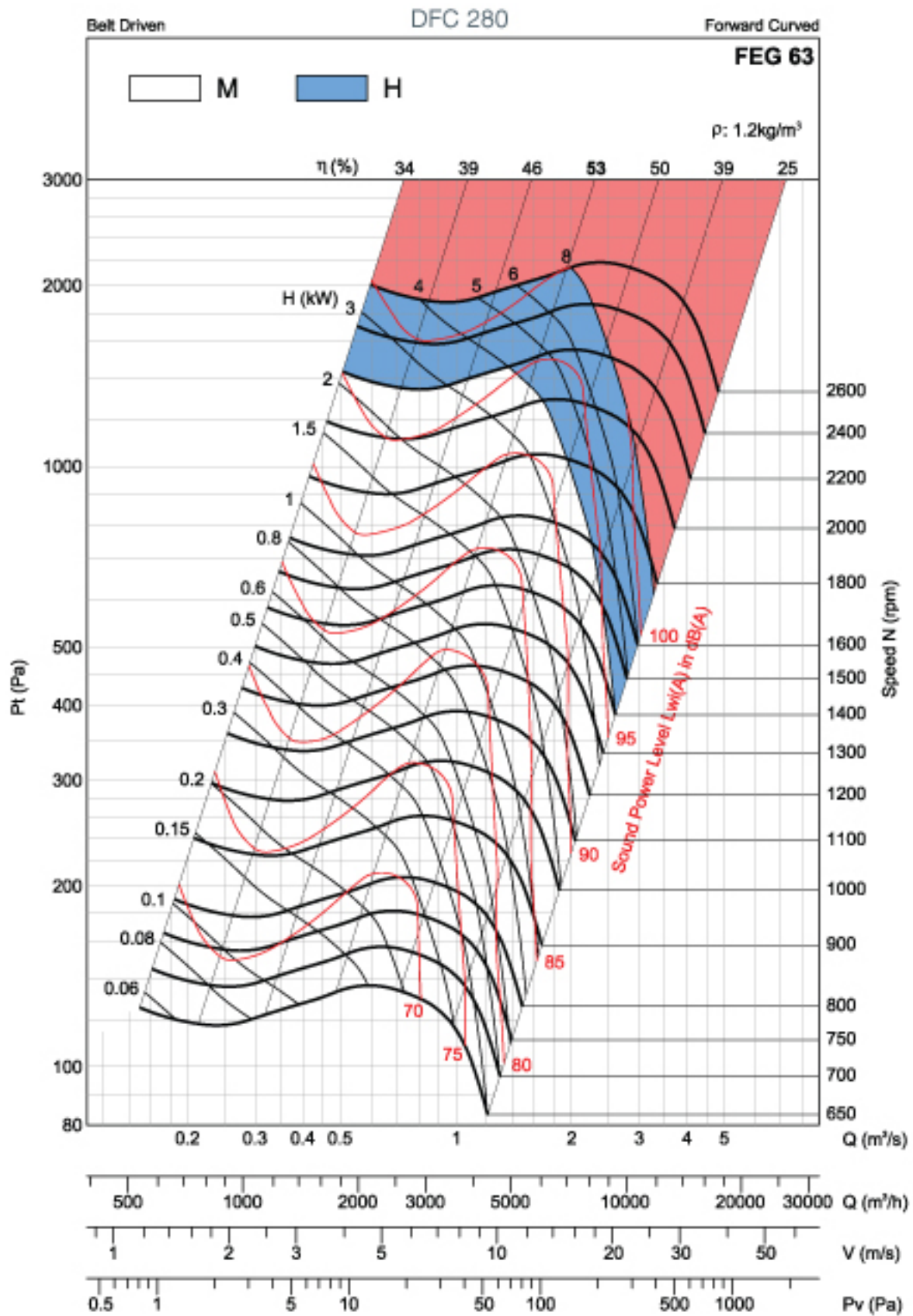
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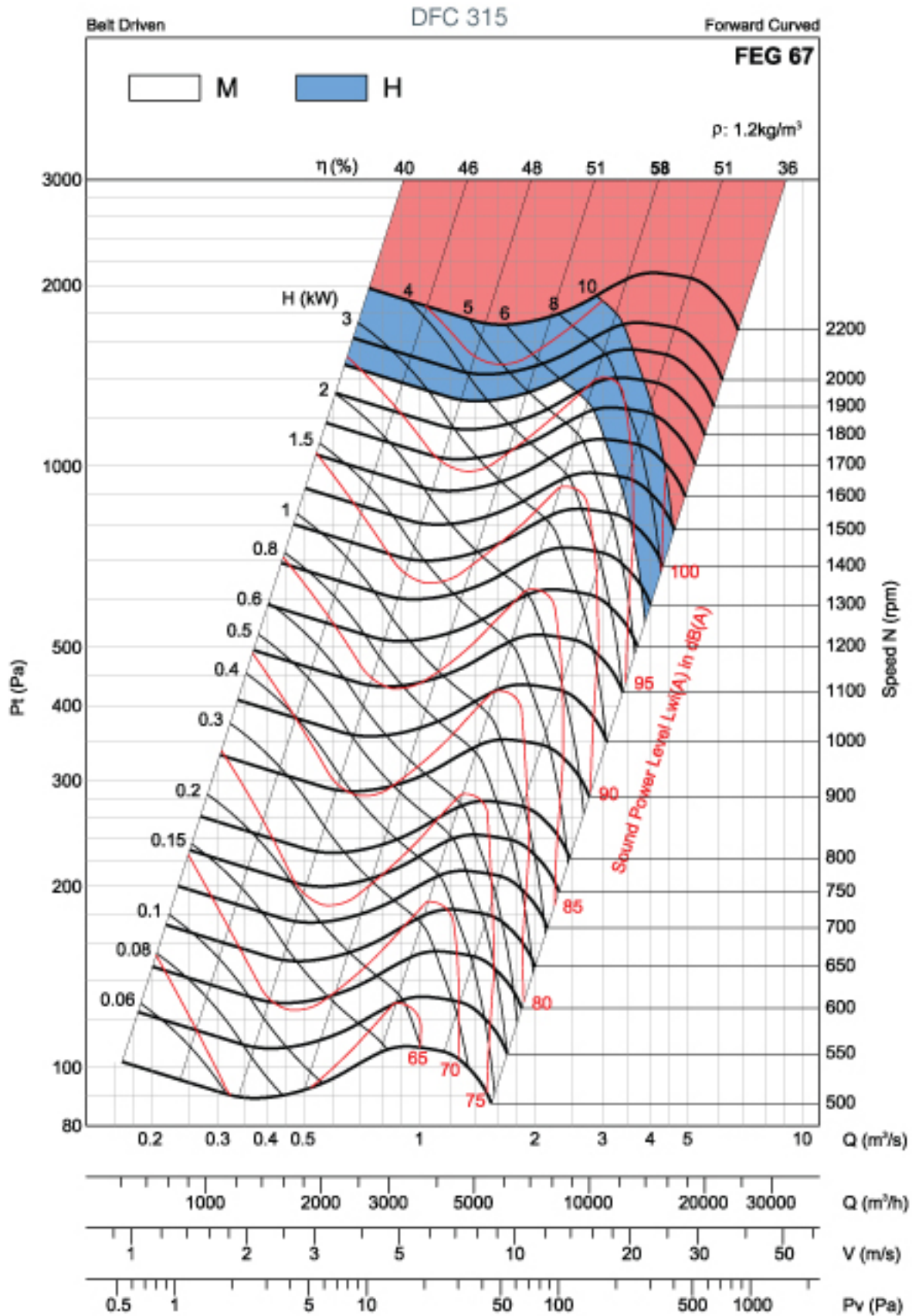
