

Sinorix NXN Natural agent extinguishing

Planning Tool

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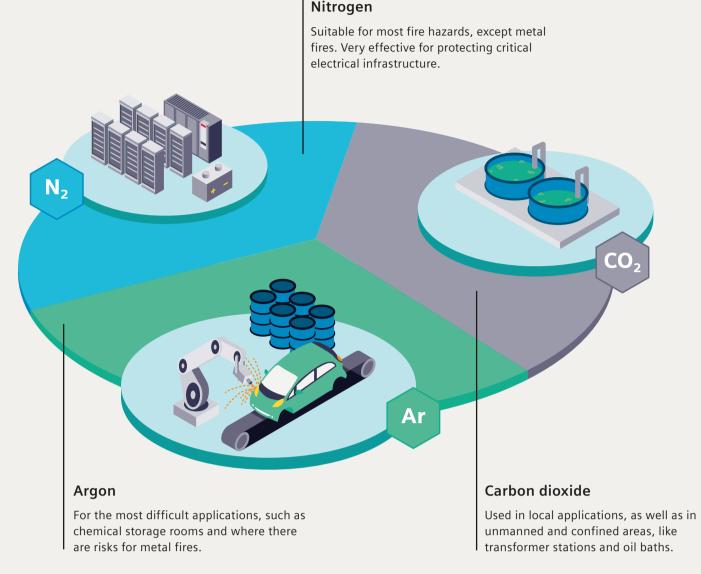
buildings and industries to adapt and evolve the way we live Smart Infrastructure intelligently connects energy systems,

Sinorix NXN

Natural inert gas extinguishing technology

Sinorix NXN features the latest generation of inert gas extinguishing technology. It is based on the three natural extinguishing agents, Argon, Nitrogen and Carbon dioxide. In pure form or mixed compounds, these natural extinguishing agents provide outstanding properties to combat a wide variety of fire hazards without harming the environment.

Their respective properties give Sinorix NXN great flexibility when designing the appropriate fire safety concept.



The Sinorix extinguishing agents are excellent for fire classes A, B, C, D and E.

Our Offering

maximum safety.

Online planning

Calculation tool

certificates

(HIT Configurator)

Product catalogue (HIT)

Ordering process with iMall

• Project documentation: Bill of

Material (BOM), data sheets,

environment are all perfectly protected.

ronment are all perfectly protected.

and minimal operational costs

ire detection Fire extinguishing

Integrated fire protection offering

Support along the entire lifecycle

Local and international representation

Naturally friendly, residue-free extinguishing

Sinorix NXN only uses agents and compounds which are found naturally in our atmosphere and do not harm the environment. They are neither subject to any regulatory restrictions, nor do they damage the ozone layer, ensuring the sustainability of your extinguishing system.

Sinorix extinguishing solutions follow the principle of inertization. When released, the gas displaces the oxygen in the flooding area and thus suppresses the fire within seconds. Fires are extinguished without incurring collateral damage and they do not leave behind any residue for clean up or disposal. This ensures minimal damage and a quick resumption of business operations. Their poor electrical conductivity makes them ideal for the protection of electrical components or systems.

Providing extinguishing solutions requires considerable expertise, especially during planning and design. Siemens provides the

ordering process, as well as calculation, planning tools and specification texts. Furthermore, Siemens design experience and

technical support is invaluable to avoid overengineering. Optimal design can greatly reduce project costs as well as ensuring

In addition to local representation, Siemens provides its customers and partners with optimal technical support via its International Center of Competence in Vienna (Austria), and a test laboratory in Altenrhein (Switzerland), where new application solutions are developed and perfected. With Sinorix NXN, people, assets, business operations and the

A complete fire safety system goes beyond fire extinguishing in many projects; and it is important to know that Sinorix extinguishing systems are developed to be easily integrated into complete fire safety solutions, including detection and evacuation. Communication and integration between the various parts of a fire safety system is one of the significant sources of risk unless correctly engineered. Sinorix NXN integrates seamlessly into Siemens fire panels, further increasing safety and reducing risk. This integration also optimizes facility management by enabling cloud-based, digital services that substantially reduce operational and maintenance costs. By choosing Siemens Sinorix NXN, people, assets, business operations and the envi-

Fire control panel

All elements working together to provide highest fire safety

latest digital planning and design tools, online product catalogue, system configuration, BIM, Step and DWG data including online

