



### Research Institute of Industrial Chemistry 1954 - 2014

## **History and Present**

Research Institute of Industrial Chemistry (VÚPCH) with its seat in Pardubice-Semtín was established by the Ministry of Defense Decree of November 2<sup>nd</sup>, 1953 to January 1<sup>st</sup> 1954 as a state administration facility with the scope of activities - research and development of explosives. VÚPCH was entitled to administrate research workplaces of national enterprise Synthesia, and experts were centralized there from the original research department, the so-called Central Laboratories of the company, and technological groups of the former Explosia. The activity of VÚPCH continuously linked up to the activity of departments R and X that had been entrusted with research, development and testing within the framework of Explosia a.s. since 1923.

By the Ministry of Chemical Industry Decree of December 30<sup>th</sup>, 1958 VÚPCH was abolished as an independent budgetary organization and to the date of January 1<sup>st</sup>, 1959 transferred into administration of national enterprise East Bohemian Chemical Works Synthesia. Within the framework of Synthesia there were, however, some changes in actual organizational incorporation of VÚPCH, especially in connexion with establishing the position of Deputy for Special Production in the 1970s, and the Plant 05 Special Production in the 1980s. VÚPCH, however, managed to keep relatively high proportion of economic independence for the whole of that time, if considered practically 100 % state financial backing. Since 2002 VÚPCH has been the part of Explosia a.s.

**DIRECTORS of VUPCH** 



### **Plastic Explosives**

In the fifties of the last century the research and later the industrial production of plastic explosives based on High explosives and non-explosive plasticizer was started in VCHZ (today known as Explosia).

Plastic explosives from Explosia are known under the trade name Semtex<sup>®</sup>. From the beginning, the newly established research institute (VÚPCH) was the author of the technical solutions of plastic explosives as well as most of the production equipment.

**PI Np 10** (The Black Semtex)





The First Structure of VUPCH taken from Officially Authorized Research and Testing Institute of company Synthesia:

1 - Analytical Laboratories	3b - Inorganic Chemistry
1a - Stabilities	3c - Explosives
1b - Smokeless Powders	3d - Textiles and Leather
1c - Cellulose and Nitrocellulose	3e - Plastic Materials
1d - Acids	4 - Technical Library
1e - Nitrocompounds and Industrial Explosives	5 - Darkroom
1f - Raw Materials	6 - Patent Office
1g - Water Resources Management	7 - Glassworks
2 - Physical Laboratories	8 - Chemicals and Glass Storage
3 - Research Laboratories	9 - Administrative
3a - Organic Chemistry	10 - Supervisory and Controling

### **Research and Development activity**

Research and development activity of VÚPCH is very closely connected with building of armament industry in the fifties of the last century. VÚPCH employees participated practically in all development projects not only in the field of propellants and military explosives and ammunition, but also in implementation of production technologies both in the today's Explosia a.s. and in other companies and abroad.

Main part of present Explosia a.s. production scope in the assortment of explosives, propellants and ammunition and also production technologies used and their know-how has been developed in VÚPCH namely in cooperation with other departments of EXPLOSIA a.s. and SYNTHESIA a.s., or with other companies.

Activities of VÚPCH are primarily aimed at research and development of production technologies for propellants, explosives and combustible masses, and also at loading of charges and ammunition, short-run production of propellants and explosives and related application techniques, as e.g. production of components for aircraft rescue systems, special blasting and demolition works, assessment of detectors of explosives according to users' requirements etc.

In addition to research and development activities the VÚPCH laboratories ensure also a wide spectrum of analyses and tests for production departments of EXPLOSIA a.s., as well as for external customers, e.g. analyses and identifications of unknown explosives, ballistic tests of propellants, explosive and safety tests of explosives etc. Many of these tests are accredited according to ČSN EN ISO/IEC 17025.

VÚPCH workers provide expert activities in the field of propellants stability problems. detection of explosives, identification of propellants from ammunition, further in the field of disposal of propellants, pyrotechnic compositions and other components de-loaded from large caliber ammunition and rockets, and provide also expert services for army research base and specialized training services (e.g. training of pyrotechnists).

Dr. František Krejčí, CSc. 1954 - 1955



Ing. Žalský Josef 1956 - 1961



1961 - 1985



### - The first produced plastic explosive. - For military use. - In 1987 released for civil use as Semtex<sup>®</sup> 10

Masa B1 (B1 Composition - The Red Semtex) - For military use - For mine clearing devices ROD and VO - In 1964 realeased for civil use as Semtex®A

Semtex<sup>®</sup> 1H (The Yellow Semtex) - Production starts in 1967 - The first Semtex with RDX

### Semtex<sup>®</sup>2

- Variant of Semtex<sup>®</sup> 1A - For secondary blasting works - For booster charges

### PI Hx 30

- For military use Aluminized explosive - Replacement of PI Np 10

### PI U-EP 14 - Thermoplastic explosive

- For extrusion or pressing - Primary used in URG-86 hand grenades

PI D-E 12 - Thermoplastic explosive - Primary used in DYNA reactive armor system



PRUNA - Specialized production facility from sixties of the last century

### Semtex<sup>®</sup>10 SE - Sheet explosive for hardening of metals - In production from 1995

**PI SE M** - Sheet explosive - Primary for military use - Basic explosive for many demolition charges - In production from 2005

### Semtex<sup>®</sup>C4

- Czech surrogate of US Composition C-4 - In production from 2010 - Good customer references

### Semtex<sup>®</sup>90

- Wide working temperature range (-40 °C - + 70 °C) - Produced in three variants (PETN, PETN / RDX, RDX) - High power explosive



## **Analytical laboratories**







2014

Explosives containing

inorganic

nitrates, inorganic

chlorates

Ing. Boris Vetlický, CSc.





# Synthesis Pilot Plant