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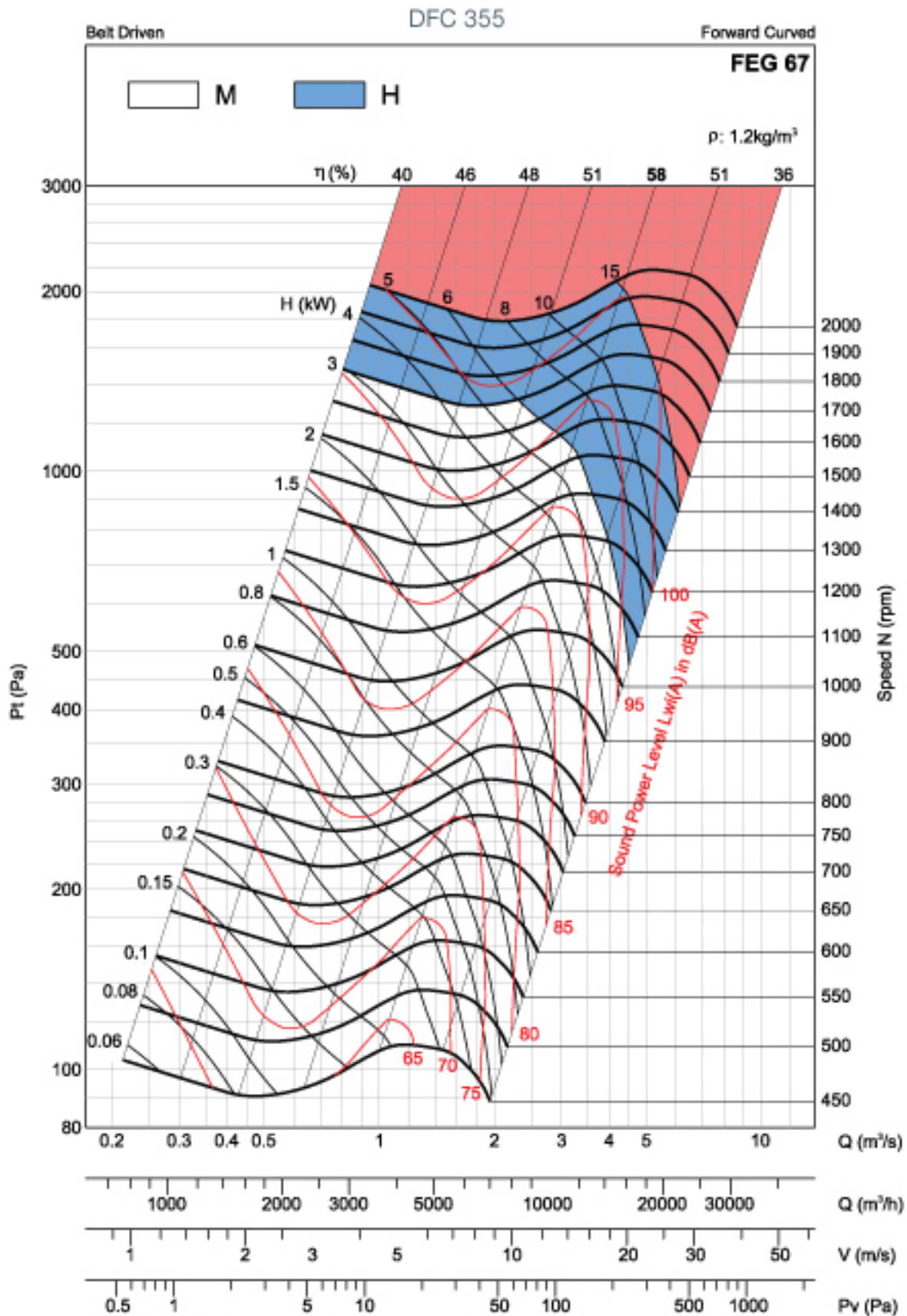
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