

ZVVZ-Enven Engineering, a.s.

Final equipment supplier for Nuclear Power Plants



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www.zvvz-enven.cz

Town MILEVSKO

37 km to the NPP Temelín



ZVVZ-Enven Engineering, a.s. ***member of ZVVZ Group***

- Establishment of the company in 1948
- member of Group with tradition of more than 60-ty years
- Company ZVVZ-Enven Engineering, a.s. is engineering and supply company
- Within the group provides supplies for NPP

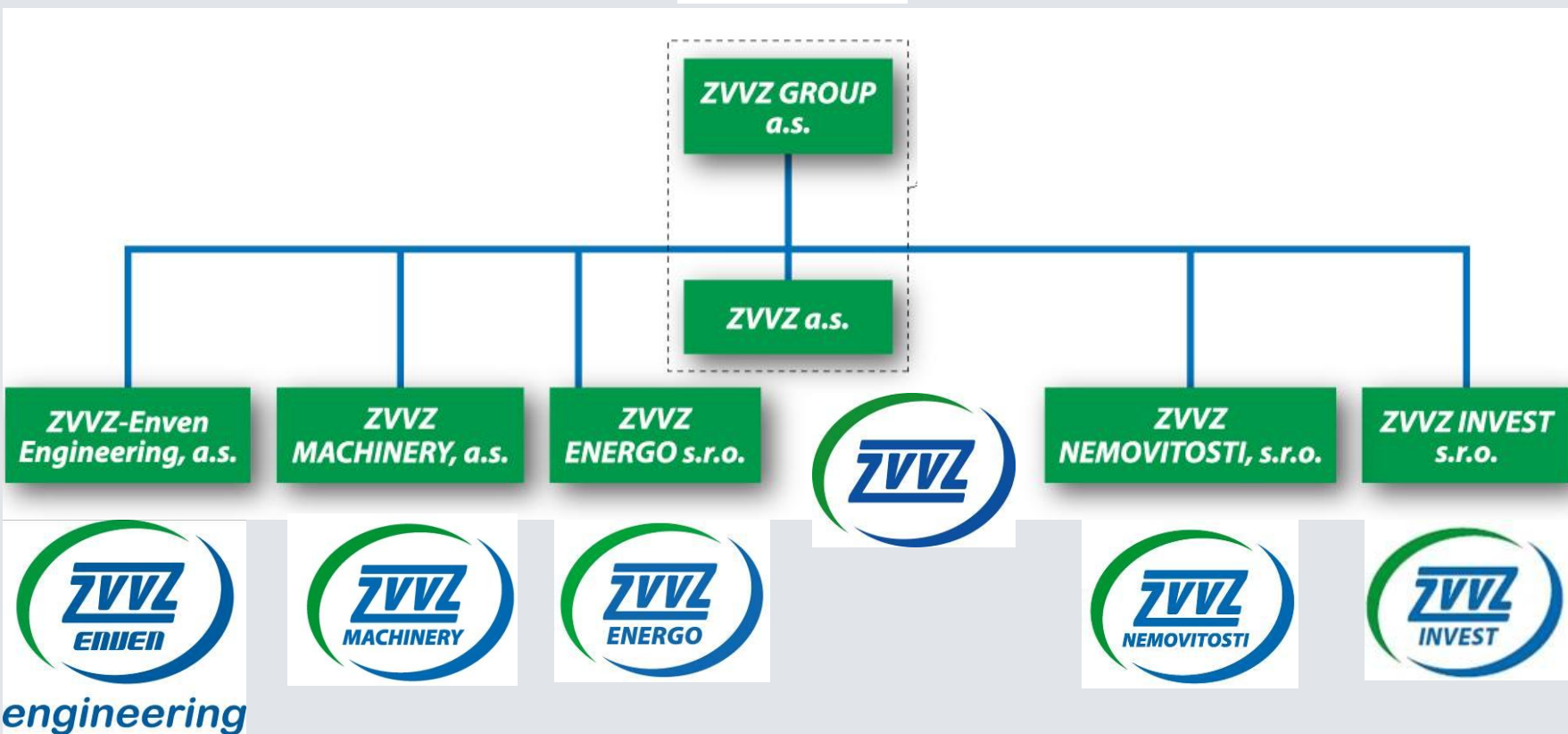


History of trade mark “ZVVZ”

- 1948** Establishment of the Company **Janka Radodín**
- 1958** Renaming of Janka Radotín to **ZVVZ, n.p. (national enterprise)**
- 1990** Transformation of national enterprise **ZVVZ to the joint stock company**
- 1992** Establishment of the Company **ENVEN Ltd.**
- 1993** Renaming to present **ZVVZ a.s.**
- 1995** Implementation of **Quality Management System in ZVVZ a.s.** and acquirement of Certificate according DIN ISO 9 001
- 1998** Transformation of ENVEN Ltd. into **ENVEN join stock company**
- 2002** Implementation of **Quality Management System and Environmental Protection System in ENVEN a.s.** and acquirement of Certificates according DIN ISO 9 001 and DIN ISO 14 001
- 2007** Capital contribution of ZVVZ a.s. into the Co. ENVEN a.s. and establishment of **ZVVZ-Enven Engineering, a.s.** as a subsidiary Co. of ZVVZ a.s.
- 2010** Establishment of **ZVVZ GROUP**, ZVVZ-Enven Engineering becomes a member of ZVVZ GROUP



ZVVZ Group (*29.9.2010)



ZVVZ MACHINERY, a.s.

