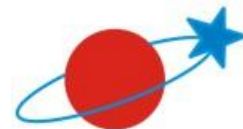


Termografiere interior



Company	PHOBOS	Tester:
	Petofi Sandor 26/3	Adrian Oprea
	Cluj-Napoca	Phone: 0744609754
		E-Mail: office@phobos-grup.ro

Device	testo 875-1i	Serial No.: 2812949
---------------	--------------	---------------------

Customer	██████████	Measuring Site:
	████████████████████	██████████
	Cluj-Napoca	████████████████████
		Cluj-Napoca
		Measuring Date: 01.01.2000

Task	Analiza stare izolare apartament
-------------	----------------------------------



Termografiere interior

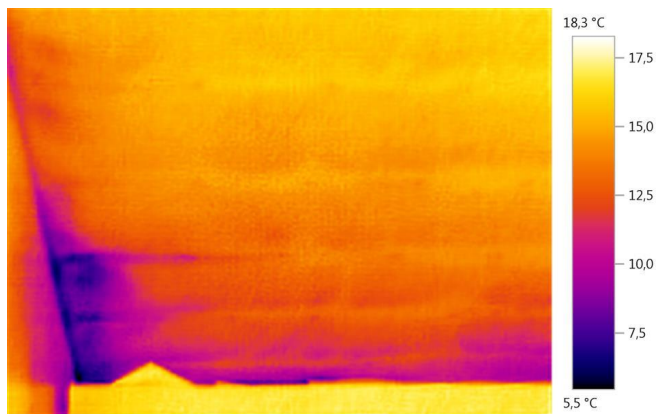
File: IV_00074.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:05:07



Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0



Termografiere interior

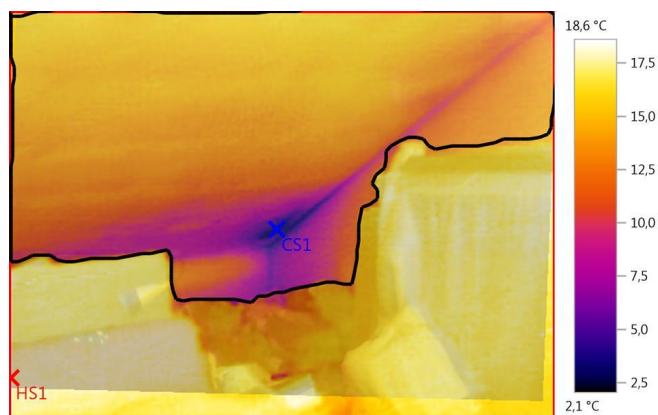
File: IV_00075.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:05:39



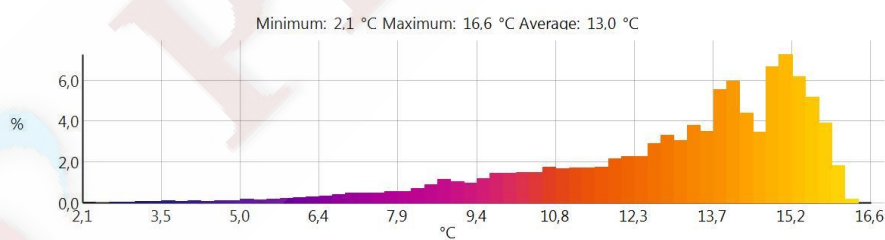
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Cold spot 1	2,1	0,95	20,0	-
Hot spot 1	18,6	0,95	20,0	-

Histogram:





Termografiere interior

File: IV_00076.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:06:25



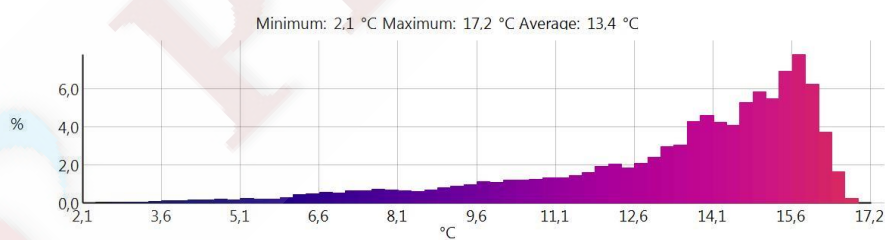
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Cold spot 1	2,1	0,95	20,0	-
Hot spot 1	95,5	0,95	20,0	-