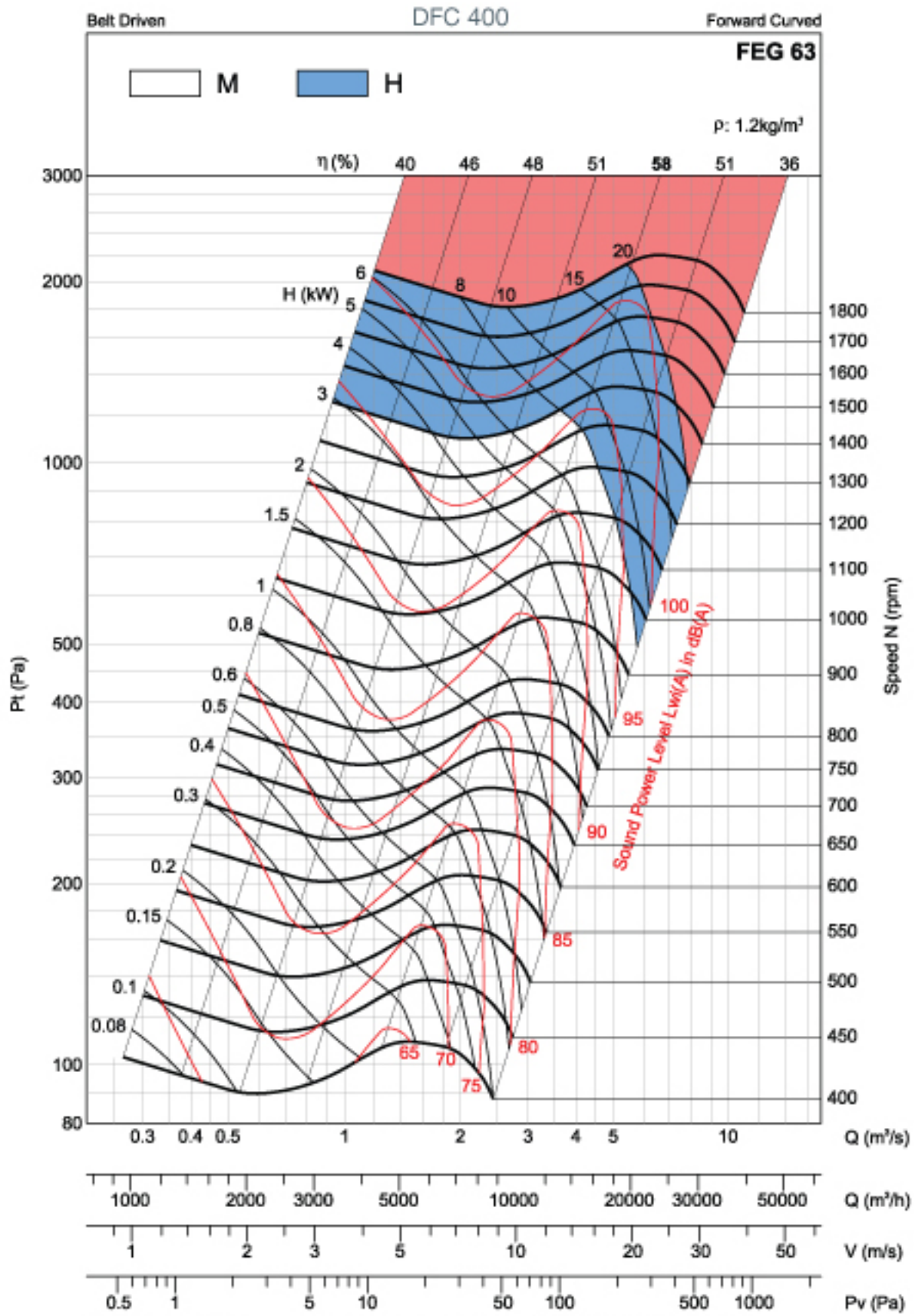
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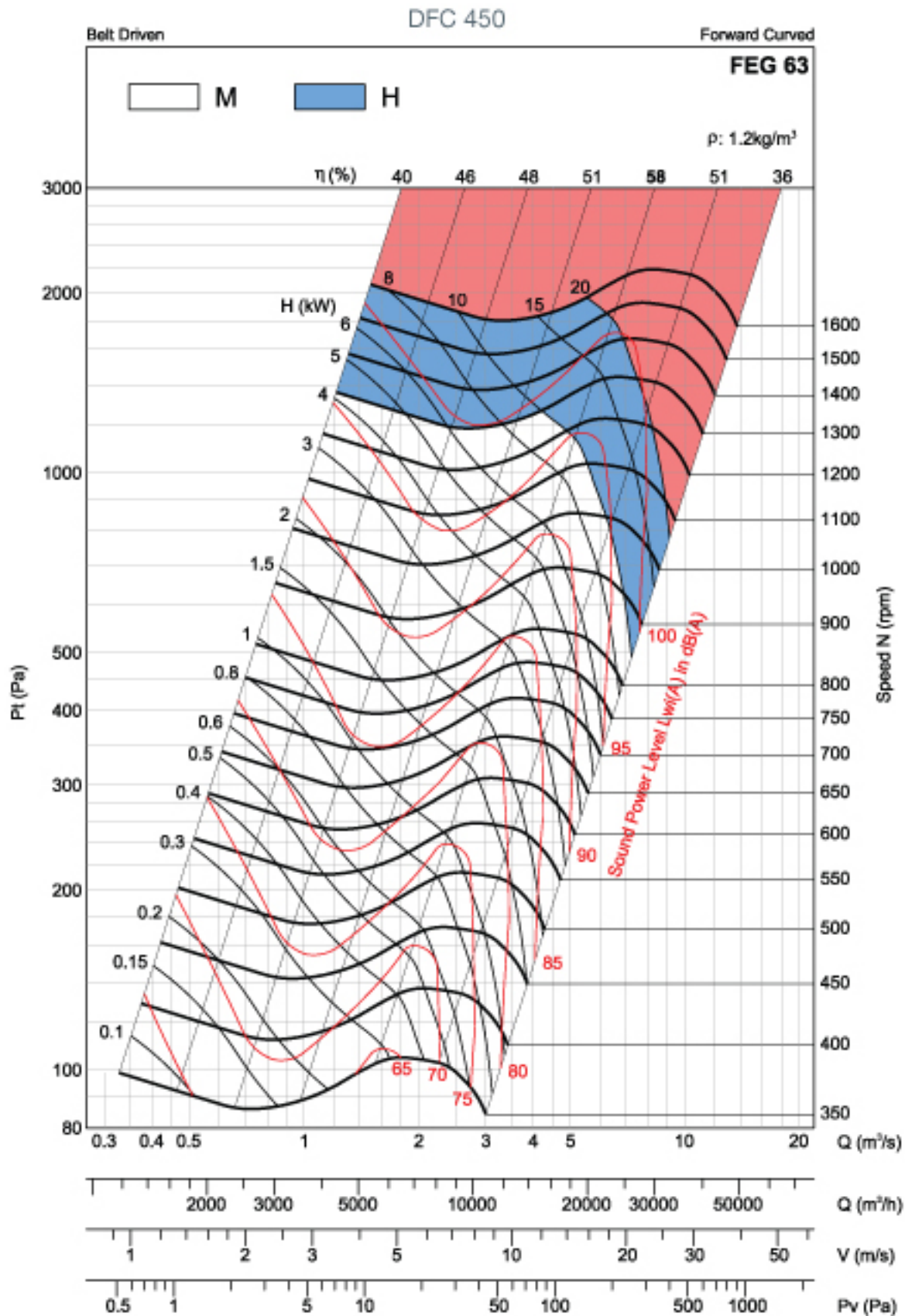
