

Cinel Strumenti Scientifici was founded in Padua in the 70's with a technical partnership of INFN LNL Legnaro Laboratory on particle accelerator projects and since then has been involved in some of the most challenging projects all over Europe.

Nowadays, CINEL has reached a long experience on mechanical design and manufacture of apparatuses in several scientific and research fields such as Synchrotron Light Sources (monochromators, fully integrated front ends and beam lines, experimental chambers), as well as accelerator components (vacuum chambers, accelerating cavities, radiofrequency quadrupole cavities) and accessories for analytical instruments such as laboratory gas generators.

Cinel has acquired skilled experience in the field of cryogenics, superconductivity, astrophysics and bio-mechanics collaborating with well-known institutions as a qualified partner in the mechanical, thermal and control system design and it can now propose turnkey solutions with high level standardization.

CAD-CAM environment and CNC machines allow Cinel to fully develop whole technical projects, from the design phase to the product certification taking care of all the electro-mechanical, pneumatic and hydraulic aspects.

Cinel in an ISO 9001 qualified company.

The first premises, the head quarter of the company, is 2000 m². It is arranged in order to separate the workshop area from the welding and from the mounting and testing areas. It is now operative a second premises of 500 m² for final assembly and testing. Both premises are based in Vigonza (Pd) Italy.



NITROGEN GENERATORS **N₂**

HYDROGEN GENERATORS **H₂**

OXYGEN GENERATORS **O₂**

ZERO AIR GENERATORS **Z** ZERO AIR

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DESIGN AND PRODUCTION OF LABORATORY GAS GENERATORS
N₂ H₂ O₂ ZERO AIR



NITROGEN GENERATORS

ZEFIRO series

The constant and completely autonomous supply of nitrogen flux

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ZEFIRO LC/MS 20-25-35-40 PSA technology

ZEFIRO Nitrogen Generator is designed specifically as a stand-alone system to provide nitrogen to single LC/MS applications which require a constant and autonomous supply of nitrogen flux.

The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas. This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and water vapor molecules under high pressure, while allowing Nitrogen to pass through. The alternation between purification and regeneration of the sieve bed pressure Vessels ensure continuous nitrogen flow production.

Application

LC/MS

Technical data

	ZEFIRO LC/MS 20-25		ZEFIRO LC/MS 35-40	
STANDARD NITROGEN FLOW RATE	20 l/min at STP	25 l/min at STP	35 l/min at STP	40 l/min at STP
OUTLET PRESSURE	max 8 bar (116 psi)		max 8 bar (116 psi)	
STANDARD PURITY	99% at STP	98,5% at STP	99% at STP	98,5% at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz		110 V / 60 Hz - 230 V / 50 Hz	
WEIGHT	132 Kg		135 Kg	
POWER CONSUMPTION	1800 W		1800 W	
FUSE	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F		N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	
PRESSURE ACCURACY	0.1 bar (± 0.5 %)		0.1 bar (± 0.5 %)	
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px		Graphic display, 128 x 64 px	
INDEX OF PROTECTION	IP2x		IP2x	
TEMPERATURE	15°C to +35°C		15°C to +35°C	
RELATIVE HUMIDITY	0-80%, non condensing		0-80%, non condensing	
SOUND PRESSURE LEVEL	< 60 dB(A)		< 60 dB(A)	
ALARM RELAYS	250 VAC, 12 A max		250 VAC, 12 A max	
OUTPUT PORT	G1/4		G1/4	
CASE DIMENSIONS	width 48 cm, height 64 cm, length 84 cm		width 48 cm, height 64 cm, length 84 cm	

STP: Standard Temperature and Pressure (20°C, 1 bar)

ZEFIRO LC/MS 50-60 MEMBRANE technology

ZEFIRO Nitrogen Generator is designed specifically as a stand-alone system to provide nitrogen flux to single LC/MS applications which require a high nitrogen consumption or allows two standard LC/MS to be supplied contemporaneously.

