

# AX3000 HEATING



Building services engineering

Authorized reseller

**3UNITS**  
TECHNOLOGY

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What makes AX3000 different?



# What makes AX3000 different?

- AX3000 is available as Plug-In for
  - BricsCAD V17-V20
  - Allplan 2017-2019
  - AutoCAD 2017-2020
- All versions and platforms are 100% compatible
- Easy interface enables quick training
- Work in CAD with familiar functions
- ONE tool for all planning phases
- ONE intuitive program workflow with both:  
Easyline (1-line dimensioning)  
AND  
construction



# What makes AX3000 different?

- Innovation and competence
- Own calculation kernel / own calculations
- Trace calculation stages separately – calculations without interfaces
- Graphical check of the building elements
  - everything is testable
  - detect errors immediately
- AX3000 integrates everything from standardized parts lists, graphical fitting lists to CNC-manufacturing lists
- Graphical presentation:
  - Holohedral (filled), black-and-white, no fill
  - with and without hidden edges

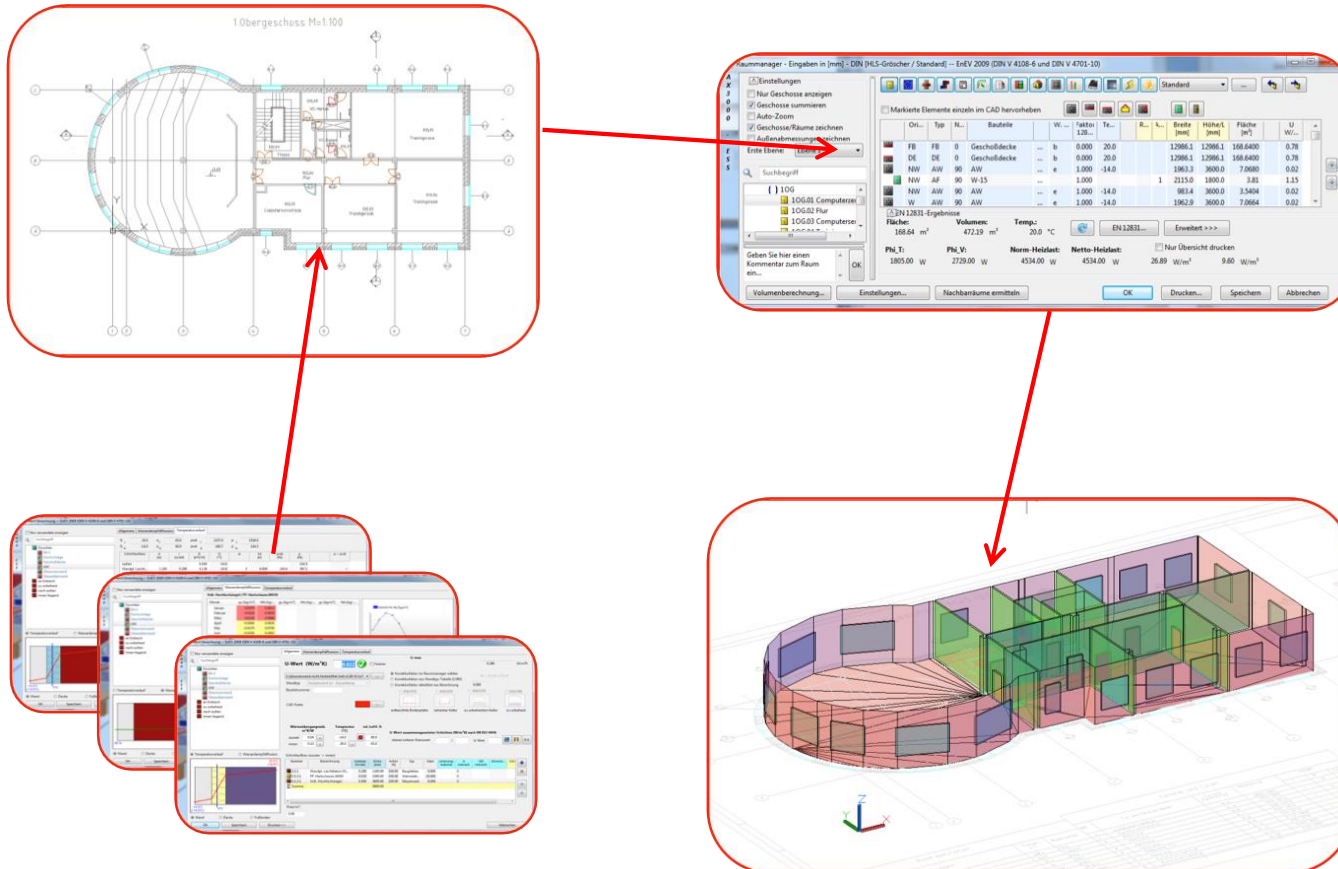
# Main Advantages of AX3000



# Main Advantages of AX3000

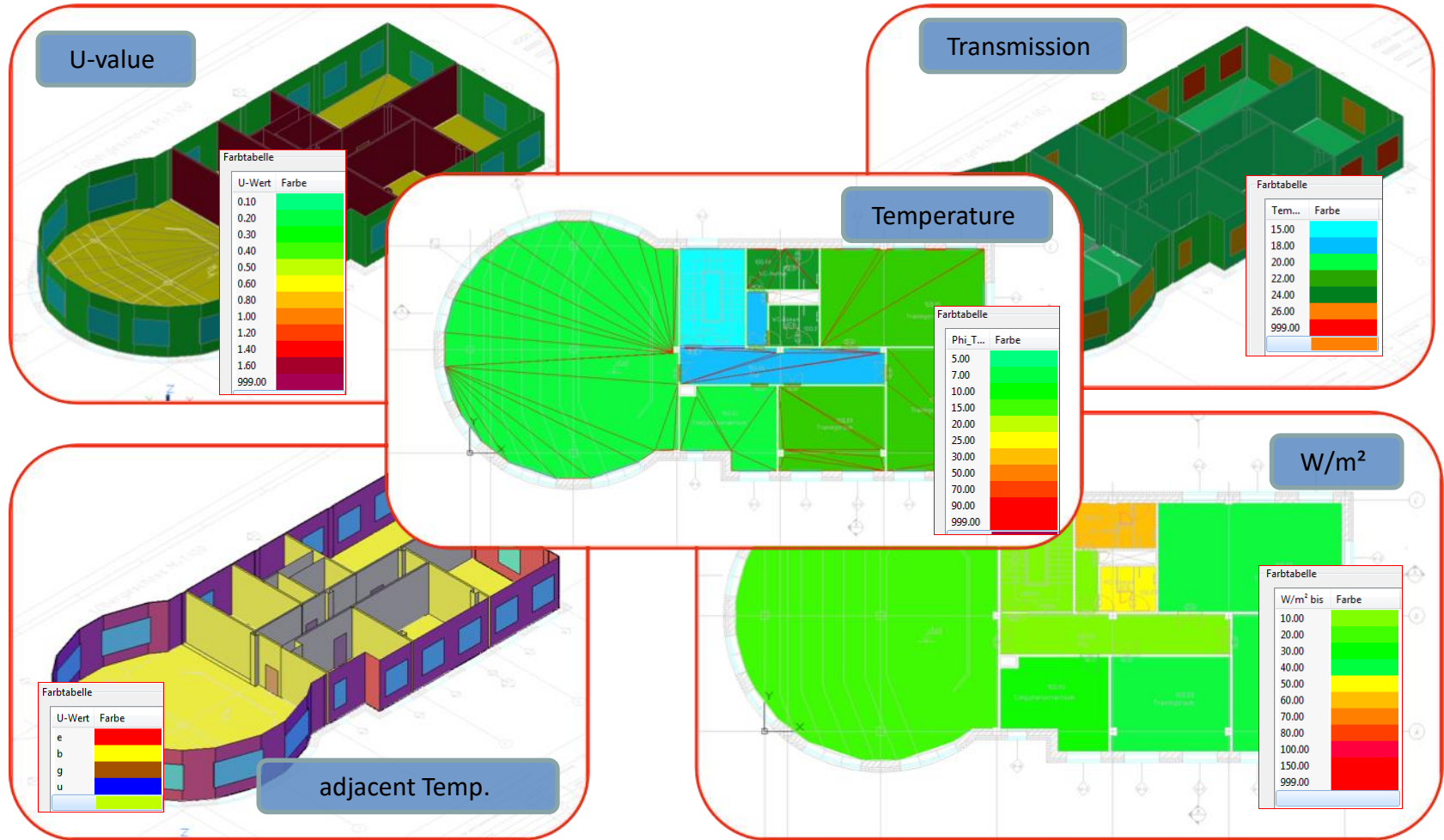
1. Calculate load's directly in the CAD system
2. Graphical analysis of the calculations
3. Radiator placement and floor heating
4. Easy planning with „Easyline“ (1-line dimensioning)
5. Use the „normal“ CAD drawing functions
6. Generate pipe networks in various variants
7. Analysis and calculation of pipe networks with regulation
8. Construction and detailed planning
9. Generate lists in Excel
10. Overall drawing workflow
11. Total compatibility among CAD systems

# Main Advantages of AX3000



Calculate heating load directly in the CAD system

# Main Advantages of AX3000



Graphical analysis of the calculation



# Main Advantages of AX3000

The screenshot displays the AX3000 software interface for heating system design. It includes a 3D model of a building with heating pipes, a detailed radiator placement table, and a room temperature overview graph.

**Heating area placement acc. to VDI 6030**

Project: Aliplan Haustechnik v2008  
Date: 18.03.2011  
Exterior temp.: -3 °C  
HRM structure

Flowtemperature: 65 °C		Return temperature: 55 °C													
Room	Area	Flow	Return	Flow	Return	Flow	Return	Flow	Return	Flow	Return	Flow	Return	Flow	Return