- | | |
|----------------------------|--|
| Production | Custom manufacturing of electrostatic precipitators and bag filters according to design documentation ZVVZ–Enven Engineering, a.s., other engineering production |
| Tanks, semitrailers | Supplies and production of tank semitrailers |
| Fans | Supplies of axial-flow and radial fans |
| Air-handling | Custom manufacturing of air-handling duct group I for ventilation and air-handling incl. all necessary accessories for completion of system of air distribution |
| Megtec | Cooperative production with American company <u>MEGTEC</u> in the field of thermic combustion especially for polygraphic industry |



Products of ZVVZ MACHINERY, a.s.



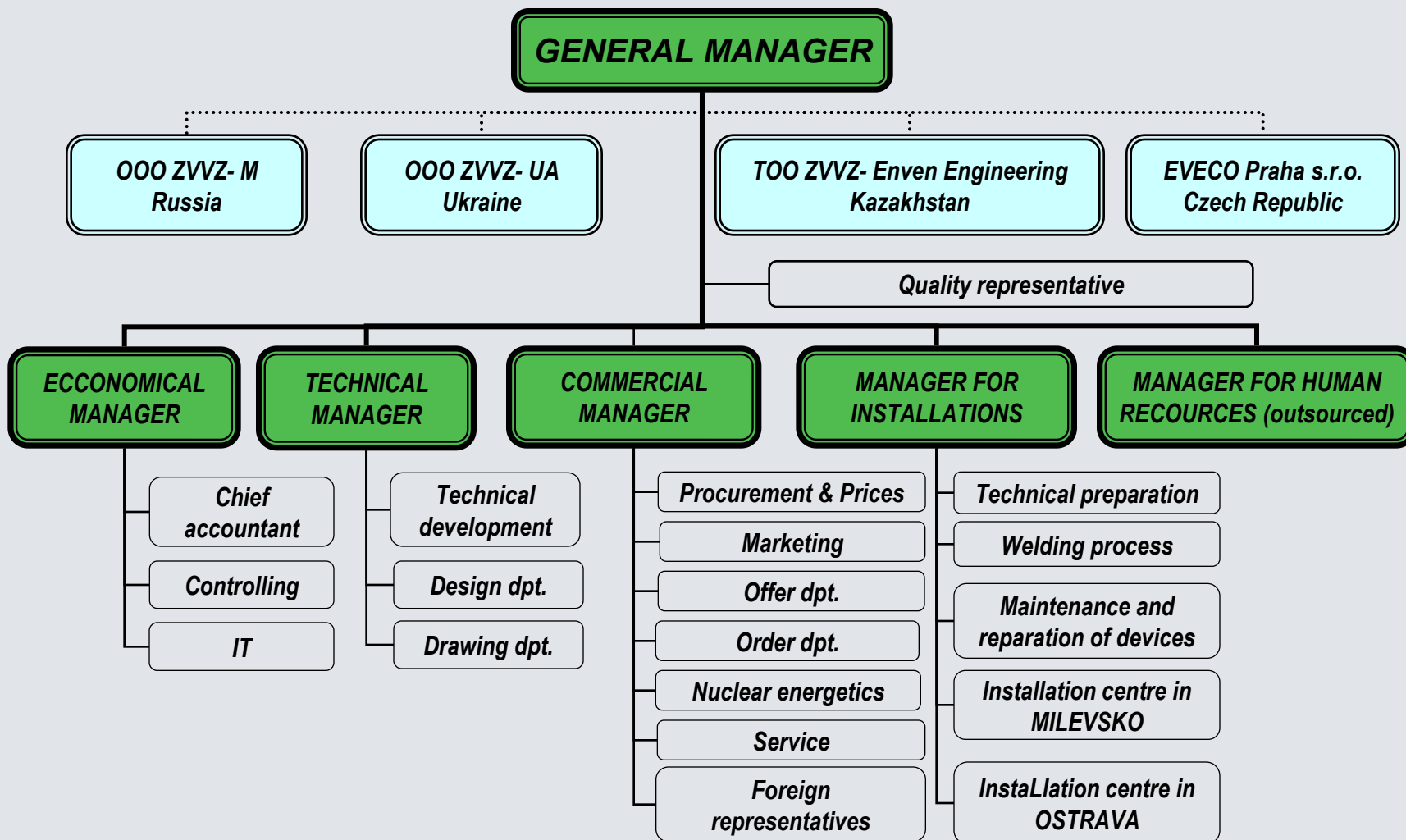
ZVVZ-Enven Engineering, a.s.

