1. EV Pokhodylo Quality control of drinking water for electrical parameters / EV Pokhodylo, O. Honsor // Measuring equipment and metrology. 2008. - Vol. 68. - P. 237-242.
2. R. Robinson Rastvorы эlektrolytov / R. Robinson, R. Stokes. - M .: Publishing ynostrannoy literature, 1963. - 646 p.
3. *Lopatin BA* Conductometry / BA Lopatin. - M .: Higher School, 1964. - 240 p.
4. *Honsor O.* Improving the regulatory and methodological support for the evaluation of the quality of drinking water supply: Thesis. Dis. on competition sciences. degree candidate. Sc. Science, Spec. 05.01.02 "Standardization, certification and metrological support" / O. Honsor. - Lviv, 2008. - 20 p.
5. Malik OV The method of quality control of milk for electrical parameters: Author. Dis. on competition sciences. degree candidate. Sc. Science, Spec. 05.01.02 "Standardization, certification and metrological support" / OV Malik. - Lviv, 2013. - 22 p.

In the work rassmatryvaetsya эlektrycheskaya model konduktometrycheskym cells. Method for monitoring water quality svoyh electric parameters. Analysis of characteristics oshybok, voznykayuschyh at aktyvnoy measurement and reactive sostavlyayuschey conduction.

Quality control, quality indicators эlektrofyzycheskye, impedance, pohreshnosty.

In paper the electric model of conductometric cell is examined. The method of water quality control for its electrical parameters is considered. The analysis of the characteristics of errors arising in the measurement of active and reactive component of conductivity.

Quality control, the electrical qualitative indeves, impedance, measurement error.

UDC 677.31

BACKGROUND OF RATIONAL sandwich panels OF CONSTRUCTION FOR felt livestock buildings

EB Aliev, Ph.D.
NAAS Institute of oilseeds

As a result of calculating thermal properties of some structures of sandwich panels with construction schedules felt obtained distribution of temperature and dew point in its width. Nand theoretical studies on thermal properties of sandwich panel construction with felt set of rational composition «OSB (8 mm) - felt (20 mm) - layer (10 mm) - steel (0.5

mm)", which is characterized by resistance to heat transfer and specific heat costs.

Felt, thermal properties, sandwich panels, livestock buildings, temperature, heat transfer.

Formulation of the problem. In recent years in the construction of livestock buildings widely used trohsharovi sandwich panels. Their use in the construction of capital structures and prefabricated modular buildings received widespread due to their light weight, durability of construction, a large mechanical strength and high thermal insulation and noise performance [1].

Analysis of recent research. Along with the unsolved problem of sheep breeding industry in Ukraine is the use of large volumes (3415 tonnes) unused wool (coarse, low value problem), which currently has a low purchase price and accepted factories initial processing of wool only in large quantities [2]. However, according to BMI NAAS developed a mechanized technology preprocessing and processing wool, sheep wool unused amounts can be recycled in an environmentally safe competitive marketable products in a building felt [3], which can be used as an insulating material for sandwich panels. Sandwich panels - efficiently large designs in a three-layered element, which insulating layer is between the hard surface. With all the known advantages of sandwich panels have several disadvantages that are associated with the materials used in their construction. [4]

The purpose of research. Set reasonable structure sandwich panel construction with felt for livestock buildings on the basis of theoretical studies of thermal properties.

Results. Consider the thermal insulating properties of some materials most widely used today and which can be used in sandwich panels (Table. 1).

1. Thermal properties of materials used in sandwich panels.

Material	Density	Specific heat	Thermal conductivity	vapor ratio	Standard thickness
	ρ, kg / m3	C, J / (kg · ° C)	λ, W / (m · ° C)	μ, mg / (h · m · ° C)	δ, mm
Thermal insulation materials					
Mineral (rock) wool	170-220	0.84	0,041	0.5	50, 100
Styrofoam	12-45	1.34	0,038	0.03	20, 30,

Felt construction	120-160	1.675	0.04	0.34	50 ... 10, 20, 50 ...
Hard coating					
Oriented strand board (OSB)	600-650	2.3	0.11	0.01	8, 10, 22 ...
Galvanized steel, profiled sheet steel	7800-7850	0.48	58	0	0.5, 0.6, 0.8 ...