00	3.8	11.3	65.0	55.0	40.0	Typ 10	0.800	0.800	0.081	754	482	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.800	0.800	0.081	421	421	---	---	---	---
00	3.8	11.3	65.0	45.0	34.0	Typ 10	0.700	0.700	0.081	120	421	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.700	0.700	0.081	421	421	---	---	---	---
00	3.8	11.3	65.0	47.4	36.2	Typ 10	0.700	0.800	0.081	620	421	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.700	0.700	0.081	421	421	---	---	---	---
00	3.8	11.3	65.0	38.4	32.2	Typ 10	0.700	0.800	0.081	620	421	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.700	0.700	0.081	421	421	---	---	---	---
00	3.8	10.7	65.0	43.6	34.3	Typ 10	0.700	0.800	0.081	930	421	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.700	0.700	0.081	421	421	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.700	0.700	0.081	421	421	---	---	---	---
00	3.8	9.7	65.0	43.6	34.3	Typ 10	0.700	0.800	0.081	120	421	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.800	0.800	0.081	710	482	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.800	0.800	0.081	482	482	---	---	---	---
00	3.8	10.7	65.0	38.4	32.2	Typ 10	0.800	0.800	0.081	710	482	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.800	0.800	0.081	482	482	---	---	---	---
00	4.4	20.1	65.0	36.2	40.6	Typ 12	1.000	0.800	0.084	1312	1239	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 12	1.000	0.800	0.084	1239	1239	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.700	0.700	0.081	421	421	---	---	---	---
00	3.8	11.3	65.0	44.2	34.6	Typ 10	0.700	0.800	0.081	120	421	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.700	0.700	0.081	421	421	---	---	---	---
00	3.8	10.7	65.0	43.6	34.3	Typ 10	0.700	0.800	0.081	930	421	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.700	0.700	0.081	421	421	---	---	---	---
00	65.0	65.0	65.0	65.0	65.0	Typ 10	0.700	0.700	0.081	421	421	---	---	---	---
00	4.0	9.8	65.0	42.1	33.0	Typ 10	0.700	0.800	0.081	1310	421	---	---	---	---

$t_r$  ... Return temperature  
 $t_{r, \text{reached}}$  ... Reached over temp. Of heating area  
 $t_{\text{type}}$  ... Type of radiator  
 $L_{\text{rad}}, H_{\text{rad}}, T_{\text{rad}}$  ... Radiator: height, length, width  
 $\eta$  ... Heat efficiency of all HR of a room  
 Keraq 755522 ... selected catalog performance (7555/20)

**Übersicht VL-Temperaturen**

Teilungen: 13 | 25 °C

20G.01 WC  
 20G.02 Büroruum  
 20G.03 Büroruum  
 20G.04 Büroruum  
 20G.05 Büroruum  
 20G.06 Flur  
 20G.07 WC  
 20G.08 WC  
 20G.09 Treppe  
 20G.10 WC

