

*Radiant systems*  
Sistemi radianti



# ***Thermal output in radiant systems*** **Rese sistemi radianti**

***TECHNICAL MANUAL***  
**MANUALE TECNICO**



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# 1 TRADITIONAL FLOOR HEATING - RISCALDAMENTO PAVIMENTO TRADIZIONALE

## 1.1 ACOUSTIC PLUS

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.045	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Heat conductivity of screed with inserts	Conducibilità massetto con bugne	$\lambda'_E$	1.0324	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.017	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	6.507	6.069	5.687	5.350	5.052	4.786	4.547	4.331	4.135	3.956	3.793	3.641	3.502	3.373	3.254	3.142
16.6	5.106	4.801	4.535	4.302	4.096	3.913	3.740	3.585	3.444	3.317	3.200	3.086	2.982	2.885	2.796	2.713
24.9	4.036	3.824	3.639	3.478	3.337	3.213	3.089	2.979	2.880	2.790	2.708	2.623	2.545	2.473	2.406	2.345

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

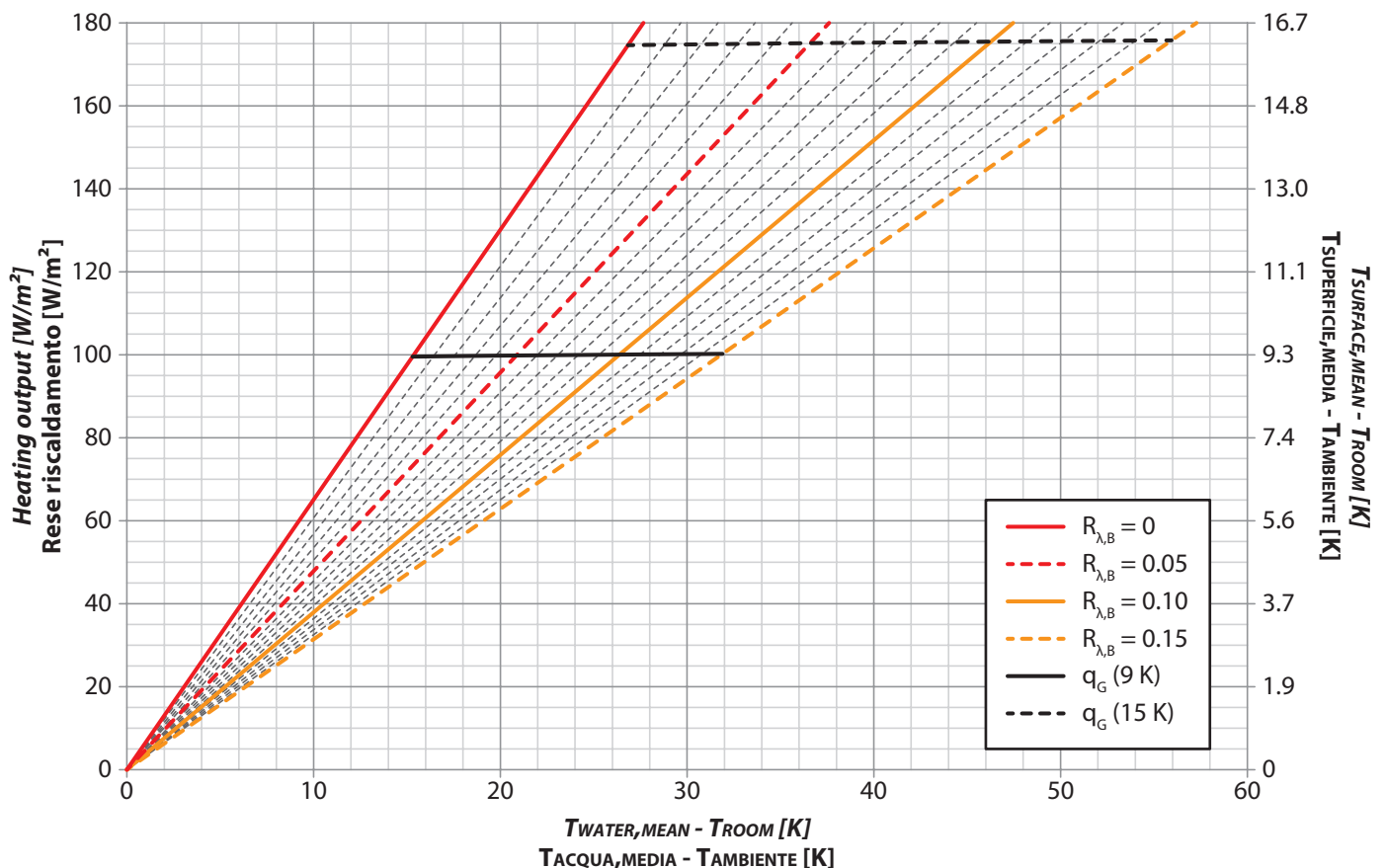
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

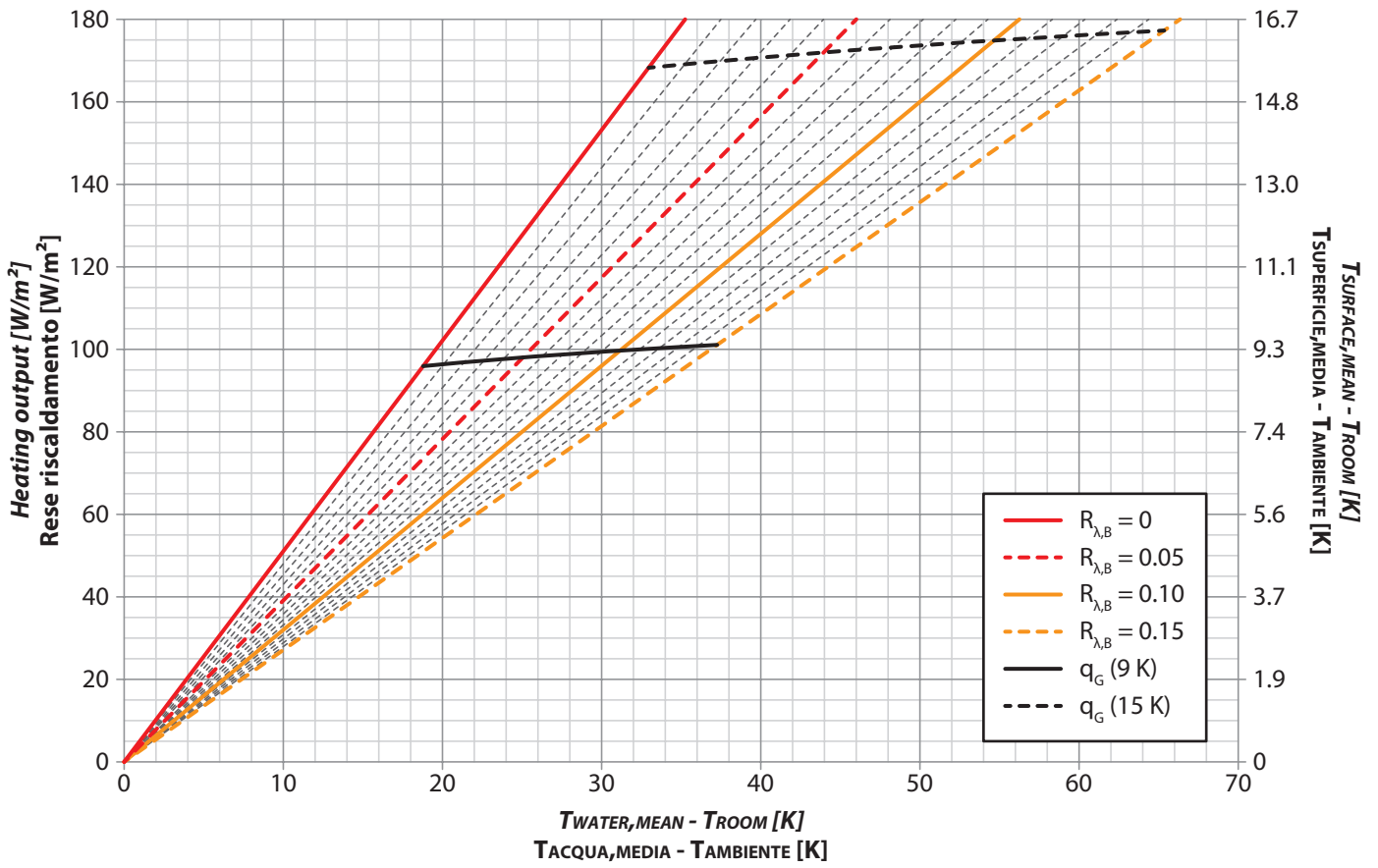
#### PASSO 8 CM





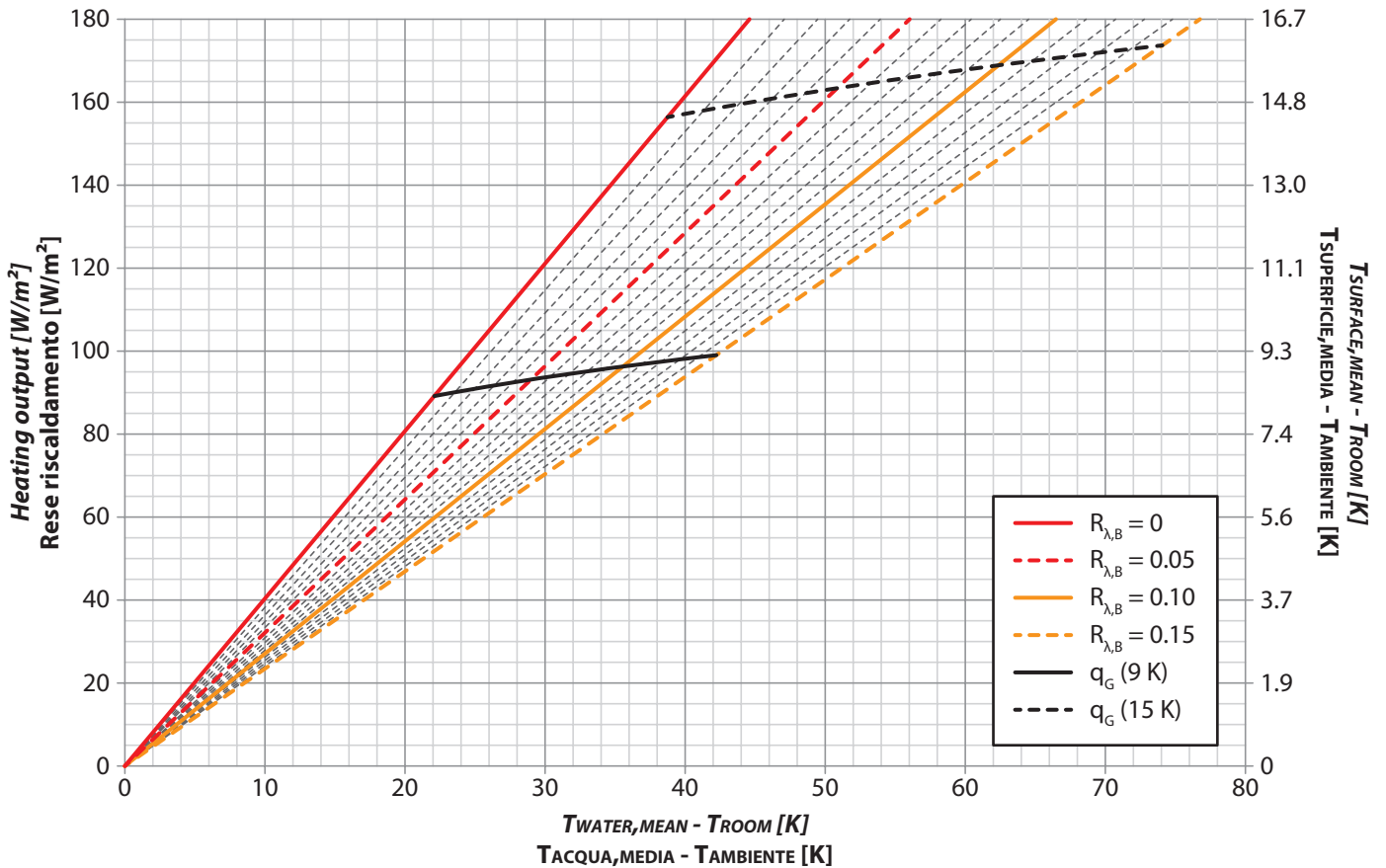
**SPACING 16-CM**

**PASSO 16 CM**



**SPACING 25-CM**

**PASSO 25 CM**



## 1.2 COVER

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.045	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Heat conductivity of screed with inserts	Conducibilità massetto con bugne	$\lambda'_E$	1.0563	W(m·k)
Piper external diameter	Diametro esterno tubo	$d_a$	0.017	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	6.555	6.110	5.723	5.382	5.081	4.812	4.570	4.352	4.154	3.973	3.808	3.656	3.516	3.386	3.265	3.153
16.6	5.144	4.833	4.564	4.328	4.119	3.933	3.759	3.602	3.460	3.331	3.213	3.099	2.993	2.896	2.806	2.722
24.9	4.066	3.850	3.662	3.499	3.356	3.230	3.105	2.993	2.893	2.802	2.719	2.633	2.555	2.482	2.415	2.353

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

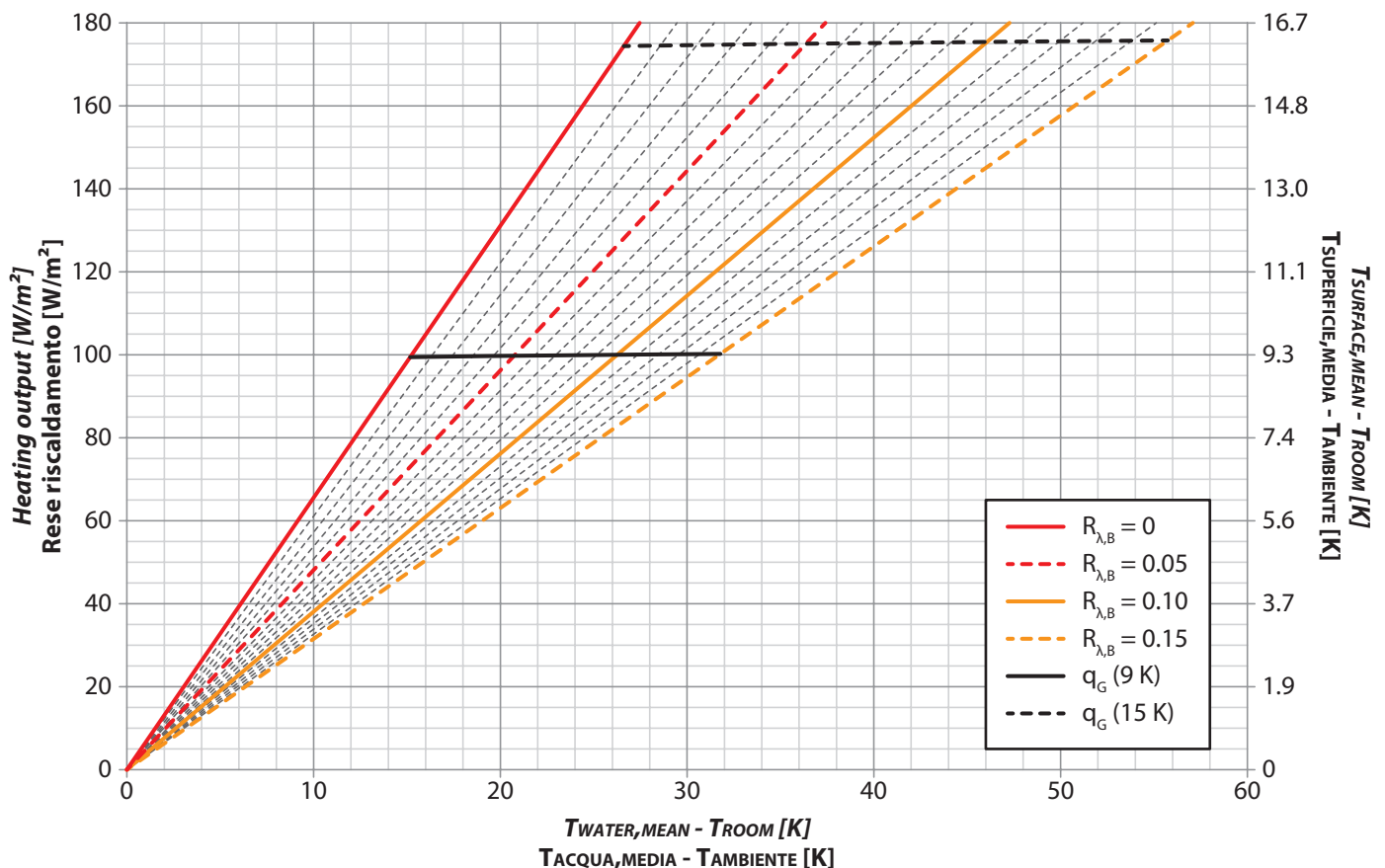
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

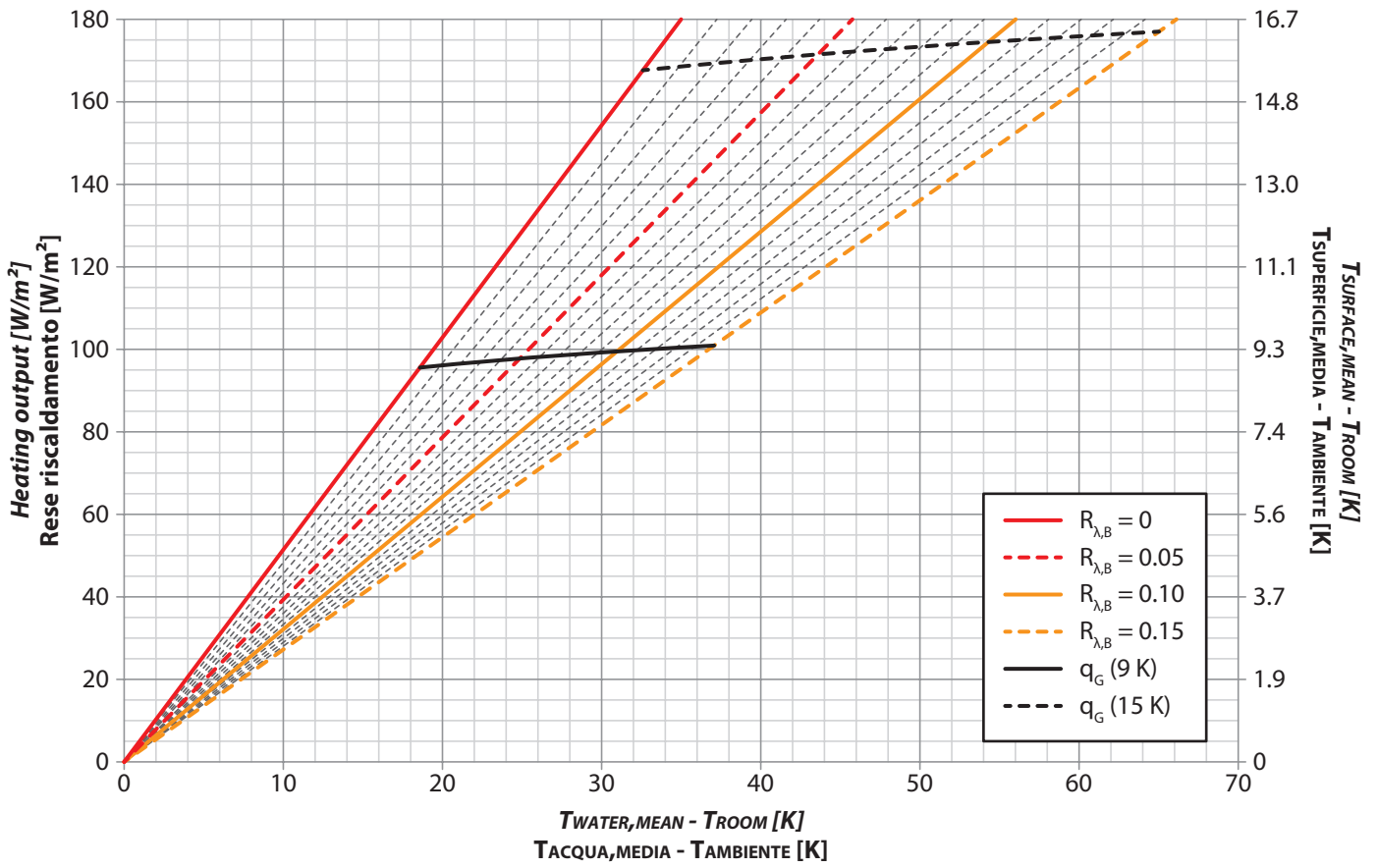
#### PASSO 8 CM





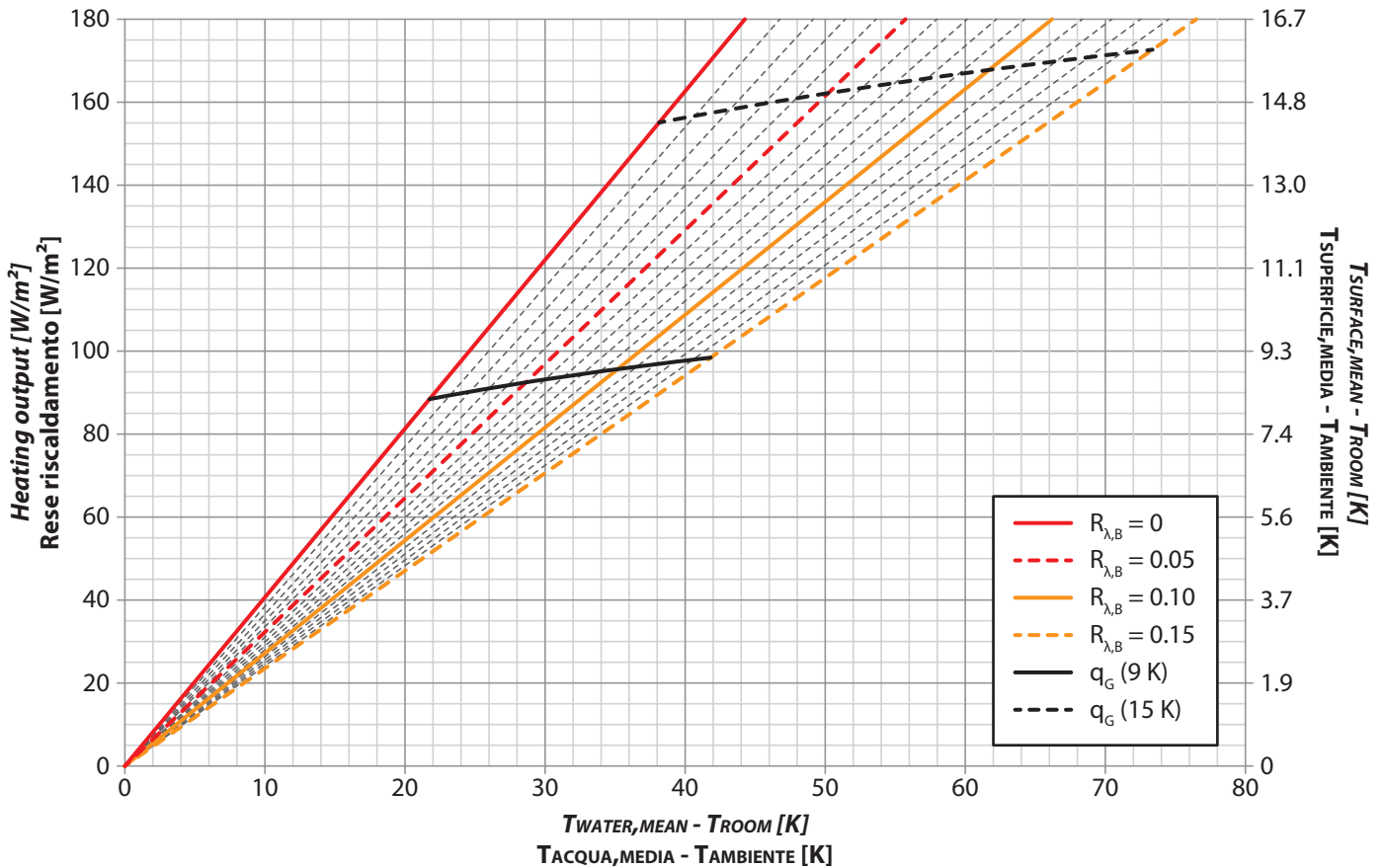
SPACING 16-CM

PASSO 16 CM



SPACING 25-CM

PASSO 25 CM





### 1.3 COVER HP

#### DATA

#### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.045	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Heat conductivity of screed with inserts	Conducibilità massetto con bugne	$\lambda'_E$	1.0568	W(m·k)
Piper external diameter	Diametro esterno tubo	$d_a$	0.017	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	6.556	6.111	5.723	5.383	5.081	4.812	4.571	4.352	4.154	3.974	3.809	3.656	3.516	3.386	3.266	3.154
16.6	5.144	4.834	4.565	4.328	4.119	3.934	3.760	3.603	3.461	3.331	3.213	3.099	2.994	2.896	2.806	2.722
24.9	4.067	3.850	3.663	3.500	3.356	3.230	3.105	2.994	2.893	2.802	2.719	2.634	2.555	2.482	2.415	2.353

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

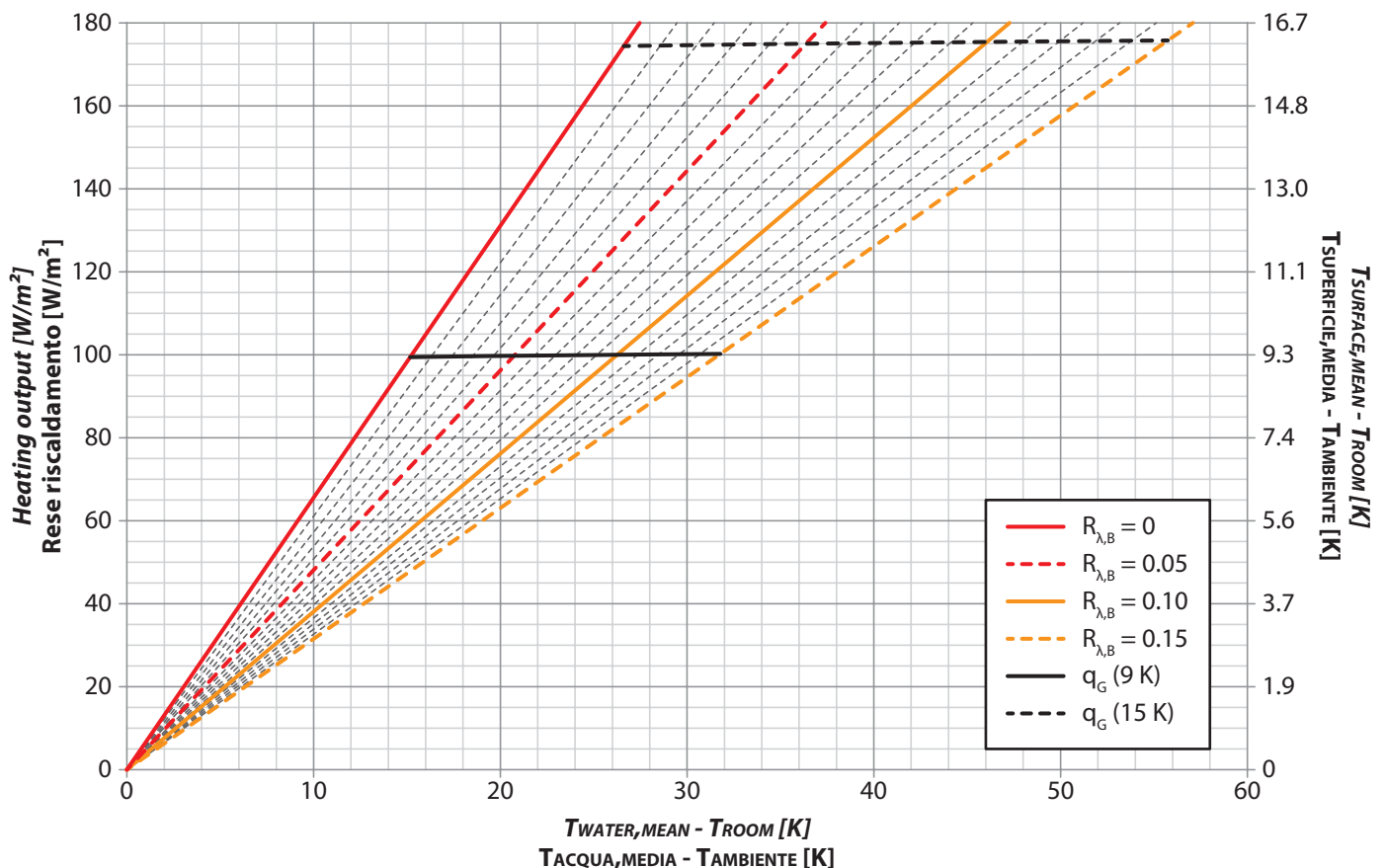
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

#### GRAPHS

#### GRAFICI

#### SPACING 8-CM

#### PASSO 8 CM

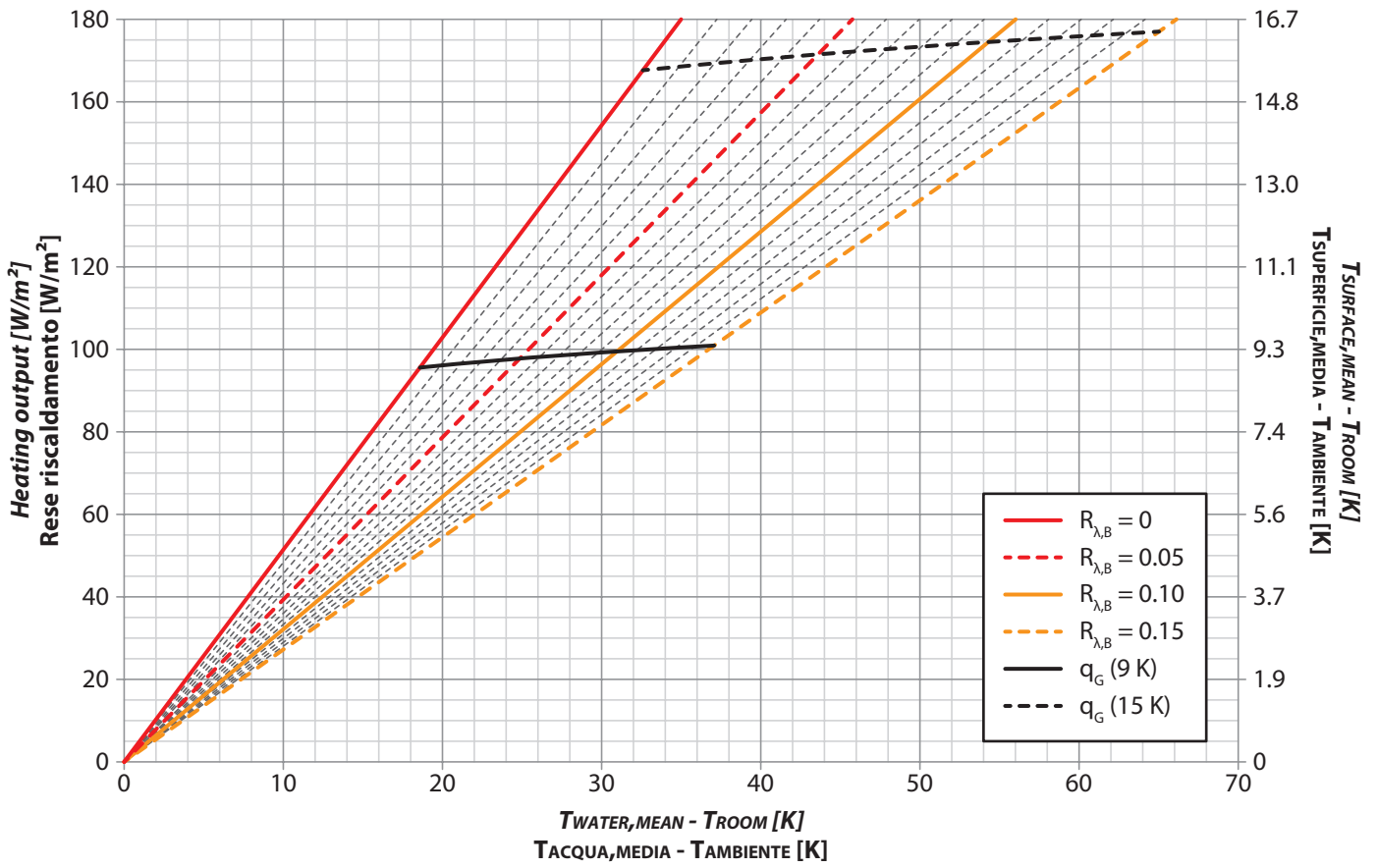






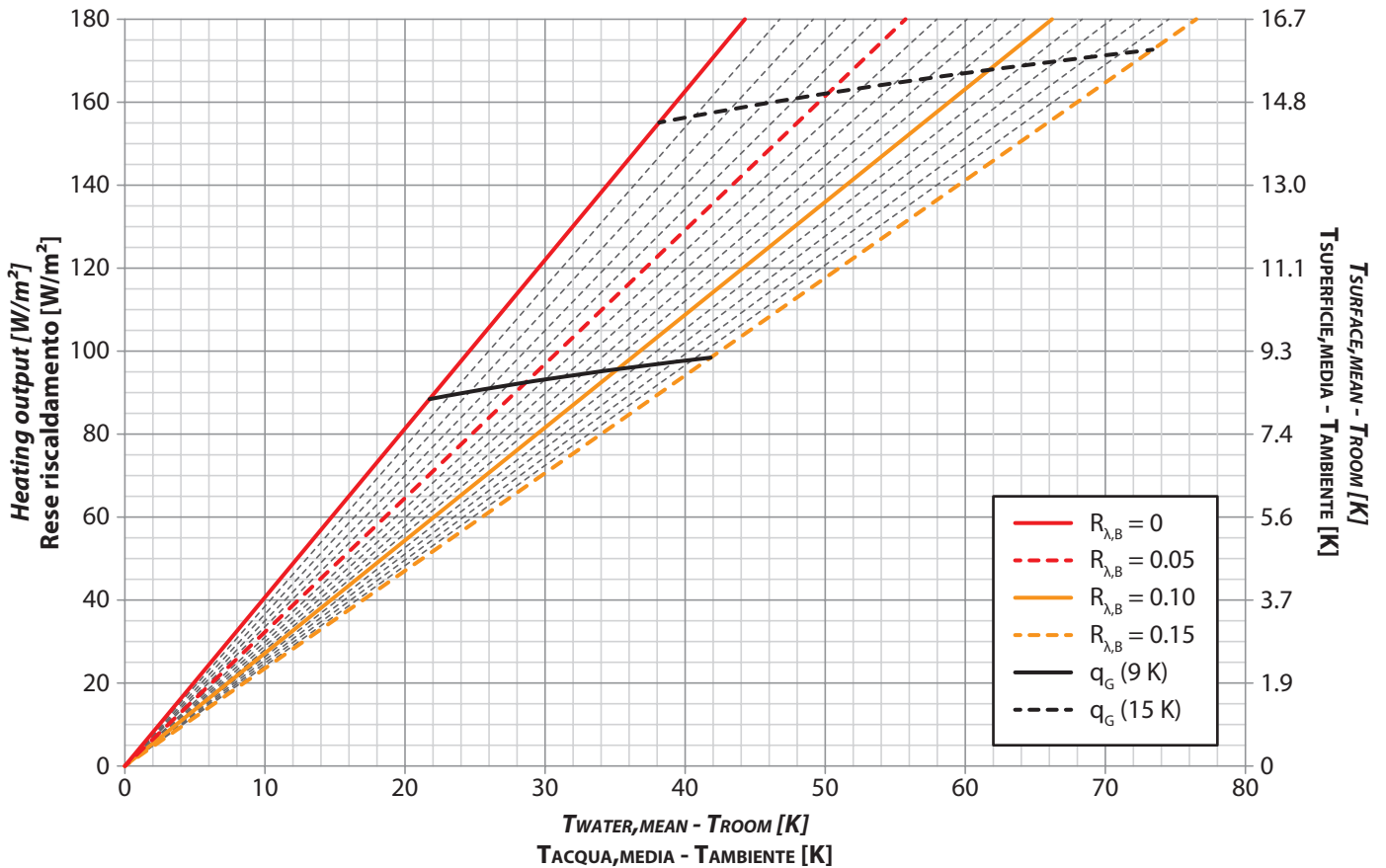
**SPACING 16-CM**

**PASSO 16 CM**



**SPACING 25-CM**

**PASSO 25 CM**



## 1.4 NEW PLUS

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.045	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Heat conductivity of screed with inserts	Conducibilità massetto con bugne	$\lambda'_E$	1.1021	W(m·k)
Piper external diameter	Diametro esterno tubo	$d_a$	0.017	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	6.642	6.185	5.789	5.441	5.133	4.858	4.612	4.390	4.188	4.005	3.837	3.683	3.540	3.408	3.286	3.173
16.6	5.212	4.893	4.617	4.375	4.161	3.971	3.794	3.634	3.489	3.357	3.238	3.121	3.014	2.915	2.824	2.739
24.9	4.120	3.897	3.705	3.537	3.390	3.261	3.134	3.019	2.917	2.824	2.740	2.653	2.572	2.499	2.431	2.368