From Table. 1 shows that all insulation materials have virtually identical thermal properties. However, taking into account environmental factors, it can be argued that the most secure building insulation material is felt. Analysis of the characteristics of a hard cover for sandwich panels (Table. 1) shows that the oriented strand board (OSB) has a high thermal insulation parameters than steel or galvanized corrugated steel sheet, but the situation is the opposite of vapor.

Calculation of the thermal properties of the sandwich panel construction felt reduced to determining resistance to heat and vapor. Calculation of heat transfer resistance sandwich panel made the following formulas [5-9]:

- For a single layer:

$$R_i = \frac{\delta_i}{\lambda_i}, \quad (1)$$

where: δi - thickness, m; λi - thermal conductivity, W / (m · ° C);

- To design, consisting of several layers:

$$R = \sum_{i=1}^{n} \frac{\delta_i}{\lambda_i}, \quad (2)$$

- The total thermal resistance design based on internal teploperehodiv (Rin = 1 / αin) and external (Rout = 1 / αout) surfaces:

$$R = \frac{1}{\alpha_{in}} + \sum_{i=1}^{n} \frac{\delta_i}{\lambda_i} + \frac{1}{\alpha_{out}}, \quad (3)$$

where: αin, αout - heat transfer coefficient, W / (m2 · ° C).

Primary thermal requirements are met if the total thermal resistance design value of R greater than the required resistance to heat Rnorm, defined climatic conditions the construction of the object, but also depends on the purpose of the building (residential, public, production) and the type of enclosure (walls, coatings, flooring, windows, etc.) [10]. This inequality is ensured by changing the thickness of the layers of insulating material in the construction of sandwich panels δi or the use of materials with different coefficients of thermal conductivity λi.

Yes, regulations DBN V.2.6-31: 2006 [5] and SP 01.23.2004 [8] provide not control the accumulation of vapor (condensed) water based on the following conditions:

1. No accumulation of moisture in sandwich panels for the annual period of operation. That condensed moisture accumulated in sandwich panels for the winter should move away (evaporate) for the summer.

2. No accumulation of moisture in the fence over a certain value ΔW, which is governed by the rules [5, 8].

Providing no accumulation of water vapor in sandwich panels is a prerequisite for designing thermal protection. This condition can be achieved if the magnitude of the resistance to operate vapor layer:

$$R_{ni} = \frac{\delta_i}{\mu_i}, \quad (4)$$

where: μi - vapor coefficient mg / (m * h. · ° C).

The value of Rpi separate layer can be adjusted by changing the thickness of the material δi or select a different coefficient of vapor μi. If you can not remove the water vapor permeability variation of the above parameters efficiently use the design of ventilated air layer.

Calculation of the thermal properties of the sandwich panel construction felt spend in the software package Smartcalc [11] .In quality climatic parameters for calculating selected Zaporozhye region, whose climate is characterized by a number of parameters listed in Table. 2 [10].

2. The main climatic parameters Zaporozhye region.

Parameter	Value
Cold Temperature five days of security 0,92, degrees respectively	-21
The duration of the heating period, days	166
The average temperature of the heating period degrees respectively	0.3
Relative humidity is the coldest month,%	85
Operating room	AND
Number of heating degree-days period (HSOP), ° C · day	3270

As a result of calculating thermal properties of some structures of sandwich panels with construction schedules felt obtained distribution of temperature and dew point in its width (Fig. 1 - Fig. 5).

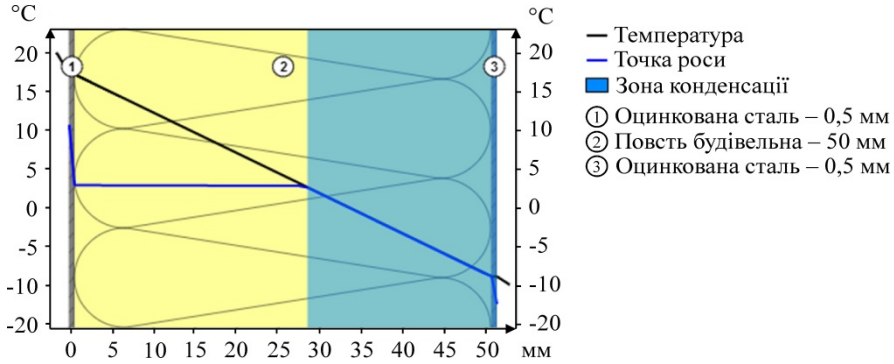

Fig. 1. Distribution of temperature and dew point sandwich panels such as "steel (0.5 mm) - felt (20 mm) - steel (0.5 mm)."