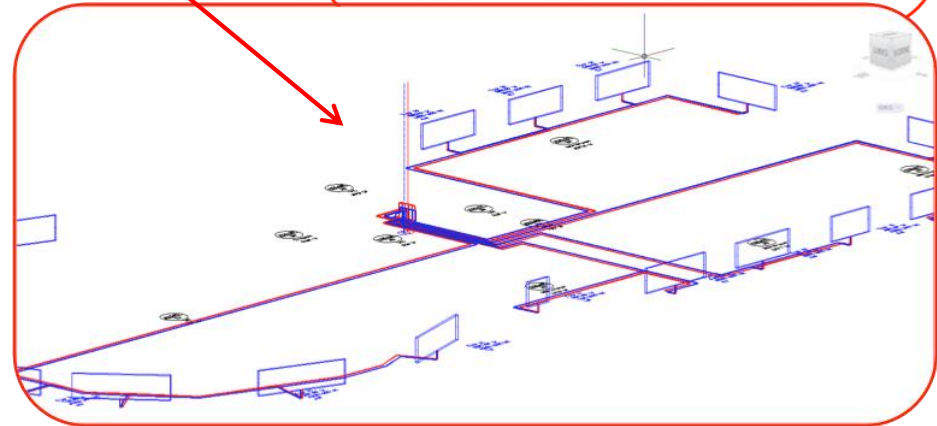
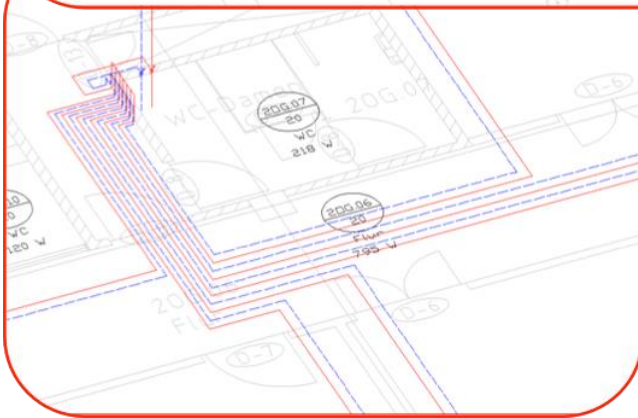
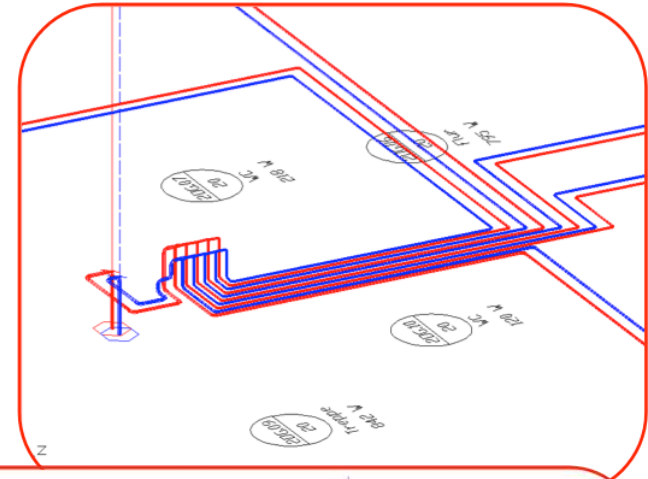
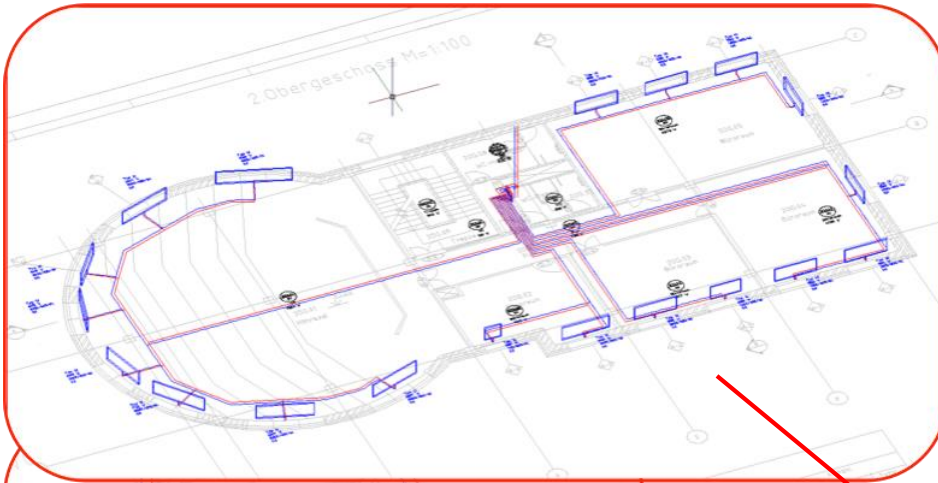
Berechnete VL-Temperatur: 47.40 °C  
 Verwendete VL-Temperatur: 50.00 °C

Hersteller: ke-keilt trocken/ke-keilt\_Platte  
 Material: ke-keilt Heizungsrohr 14

