Protocol for the Energy Performance Certificate

Purpose of the certificate processing

☐ New building	☐ Building used by public authorities
☐ Sale of the building or its part	☐ Lease of the building or its part
☐ Larger change of the completed building	☒ Nearly Zero Energy Building
☐ Another purpose:	

Basic information about the evaluated building

Building identification data	
Building address (place, street, street number, ZIP code):	LETNANY
Cadastral area:	PRAGU
Parcel number:	
Date of building commissioning (or expected date of commissioning):	
Owner or builder:	
Address:	,
Company identification number:	
Tel./e-mail:	

Building type		
☐ Family house	☒ Residential house	☐ Building for accommod. and catering
☐ Administrative building	☐ Building for health service	☐ Building for education service
☐ Building for sport activities	☐ Building for business purposes	☐ Building for culture activities
☐ Another building type:		

Geometric characteristics of the building		
Parameter	units	value
Volume of the building V (volume of building zones with conditioned internal environment defined by the outer surfaces of building envelope constructions)	[m^3]	11264,0
Total area of the building envelope A (the sum of areas of external building constructions surrounding the volume of the building V)	[m^2]	3264,2
Shape factor A/V	[m^2/m^3]	0,29
Total energy reference area of the building A_c	[m^2]	3520,0

Types of energy (energy carriers) used in the building	
☐ Lignite	☐ Coal
☐ Oil	☐ Propan-butan/LPG
☐ Wood (logs), wood chips	☐ Wood pellets
☒ Natural gas	☒ Electricity
☐ System of thermal energy supply (district heating): *RES rate:* ☐ *to 50 % including,* ☐ *over 50 to 80 %,* ☐ *over 80 %*	
☐ Energy of surrounding environment (e.g. solar energy): *purpose:* ☐ *for heating,* ☐ *for hot water preparing,* ☐ *for the electricity production*	
☐ Other fuels or other types of energy supply:	

Types of energy delivered outside of the building		
☐ Electricity	☐ Heat	☒ None

Information about building components and technical systems

A) building components and constructions

a.1) requirements for thermal transmittance

Building envelope constructions	Area A_j	Thermal transmittance			Temper. reduction factor b_j	Heat transfer coeff. by transmittion $H_{T,j}$
		Calculated value U_j	Reference value $U_{N,rc,j}$	Fulfilled		
	[m^2]	[W/(m2.K)]	[W/(m2.K)]	[yes/no]	[-]	[W/K]
V 2	1 400,00	0,230	0,30		1,00	322,0
R 1	704,00	0,160	0,24		1,00	112,6
SDKP 2	704,00	0,400	0,60		0,88	246,8
W 1	453,00	1,200	1,50		1,00	543,6
D 1	3,20	1,500	1,70		1,00	4,8
Tepelné vazby						65,3
Total	**3 264,2**	**x**	**x**	**x**	**x**	**1 295,1**

Note: The evaluation of the fulfillment of requirements is required only for larger changes of the building and for other than larger changes of the completed building in the case of evaluation of energy performance in accordance with § 6, paragraph 2, point. c).

a.2) requirements for mean thermal transmittance

Zone	Prevailing design internal temperature $\Theta_{im,j}$	Zone volume V_j	Reference value of the mean thermal transmittance of the zone $U_{em,R,j}$	Product $V_j \cdot U_{em,R,j}$
	[°C]	[m^3]	[W/(m^2.K)]	[W.m/K]
Accomodation areas	20,0	11 264,0	0,36	4 055,04
Total	**x**	**11 264,0**	**x**	**4 055,04**

Building	Mean thermal transmittance of the building		
	Calculated value U_{em} ($U_{em} = H_T/A$)	Reference value $U_{em,R}$ ($U_{em,R} = \Sigma(V_j \cdot U_{em,R,j})/V$)	Fulfilled
	[W/(m^2K)]	[W/(m^2K)]	[yes/no]
TOTAL BUILDING	0,40	0,36	ne

Note: The evaluation of the fulfillment of requirements is required for a new building, a building with almost zero energy consumption and for larger changes of the completed building in the case of evaluation of energy performance in accordance with § 6, paragraph 2, point. a) and point b).

