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People spend about 90 percent
of their time indoors.
Improve the places where they spend
their lives and you improve their lives.
With our people and technology,
our products and services,
our aim is to create perfect places.
For every stage of life.
When building technology creates
perfect places – that's ingenuity for life.
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Sinorix 1230 extinguishing system



1 Selection of extinguishing agents

Novac 1230

10 (s)

42 (bar)

30 - 50 (m³)

GWP = 1
ALT = 5d

10% Gas

>10% Gas

EN

Sustainable extinguishing systems

Sinorix™ 1230 is an excellent solution for the protection of high-value assets, business processes and people. It is based on the sustainable extinguishing agent 3M™ Novac™ 1230 Fire Protection Fluid. The high-pressure technology from Siemens allows highest design flexibility and the realization of single-sector and multi-sector systems. Enabling rapid, safe and automated interventions, Sinorix 1230 can prevent loss of data and secure business continuity.

Fast, highly effective and economical

The high efficiency of the Sinorix 1230 system allows using a low extinguishing concentration. Novac 1230 fluid even offers the lowest extinguishing concentration of all currently authorized extinguishing agents. This enables compact system designs and requires less space for installation and cylinder storage.

- Optimal protection for electric or electronic equipment
- Fast extinguishing
- Environmentally friendly and safe for people

Most effective for smoldering fires

Sinorix 1230 is an effective and clean extinguishing solution that is ideally suited to extinguish smoldering fires. It neither causes damage to nor leaves any residue on sensitive equipment. This makes it the perfect choice for eliminating electrical and electronic risks.

2 Determination of extinguishing agent concentration

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

Clean agent Novac 1230 extinguishing concentrations								
	ISO14520 ed2016		EN15004 ed2008		VdS2381 ed2016		NFPA2001 ed2018	
	Safety margin	Design concentration	Safety margin	Design concentration	Safety margin	Design concentration	Safety margin	Design concentration
Class A	1.3	5.3%	1.3	5.3%	1.3*	4.55%	1.2	4.5%
Class A - High Hazard (HH)	1.3	5.6%	1.3	5.6%	1.3*	5.8%	1.35	4.5%**
Class B	1.3	5.9%	1.3	5.9%	1.3*	6.1%	1.3	5.9%

* +10% up to 19 cylinders, +5% as from 20 cylinders.
** Class C for NFPA.
All concentrations reported are at 20°C (ISO/EN/VdS) respectively 70°F (NFPA).

3 Determination of the quantity of extinguishing agent

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

Agent concentration	Room volume [m³]									
	1	100	150	200	250	300	350	400	450	500
6.1%	0.90	90	136	181	226	271	316	362	407	452
6.0%	0.89	89	133	178	222	266	311	355	400	444
5.9%	0.87	87	131	174	218	262	305	349	393	436
5.8%	0.86	86	128	171	214	257	300	343	385	428
5.7%	0.84	84	126	168	210	252	294	336	378	420
5.6%	0.83	83	124	165	206	248	289	330	371	413
5.5%	0.81	81	121	162	202	243	283	324	364	405
5.4%	0.79	79	119	159	199	238	278	318	357	397
5.3%	0.78	78	117	156	195	234	273	311	350	389
5.2%	0.76	76	114	153	191	229	267	305	343	382
5.1%	0.75	75	112	150	187	224	262	299	336	374
5.0%	0.73	73	110	146	183	220	256	293	329	366
4.9%	0.72	72	108	143	179	215	251	287	323	358
4.8%	0.70	70	105	140	175	210	245	281	316	351
4.7%	0.69	69	103	137	172	206	240	274	309	343
4.6%	0.67	67	101	134	168	201	235	268	302	335
4.5%	0.66	66	98	131	164	197	229	262	295	328

Agent quantity [kg]

All concentrations reported are at 20°C.

4 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.

Filling ratio of a Sinorix 1230 cylinder			
Cylinder volume [l]	Useable agent net filling [kg]		Lost agent quantity [kg]
	Min.	Max.	
7	3	7	1
16	6.5	17.6	1.6
32	13	36.5	2
67	27	78.5	2
80	32	94	2
120	48	116	4

General requirements

General requirements

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

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 country-specific regulations.

Pipe network

Pipes must be electrically earthed.

Room integrity

In principle, the tightness of the rooms should be checked. Cable and pipe bulkheads must be tightly closed.

Escape routes

Escape routes must be available for all extinguishing areas.

Doorways

Doors must be self-closing and open outwards.

Warning

A warning of the danger point / extinguishing system must be placed at all entrances to the extinguishing area. Additional storage of material that cause further fire loads in the extinguishing area is not allowed.