Sinorix NXN

Key portfolio components (Not to scale)

ADVtechnology



Cylinder valve

- ADVtechnology two ports for pneumatic and electromagnetic actuation
- One valve type for all extinguishing agents
- Seal concept for ports allows pressure-free
- assembly and disassembly
- Push-button to close valve
- Compact design (Re)filling via discharge port
- Fits under standard protection cap

Manifold

- One type for all PN360 certified components
- Contactable by hand (no tools)
- O-ring sealing

Quantum connection

One type for all agents

• Incorrect assembly impossible

• Activation range 8 - 360 bar





Check valve and pressure regulator

Pneumatic and manual actuator

• Control line remains intact during cylinder replacement











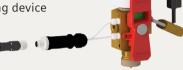
One type for all gases PN360



Electromagnetic actuator

• All functions monitored such as, unblocked, blocked, actuator installed

- Blocking with standard padlock
- Actuator cable with LED
- Include with blocking device



Control and discharge hose

Flexible material for easy installation



Sinorix NXN – typical applications







Data centers and server rooms

Pressure regulator

ADVtechnology

pressure range (8 – 360 bar).

A small change with a big impact

By applying ADV technology the number of different components has been significantly

reduced. This facilitates handling and leaves no room for confusion, as only one type of

each component is used. At the same time, the actuators have been reduced in size,

Due to an adaptation in the mechanical design of the cylinder valve, the gas cylinder

control hose, discharge hose and pneumatic actuator is needed – covering the full

Assembly by hand, without additional sealants!

The check valve, pressure regulator, manifolds and connectors are all designed and equipped with the O-ring sealing mechanism. With a few twists of the wrist, and minimal force, all components are assembled by hand without needing special mechanical

Furthermore, this new cylinder valve can accommodate either an electric

or a pneumatic actuator, so only one type of valve body is needed.

tools or additional sealants, such as hemp string or teflon tape.

can open with a lower pneumatic pressure. This means that only one type of manifold,

making them lighter and easier to handle during installation and maintenance.



Li-ion battery energy storage systems Telecommunication systems



Power distribution/E-houses

Cable ducts



Industrial applications



Electrical switching rooms

Sinorix Silent Extinguishing Technology

Sinorix CDT – Constant Discharge Technology

Sinorix Constant Discharge Technology (CDT) is a technology where the cylinder valve releases the extinguishing agent at a constant mass flow.

But why is this important?

3D Modelling data

Cloud based service

011110101010

BIM data

DWG

Step

CAD

Conventional extinguishing systems are called unregulated, as they do not regulate the flow rate at which the extinguishing agent is released. This means that there is a huge pressure peak at the start of discharge, requiring large overpressure flaps.

In addition to overpressure, unregulated systems also generate a lot of noise during discharge. The resulting vibrations can severely impair the operation of hard disks or other sensitive equipment, for example in server rooms and data centers. Sinorix CDT eliminates this pressure peak, resulting in lower noise levels and allowing the size of the overpressure flaps to be

Sinorix silent nozzle

In combination with Sinorix CDT, the Sinorix silent nozzle forms an unbeatable combination for protecting sensitive hard disks. Its ingenious design further reduces the noise level during discharge of the extinguishing agent.



Scan the QR Code to access the HIT product catalogue:



SIEMENS

01 | Selection of extinguishing agents

Environmentally friendly and residue-free

The natural agents used with Sinorix NXN are N₂ (IG100), Ar (IG01), CO₂ or mixtures such as IG55 or IG541. They present no environmental hazards. This allows not only environmentally friendly extinguishing, but also rapid resumption of operation within the extinguished zones after a flooding thanks to simple overpressure ventilation. In addition, the extinguishing agents have poor electric conductive properties and are chemically inert. This means that there will be no harmful reaction products when they come into contact with fire, preventing damage.

Excellent extinguishing properties

Whether nitrogen, argon, carbon dioxide or mixtures such as IG55 or IG541 – natural agents excel thanks to their excellent extinguishing properties for fire classes A (solids), B (flammable liquids), and C (flammable gases). Argon is also optimally suited for fire class D (metal fires).

Fast and easy refilling

Natural agents are easy to refill in case of a discharge as they are widely available.

Thus, you can always refill the cylinders within a very short period of time. This minimizes the downtime of the extinguishing system after a discharge and reduces costs.

