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# ECO CERTIFICATION FOR WOOD-BURNING APPLIANCES

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# ECO CERTIFICATION

## 1. WHAT

- is a voluntary certification system which confirms that a certain product within a special product category has better environmental characteristics than the other products in same category.

## 2. WHY

- decreasing emission of harmful gases;
- subsidies for buying new appliances (conversion of old appliances).

## 3. WHO

- producers;
- buyers.

# THE FIRST CONDITION

## 1. ACCORDING TO:



- EN 303-5:2012: Heating boilers – Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW – Terminology, requirements, testing and marking.



- EN 14785:2011: Residential space heating appliances fired by wood pellets – Requirements and test methods.



- EN 13240:2001: Roomheaters fired by solid fuel – Requirements and test methods.

# THE SECOND CONDITION: ENERGY EFFICIENCY

Class 3:

- energy efficiency:  $\eta_k = 67 + 6 \log Q$ , where Q is up to 500kW;

Class 4:

- energy efficiency:  $\eta_k = 80 + 2 \log Q$ , where Q is up to 100kW;

Class 5:

- energy efficiency:  $\eta_k = 87 + \log Q$ , where Q is up to 100 kW.

- $\eta_k$  – efficiency in %;
- Q – heat output in kW.

# THE THIRD CONDITION: EMISSION OF HARMFUL GASES

Emission limits for CO, OGC and dust according to standard EN 303-5

Nominal heat Output	Emission limits (mg/m <sup>3</sup> at 10% O <sub>2</sub> )								
	CO			OGC			Dust		
	Class 3	Class 4	Class 5	Class 3	Class 4	Class 5	Class 3	Class 4	Class 5
Automatically fired boiler									
< 50	3000	1000	500	100	30	20	150	60	40
> 50 = 150	2500			80			150		
> 150 = 500	1200			80			150		
Manually fired boiler									
< 50	5000	1200	700	150	50	30	150	75	60
> 50 = 150	2500			100			150		
> 150 = 500	1200			100			150		

Source: Standard EN 303-5:2012, Annex C

# BUT...ANEX C FOR AUSTRIA END GERMANY

## AUSTRIA: ENERGY EFFICIENCY

Requirements for efficiency of central heating used for wooden fuels

	Heat output (kW)	Minimum efficiency (%)
Manually loaded boiler	up to 10	79
	10 – 200	$(71.3 + 7.7 \log P_N)^*$
	> 200	89
Automatically loaded boiler	up to 10	80
	10 – 200	$(72.3 + 7.7 \log P_N)^*$
	> 200	90

\* $P_N$  is the nominal heat output.

Source: Standard EN 303-5:2012, Annex C

# AUSTRIA: EMISSION OF HARMFUL GASES

Emission limits of small burners for solid fuels **MANUALLY** loaded

Parameter	Emission limits (mg/MJ)	
	Room heaters	Central heaters
CO	1100	500
No <sub>x</sub>	150	100
OGC	50	30
Dust	35	30

Source: Standard EN 303-5:2012, Annex C

Emission limits of small burners used for solid fuels **AUTOMATICALLY** loaded

Parameter	Emission limits (mg/MJ)		
	Wood pellets (Room heaters)	Wood pellets (Central heaters)	Other wooden fuels
CO	500	250	250
No <sub>x</sub>	100	100	100
OGC	30	20	30
Dust	25	20	30

Source: Standard EN 303-5:2012, Annex C

# GERMANY: EMISSION OF HARMFUL GASES

Requirements for the emission of gases for wood fuels burning boilers applied on the market in Germany for appliances installed after 31.12.2014

Type of fuels	Nominal output range (kW)	Dust g/m <sup>3</sup>	CO g/m <sup>3</sup>	
Split logs, wood chips, brush wood and cones, saw dust, shavings, abrasive dust, bark, wood pellets	= 4	0.02	0.4	400
Coated, varnished or laminated wood as well as remains, as far as no wood preservative has been applied or is contained due of a treatment and the laminates do not contain halogens in organic bonding or heavy metals;	= 30 = 500	0.02	0.4	
Plywood, chipboard, fibreboards or otherwise glued wood as well as the remains, as far as no wood preservative has been applied or is contained due to a treatment and the laminates do not contain aforementioned fuels	> 500	0.02	0.3	300

Source: Standard EN 303-5:2012, Annex C

## Class 5: dust

- 40 mg/m<sup>3</sup> (automatically);
- 60 mg/m<sup>3</sup> (manually).