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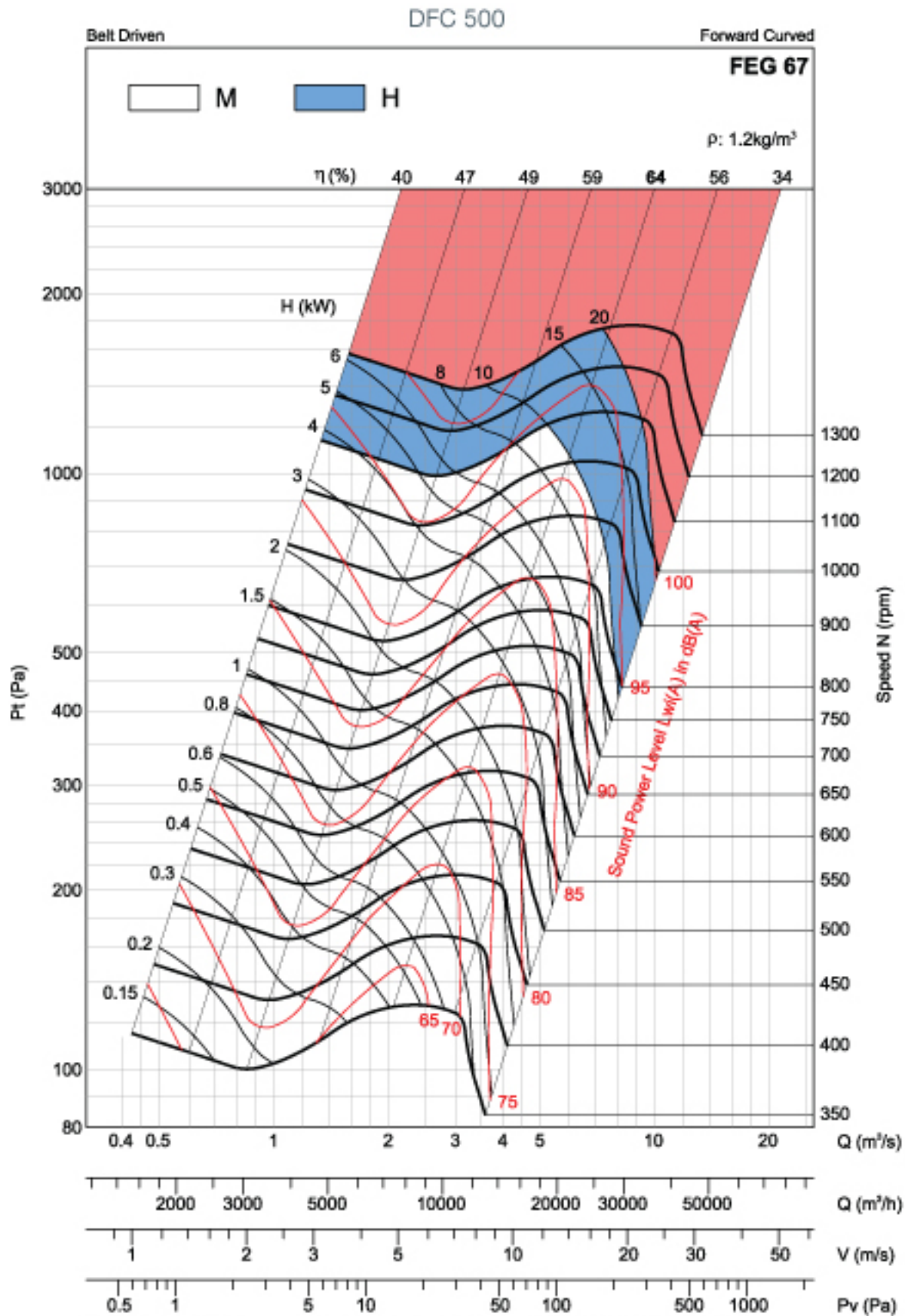
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