The nitrogen generator uses membranes technology. Compressed air is forced through a hollow fibre membrane, with selective permeation of the different components, nitrogen, oxygen, CO2, water vapor and traces of rare gases (Ar, Co), depending on the rate of diffusion. The rate of diffusion of nitrogen through the membrane is slower than the other components, which thus flow outside of the fiber membrane, leaving nitrogen inside only.

Application

LC/MS

Technical data

	50 l/min at STP	60 l/min at STP
STANDARD NITROGEN FLOW RATE	50 l/min at STP	60 l/min at STP
OUTLET PRESSURE	max 7 bar (102 psi)	
STANDARD PURITY	98.5% at STP	98% at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz	
WEIGHT	80 Kg	
POWER CONSUMPTION	1900 W	
FUSE	N.1 6.3x32 mm, 16 A, type F	
PRESSURE ACCURACY	0.1 bar (± 0.5 %)	
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px	
INDEX OF PROTECTION	IP2x	
TEMPERATURE	15°C to +35°C	
RELATIVE HUMIDITY	0-80%, non condensing	
SOUND PRESSURE LEVEL	< 60 dB(A)	
ALARM RELAYS	250 VAC, 16 A max	
OUTPUT PORT	G1/4	
CASE DIMENSIONS	width 48 cm, height 64 cm, length 84 cm	

ZEFIRO LC/MS series

ZEFIRO LC/MS COMBINED

ZEFIRO Nitrogen Generator LC-MS COMBINED is specifically designed to supply Nitrogen & Exhaust gases for the AB SCIEX LCMS instruments.

The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas. This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and residual water vapor molecules under high pressure, while allowing Nitrogen to pass through. The internal oil free air compressor which is firstly pre filtered provide also to the exhaust air flow which is treated by a drying filter.

Application

ABX SC LC/MS

Technical data

STANDARD AIR & NITROGEN FLOW RATE	Air outlet: 25 l/min + 5 l/min at STP N2 outlet: 10 l/min at STP
OUTLET PRESSURE AIR & NITROGEN	Max 7,5 bar (108 psi) Max 5,5 bar (78 psi)
STANDARD PURITY	98.0% at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	132 Kg
POWER CONSUMPTION	1800 W
FUSE	N.1 6.3x32 mm, 20 A, type F - N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	15°C to +35°C
RELATIVE HUMIDITY	0-80%, non condensing
SOUND PRESSURE LEVEL	< 60 dB(A)
ALARM RELAYS	250 VAC, 16 A max
OUTPUT PORT	G1/4
CASE DIMENSIONS	width 48 cm, height 64 cm, length 84 cm

ZEFIRO LC/MS DUAL-PURITY

ZEFIRO Nitrogen Generator LC-MS DUAL PURITY is specifically designed to meet the gas flow, purity and pressure requirements of AGILENT LCMS instruments. The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas. This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and water vapor molecules under high pressure, while allowing Nitrogen to pass through.

The system supplies simultaneously Nitrogen for LC-MS & ultra high purity nitrogen for the collision cell combining standard PSA management with special PSA DP (Double Step) to produce pure nitrogen gas with ultra high purity.

Application

AGILENT LC-MS

Technical data

STANDARD NITROGEN FLOW RATE	First N2 outlet: from 20 l/min to at STP Second N2 outlet: 0.15 l/min at STP
OUTLET PRESSURE	8 Bar at STP 2 Bar at STP
STANDARD PURITY	99.0% at STP 99,999% at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	132 Kg
POWER CONSUMPTION	1800 W
FUSE	N.1 6.3x32 mm, 20 A, type F - N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	15°C to +35°C
RELATIVE HUMIDITY	0-80%, non condensing
SOUND PRESSURE LEVEL	< 60 dB(A)
ALARM RELAYS	250 VAC, 16 A max
OUTPUT PORT	G1/4
CASE DIMENSIONS	width 48 cm, height 64 cm, length 84 cm

ZEFIRO SPECIAL UNITS series

ZEFIRO HIGH PRESSURE

The HIGH PRESSURE nitrogen generator has been specifically designed to meet the gas flows, purity and pressure requirements of the Accelerated Solvent Extraction System (ASE®), the Dionex patented technique for the extraction of solid and semisolid sample matrices using common solvents at elevated temperatures and pressures. The Nitrogen reach the maximum pressure of 11 bars.