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

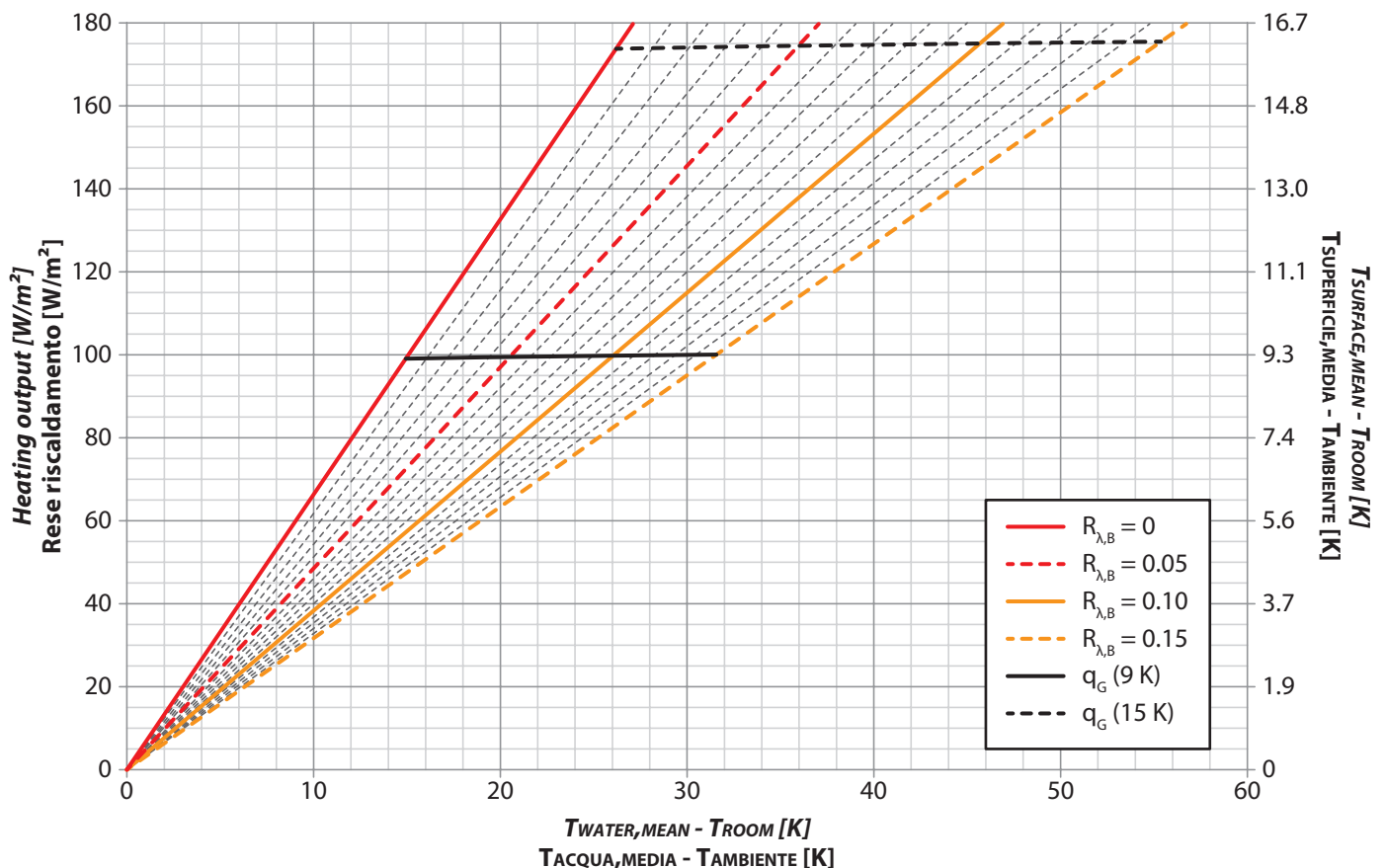
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

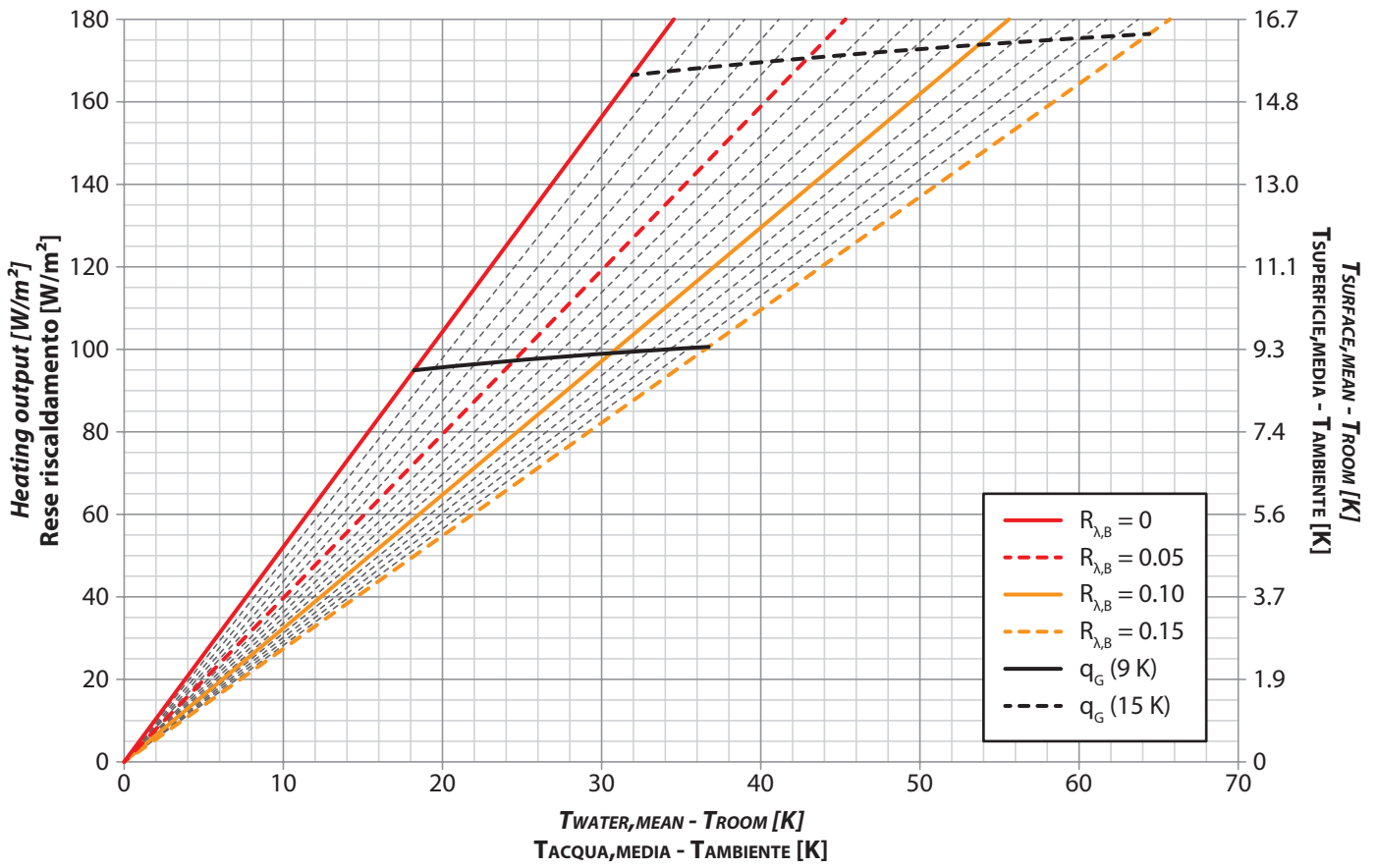
#### PASSO 8 CM





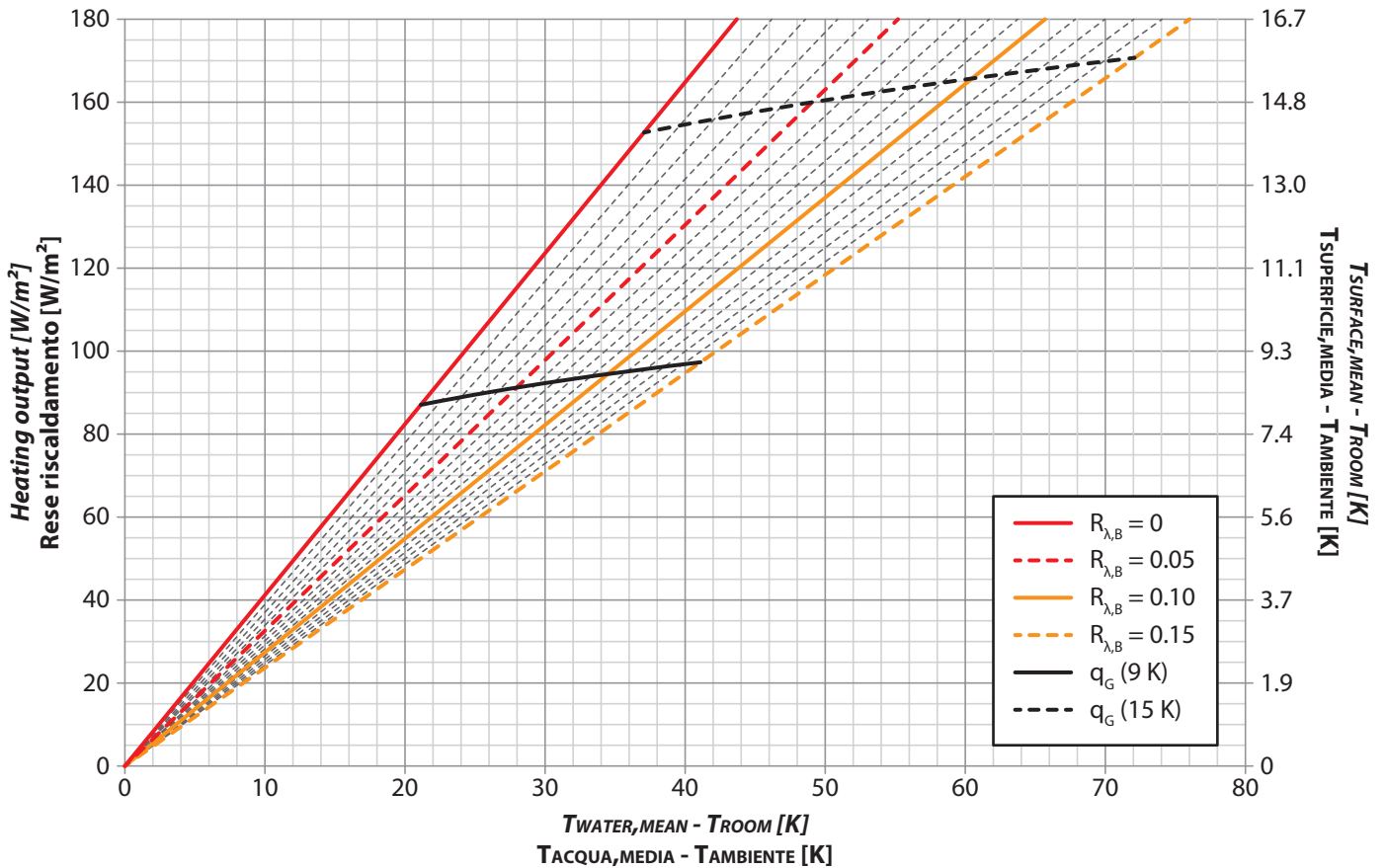
SPACING 16-CM

PASSO 16 CM



SPACING 25-CM

PASSO 25 CM





## 1.5 SMOOTH PANEL, PIPE Ø 17 - PANNELLI LISCI, TUBO Ø 17

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.045	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.017	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	6.811	6.332	5.917	5.554	5.233	4.948	4.693	4.463	4.255	4.066	3.893	3.734	3.587	3.452	3.327	3.211
16.6	5.345	5.009	4.719	4.466	4.243	4.045	3.860	3.694	3.544	3.408	3.284	3.165	3.054	2.953	2.859	2.772
24.9	4.225	3.990	3.787	3.611	3.457	3.321	3.188	3.070	2.963	2.867	2.779	2.689	2.607	2.531	2.461	2.396

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

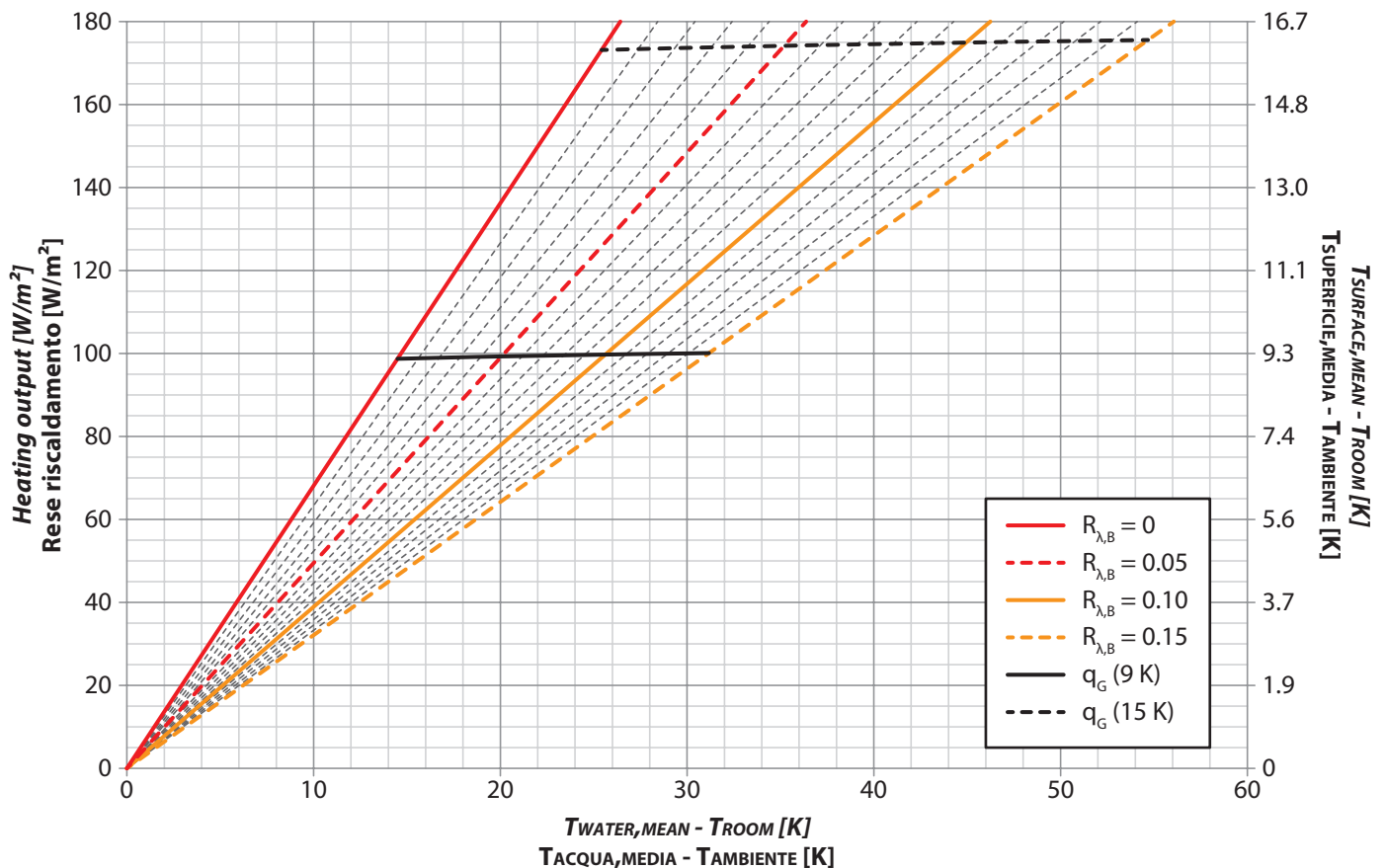
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

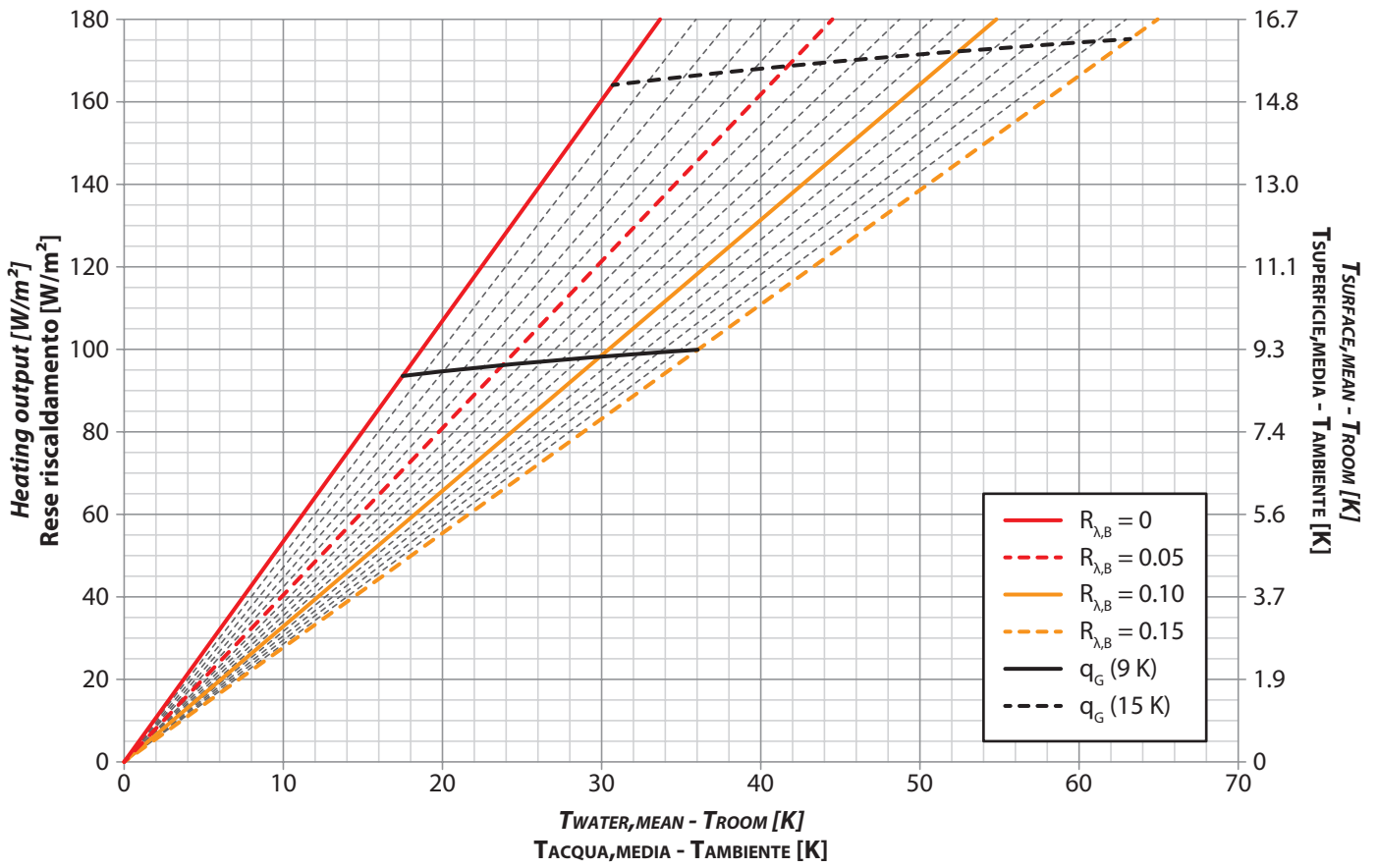
#### PASSO 8 CM





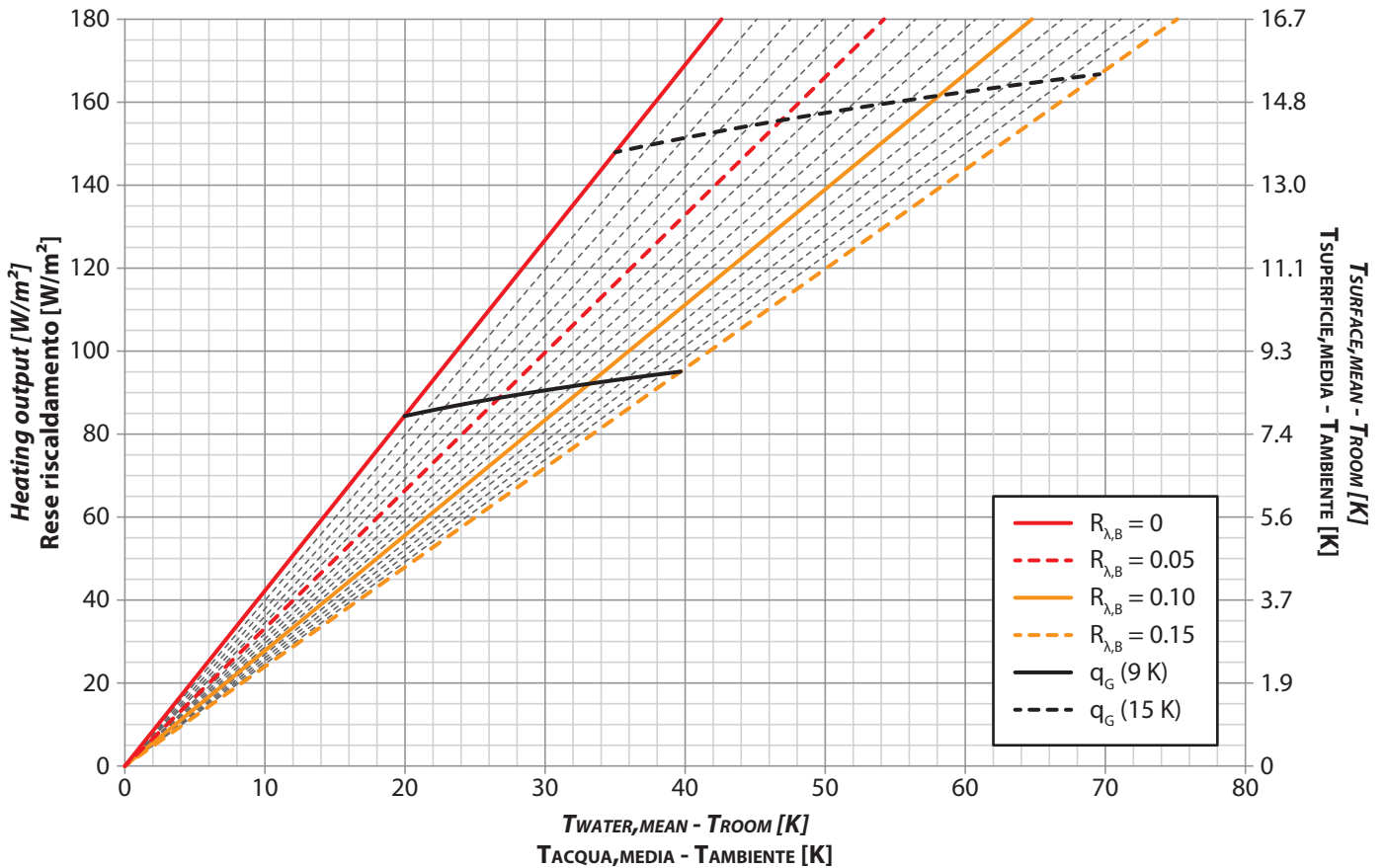
SPACING 16-CM

PASSO 16 CM



SPACING 25-CM

PASSO 25 CM





## 1.6 ZERO LEVEL - QUOTA ZERO

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.035	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Heat conductivity of screed with inserts	Conducibilità massetto con bugne	$\lambda'_E$	1.1537	W(m·k)
Piper external diameter	Diametro esterno tubo	$d_a$	0.014	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	7.032	6.530	6.094	5.712	5.375	5.075	4.807	4.565	4.346	4.147	3.965	3.802	3.651	3.512	3.383	3.263
12.5	6.136	5.725	5.368	5.056	4.780	4.534	4.310	4.107	3.924	3.757	3.605	3.466	3.338	3.220	3.110	3.009
16.6	5.394	5.054	4.760	4.502	4.275	4.073	3.884	3.714	3.560	3.421	3.293	3.174	3.064	2.962	2.869	2.782

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

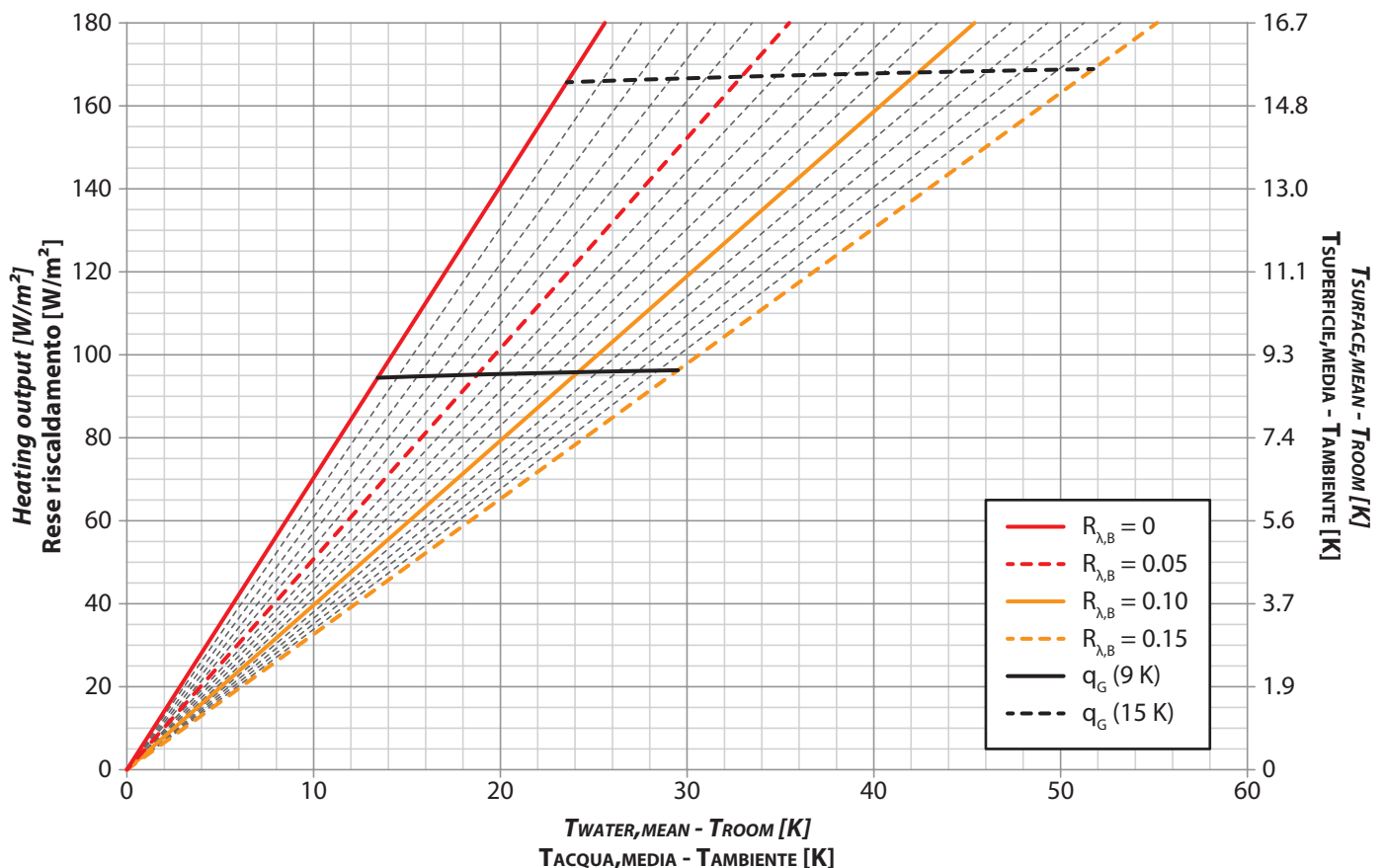
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

#### PASSO 8 CM

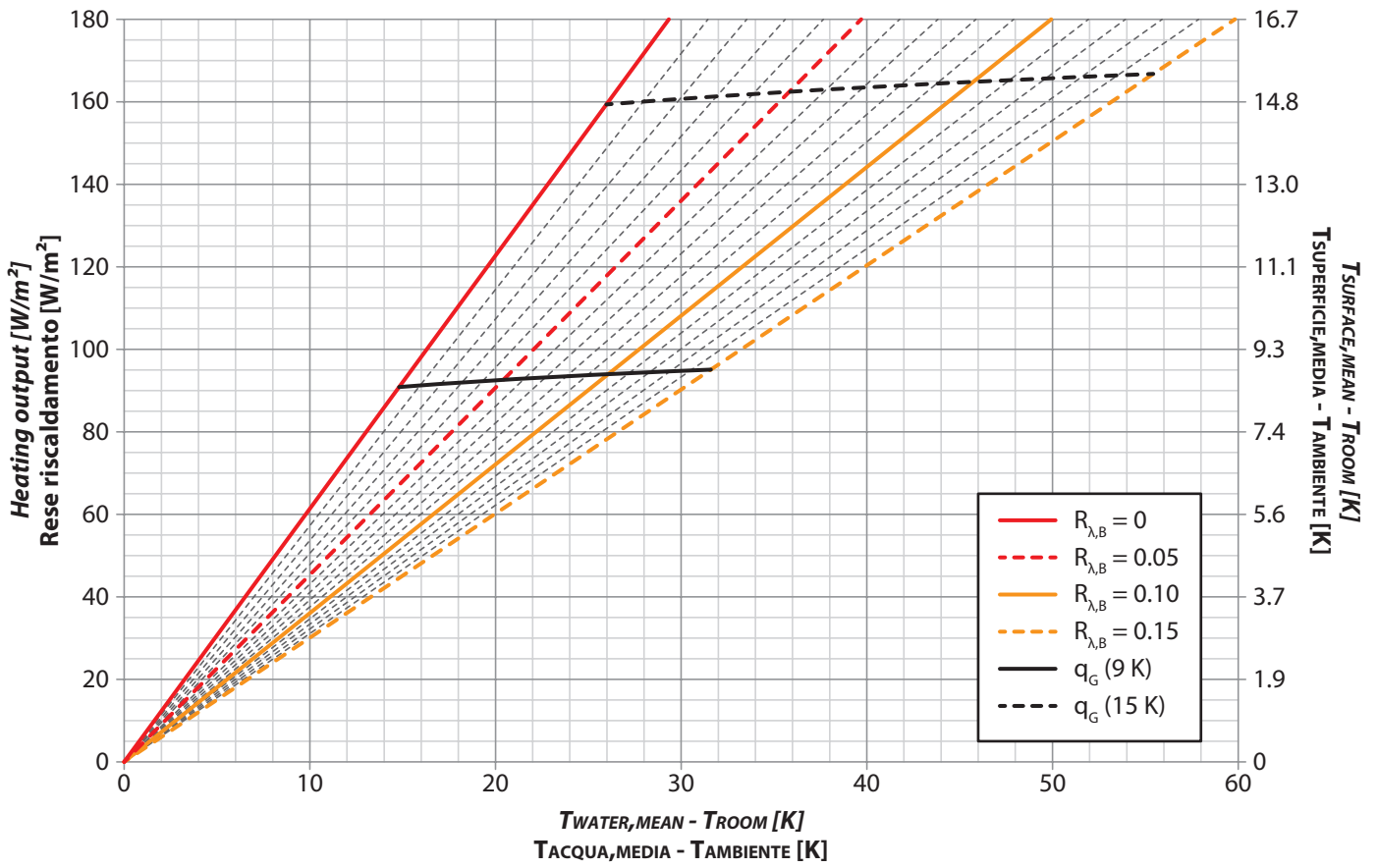






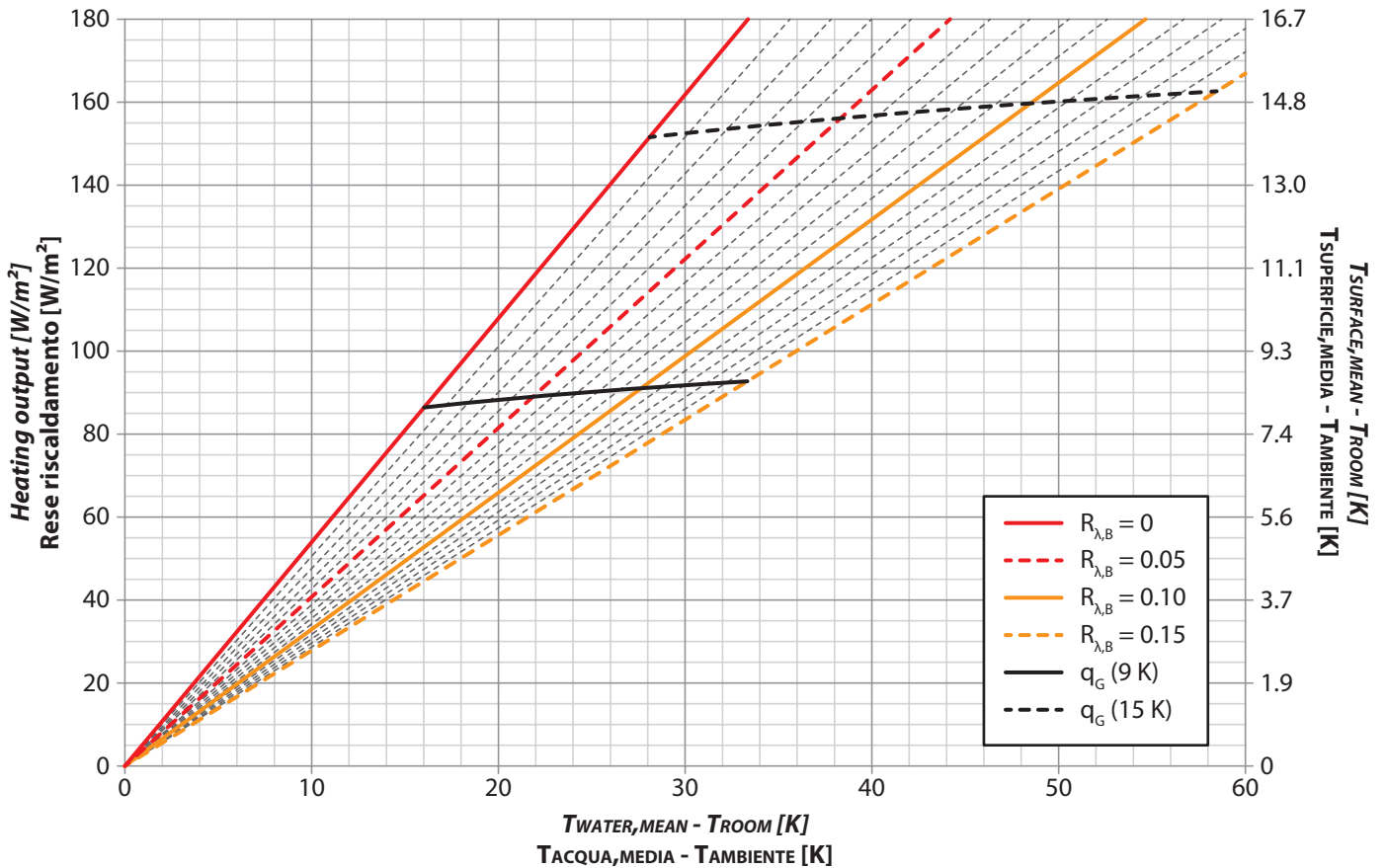
SPACING 12-CM

PASSO 12 CM



SPACING 16-CM

PASSO 16 CM





## 1.7 SMOOTH PANEL, PIPE Ø 14 - PANNELLI LISCI, TUBO Ø 14

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.035	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.014	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	7.129	6.614	6.167	5.777	5.432	5.126	4.852	4.606	4.384	4.181	3.996	3.830	3.677	3.536	3.405	3.284
16.6	5.468	5.119	4.817	4.553	4.320	4.114	3.921	3.748	3.591	3.449	3.319	3.198	3.086	2.983	2.888	2.799
24.9	4.257	4.015	3.807	3.626	3.468	3.328	3.193	3.071	2.962	2.863	2.774	2.684	2.602	2.526	2.456	2.392

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

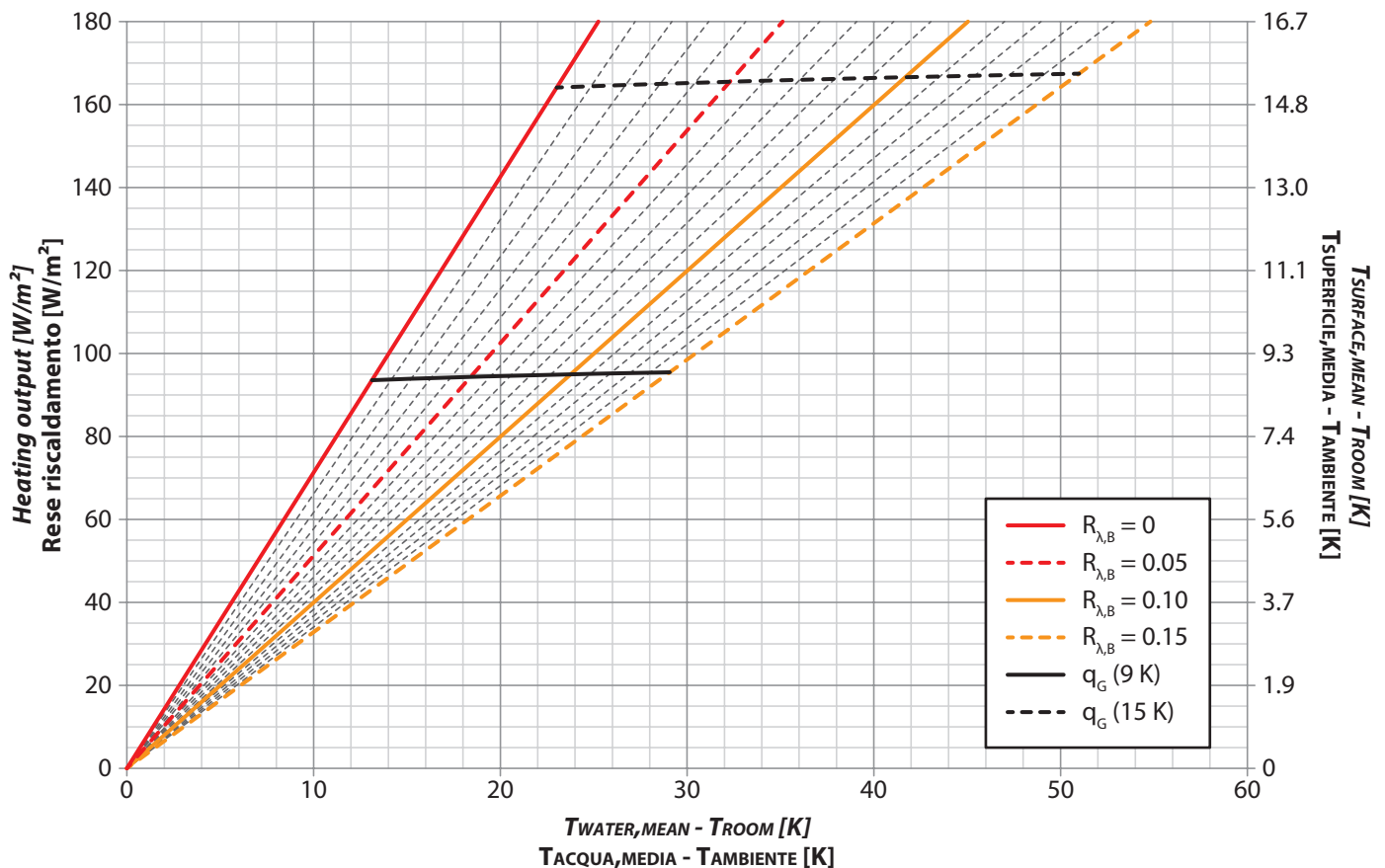
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