ZVVZ-Enven Engineering, a.s., a member of **ZVVZ GROUP**, is a business-engineering company that plans, designs, delivers and installs:

- Plants for **treatment of waste gases**, to remove solid and gaseous pollutants
- Plants for **pneumatic transport** of loose materials
- Equipment for **air-conditioning and ventilation of nuclear power stations**
- Air-conditioning **of buildings** and ventilation **of industrial workshops, mines, tunnels and underground**



ZVVZ-Enven Engineering, a.s.



Commercial Representation



SLOVAKIA

ZVVZ-Enven Engineering, a.s. - Organization unit

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Certifikates of ISO 9001, 14001, 18 001



DET NORSKE VERITAS
MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 88255-2010-AQ-CZS-RvA

This is to certify that the Management System of:

ZVVZ-Enven Engineering, a.s.

Sažínova 1339, 399 01 Milevsko, Czech Republic

has been found to conform to:

ISO 9001:2008

This Certificate is valid for the following product or service ranges:

Engineering in the design and implementation of technological equipment supply of technological equipments.

Initial Certification date: 17 November 2010

This Certificate is valid until: 17 November 2013

The audit has been performed under the supervision of:


Ladislav Novák
Lead Auditor

Place and date:
Prague, 18 November 2010

for the Accredited Unit:
DET NORSKE VERITAS CZ
THE NETHERLANDS

Tomáš Urban
Management Representative

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.
DET NORSKE VERITAS Certificatie B.V., Zwaluwen 1, 3991 LD Zwaluwen, The Netherlands, TEL: +31 (0)202 635 1000 - www.dnv.com - www.dnv.nl



DET NORSKE VERITAS
MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 88256-2010-AF-CZS-RvA

This is to certify that the Management System of:

ZVVZ-Enven Engineering, a.s.

Sažínova 1339, 399 01 Milevsko, Czech Republic

has been found to conform to:

ISO 14001:2004

This Certificate is valid for the following product or service ranges:

Engineering in the design and implementation of technological equipment supply of technological equipments.

Initial Certification date: 17 November 2010

This Certificate is valid until: 17 November 2013

The audit has been performed under the supervision of:


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DET NORSKE VERITAS
MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 88307-2010-AI-ISO-CZS-RvA

This is to certify that the Management System of:

ZVVZ-Enven Engineering, a.s.

Sažínova 1339, 399 01 Milevsko, Czech Republic

has been found to conform to:

OHSAS 18001:2007

This Certificate is valid for the following product or service ranges:

Engineering in the design and implementation of technological equipment, supply of technological equipments.

Initial Certification date: 17 November 2010

This Certificate is valid until: 17 November 2013

The audit has been performed under the supervision of:

Ladislav Novák
Lead Auditor

Place and date:
Prague, 18 November 2010

for the Accredited Unit:
DET NORSKE VERITAS Certificatie B.V., THE NETHERLANDS

Tomáš Urban
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Air-conditioning and Ventilation for Nuclear Power Plants

Elaboration of implementation documentation according basic-engineering documentation, elaboration of as-build documentation

We provide:

1. Air-handling equipment deliveries:

- Special filtering equipment
- Radial-flow and axial-flow fans
- Air-conditioners
- Noise silencers, closing air-elements
- Cooling units
- Fire fighting flaps
- Pipeline systems



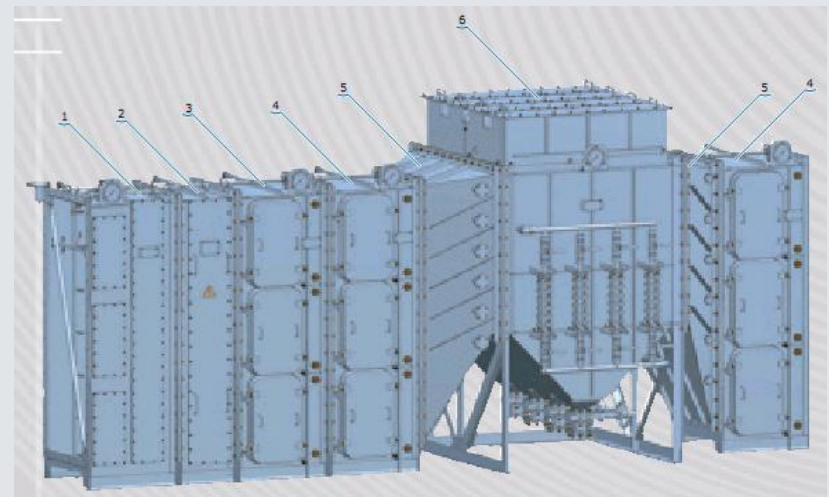
2. **Installation, adjustment and commissioning**
3. **Electrical part – heavy current and light current**
4. **Measuring and regulation**
5. **Distribution of heat and cold**
6. **Support structures + platforms**
7. **Ventilating and exhausting systems for building part**