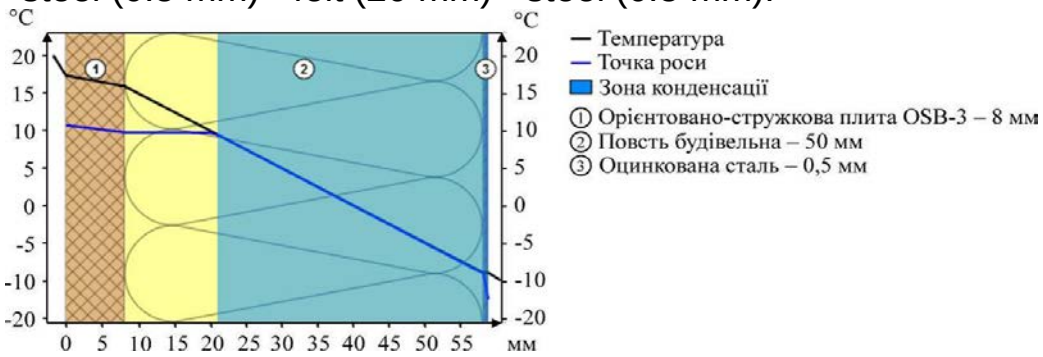

Fig. 2. Distribution of temperature and dew point sandwich panels type «OSB (8 mm) - felt (20 mm) - steel (0.5 mm)."

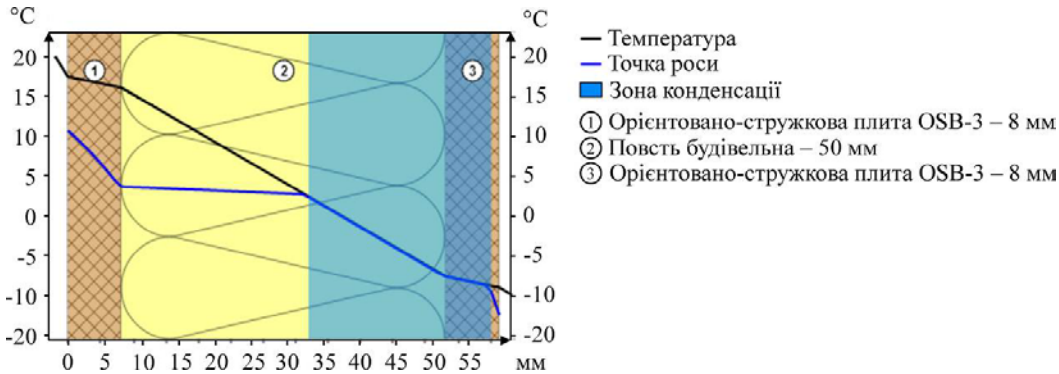

Fig. 3. Distribution of temperature and dew point sandwich panels type «OSB (8 mm) - felt (20 mm) - OSB (8 mm)."

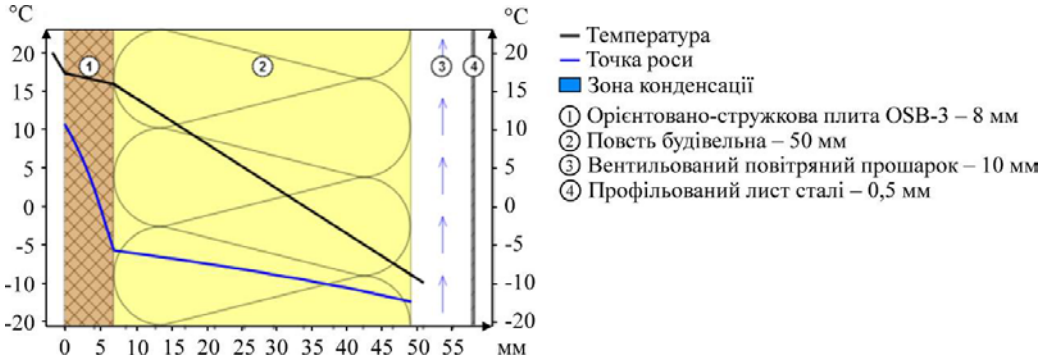

Fig. 4. Distribution of temperature and dew point sandwich panels type «OSB (8 mm) - felt (20 mm) - layer (10 mm) - steel (0.5 mm)."