#### PASSO 8 CM

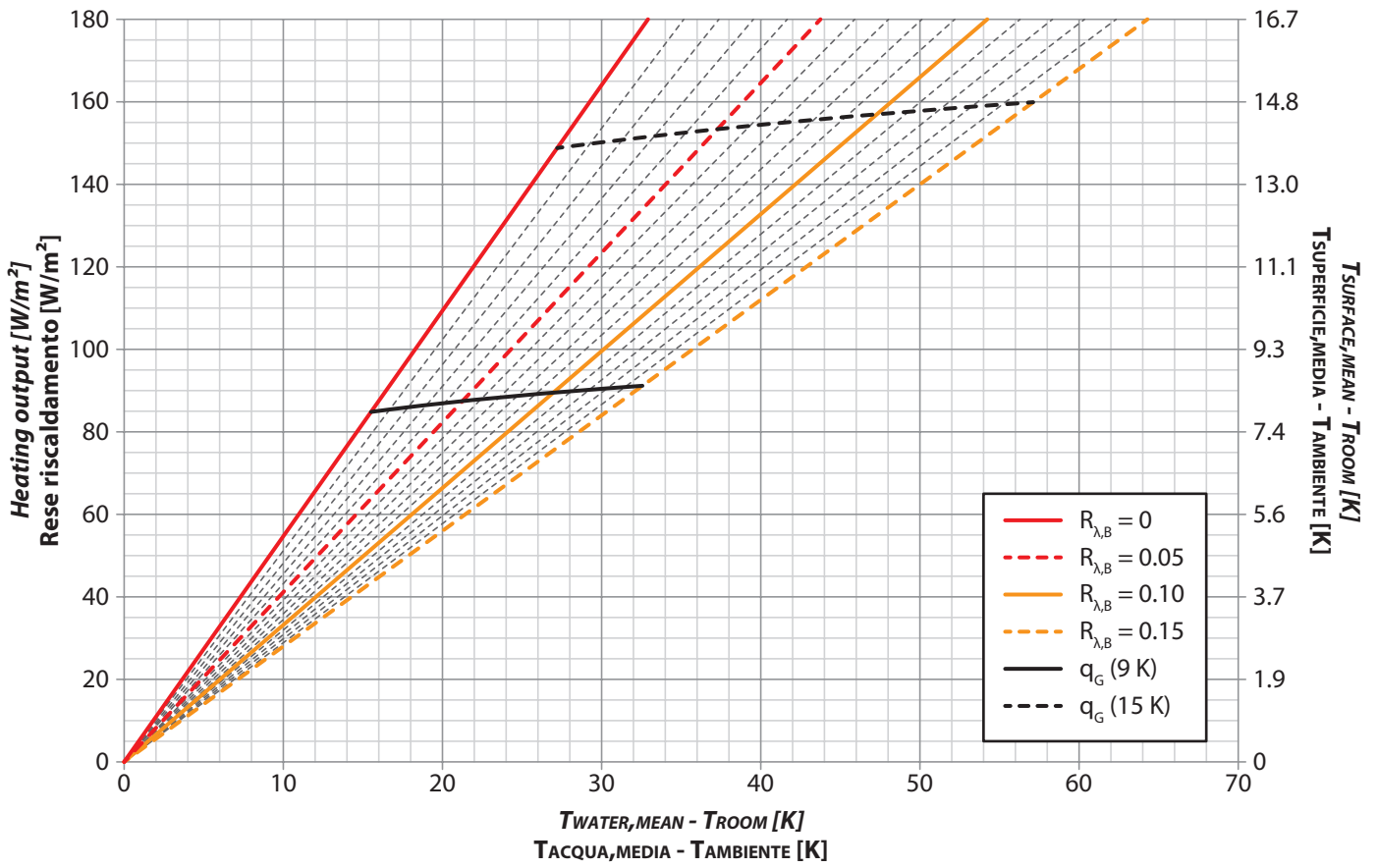






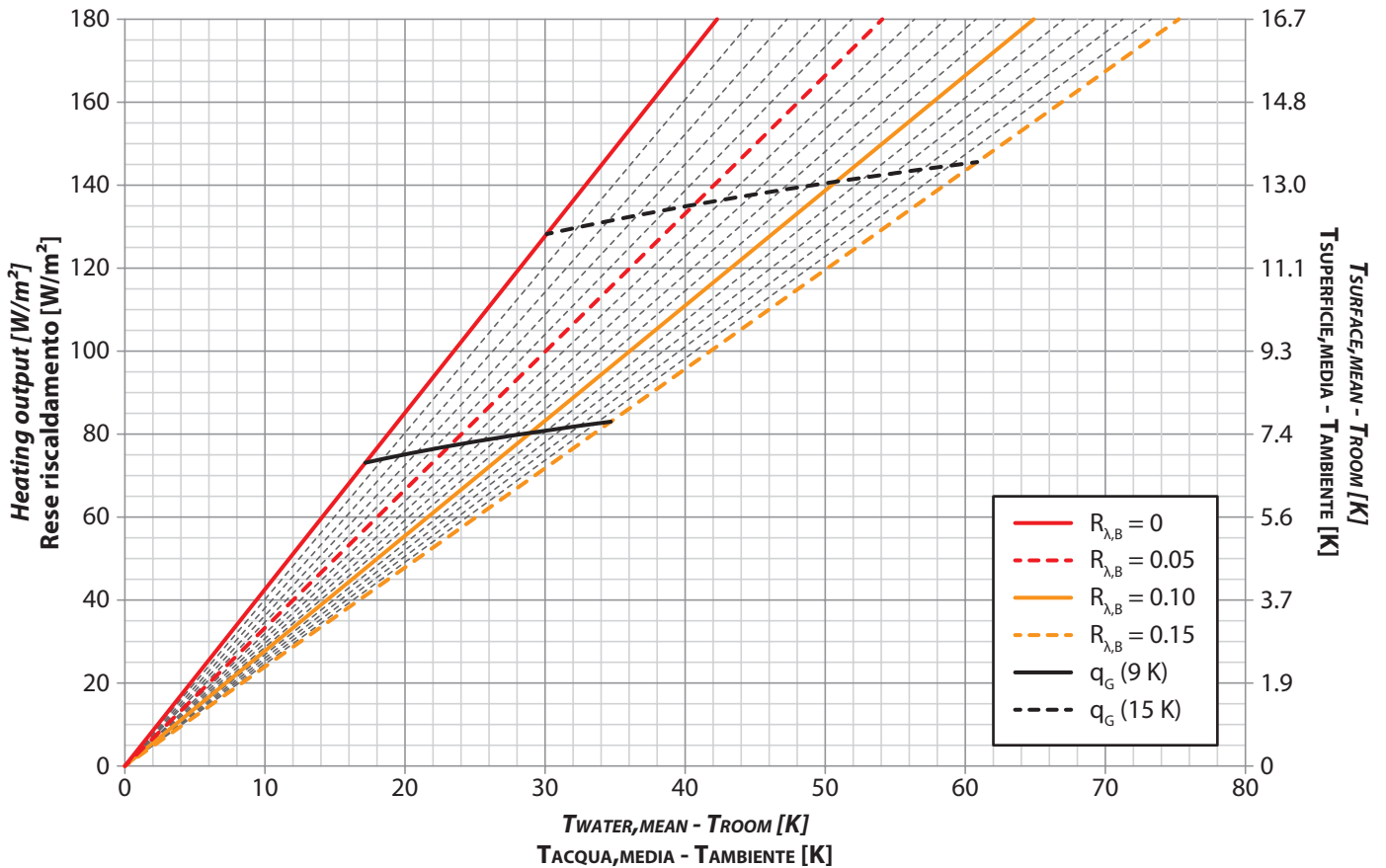
SPACING 16-CM

PASSO 16 CM



SPACING 25-CM

PASSO 25 CM



## 2 TRADITIONAL FLOOR COOLING - RAFFRESCAMENTO PAVIMENTO TRADIZIONALE

### 2.1 ACOUSTIC PLUS

#### DATA

#### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.045	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Heat conductivity of screed with inserts	Conducibilità massetto con bugne	$\lambda'_E$	1.0324	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.017	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	4.528	4.313	4.118	3.940	3.777	3.627	3.488	3.360	3.240	3.129	3.025	2.928	2.837	2.751	2.671	2.595
16.6	3.754	3.598	3.455	3.323	3.200	3.087	2.981	2.882	2.789	2.702	2.621	2.544	2.472	2.403	2.338	2.277
24.9	3.118	3.006	2.902	2.805	2.715	2.630	2.550	2.475	2.404	2.337	2.274	2.214	2.157	2.103	2.051	2.002

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

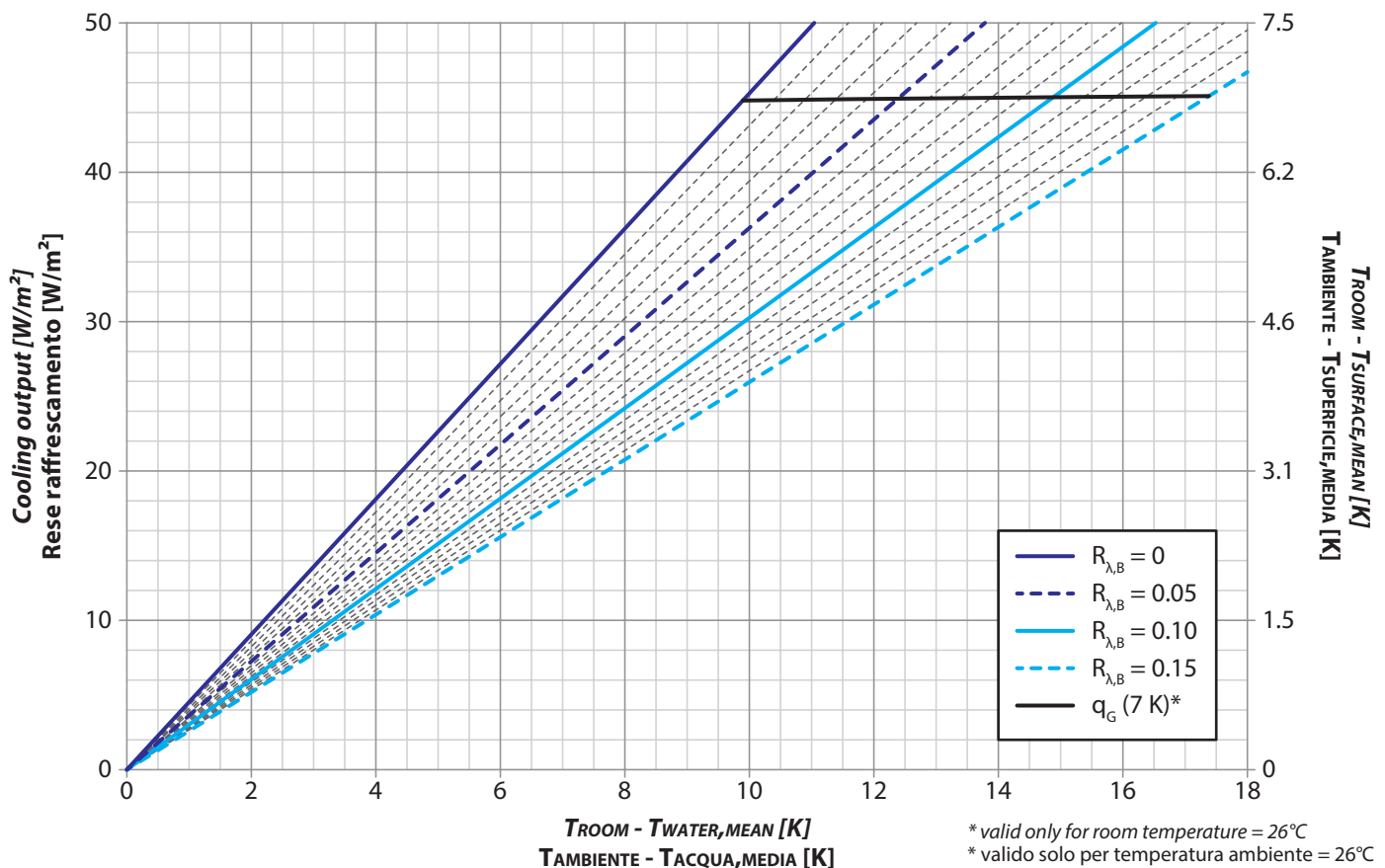
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

#### GRAPHS

#### GRAFICI

#### SPACING 8-CM

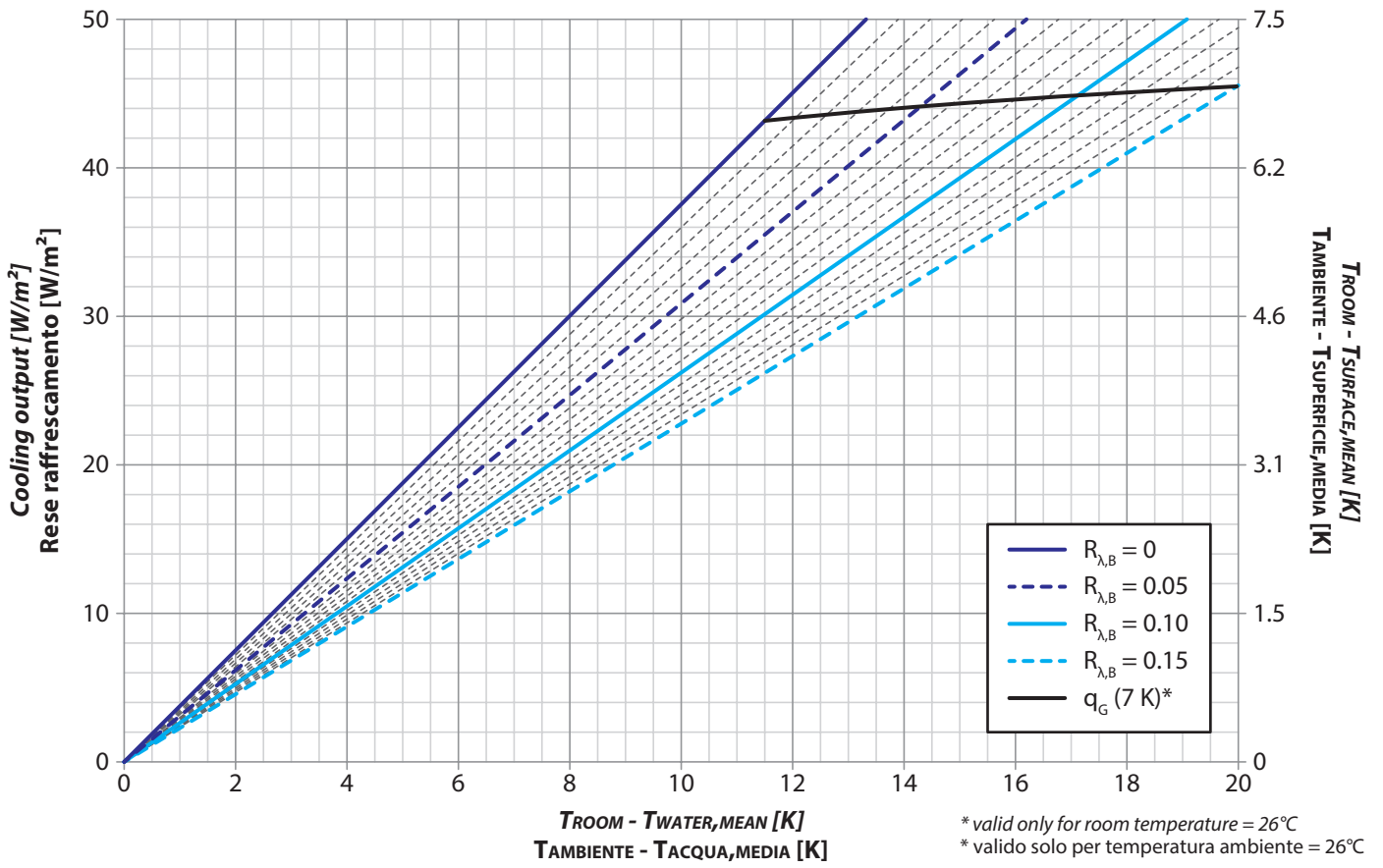
#### PASSO 8 CM





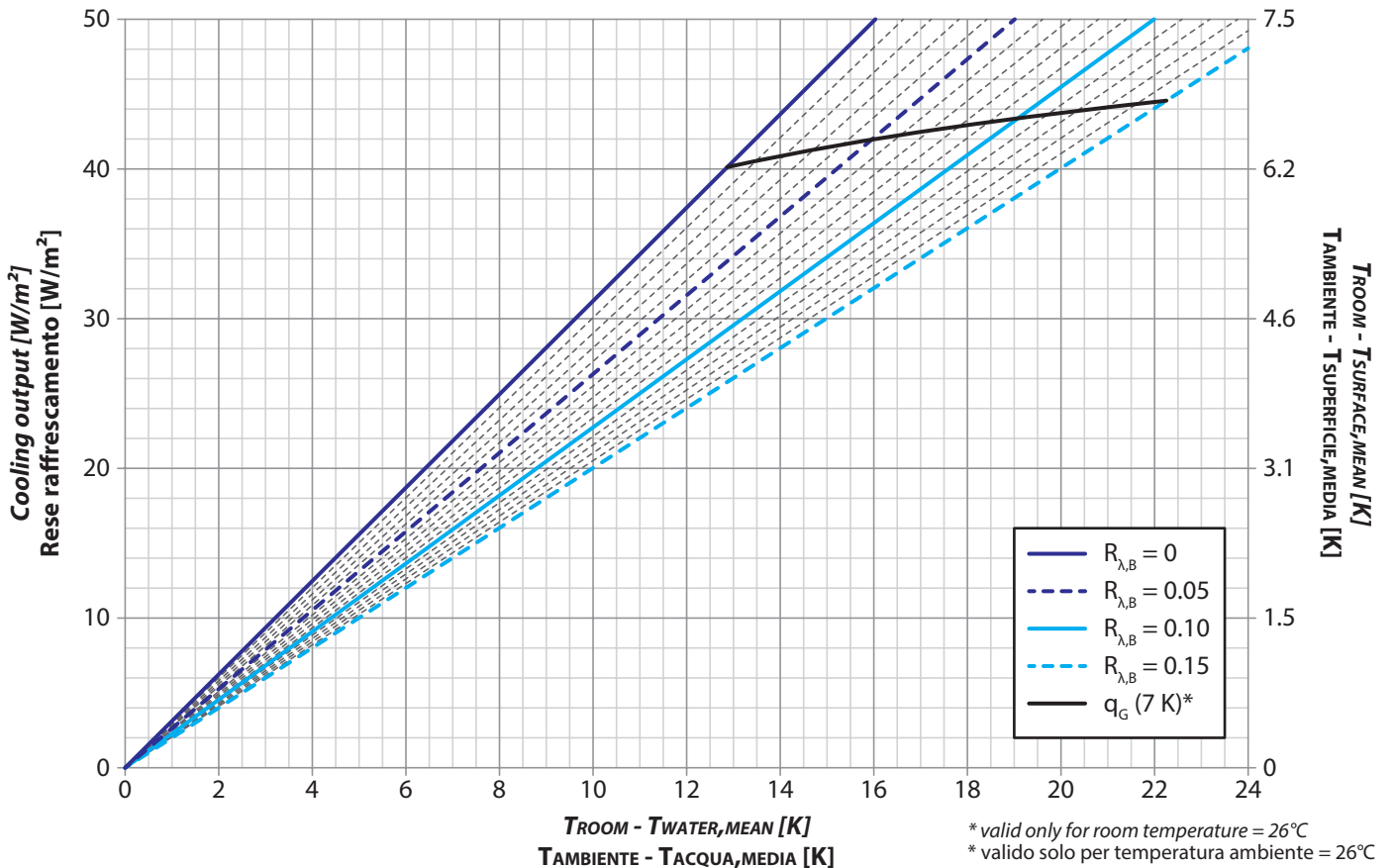
**SPACING 16-CM**

**PASSO 16 CM**



**SPACING 25-CM**

**PASSO 25 CM**





## 2.2 COVER

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.045	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Heat conductivity of screed with inserts	Conducibilità massetto con bugne	$\lambda'_E$	1.0563	W(m·k)
Piper external diameter	Diametro esterno tubo	$d_a$	0.017	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	4.550	4.334	4.137	3.958	3.793	3.641	3.502	3.372	3.252	3.140	3.035	2.937	2.846	2.760	2.678	2.602
16.6	3.773	3.616	3.471	3.338	3.214	3.099	2.992	2.892	2.799	2.712	2.629	2.552	2.479	2.410	2.345	2.283
24.9	3.134	3.021	2.916	2.818	2.726	2.640	2.560	2.484	2.412	2.345	2.281	2.221	2.163	2.109	2.057	2.008

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

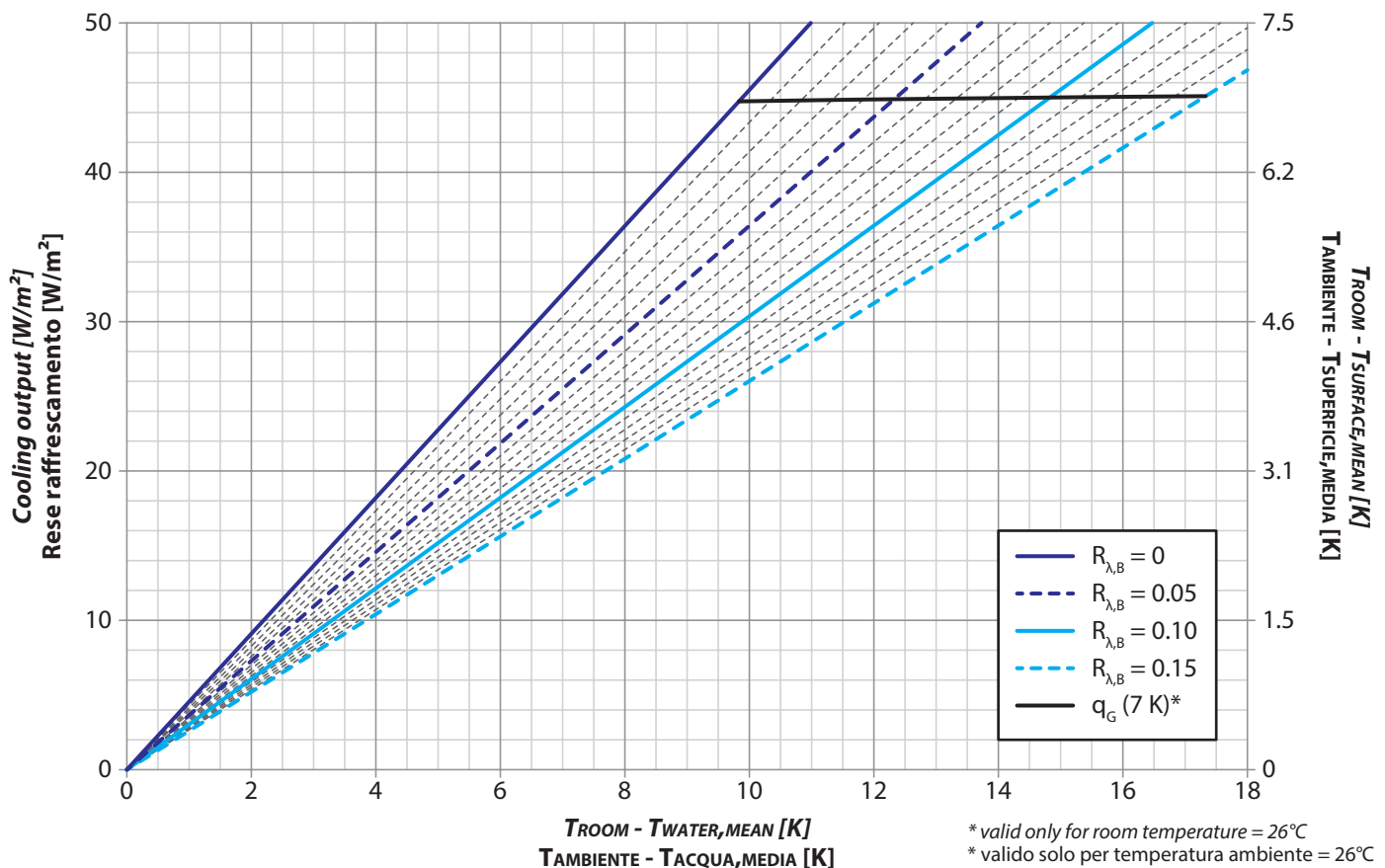
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

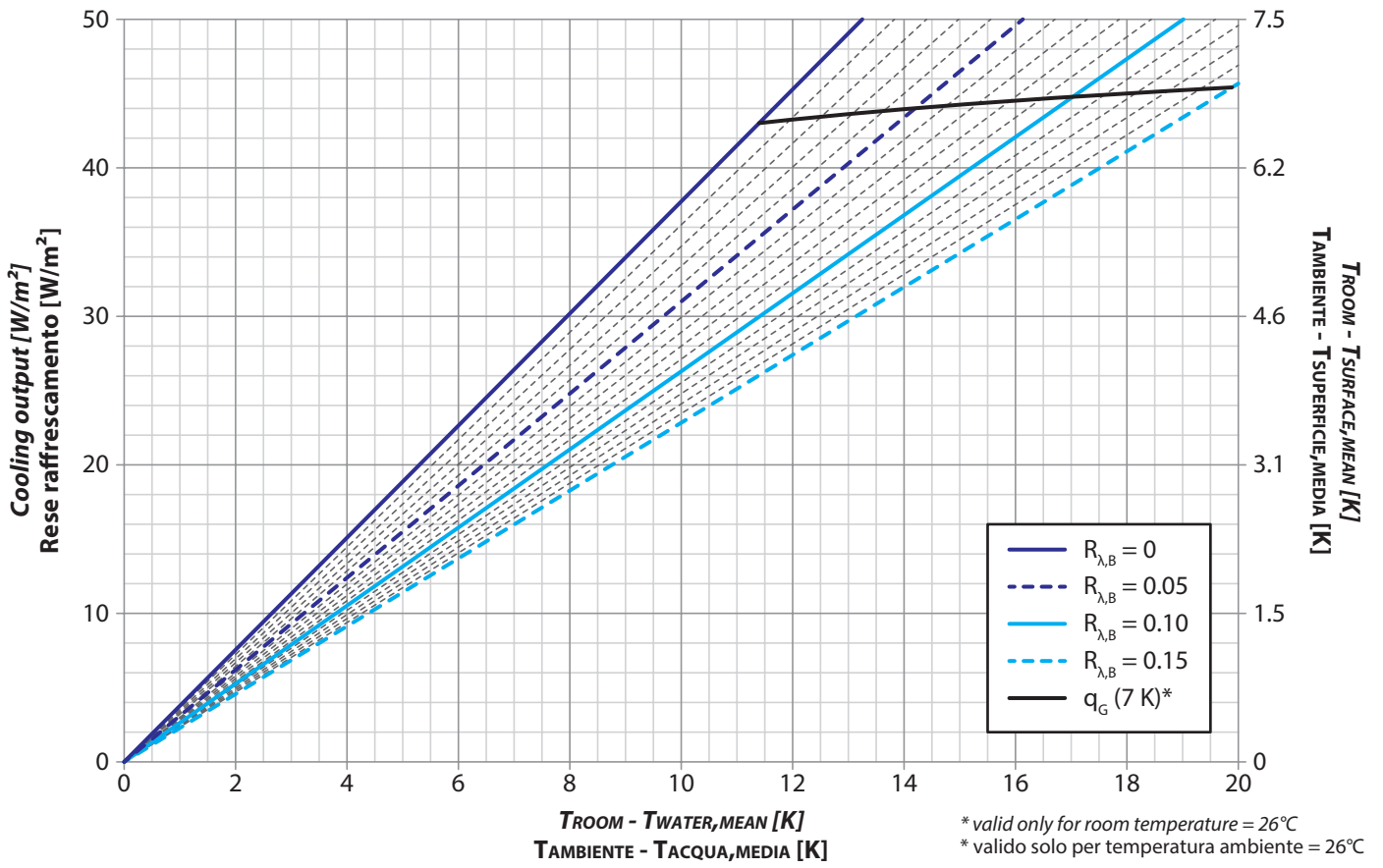
#### PASSO 8 CM





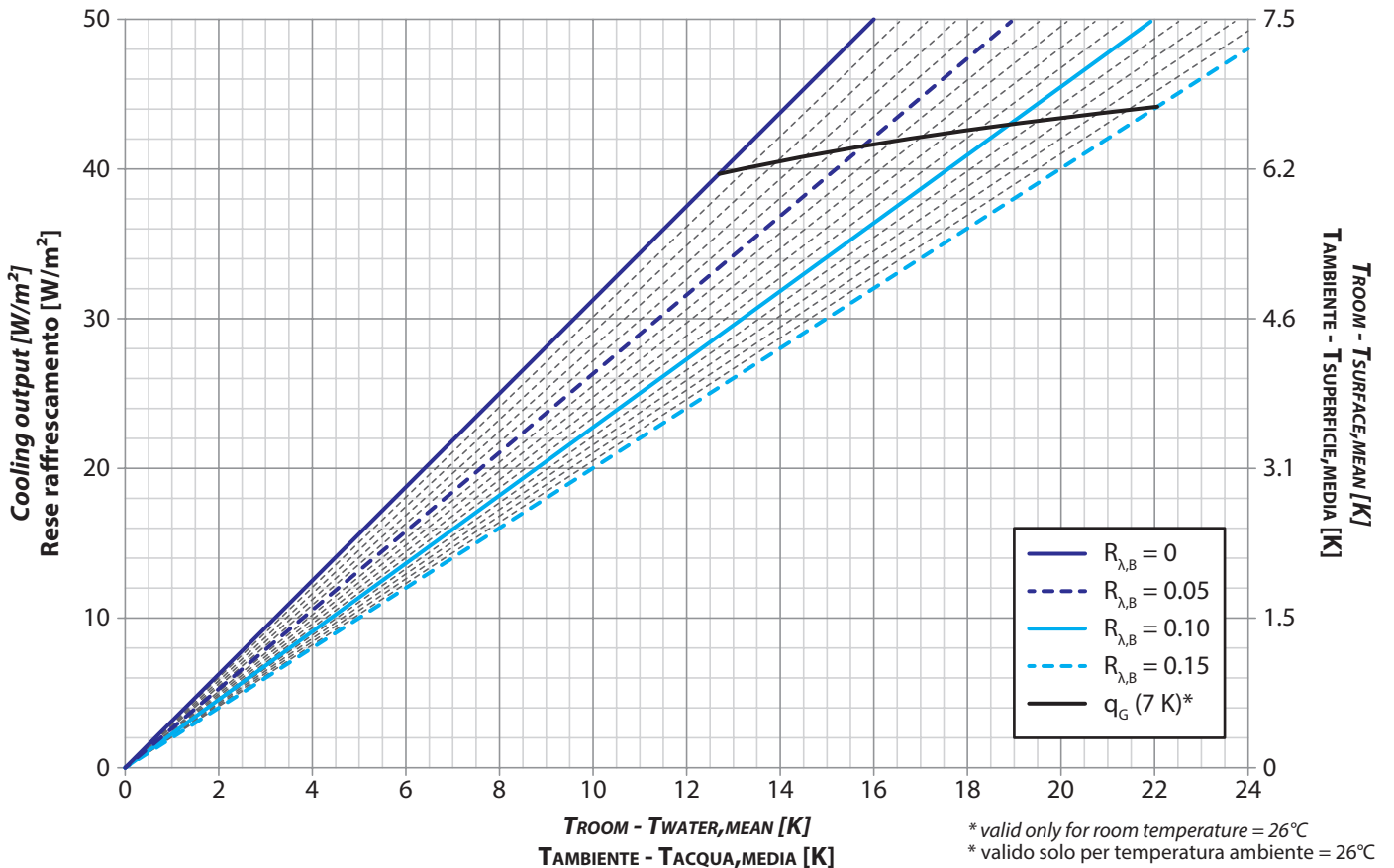
**SPACING 16-CM**

**PASSO 16 CM**



**SPACING 25-CM**

**PASSO 25 CM**





## 2.3 COVER HP

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.045	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Heat conductivity of screed with inserts	Conducibilità massetto con bugne	$\lambda'_E$	1.0568	W(m·k)
Piper external diameter	Diametro esterno tubo	$d_a$	0.017	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	4.551	4.334	4.138	3.958	3.793	3.642	3.502	3.372	3.252	3.140	3.035	2.938	2.846	2.760	2.679	2.602
16.6	3.774	3.616	3.471	3.338	3.214	3.099	2.992	2.893	2.799	2.712	2.630	2.552	2.479	2.410	2.345	2.283
24.9	3.135	3.022	2.916	2.818	2.727	2.641	2.560	2.484	2.413	2.345	2.281	2.221	2.163	2.109	2.057	2.008

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

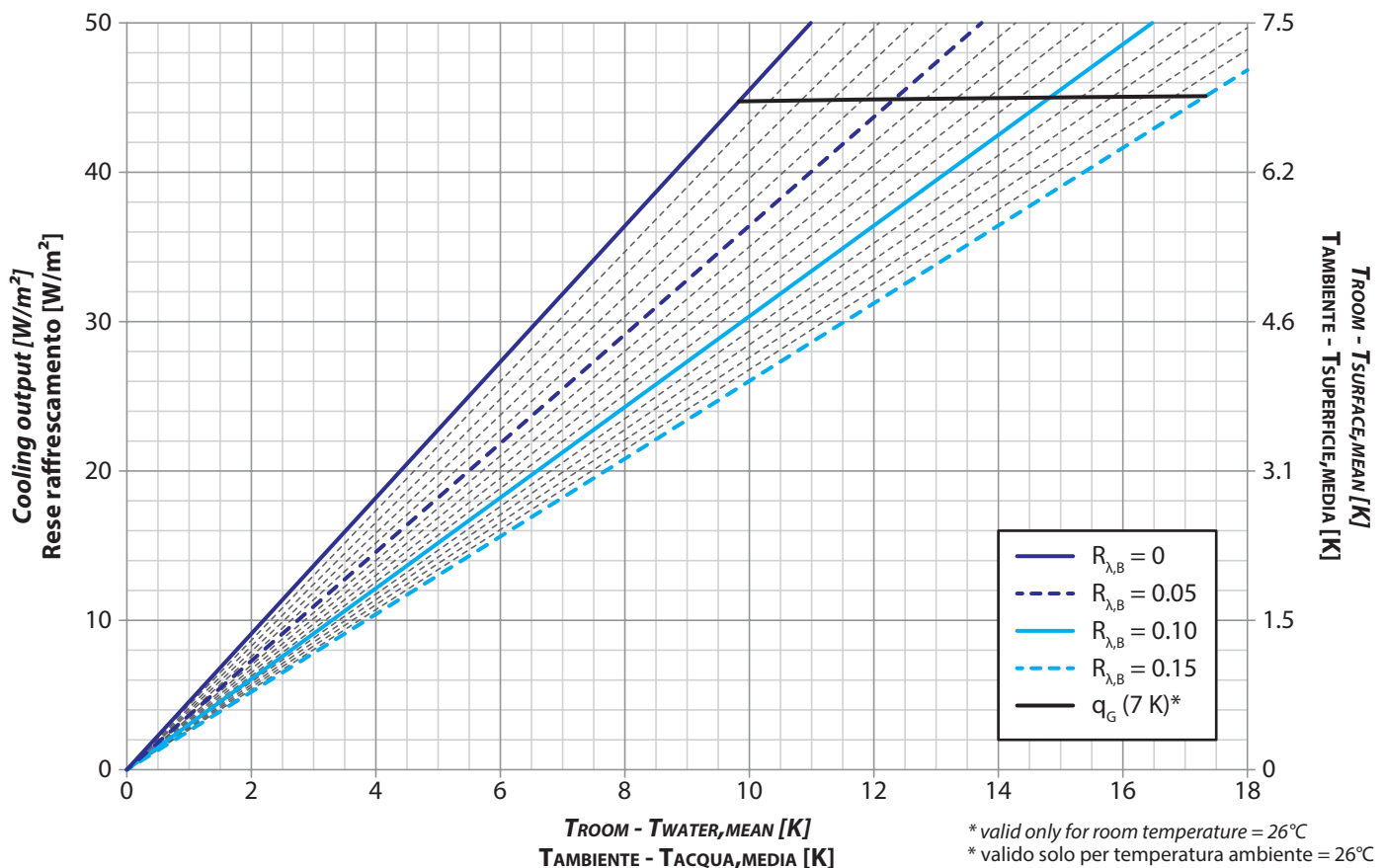
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