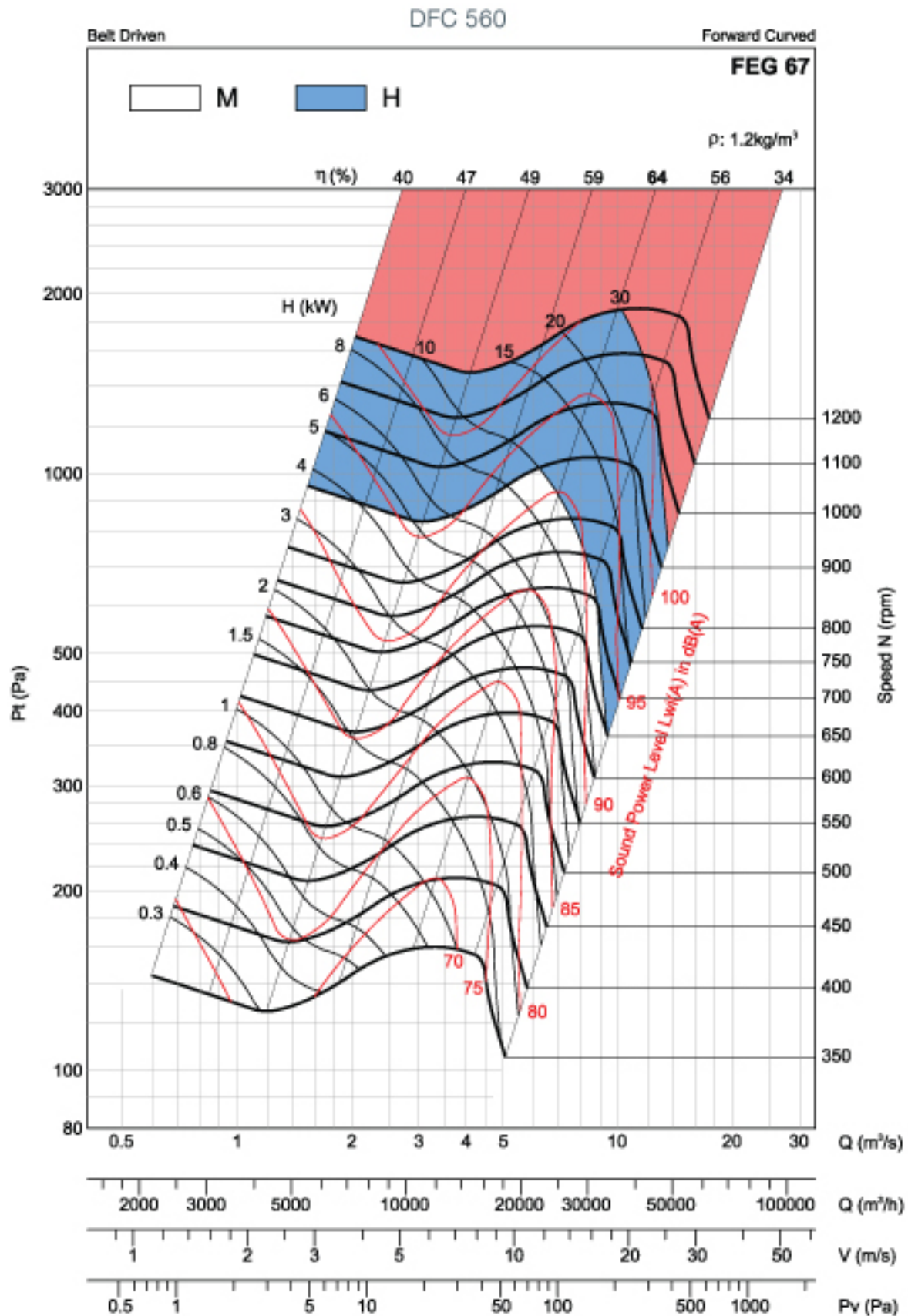
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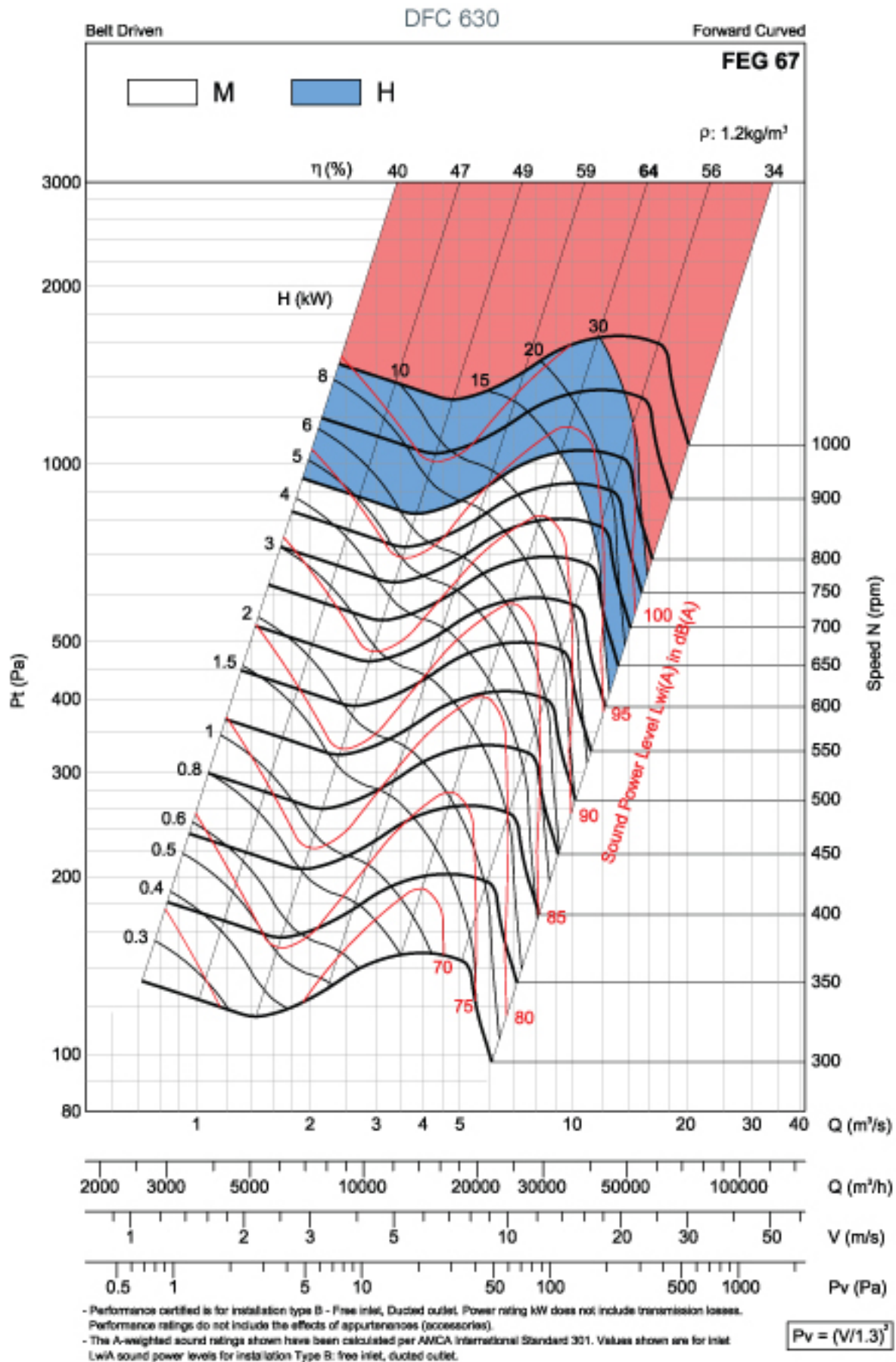