Histogram:





Termografiere interior

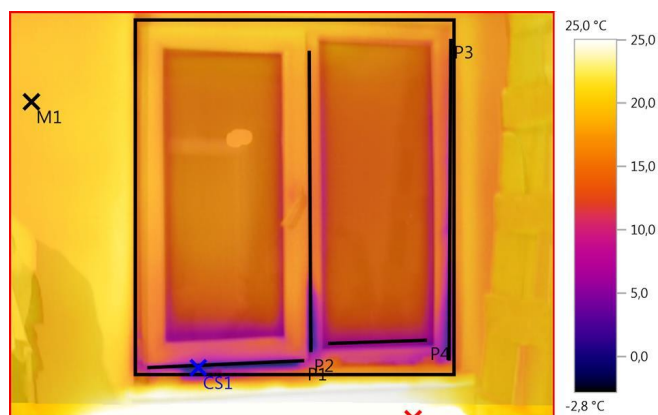
File: IV_00077.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:09:51



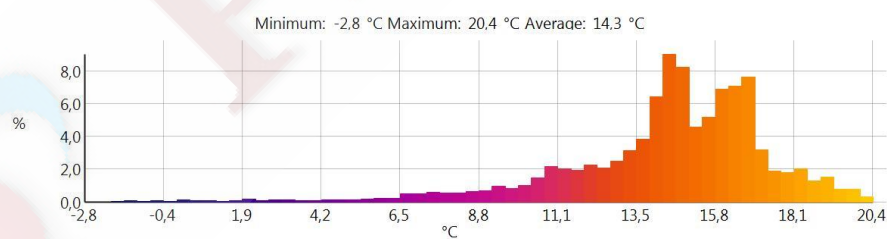
Picture parameters:

Emissivity: 0,95
 Refl. temp. [°C]: 20,0

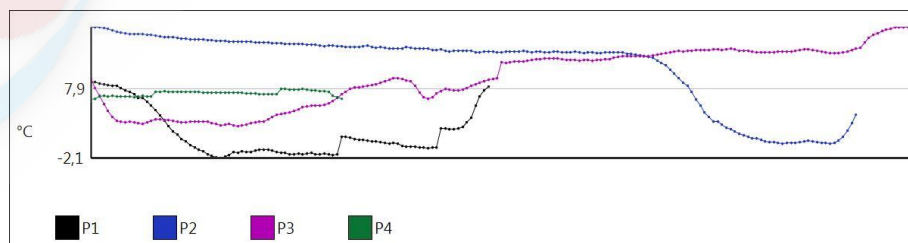
Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	19,1	0,95	20,0	-
Cold spot 1	-2,8	0,95	20,0	-
Hot spot 1	50,2	0,95	20,0	-

Histogram:



Profile line:





Termografiere interior

File: IV_00078.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:11:42



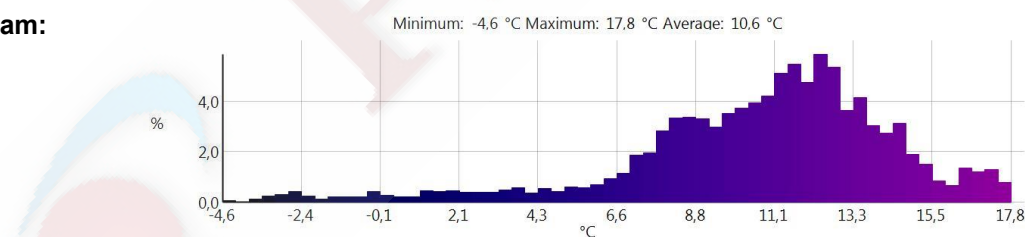
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	21,2	0,95	20,0	-
Cold spot 1	-4,6	0,95	20,0	-
Hot spot 1	69,5	0,95	20,0	-

Histogram:





Termografiere interior

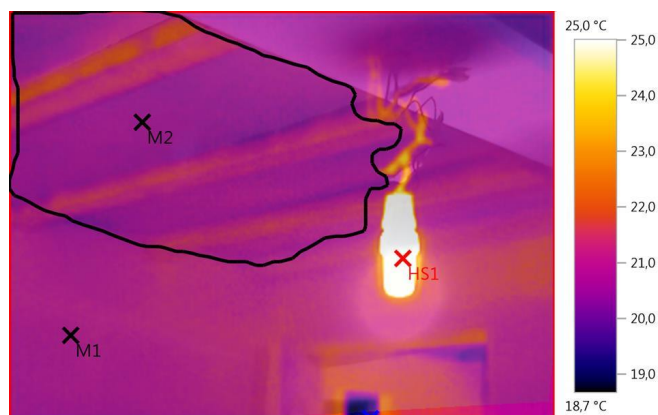
File: IV_00079.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:12:07