Filtering Equipment

1. Field of application:

- Separation of radioactive aerosols, iodine and iodine compounds
- Part of inlet, outlet and circulative air-handling systems of nuclear power plant



Filtering Equipment

1 Devaporation filter

2 Electric heater

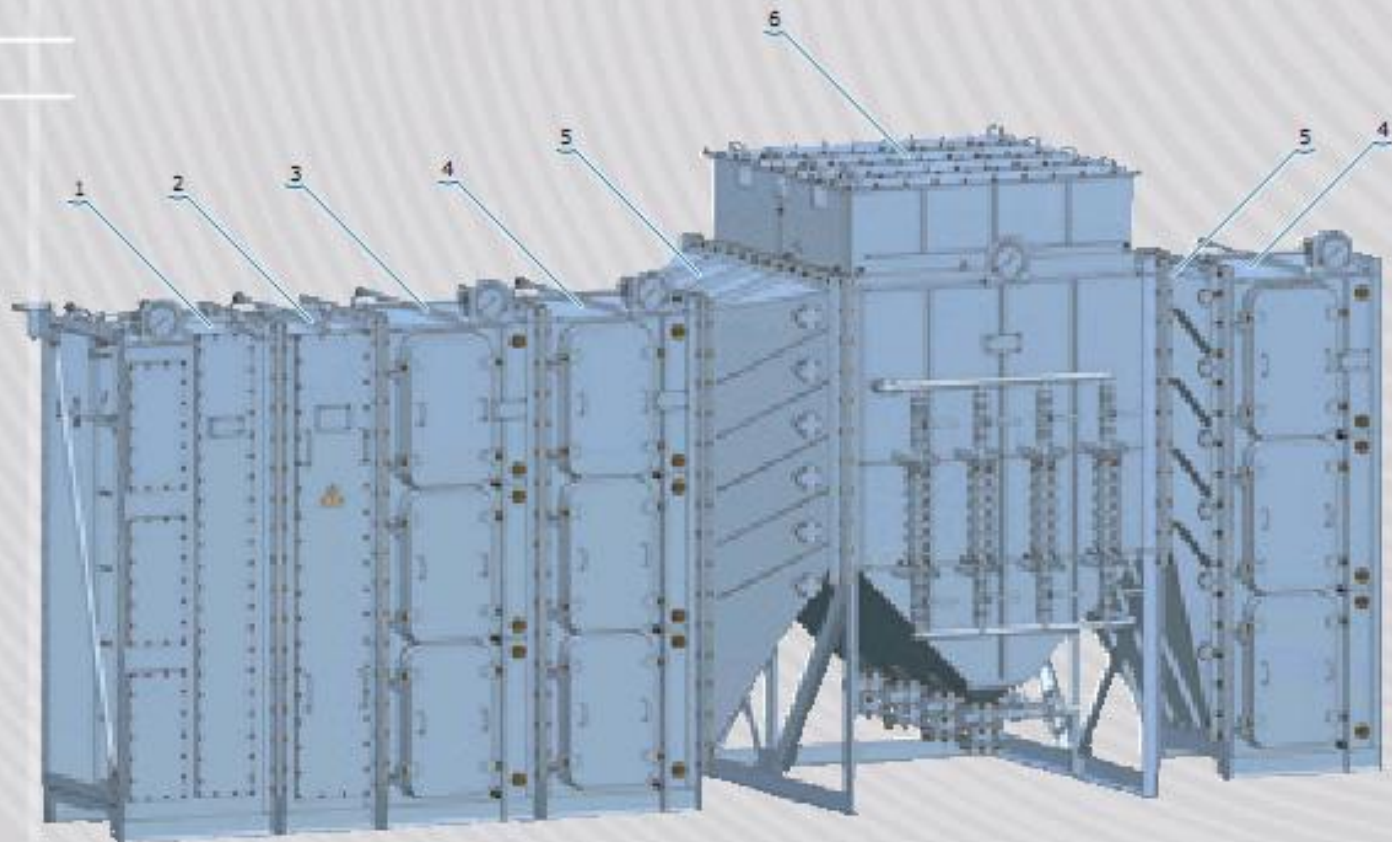
3 Aerosol pre-filter

4 High efficiency filter

5 Connecting parts

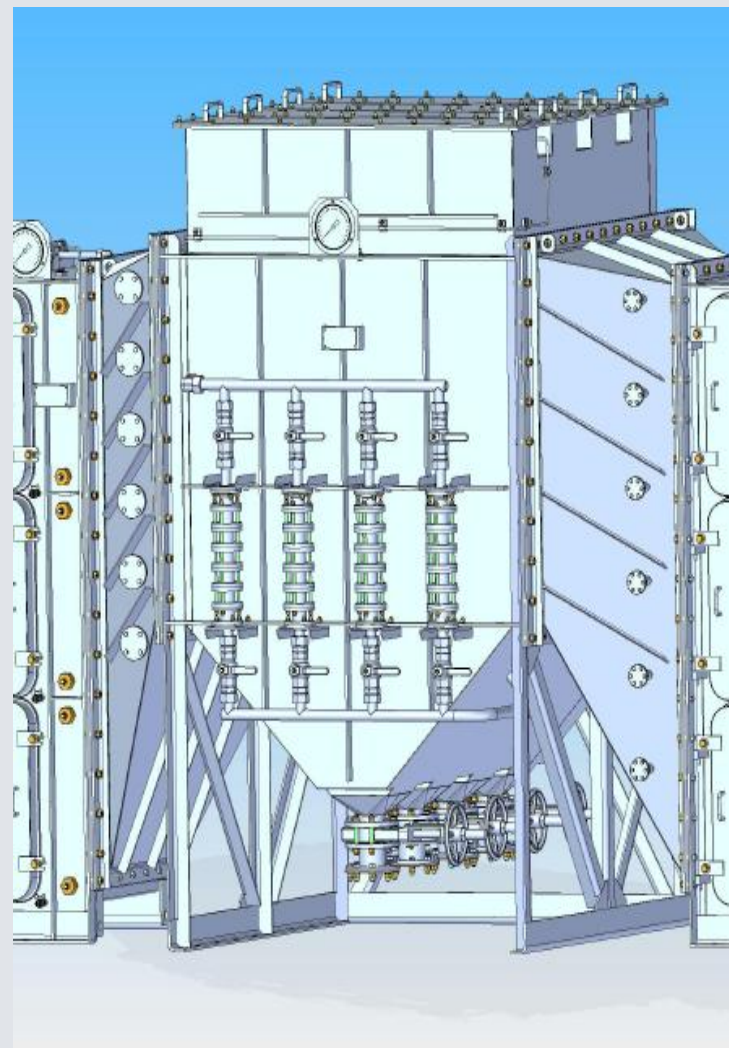
6 Iodine filter

2. Description of a modular type equipment



3. Technical parameters

- Nominal air flow rate of 2000, 4 000, 8 000, 12 000 a 16 000 m³.h⁻¹
- Separation efficiency min. 99,95 % for radioactive aerosols and min. 99,99 % for gaseous compounds of radioactive iodine
- Designed for underpressure 10 kPa
- The pressure drop up to 2 kPa
- Temperature of gas up to 150 °C
- Own know – how for this filtration equipment
- Certification for Russia and EU in progress



Radial fans RVJE - for NPP per 1000 MW

Common characteristic:

- Design: "direct" (blade wheel directly on the axis pin of motor)
one-side suction
- Seismic resistance: high – according world standards
- Protection coating: according project requirement
- Periodicity among shut downs: each 10 000 hours
- Life-time: 25 - 30 years
- Certification of manufacturing and inspection: according ISO 9001
- ZVVZ – Machinery own know- how for this fans
- Certification for Russia and EU in progress