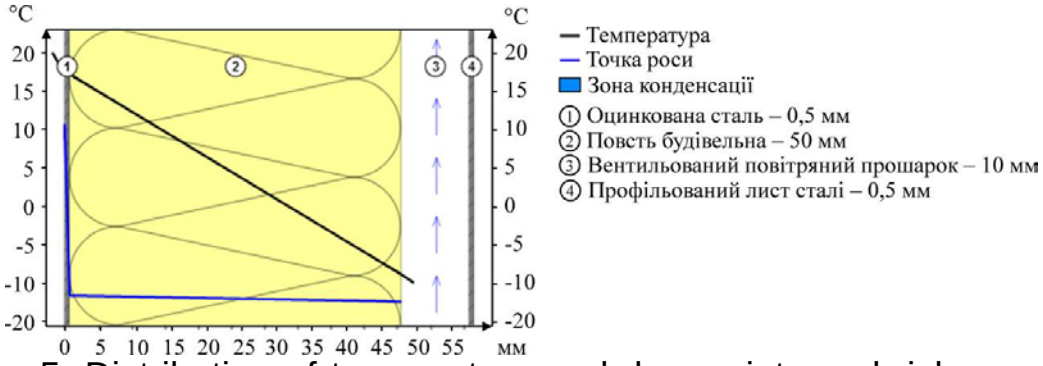

Fig. 5. Distribution of temperature and dew point sandwich panels such as "steel (0.5 mm) - felt (20 mm) - layer (10 mm) - steel (0.5 mm)."

Summary thermal parameters of sandwich panels of various types are presented in Table. 3, which shows that the most effective in terms of heat and vapor is sandwich panel type «OSB (8 mm) - felt (20 mm) - layer (10 mm) - steel (0.5 mm)."

3. Thermal parameters of sandwich panels of different types.

Type sandwich panels	resistance to heat	Specific heat consumption	resistance to vapor
	R, m2 · ° C / W	Q, Wh / m2	Rp (m² · Pa · h) / mg
Steel (0.5 mm) - felt (20 mm) - steel (0.5 mm)	1.22	16.12	10.15
OSB (8 mm) - felt (20 mm) - steel (0.5 mm)	1.28	15.35	0.95
OSB (8 mm) - felt (20 mm) - OSB (8 mm)	1.35	14,64	0.95
OSB (8 mm) - felt (20 mm) - layer (10 mm) - steel (0.5 mm)	1.33	14.78	-
Steel (0.5 mm) - felt (20 mm) - layer (10 mm) - steel (0.5 mm)	1.27	15.5	-
Requirements [9,10]			
Sanitation requirements	> 1.18	<16.72	
Standardized values for elemental requirements	> 1.6	<12.29	> 2.84
The base value for the element requirements	> 2.54	<7,74	

Conclusion. Based on theoretical research thermal properties of sandwich panel construction with felt set of rational composition «OSB (8 mm) - felt (20 mm) - layer (10 mm) - steel (0.5 mm)", which is characterized by the following parameters: resistance heat R = 1,33 m2 · ° C / W, specific heat consumption Q = 14,78 Wh / m2.