#### PASSO 8 CM

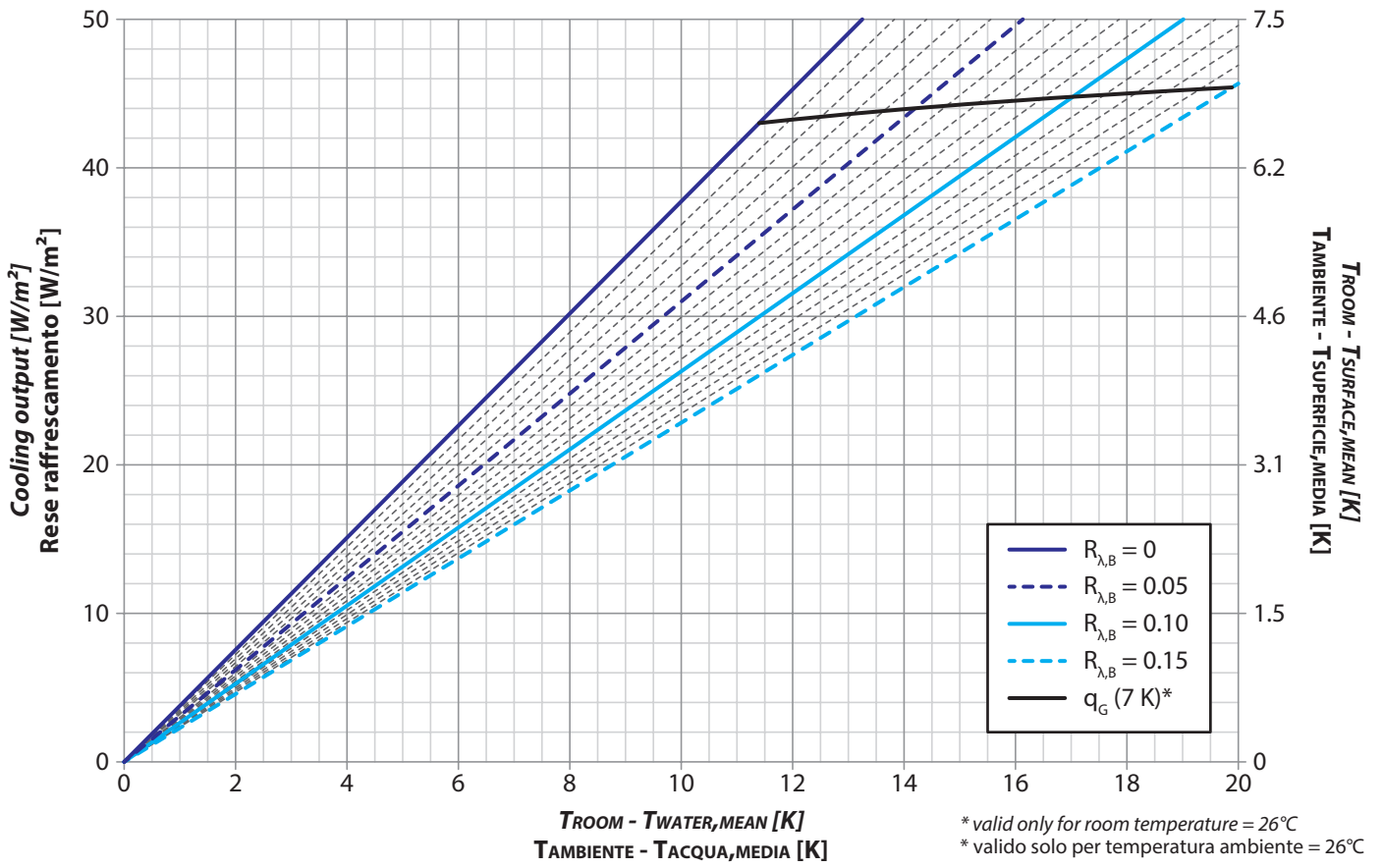






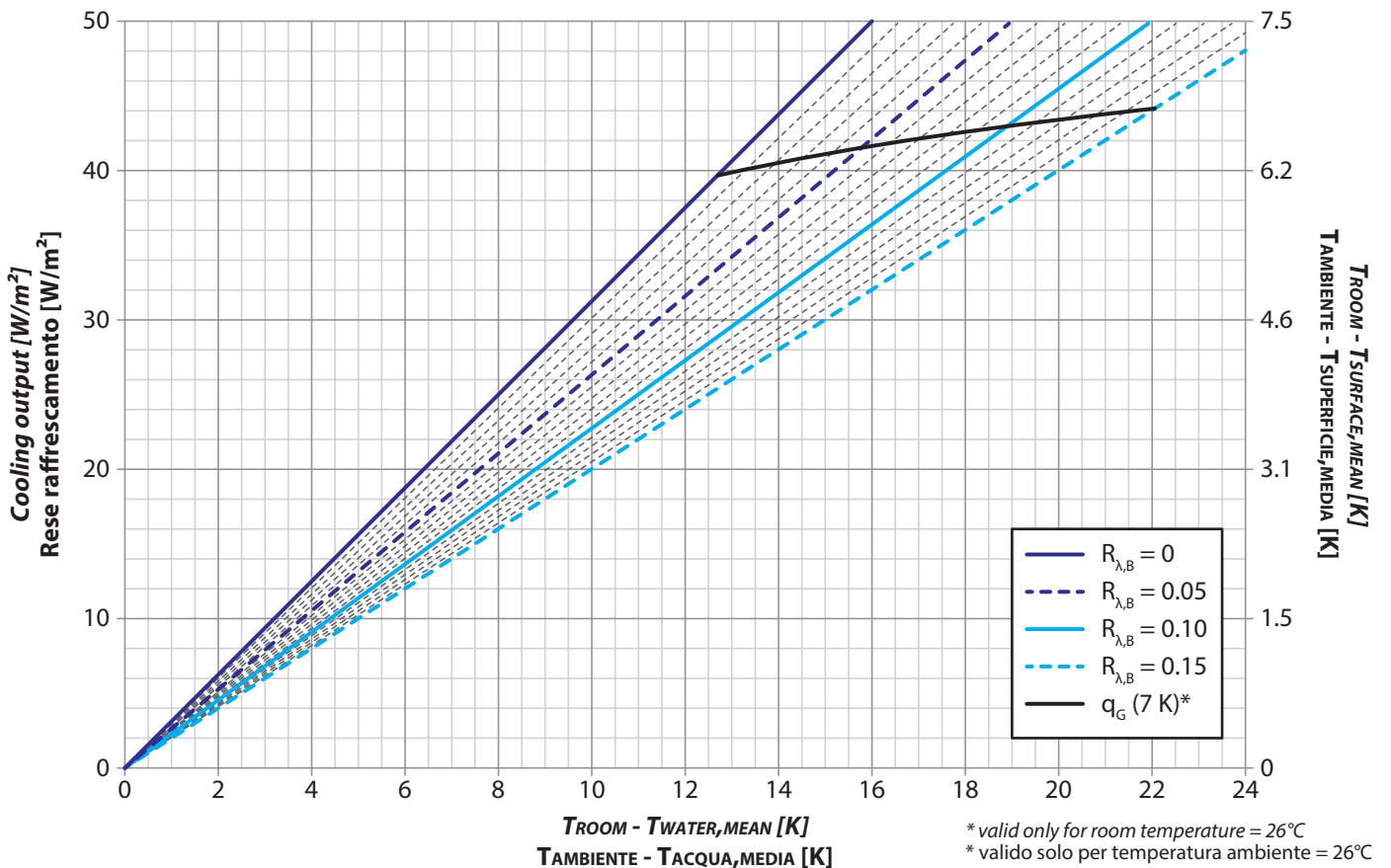
**SPACING 16-CM**

**PASSO 16 CM**



**SPACING 25-CM**

**PASSO 25 CM**





## 2.4 NEW PLUS

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.045	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Heat conductivity of screed with inserts	Conducibilità massetto con bugne	$\lambda'_E$	1.1021	W(m·k)
Piper external diameter	Diametro esterno tubo	$d_a$	0.017	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	4.592	4.372	4.171	3.989	3.822	3.668	3.526	3.395	3.273	3.159	3.053	2.954	2.862	2.775	2.693	2.615
16.6	3.808	3.648	3.500	3.364	3.239	3.122	3.013	2.912	2.817	2.728	2.645	2.567	2.493	2.423	2.357	2.295
24.9	3.164	3.048	2.941	2.841	2.748	2.660	2.578	2.501	2.428	2.359	2.295	2.233	2.175	2.120	2.067	2.017

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

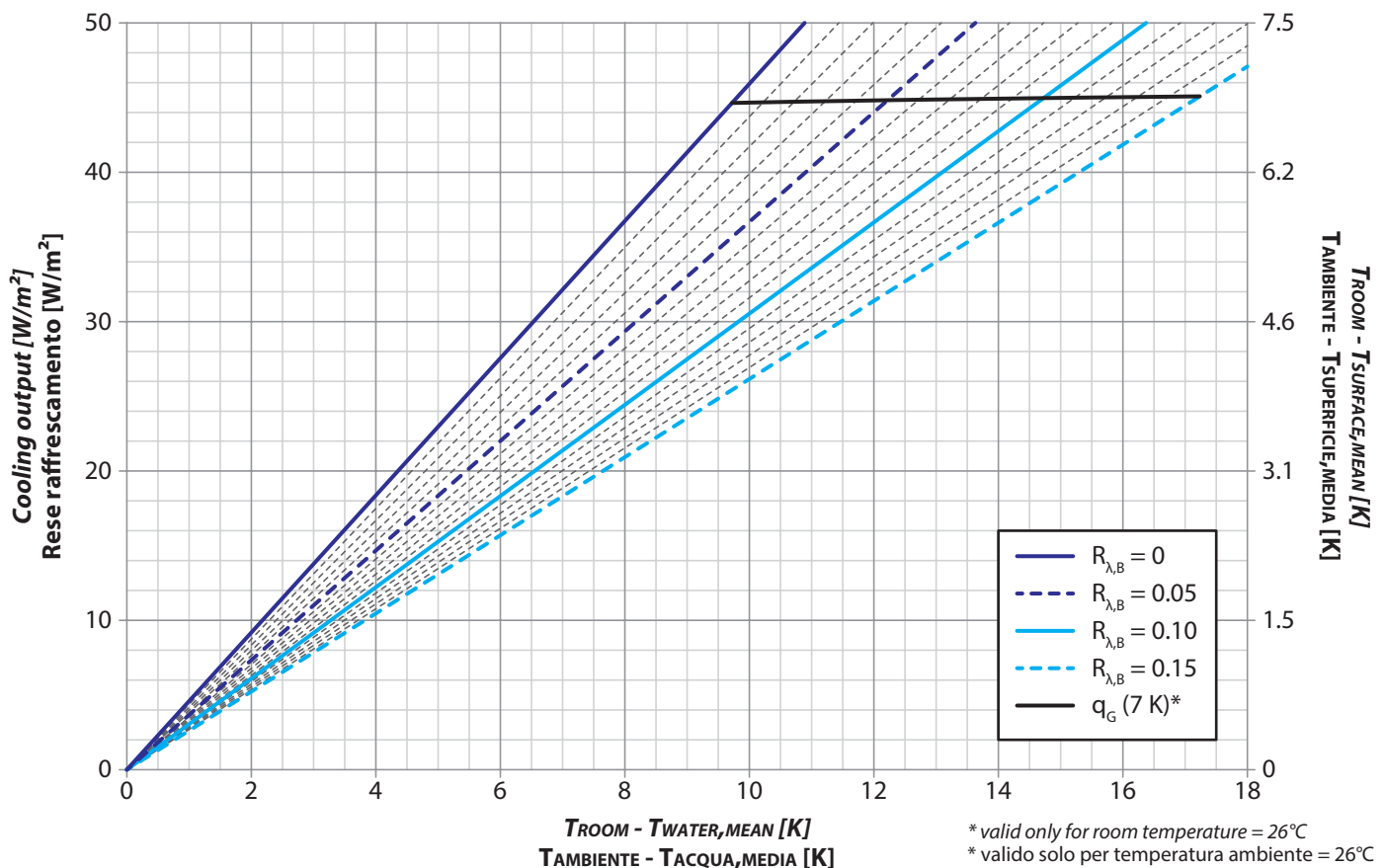
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

#### PASSO 8 CM

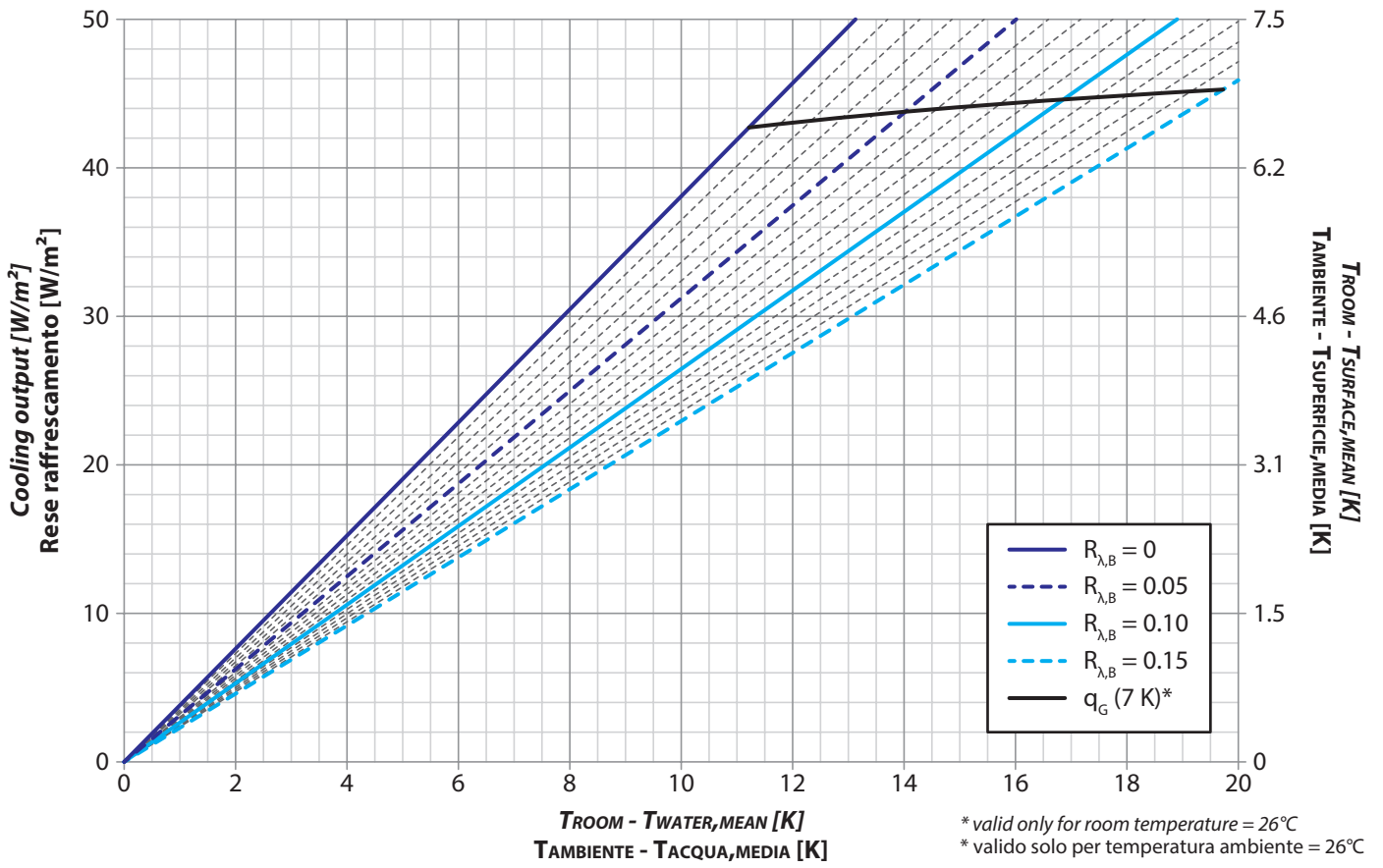






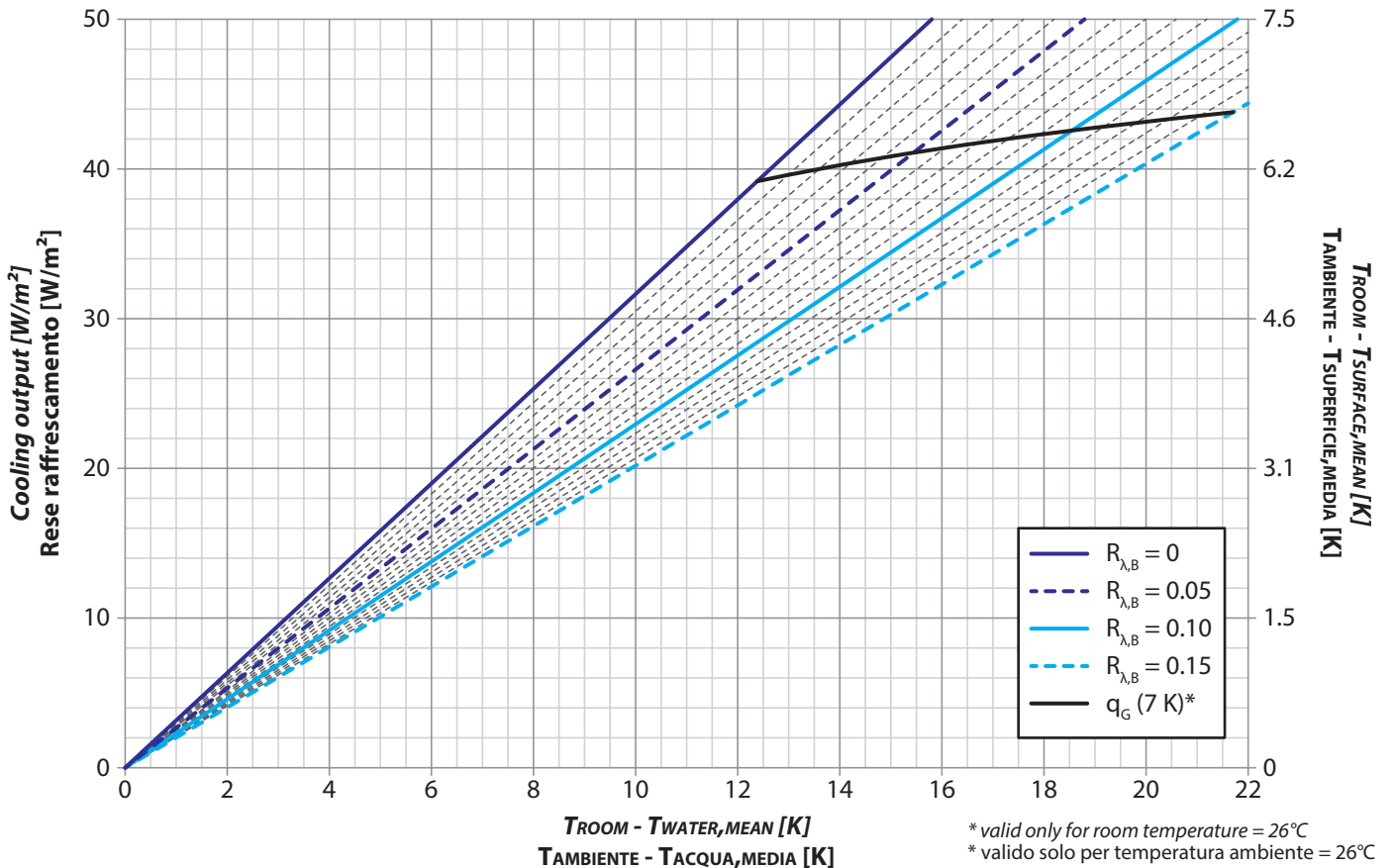
**SPACING 16-CM**

**PASSO 16 CM**



**SPACING 25-CM**

**PASSO 25 CM**





## 2.5 SMOOTH PANEL, PIPE Ø17 - PANNELLI LISCI, TUBO Ø17

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.045	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.017	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	4.672	4.444	4.237	4.049	3.877	3.718	3.573	3.438	3.313	3.197	3.088	2.987	2.892	2.803	2.720	2.641
16.6	3.876	3.709	3.557	3.416	3.286	3.165	3.054	2.949	2.852	2.761	2.675	2.595	2.519	2.448	2.380	2.316
24.9	3.221	3.101	2.989	2.885	2.788	2.698	2.613	2.533	2.458	2.387	2.321	2.258	2.198	2.141	2.087	2.036

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

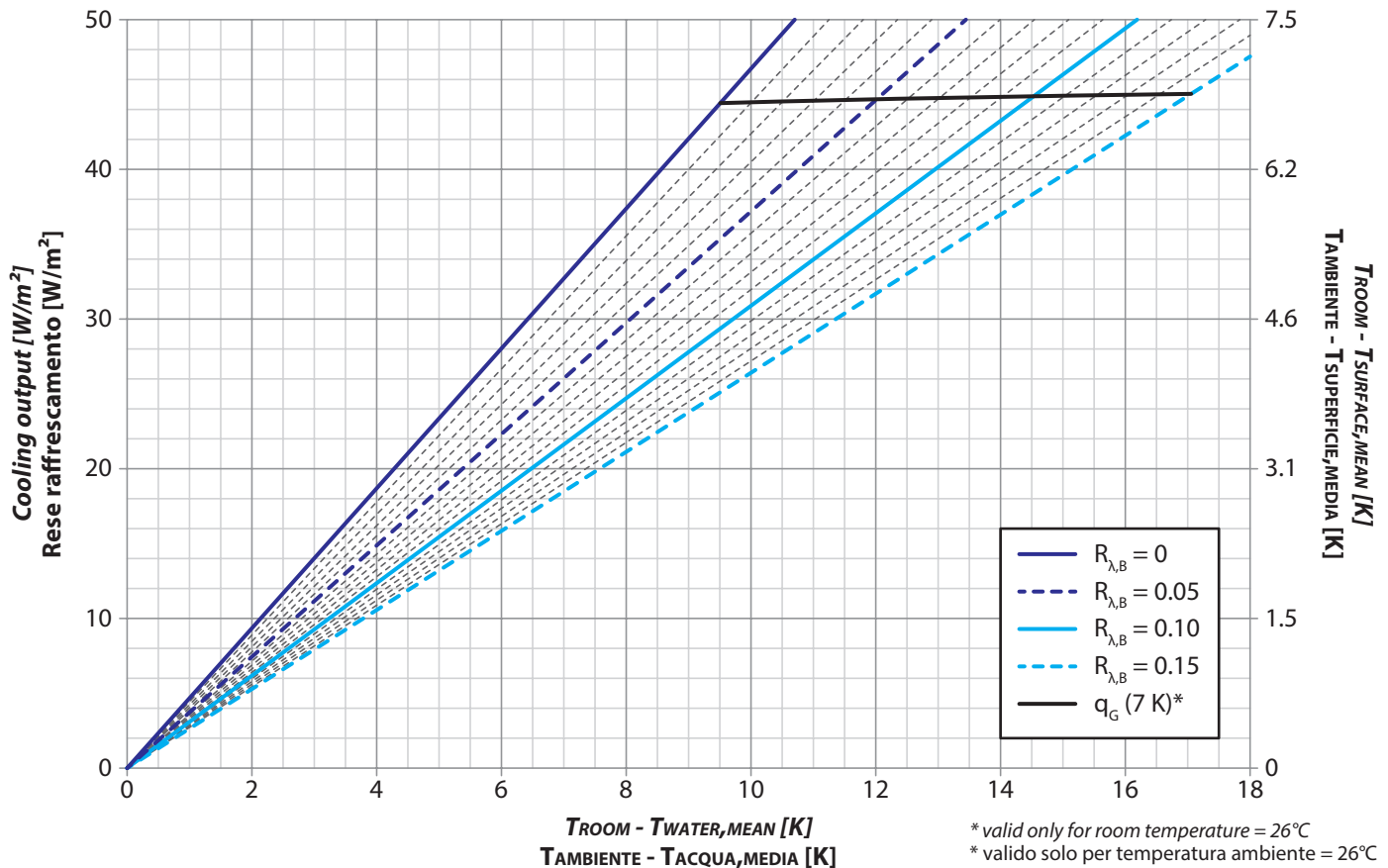
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

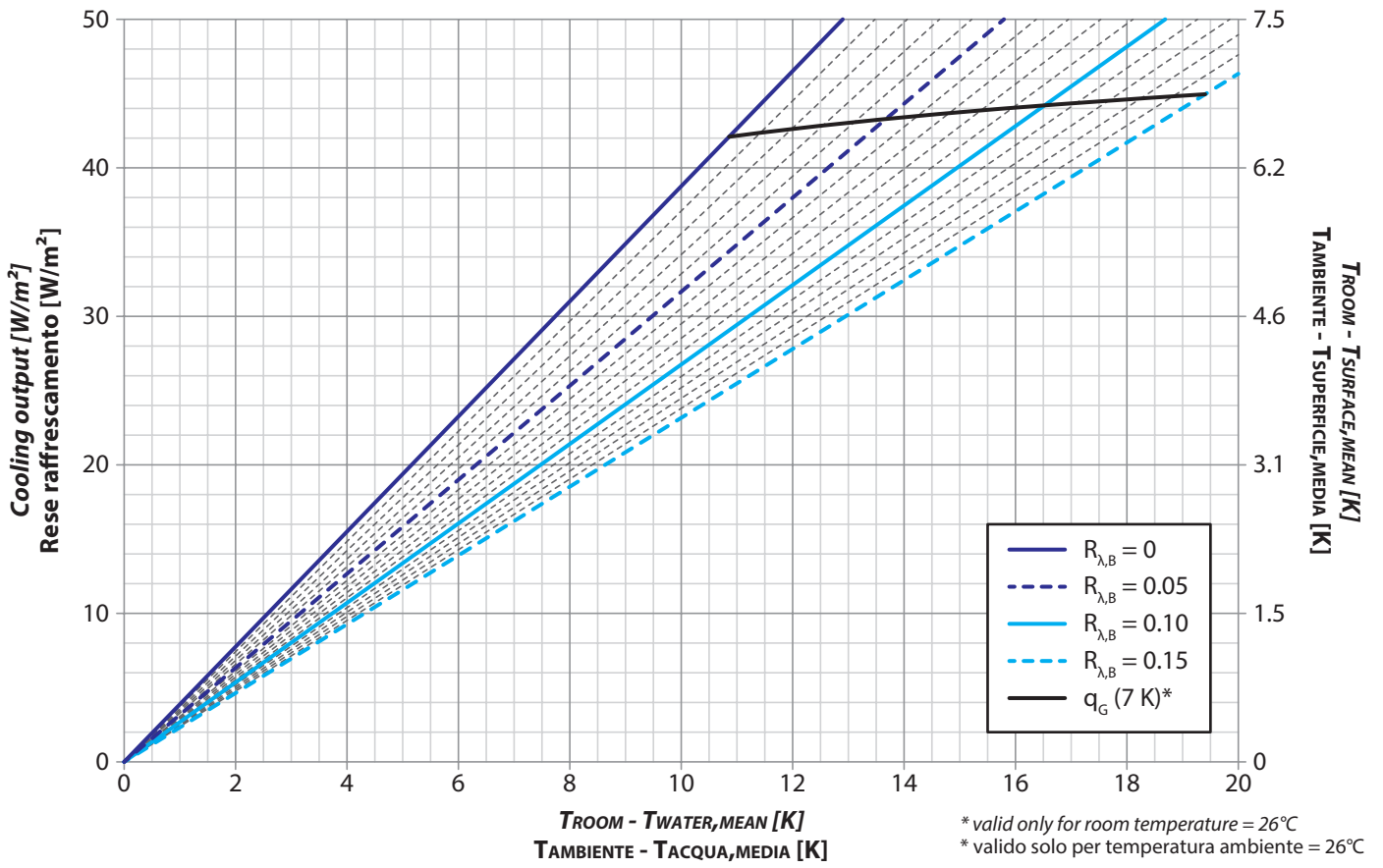
#### PASSO 8 CM





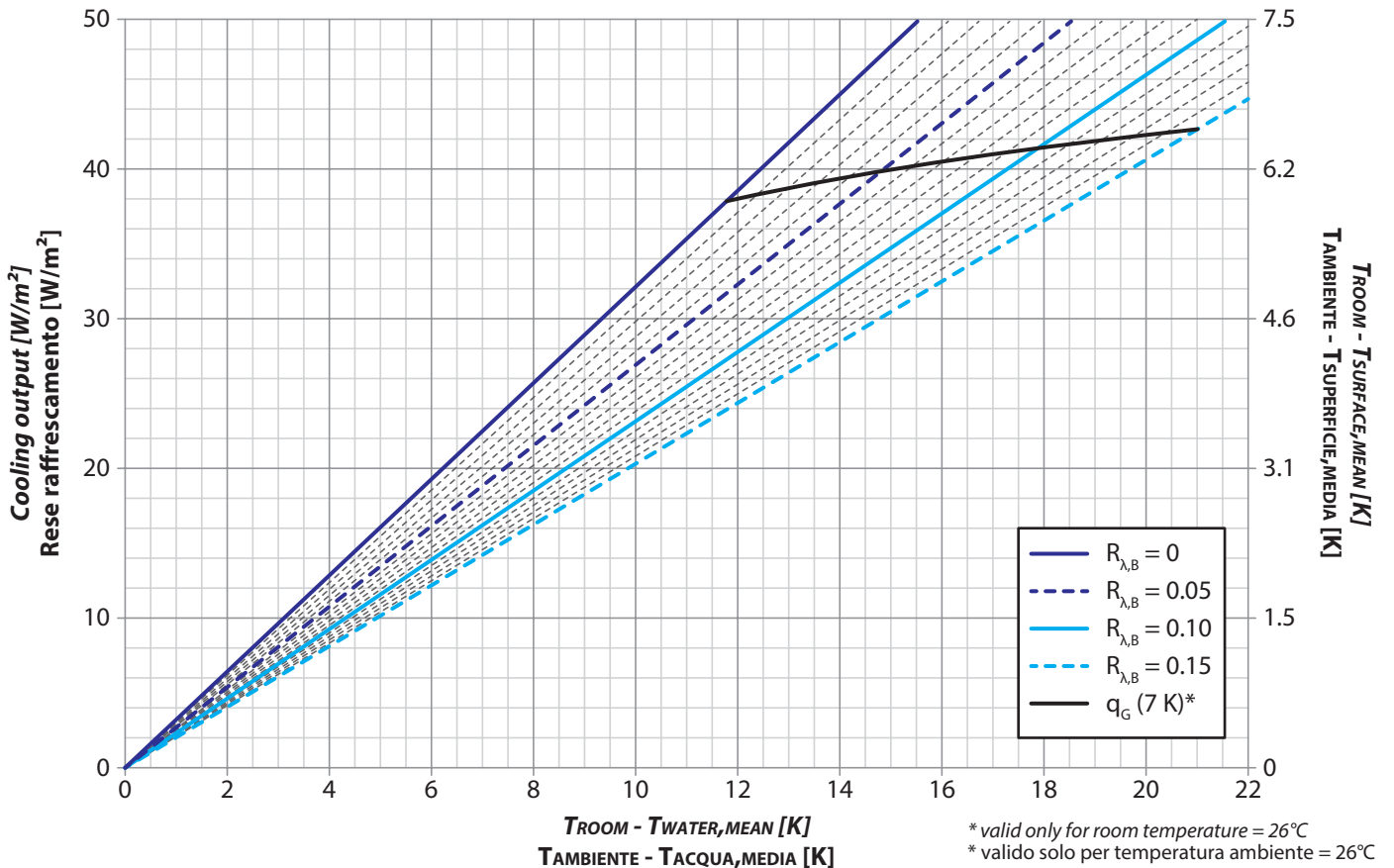
SPACING 16-CM

PASSO 16 CM



SPACING 25-CM

PASSO 25 CM





## 2.6 ZERO LEVEL - QUOTA ZERO

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.035	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Heat conductivity of screed with inserts	Conducibilità massetto con bugne	$\lambda'_E$	1.1537	W(m·k)
Piper external diameter	Diametro esterno tubo	$d_a$	0.014	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	4.778	4.541	4.326	4.130	3.951	3.787	3.637	3.497	3.368	3.248	3.137	3.033	2.935	2.844	2.758	2.677
12.5	4.308	4.108	3.926	3.759	3.606	3.465	3.335	3.214	3.101	2.996	2.898	2.806	2.720	2.639	2.563	2.491
16.6	3.899	3.730	3.575	3.433	3.301	3.179	3.066	2.961	2.862	2.770	2.684	2.603	2.527	2.455	2.387	2.322

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

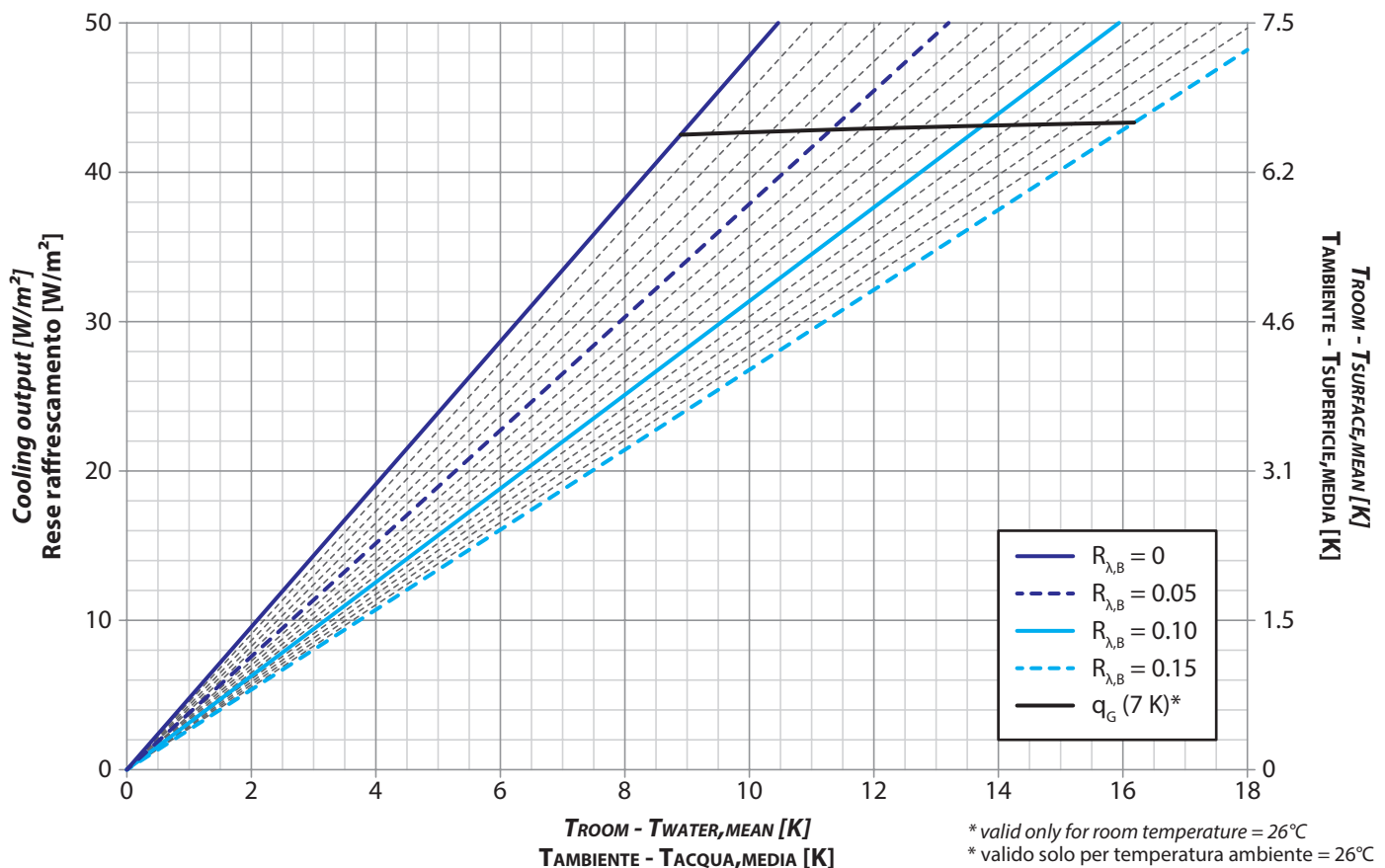
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

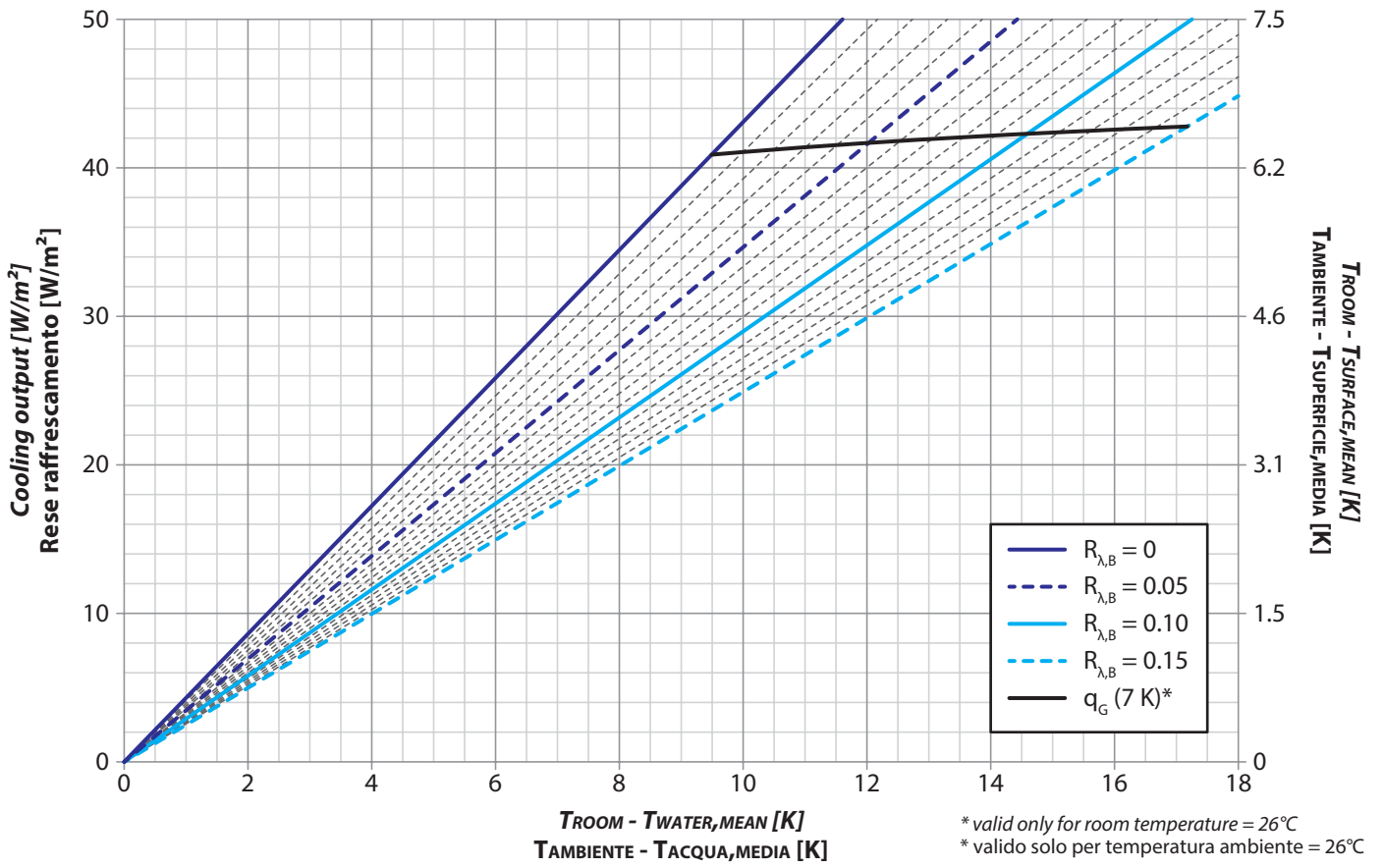
#### PASSO 8 CM





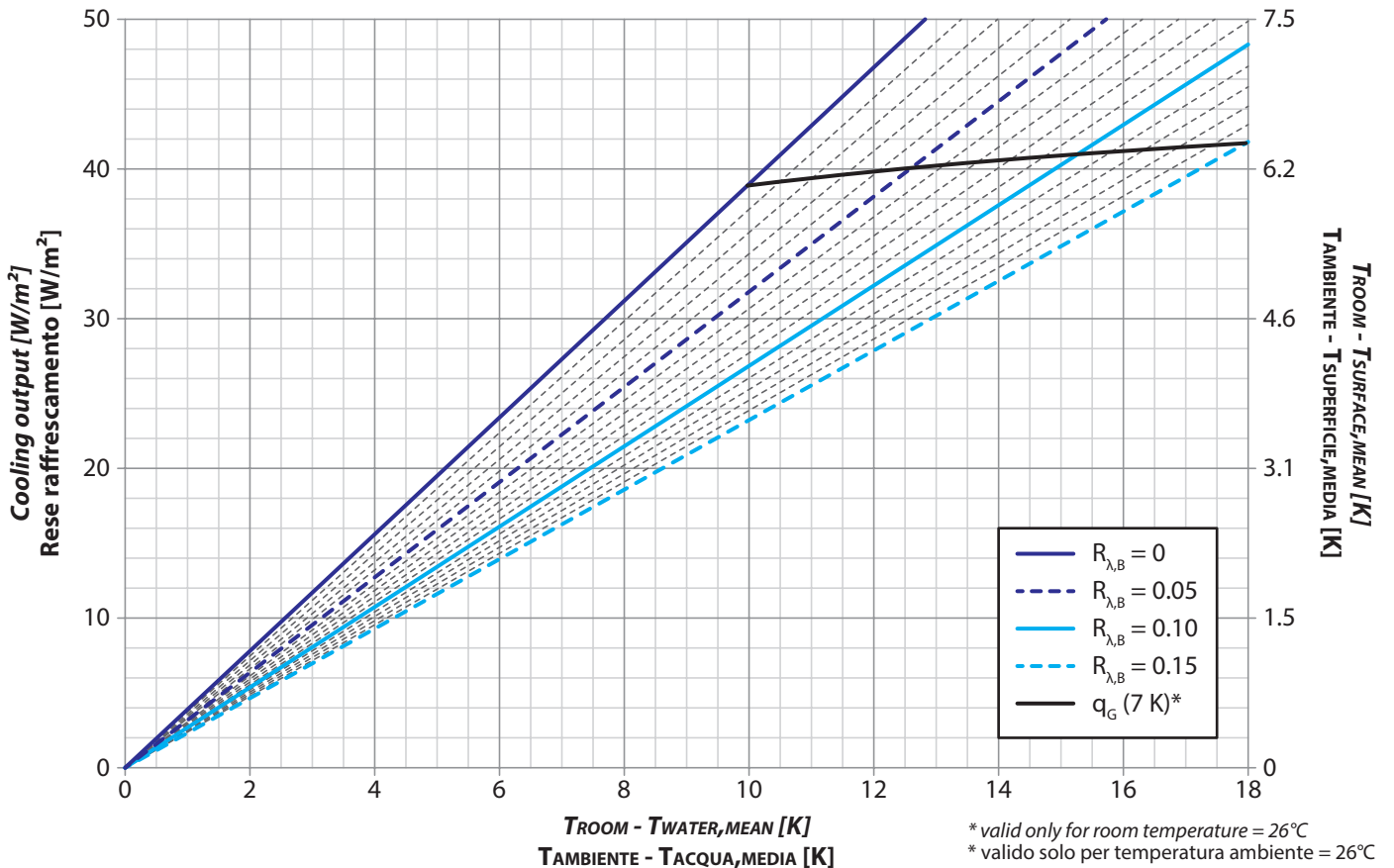
SPACING 12-CM

PASSO 12 CM



SPACING 16-CM

PASSO 16 CM





## 2.7 SMOOTH PANEL, PIPE Ø14 - PANNELLI LISCI, TUBO Ø14

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.035	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.2	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.014	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.3	4.823	4.581	4.362	4.163	3.982	3.816	3.663	3.521	3.391	3.269	3.156	3.051	2.952	2.860	2.773	2.691
16.6	3.936	3.764	3.606	3.461	3.327	3.203	3.088	2.981	2.881	2.788	2.701	2.618	2.541	2.468	2.399	2.334
24.9	3.229	3.107	2.993	2.888	2.789	2.697	2.611	2.531	2.455	2.383	2.316	2.252	2.192	2.135	2.081	2.029