Application

**DIONEX ASE
Sample Preparation**

Technical data

STANDARD NITROGEN FLOW RATE	From 20 to 35 l/min at STP
OUTLET PRESSURE	Outlet 1: max 11 bar (160 psi) - Outlet 2: max 8 bar (116 psi)
STANDARD PURITY	From 98.0% to 99.0% at STP (in function of the outlet flow)
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	132 Kg
POWER CONSUMPTION	1800 W
FUSE	N.1 6.3x32 mm, 20 A, type F - N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	15°C to +35°C
RELATIVE HUMIDITY	0-80%, non condensing
SOUND PRESSURE LEVEL	< 60 dB(A)
ALARM RELAYS	250 VAC, 16 A max
OUTPUT PORT	Outlet 1: fitting 4 mm - Outlet 2: fitting 6 mm
CASE DIMENSIONS	width 48 cm, height 64 cm, length 84 cm

STP: Standard Temperature and Pressure (20°C, 1 bar)

ZEFIRO 8 EL-SD

ZEFIRO Nitrogen Generator EL-SD series is specifically designed to meet the gas flow, purity and pressure requirements of Evaporative Light Scattering Detectors. The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas. This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and water vapor molecules under high pressure, while allowing Nitrogen to pass through.

Application

EL-SD

Technical data

STANDARD NITROGEN FLOW RATE	8 l/min at STP
OUTLET PRESSURE	5 Bar at STP (72,5 psi)
STANDARD PURITY	0.1% at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	132 Kg
POWER CONSUMPTION	1800 W
FUSE	N.1 6.3x32 mm, 20 A, type F - N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	15°C to +35°C
RELATIVE HUMIDITY	0-80%, non condensing
SOUND PRESSURE LEVEL	< 60 dB(A)
ALARM RELAYS	250 VAC, 16 A max
OUTPUT PORT	G1/4
CASE DIMENSIONS	width 48 cm, height 64 cm, length 84 cm

ZEFIRO HP series



ZEFIRO 3 HP - 5 HP & mini-ZEFIRO 1 HP

The model HP (High Purity) Nitrogen Generator is designed specifically for use as make up and carrier gas for GC Applications, which require ultra high purity nitrogen for operation.

The HP nitrogen generator series is also suitable for ICP.

The Nitrogen generator use pressure swing adsorption technology (PSA) combined with a pressure management in two steps (DP PSA) to produce pure nitrogen gas with ultra high purity.

Application

Carrier gas for GC
ICP

Technical data

ZEFIRO 3 HP

ZEFIRO 5 HP

STANDARD NITROGEN FLOW RATE	3 l/min at STP	5 l/min at STP
OUTLET PRESSURE	max 5 bar (72,5 psi)	max 5 bar (72,5 psi)
STANDARD PURITY	99.999% (O ₂ < 10 ppm) at STP	99.999% (O ₂ < 10 ppm) at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	95 Kg	110 Kg
POWER CONSUMPTION	800 W	1500 W
FUSE	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x	IP2x
TEMPERATURE	15°C to +35°C	15°C to +35°C
RELATIVE HUMIDITY	0-80%, non condensing	0-80%, non condensing
SOUND PRESSURE LEVEL	< 60 dB(A)	< 60 dB(A)
ALARM RELAYS	250 VAC, 12 A max	250 VAC, 12 A max
OUTPUT PORT	G1/4	G1/4
CASE DIMENSIONS	width 48 cm, height 64 cm, length 84 cm	width 48 cm, height 64 cm, length 84 cm

Technical data

mini-ZEFIRO 1 HP

STANDARD NITROGEN FLOW RATE	1 l/min at STP
OUTLET PRESSURE	max 5 bar (87 psi)
STANDARD PURITY	99.999% (O ₂ < 10 ppm) at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	45 Kg
POWER CONSUMPTION	600 W
FUSE	N.1 6.3x32 mm, 20 A, type F - N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	15°C to +35°C
RELATIVE HUMIDITY	0-80%, non condensing
SOUND PRESSURE LEVEL	< 60 dB(A)
ALARM RELAYS	250 VAC, 16 A max
OUTPUT PORT	Swagelok for tube 1/8" or 3 mm
CASE DIMENSIONS	width 55 cm, height 42 cm, length 51 cm