List of references

1. *JA Fylypson* Analysis of Benefits and drawbacks metallis of application "sandwiches" in the construction-panel / YA // Fylypson collections of materials VI-Vserossyyskoy and scientific-technical conference studentov, aspyrantov of Young scientists and / Otv. Ed. OA Kraev. - Krasnoyarsk: Sib. Feder. University Press, 2011. - P. 169-180.
2. *Suharlov VA* Justification develop technical and technological module for making local production of felt wool / VA Suharlov, *VV Likhoded, IN Romantsov* // Mechanization, greening and convert biosyrovyny livestock / Inst fur. NAAS livestock. - Zaporozhye, 2010. - Vol. 1 (5, 6). - S. 116-119.
3. *Likhoded V.* Results of production testing compact plate-fulling machine FCM-1 / VV Likhoded, EB Aliyev, SI Pavlenko, VV Ivlev // Journal of Kharkov National Technical University of Agriculture Petro Vasilenko. - Kharkiv, 2014. - Vol. 144. - P. 196-201.
4. *Treskova NV* Uteplenye naruzhnыh walls / NV Treskova, AS Mareyev // Krovelnые yzolyatsyonnые and materials. - 2012. - № 1. - P. 40-44.
5. *DBN* V.2.6-31: 2006 Construction of buildings and structures. Insulation of buildings [to replace SNIP II-3-79] approved. Order № 301 of the Ministry of Construction, Architecture and Housing and Communal Services of Ukraine of 09.09.2006 p .; acting on 2007-04-01. - Ministry of Construction of Ukraine, 2006. - K .: SE "" Ukrarhbudinform. " - 71 sec.
6. *Teplovaya* protection of buildings: SNIP 2.23. - Ministry rehyonalnoho development of the Russian Federation, 2011 - AM - 48 sec.
7. *GOST* P 54851-2011 (ISO 14683: 2007, NEQ) Constructions stroytelnые ohrazhdayuschye neodnorodnые. Raschët bring Resistance of heat transfer: Approved. and put into Action by the command of the Federal Agency of technical regulation and metrology from 15 December 2011 g number 1556-c. - M .: FSUE "Standartynform", 2012. - 24 p.
8. *JV* 01/23/2004 Designing thermal protection of buildings [In return SP 23-101-2000]: Introduction to Action 2004-06-01. - M, 2004. - 178 p.
9. *HUNDRED* 00044807-001-2006 Teplozaschytnые properties ohrazhdayuschyh structures of buildings, ratified. ROYS commandment February 21, 2006 № 8-12; vvedën in Action from 1 March 2006 - ROYS, 2006 - AM - 67 p.
10. *ISO-H* V.1. B-27: 2010 Protection from dangerous geological processes, operational harmful effects of fire. Building Climatology: approved. Order № 511 of 16.12.2010 p .; acting on 2011-11-01. - Ministry of Regional Development of Ukraine 2011 - K .: SE "" Ukrarhbudinform. " - 123 p.
11. *Teplotehnycheskyy* calculator. Calculation uteplenyya and dew point for thy stroyaschyh Home [Electronic resource] / the Network Resource www.smartcalc.ru, Idea and Development, VA Kireev. - Mode constantly access: http://www.smartcalc.ru/ thermocalc. - Register latter date 02/04/2014.

As a result of calculation teplofyzycheskyh properties nekotorыh structures sandwich panels IZ Construction Felt poluchennы graphics apportionment of temperature and dew point in EE width. On the basis of research teplofyzycheskyh properties Theoretically sandwich-panels IZ Construction Felt's laid ego ratsyonalnыy composition «OSB (8 mm) - Felt (20 mm) - layer of (10 mm) - steel (0.5 mm)», which harakteryzuetsya Resistance to heat transfer and udelnым teplovым rashodom.

Felt, teplofyzycheskye properties, sandwich panels, zhyvotnovodcheskye the premises, temperature, heat transfer.

Result of calculation of thermal properties of some structures of sandwich panels of the building felt the resulting chart of temperature and dew point in its width. On the basis of theoretical investigations of thermal properties of sandwich panels of the building felt it set a rational structure of «OSB (8 mm) - felt (20 mm) - layer (10 mm) - steel (0.5 mm)", which is characterized by resistance to heat transfer and specific heat flow.

Felts, thermal properties, sandwich panels, livestock facilities, temperature, heat transfer.

UDC 677,057,617

Mathematical model of felting GROSS wool felt in Plast ON sized plate-fulling machine

EB Aliev, Ph.D.
NAAS Institute of oilseeds
SI. Pavlenko, PhD
Dnipropetrovsk State Agrarian University of Economics

Based on the conditions intensifying the process of felting wool rough layer in Felt reasonably ryfliv geometric parameters of the working surface of the upper movable plate compact plate-fulling machine. From the condition of maximum area tension action that occurs in a layer of coarse wool during loading geometry set ryfliv working surface of the upper movable plate compact plate-fulling machine.

Wool, felt, felting, mathematical model, ryfli function.

Formulation of the problem. Analyzing the results of previous experimental studies [1-4] densification damp coarse wool found that its deformation under the working surface of the upper plate of the moving ryflyamy is not uniformly over its thickness.

Analysis of recent research. These observations led to the hypothesis of the interaction of the working surface of the upper movable plate compact plate-fulling machine with damp coarse wool, according to which of the surface of ryflyamy compared with a flat surface leads to