## Radiator placement and floor heating

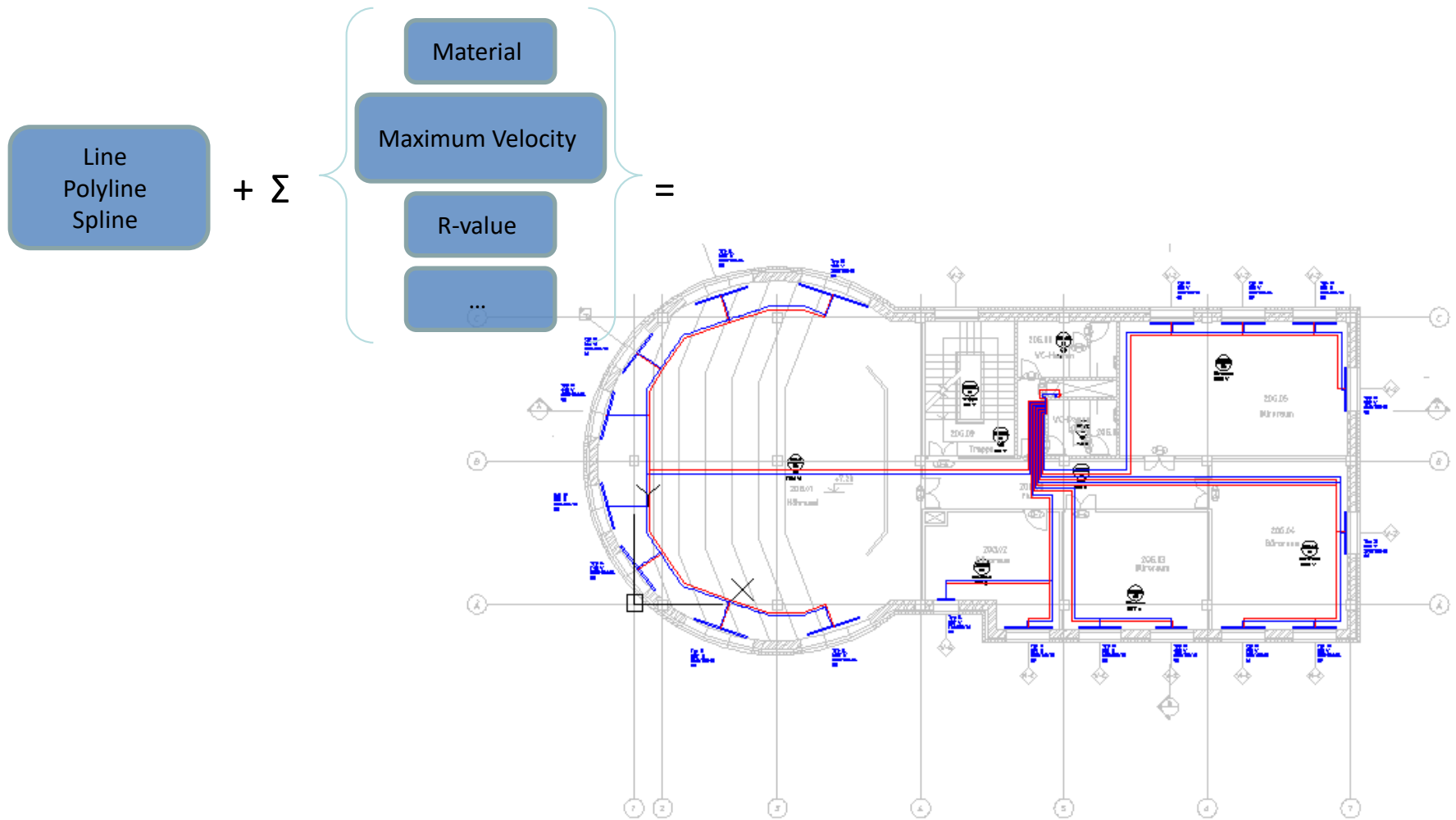


# Main Advantages of AX3000



Easy planning with “Easyline”

# Main Advantages of AX3000



# Main Advantages of AX3000

## PIPETNET CALCULATION

Project: Wärmebedarf  
 Customer:  
 Order No.:  
 Project: C:\Users\Admin\Desktop\Zeichnungen\Wärmebedarf  
 Dno.:  
 Material: MA Stahlrohr Density: 983  
 Roughness: 0,0450  
 Originator:  
 Date/Time: 17. März 2011  
 System: ax-H\_VL  
 FLJRT: 60|25

Valve setting data Dia 15 dp/VL 2417 Pa dp/Valve 2350 Pa kvs: 0,20  
 8,0 dp/PRL 24

Track	Name	Dimensions (mm)				
		L/s	d1	d2	d3	di
EG.004						
	kermi					
	Typ 10					
	Profil-Kompakt					
	700/600/61					
	Danfoss					
	RA-N 15 with sensor R					
8,0	Line	15				
8,1	Line	100	15			16
8,2	Branch	1703	15			16
2,10	Tee (Passage)	2390	20			21
2,11	Tee (Passage)	2390	20			21
2,12	Tee (Passage)	2390	20			21
2,13	Tee (Passage)	2390	20			21
2,14	Tee (Passage)	2390	20			21
2,15	Tee (Passage)	2390	20			21
2,16	Tee (Passage)	2390	20			21
2,17	Line	4740	20			21
2,18	Line	3443	20			21
2,19	Line	5999	20			21

Track sum flow:

Track	Name	Dimensions (mm)				
		L/s	d1	d2	d3	di
EG.004						
	kermi					
	Typ 10					
	Profil-Kompakt					
	700/600/61					
	Danfoss					
	RA-N 15 with sensor R					
8,0	Line	15				
8,1	Line	120	15			16
8,2	Line	1217	15			16
8,3	Branch	20	15			16
2,11	Tee (Passage)	2390	20			21
2,12	Tee (Passage)	2390	20			21
2,13	Tee (Passage)	2390	20			21
2,14	Tee (Passage)	2390	20			21
2,15	Tee (Passage)	2390	20			21

## PIPETNET CALCULATION

Project: Wärmebedarf  
 Customer:  
 Order No.:  
 Project: C:\Users\Admin\Desktop\Zeichnungen\Wärmebedarf  
 Dno.:  
 Material: MA Stahlrohr Density: 983  
 Roughness: 0,0450  
 Originator:  
 Date/Time: 17. März 2011  
 System: ax-H\_VL  
 FLJRT: 60|25 °C

Valve setting data Dia 15 dp/VL 2926 Pa dp/Valve 1332 Pa kvs: 0,26  
 5,0 dp/PRL 2978 Pa Setting: 4,61