STP: Standard Temperature and Pressure (20°C, 1 bar)

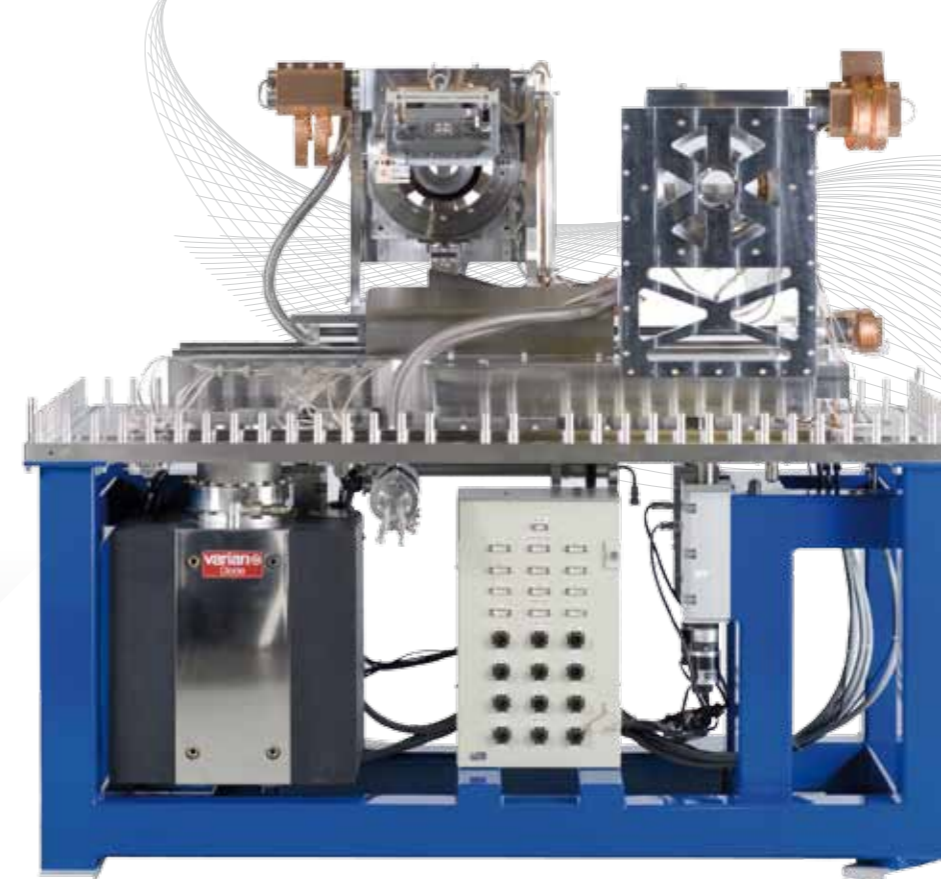
Summary

Technical data

	ZEFIRO LC/MS 20-25 PSA technology	ZEFIRO LC/MS 35-40 PSA technology	ZEFIRO LC/MS 50-60 PSA technology	ZEFIRO LC/MS MEMBRANE technology	ZEFIRO LC/MS COMBINED	ZEFIRO LC/MS DUAL-PURITY	ZEFIRO LC/MS HIGH PRESSURE	ZEFIRO LC/MS EL-SD	ZEFIRO LC/MS 3 Hp - 5 Hp	mini-ZEFIRO 1 Hp
STANDARD AIR & NITROGEN FLOW RATE	20 l/min at STP 25 l/min at STP	35 l/min at STP 40 l/min at STP	50 l/min at STP 60 l/min at STP	Air outlet: 25 l/min + 5 l/min at STP N2 outlet: 10 l/min at STP	First N2 outlet: from 20 l/min to at STP Second N2 outlet: 0.15 l/min at STP	From 20 to 35 l/min at STP	8 l/min at STP	3 l/min at STP 5 l/min at STP	1 l/min at STP	
OUTLET PRESSURE AIR & NITROGEN	max 8 bar (116 psi)	max 8 bar (116 psi)	max 7 bar (102 psi)	Max 7.5 bar (108 psi) Max 5.5 bar (78 psi)	8 Bar at STP 2 Bar at STP	Outlet 1: max 11 bar (160 psi) Outlet 2: max 8 bar (116 psi)	5 Bar at STP (72.5 psi)	max 5 bar (72.5 psi)	max 5 bar (87 psi)	
STANDARD PURITY	99% at STP 98.5% at STP	99% at STP 98.5% at STP	98.5% at STP 98% at STP	98% at STP	99.0% at STP 99.999% at STP	From 98.0% to 99.0% at STP (in function of the outlet flow)	0.1% at STP	99.999% (O2 < 10 ppm) at STP	99.999% (O2 < 10 ppm) at STP	
INPUT VOLTAGE	110 V / 60 Hz 230 V / 50 Hz	110 V / 60 Hz 230 V / 50 Hz	110 V / 60 Hz 230 V / 50 Hz	110 V / 60 Hz 230 V / 50 Hz	110 V / 60 Hz 230 V / 50 Hz	110 V / 60 Hz 230 V / 50 Hz	110 V / 60 Hz 230 V / 50 Hz	110 V / 60 Hz 230 V / 50 Hz	110 V / 60 Hz 230 V / 50 Hz	
WEIGHT	132 Kg	135 Kg	80 Kg	132 Kg	132 Kg	132 Kg	132 Kg	95 Kg 110 kg	45 Kg	
POWER CONSUMPTION	1800 W	1800 W	1900 W	1800 W	1800 W	1800 W	1800 W	800 W 1500 W	600 W	
FUSE	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	N.1 6.3x32 mm, 16 A, type F	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	