Special characteristic:

- Integral amount of RA radiation for the life time of motor up to 6.105 Gy
- Valid for fans designed into the hermetic zone and service places

Special adjustment and design:

- Rustfree design
- Elastic foundation bearing (delivery of vibration insulators and steel frame)
- Steeples speed control of motor/fan (thyristor control)
- Increased temperature resistance up to 150°C (for all fans inst. of fans for hermetic zone)
- Explosionproof design: according environment, valid standard and request of customer (SNV-1/SVN-2)
- Gastightness: according environment, valid standard and request of customer



Radial and axial fans for NPP

Radial fans					
High - pressure				Medium - pressure	
RVIJ	315, 500, 630, (U), 800, 1000			RSJJ	630, 710 (U,US,atd.)
RVZJ	630			RSIJ	800, 1000, 1250, 1600
RVJJ	560			RSZJ	1600
RVIJ	400,500630, 800,100, 1250			RSZK	1600
RVIJ	315, 400, 500, 630			RSZI	1250
RVKJ	1000, 1250			RSIJ	1000
RVIJ	1000				
RVM	800				
RSB	400 - 1400	2009			

Axial fans	
(unidirectional, reverse)	
APTJ	800, 1000
APIJ	500



Ventilátor RSB 1400 vyrobený a dodaný na Mochovce 3,4 v roce 2011

Automatic Gas-tight Flaps (APU)

Application of APU: long-distance remote for closing of individual ventilation

Basic model lines of APU: D 200,355,500,630,800,1000,1500

Additional model lines of APU: 315,400,560 ...

Basic characteristic:

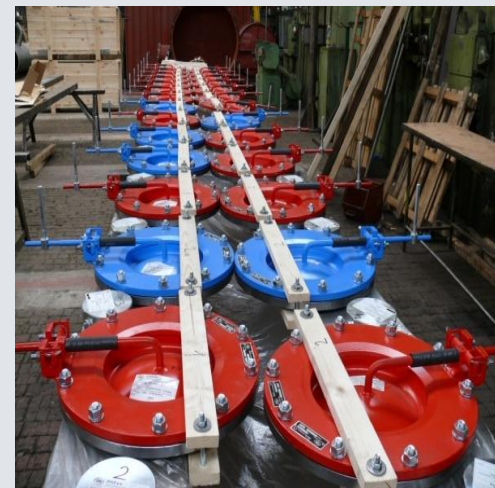
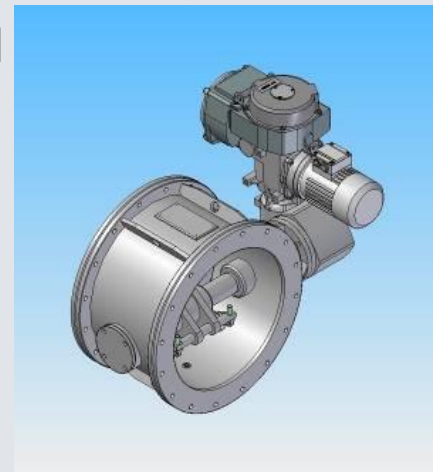
- Maximal operation overpressure up to 6 kPa
- Temperature of transported air +5 °C up to +70 °C
- Maximal relative humidity of transported air up to 100%
- The transported air can content evaporation decontamination substances, fighting toxic substances, sulfur and ammonia acids
- Gas-tight flaps are not designed as explosion nor fire flaps!

Environment:

- Seismic resistance for maximal calculating earthquake 8
- Maximal relative humidity of environment up to 80%
- temperature of environment 15 °C up to +70 °C

Certification:

- Certification for Russia and EU in progress
- Company Own know – how for this equipments



Final equipment supplier for Nuclear Power Plants

During construction of the first and 2 units of nuclear power plant Temelin and Mochovce we provided:

1. Elaboration of complete documentation, incl. as-built documentation
2. Deliveries of technical ventilation plants for the primary and secondary circuits of nuclear power stations:
 - Radial-flow and axial-flow fans
 - Units for air treatment
 - Sealed closing flaps and control valves, noise silencers
 - Cooling units and air coolers
 - Fire closures and fire-fighting flaps
 - Insulations of pipelines against noise, fire and heat
 - Pipeline systems, incl. fittings
 - Installation, adjustment and commissioning
3. Electrical part, heavy current and light current
4. Electrical part of the management control system
5. Measuring and regulation
6. Distribution of heat and cold
7. Technological structures and platforms
8. Lifting mechanisms
9. Shielding plates and covers
10. Construction part for ventilating and exhausting systems, for buildings and auxiliary structures



Our References in the Range of Nuclear Power Engineering

• NPP JASLOVSKÉ BOHUNICE, SK

- disposal of A1 – disposal of dwtorn
- vitrification of chompik
- fuel preparation equipment
- adaptation of repository
- overhaul of V1 – the 1st unit

• NPP DUKOVANY – the 3rd and 4th unit, CZ

- reactor building
- building of auxiliary services
- operating building
- galleries
- spent fuel store
- radiation monitoring in the stack
- diesel-generator plant – DGS
- radioactive waste processing

Related supplies:

- electrical part – power current
- electrical part – measurement and regulation
- heating and cooling distribution systems
- process structures and platforms
- lifting mechanisms
- shielding slabs and covers

• NPP MOCHOVCE – the 1st and 2nd unit, SK

- reactor building
- building of auxiliary services
- operating building
- switch house
- training centre
- dry hydrate store
- radiation monitoring in the stack
- diesel-generator plant – DGS
- radioactive waste processing

Related supplies:

- electrical part – power current
 - electrical part – measurement and regulation
 - heating and cooling distribution systems
 - process structures and platforms
 - lifting mechanisms
 - civil engineering air-handling equipments for IIIrd and IVth construction (administrative buildings, kitchens, exchanger plants, machine rooms, building of control centre), air cooler and radial fans in the system
- TL No. 02 and 03

• NPP TEMELÍN – the 1st and 2nd unit, CZ

- reactor building
- building of auxiliary services
- operating building
- switch house
- training centre
- dry hydrate store
- radiation monitoring
- diesel-generator plant – DGS
- radioactive waste processing
- examination of waste water

Related supplies:

- electrical part – power current
- electrical part – measurement and regulation
- heating and cooling distribution systems
- process structures and platforms
- lifting mechanisms
- civil engineering air-handling equipments for IIIrd and IVth construction (administrative buildings, kitchens, exchanger plants, machine rooms, building of control centre)

Reference, NPP Mochovce, SK

1st bloc – Operating complex

PS 1.20 Air-handling equipment of reactor building

- PS 1.20.01 Equipment for hermetic area
- PS 1.20.02 Equipment for air-tight area
- PS 1.20.03 Inlet air handling systems
- PS 1.20.04 Inset circuit of low-pressure coolers
- PS 1.20.06 Lifting mechanism
- PS 1.20.07 Cooling and heating pipelines
- PS 1.20.08 Electrical part
- PS 1.20.12 Technological platforms
- PS 1.20.15 Shielding plates and covers

PS 1.21 Air-handling equipment of building of auxiliary serv

- PS 1.21.01 Air-handling of mechanical part
- PS 1.21.06 Lifting mechanism
- PS 1.21.07 Cooling and heating pipelines
- PS 1.21.08 Electrical part
- PS 1.21.12 Technological platforms

PS 1.25 Air-handling equipment of support building

- PS 1.25.01 Crosswise gallery
- PS 1.25.02 Lengthwise gallery
- PS 1.25.07 Cooling and heat pipelines
- PS 1.25.08 Electrical part



Reference, NPP Mochovce, SK

2nd bloc – Operating complex

PS 2.20 Air-handling equipment of reactor building

- PS 2.20.01 Equipment for hermetic area
- PS 2.20.02 Equipment for air-tight area
- PS 2.20.03 Inlet air-handling systems
- PS 2.20.04 Inset circuit of low-pressure coolers
- PS 2.20.06 Lifting mechanism
- PS 2.20.07 Cooling and heating pipelines
- PS 2.20.08 Electrical part
- PS 2.20.12 Technological platforms
- PS 2.20.15 Shielding plates and covers

PS 2.25 Air-handling equipment for support buildings

- PS 2.25.01 Crosswise gallery
- PS 2.25.02 Crosswise gallery
- PS 2.25.07 Cooling and heating pipelines
- PS 2.25.08 Electrical part

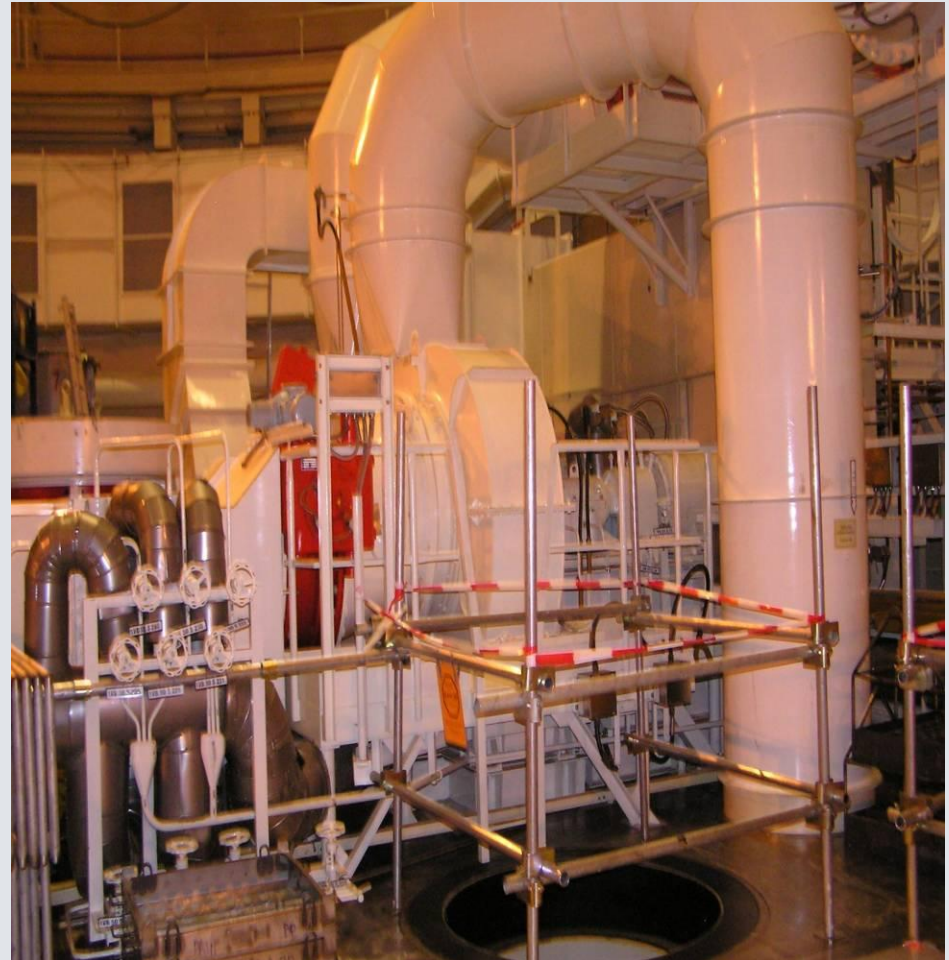
Joint for 1st and 2nd blocs – Operating complex

PS 0.22 Air-handling equipment of business premises

- PS 0.22.01 Air-handling equipment
- PS 0.22.06 Lifting mechanism
- PS 0.22.07 Cooling and heating pipelines
- PS 0.22.08 Electric part
- PS 0.22.12 technological platformsy



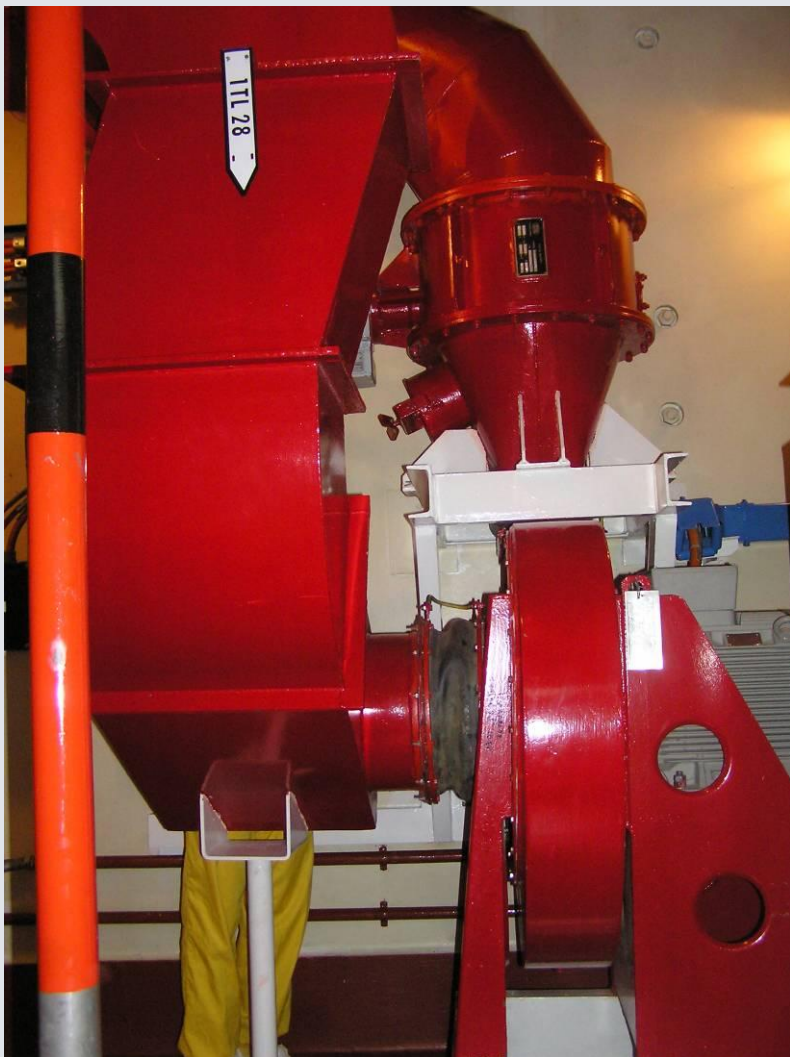
Selected References



Selected References



Selected References



Selected References



Ferosplavy - LF

Product:	2 x FTS 2x6-15x20/5
Customer:	HLMK Lipect, RU

Flow:	2 x 480 000 m ³ /h
Temperature:	160 °C
Pressure:	-6 kPa



Selected References

ESPs

AO Aluminium Pavlodar KAZ - Aluminium PAVLODAR - aluminium works

AOO EMZ - Yenakiyeve UA - EMZ YENAKIYEVE blast furnace No. 3 LD

EUROCEMENT Group RUS - Cement Plant BELGOROD rotary kiln for clinker production, No.7

EUROCEMENT Group RUS - Cement plant KATAVSK rotary kiln for clinker production No.1, 840 t/day

BFs and separators

LAFARGE CEMENT, Voskressensk Plant RU - Voskreessensk building industry separation circuit of cement mill

LAFARGE CEMENT, Voskressensk Plant RU - Voskreessensk building industry cement mill

EVRAZ, NTMK Nizhniy Tagil Iron & Steel Works RU - Nizhniy Tagil metallurgy converters

OAO "Sucholozskcement" 5TL - Dyckerhoff RU - Suchoj Log building industry slag dryer

LAFARGE CEMENT, Uralcement plant RU - Korniko building industry cement mill

OAO "Sucholozskcement" - Dyckerhoff RU - Suchoj Log building industry clinker transport

OOO "ZVVZ - M" RU - Lipeck metallurgy rotary wagon tipper of coal

Why should you choose just our devices?



- 60 years of long standing tradition
- Skilled team of specialists
- High level of technical and technological facilities
- Hundreds of satisfied customers
- Individual approach for design of each supply
- Feedback from each installation and operation of device
- Foreign representation in several countries of Europe

Customer Service

ZVVZ-Enven Engineering, a.s. provides customer service both for our equipment and for equipment of other manufacturers.

A) Warranty service:

- regular controls of installed products and equipment, free of charge within the warranty period

B) Post-warranty service:

- after the expiration of warranty period, based on a service contract with the user, we provide control, adjustments and eventual repair proposals

C) Long-term service:

- based on a long-term service contract, the service is performed in such a manner as to eliminate all unplanned out-of-service periods and work interruptions



Thank you very much for your attention!