Track	Name	Dimensions (mm)				Performance Watt	Veloc. kg/h	R m/s	Zeta Palm	Kvs m³/h	Pre. Loss EBT	Pressure loss	
		L/s	d1	d2	d3							di	separate Pa
EG.005													
	kermi												
	Typ 10												
	Profil-Kompakt												
	700/600/61												
	Danfoss												
	RA-N 15 with sensor R												
5,0	Line	15				1225	30			0,3			
5,1	Line	100	15			1225		0,04	3,1		0,3	0,3	
5,2	Branch	1703	15			1225		0,04	3,1	7,0	11,6	12,0	
2,7	Tee (Passage)	2390	15			6125		0,21	51,3	0,0	122,7	134,7	
2,8	Tee (Passage)	2390	15			7350		0,25	71,2	0,0	170,2	304,7	
2,9	Tee (Passage)	2390	15			8575		0,30	94,1	0,2	225,0	529,9	
2,10	Tee (Passage)	2390	20			6800		0,20	31,6		75,6	665,5	
2,11	Tee (Passage)	2390	20			11025		0,22	39,1		93,4	698,8	
2,12	Tee (Passage)	2390	20			12250		0,25	47,2		112,9	811,7	
2,13	Tee (Passage)	2390	20			13475		0,27	56,1		134,1	945,7	
2,14	Tee (Passage)	2390	20			14700		0,30	65,7		157,0	1102,8	
2,15	Tee (Passage)	2390	20			15925		0,32	76,0		181,6	1264,6	
2,16	Tee (Passage)	2390	20			17150		0,34	87,0		207,9	1492,3	
2,17	Line	4740	20			18375		0,37	98,7		467,8	1960,1	
2,18	Line	3443	20			18375		0,37	98,7		339,9	2300,0	
2,19	Line	5999	20			18375		0,37	98,7	0,5	626,2	2926,2	

Track sum flow: 2926,2 Pa

1225	0,04	3,1	15,7	15,0
8900	0,20	31,6		75,6
11025	0,22	39,1		93,4
12250	0,25	47,2		112,9
13475	0,27	56,1		134,1
14700	0,30	65,7		157,0

## VALVE SETTING

Project: Büro\_2d\_leer\_recover  
 Customer: AX-3000  
 Date/Time: 17. März 2011

Order no.:  
 Project:  
 Dno.:  
 System: H\_VL

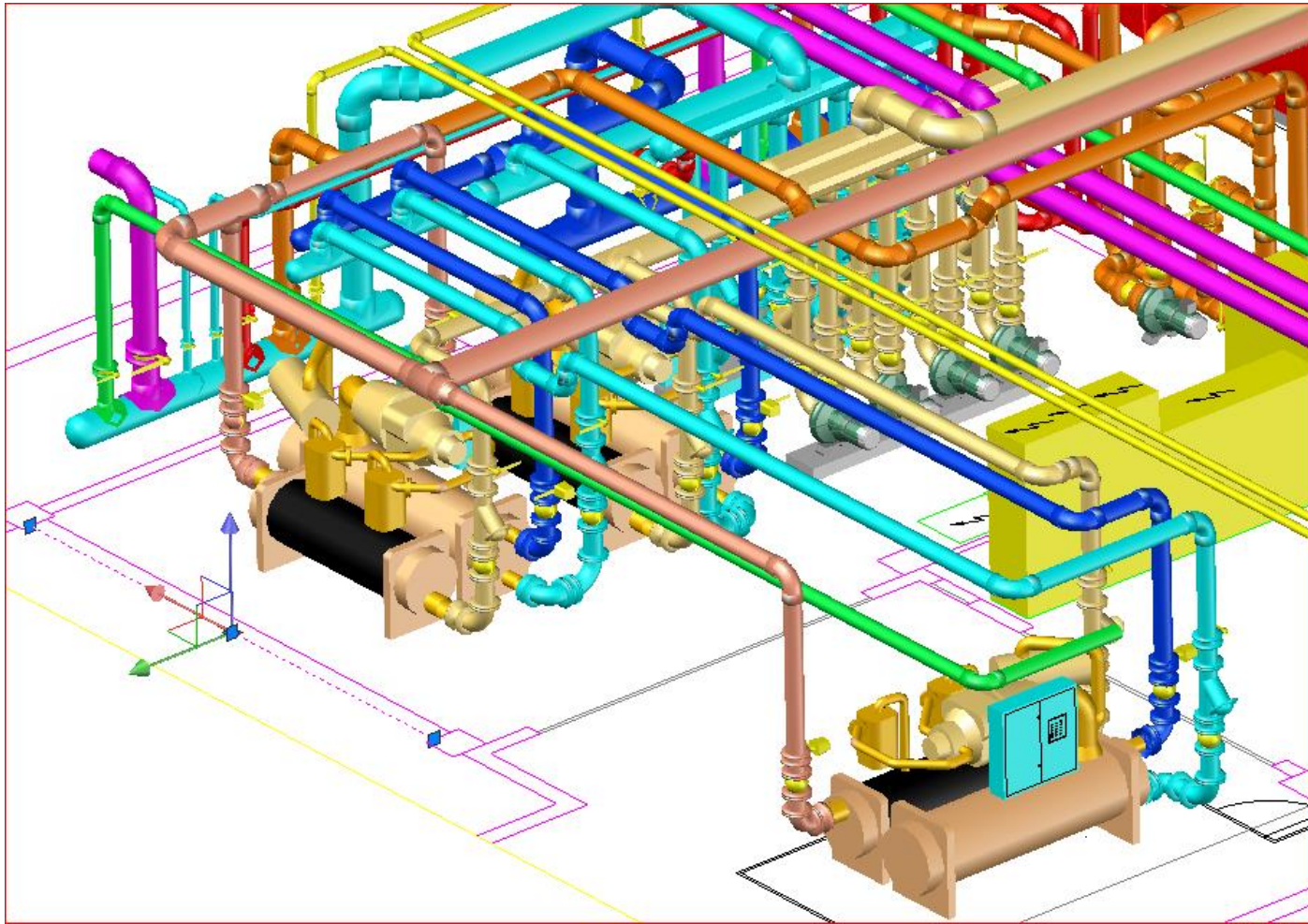
Material: MA Kupfer  
 FLJRT: 75 65 °C  
 Roughness: 0,0015 mm  
 Density: 975 kg/m³  
 Entire pressure loss: 9722 pa  
 1,00 mWs  
 Entire performance: 12231  
 1,05 m³/h

Name	Dia mm	Vent Pa	FL Pa	RT Pa	Kv	Setting	Performance	
							Watt	
1.001	Buderus 2008-07							
	Typ 10							
	Logatrend K-Profil							
	800/600/65							
	Danfoss							
	RA-N 15 with sensor RA 2							
	1,0	15	1189	4269	4263	0,40	6,0	506
1.001	Buderus							
	Typ 10							
	Logatrend K-Profil							
	800/600/65							
	Danfoss							
	RA-N 15 with sensor RA 2							
	2,0	15	1211	4258	4252	0,40	6,0	506
1.002	kermi							
	Typ 11							
	Profil-Kompakt							
	1000/600/61							
	Danfoss							
	RA-N 15 with sensor RA 2							
	3,0	15	1266	4229	4227	0,75	8,0	979
1.002	kermi							
	Typ 10							
	Profil-Kompakt							
	1000/600/61							
	Danfoss							
	RA-N 15 with sensor RA 2							
	4,0	15	1575	4076	4071	0,41	6,1	602
1.003	kermi							
	Typ 11							
	Profil-Kompakt							
	1000/600/61							
	Danfoss							
	RA-N 15 with sensor RA 2							
	5,0	15	1941	3891	3890	0,61	7,4	979
1.003	kermi							
	Typ 11							
	Profil-Kompakt							

