STRUMENTI SCIENTIFICI
CINEL S.r.l.

Vigonza (Padova) – Italia

DESIGN and MANUFACTURING of SCIENTIFIC RESEARCH EQUIPMENT for SYNCHROTRON LIGHT SOURCES, XFELs and PARTICLE PHYSICS ACCELERATORS
PREMISES AND LOCATION

Headquarter is located in a 2000 m² industrial estate, arranged in order to separate the mechanical workshop and welding area from the assembly and metrology/testing area. Since 2011 the company also owns a 500 m² building dedicated to further assembly and brazing facilities.

Location: Vigonza (Padua) – Italy. 30 km west from Venice (Venezia) Marco Polo Intl. airport

Strumenti Scientifici CINEL S.r.l. is an ISO 9001:2008 certified company
COMPANY BACKGROUND

• Strumenti Scientifici CINEL was founded in Padua at the beginning of the 70's, via a technical partnership with the Italian Institute of Nuclear Physics of Legnaro (INFN-LNL) located at 15 km from the company.

• Since the mid 80’s CINEL established relationships with major Italian nuclear physics research sites and also started exporting its products, starting collaborations with CERN (Geneva, Switzerland).

• Nowadays CINEL manufactures components and systems for Synchrotron Light Sources, XFELs and Nuclear/Accelerator Physics laboratories.
MAIN ACTIVITIES

• Synchrotron Light Source Facilities and XFELs: X-ray Monochromators, Mirror systems, Front Ends, Storage Ring and Beamline components

• Particle Accelerator components: Resonant Cavities, Beam Diagnostics, Linac Modules, Vacuum Chambers

• Cad 3D Design and System integration, high precision machining of special metals, Vacuum brazing, optical metrology and vacuum testing for custom instruments

• **R&D and Project coordination: Partnership with several Customers and selected sub-suppliers**
MACHINING EQUIPMENT

Machining Centers and milling machines with working strokes up to \( x=4000, y=1200 \) and \( z=2000 \)

CNC Turning machines for work pieces up to a diameter of 800 mm and a length of 3000 mm

Lathes

Spark erosion: drill machine for holes down to 0.3 mm on 150 mm thick copper blocks, EDW machines to cut up to 300 mm of thickness

Grinding machine
WELDING EQUIPMENT

GTAW and SMAW welding machine (current 300-400 A)

MIG and MAG welding machine

Brazing Furnace: TAV All Metal Vacuum Furnace,
1) Working space: 450 x 450 x 1200 mm
2) Max operat. Temp 1400 °C
3) High Vacuum 1 x 10⁻⁶ mbar or Ar-N partial pressure (10 mbar max)
CLEANING EQUIPMENT

Ultrasound washing pool with 3 stages (warm bath with detergent, tap water for first rinsing, demineralized water for final rinsing).

Max. Useful dimensions: 1500 x 1000 x 1200 (h) mm

Standard cleaning of: storage ring components, ID vessels, UHV components for beamlines and accelerators
VACUUM TEST EQUIPMENT

Two complete dry pumping groups (Varian Try-Scroll forevacuum pump, Varian HT300 turbo pump, Varian Starcell 500 ion pump) with associated pressure gauges

Two Residual Gas Analyzer MKS Microvision Plus

Two Backout units with Gefran temperature controllers up to 15 kw power divided into 10 areas

Two Helium leak detectors: Pfeiffer HLT 265 - Pfeiffer HLT 560
METROLOGY EQUIPMENT

Perthometer Mahr M2; measuring range up to 100 µm and resolution of 12 nm

Ultrasound thickness gauge: Panametrics 26XDTL-93-M, measuring range from 0.5 mm up to 500 mm (depending on material), resolution 0.01 mm

Height Gauge: Micro-Hite. Measuring range up to 800 mm, resolution of 0.001 mm, accuracy 0.003 mm
METROLOGY EQUIPMENT

Magnetoscope for magnetic permeability measurements

Laser Interferometer Renishaw ML10 Gold. Linear measurement, range is up to 40m and resolution is 0.001 µm; Angular measurement, range is up to 10° with a resolution of 0.1 µrad

3D Zeiss Measuring Machine, Zeiss Accura 2 with VAST XT Gold sensor. Working volume 1200x900x800 mm; resolution 1.6 µm + L /333 (mm), Max weight load (gross) 400 Kg
3D Zeiss Measuring Machine
Zeiss Accura 2 with VAST XT
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Particle Accelerator Components

*Sincrotrone Trieste S.C.p.A.*  
*Cavity Beam Position Monitor*

Non-destructive sub micron resolution diagnostic for FEL electron beam

A novel electromagnetic design and a new manufacturing process for the cavity BPM (Beam Position Monitor), NIM A 662, Issue 1, January 2012
Particle Accelerator Components

Italian Institute for Nuclear Physics
IFMIF EVEDA CW RFQ (module N. 16 in the picture, brazed). 175 MHz from 0.1 MeV to 5 MeV, 125 mA, 1.6 MW total power
Particle Accelerator Components

ESRF Storage Ring HOM damped Resonant Cavity, 352.2 Mhz frequency
Particle Accelerator Components

“ELETTRA Design” Normal Conducting RF Cavities

7 being currently built
Particle Accelerator Components

X-FEL IBFB KICKERS
Ing. Fabio Marcellini (PSI)

X-BAND SPLITTERS FOR CLIC PROJECT
Ing. Maria Filippova (CERN)

X-BAND COMPACT PUMPING PORTS AND TAPERS FOR THE CLIC PROJECT
Dott. Germana Riddone (CERN)

RF PLANAR HYBRID COUPLER FOR THE CLIC PROJECT
Ing. Patrick Girardot (CEA)

IFMIF – EVEDA ACCELERATOR
Dott. Andrea Pisent (INFN)

COLLIMATORS FOR LHC
Dott. Roberto Losito (CERN)

… And MANY others!!
Synchrotron Light Sources Instrumentation

Monochromators, Mirror Systems, Beam Lines, Ancillary Components
Synchrotron Light Sources Instrumentation

I12 – DLS  RIXS spectrometer

Experimental chamber incorporating sliding seal technology developed by CINEL

Strict UHV (< 10^-9 mbar) and up to 150° allowed angle for rotating arm
Synchrotron Light Sources Instrumentation

IMBL@ SLSA High Power White Beam Slits for Wiggler Beam

Glidcop absorbers for up to 5 KW absorbed power each
Synchrotron Light Sources Instrumentation

... and MUCH MORE !! For example:

- SLS Front-Ends
- Mechanics for distribution mirrors (CHOMs) @ EU-XFEL
- LIX beamline @ NSLS II
- LIX, SMI, CMS, QAS, XFM Shielded Beam Transports @ NSLS II
- Laue monochromators for APS, PETRA III
- IBF machine for ESRF
- Shutters and attenuators for SWISSFEL
- KB system for Photon Factory
- White beam Transfocators for ESRF and PETRA III
- Standard 5-DOF mirror systems (...many!)
- Cryocooled DCMs with LN2 transfer lines
- KB’s for adaptive mirrors, mechanical benders, fixed shape mirrors, with cooling
- Slits (cooled, uncooled, large stroke...)
- Fixed masks (OHFC Cu, GlidCop)
- Integration of feedback systems and fast encoders readouts
- ...
THANKS FOR YOUR ATTENTION

QUESTIONS TIME!