



●
HYPOXIA

PROTECTION

**Hypoxic Air:
Système de prévention d'incendie
pour Data Centers**

CONTEG

EXTINCTION OU PRÉVENTION?

Que préférez vous ?

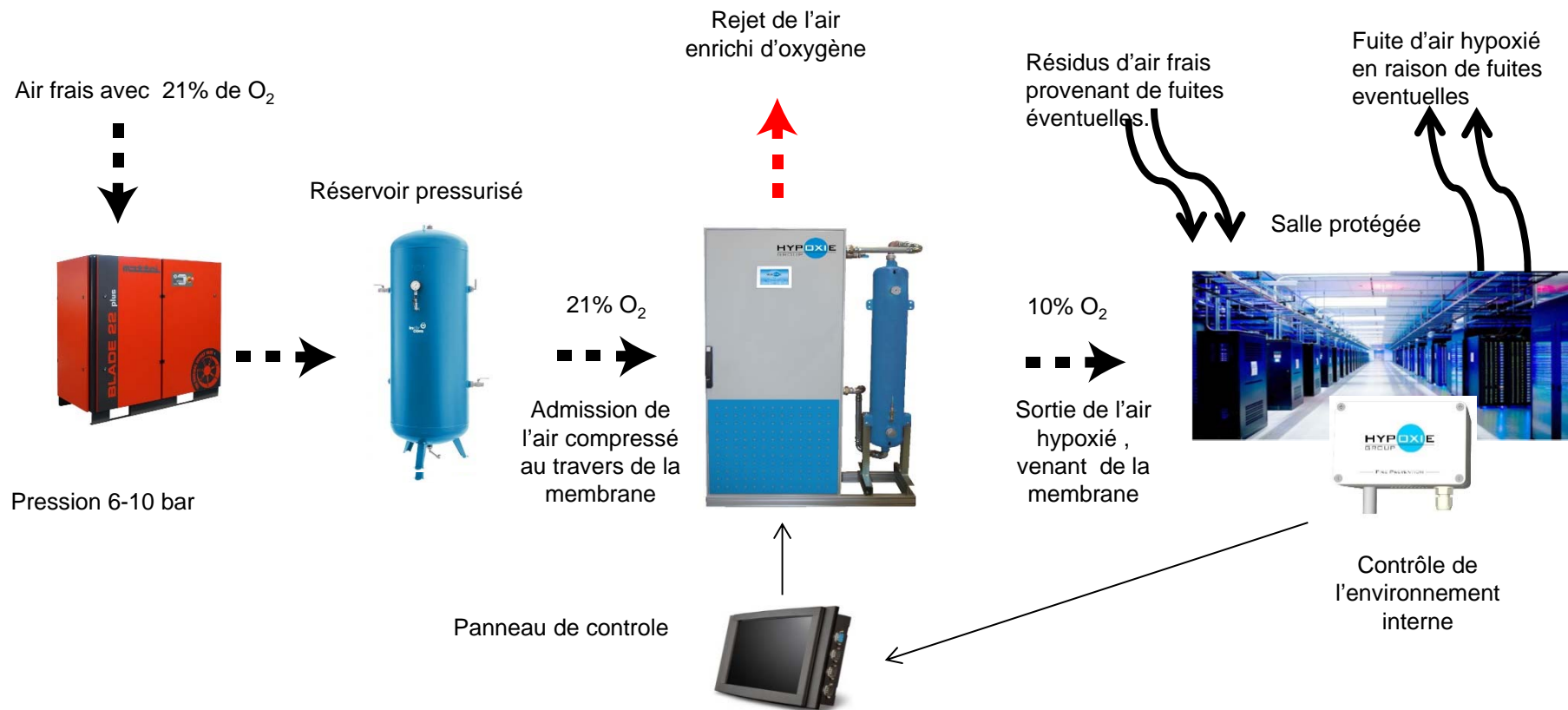


Système de prévention d'air Hypoxique – diminution permanente d'oxygène contenu dans l'air ambiant

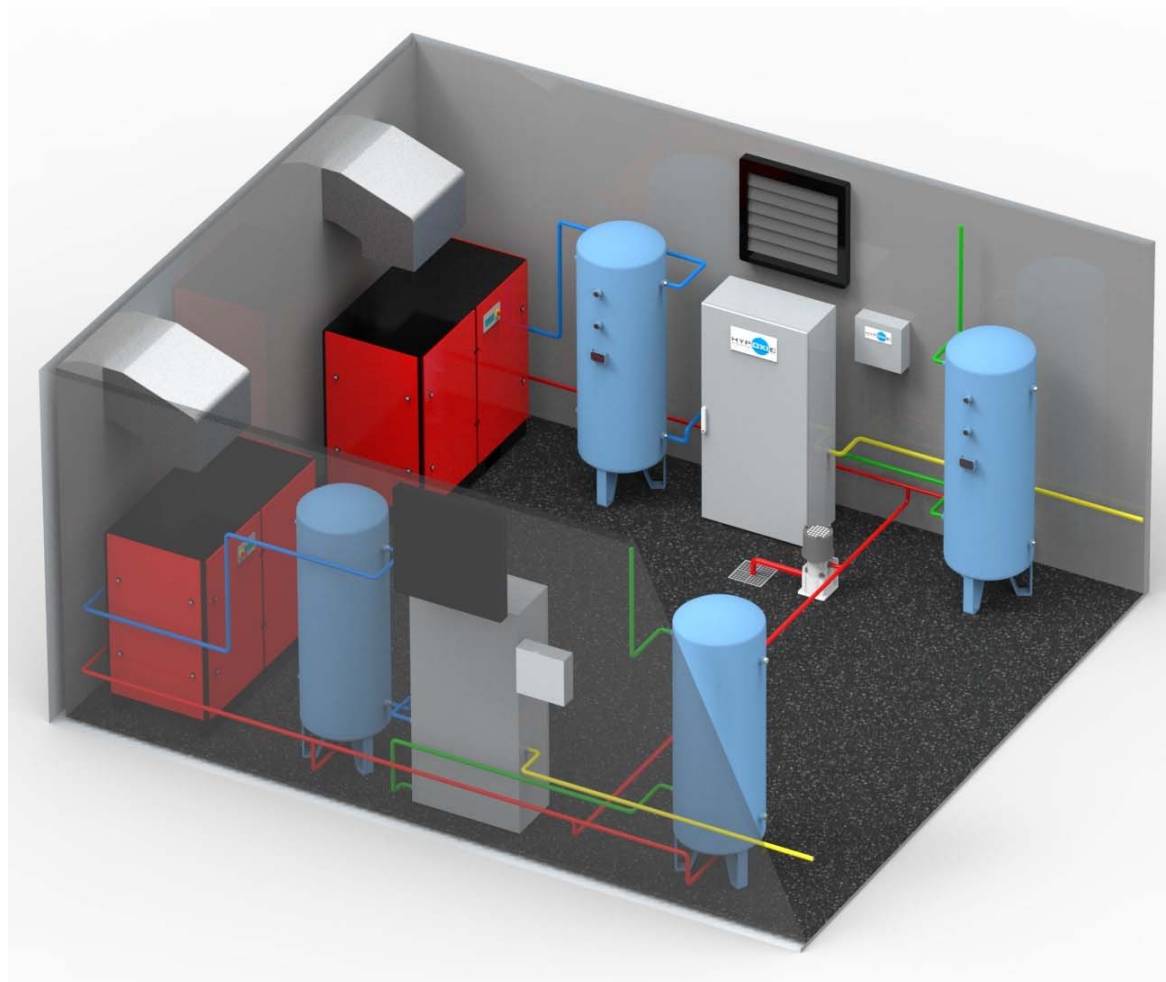
PRINCIPES DE LA PROTECTION PREVENTIVE HYPOXIQUE

- Le système de prévention hypoxique permet d'éliminer une des 3 raisons d'incendie = l'oxygène. Il prévient de tout démarrage de feu dans la zone protégée.
- Le principe de la technologie hypoxique est la diminution et le maintien d'un taux d'oxygène dans la zone protégée inférieur à 16% (dans la plupart des cas).
- Ce n'est pas un système de suppression ou d'extinction de feu mais un système de prévention au moyen de l'hypoxie normobarique.

FONCTIONNEMENT DU SYSTEME



SALLE TECHNIQUE



SECURITE DU TRAVAIL DANS UN CONTEXTE D'HYPOXIE

Table according to Consensus statement of the Medical Commission of UIAA No. 15: Work in hypoxic conditions March 2015 (p. 17)

Risk classification according to the exposure to reduced oxygen content and safety measures

Risk category	Oxygen level in the air			Specific risk	Measure
	%O ₂ (%)	Equivalent Altitude (m)	pO ₂ (mmHg)		
Class1	>=17	0 - 1,600	159 - 130	No risk	Instructions for employees
Class 2	16.9 - 14.8	1,600 - 2,700	130 - 110	No risk for whole day shift if serious lung or heart diseases and serious anemia are excluded	Exclude serious diseases (min requirement – climb 2 floors without breathlessness) Instructions for employees
Class 3	14.7 - 13.0	2,700 - 3800	110 - 99	No risk if serious diseases for Class 2 are excluded, work load is limited (see Table 3) a the duration of exposition is no longer than 4 hours/day or 2x2 hours/day with high work load	Exclude serious diseases (physician for occupational medicine) Check the level of work load Instructions for employees
Class 4	13.0 - 10.4	3,800 - 5,500	99 - 79	Risk of AHN and of other disorders (e.g. limited movement coordination) may occur among non-acclimated persons	Special measures are necessary
Class 5	< 10.4	> 5,500	<79	Risk of acute hypoxia, dizziness, mental or other disorders (e.g. limited movement coordination) may appear in 30 minutes for non-acclimated persons	Special measures are necessary

STATE HEALTH INSTITUTE - OPINION

Based on this (and other) material, we are changing our opinion as follows:

Work in hypoxia with an oxygen concentration of about 15% can be permanent under the following conditions:

- a) the workers must be thoroughly trained in the principles of occupational safety and first aid provision;
- b) the health conditions of the workers must be verified and controlled, in accordance with current legislation, in particular with regard to respiratory, circulatory diseases, anemia and diseases which would prevent rapid escape in case of an accident and the use of personal protective equipment. The medical fitness of the employee is assessed by the physician of the occupational health care on the basis of the performed medical check-up individually and with regard to the health condition of the worker and the work actually done. The proposal for carrying out occupational health inspections is not the subject of this opinion;
- c) the worker must also be able to leave the workplace at any time in case of subjective difficulties;
- d) the ease of leaving the premises;
- e) the reliability of the O₂ concentration control; the O₂ concentration in the workers' breathing zone must be continuously monitored at the permanent workplace with the immediate release of an alarm when the oxygen concentration drops below 14%;
- f) we recommend having at least two people simultaneously in the working area, with the possibility of communicating with the outside environment;
- g) the designation of the workplace with a warning of reduced oxygen concentration and indicating the oxygen content of the area.

MUDr. Michael Vít, PhD.
Head of the center for occupational hygiene and occupational diseases

UTILISATIONS D'HYPOXIA - PROTECTION

- Data Centers/salles informatiques
- Large surfaces de stockage
- Archives, musées
- Coffres, consignes
- Frigos industriels
- Stockage de munitions
- Tunnels de câbles
- Plateformes de transformation et distribution électriques
- Stockage de carburant



AVANTAGES ET INCONVENIENTS

- + Permet de réduire la résistance des structures à moins de 30minutes
- + Installation d'équipements pour l'évacuation de chaleur et de fumée non requis
- + Aucun besoin d'installer une unité d'aération maintenant un minimum de recirculation d'air sain/sécurisé.
- + Remises financières sur les cotisations d'assurance puisque le taux de risque d'incendie est extrêmement bas
- + Aucun dommage résultant d'un incendie (personnes blessées, pertes de données/procédés,...)
- + Durée de vie étendue des matériaux (archives, musées, consignes), en raison de l'air hémoxié et de la réduction de l'oxydation due à l'oxygène.
- + - Coûts opérationnels
- Utilisation limitée- le système demande un contrôle efficace de la zone à protéger.

COMPARISON DE COUTS

Volume	Comparaison de couts comparé à un système d'extinction traditionnel*
1 - 1,000 m ³	-5% à +10%
1,000 - 5,000 m ³	-15% à 0%
5,000 - 10,000 m ³	-15% à -20%
10,000 - 50,100 m ³	-20% à -30%
50,000 et plus	-30% et plus

*These comparisons are only the investment costs of the technology. The calculation does not include the economic benefits of hypoxia systems for related fields (e.g. it is not necessary to install heat and smoke removal equipment, air conditioning, fire resistance of structures can be reduced)

CONTEG

presales@conteg.com

www.conteg.com