PRESSURE ACCURACY	0.1 bar (± 0.5 %)	0.1 bar (± 0.5 %)	0.1 bar (± 0.5 %)	0.1 bar (± 0.5 %)	0.1 bar (± 0.5 %)	0.1 bar (± 0.5 %)	0.1 bar (± 0.5 %)	0.1 bar (± 0.5 %)	0.1 bar (± 0.5 %)	
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px	Graphic display, 128 x 64 px	Graphic display, 128 x 64 px	Graphic display, 128 x 64 px	Graphic display, 128 x 64 px	Graphic display, 128 x 64 px	Graphic display, 128 x 64 px	Graphic display, 128 x 64 px	Graphic display, 128 x 64 px	
INDEX OF PROTECTION	IP2x	IP2x	IP2x	IP2x	IP2x	IP2x	IP2x	IP2x	IP2x	
TEMPERATURE	15°C to +35°C	15°C to +35°C	15°C to +35°C	15°C to +35°C	15°C to +35°C	15°C to +35°C	15°C to +35°C	15°C to +35°C	15°C to +35°C	
RELATIVE HUMIDITY	0-80%, non condensing	0-80%, non condensing	0-80%, non condensing	0-80%, non condensing	0-80%, non condensing	0-80%, non condensing	0-80%, non condensing	0-80%, non condensing	0-80%, non condensing	
SOUND PRESSURE LEVEL	< 60 dB(A)	< 60 dB(A)	< 60 dB(A)	< 60 dB(A)	< 60 dB(A)	< 60 dB(A)	< 60 dB(A)	< 60 dB(A)	< 60 dB(A)	
ALARM RELAYS	250 VAC, 16 A max	250 VAC, 16 A max	250 VAC, 16 A max	250 VAC, 16 A max	250 VAC, 16 A max	250 VAC, 16 A max	250 VAC, 16 A max	250 VAC, 16 A max	250 VAC, 16 A max	
OUTPUT PORT	G1/4	G1/4	G1/4	G1/4	Outlet 1: fitting 4 mm Outlet 2: fitting 6 mm	Outlet 1: fitting 4 mm Outlet 2: fitting 6 mm	Outlet 1: fitting 4 mm Outlet 2: fitting 6 mm	Swagelok for tube 1/8" or 3 mm	Swagelok for tube 1/8" or 3 mm	
CASE DIMENSIONS	48x84x64 cm (WxDxH)	48x84x64 cm (WxDxH)	48x84x64 cm (WxDxH)	48x84x64 cm (WxDxH)	48x84x64 cm (WxDxH)	48x84x64 cm (WxDxH)	48x84x64 cm (WxDxH)	48x84x64 cm (WxDxH)	55x51x42 cm (WxDxH)	
APPLICATION	LC/MS	LC/MS	LC/MS	ABX SC LC/MS	AGILENT LC-MS	DIONEX ASE Sample Preparation	EL-SD	Carrier gas for GC ICP	Carrier gas for GC ICP	

...other

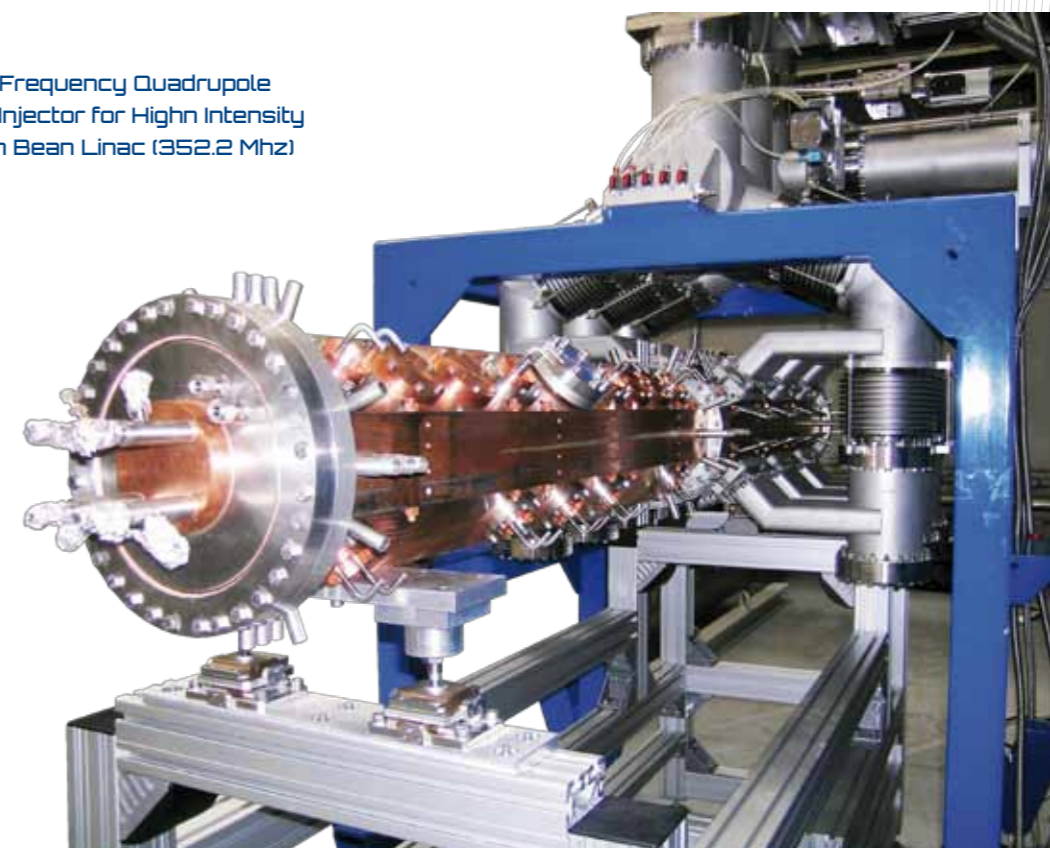
Double Crystal/Multilayer
Monochromator
(energy range 8-45 keV)
for TOMCAT Beamline



Components for

SYNCHROTRON LIGHT

Radio Frequency Quadrupole
Linac Injector for High Intensity
Proton Beam Linac (352.2 Mhz)



Components for

PARTICLE ACCELERATORS