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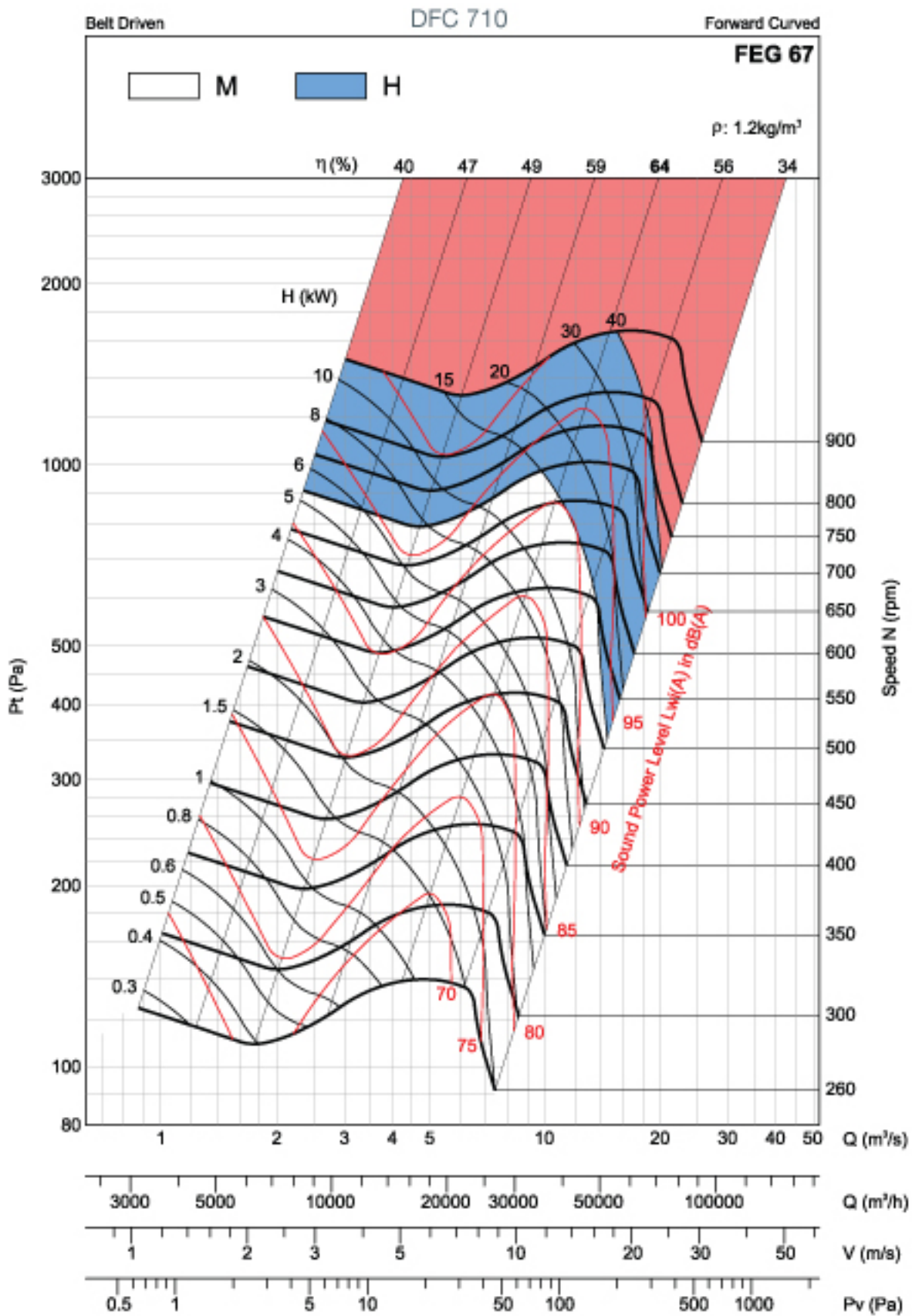
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