



# Termografering og tetthetsmåling

 **BYGGMESTER**   
**ROLF UNDSETH AS**

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**Byggmester Rolf Undseth A/S**

**Building Air Leakage Test Results**  
**In Compliance with European Norm EN13829**

## Building Details

Building Address:	Elevation:	<b>0 m</b>
	Height above ground:	<b>0 m</b>
	Building Volume, V:	<b>181 m<sup>3</sup></b>
Test technician: <b>Thomas Undseth</b>	Total envelope area, A <sub>T BAT</sub> :	<b>0 m<sup>2</sup></b>
Test company: <b>Byggmester Rolf Undseth AS</b>	Building exposure to wind:	
	Accuracy of measurements:	<b>0%</b>

## Testing Details

Fan Model: <b>Retrotec 2000</b>	Fan SN:	Gauge Model: <b>DM-2</b>	Gauge SN: <b>204387</b>
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## Undertrykk set

Date: **2011-05-06** Time: **12:20** to **12:36**

### Environmental Conditions:

*Barometric Pressure:* **101,3** KPa from **Standard temperatur og trykk..**

*Wind speed:* **0:Stille**

*Temperature:* Initial: indoors **19 °C** outdoors **10 °C**.  
Final: indoors **19 °C** outdoors **10 °C**.

### Test Data:

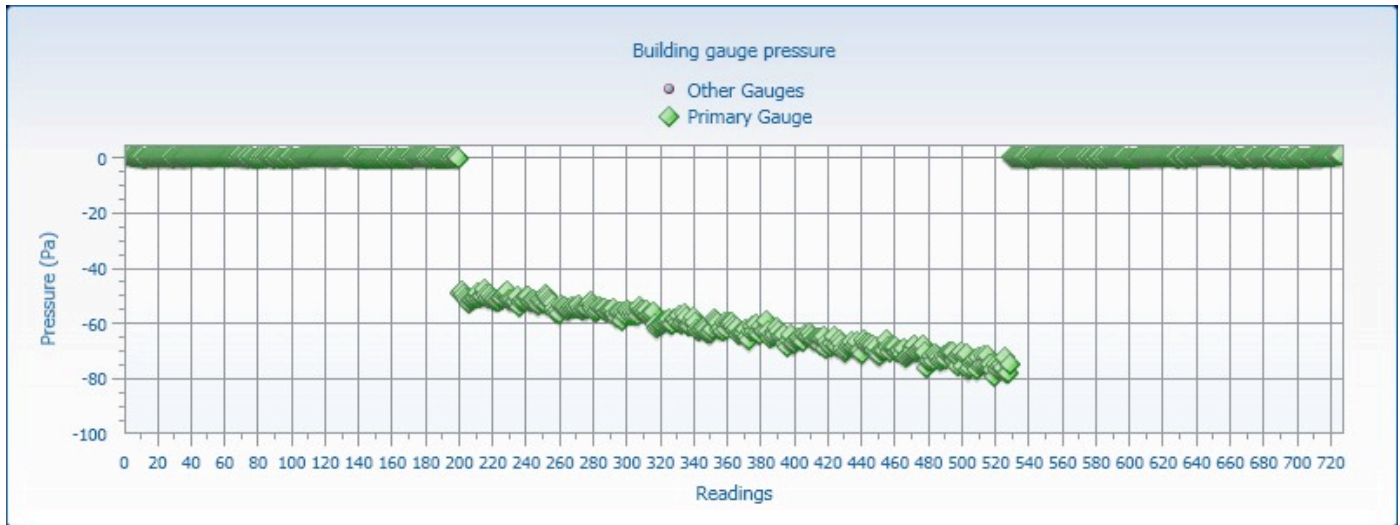
**12** bias pressures taken for **10** sec each.