Analysis and calculation of pipenets with regulation



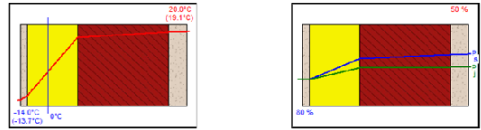
# Main Advantages of AX3000



Construction and detailed planning

# Main Advantages of AX3000

Wärmebedarf		Bauteil: <b>Aussenwand 1</b>
U-Wert:	<b>0,203 W/m<sup>2</sup>K</b>	
Anforderung:	<b>0,280 W/m<sup>2</sup>K</b>	erfüllt



Nr.	Schichtbau	d mm	ρ kg/m <sup>3</sup>	λ W/mK	Wärmeschutz		Tauwasserschutz	
					R m <sup>2</sup> K/W	μ	S <sub>a</sub> m	ρ <sub>max</sub> Pa
	außen				0,040			
	Wärmedämmputz_060	20,00	4,0	0,080	0,333	5	0,10	-13,7
	Heran-HP	140,00	9,8	0,085	4,000	14	20,06	16,2
	Voll-Hochlochziegel	250,00	400,0	0,080	0,308	9	1,26	18,7
	Putzbröckel_guss_Kalk	50,00	90,0	0,070	0,267	16	0,75	19,1
	innen				0,130			19,1
Summe Bauteil		460,00	503,8		4,828		22,06	

## Berechnung der Norm-Heizlast nach DIN EN 12831 (ausführliches Verfahren)

## Berechnung der Norm-Heizlast nach DIN EN 12831 (ausführliches Verfahren)

Projekt-Nr.: D:\@_WorkITEST\Wärmebedarf		Datum: 15. Januar 2011	
Projekt-Bez.: Wärmebedarf		Seite 8	
RAUM-Heizlast	Raum-Nr.: EG.006	Bez.: Büro	Wohnfläche:
Geschoss-Nr.: EG	Raum-Nr.: EG.006	Bez.: Büro	Wohnfläche:
Innen-temperatur	t <sub>int</sub> 23,00 °C	Infiltration	
Wärde-Luftwechsel	n <sub>int</sub> 0,50 h <sup>-1</sup>	Luftwechselrate	n <sub>50</sub> 6,00 h <sup>-1</sup>
Abmessungen		Koeffizient Abschirmklasse	e 0,03 -
Raumbreite	b 4,84 m	Höhe über Erdreich	h 0,00 m
Raumlänge	l <sub>a</sub> 3,84 m	Höhenkorrekturfaktor	z 1,00 -
Raumfläche	A <sub>R</sub> 18,59 m <sup>2</sup>	Mechanische Belüftung	
Geschosshöhe	h <sub>s</sub> 3,00 m	Zulu-Volumenstrom	V <sub>zulu</sub> m <sup>3</sup> /h
Deckendicke	d 0,20 m	- Temperatur	t <sub>ext</sub> °C
Raumhöhe	h <sub>R</sub> 2,80 m	- Korrekturfaktor	f <sub>cor</sub> -
Raumvolumen	V <sub>R</sub> 52,05 m <sup>3</sup>	Abluft-Volumenstrom	V <sub>abluft</sub> m <sup>3</sup> /h
Erdreich		Überströmung Nachbarkante	V <sub>überstr</sub> m <sup>3</sup> /h
Tiefe unter Erdreich	z 0,00 m	- Temperatur	t <sub>ext,erd</sub> °C
Erdreich berührter Umfang	P 0,00 m	- Korrekturfaktor	f <sub>cor,erd</sub> -
B-Wert	W-Raumweise	mech. Infiltration von außen	V <sub>mech,inf</sub> m <sup>3</sup> /h

Projekt-Nr.: D:\@_WorkITEST\Wärmebedarf		Datum: 15. Januar 2011	
Projekt-Bez.: Wärmebedarf		Seite 9	
Gebäudezusammenstellung		Datei: 15. Januar 2011	
Wärmeverlust-Koeffizienten		WIK	
Transmissionärmeverlustkoeffizient		H <sub>tr,geb</sub> 101,3	
Lüftungsärmeverlust-Koeffizient		H <sub>l,geb</sub> 200,5	
Gebäude-Wärmeverlust-Koeffizient		H <sub>geb</sub> 301,8	
Wärmeverluste		W	
Transmissionärmeverluste (nach außen)		Q <sub>tr,geb</sub> 1673,0	
Lüftungsärmeverluste		Q <sub>l,geb</sub> 1018,0	
aus natürlicher Infiltration		Q <sub>l,inf,nat</sub> = 0,5 * Σ Q <sub>l,inf,nat</sub> 0,0	
aus mechanischem Zulu-Volumenstrom		Q <sub>l,inf,mech</sub> 0,0	
aus mech. Infiltration/Volumenstrom		Q <sub>l,inf,mech</sub> 510,0	
Lüftungswärmeverluste		Q <sub>l,geb</sub> 1528,0	
NORM-GEBÄUDEHEIZLAST		Q <sub>tr,geb</sub> 3201,0 W	
ZUSATZ-AUFHEIZLEISTUNG		Q <sub>tr,geb</sub> 0,0 W	
AUSLEGUNGS-HEIZLEISTUNG		Q <sub>tr,geb,des</sub> 3201,0 W	
BEZOGENE WERTE			
Heizlast / beheizte Gebäudefläche		A <sub>be</sub> 387,6 m <sup>2</sup> Q <sub>tr,geb,des</sub> / A <sub>be</sub> 8,3 W/m <sup>2</sup>	
Heizlast / beheiztes Gebäudevolumen		V <sub>be</sub> 1077,0 m <sup>3</sup> Q <sub>tr,geb,des</sub> / V <sub>be</sub> 3,0 W/m <sup>3</sup>	
wärmeübertragende Umfassungsfläche		A 509,7 m <sup>2</sup>	
spez. Transmissionswärmeverlust-Koeffizient		H <sub>tr</sub> 101,26 W/K 0,26 W/(m <sup>2</sup> ·K)	