B) technical systems

b.1.a) heating

Assessed building/zone	Source type	Energy carriers	Coverage of partial energy needs for heating	Energy output	Efficiency of heat source[2)]		Efficiency of energy distribution $\eta_{H,dis}$	Efficiency of energy emission $\eta_{H,em}$
					$\eta_{H,gen}$	COP		
	[-]	[-]	[%]	[kW]	[%]	[-]	[%]	[%]
Reference building	x[1)]	x	x	x	80	--	85	80
Assessed building/zone:								
Accomodation areas	Gas boiler	zemní plyn	100,0	190,0	90		89	88

Note: [1)] **x** symbol means that there is no required reference value
[2)] it is not filled-in in the case of thermal energy supply system

b.1.b) requirements for the efficiency of the heating system

Assessed building/zone	Source type	Efficiency of heat source energy production $\eta_{H,gen}$ nebo $COP_{H,gen}$	Efficiency of reference heat source energy production $\eta_{H,gen,rq}$ or $COP_{H,gen}$	Fulfilled
	[-]	[%]	[%]	[yes/no]

Note: The evaluation of the fulfillment of requirements is required only for larger changes of the building and for other than larger changes of the completed building in the case of evaluation of energy performance in accordance with § 6, paragraph 2, point. c).

B) technical systems

b.2.a) cooling

Assessed building/zone	Type of cooling system	Energy carriers	Coverage of partial energy needs for cooling	Cooling output	Cooling factor of cold source $EER_{C,gen}$	Efficiency of energy distribution $\eta_{C,dis}$	Efficiency of energy emission $\eta_{C,em}$
	[-]	[-]	[%]	[kW]	[-]	[%]	[%]
Reference building	x	x	x	x			
Assessed building/zone:							

b.2.b) requirements for the efficiency of the cooling system

Assessed building/zone	Type of cooling system	Cooling factor of cold source $EER_{C,gen}$	Cooling factor of reference cold source $EER_{C,gen}$	Fulfilled
	[-]	[-]	[-]	[yes/no]

Note: The evaluation of the fulfillment of requirements is required only for larger changes of the building and for other than larger changes of the completed building in the case of evaluation of energy performance in accordance with § 6, paragraph 2, point. c).

B) technical systems

b.3) ventilation

Assessed building/zone	Type of ventilation system	Energy carriers	Heating energy output	Cooling energy output	Coverage of partial energy needs for ventilation	Nominal electricity input of ventilation system	Nominal volume flow of ventilation air	Specific input of fans for forced ventilation SFP_{ahu}
	[-]	[-]	[kW]	[kW]	[%]	[kW]	[m^3/hour]	[W.s/m^3]
Reference building	x	x	x	x	x	x	x	
Assessed building/zone:								
Accomodation areas	NATURAL VENTILATION							

B) technical systems

b.4) air humidity adjustment

Assessed building/zone	Type of humidification system	Energy carriers	Nominal electricity input	Nominal energy output	Coverage of partial energy needs for air humidification	Efficiency of air humidification $\eta_{RH+,gen}$
	[-]	[-]	[kW]	[kW]	[%]	[%]
Reference building	x	x	x	x	x	
Assessed building/zone:						

Assessed building/zone	Type of dehumidification system	Energy carriers	Nominal electricity input	Nominal energy output	Coverage of partial energy needs for air dehumidification	Cooling output	Efficiency of air dehumidification $\eta_{RH-,gen}$
	[-]	[-]	[kW]	[kW]	[%]	[kW]	[%]
Reference building	x	x	x	x	x	x	
Assessed building/zone:							

B) technical systems

b.5.a) hot water preparation

Assessed building/zone	Type of hot water preparation in the building	Energy carriers	Coverage of partial energy needs for hot water preparation	Energy input for hot water preparation	Hot water tank volume	Efficiency of heat source for hot water preparation[1)]		Specific heat loss of hot water tank $Q_{W,st}$	Specific heat loss of hot water distribution $Q_{W,dis}$
						$\eta_{W,gen}$	COP		
	[-]	[-]	[%]	[kW]	[liters]	[%]	[-]	[Wh/l.d]	[Wh/m.d]
Reference building	x	x	x	x	x	85	--	5,0	150,0
Assessed building/zone:									
Accomodation areas	Gas boiler	zemní plyn	100,0	190,0	1000	90		3,9	128,7

Note: [1)] not filled in case of thermal energy supply

b.5.b) requirements for the efficiency of the hot water preparation system

Assessed building/zone	Type of hot water preparation system	Efficiency of heat source for hot water preparation $\eta_{W,gen}$ nebo $COP_{W,gen}$	Efficiency of reference heat source for hot water preparation $\eta_{W,gen,rq}$ nebo $COP_{W,gen}$	Fulfilled
	[-]	[%]	[%]	[yes/no]

Note: The evaluation of the fulfillment of requirements is required only for larger changes of the building and for other than larger changes of the completed building in the case of evaluation of energy performance in accordance with § 6, paragraph 2, point. c).