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

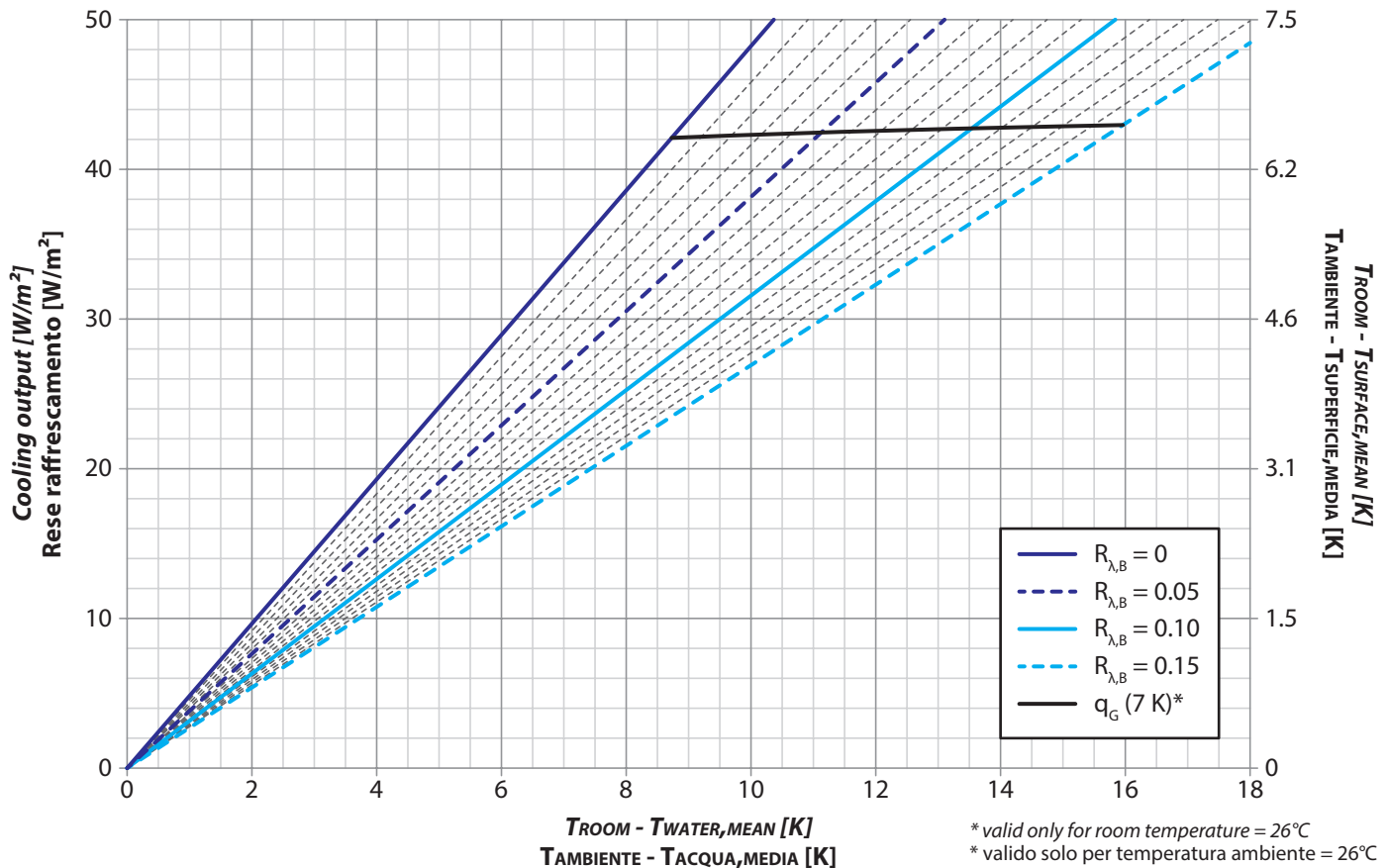
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

#### PASSO 8 CM

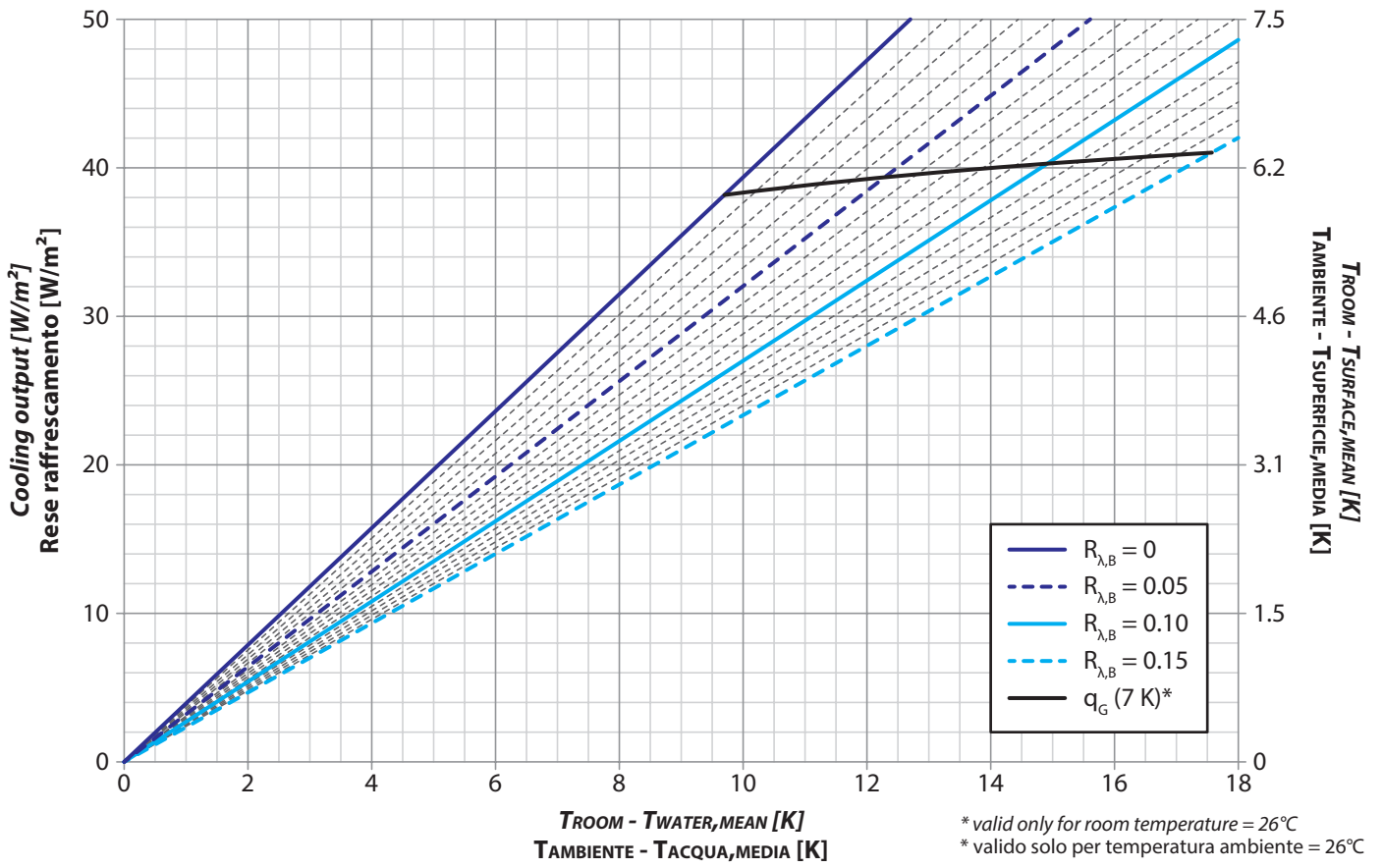






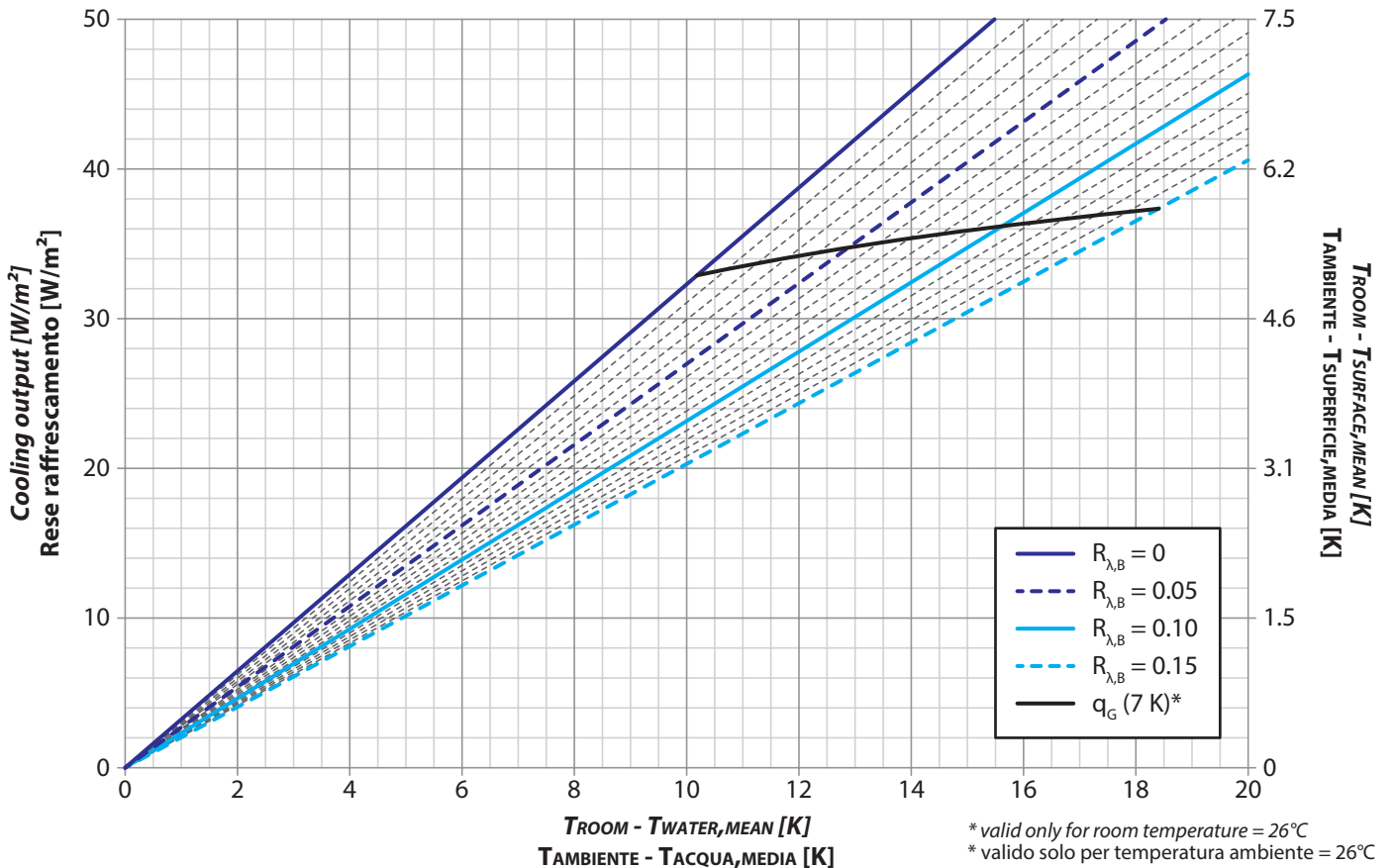
SPACING 16-CM

PASSO 16 CM



SPACING 25-CM

PASSO 25 CM



### 3 LOW-INERTNESS FLOOR HEATING - RISCALDAMENTO PAVIMENTO BASSA INERZIA

#### 3.1 SUPER D

##### DATA

##### DATI

##### INPUT DATA

##### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.01	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.4	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.012	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.0013	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.22	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]														
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.1	7.125	6.596	6.158	5.779	5.448	5.153	4.890	4.653	4.438	4.242	4.063	3.898	3.747	3.606	3.476
12.2	5.696	5.233	4.889	4.605	4.360	4.145	3.952	3.778	3.620	3.476	3.343	3.220	3.106	3.000	2.901
16.3	4.893	4.453	4.154	3.916	3.715	3.540	3.384	3.244	3.116	2.998	2.891	2.791	2.698	2.612	2.531

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

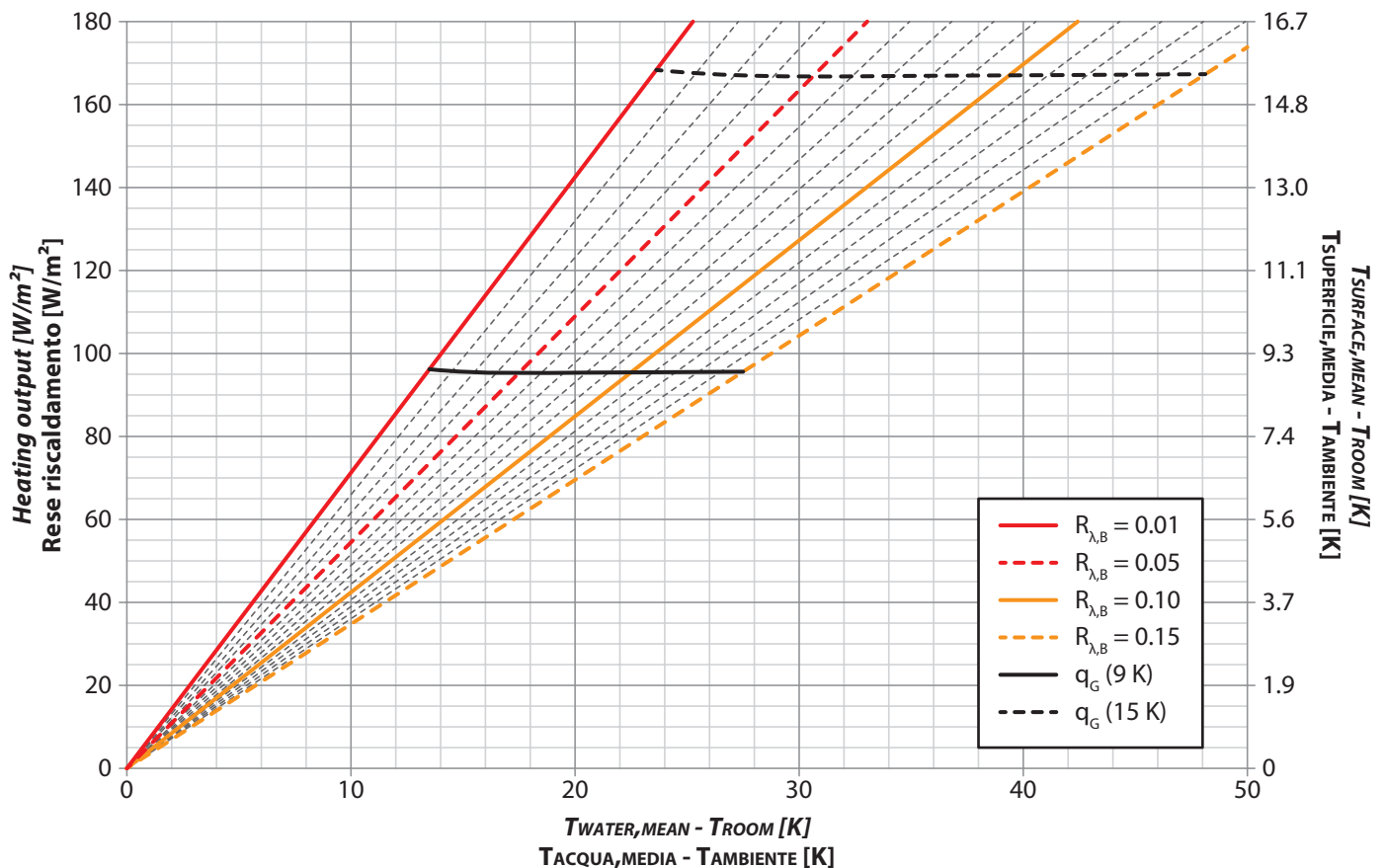
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

##### GRAPHS

##### GRAFICI

##### SPACING 8-CM

##### PASSO 8 CM

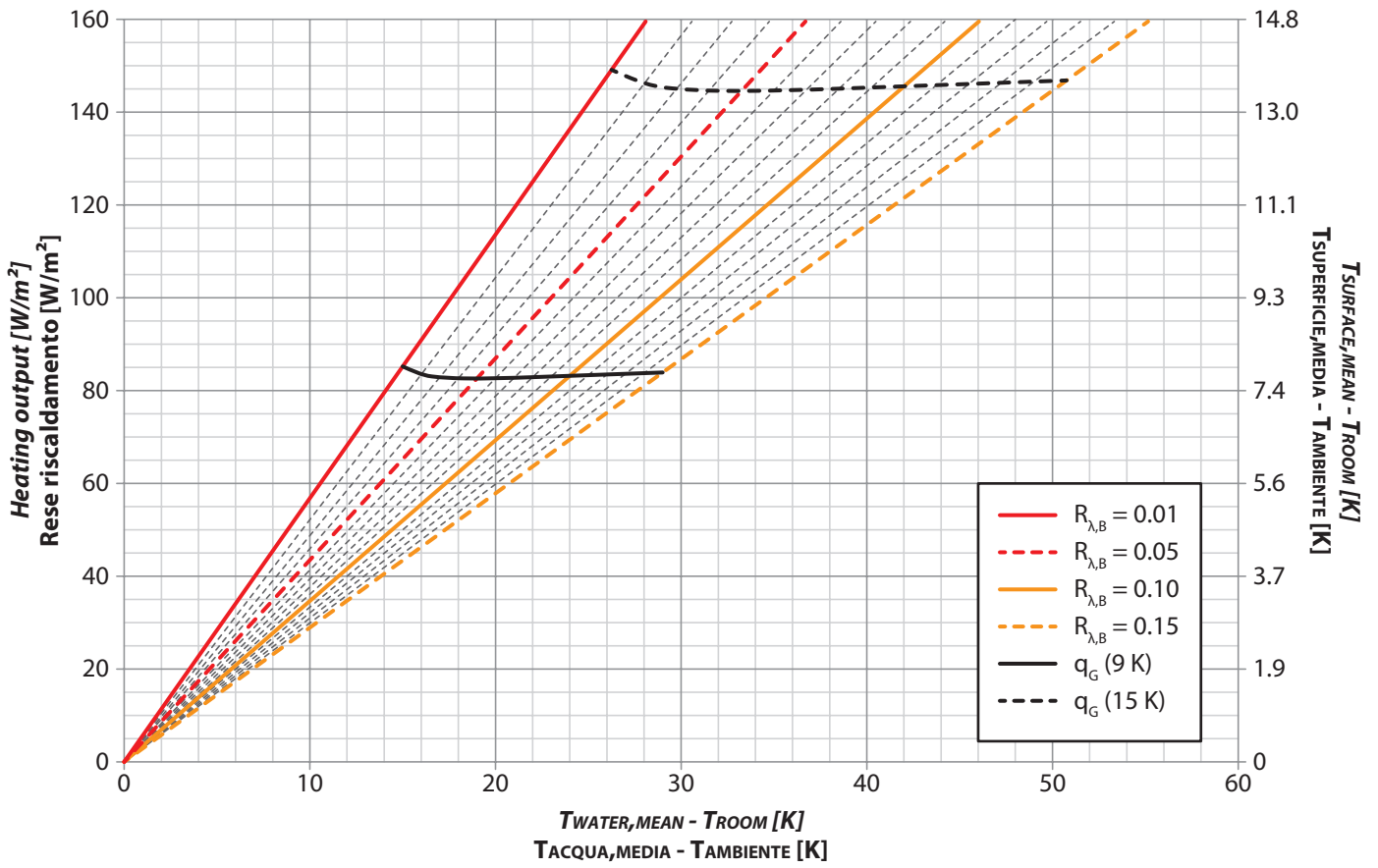






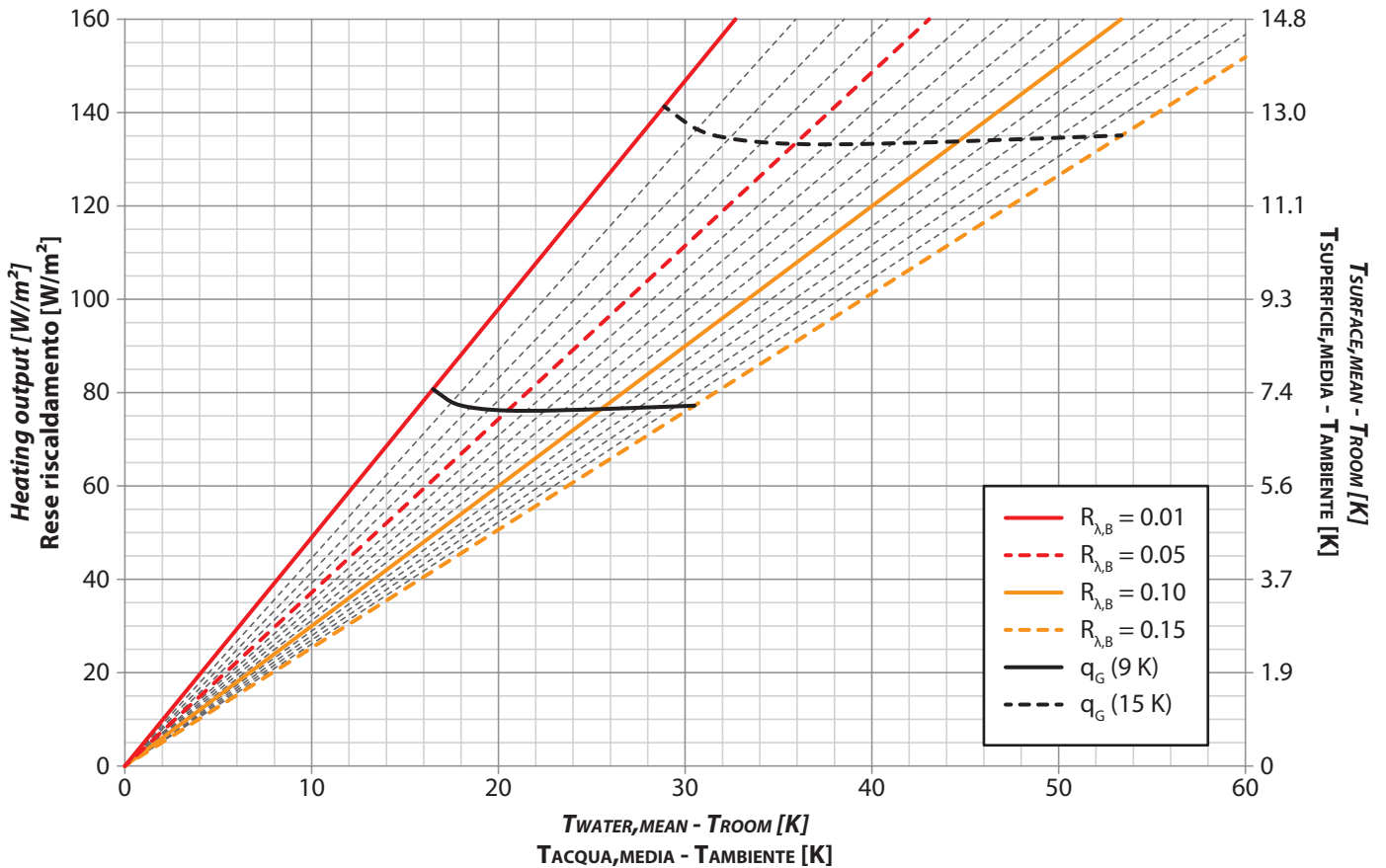
**SPACING 12-CM**

**PASSO 12 CM**



**SPACING 16-CM**

**PASSO 16 CM**





### 3.2 ZERO LEVEL AD - QUOTA ZERO AD

#### DATA

#### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.005	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.4	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.012	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.0013	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.22	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]														
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.1	7.469	6.819	6.312	5.891	5.529	5.211	4.930	4.679	4.454	4.249	4.062	3.892	3.735	3.591	3.457
12.2	6.260	5.645	5.217	4.875	4.587	4.339	4.118	3.921	3.743	3.583	3.436	3.300	3.175	3.061	2.954
16.3	5.228	4.656	4.292	4.012	3.781	3.583	3.410	3.254	3.114	2.987	2.871	2.764	2.665	2.574	2.488

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

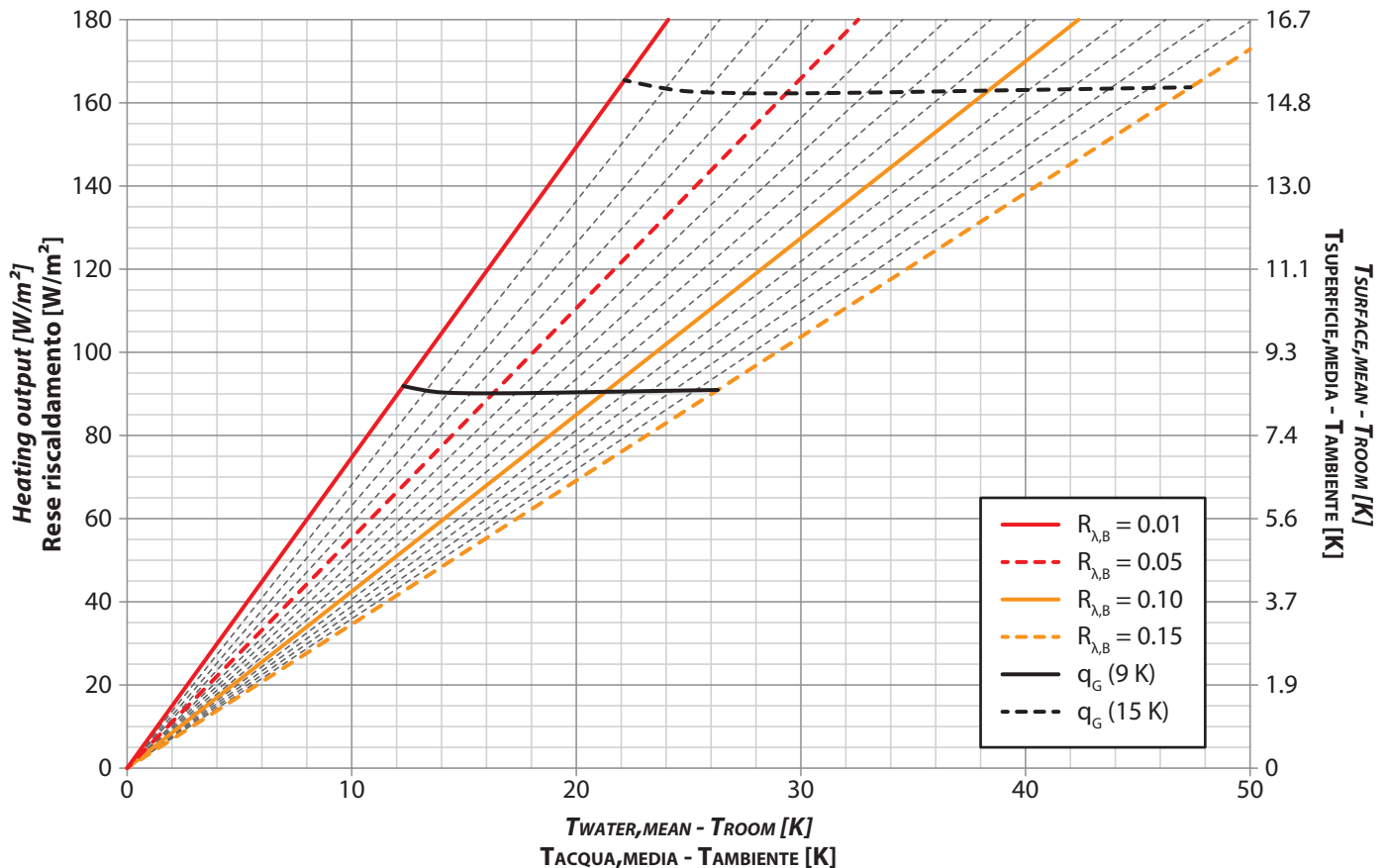
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

#### GRAPHS

#### GRAFICI

#### SPACING 8-CM

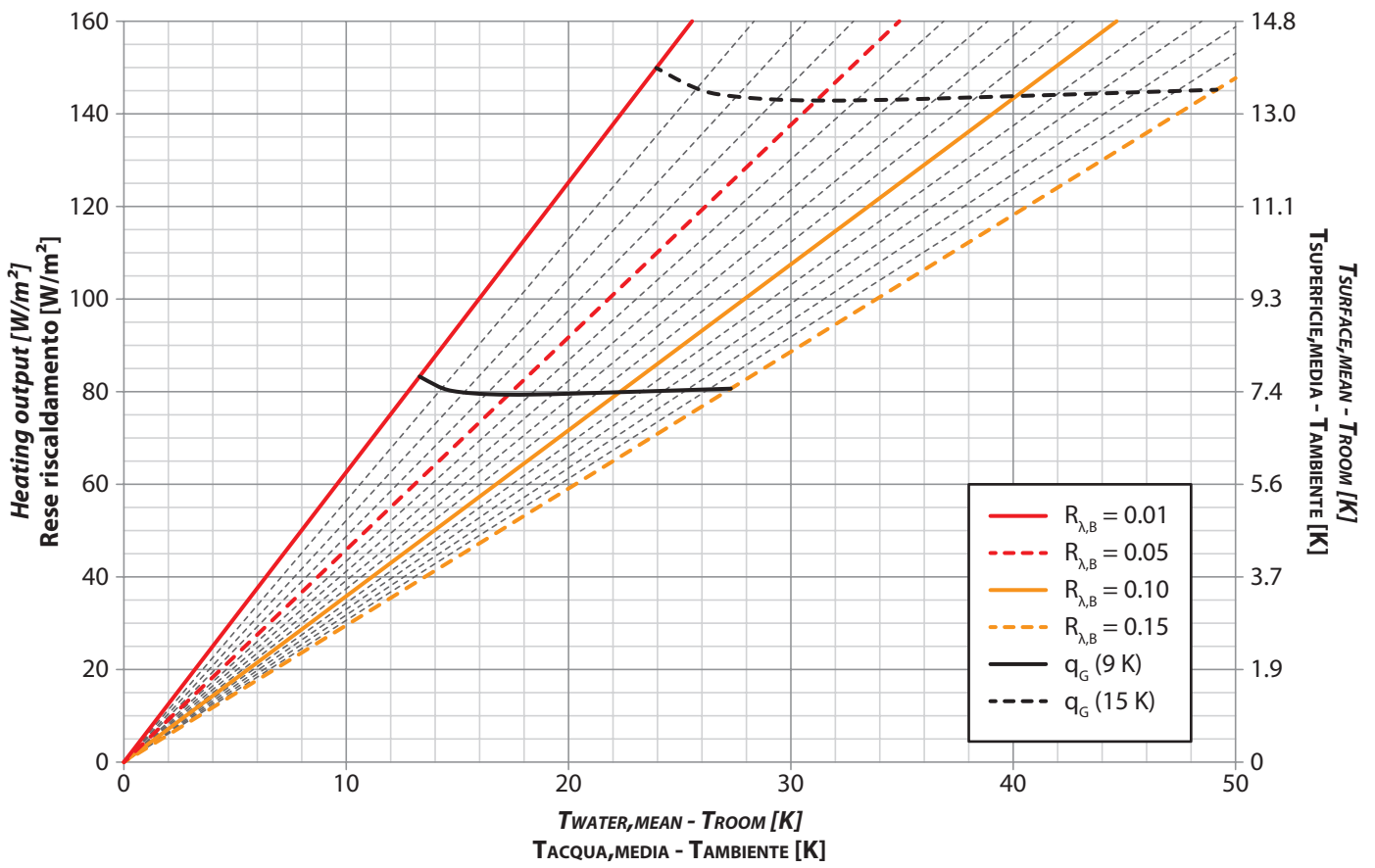
#### PASSO 8 CM





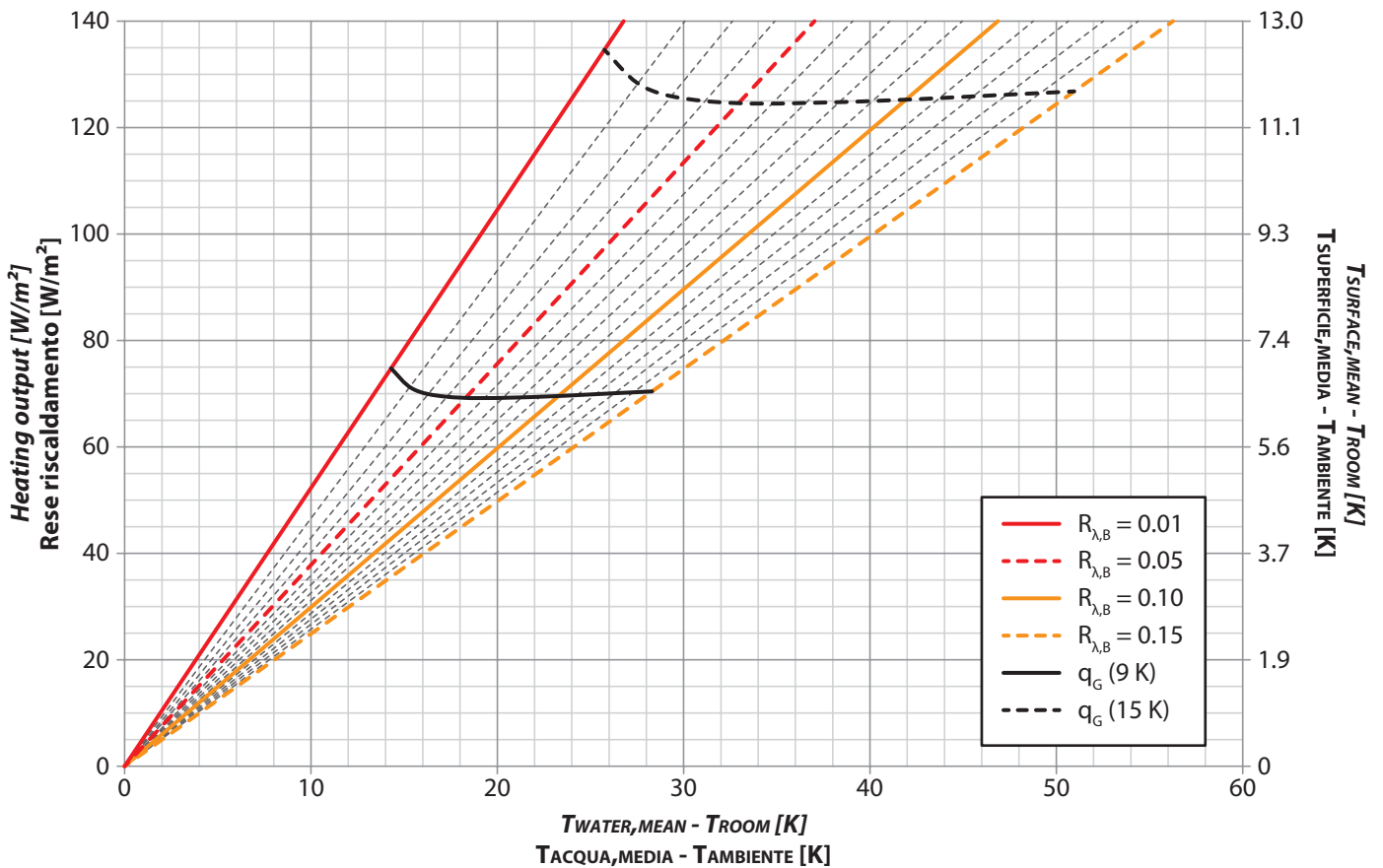
SPACING 12-CM

PASSO 12 CM



SPACING 16-CM

PASSO 16 CM





### 3.3 FIBER 18

#### DATA

#### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.005	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.4	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.012	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.0013	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.22	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]														
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
10	6.182	5.543	5.102	4.755	4.472	4.226	4.012	3.822	3.650	3.495	3.352	3.222	3.102	2.992	2.888

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

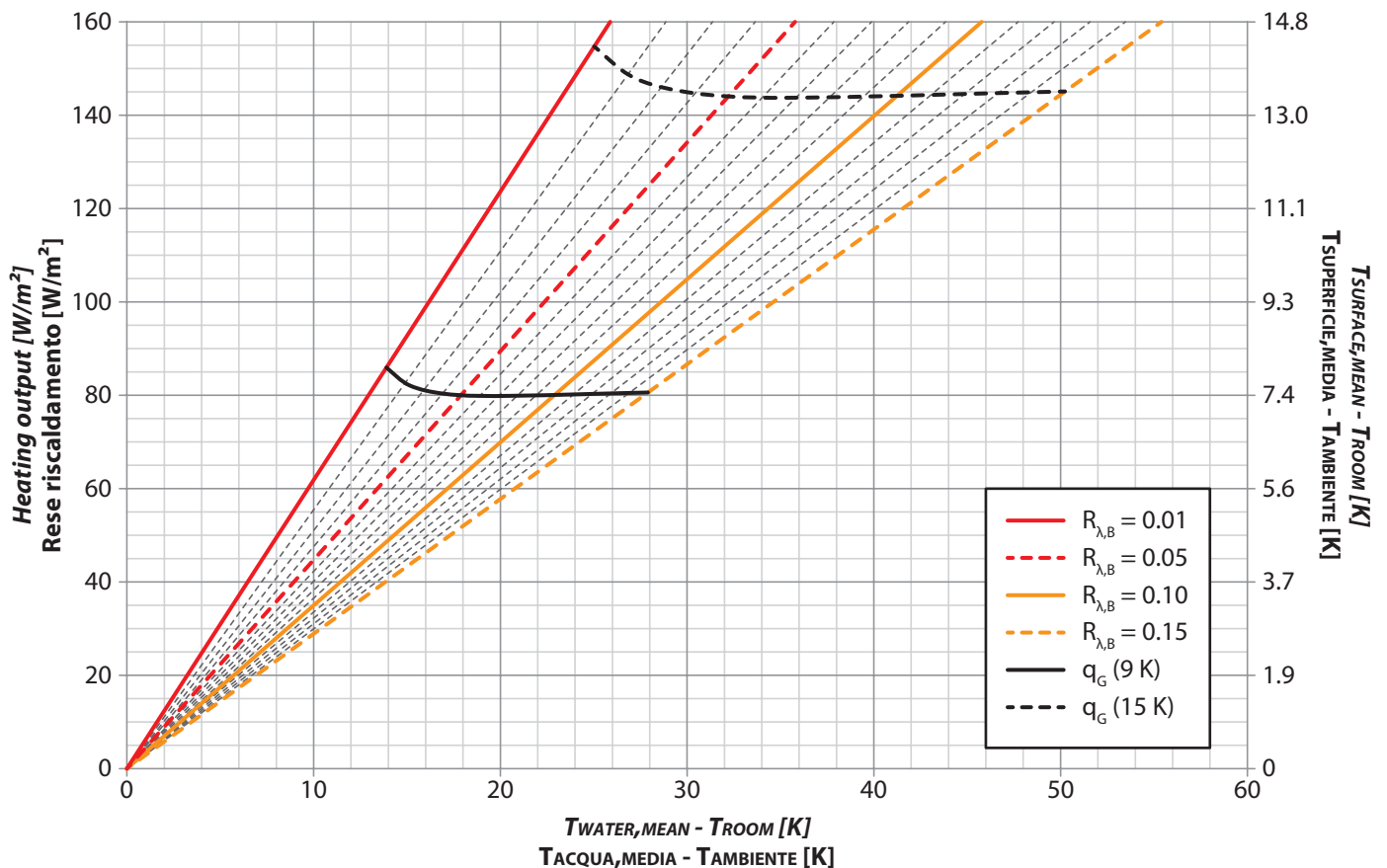
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

#### GRAPHS

#### GRAFICI

#### SPACING 10-CM

#### PASSO 10 CM



### 3.4 DRY

#### DATA

#### INPUT DATA

Piper external diameter	Diametro esterno tubo	$d_a$	0.014	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

#### DATI

#### DATI DI INPUT

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
14	5.445	5.197	4.968	4.756	4.560	4.380	4.213	4.060	3.917	3.786	3.663	3.549	3.441	3.339	3.242	3.148

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

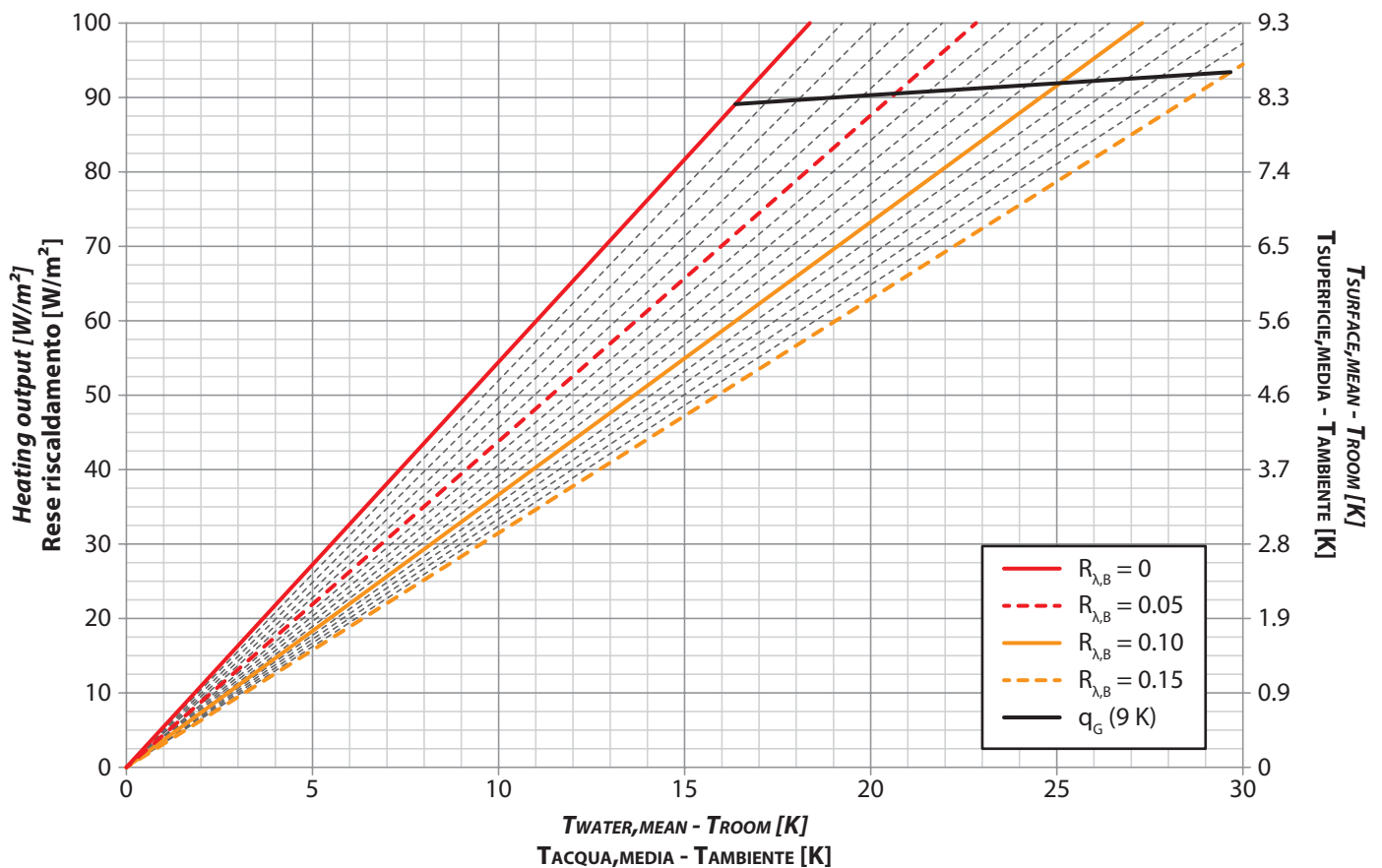
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

#### GRAPHS

#### SPACING 14-CM

#### GRAFICI

#### PASSO 14 CM



### 3.5 EVO-DRY

#### DATA

#### DATI

#### INPUT DATA

#### DATI DI INPUT

Piper external diameter	Diametro esterno tubo	$d_a$	0.014	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
14	4.330	4.167	4.017	3.878	3.749	3.629	3.516	3.410	3.310	3.214	3.121	3.030	2.939	2.848	2.756	2.661

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

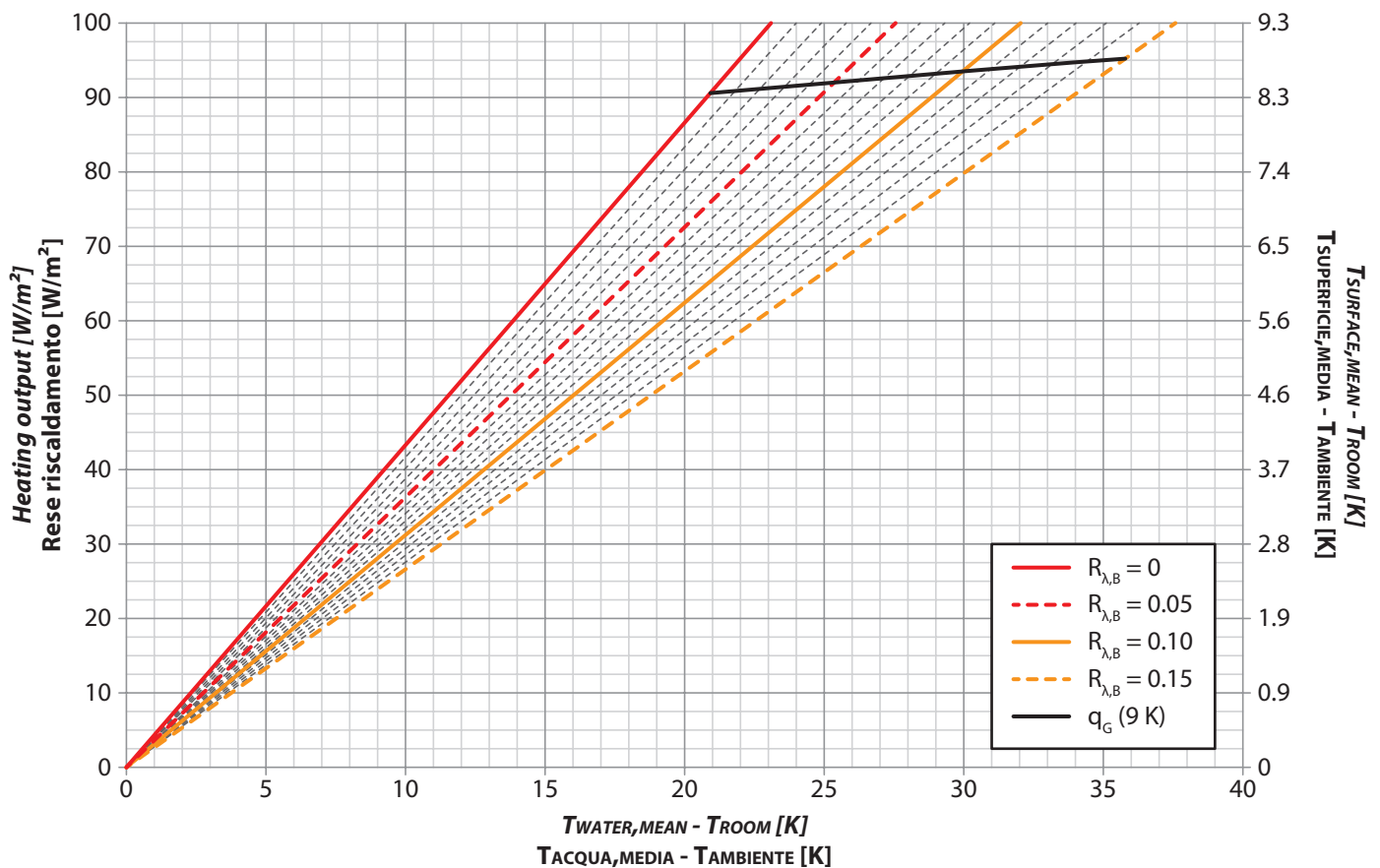
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

#### GRAPHS

#### GRAFICI

#### SPACING 14-CM

#### PASSO 14 CM





## 4 LOW-INERTNESS FLOOR COOLING - RAFFRESCAMENTO PAVIMENTO BASSA INERZIA

### 4.1 SUPER D

#### DATA

#### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.01	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.4	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.012	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.0013	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.22	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]														
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.1	4.897	4.639	4.416	4.216	4.036	3.871	3.720	3.580	3.451	3.331	3.219	3.115	3.017	2.925	2.838
12.2	4.095	3.835	3.640	3.476	3.333	3.203	3.085	2.977	2.877	2.783	2.697	2.615	2.539	2.467	2.399
16.3	3.608	3.342	3.160	3.015	2.892	2.782	2.682	2.592	2.508	2.430	2.358	2.290	2.226	2.166	2.109

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

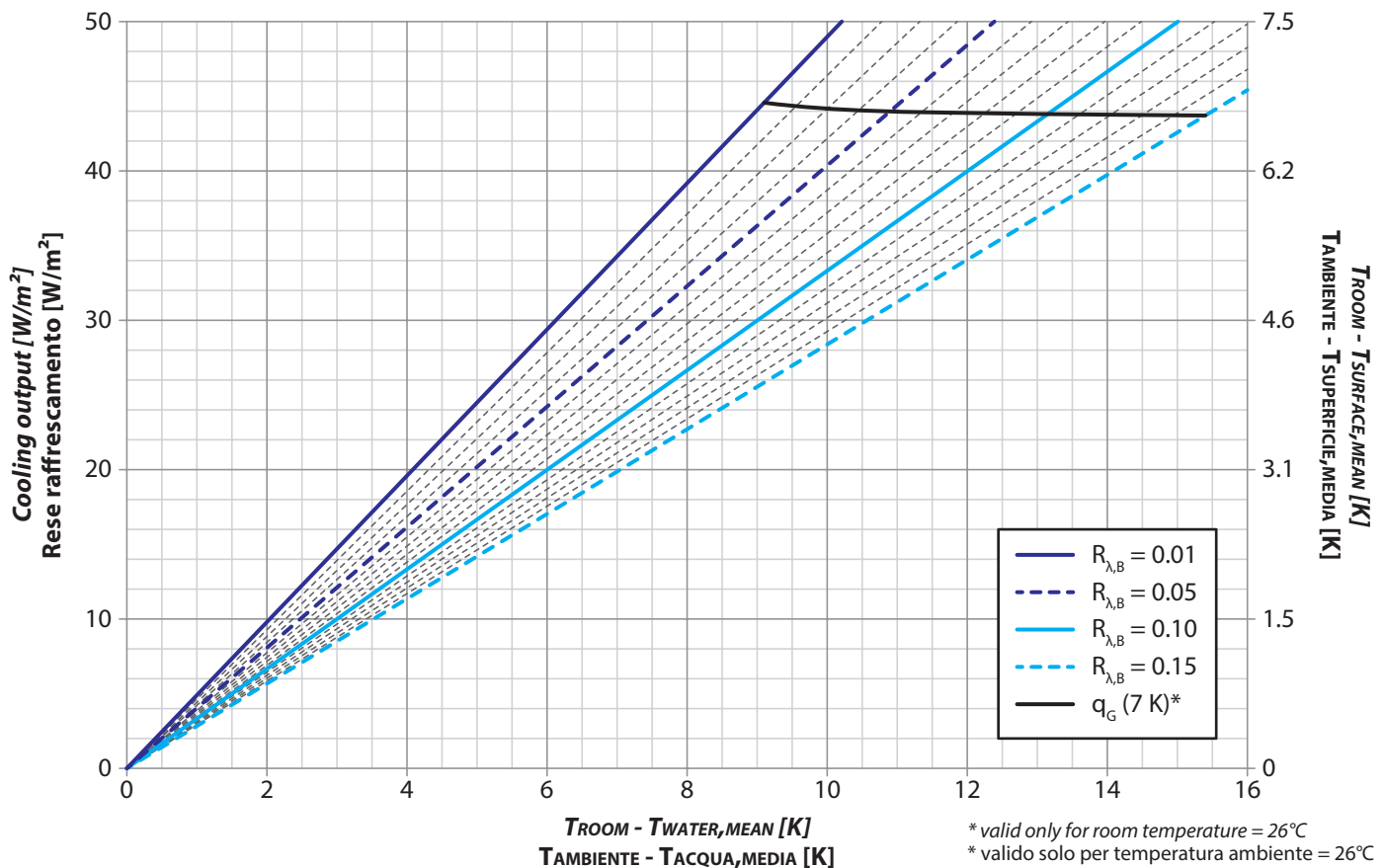
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

#### GRAPHS

#### GRAFICI

#### SPACING 8-CM

#### PASSO 8 CM

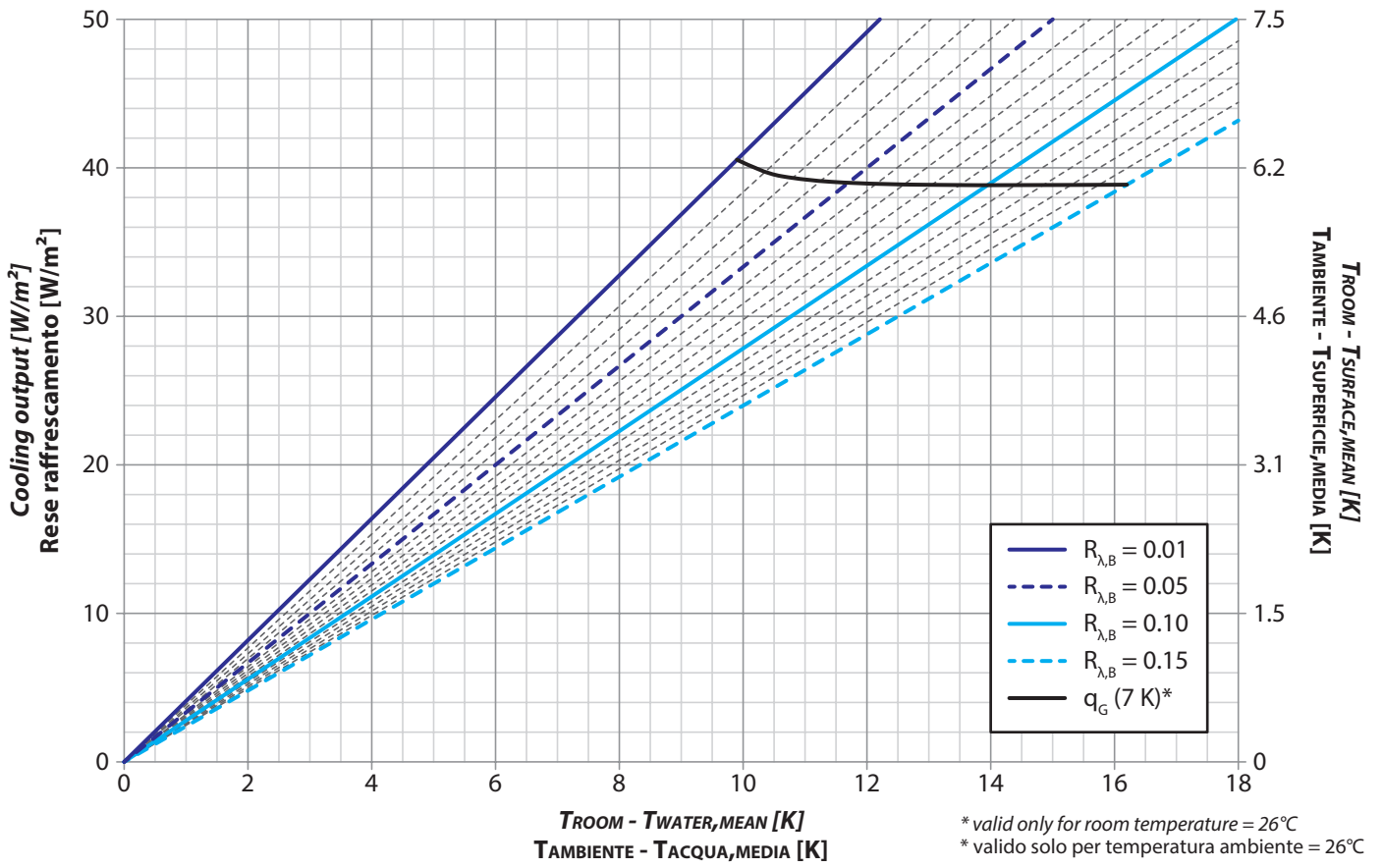






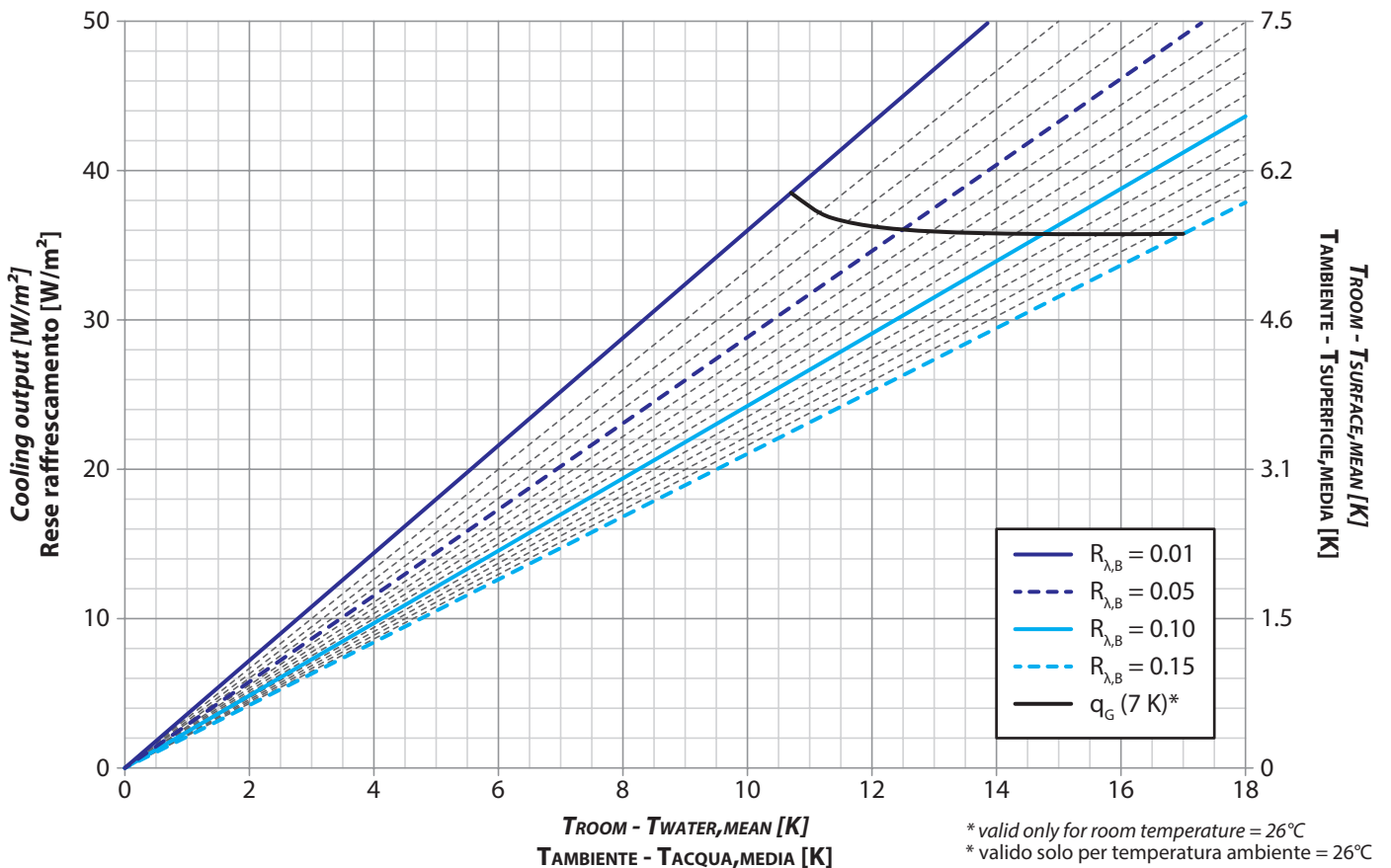
SPACING 12-CM

PASSO 12 CM



SPACING 16-CM

PASSO 16 CM



## 4.2 ZERO LEVEL AD - QUOTA ZERO AD

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.005	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.4	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.012	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.0013	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.22	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]														
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
8.1	4.986	4.673	4.422	4.205	4.013	3.839	3.682	3.538	3.405	3.282	3.168	3.061	2.962	2.869	2.782
12.2	4.297	3.970	3.736	3.548	3.386	3.242	3.113	2.995	2.887	2.787	2.694	2.607	2.526	2.450	2.380
16.3	3.673	3.340	3.128	2.964	2.828	2.708	2.602	2.506	2.418	2.337	2.262	2.192	2.126	2.065	2.007

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

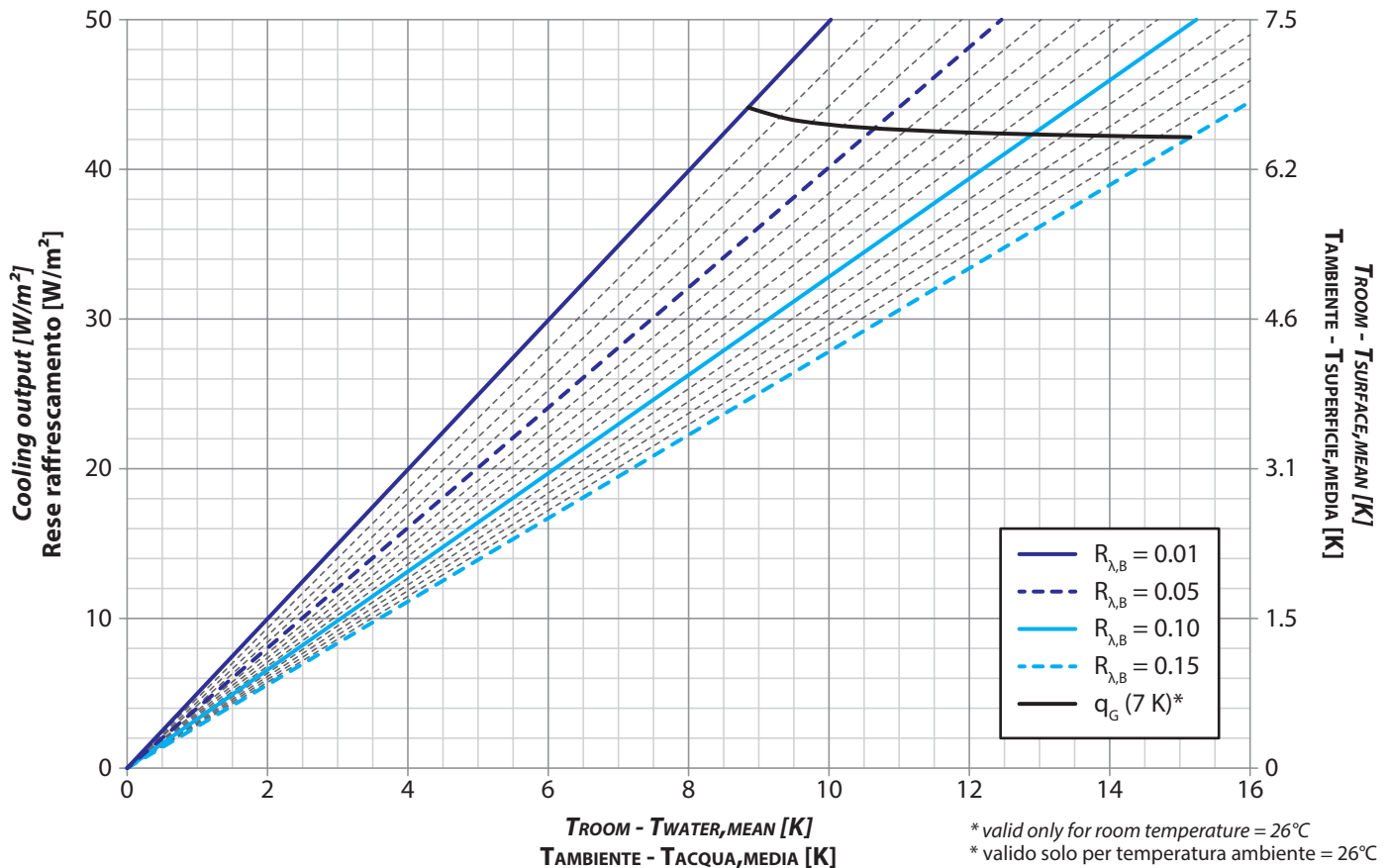
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

#### SPACING 8-CM

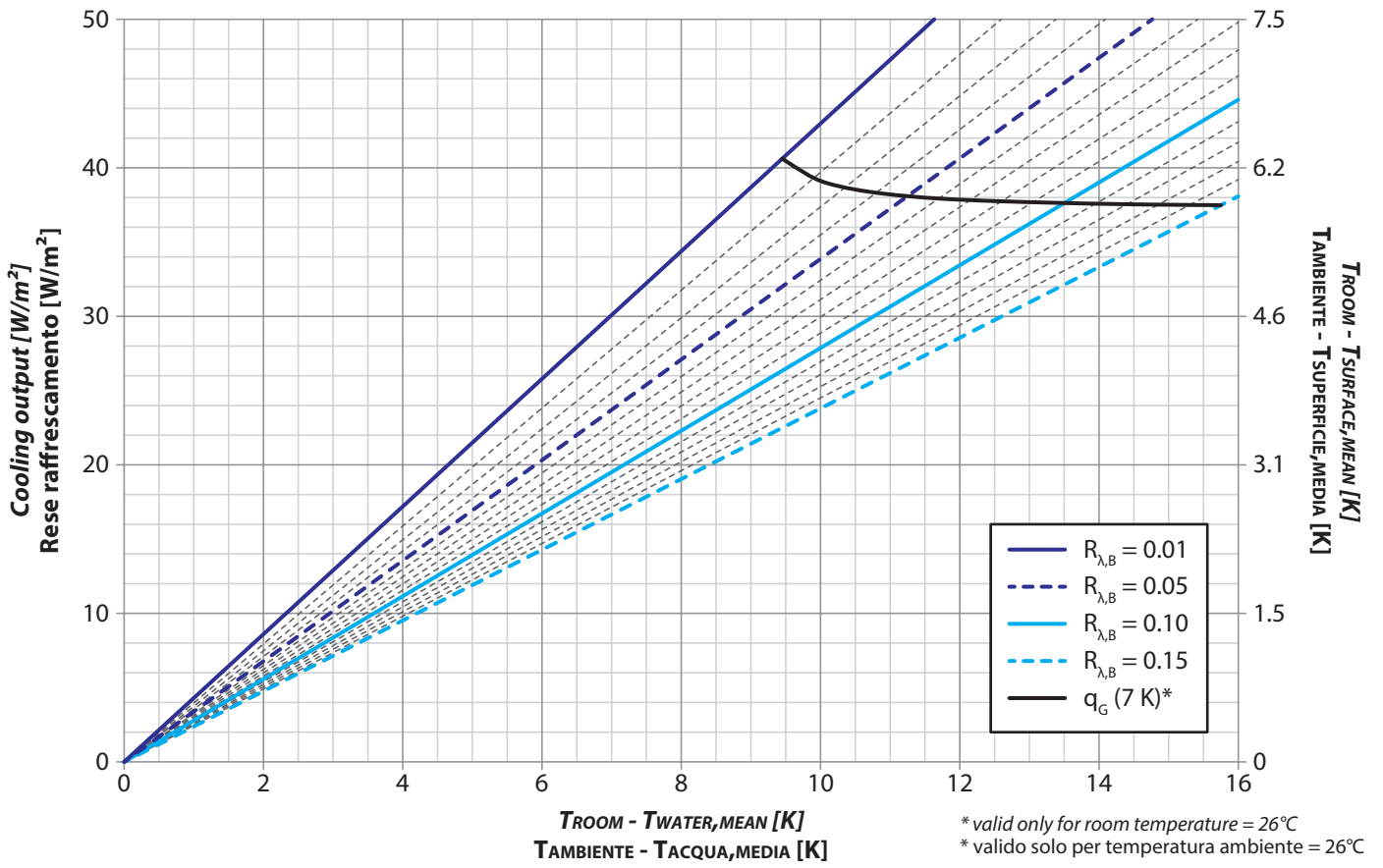
#### PASSO 8 CM





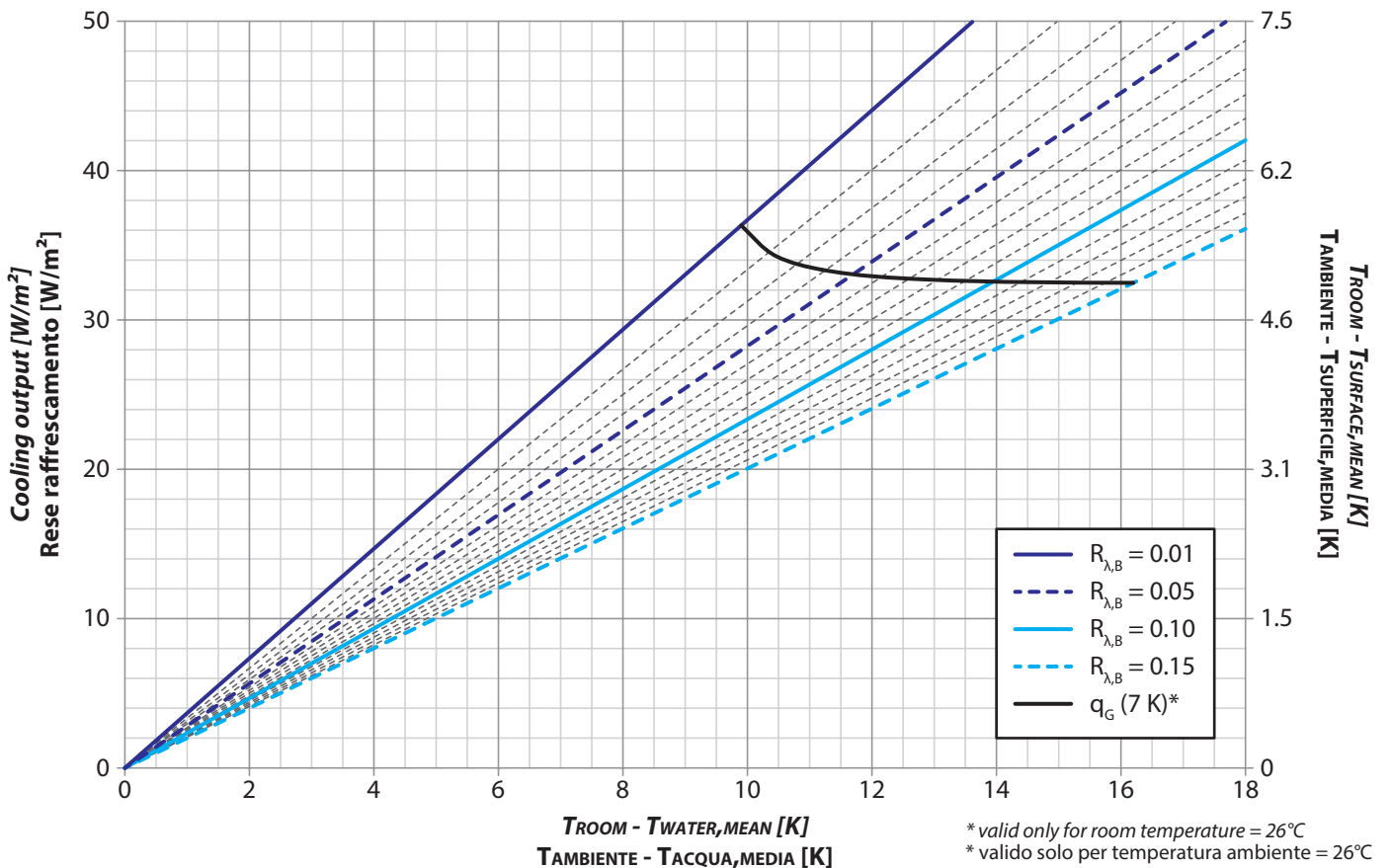
**SPACING 12-CM**

**PASSO 12 CM**



**SPACING 16-CM**

**PASSO 16 CM**





### 4.3 FIBER 18

#### DATA

#### DATI

#### INPUT DATA

#### DATI DI INPUT

Screed coverings above the pipe	Spessore massetto sopra tubo	$s_U$	0.005	m
Heat conductivity of screed	Conducibilità massetto	$\lambda_E$	1.4	W(m·k)
Pipe external diameter	Diametro esterno tubo	$d_a$	0.012	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.0013	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.22	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]														
	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
10	4.295	3.947	3.702	3.506	3.338	3.196	3.067	2.950	2.843	2.745	2.654	2.569	2.490	2.416	2.347

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

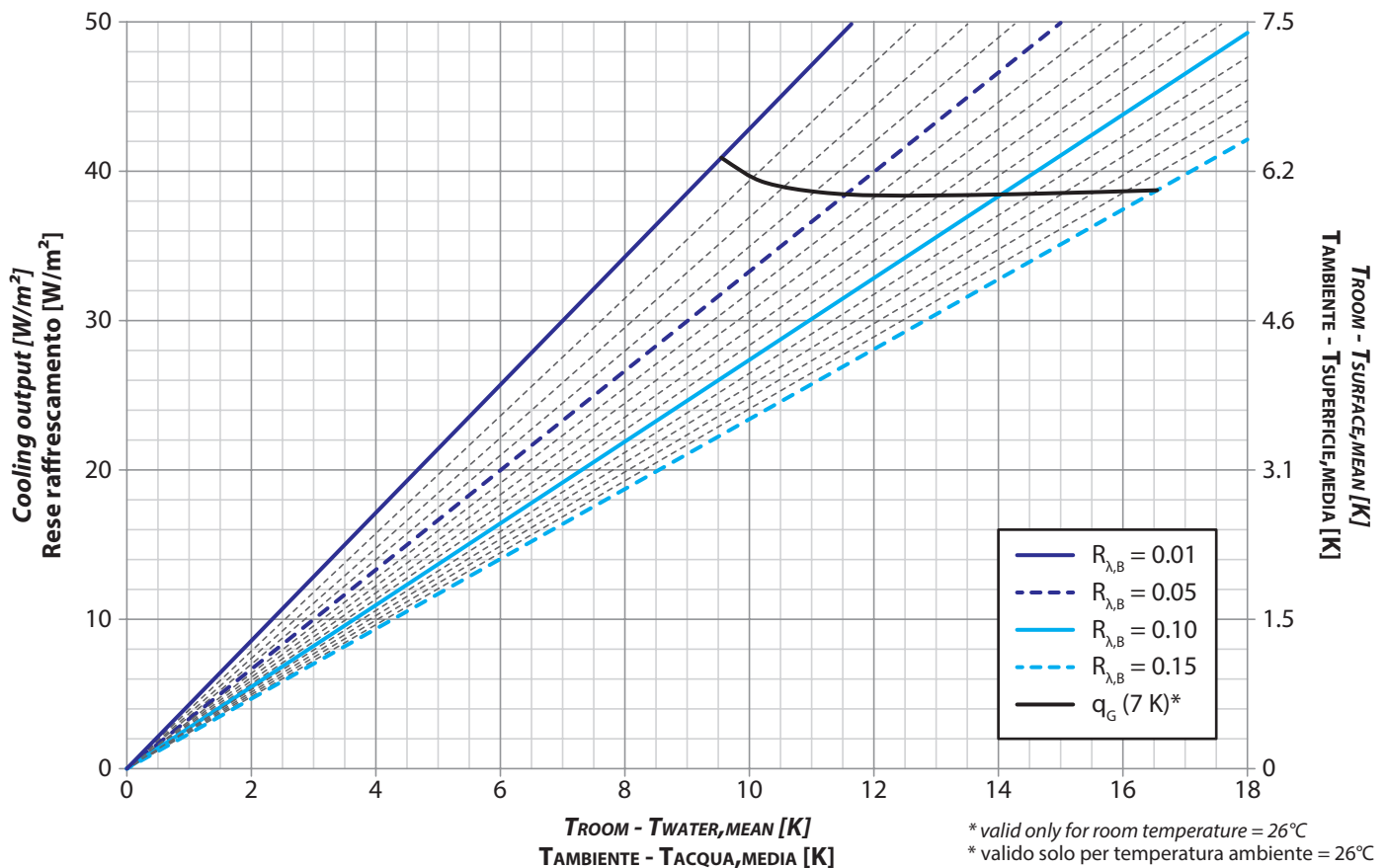
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

#### GRAPHS

#### GRAFICI

#### SPACING 10-CM

#### PASSO 10 CM



## 4.4 DRY

### DATA

#### INPUT DATA

Piper external diameter	Diametro esterno tubo	$d_a$	0.014	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
14	4.195	4.045	3.904	3.772	3.649	3.533	3.424	3.323	3.227	3.137	3.052	2.972	2.895	2.823	2.753	2.686

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

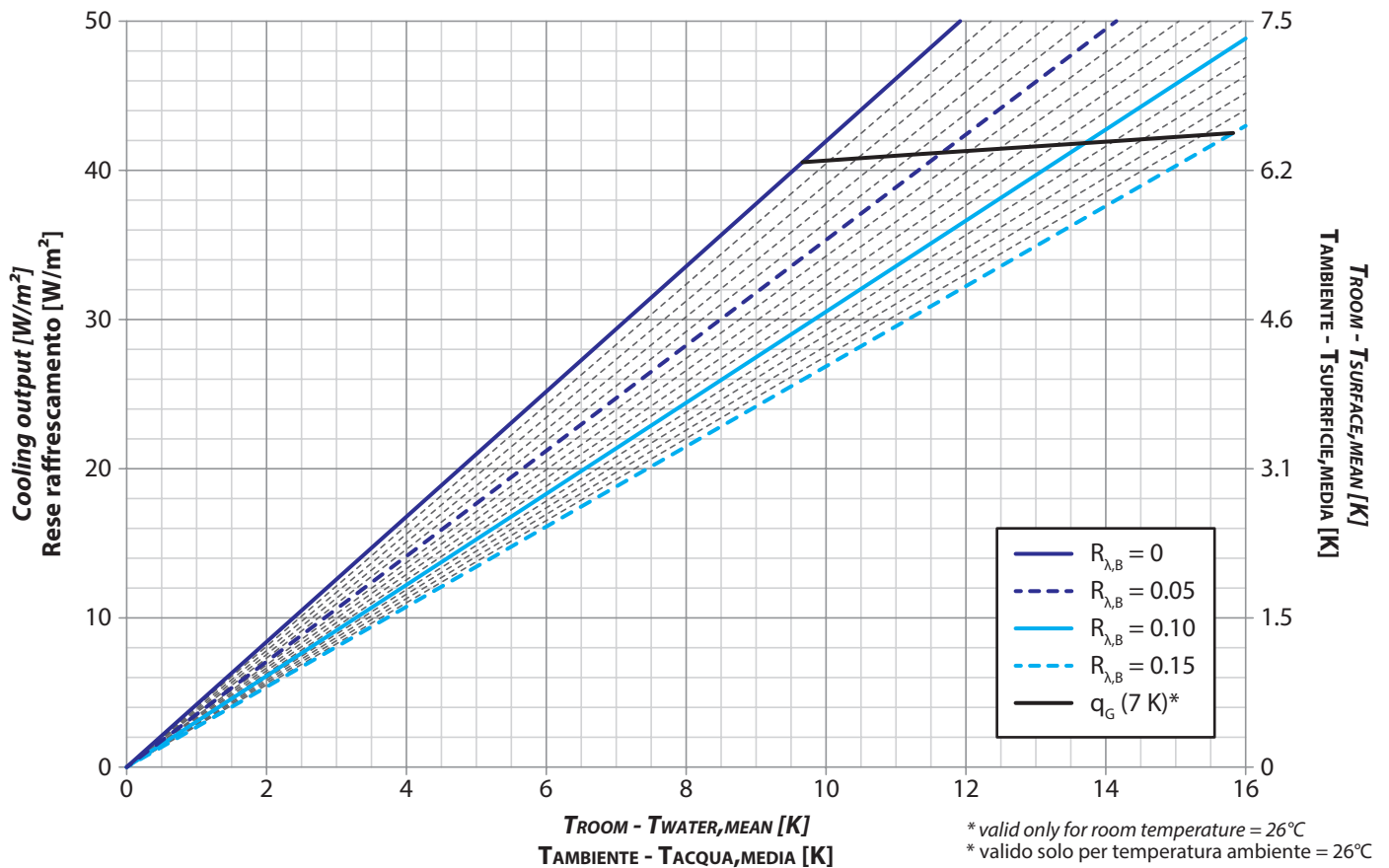
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

#### SPACING 14-CM

### GRAFICI

#### PASSO 14 CM





## 4.5 EVO-DRY

### DATA

### DATI

#### INPUT DATA

#### DATI DI INPUT

Piper external diameter	Diametro esterno tubo	$d_a$	0.014	m
Pipe wall thickness	Spessore parete tubo	$s_R$	0.002	m
Pipe heat conductivity	Conducibilità tubo	$\lambda_R$	0.35	W(m·k)

$K_H$

$K_H$

T [cm]	$R_{\lambda,B}$ [m <sup>2</sup> ·k/W]															
	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15
14	3.500	3.394	3.294	3.200	3.111	3.028	2.949	2.874	2.802	2.733	2.667	2.602	2.538	2.476	2.413	2.350

$R_{\lambda,B}$ : Heat conduction resistance of the floor covering  
 T: Pipe spacing

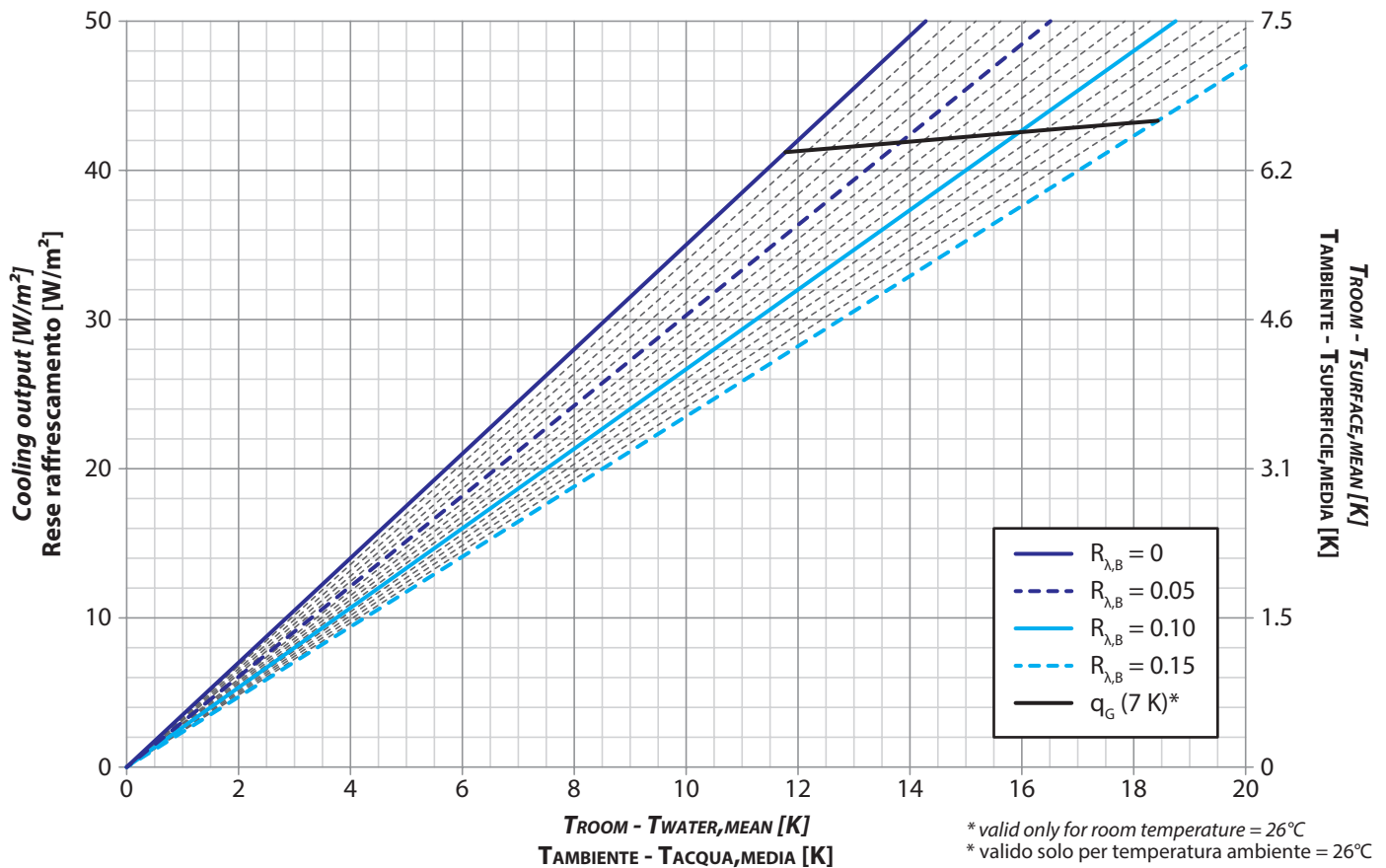
$R_{\lambda,B}$ : Resistenza del rivestimento  
 T: Passo di posa del tubo

### GRAPHS

### GRAFICI

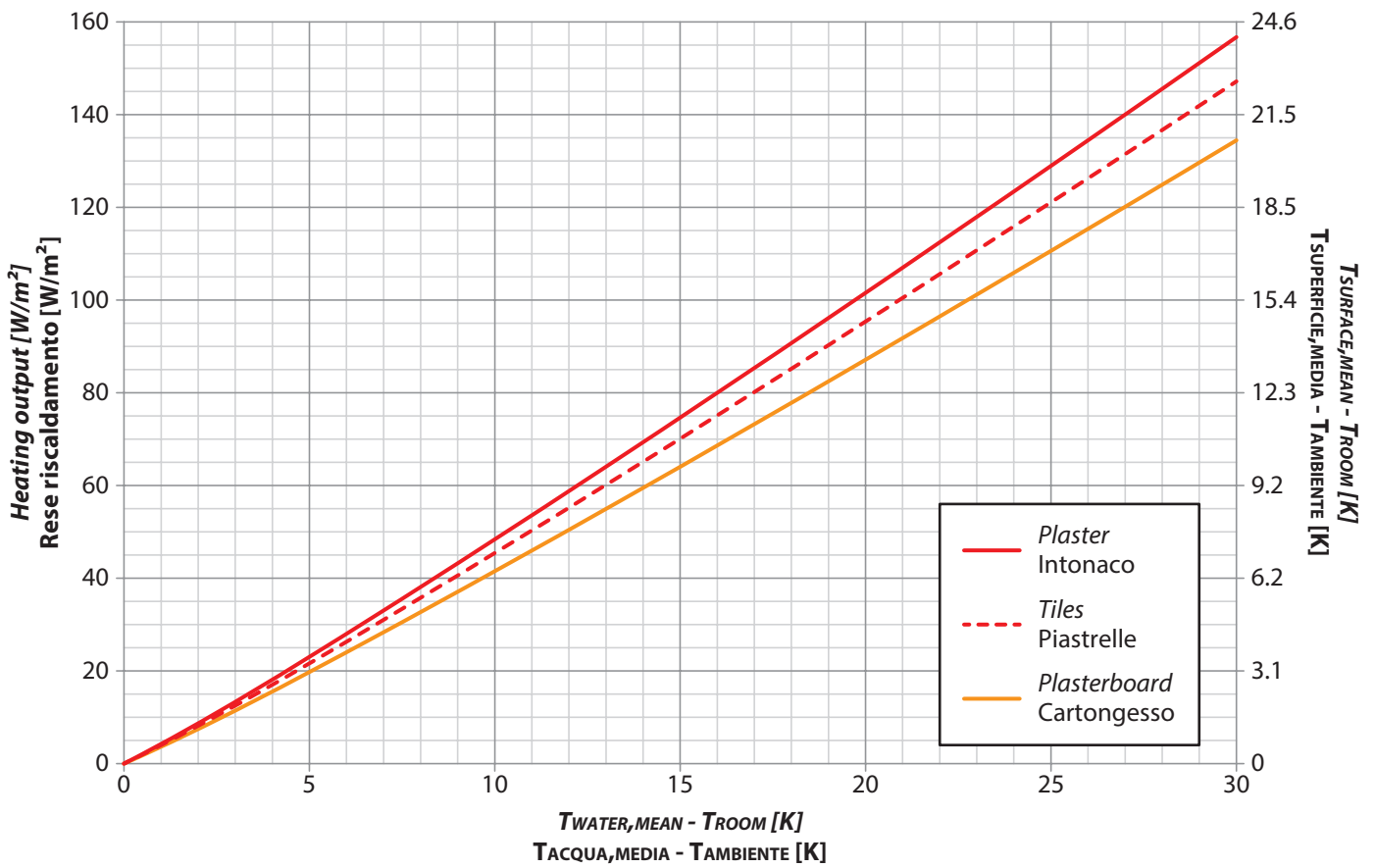
#### SPACING 14-CM

#### PASSO 14 CM

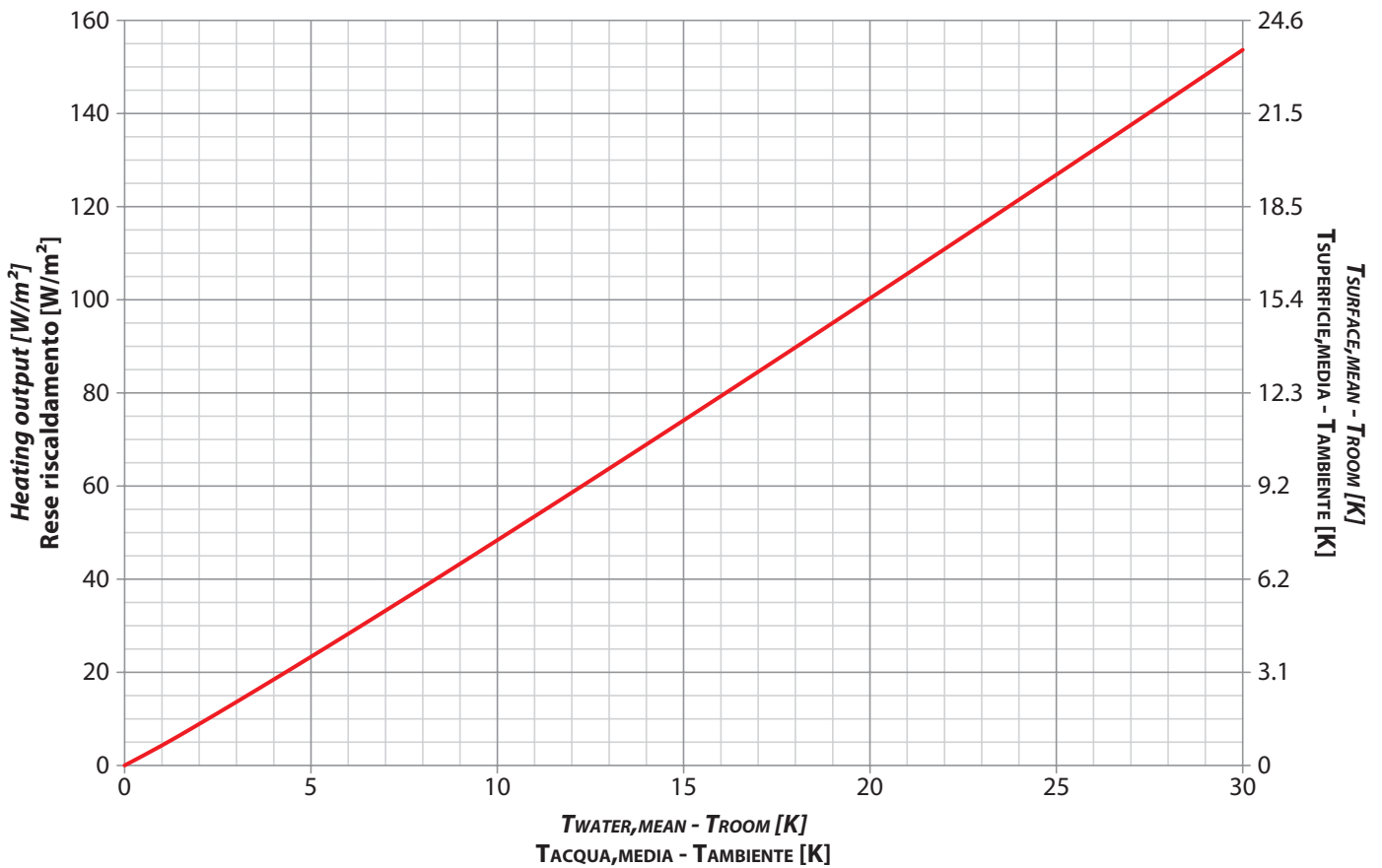


## 5 RESIDENTIAL CEILING HEATING - RISCALDAMENTO SOFFITTO RESIDENZIALE

### 5.1 B!KLIMAX



### 5.2 B!KLIMAX+

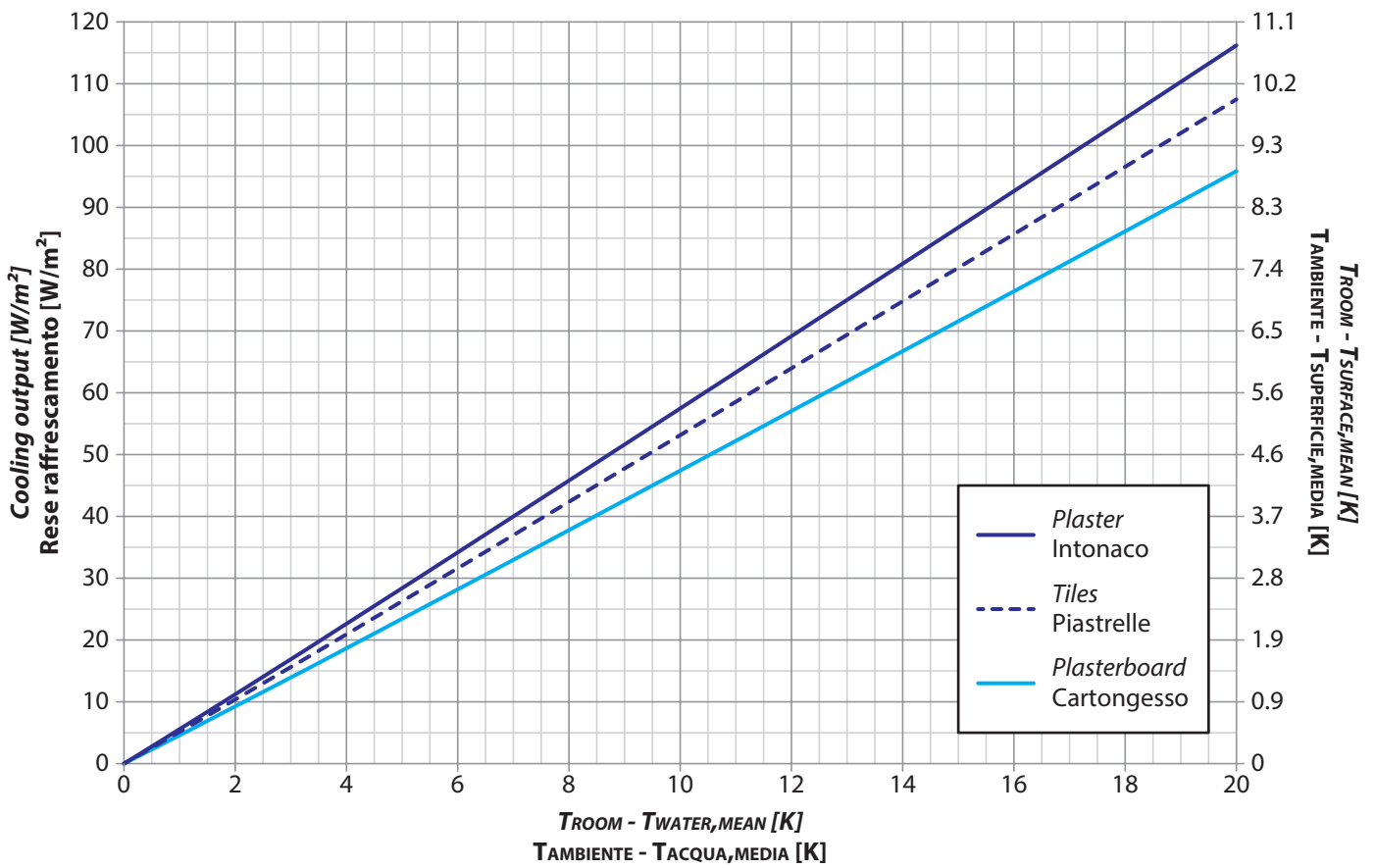




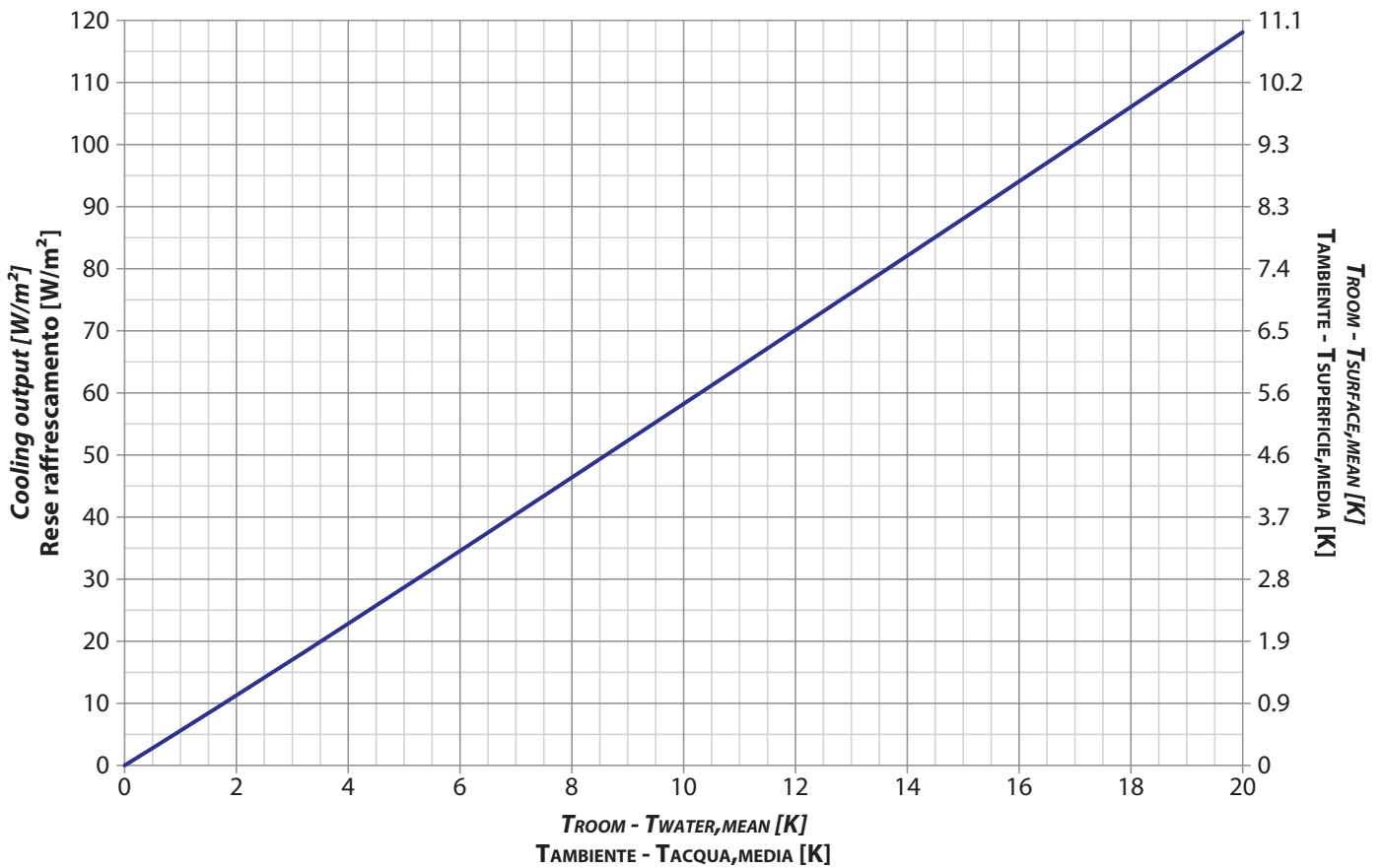


## 6 RESIDENTIAL CEILING COOLING - RAFFRESCAMENTO SOFFITTO RESIDENZIALE

### 6.1 B!KLIMAX

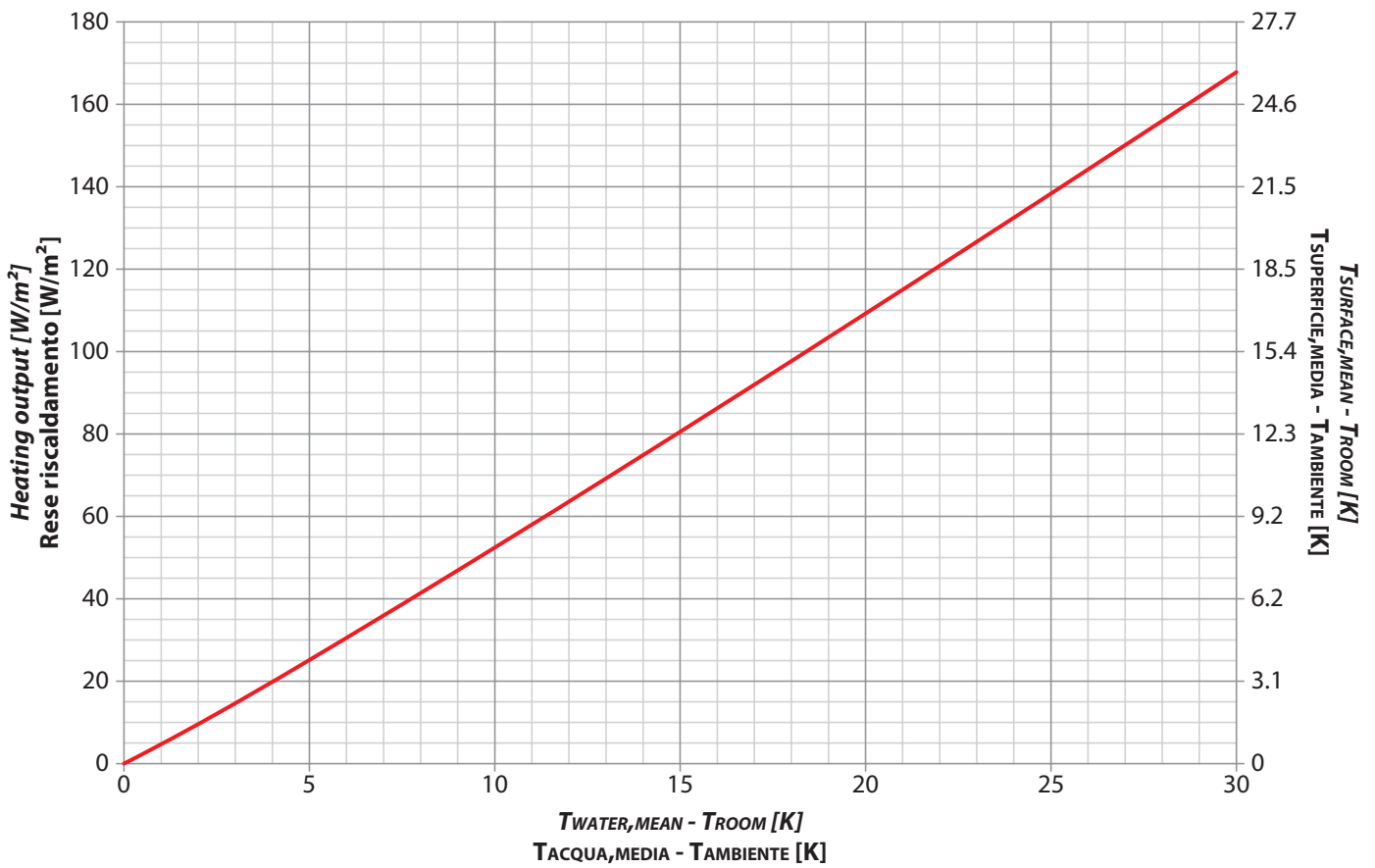


### 6.2 B!KLIMAX+

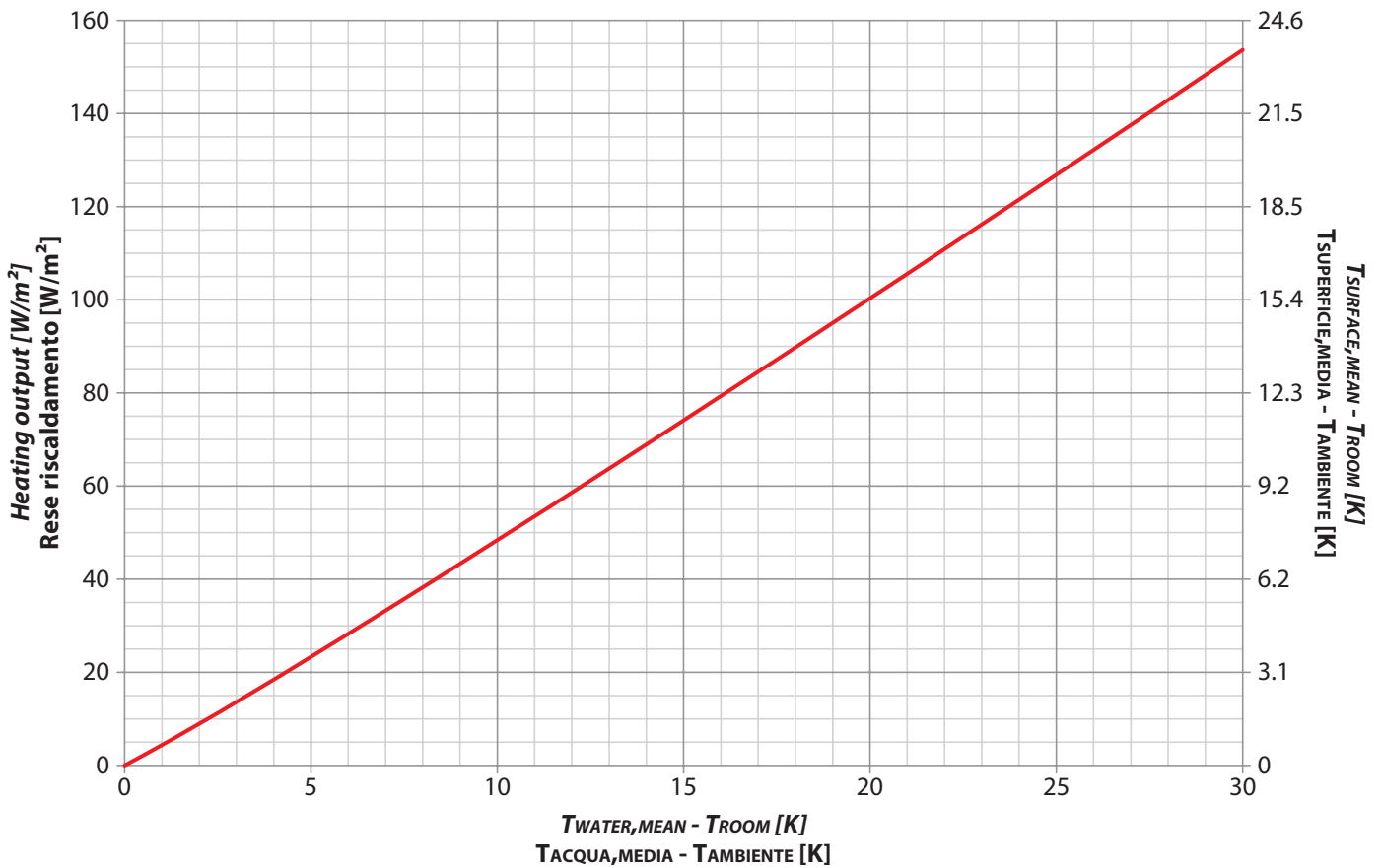


## 7 NON-RESIDENTIAL CEILING HEATING - RISCALDAMENTO SOFFITTO TERZIARIO

### 7.1 QUADROTTO

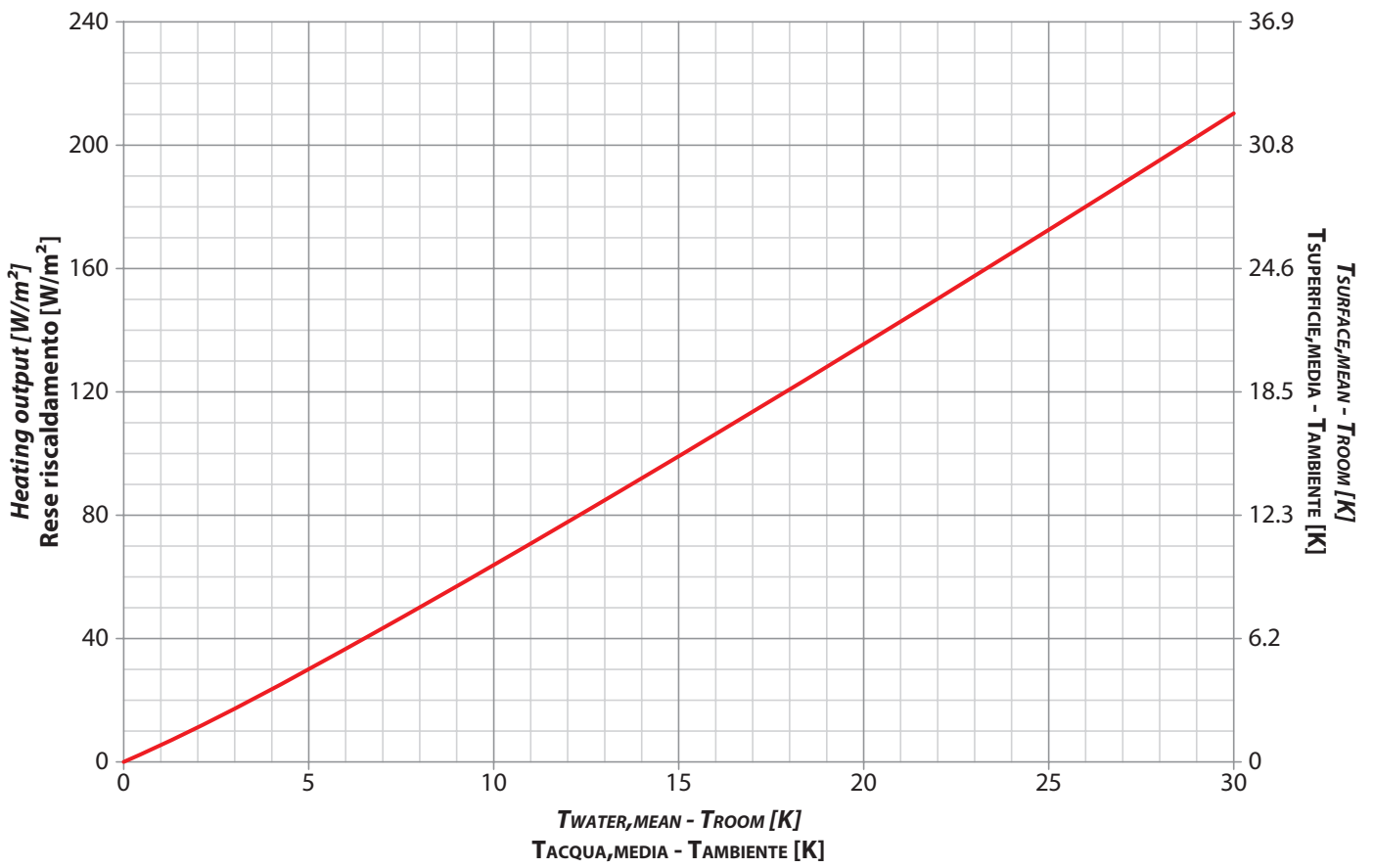


### 7.2 QUADROTTO CARTONGESSO

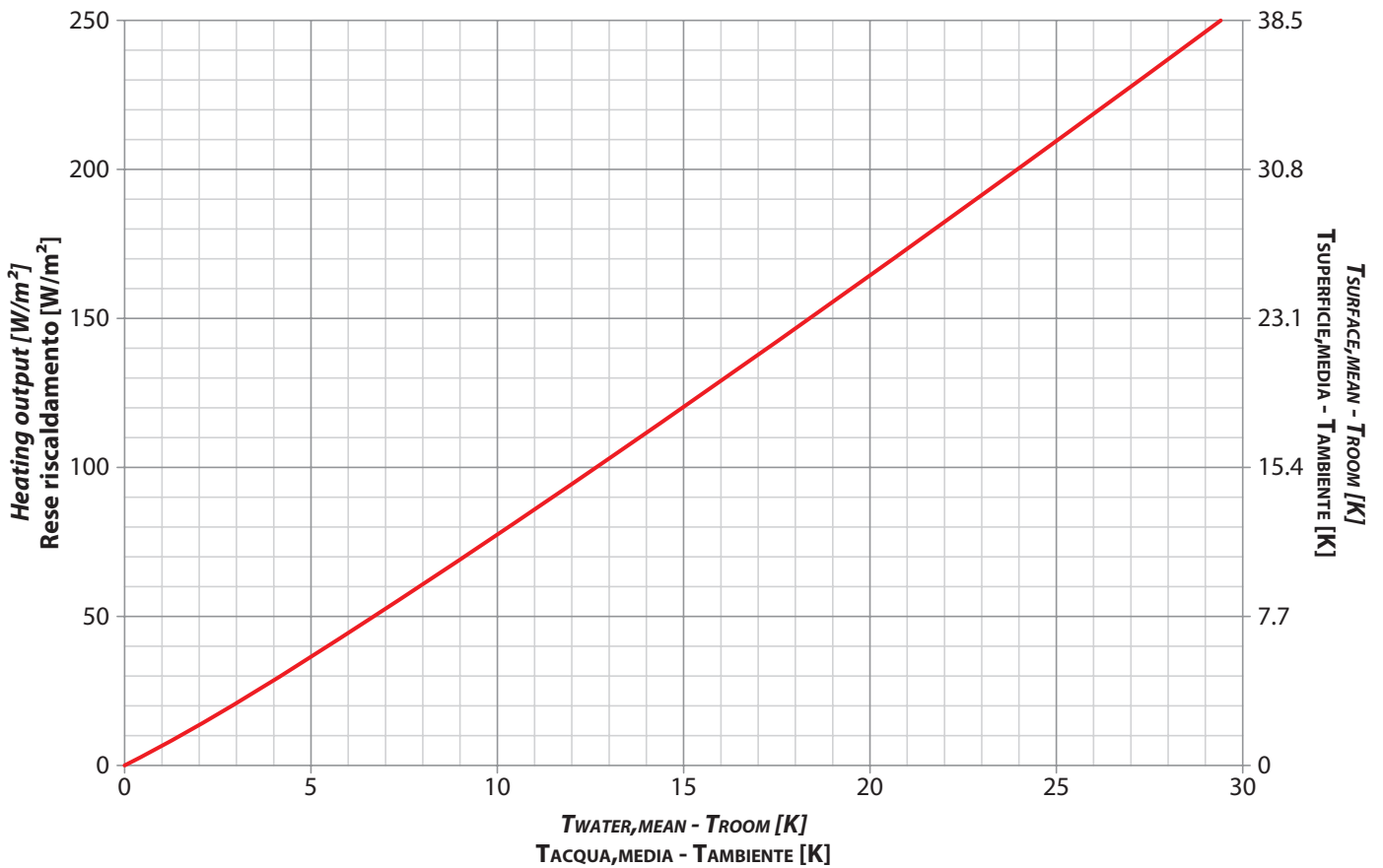




### 7.3 QUADROTTO HP

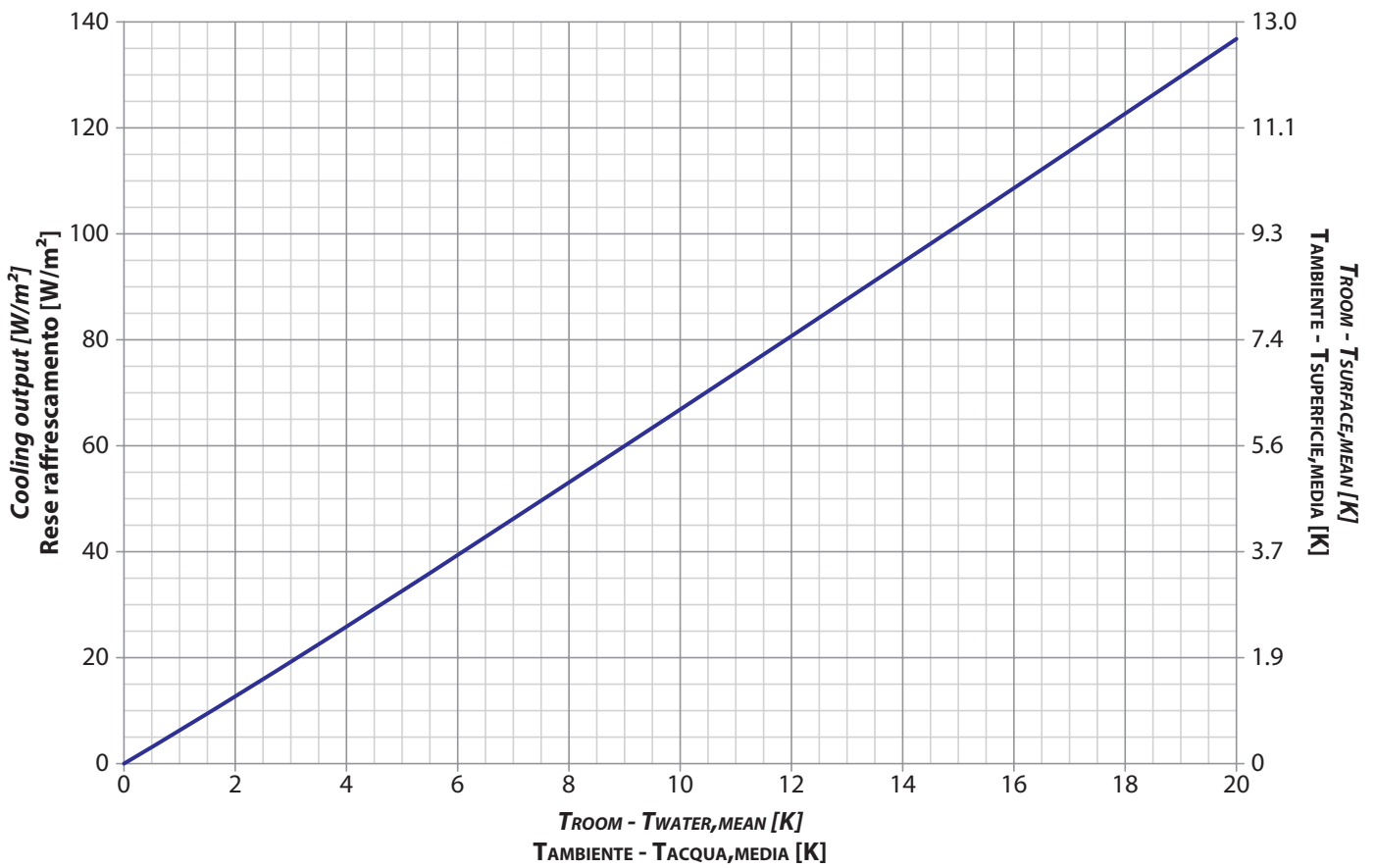


### 7.4 COPPER 8

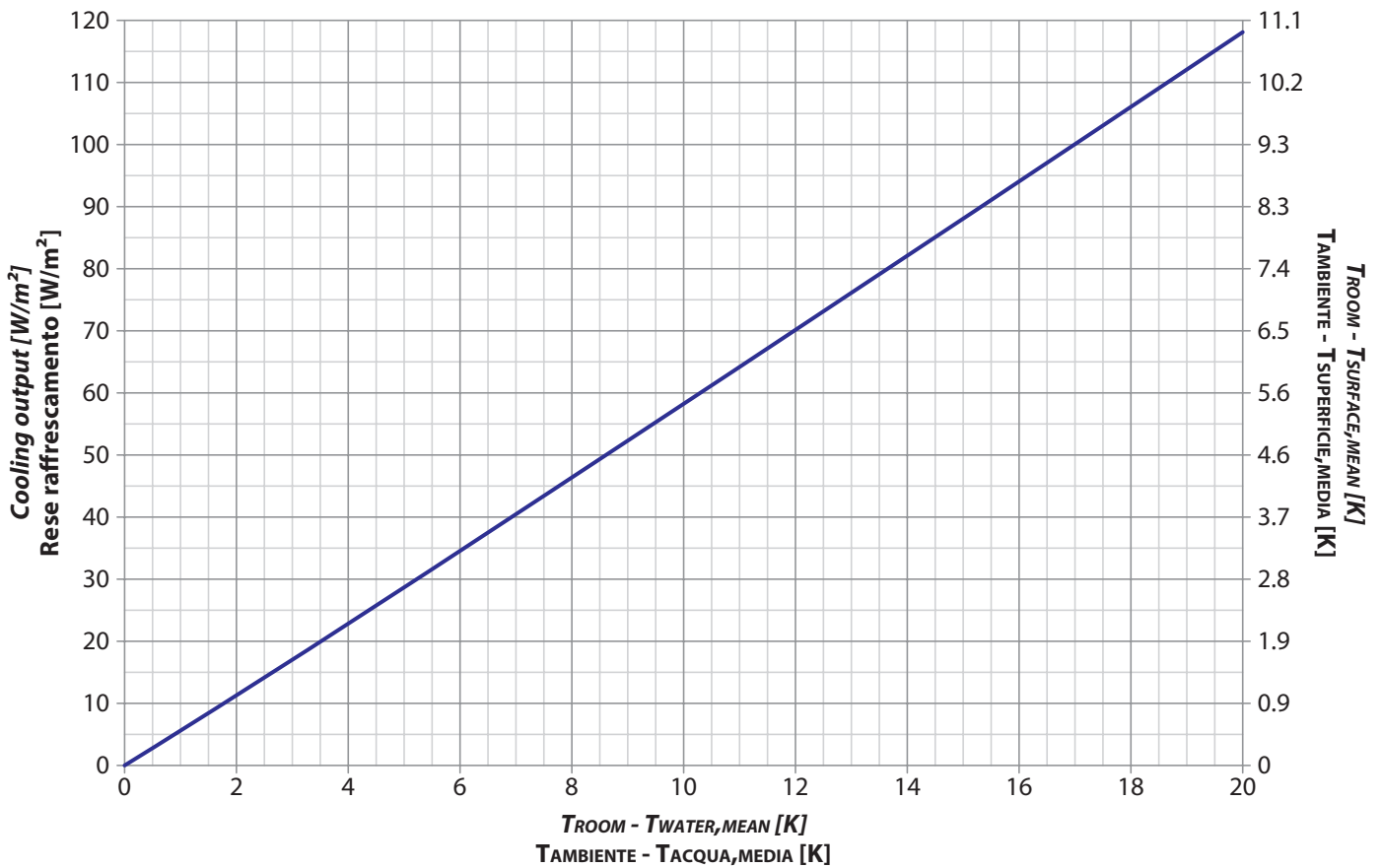


## 8 NON-RESIDENTIAL CEILING COOLING - RAFFRESCAMENTO SOFFITTO TERZIARIO

### 8.1 QUADROTTO

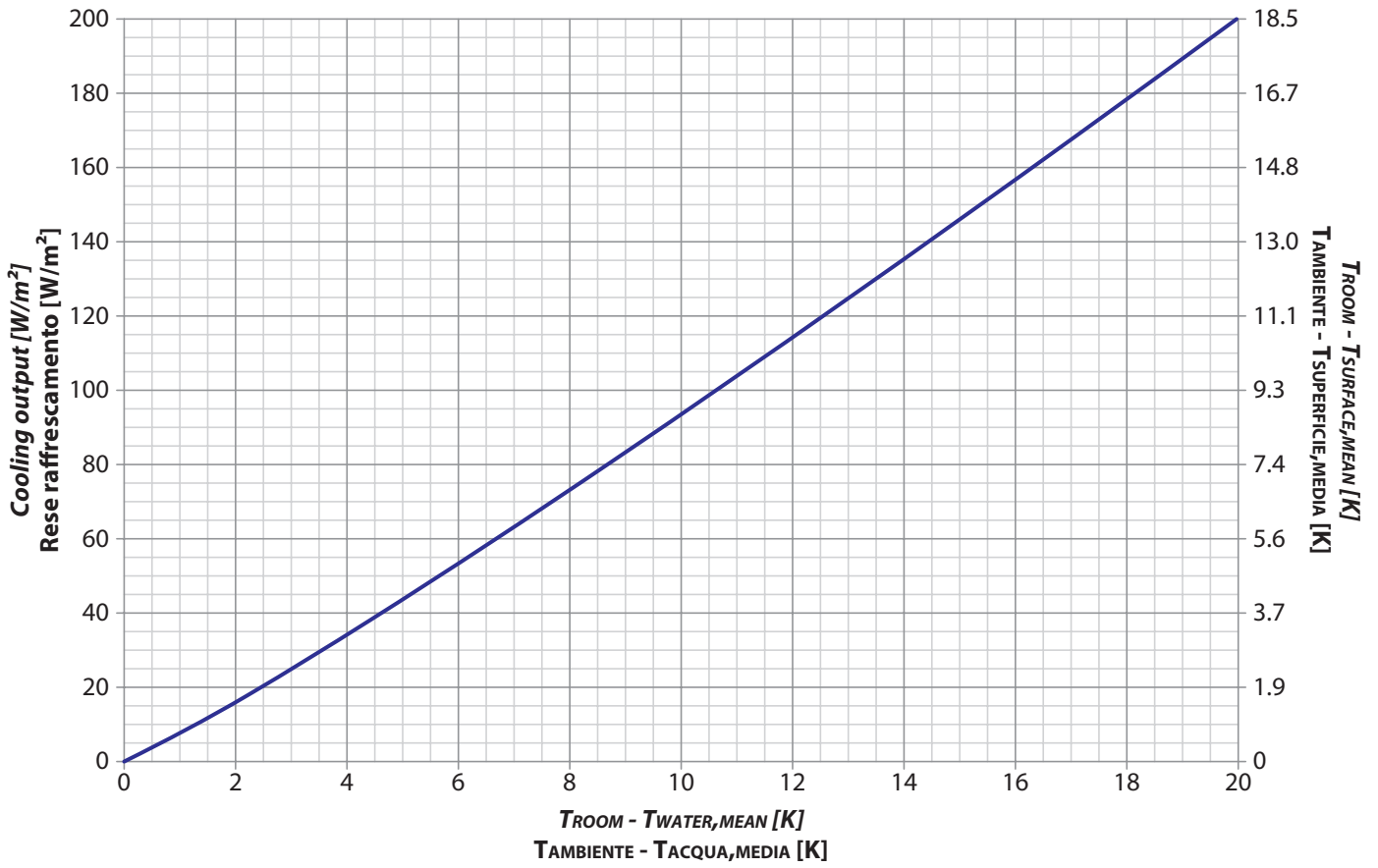


### 8.2 QUADROTTO CARTONGESSO

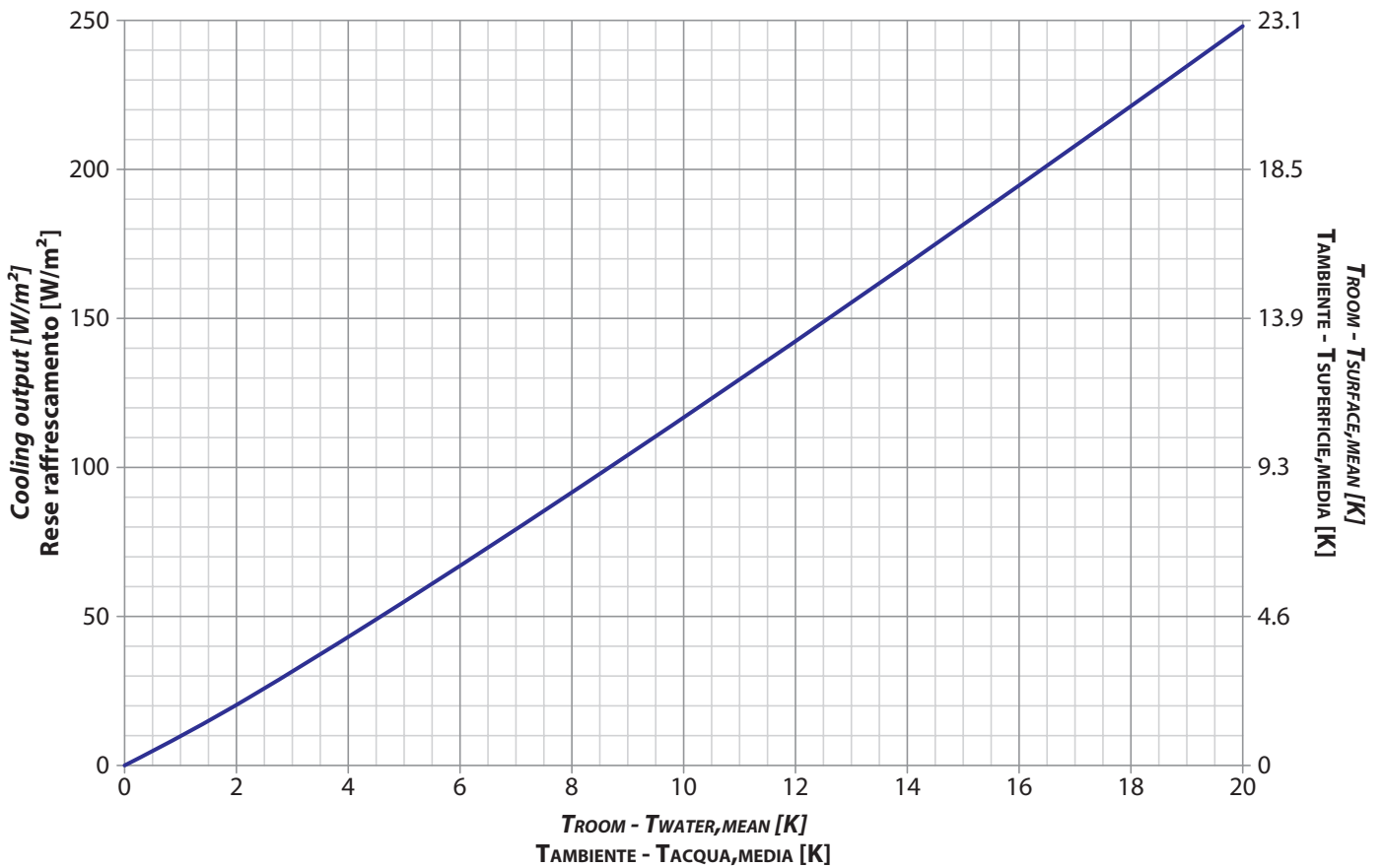




### 8.3 QUADROTTO HP

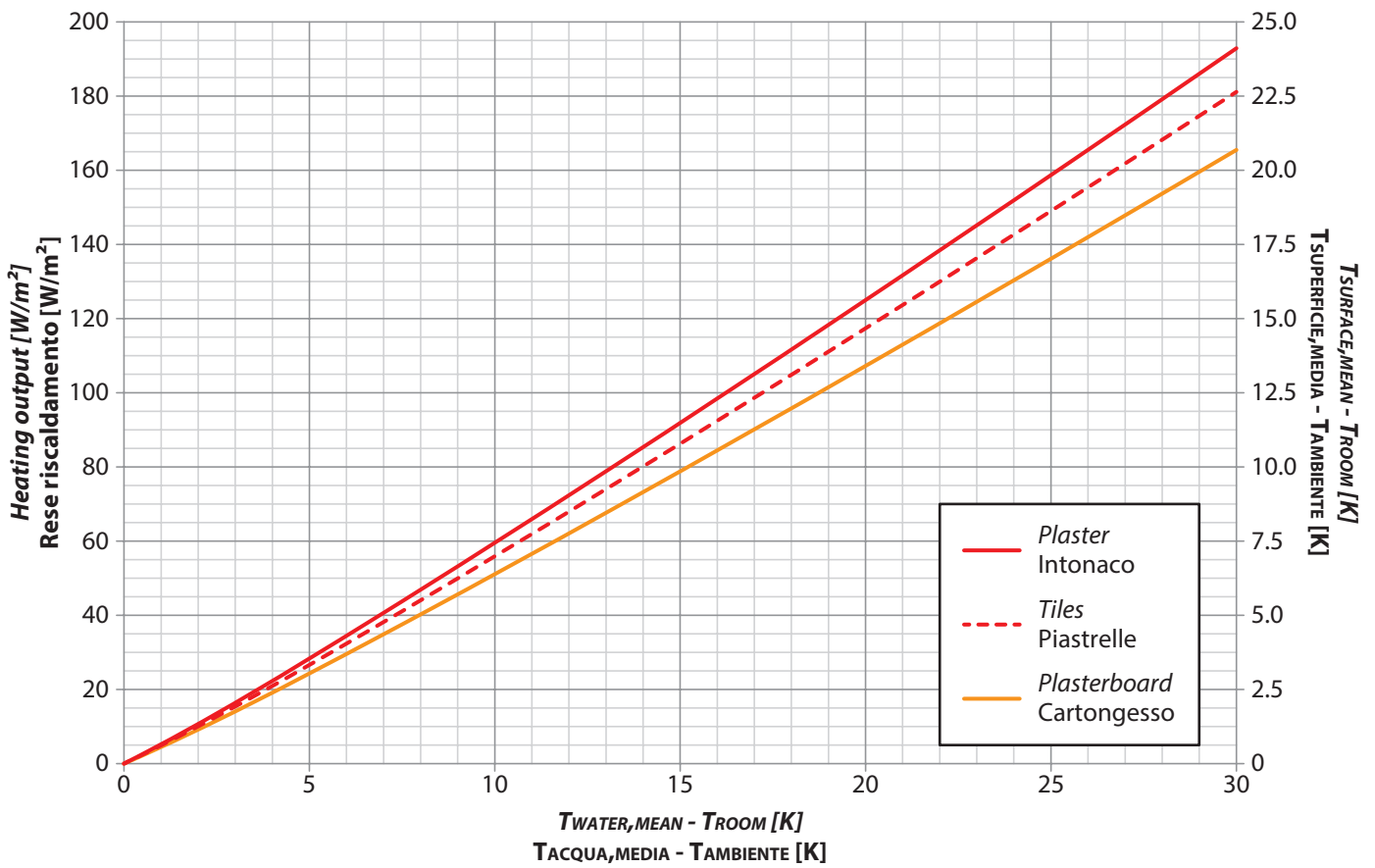


### 8.4 COPPER 8

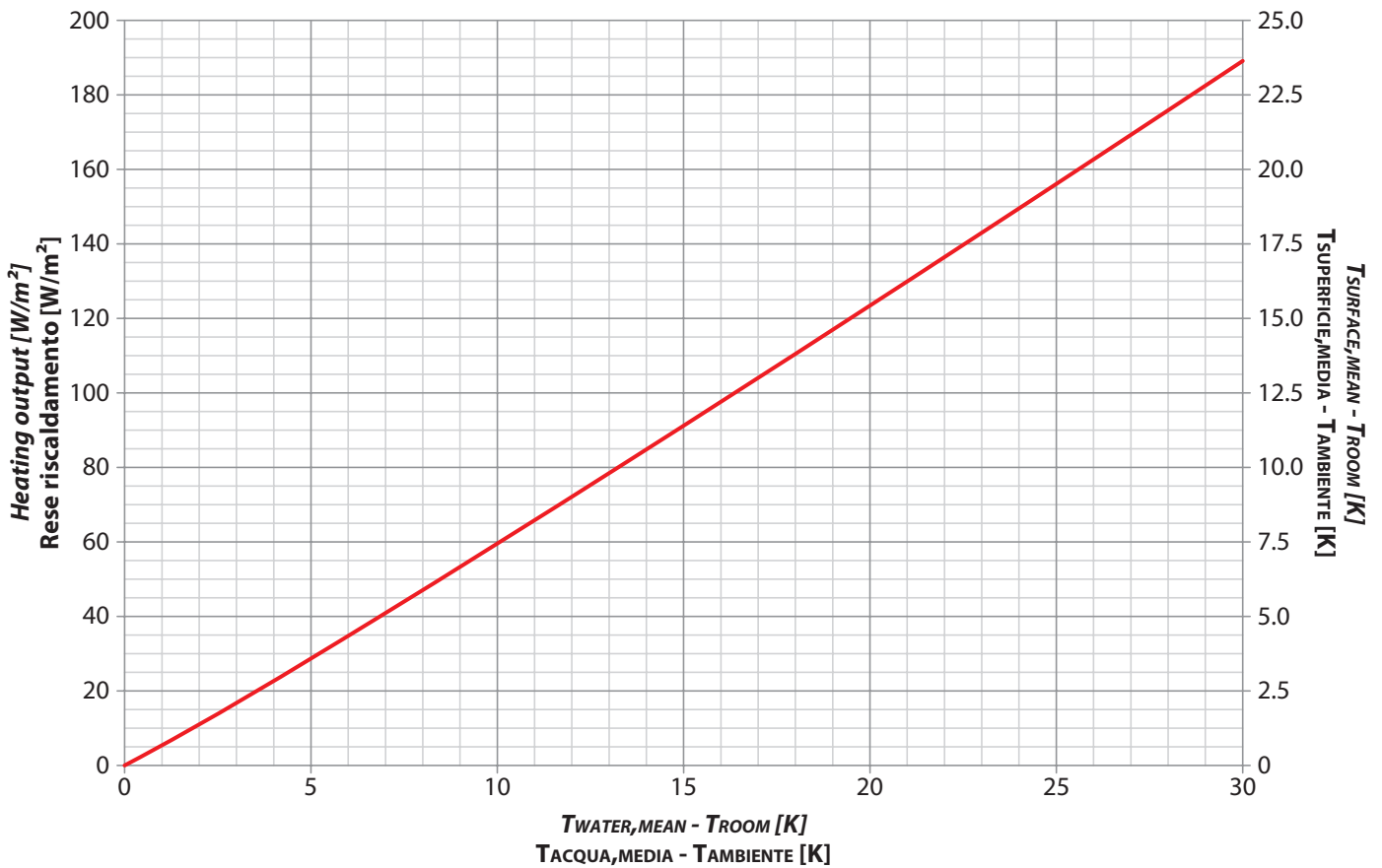


## 9 RESIDENTIAL WALL HEATING - RISCALDAMENTO PARETE RESIDENZIALE

### 9.1 B!KLIMAX

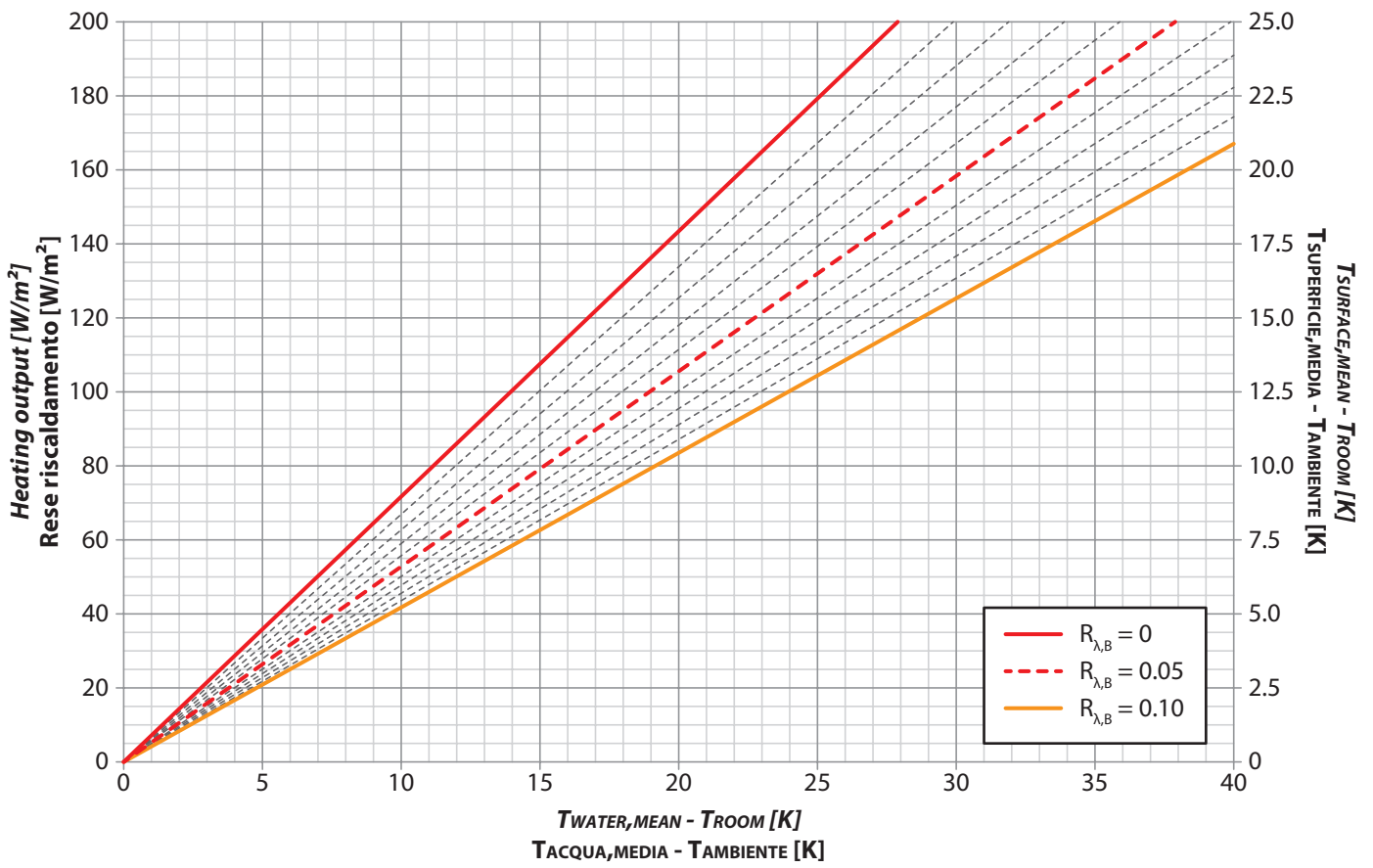


### 9.2 B!KLIMAX+



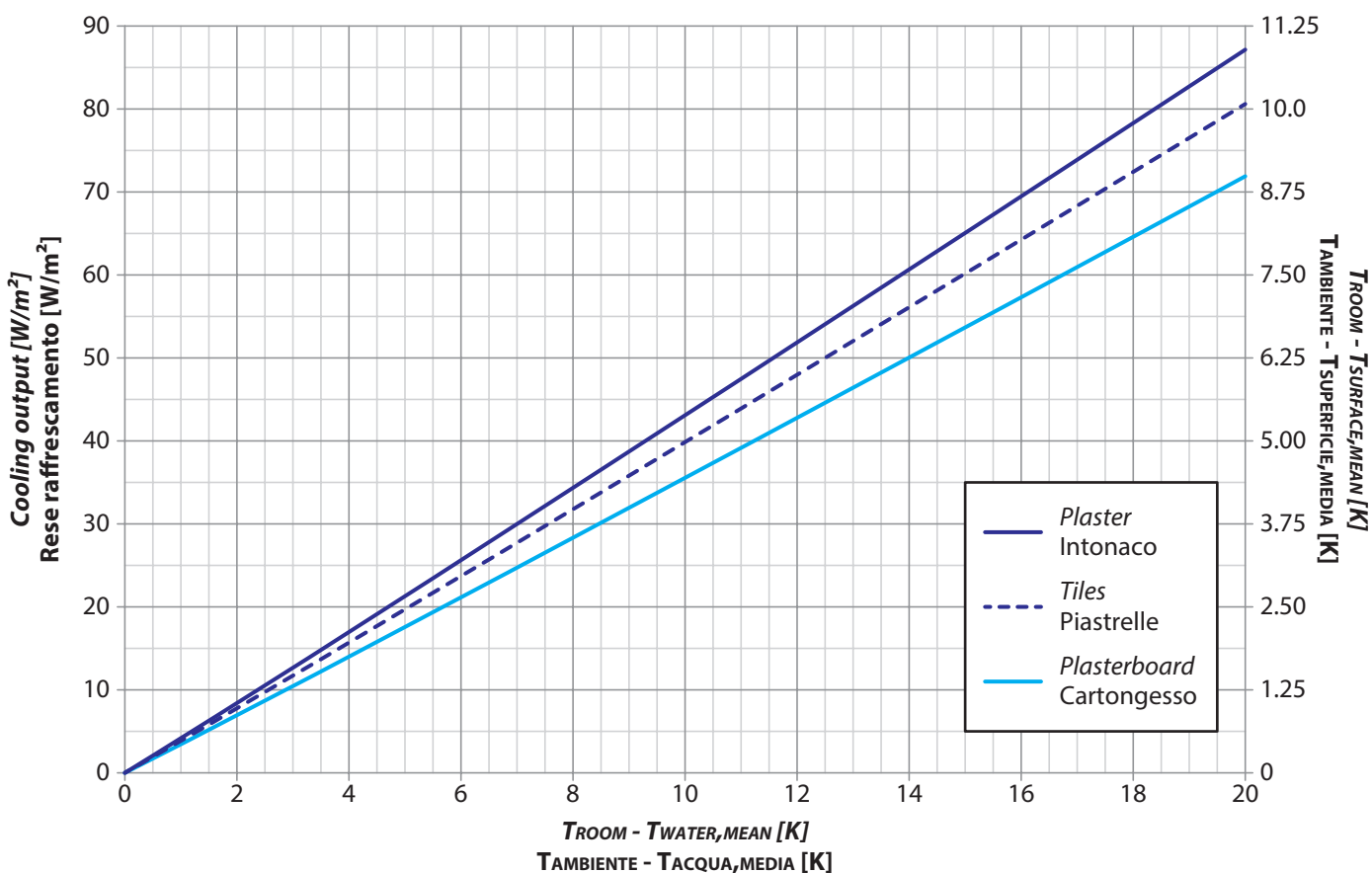


### 9.3 CLIMAWALL

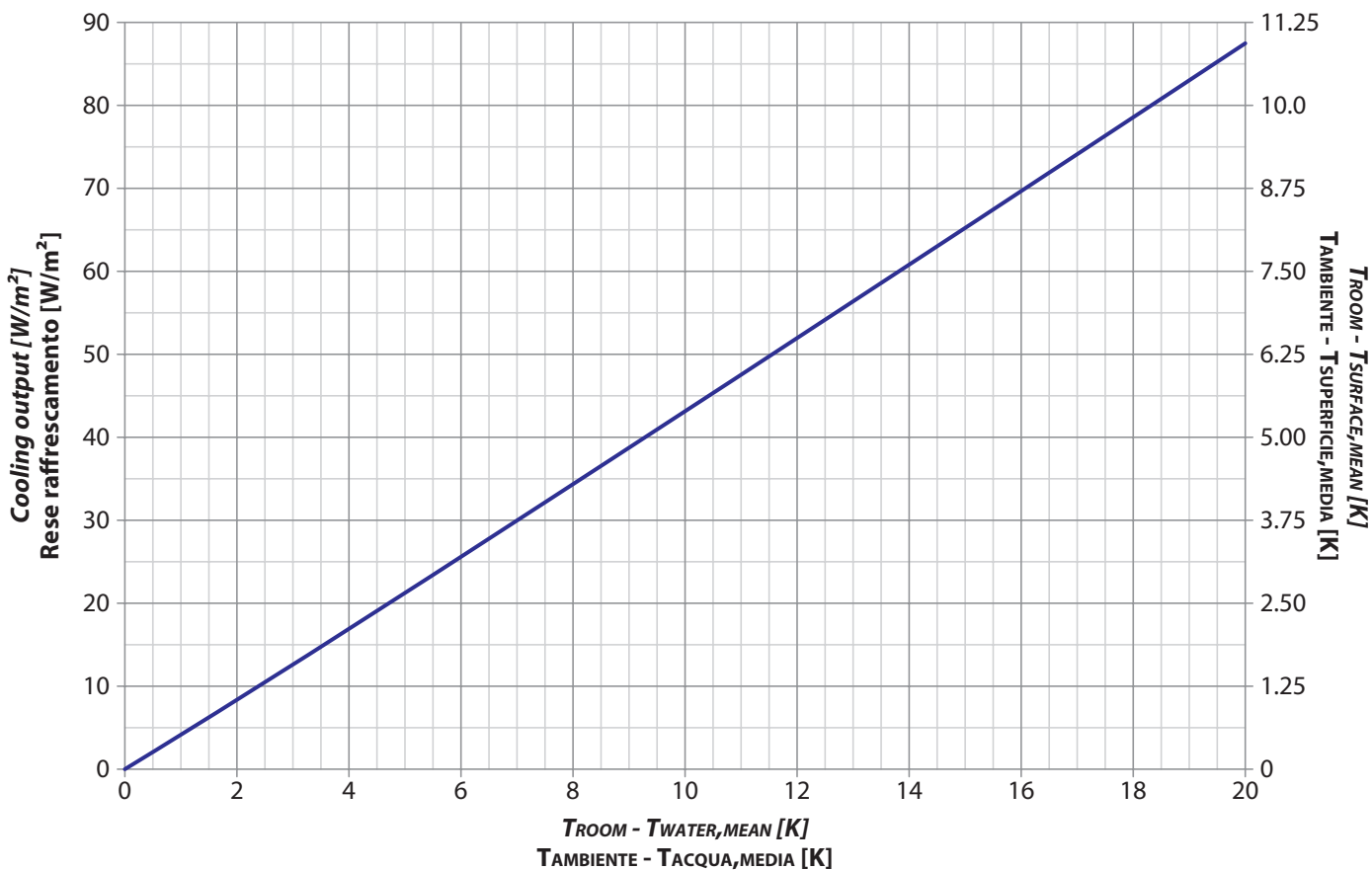




10.1 B!KLIMAX

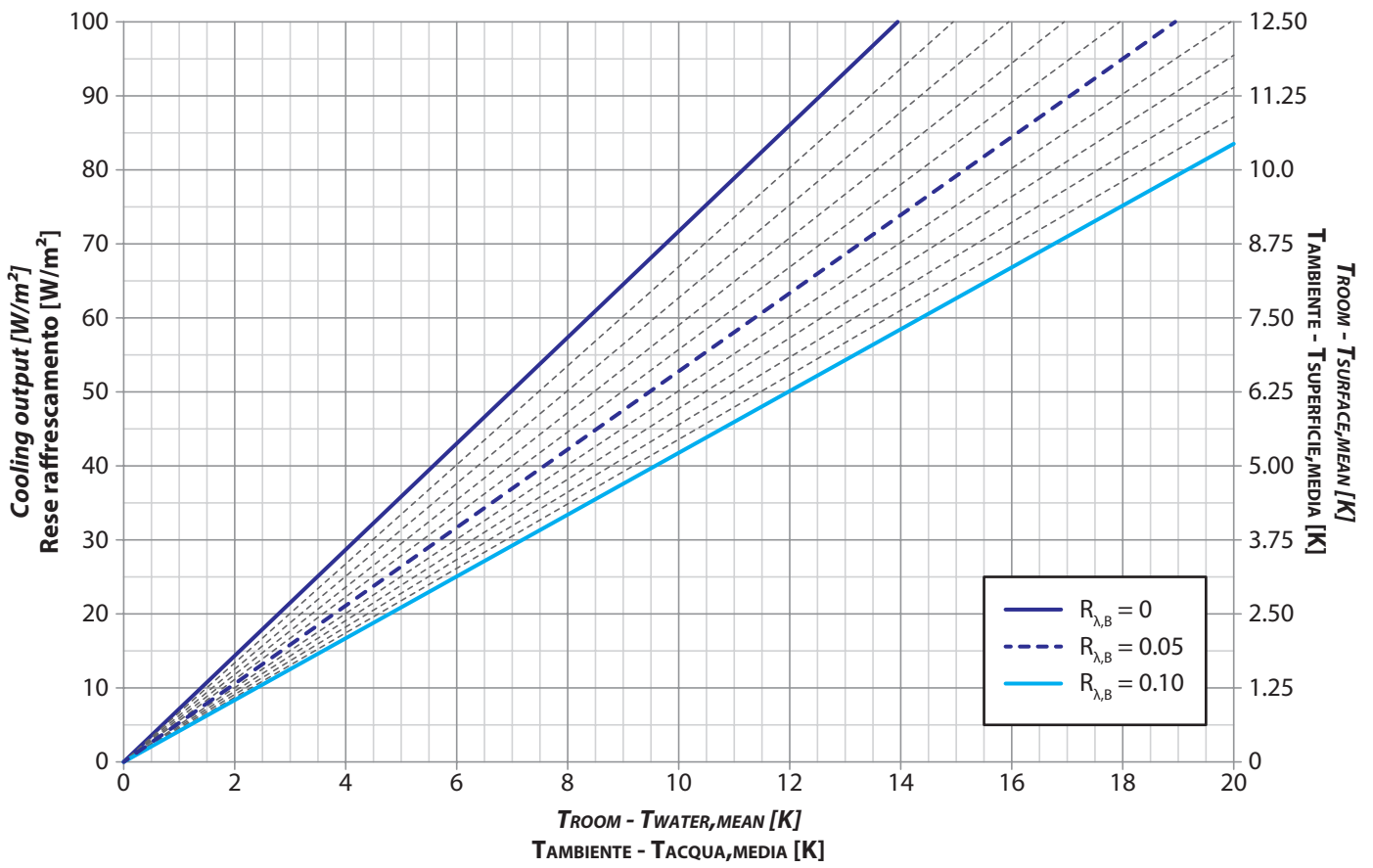


10.2 B!KLIMAX+





### 10.3 CLIMAWALL











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