## PIPENET

Project: Wärmebedarf  
 Customer:  
 Order No.:  
 Project: C:\Users\Admin\Desktop  
 Dno.:  
 Material: M  
 Roughness:

Valve setting data  
 B.D

Track	Name	Lin
-------	------	-----

EG.004	kern	
	Typ 10	
	Profilkompakt	
	70080081	
	Darfloss	
	RA-N 15 with sensor R	

Track	Name	Lin	Dimensions (mm)	Performance	Valve
2.10	Line	100			
2.11	Line	100			
2.12	Line	100			
2.13	Line	100			
2.14	Line	100			
2.15	Line	100			
2.16	Line	100			
2.17	Line	100			
2.18	Line	100			
2.19	Line	100			

Track sum flow:

Track	Name	Lin	Dimensions (mm)	Performance	Valve
EG.004	kern				
	Typ 10				
	Profilkompakt				
	70080081				
	Darfloss				
	RA-N 15 with sensor R				
8.0	Line	100			
8.1	Line	100			
8.2	Line	100			
8.3	Branch	100			
2.11	Line	100			
2.12	Line	100			
2.13	Line	100			
2.14	Line	100			
2.15	Line	100			

## PIPE PARTS LIST

Order: Büro\_2d\_leer\_recover  
 Project: D:\Projekt\Büro\_2d\_leer\_recover  
 Originator:  
 Date/Time: 17. März 2011

Name	Fno.	Dimensions (mm)										Entire	Pcs.	mm	Litre	Di	Order no.	
		L/α	d1	d2	d3	d4	t1	t2	l/r	mm	mm							
MA Kupfer	15	15																
PIPE	15	20																
PIPE	15	25																
PIPE	15	32																
ELBOW ROUND	25	90	15															
ELBOW ROUND	25	90	32															
TRANSITION ROUND S	30	3	20	15														
TRANSITION ROUND S	30	25	20	20														
TRANSITION ROUND S	30	25	32	25														
TEE ROUND 90	75	17	15	18	15	15	17											
TEE ROUND 90	75	17	20	20	15	15	17											
TEE ROUND 90	75	17	25	25	15	15	17											
TEE ROUND 90	75	17	32	32	15	15	17											

Water capacity pipes: 100,37  
 Water capacity radiators: 4,10  
 Entire water capacity: 104,47

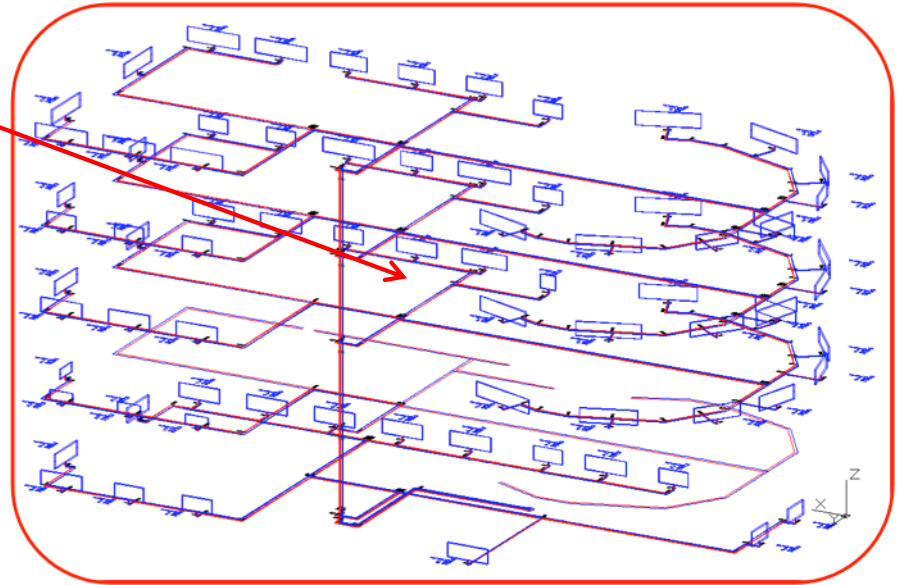
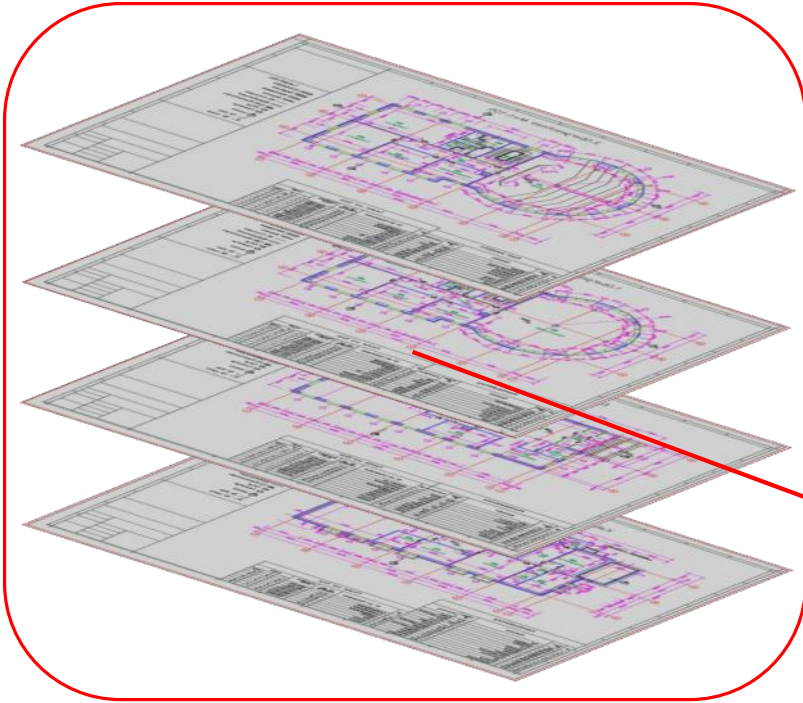
## Berechnung der Norm-Heizlast nach DIN EN 12831 (ausführliches Verfahren)