**12** building pressures taken for **20** sec each.

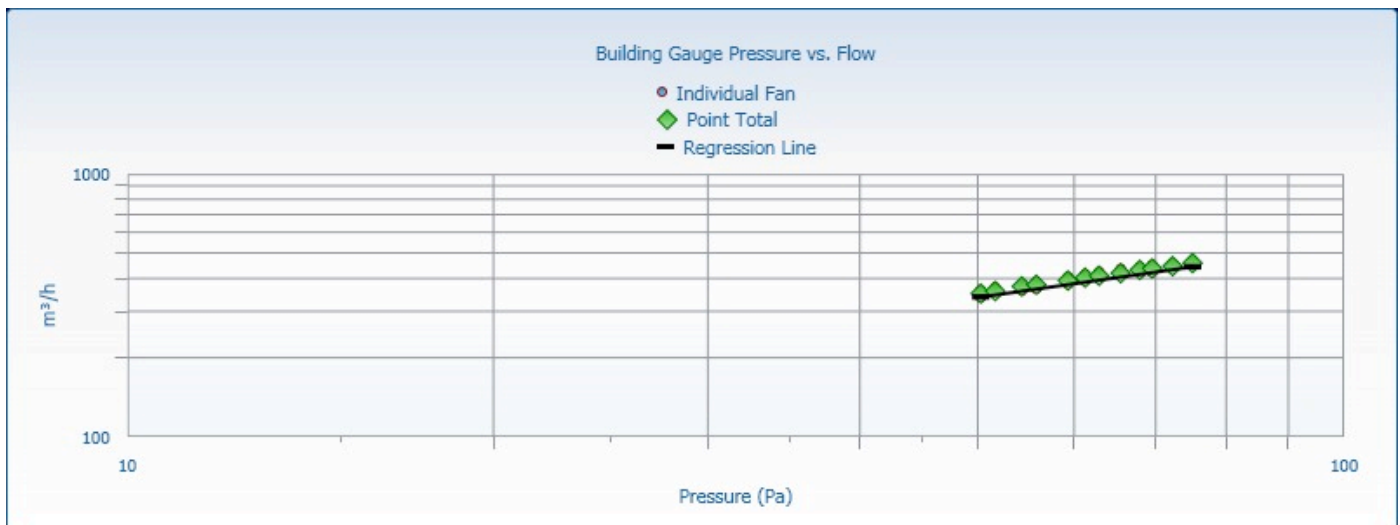
Bias, initial [Pa]	<b>0,53</b>	<b>0,34</b>	<b>0,42</b>	<b>0,53</b>	<b>0,22</b>	<b>0,15</b>	<b>0,36</b>	<b>0,44</b>	<b>0,05</b>	<b>-0,01</b>	<b>0,11</b>	<b>0,06</b>
Building Test Pressure [Pa]	<b>-50,3</b>	<b>-51,7</b>	<b>-54,3</b>	<b>-55,9</b>	<b>-59,3</b>	<b>-61,3</b>	<b>-62,9</b>	<b>-65,5</b>	<b>-67,9</b>	<b>-69,6</b>	<b>-72,3</b>	<b>-75,1</b>
Bias, final [Pa]	<b>0,23</b>	<b>0,40</b>	<b>0,20</b>	<b>0,21</b>	<b>0,15</b>	<b>0,41</b>	<b>0,53</b>	<b>0,85</b>	<b>0,16</b>	<b>0,23</b>	<b>0,09</b>	<b>0,59</b>
Door Fan Pressure, [Pa]	<b>78,2</b>	<b>81,2</b>	<b>87,3</b>	<b>89,8</b>	<b>96,1</b>	<b>100,6</b>	<b>103,7</b>	<b>108,2</b>	<b>114</b>	<b>116,7</b>	<b>121,1</b>	<b>127,4</b>
Total flow, V <sub>r</sub> [m <sup>3</sup> /h]	<b>351,0</b>	<b>358,5</b>	<b>373,3</b>	<b>378,9</b>	<b>393,3</b>	<b>403,3</b>	<b>409,8</b>	<b>419,3</b>	<b>431,6</b>	<b>437,1</b>	<b>445,8</b>	<b>458,3</b>
Corrected flow, V <sub>env</sub> [m <sup>3</sup> /h]	<b>339,6</b>	<b>346,9</b>	<b>361,2</b>	<b>366,5</b>	<b>380,5</b>	<b>390,2</b>	<b>396,5</b>	<b>405,6</b>	<b>417,5</b>	<b>422,9</b>	<b>431,3</b>	<b>443,4</b>
Error [%]	<b>-0,6%</b>	<b>-0,2%</b>	<b>0,5%</b>	<b>0,2%</b>	<b>0,0%</b>	<b>0,4%</b>	<b>0,2%</b>	<b>-0,2%</b>	<b>0,3%</b>	<b>0,1%</b>	<b>-0,5%</b>	<b>-0,2%</b>

*Bias pressure Averages:* initial [Pa]  $\Delta P_{01}$  **0,27**,  $\Delta P_{01-}$  **-0,01**,  $\Delta P_{01+}$  **0,29**  
final [Pa]  $\Delta P_{01}$  **0,34**,  $\Delta P_{01-}$  **0,00**,  $\Delta P_{01+}$  **0,34**

## Building Gauge Pressure



## Building Gauge Pressure vs. Flow



## Undertrykk Test Results

	Results		
<i>Correlation, r [%]</i>	<b>99,92</b>	95% confidence limits	
<i>Intercept, C<sub>env</sub> [m³/h.Pa<sup>n</sup>]</i>	<b>25,75</b>	<b>23,85</b>	<b>27,75</b>
<i>Intercept, C<sub>L</sub> [m³/h.Pa<sup>n</sup>]</i>	<b>26,05</b>	<b>24,15</b>	<b>28,10</b>
<i>Slope, n</i>	<b>0,6591</b>	<b>0,6409</b>	<b>0,6774</b>

	Results	95% confidence		Uncertainty
<i>Air flow at 50 Pa, V<sub>50</sub> [m³/h]</i>	<b>343,0</b>	<b>341,5</b>	<b>344,5</b>	<b>+/-0,0045</b>
<i>Air changes at 50 Pa, n<sub>50</sub> [/h]</i>	<b>1,895</b>	<b>1,885</b>	<b>1,905</b>	<b>+/-0,0045</b>
<i>Permeability at 50 Pa, q<sub>50</sub> [m³/h.m²]</i>	<b>0,000</b>			
<i>Specific Leakage at 50 Pa, w<sub>50</sub> [m³/h.m²]</i>				

### {2-TestDirection} set

#### Environmental Conditions:

*Barometric Pressure:* {2-Barometric} KPa from {2-BarometricMethod}.

#### Test Data:

{2-StaticPointCount} bias pressures taken for {2-StaticSecondsPerPoint} sec each.

{2-FlowPointCount} building pressures taken for {2-FlowSecondsPerPoint} sec each.

### Building Gauge Pressure

### Building Gauge Pressure vs. Flow

	Results		

	Results	95% confidence		Uncertainty

## Kombinert testdata.

	Resultat	95% Confidence Interval		Uksikkerhet
<i>Air flow at 50 Pa, <math>V_{50}</math> [m<sup>3</sup>/h]</i>	<b>343,0</b>	<b>341,5</b>	<b>344,5</b>	<b>+/-0,0045</b>
<i>Air changes at 50 Pa, <math>n_{50}</math> [/h]</i>	<b>1,895</b>	<b>1,885</b>	<b>1,905</b>	<b>+/-0,0045</b>
<i>Permeability at 50 Pa, <math>q_{50}</math> [m<sup>3</sup>/h.m<sup>2</sup>]</i>	<b>0,000</b>			
<i>Specific leakage at 50 Pa, <math>w_{50}</math> [m<sup>3</sup>/h.m<sup>2</sup>]</i>				<b>+/-0,0050</b>

**Test Notes:** Skriv inn notat her

## Calibration Certificate

<b>Retrotec 2000 . Calibrated on .</b>						
Range	N	K	K1	K2	K3	K4
<b>Open(22)</b>	<b>0,5214</b>	<b>486,99</b>	<b>-0,07</b>	<b>0,8</b>	<b>-0,115</b>	<b>1,067</b>
<b>A</b>	<b>0,503</b>	<b>259,038</b>	<b>-0,075</b>	<b>1</b>	<b>0</b>	<b>1,023</b>
<b>B</b>	<b>0,5</b>	<b>174,8824</b>	<b>0</b>	<b>0,3</b>	<b>0</b>	<b>1</b>
<b>C8</b>	<b>0,5</b>	<b>78,5</b>	<b>-0,02</b>	<b>0,5</b>	<b>0,016</b>	<b>1</b>
<b>C6</b>	<b>0,505</b>	<b>61,3</b>	<b>0,054</b>	<b>0,5</b>	<b>0,004</b>	<b>1</b>
<b>C4</b>	<b>0,514</b>	<b>39,3</b>	<b>0,08</b>	<b>0,5</b>	<b>0,0005</b>	<b>1</b>
<b>C2</b>	<b>0,55</b>	<b>20</b>	<b>0,139</b>	<b>0,5</b>	<b>-0,0027</b>	<b>1</b>
<b>C1</b>	<b>0,541</b>	<b>11,9239</b>	<b>0,122</b>	<b>0,4</b>	<b>0</b>	<b>1</b>
<b>L4</b>	<b>0,48</b>	<b>4,0995</b>	<b>0,003</b>	<b>1</b>	<b>0,0004</b>	<b>1</b>
<b>L2</b>	<b>0,502</b>	<b>2,0678</b>	<b>0</b>	<b>0,5</b>	<b>0,0001</b>	<b>1</b>
<b>L1</b>	<b>0,4925</b>	<b>1,1614</b>	<b>0,1</b>	<b>0,5</b>	<b>0,0001</b>	<b>1</b>