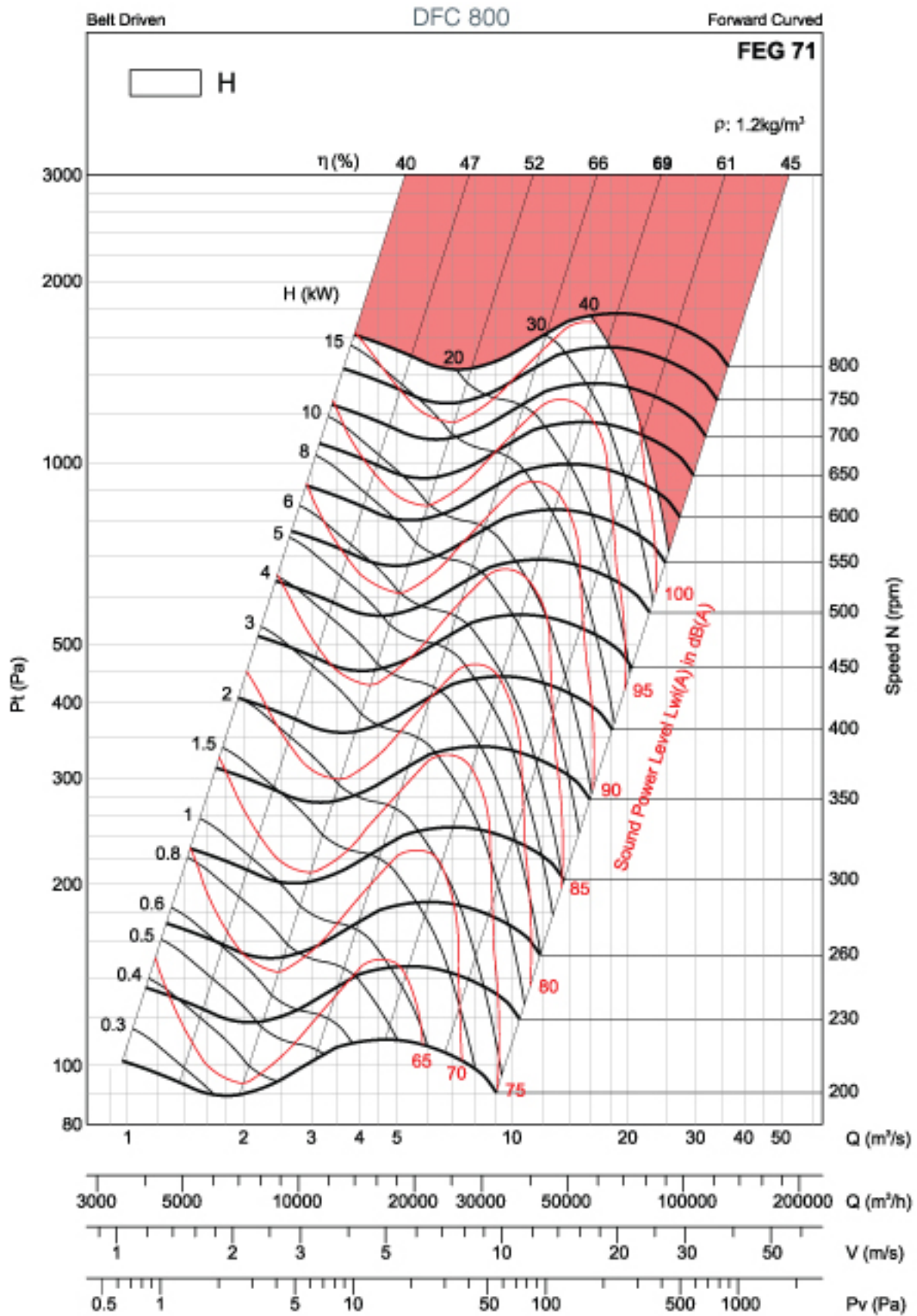
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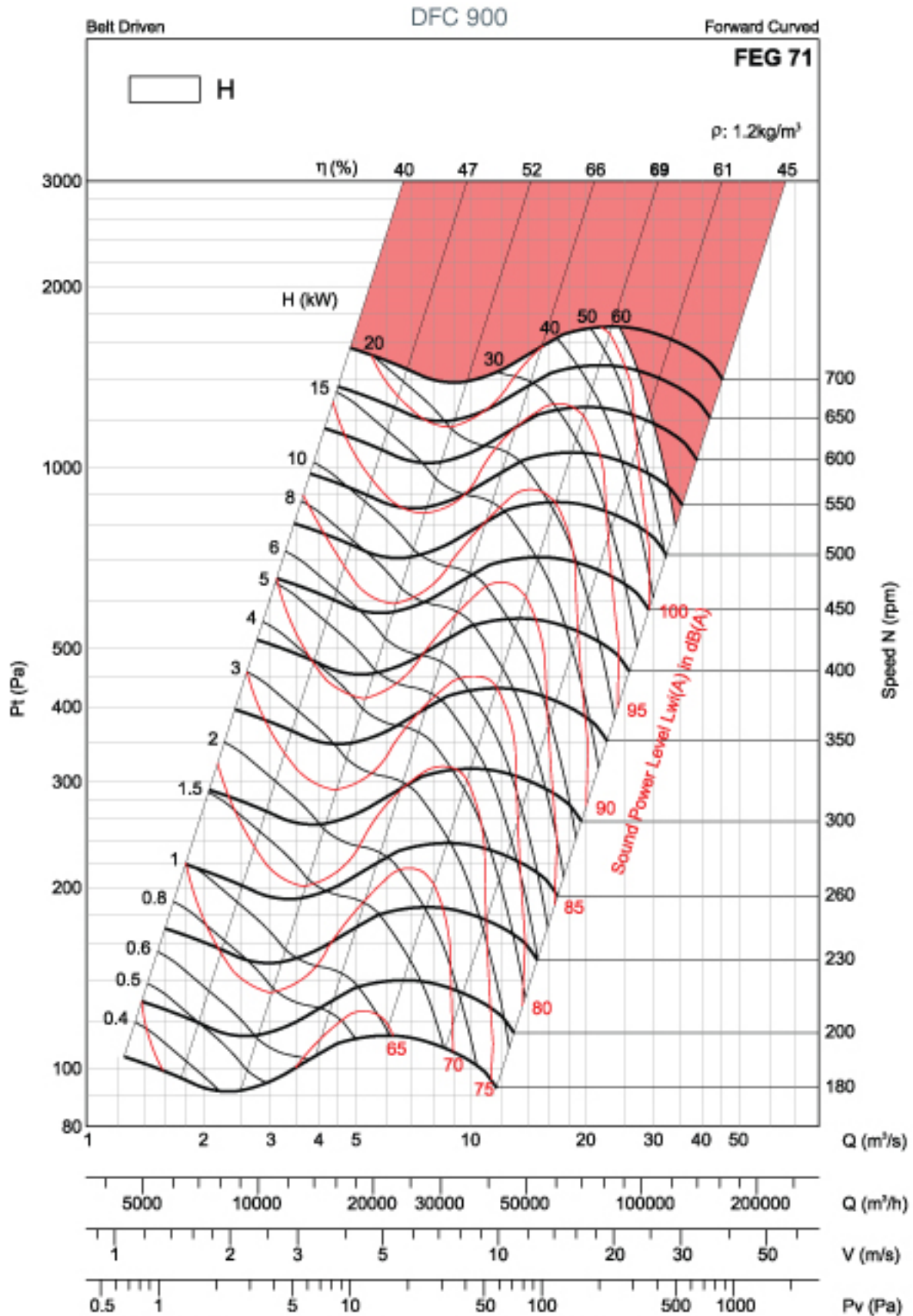