General requirements

For safe operation, extinguishing systems must comply with generally accepted technical standards and be operated properly. Novec extinguishing systems fall into the lowest hazard class (extinguishing gas concentration below NOAEL and oxygen concentration above 12%).

Escape routes

Warning

Room requirements

Concentration after holding time

at the height of protected content

85% of the design concentration

MEC at 10% and 90% of the

at 10% and 90% of the maximum room height

In principle, the tightness of the rooms should be checked:

Escape routes must be available for all extinguishing areas.

Cable and pipe bulkheads must be tightly closed.

Door must be self-closing and open outwards.

loads in the extinguishing area is not allowed.

Careful closing of all openings is essential to achieve the required holding times.

A warning of the danger point/extinguishing system

Additional storage of material that cause further fire

must be placed at all entrances to the extinguishing area.

Minimum holding time

Alarm device

Extinguishing areas must be equipped with acoustic and, if necessary, optical alarm devices to warn persons in the danger area.

Warning time

The warning time must be such that the endangered areas can be left from any point without haste.

Blocking mechanism

The activation of an extinguishing system must be electrically or mechanically blockable, depending on coun-

try-specific regulations. Pipe network

EN15004

ISO14520

NFPA2001

VdS2080

APSAD R13

Pipes must be electrically earthed.

02 | Determination of extinguishing agent concentration

Electrical risks in server and electrical switching rooms and telecommunication systems belong to Class A – High Hazard (HH)

Extinguishing concentrations for inert gasses										
		ISO14520-1	3 ed2016	EN15004-8	ed2018	VdS2380 ed	2019	NFPA2001 ed2018		
Fire class	Type of agent	Safety margin	Design concentra- tion	Safety margin	Design concentra- tion	Safety margin	Design concentra- tion	Safety margin	Design concentra- tion	
	IG01	1.3	41.9%	1.3	41.9%	1.3*	39.9%	1.2	50.4%	
Class A	IG55	1.3	40.3%	1.3	40.3%	1.3*	41.1%	1.2	37.9%	
	IG100	1.3	40.3%	1.3	40.3%	1.3*	37.2%	1.2	37.2%	
	IG541	1.3	39.9%	1.3	39.9%	1.3*	36.5%	1.2	34.2%	
	IG01	1.3	48.3%	1.3	49.2%	1.3*	49.1%	1.35	54.6%	
Class A –	IG55	1.3	45.1%	1.3	45.2%	1.3*	45.2%	1.35	42.7%	
high hazard**	IG100	1.3	41.5%	1.3	45.2%	1.3*	45.2%	1.35	41.9%	
	IG541	1.3	41.7%	1.3	45.7%	1.3*	45.7%	1.35	38.5%	
	IG01	1.3	50.8%	1.3	51.7%	1.3*	51.7%	1.3	54.6%	
Class B	IG55	1.3	47.5%	1.3	47.6%	1.3*	47.6%	1.3	45.5%	
Class D	IG100	1.3	43.7%	1.3	47.6%	1.3*	47.6%	1.3	41.9%	
	IG541	1.3	43.9%	1.3	48.1%	1.3*	48.1%	1.3	40.3%	



All concentrations reported are at 20°C (ISO/EN/VdS) respectively 70°F (NFPA).

10 | Pressure release

During flooding by the extinguishing agent, the room pressure varies according to the pressure curve, shown below. Suitable pressure relief devices must be provided. The table shows values for the different inert agents based on their corresponding concentration and for rooms of different size with the regulated extinguishing system Sinorix NXN CDT.

Maximum admitted pressure in the	Type of	Volume							
protected risk	agent	100 m³	250 m³	500 m³	1,000 m ³				
	IG01	0.18	0.44	0.89	1.77				
100 Pa	IG55	0.15	0.38	0.76	1.51				
100 Fa	IG100	0.14	0.36	0.72	1.44				
	IG541	0.15	0.38	0.77	1.54				
	IG01	0.10	0.26	0.51	1.02				
300 Pa	IG55	0.09	0.22	0.44	0.87				
300 Fa	IG100	0.08	0.21	0.42	0.83				
	IG541	0.09	0.22	0.44	0.89				
	IG01	0.08	0.20	0.40	0.79				
500 Pa	IG55	0.07	0.17	0.34	0.68				
300 Fa	IG100	0.07	0.16	0.32	0.65				
	IG541	0.07	0.17	0.34	0.69				

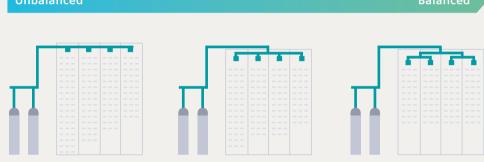
Pressure Curve

09 | Design of the pipe network

			1	Pipe cap	acity				
Pipe size	3/8	1/2	3/4	1	1 1/4	1 1/2	2	21/2	3
(inch)	DN10	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80
Maximal flow rate (kg/min.)	18	35	70	105	158	280	350	578	980

Balanced system design A balanced system will ensure an equal extinguishing agent concentration in all zones.





08 | Selection of nozzles

The table below shows the maximum dischargeable extinguishing agent quantity in kg/sec for type 2002 and 2003 extinguishing nozzles.

	Max flow nozzle	
3/8"	0,3 kg/sec	
1/2"	0,6 kg/sec	
3/4"	1,2 kg/sec	
1"	1,8 kg/sec	
1″1/4	2,6 kg/sec	
1″1/2	4,7 kg/sec	
2"	5,8 kg/sec	

03 | Determination of the quantity of extinguishing agent

The tabel below shows the quantity of extinguishing agent without any safety margins.

Room volume (m³)															
1				100				250				500			
IG01	IG55	IG100	IG541	IG01	IG55	IG100	IG541	IG01	IG55	IG100	IG541	IG01	IG55	IG100	IG541
1.33	1.13	0.93	1.13	132.6	112.8	93.0	113.1	331.5	282.0	232.5	282.8	663.0	564.0	465.0	565.5
1.29	1.10	0.91	1.10	128.9	109.7	90.5	110.0	322.3	274.3	226.3	275.0	644.5	548.5	452.5	550.0
1.25	1.07	0.88	1.07	125.4	106.6	88.0	107.0	313.5	266.5	220.0	267.5	627.0	533.0	440.0	535.0
1.22	1.04	0.86	1.04	121.9	103.7	85.5	104.0	304.8	259.3	213.8	260.0	609.5	518.5	427.5	520.0
1.18	1.01	0.83	1.01	118.4	100.7	83.1	101.1	296.0	251.8	207.8	252.8	592.0	503.5	415.5	505.5
1.15	0.98	0.81	0.98	115.1	97.9	80.8	98.2	287.8	244.8	202.0	245.5	575.5	489.5	404.0	491.0
1.12	0.95	0.79	0.95	111.8	95.1	78.5	95.4	279.5	237.8	196.3	238.5	559.0	475.5	392.5	477.0
1.09	0.92	0.76	0.93	108.6	92.3	76.2	92.7	271.5	230.8	190.5	231.8	543.0	461.5	381.0	463.5
1.05	0.90	0.74	0.90	105.4	89.7	74.0	90.0	263.5	224.3	185.0	225.0	527.0	448.5	370.0	450.0
1.02	0.87	0.72	0.87	102.3	87.0	71.8	87.3	255.8	217.5	179.5	218.3	511.5	435.0	359.0	436.5
0.99	0.84	0.70	0.85	99.3	84.4	69.7	84.7	248.3	211.0	174.3	211.8	496.5	422.0	348.5	423.5
0.96	0.82	0.68	0.82	96.3	81.9	67.6	82.2	240.8	204.8	169.0	205.5	481.5	409.5	338.0	411.0
0.93	0.79	0.66	0.80	93.3	79.4	65.5	79.6	233.3	198.5	163.8	199.0	466.5	397.0	327.5	398.0
0.90	0.77	0.64	0.77	90.4	76.9	63.5	77.2	226.0	192.3	158.8	193.0	452.0	384.5	317.5	386.0
0.88	0.75	0.62	0.75	87.6	74.5	61.5	74.8	219.0	186.3	153.8	187.0	438.0	372.5	307.5	374.0
0.85	0.72	0.60	0.72	84.8	72.1	59.5	72.4	212.0	180.3	148.8	181.0	424.0	360.5	297.5	362.0
0.82	0.70	0.58	0.70	82.1	69.8	57.6	70.0	205.3	174.5	144.0	175.0	410.5	349.0	288.0	350.0
0.79	0.68	0.56	0.68	79.4	67.5	55.7	67.7	198.5	168.8	139.3	169.3	397.0	337.5	278.5	338.5
0.77	0.65	0.54	0.66	76.7	65.2	53.8	65.5	191.8	163.0	134.5	163.8	383.5	326.0	269.0	327.5
0.74	0.63	0.52	0.63	74.1	63.0	52.0	63.2	185.3	157.5	130.0	158.0	370.5	315.0	260.0	316.0
0.72	0.61	0.50	0.61	71.5	60.8	50.2	61.0	178.8	152.0	125.5	152.5	357.5	304.0	251.0	305.0
0.69	0.59	0.48	0.59	69.0	58.7	48.4	58.9	172.5	146.8	121.0	147.3	345.0	293.5	242.0	294.5
agent o	quantity	(kg)													

04 | Cylinder size/number of cylinders

The maximum net-filling quantity per cylinder is subject to short and simple pipe networks. If several cylinders are needed, the total quantity must be divided evenly over all cylinders. In addition to the amount of useable extinguishing agent, the lost quantity must be filled.

Only cylinders with the same filling pressure may be used for one flooding zone within an extinguishing system.

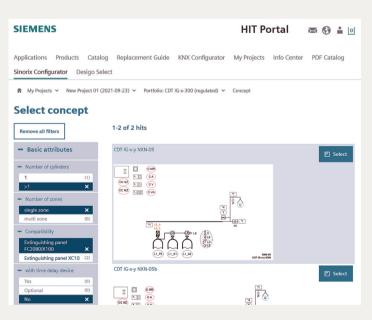
Room volume (m³)										
2,7 liter		10 liter		20 liter		80 liter			140 liter	
Reference	200 bar	Reference	200 bar	Reference	300 bar	Reference	200 bar	300 bar	Reference	300 bar
CYF-2.7 200 N2	0,6kg	CYF-10 200 N2	2,2kg			CYF-80 200 N2	17,9kg			
				CYF-20 300 N2	6,2kg	CYF-80 300 N2			CYF-140 300 N2	43,3kg
						CYF-80 300 Ar			CYF-140 300 Ar	71,6kg
						CYF-80 300 541			CYF-140 300 541	58,3kg
						CYF-80 300 55			CYF-140 300 55	56,4kg
	Reference	Reference 200 bar	Reference 200 bar Reference CYF-2.7 O.6kg CYF-10	Reference 200 bar Reference 200 bar CYF-2.7 0.6kg CYF-10 3.2kg	2,7 liter 10 liter 20 liter Reference 200 bar Reference 200 bar Reference CYF-2.7 200 N2 0,6kg CYF-10 200 N2 2,2kg CYF-20	2,7 liter 10 liter 20 liter Reference 200 bar Reference 200 bar Reference 300 bar CYF-2.7 200 N2 0,6kg CYF-10 200 N2 2,2kg CYF-20 6 3kg	2,7 liter 10 liter 20 liter 80 liter Reference 200 bar Reference 300 bar Reference CYF-2.7 200 N2 0,6kg CYF-10 200 N2 2,2kg CYF-20 300 N2 CYF-80 300 N2 CYF-20 300 N2 CYF-80 300 N2 CYF-80 300 Ar CYF-80 300 541 CYF-80	2,7 liter 10 liter 20 liter 80 liter Reference 200 bar Reference 200 bar Reference 200 bar CYF-2.7 200 N2 0,6kg CYF-10 200 N2 2,2kg CYF-20 300 N2 CYF-80 300 N2 CYF-80 300 Ar CYF-80 300 541 CYF-80 CYF-80	2,7 liter 10 liter 20 liter 80 liter Reference 200 bar Reference 200 bar Reference 200 bar 300 bar CYF-2.7 200 N2 0,6kg CYF-10 200 N2 2,2kg CYF-20 300 N2 CYF-80 300 N2 CYF-80 300 N2 CYF-80 300 Ar CYF-80 300 541 CYF-80	2,7 liter 10 liter 20 liter 80 liter 140 liter Reference 200 bar Reference 300 bar Reference 200 bar 300 bar Reference CYF-2.7 200 N2 0,6kg CYF-10 200 N2 2,2kg CYF-20 300 N2 CYF-80 300 N2 CYF-80 300 N2 CYF-140 300 Ar CYF-140 300 Ar CYF-140 300 541 CYF-140 300 541 CYF-140 300 541

05 | Cylinder arrangements

Arrangement limits & pneumatic activation of the cylinders

- The extinguishing system can be triggered manually or automatically.
- The master cylinder (dark green) should always be on the front row
- 80 and 140 l cylinder banks up to 4 rows (max. 15 cyl in a row)
- The maximum number of extinguishant cylinders per master cylinders is 80. If more cylinders are required, a booster set will be added

2 rows 4 rows



06 | Cylinder rack

For racks, we have to choose between wall-mounted and free-standing variants.

Three variants are possible:

- Solid concrete wall mounted 1 row, 2 row rack
- For all other arrangements freestanding rack 1,2 & 4 row rack
- Special arrangement realizable with additional cylinder banks possible

07 | Actuation

During the flooding of the extinguishing agent the room pressure varies according to the pressure curve, shown in section 10. Suitable pressure relief devices must be provided. The table shows values for the different inert agents based on their corresponding concentration and for rooms of different size with the regulated extinguishing system Sinorix NXN CDT.

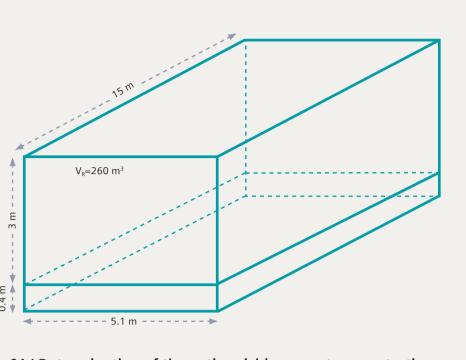
All points from 5 – 7 are supported with the system configuration in the HIT Configurator.



Application planning example

A low-voltage switchgear must be protected in a switching room with a false floor, with a total volume of 260 cubic meter (m³), with an overall room height including false floor of 3.4 m whereby the false floor is 40 cm high.

The pressure resistance of the room is specified as 300 Pa or 3 mbar.



01 | Determination of the extinguishing agent concentration Extinguishing system is to be planned and installed in accordance with guideline VdS 2380. The electrical risk falls into hazard class A HH.

02 | Determination of the quantity of extinguishing agent For 260 m³ we need 182.3 kg of nitrogen. This means we need at least 8 cylinders of N2 at 300 bar. In addition, we calculate the extra amount of 10% required by VdS: 182.3 kg + 18.2 kg = 200.5 kg.

03 | Type and number of cylinders

The required quantity of extinguishing agent can be stored in nine 80 l cylinders at 300 bar.

05 – 07 | Cylinder arrangement and activation

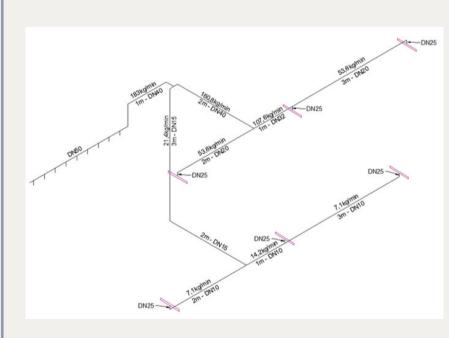
The 9 extinguishing containers can be arranged in 1 or 2 rows. If the wall is solid, the choice of wall-mounted rack reduces the amount of parts. Activation is done by an electrical actuator on the first cylinder (master-cylinder).

08 | Selection of nozzles

With a given room volume breakdown, 160.8 kg of the extinguishing agent is allocated to the room and 21.4 kg to the false floor. According to VdS (maximum 30 square meter area per nozzle) 3 nozzles are to be placed on a total area of 76 square meter per flooding area. With the given agent quantity follows the usage of 3 nozzles of type 2002- G3/4 inch in the room and 3 2003-G3/8 nozzles in the false floor.

09 | Design of the pipe network

By making a sketch of the pipe network, extinguishing agent flows can be illustrated and the pipe dimensions determined.



10 | Pressure release

Beside table shows for 250 m³ at 300 Pa a relief area of 0.21 m². In our example we have 10 m³ more room volume. For a volume of 100 m³ we need a relief vent of 0.08 m². A simple calculation gives a necessary relief area of 0.008 m² for 10 m³ (10% of 100 m³). This makes a total relief area of 0.22 m².