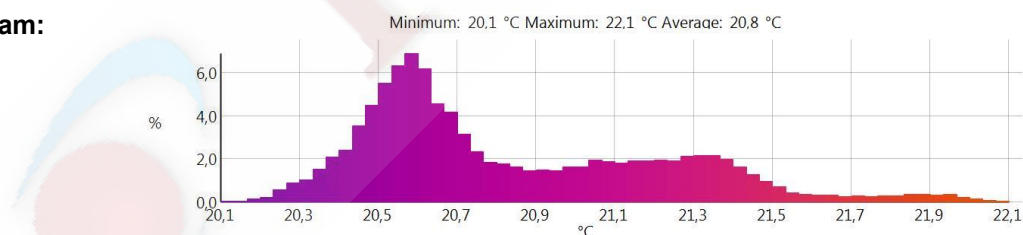
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	20,9	0,95	20,0	-
Measure point 2	20,6	0,95	20,0	-
Cold spot 1	18,7	0,95	20,0	-
Hot spot 1	101,8	0,95	20,0	-

Histogram:





Termografiere interior

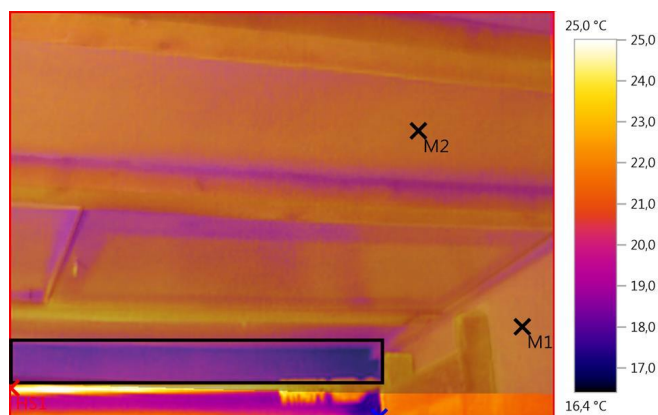
File: IV_00080.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:12:44



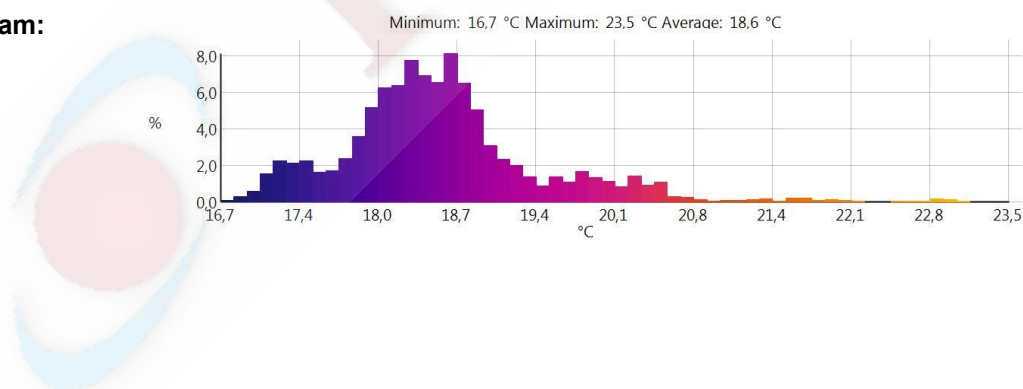
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	21,5	0,95	20,0	-
Measure point 2	21,2	0,95	20,0	-
Cold spot 1	16,4	0,95	20,0	-
Hot spot 1	26,1	0,95	20,0	-

Histogram:





Termografiere interior

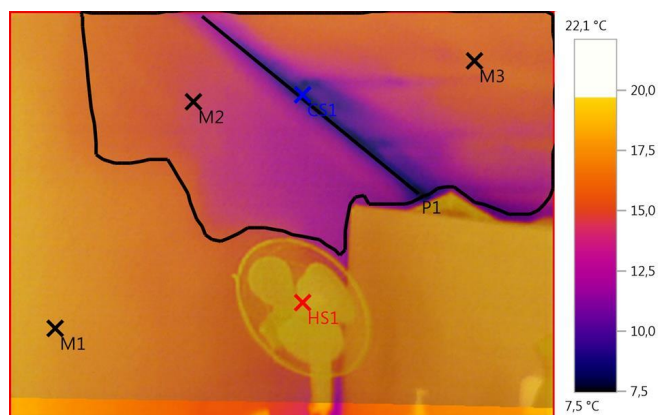
File: IV_00091.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:25:53



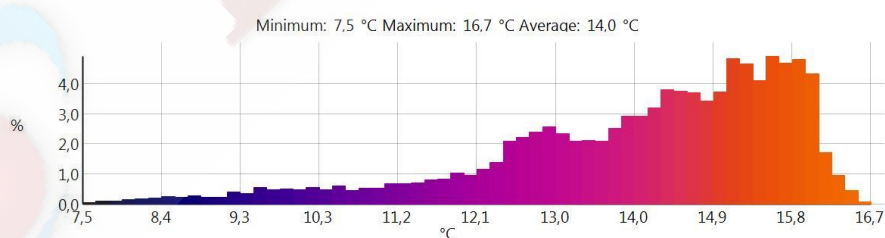
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

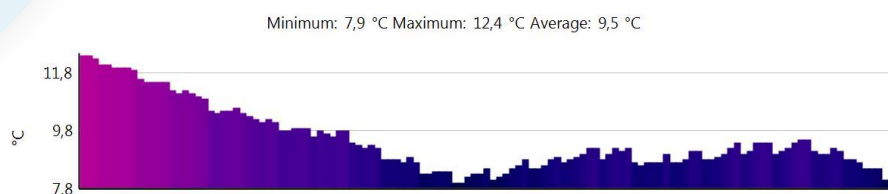
Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	18,1	0,95	20,0	-
Measure point 2	14,6	0,95	20,0	-
Measure point 3	15,8	0,95	20,0	-
Cold spot 1	7,5	0,95	20,0	-
Hot spot 1	19,7	0,95	20,0	-

Histogram:



Profile line:





Termografiere interior

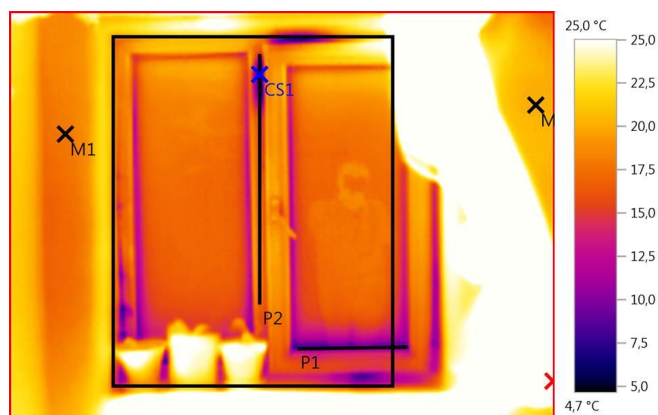
File: IV_00081.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:14:13



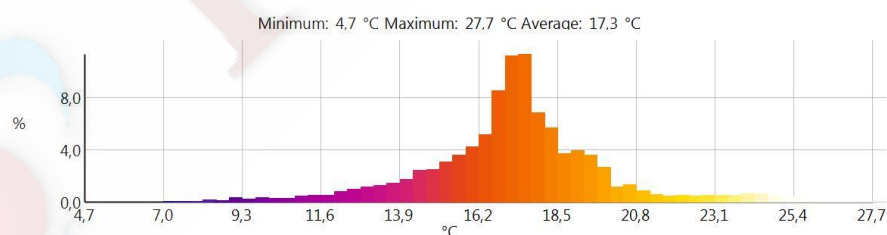
Picture parameters:

Emissivity: 0,95
 Refl. temp. [°C]: 20,0

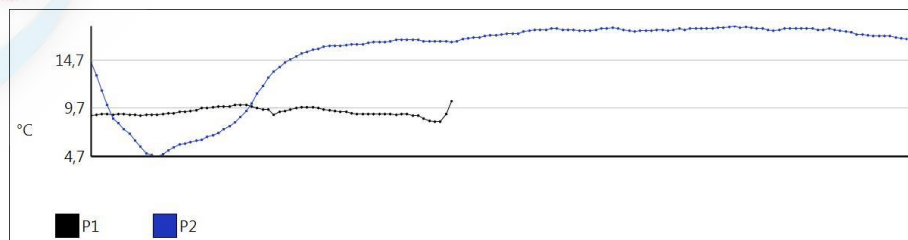
Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	17,9	0,95	20,0	-
Measure point 2	20,1	0,95	20,0	-
Cold spot 1	4,7	0,95	20,0	-
Hot spot 1	38,5	0,95	20,0	-

Histogram:



Profile line:





Termografiere interior

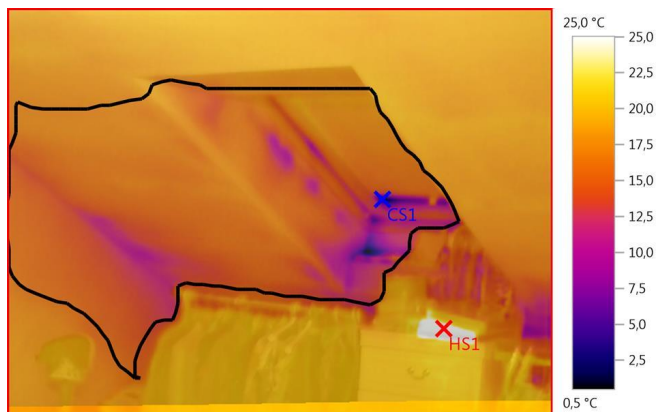
File: IV_00082.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:14:49



Picture parameters:

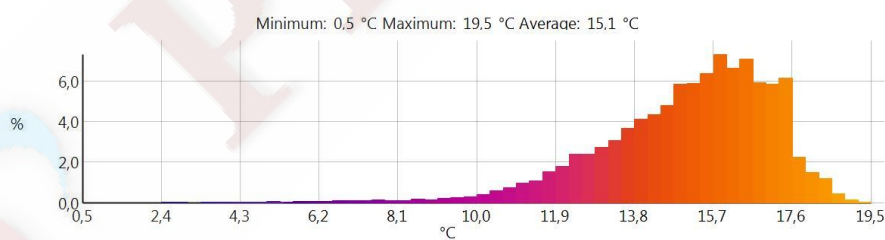
Emissivity: 0,95

Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Cold spot 1	0,5	0,95	20,0	-
Hot spot 1	41,0	0,95	20,0	-

Histogram:





Termografiere interior

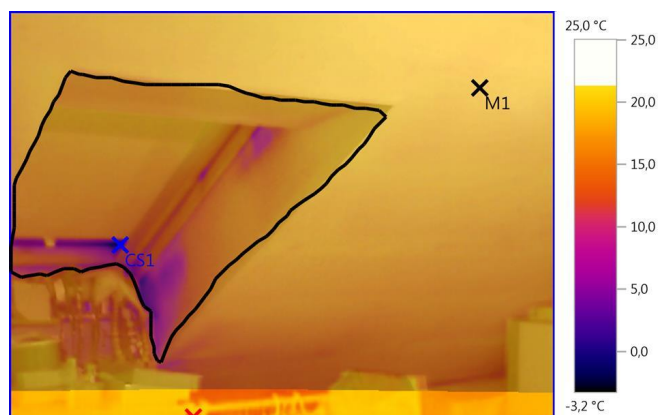
File: IV_00083.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:15:12



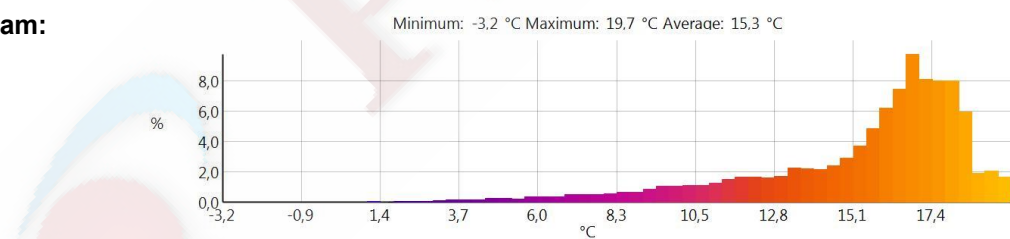
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	19,0	0,95	20,0	-
Cold spot 1	-3,2	0,95	20,0	-
Hot spot 1	21,3	0,95	20,0	-