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

Room requirements		
Regulation	Concentration after holding time	Minimum holding time
ISO14520	85% of design concentration at the elevation of the protected hazard.	10 minutes
NFPA2001		
EN15004 VdS2381	85% of design concentration at 10%, 50% and 90% of the enclosure height.	
APSAD R13	70% of design concentration at 10%, 90% of the enclosure height.	

5 Cylinder arrangements

Possible master cylinder arrangement. In principle, it is possible to equip up to three master cylinders with actuators. The master cylinders are the first agent battery cylinders. An activated master cylinder activates all remaining agent cylinders pneumatically.

Position the master cylinder(s)

6 Cylinder rack

For racks, we have to choose between a wall mounting and a freestanding version.

10 Pressure release

During the flooding of the extinguishing agent, the typical pressure curve outlined below occurs. Suitable bidirectional pressure relief devices must be provided. The table shows values for an extinguishing agent concentration of 5.6 % and rooms of different size.

Smaller overpressure can generally be expected when using chemical agent solutions, but the pressure gradient should be observed! Overpressure release to be considered!

Max. admitted pressure in the protected risk	Volume			
	100 m³	250 m³	500 m³	1000 m³
100 Pa	0,06	0,14	0,29	0,58
300 Pa	0,03	0,08	0,17	0,33
500 Pa	0,03	0,06	0,13	0,26

Required net opening (m²) per volume at a design concentration of 5.6%.

9 Design of the pipe network

Pipe capacity									
Pipe size (inch)	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
	DN10	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80
Flow rate (kg/l10sec.)	Max	10	19	33	56	79	125	215	290
	Min	0	10	19	33	56	79	125	215

When designing the pipe network, please note that the maximum agent transit time difference between 2 nozzles must not exceed 2 seconds. The more symmetrical/balanced a system is, the smaller the agent transfer time difference is.

Balanced system design

Sinorix 1230 T-configurations

Agent distribution - because of the fluid properties of the extinguishing agent, a splitting must always be in a horizontal level.

Rules concerning flow distribution

For side-branches the ratio may not exceed 20:80, in the case of bull-t's 1:10.

8 Selection of nozzles

The table below shows the maximum dischargeable extinguishing agent quantity in kg/l10s for the BUCEFA room protection and BFFP false floor nozzle.

Nozzle capacity		
Nozzle size (inch)	Maximum flow rate BUCEFA (kg/l10sec.)	Maximum flow rate BFFP (kg/l10sec.)
1/4	10	-
3/8	-	10
1/2	20	20
3/4	33	33
1	56	56
1 1/4	79	-
1 1/2	125	-
2	210	-

Planning example

1 Selection of extinguishing agent

A Low-voltage switchgear must be protected in a switch room with a false floor, with a total volume of 260 cubic meters, with an overall room height including false floor of 3.4m whereby the false floor is 40 cm high. The pressure resistance of the room is specified as 300Pa or 3mbar.

Both application and room size indicate the use of Sinorix 1230.

2 Determination of the extinguishing agent concentration

Extinguishing system is to be planned and installed in accordance with guideline VdS 2381. The electrical risk falls into hazard class A HH. The needed design concentration is 5.8%.

3 Determination of the quantity of extinguishing agent

For 260m³ we take 214kg for 250m³ and 8.6kg for 10m³ (1/10 of 100) from the table makes 222.6kg. In addition, we calculate the extra amount of 10% required by VdS:

222.6kg + 22.26kg = 244.9kg.

For further consideration we round to 245kg.

4 Cylinder size/number of cylinders

The required quantity of extinguishing agent can be stored in 3 80l cylinder with a usable filling of 81.7kg per cylinder. Due to the dip tube configuration, 2kg of extinguishing agent remain in an 80l cylinder after release. This quantity must be added for filling. This means that the filling/ order quantity per cylinder is 83.7kg, in this example.

5 - 7 Cylinder arrangement and activation

The 3 extinguishing agent cylinders are of course arranged in one row. And, for cost reasons, if possible always wall-mounted. Activation is done by an electrical actuator on the first cylinder (master-cylinder).

8 Selection of nozzles

With a given room volume breakdown, 88% of the volume and thus of the extinguishing agent is allocated to the room and 12% to the false floor. 88% of design quantity of 222.6 kg (196kg) has to be discharge in the room, the remaining quantity of 26.6kg into 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 1¼ inch BUCEFA nozzles in the room and 3 3/8 inch BFFP nozzle in the false floor.

9 Design of the pipe network

By simply drawing a hand-drawn sketch of the pipe network, extinguishing agent flows can be illustrated and the pipe dimensions determined.

10 Pressure release

The table shows for 250m³, 300Pa and 5.6% 0,08m² relief area. In our example we have 4% more room volume and a 3.5% higher design concentration. In our case, simple multiplication gives a necessary relief area of 0.09m².