B) technical systems

b.6) lighting

Assessed building/area	Type of lighting system	Coverage of partial lighting energy needs	Total electricity input for lighting of the building	Mean specific input for lighting related to the illumination zone $p_{L,lx}$
	[-]	[%]	[kW]	[W/(m^2.lx)]
Reference building	**x**	**x**	**x**	0,05
Assessed building/area:				
Accomodation areas	Light	100	14,9	0,05

Energy performance of assessed building

a) list of considered zones and partial delivered energies in the building

Assessed building/zone	Heating EP_H	Cooling EP_C	Mechanical ventilation EP_F		Hot water prepa-ration EP_W	Lighting EP_L	Energy production from renewable energy source or cogeneration	
			Without humid. adjustment	With humidity adjustment			For the building	For the building and external delivery
Accomodation areas	☒	☐	☐	☐	☒	☒	☐	☐

b) partial delivered energies

r.			Heating		Cooling		Ventilation		Air humidity adjustment		Hot water preparation		Lighting	
			Ref. building	Ass. building	Ref. building	Ass. building	Ref. building	Ass. building	Ref. building	Ass. building	Ref. building	Ass. building	Ref. building	Ass. building
(1)	Energy need	[MWh/year]	157,430	153,971			x	x			114,427	114,427	x	x
(2)	Calculated energy use	[MWh/year]	289,393	218,436							147,718	137,596	14,506	14,506
(3)	Auxiliary energy use	[MWh/year]	0,460	0,796							0,118	0,118		
(4)	Partial delivered energy (r.4)=(r.2)+(r.3)	[MWh/year]	289,853	219,232							147,836	137,715	14,506	14,506
(5)	Specific partial delivered energy related to total energy reference surface (r.4) / m^2	[kWh/(m2.year)]	82	62							42	39	4	4

c) energy production facility located in the building, on the building or on attached auxiliary objects

Production type	Utilization of produced energy	Produced energy	Total primary energy factor	Non-renew-able primary energy factor	Total primary energy	Non-renewable primary energy
units		[MWh/year]	[-]	[-]	[MWh/year]	[MWh/year]
Cogeneration unit EP_{CHP} - heat	Building					
	Delivery out of the building					
Cogeneration unit EP_{CHP} - electricity	Building					
	Delivery out of the building					
Photovoltaic panels EP_{PV} - electricity	Building					
	Delivery out of the building					
Solar thermal systems $Q_{H,sc,sys}$ - heat	Building					
	Delivery out of the building					
Others	Building					
	Delivery out of the building					

d) distribution of partial delivered energies, of the total primary energy and of the non-renewable primary energy according to energy carriers

Energy carriers	Partial calculated energy use/ Auxiliary energy use	Total primary energy factor	Non-renewable primary energy factor	Total primary energy	Non-renewable primary energy
	[MWh/year]	[-]	[-]	[MWh/year]	[MWh/year]
zemní plyn	356,033	1,1	1,1	391,636	391,636
elektřina ze sítě	15,420	3,2	3,0	49,344	46,260
Total	**371,452**	**x**	**x**	**440,979**	**437,895**

e) requirement for total delivered energy

(6)	Reference building	[MWh/year]	452,195	Fulfilled (yes/no)	ano
(7)	Assessed building		371,452		
(8)	Reference building	[kWh/m^2.year]	128		
(9)	Assessed building		106		

f) requirement for non-renewable primary energy

(10)	Reference building	[MWh/year]	420,859	Fulfilled (yes/no)	ne
(11)	Assessed building		437,895		
(12)	Reference building (r.10 / m^2)	[kWh/m^2.year]	120		
(13)	Assessed building (r.11 / m^2)		124		

g) primary energy of the assessed building

(14)	Total primary energy	[MWh/year]	440,979
(15)	Renewable primary energy (r.14 - r.11)	[MWh/year]	3,084
(16)	The use of renewable energy sources from the point of view of primary energy (r.15 / r.14 x 100)	[%]	0,7

h) values for the derivation of energy classes levels

Values corresponding to the upper limit of Class C:	Total delivered energy	[MWh/year]	480,144
	Non-renewable primary energy	[MWh/year]	556,837
	Mean thermal transmittance of the building	[W/m^2.K]	0,41
	Partial delivered energy: heating	[MWh/year]	317,802
	cooling	[MWh/year]	
	ventilation	[MWh/year]	
	air humidity adjustment	[MWh/year]	
	hot water preparation	[MWh/year]	147,836
	lighting	[MWh/year]	14,506

Table h) contains values used for the derivation of energy classes levels according to Annex No. 2.