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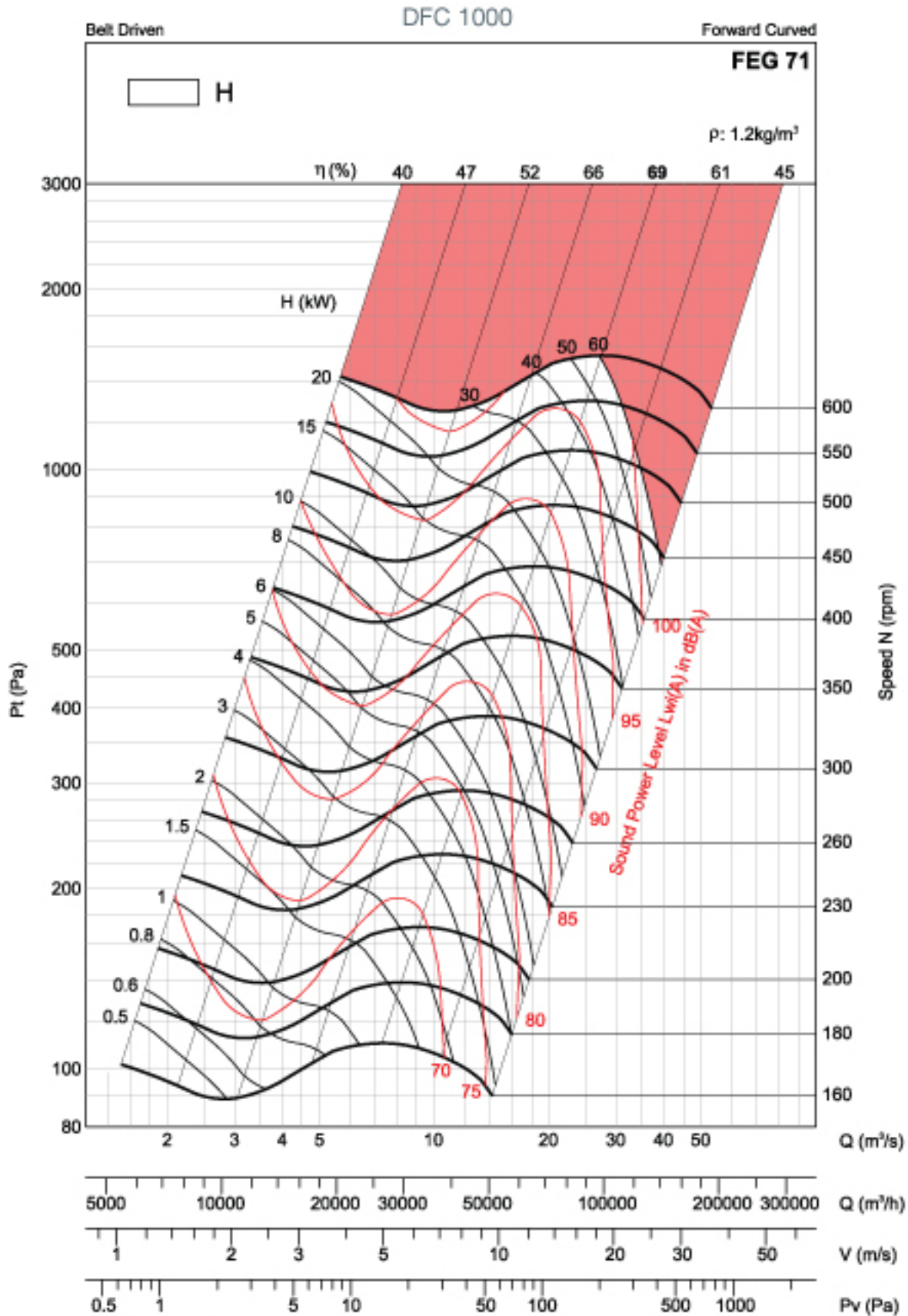
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