## Class 5: CO

- 500 mg/m<sup>3</sup> (automatically);
- 700 mg/m<sup>3</sup> (manually).



# EUROPEAN ECO LABELS FOR WOOD-BURNING APPLIENCES



Pursuant to standard EN 14785:2011:

- energy efficiency of wood pellet stoves should be 75%;
- CO concentration shall not exceed 500 mg/m<sup>3</sup>;
- limit values for the emission of oxides of nitrogen are not set in the standard.

# EUROPEAN ECO LABELS FOR WOOD-BURNING APPLIENCES

## NORDIC: SWAN

Norway, Sweden, Iceland,  
Denmark, Finland



- boilers with heat output up to 500 kW burning firewood, wood pellets, briquettes and chips and
- wood burning stoves with heat output of 3-15 kW.

## GERMAN: BLUE ANGEL



- wood pellet and wood chip burning boilers with heat output up to 500 kW and
- wood pellet stoves with heat output up to 15 kW.

## AUSTRIAN: UZ 37



- boilers with heat output up to 400kW burning wood pellets, briquettes, chips and firewood and
- wood burnig stoves with heat output up to 15 kW.

# NORDIC ECO LABELS FOR MANUALLY AND AUTOMATICALLY STOKED BOILERS

Requirements for energy efficiency of manually and automatically fired boilers

Manually fired boiler up to 100 kW	$nk=87 + \log(\text{output})$
Manually fired boiler more than 100 kW	nk is always 89%
Automatically fired boiler up to 100 kW	$nk = 88 + \log(\text{output})$
Automatically fired boiler more than 100 kW	nk is always 90%

Source: Nordic Ecolabelling of Boilers for solid biofuels, Version 3.0

- ✓ emissions of CO and OGC: TWICE lower than values for class 5;
- ✓ dust (msb) 33% lower; same (asb).

## NORDIC ECO LABELS FOR WOOD PELLETS STOVES

- energy efficiency at least 87% (75% standard)
- CO: 2.5 times lower.

# COMPARISON OF REQUIREMENTS OF ECO LABELS FOR WOOD BURNING APPLIANCES

## **Energy efficiency:**

- ✓ completely different way to separate manually and automatically loaded boilers according to heat output;
- ✓ all three eco certifications have more strict requirements than standards.

## **Emission of harmful gases:**

- ✓ all three eco certifications have more strict requirements than standards;
- ✓ the biggest differences are for emission of CO, then for emission of OGC and the smallest for dust.

# AUSTRIAN ECO CERTIFICATED WOOD PELLET BOILER



Austrian eco label for wood pellet boilers,  
Petrović, S., 2013

- ✓ 93 models of certified firewood and wood pellet stoves;
- ✓ 384 models of firewood, wood pellet and chips boiler (may, 2015).

# CONCLUSIONS

- ✓ WOOD BURNING APPLIANCES HAVE TO BE PRODUCED ACCORDING TO THE REQUIREMENTS OF APPROPRIATE EN QUALITY STANDARDS;
- ✓ ENERGY EFFICIENCY AND EMISSION OF HARMFUL GASES ARE THE MOST IMPORTANT CHARACTERISTICS OF WOOD BURNING APPLIANCES FOR ECO CERTIFICATION;
- ✓ THE MOST FAMOUS EUROPEAN ECO LABELS FOR WOOD BURNING APPLIANCES ARE NORDIC “SWAN”, GERMAN “BLUE ANGEL” AND AUSTRIAN UZ 37.

# Thank you for your attention!

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