Analysis of the technical, economical and environmental suitability of alternative energy supply systems for new buildings and larger changes of completed buildings

Alternative systems	Feasibility assessment			
	Decentralized energy supply systems based on renewable energy sources	**Cogeneration**	**System of the thermal energy supply**	**Heat pump**
Technical suitability	yes	no	no	yes
Economical suitability	no	no	no	no
Ecological suitability	yes	no	yes	yes
Recommendations for implementation and justification				
Date of analysis completion	19.4.2018			
Author of analysis	Malathe Alkhateeb			
Energy assessment	Obligation of the energy assessment preparation	no		
	Energy assessment is a part of the analysis	no		
	Date of the energy assessment preparation	--		
	Author of energy assessment	--		

Recommended technically and economically suitable measures to improve energy performance of the building

Measure description		Expected mean thermal transmittance of the buiilding	Expected delivered energy	Expected nonrenewable primary energy	Expected savings of total delivered energy	Expected savings of the nonrenewable primary energy
		[W/(m^2.K)]	[MWh/year]	[MWh/year]	[MWh/year]	[MWh/year]
Building components and building constructions:						
Windows triple glass Thermal insulation th. 200 mm			**x**	**x**		25,6
Building technical systems:						
heating:		**x**		x		
cooling:		**x**		x		
ventilation:		**x**		x		
air humidity adjustment:		**x**		x		
hot water preparation:		**x**		x		
lighting:		**x**		x		
Operation and maintenance of the building systems:						
		x	x	x		
Other - please specify:						
		x	x	x		
Total		**x**				25,6

Measure	Assessment of appropriateness			
	Building components and constructions	Technical systems in the building	Maintenance and operation of building systems	Other - please specify:
Technical suitability	yes	no	no	no
Functional suitability	yes	no	no	no
Economical suitability	yes	no	no	no
Recommendations for implementation and justification	Windows triple glass Thermal insulation th. 200 mm			
Date of recommended measures preparing	19.4.2018			
Author of analysis	Malathe Alkhateeb			
Energy assessment	Energy assessment is a part of the analysis	no		
	Date of the energy assessment preparation	--		
	Author of energy assessment	--		

Energy specialist's final evaluation

New building or building with almost zero energy consumption	
• Building meets the requirement according to § 6 paragraph 1	No
• Building energy performance class for the total delivered energy	C
Larger change of completed building or other change of the building	
• Building meets the requirement according to § 6 paragraph 2 point a)	
• Building meets the requirement according to § 6 paragraph 2 point b)	
• Building meets the requirement according to § 6 paragraph 2 point c)	
• Fulfillment of requirements on the building energy performance is not required	
• Building energy performance class for the total delivered energy	
Building used by public authorities	
• Building energy performance class for the total delivered energy	
Sale or lease of the building or its part	
• Building energy performance class for the total delivered energy	
Another purpose of certificate processing	
• Building energy performance class for the total delivered energy	

Identification data of energy specialist who created the certificate

Name and surname	Malathe Alkhateeb
Authorization No. of Ministry of Industry and Trade	
Energy specialist's signature	