Histogram:





Termografiere interior

File: IV_00084.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:19:08



Picture parameters:

Emissivity: 0,95

Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	18,7	0,95	20,0	-
Cold spot 1	9,6	0,95	20,0	-
Hot spot 1	69,1	0,95	20,0	-



Termografiere interior

File: IV_00085.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:19:56



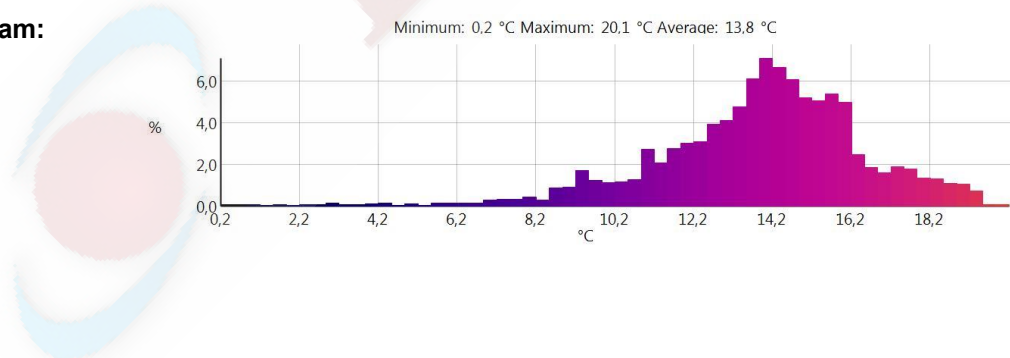
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	21,3	0,95	20,0	-
Measure point 2	15,9	0,95	20,0	-
Measure point 3	16,3	0,95	20,0	-
Measure point 4	16,7	0,95	20,0	-
Measure point 5	14,4	0,95	20,0	-

Histogram:





Termografiere interior

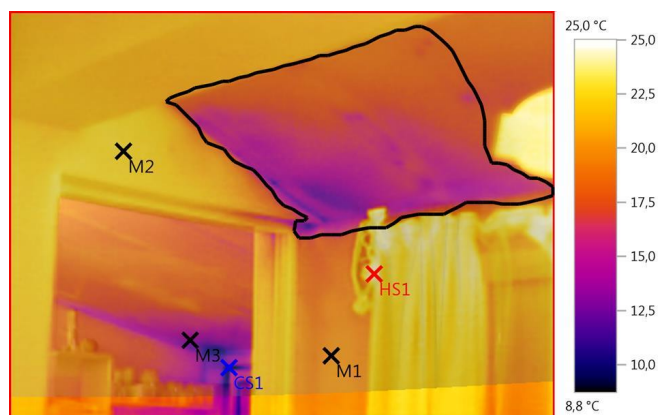
File: IV_00087.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:20:54



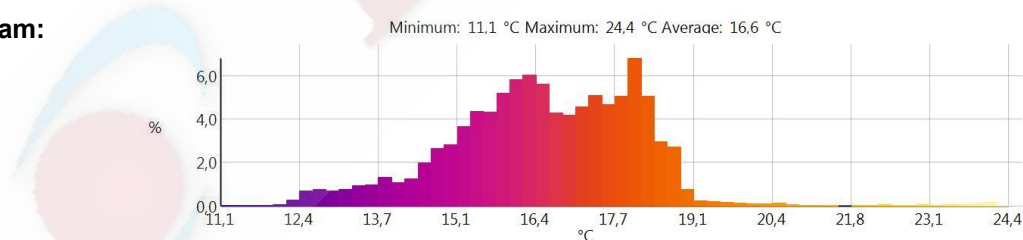
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	20,2	0,95	20,0	-
Measure point 2	22,6	0,95	20,0	-
Measure point 3	13,1	0,95	20,0	-
Cold spot 1	5,5	0,95	20,0	-
Hot spot 1	24,6	0,95	20,0	-

Histogram:





Termografiere interior

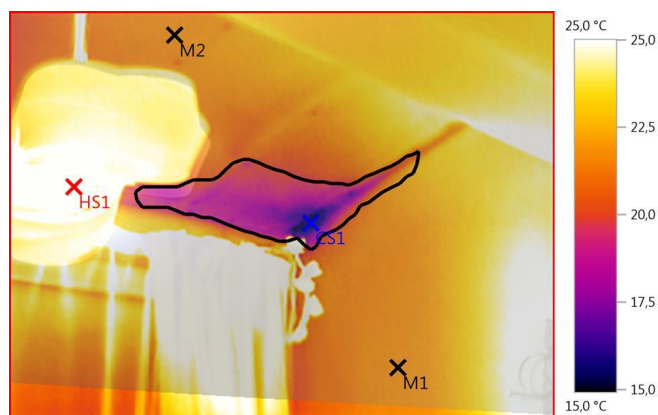
File: IV_00088.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:21:08



Picture parameters:

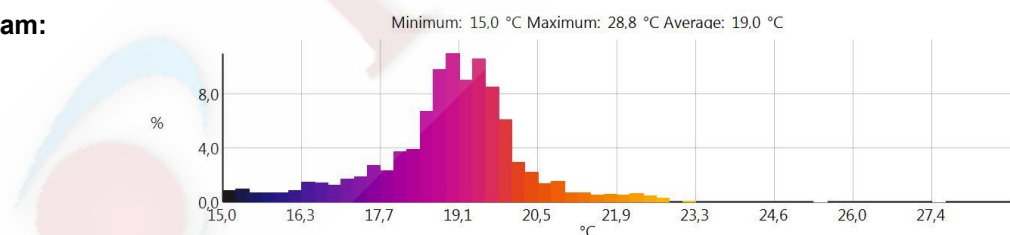
Emissivity: 0,95

Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	21,8	0,95	20,0	-
Measure point 2	21,7	0,95	20,0	-
Cold spot 1	15,0	0,95	20,0	-
Hot spot 1	82,7	0,95	20,0	-

Histogram:





Termografiere interior

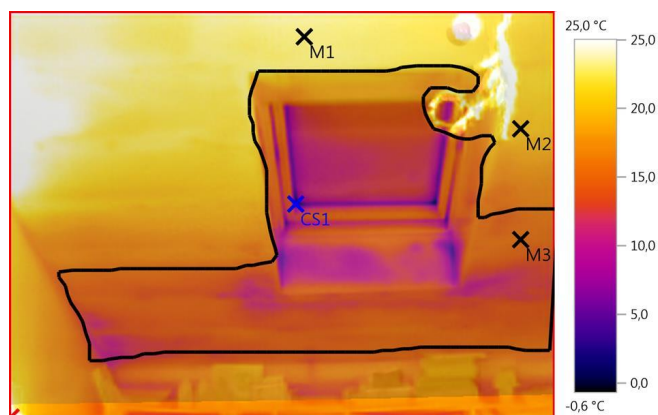
File: IV_00090.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:23:33



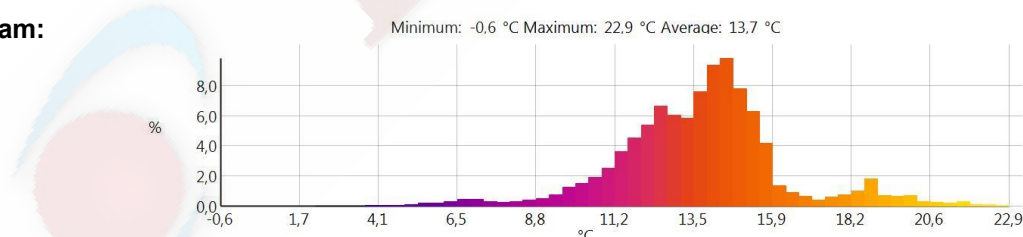
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	22,8	0,95	20,0	-
Measure point 2	19,7	0,95	20,0	-
Measure point 3	15,6	0,95	20,0	-
Cold spot 1	-0,6	0,95	20,0	-
Hot spot 1	34,3	0,95	20,0	-

Histogram:





Termografiere interior

File: IV_00092.BMT

Date: 01.01.2000

lens type: Standard 32°

lens serial no.: 20385847

Measuring Time: 19:26:15



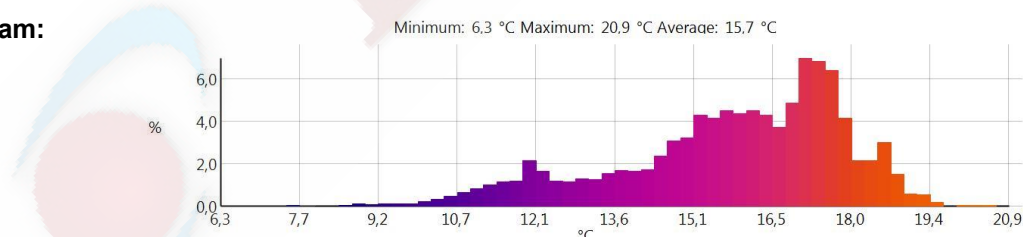
Picture parameters:

Emissivity: 0,95
Refl. temp. [°C]: 20,0

Picture markings:

Measurement Objects	Temp. [°C]	Emiss.	Refl. temp. [°C]	Remarks
Measure point 1	18,4	0,95	20,0	-
Measure point 2	23,4	0,95	20,0	-
Measure point 3	21,3	0,95	20,0	-
Cold spot 1	6,3	0,95	20,0	-
Hot spot 1	28,2	0,95	20,0	-

Histogram:



Review:

CONCLUZII

Pentru o referinta la incaperile masurate, acestea vor fi notate cu C1 pana la C5 (vezi anexa cu schita apartament).

Imaginile asociate cu fiecare incapere sunt dupa cum urmeaza:

IV_00074 pana la IV_00080 si IV_00091 incaperea C1
IV_00081 pana la IV_00084 incaperea C2
IV_00085 pana la IV_00090 si IV_00092 incaperea C3
IV_00087 incaperea C5

In incaperea C4 nu au fost gasite probleme de izolatie.



Termografiere interior

Dupa cum se poate vedea in imaginile termografice anexate, impreuna cu histograma temperaturilor pe zonele cele mai afectate, exista zone cu un puternic transfer termic avand ca si cauza probleme constatate la elementele de constructie ale apartamentului.

Problema 1

Unul dintre elementele de constructie care afecteaza balanta termica a incaperilor sunt ferestrele. La acestea s-a constatat urmatoarele:

1. Deficienta a etanseitatii ramelor, ceea ce duce la infiltrarea aerului rece intre rama si tocul ferestrei.
2. Deficienta a etanseitatii vitrajului fata de rama ferestrei, ceea ce duce la infiltrarea aerului rece intre rama si vitraj.

Problema 2

Al doilea element de constructie cu probleme este izolarea cu vata minerala a spatiului dintre astereala acoperisului si peretii interiori ai apartamentului. Dupa cum se poate remarca in imagini o suprafata semnificativa din peretii in panta care sunt paraleli cu acoperisul prezinta temperaturi scazute ceea ce indica un transfer termic important intre incapere si mediul exterior. Aceasta problema poate fi cauzata de montarea gresita a panourilor de vata minerala astfel incat acestea nu formeaza un volum compact impreuna cu capriorii acoperisului, astfel existand interstitii pe unde are aerul rece acces spre peretii interiori ai apartamentului. O astfel de problema poate sa apara in timp si datorita unui montaj incorect al straturilor acoepriului si datorita acestui fapt vata minerala se poate imbiba cu apa si tasa, acesta ducand la deformarea acesteia cu consecinta formarii de interstitii intre capriorii si panourile de vata minerala si de asemenea pierderea calitatilor de izolarea a panoului de vata minerala afectat.

RECOMANDARI

Problema 1

Recomandam reglajul ferestrelor (acolo unde constructia acestora permite), iar daca in urma acestei operatii etanseitatea nu se poate realiza, se recomanda inlocuirea garniturilor de etansare.

La ferestrele velux se recomanda izolarea eventualelor interstitii intre tocul acestora si peretii interiori ai apartamentului.

Problema 2

Se recomanda verificarea organoleptica a izolatiei din zonele afectate (vezi imagini), si in functie de evalaurea organoleptica luate masuri de refacere a izolatiei si eliminarea puntilor termice formate intre elementele de constructie ale acoperisului.

Cele de mai sus sunt singurele metode reale de imbunatatire a confortului termic in incaperile afectate si reducerea implicita a pierderilor de caldura.

Faptul ca o incapere are radiatoare supradimensionate si prin aceasta reuseste sa compenseze pierderile de caldura excesive, va mentine intr-adevar temperatura unei incaperi la cotele de confort dar cu un consum excesiv al sistemului de incalzire.

01.01.2000 ,

Adrian Oprea