Projekt-Nr.: D:\@_WorkITEST\Wärmebedarf		Datum: 15. Januar 2011	
Projekt-Bez.: Wärmebedarf		Seite 10	
Gebäudezusammenstellung		Datei: 15. Januar 2011	
Wärmeverlust-Koeffizienten		WIK	
Transmissionärmeverlustkoeffizient		H <sub>tr,geb</sub> 101,3	
Lüftungsärmeverlust-Koeffizient		H <sub>l,geb</sub> 200,5	
Gebäude-Wärmeverlust-Koeffizient		H <sub>geb</sub> 301,8	
Wärmeverluste		W	
Transmissionärmeverluste (nach außen)		Q <sub>tr,geb</sub> 1673,0	
Lüftungsärmeverluste		Q <sub>l,geb</sub> 1018,0	
aus natürlicher Infiltration		Q <sub>l,inf,nat</sub> = 0,5 * Σ Q <sub>l,inf,nat</sub> 0,0	
aus mechanischem Zulu-Volumenstrom		Q <sub>l,inf,mech</sub> 0,0	
aus mech. Infiltration/Volumenstrom		Q <sub>l,inf,mech</sub> 510,0	
Lüftungswärmeverluste		Q <sub>l,geb</sub> 1528,0	
NORM-GEBÄUDEHEIZLAST		Q <sub>tr,geb</sub> 3201,0 W	
ZUSATZ-AUFHEIZLEISTUNG		Q <sub>tr,geb</sub> 0,0 W	
AUSLEGUNGS-HEIZLEISTUNG		Q <sub>tr,geb,des</sub> 3201,0 W	
BEZOGENE WERTE			
Heizlast / beheizte Gebäudefläche		A <sub>be</sub> 387,6 m <sup>2</sup> Q <sub>tr,geb,des</sub> / A <sub>be</sub> 8,3 W/m <sup>2</sup>	
Heizlast / beheiztes Gebäudevolumen		V <sub>be</sub> 1077,0 m <sup>3</sup> Q <sub>tr,geb,des</sub> / V <sub>be</sub> 3,0 W/m <sup>3</sup>	
wärmeübertragende Umfassungsfläche		A 509,7 m <sup>2</sup>	
spez. Transmissionswärmeverlust-Koeffizient		H <sub>tr</sub> 101,26 W/K 0,26 W/(m <sup>2</sup> ·K)	

Generate lists in Excel

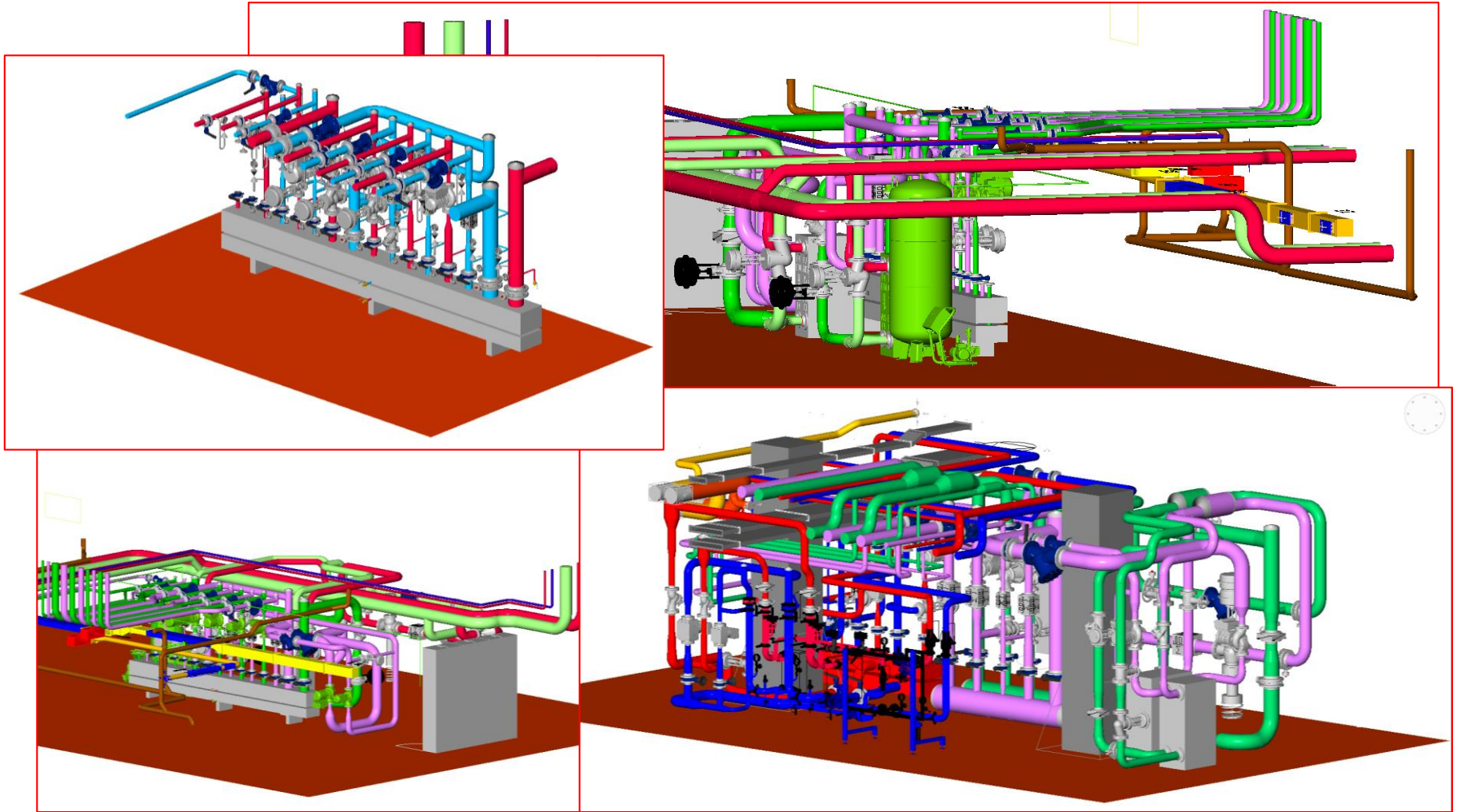


# Main Advantages of AX3000



Overall drawing workflow

# Main Advantages of AX3000



Compatible to all CAD systems



# AX3000 HEATING



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