Date of certificate creation

Date of certificate creation	19.4.2018

Source of information	http://www.mpo-efekt.cz/cz/ekis/i-ekis/

ENERGY PERFORMANCE CERTIFICATE

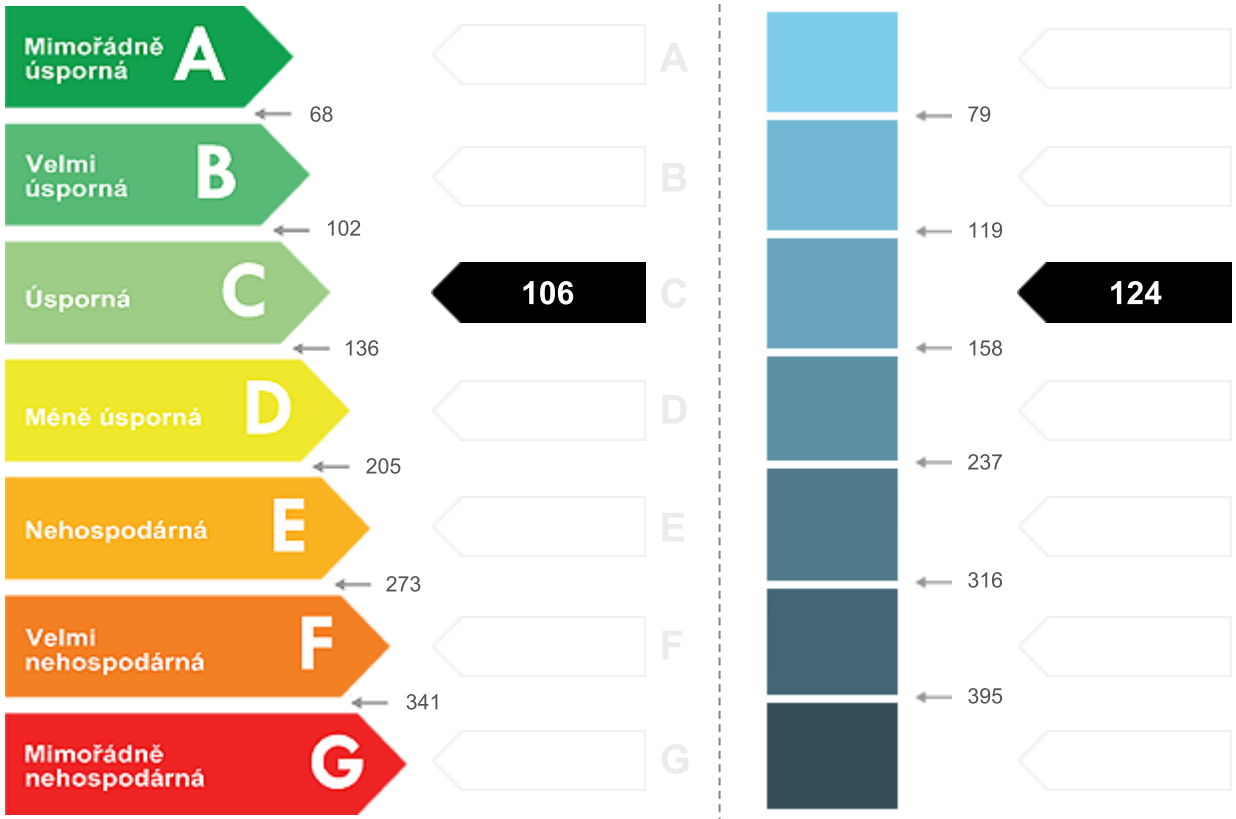
issued according to Act No. 406/2000 Coll., about energy management,
and Directive No. 78/2013 Coll., about building energy performance

Street, number:	
ZIP code, place:	
Building type:	
Building envelope area:	**3264,2 m^2**
Shape factor A/V:	**0,29 m^2/m^3**
Total energy reference area:	**3520,0 m^2**

ENERGY PERFORMANCE OF THE BUILDING

Total delivered energy (Energy input to the building)	**Non-renewable primary energy** (Impact of the building on the environment)

Specific values kWh/(m^2·year)



Values for the whole building MWh/year	**371,452**	**437,895**

RECOMMENDED MEASURES

Measure for	Defined
Outdoor walls:	☐
Windows and doors:	☐
Roof:	☐
Floor:	☐
Heating:	☐
Cooling:	☐
Ventilation:	☐
Hot water prepar.:	☐
Lighting:	☐
Others:	☐

Description of measures can be found in protocol and their impact on energy performance is shown by an arrow.

Doporučení

DELIVERED ENERGY DISTRIBUTION TO ENERGY CARRIERS

Values for the whole building
MWh/year

Elektřina ze sítě: 15,4
Zemní plyn: 356

BUILDING ENERGY PERFORMANCE INDICATORS

	The building envelope	Heating	Cooling	Ventilation	Humidity adjustment	Hot water	Lighting
	U_{em} W/(m²·K)	Partial delivered energy			Specific values	kWh/(m²·year)	
Mimořádně úsporná A							
B		62					
C	0,40					39	4
D							
E							
F							
G							
Mimořádně nehospodárná							
Values for the whole building MWh/year		219,23				137,71	14,51

Author: Malathe Alkhateeb
Contact:

Certificate No.:
Prepared on: 19.4.2018
Signature: