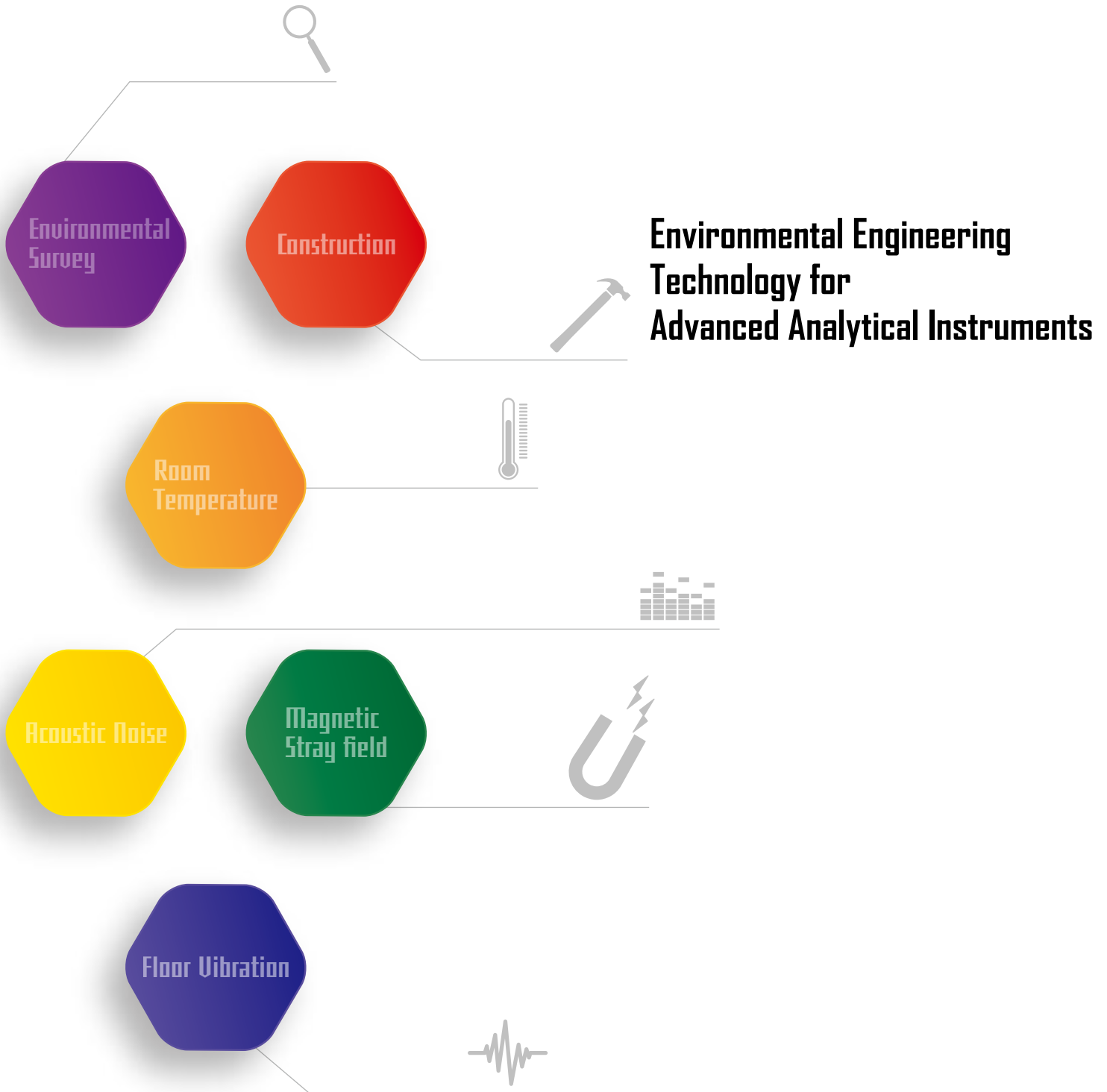
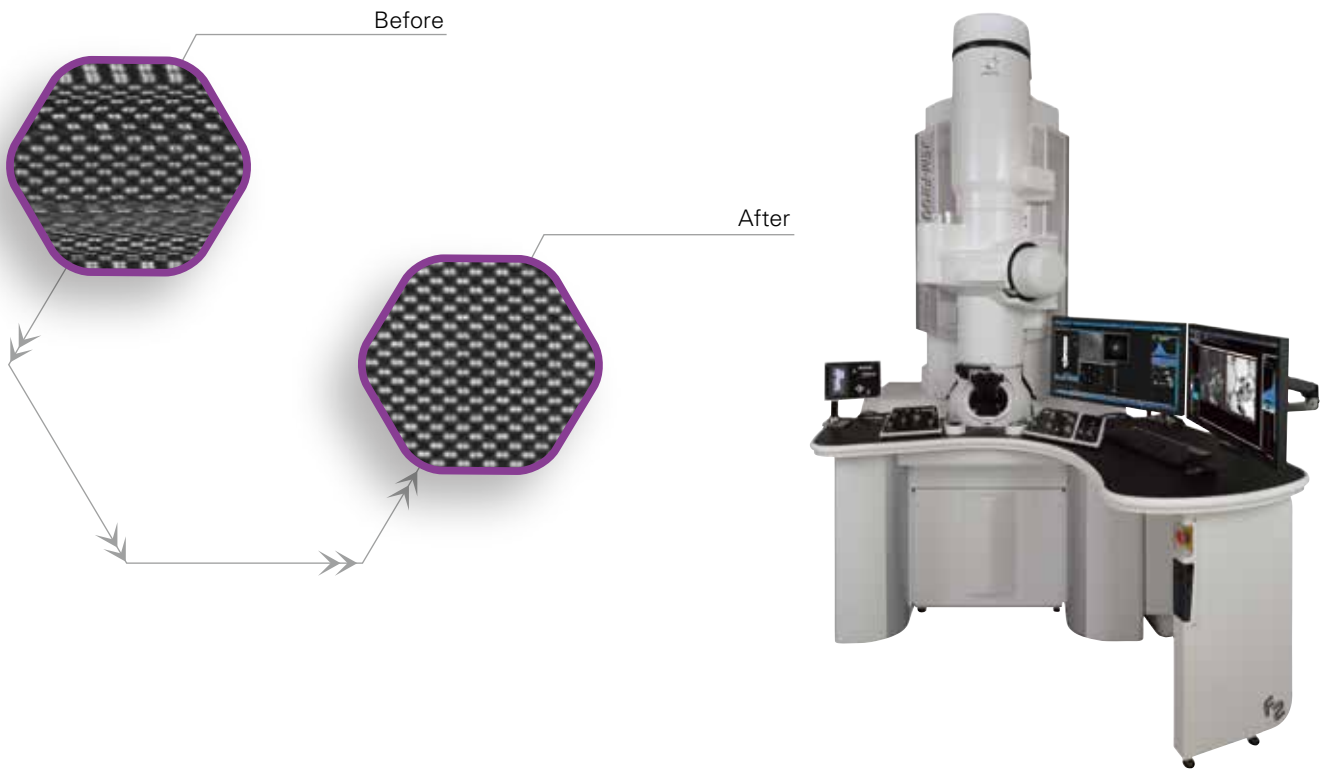


Solutions for Innovation



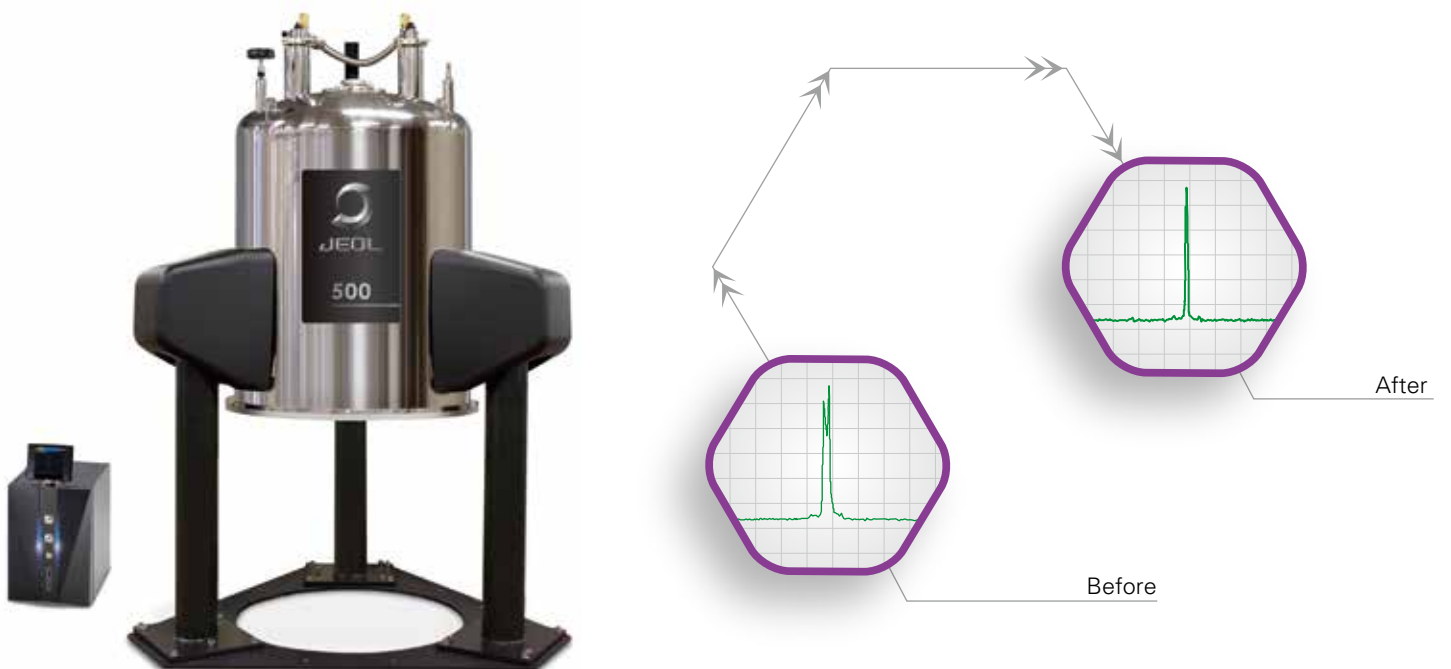
Various environmental disturbances exist around the instrument, which cause influence on the instrument's performance.





Environment is another important aspect for your instrument's performance

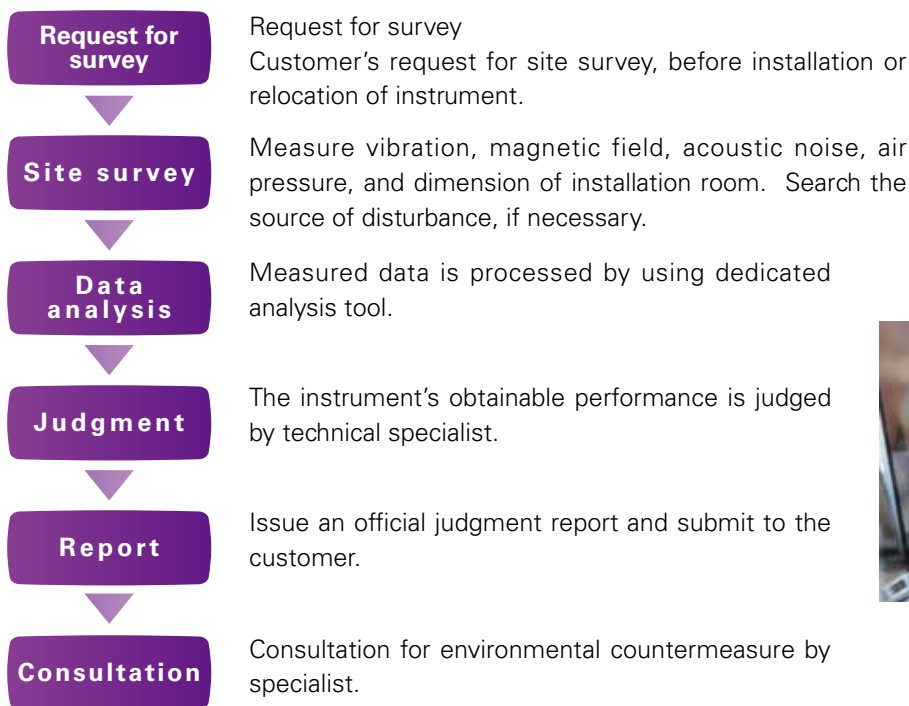
The necessity of environmental countermeasure is increasing as the performance of analytical instruments are making progress day by day. JEOL provides a unique and truly effective environmental countermeasure solution as an indispensable counterpart of the instrument, aiming for total satisfaction of our customers.



Environmental survey

The whole story of environmental countermeasure starts from accurate site measurement, using precise measurement tools which fulfill the requirement of instrument. JEOL develops unique countermeasure technology associated with the instrument, and the obtained data or know-how are beneficially used to adopt reliable judgment results. Also the judgment report is issued with needs and recommendation of countermeasure, leading to execution of satisfactory environmental countermeasure.

Environmental Survey Process



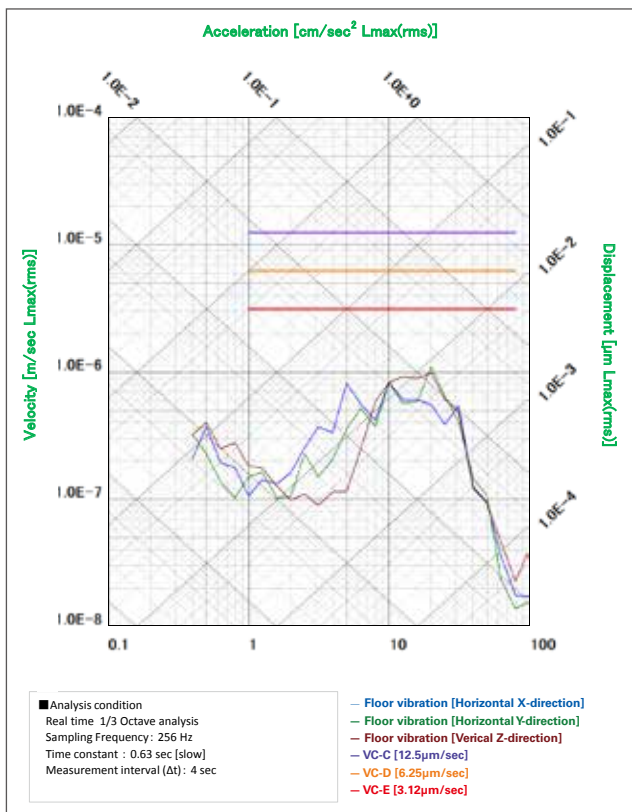
- ### Survey items
- Vibration
 - Magnetic field
 - Acoustic noise
 - Air pressure change etc.



Example of measurement tools (Vibration, Magnetic field, Acoustic noise, Air pressure)



Measurement data analysis

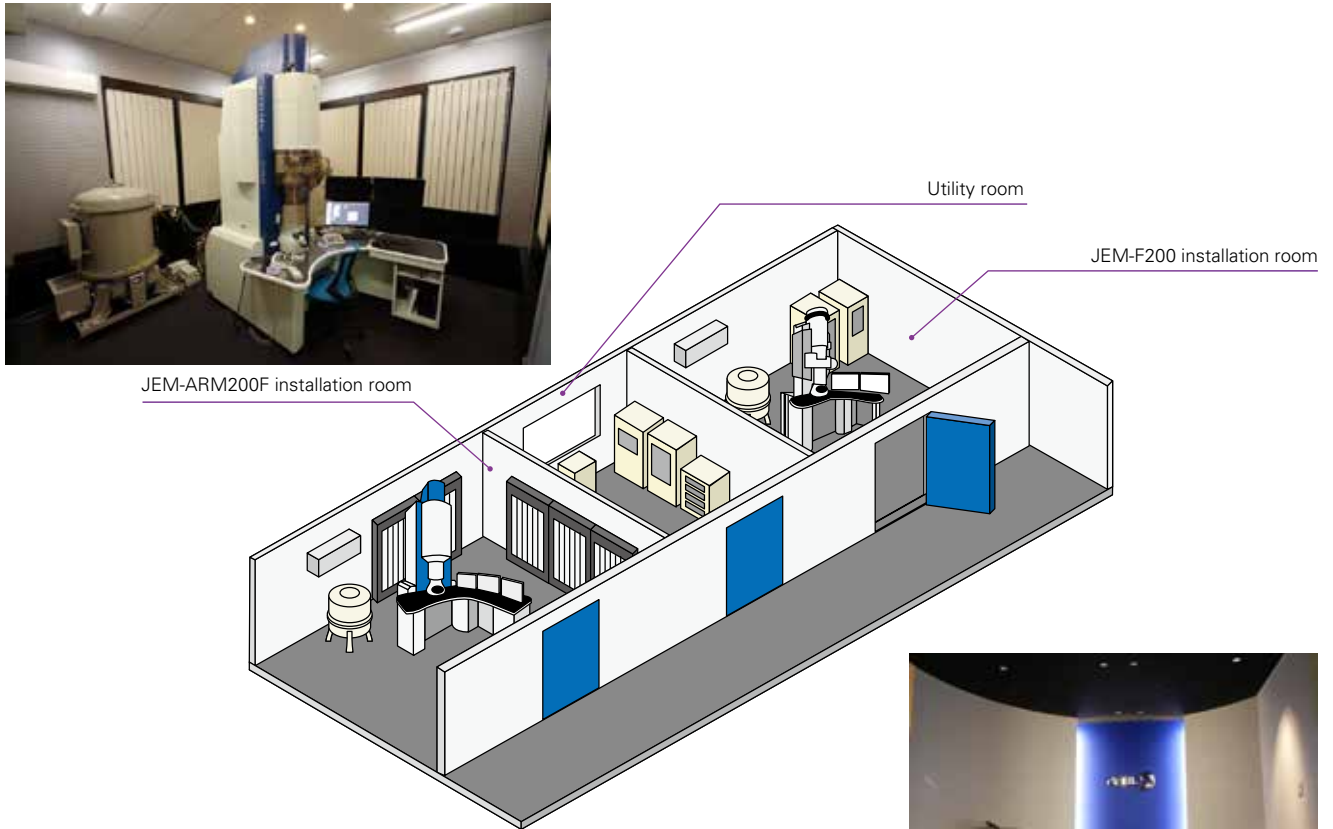


Example of vibration data



Lab design consulting

Not only optimum environment for instruments, but JEOL also aims to build up safe and comfortable environment for human. JEOL suggests Total Lab Solution including instrument layout plan to visual design. Please consult us if you are planning construction, renovation of Lab or relocation of instruments.



Lab entrance hall



TEM installation room lighting design



TEM installation room total design

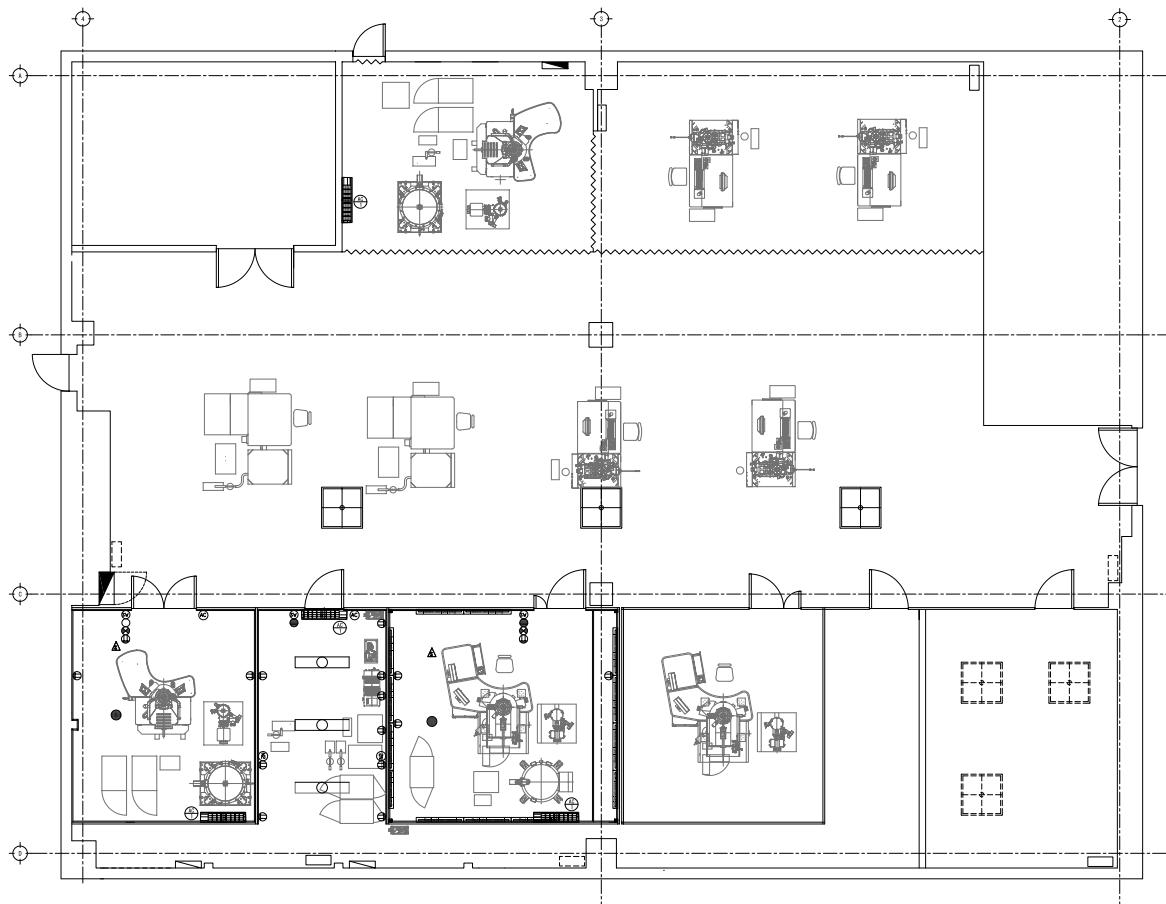


FIB installation room design



Room construction

JEOL focuses on designing and constructing installation rooms not only satisfying instrument's requirements but considering work efficiency, safety and attractive design. As an instrument manufacturer, we incorporate helpful advice and tips provided from technical, service and application division and actualize a convenient and comfortable installation room.



Example of installation room layout plan

Carpentry and interior finish

- Interior finish
- Fittings
- Floor modification

Electrical and plumbing

- Electrical works
- Air conditioning
- Plumbing
- Instrumentation works

Special facilities

- Clean rooms
- Chemical hazard rooms
- Shielded rooms
- Temperature and humidity control

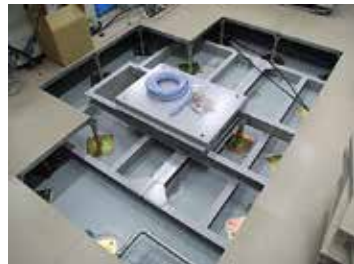
Example of room construction



Partition wall construction



Floor renovation



Floor reinforcement



Clean room



Glove box

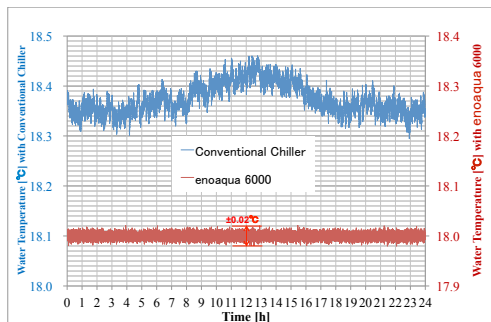


Temperature and humidity control

Cooling water temperature control

The brand-new water chiller “enoaqua”, uniquely developed by JEOL, features surprisingly stable cooling water temperature control which enables high-end electron microscopes to achieve their highest possible performance.

Example of water temperature fluctuation
(Installed to JEM-ARM200F)



Blue: Conventional chiller
Red: enoaqua DS-78660WCI



DS-78660WCI



Room temperature control

The state-of-the-art air conditioning system “Hydro Radiant Cooling System”, uniquely developed for High-End electron microscopes, realizes “room temperature fluctuation below $\pm 0.05^{\circ}\text{C}$ with no air flow” which is a difficult target for conventional air conditioning system. It is possible to retrofit this system to existing room, so please consult us in case of room renovation .



Installation example of water-cooled radiant panel system



Water-cooled radiant panels



Please refer to a separate brochure “Room Temperature Control” for more details.



Acoustic noise countermeasure

A truly effective acoustic noise countermeasure becomes possible by not only one treatment but as a combination of multiple countermeasures. JEOL executes noise frequency analysis and noise reduction simulation beforehand, then we plan to adopt multiple treatments such as noise insulation / absorption, low noise air conditioning, soundproof doors and so on in order to realize optimum countermeasure.

Also adoption of smart and stylish “Wooden acoustic panels” adds a touch of class to the installation room without decrease of acoustic damping ability.



Wooden acoustic absorption panel for TEM room



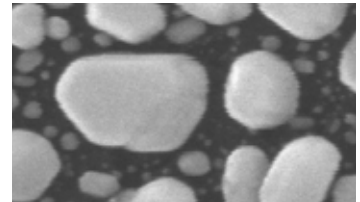
Example of glass wool acoustic absorption panel

Vibration countermeasure

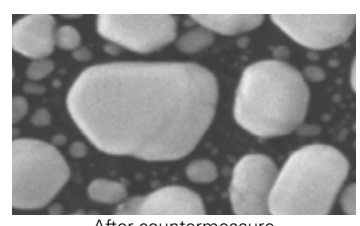
JEOL provides wide lineup of integrated type active isolation system which features high vibration attenuation and reliability. As it does not affect the operability of instrument, it is highly acclaimed by our customers. Also we have a lineup of platform type active isolation system, which is versatile and applicable to many instruments. These systems are jointly produced with specialist company and the obtained experimental data are applied to our judgment method to ensure precise vibration judgment.



Built-in type active isolation system



Before countermeasure



After countermeasure



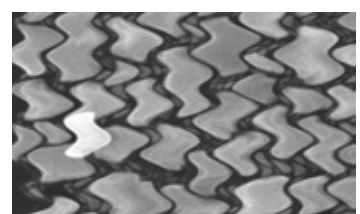
Please refer to a separate brochure "Vibration Countermeasure" for more details.

Magnetic field countermeasure

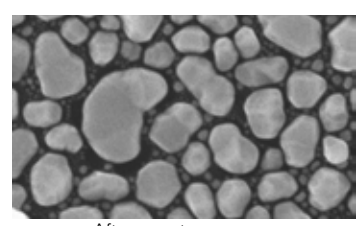
JEOL has exclusively developed active magnetic field cancellation system suitable for analytical instruments such as electron microscopes, NMR and EB systems. It features extremely low noise electrical circuit design in order to assure high image quality and resolution. Also its expandability enables upgrade of performance by adding extra controller or sensor if required.



Example of canceller cage



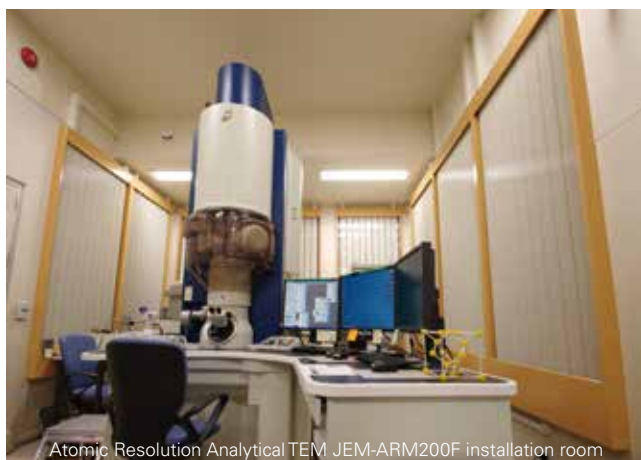
Before countermeasure



After countermeasure



Please refer to a separate brochure "Vibration Countermeasure" for more details.



Atomic Resolution Analytical TEM JEM-ARM200F installation room

The missions of the Isotope Geochemistry Group are to acquire the high-quality data, to revolutionize in technical developments and applications of multidisciplinary sciences, and to maintain instruments as a world-class facility. Their main research topics are material circulation on the Earth, geological processes of water-rock interactions, regional to global environmental changes, and limits of subseafloor life. This has been done by combinations of isotope/elemental analysis with microstructural observation utilizing ultra-high resolution TEM.

The Group have established one of the most comprehensive laboratories in Japan, consisting of TEM, FIB, SIMS, (MC)-ICP-MS and TIMS, to satisfy various needs of scientists, and to support the leading-edge researches. This powerful and world-class facilities made the highest level on ultrahigh-sensitivity and ultrahigh-precision microanalysis.



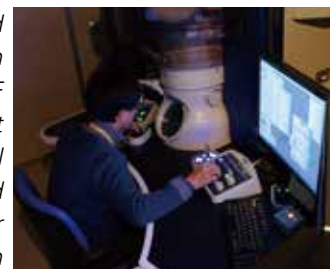
Micro Analysis Laboratory, Isotope Geochemistry Group
Deputy Group Leader Motoo Ito, Ph. D.
Senior Research Scientist Naotaka Tomioka, Ph. D.
Marine Works Japan Ltd. Yu Kodama Ph. D.

Dr. Tomioka: We have adopted a JEOL JEM-ARM200F TEM to realize not only atomic resolution observation but also multiple analyses at one time. We study many precious samples derived from drilling cores or meteorites, so versatility in microanalyses (STEM, EDS, EELS and so on) was a very important factor to minimize structural damages

or elemental loss in such samples. Also user interface of the JEM-ARM200F improved for exponentially high throughput was another reason for this choice.

The installation room for the JEM-ARM200F is equipped with the JEOL's state-of-the-art environmental countermeasure systems which assure stable and quiet environmental conditions, best suited for high-end analytical instruments.

Dr. Ito: We have requested totally controlled operation room for the JEM-ARM200F to the JEOL because it features the highest spatial resolution in our lab and is the key instrument for microstructural observation at sub-nm spatial scale. JEOL proposed us a world best environmental countermeasure which is for vibration, magnetic field and temperature control. Thanks to these systems, the highly stable environment for TEM offers us not only very clear ultra-high-resolution image, but also high stability during prolonged observation and analysis, such as EDS and/or EELS elemental mapping at atomic resolution. We highly appreciate on this comprehensive environmental countermeasure.



Dr. Kodama: We have two FIB instruments installed in the same room. Similar to TEM, FIB requires stable environment for minute and precise sample processing. The highly stable room environment assures trouble-free processes when handling samples, and we are very pleased with this.

Dr. Tomioka: Our samples are often chemically and structurally heterogeneous. Therefore, precisely coordinated multi-microanalysis is required for investigating such samples. The unexpected change of target position may be caused by unstable environmental conditions. When observing samples collected from deep-drilled cores or the asteroid "ITOKAWA," reanalysis is difficult due to their small sizes and amounts. The stable environmental condition realized by effective environmental countermeasure will be a great help to assure reliability of obtained data.

JAMSTEC is now pursuing the deep ocean floor drilling projects, by the deep sea scientific drilling vessel "CHIKYU," aiming to collect materials from the Earth's mantle which no one has ever reached. Once this has been achieved, it will be an epoch-making event for geosciences.

Dr. Ito: This is our main reason for settling the powerful lab facility. We will conduct wide range of analysis on macro to nano scale, contributing to understand (1) Climate and Ocean Change, (2) Biosphere Frontiers, (3) Earth

Connections: Deep Processes and Their Impact on Earth's Surface Environment, and (4) Earth in Motion: Processes and Hazards on Human Time Scales. We are also preparing for analysis of valuable extraterrestrial materials obtained by "HAYABUSA 2" space craft which will return to the Earth in 2020 just after the Tokyo Olympics. Our investigation does not only understand the Earth's past, but also predict the future of the Earth. Our research drives the technological breakthrough to solve global environmental issues, which may greatly contribute the sustainable development goals.

Dr. Tomioka: Various information such as origin of the Earth and the Space, past climate changes and evolution history of life could be obtained from drilled cores or asteroid samples. Each natural sample has their own characteristics, thus analytical scheme of the samples should be carefully determined. In order to eliminate uncertainty on analyzed data, observation under the totally stable environment is necessary. The Garnet Crystal image shown on the attached photo has been taken by nanometer scale observation of a meteorite sample. This technique allows us to obtain crystallographic and chemical characteristics of an extremely small region-of-interest. Therefore, it would be a core technology on sample analyses in both deep sea drilling by the IODP (International Ocean Discovery Program) and asteroidal sample return mission "HAYABUSA 2," by the JAXA (Japan Aerospace Exploration Agency).

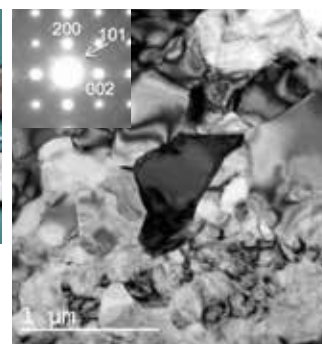
Dr. Kodama: Besides the research activities at the KOCHI, I sometimes board on the "CHIKYU" and analyze drilled core samples. Once the "CHIKYU" sails out, the expedition will continue for months and the vessel sometimes stays at one drilling site on the ocean floor for a month. Normally, the core samples are analyzed or observed by onboard researchers during the expedition, because some samples deteriorate rapidly and the onsite analyses are necessary to decide the distribution of core samples for the following analyses. Unfortunately, due to unstable environment on

shipboard, highly sensitive instruments such as TEM are not available on the vessel presently. We wish to observe such samples in a fresh status onsite, so it will be fantastic if analytical instruments such as electron microscopes could be installed on the vessel, assuring the same performance as installed onshore.

JAMSTEC was established in 1971 as the Japan Marine Science and Technology Center. JAMSTEC has the main objective to contribute to the advancement of academic research in addition to the improvement of marine science and technology by proceeding the fundamental research and development on marine, and the cooperative activities on the academic research related to the Ocean for the benefit of the peace and human welfare.



Deposition core sample which records history of climate changes



TEM image of special Garnet crystal generated under ultra-high pressure caused by collision of meteorite



Deep sea drilling vessel "CHIKYU"



Kochi Institute for Core Sample Research, KOCHI



The KOCHI was established in October 2005 as the fifth domestic hub of the JAMSTEC. Since then, it has been highly valued worldwide as a unique research facility which consistently carries out drilled core processing, storage and advanced researches, leading the technology development on geological, biological and scientific drilling field. These activities are performed at "Kochi Core Center," which is co-operated with the Center for Advanced Marine Core Research, Kochi University.

<http://www.jamstec.go.jp/kochi/j/index.html>

Certain products in this brochure are controlled under the "Foreign Exchange and Foreign Trade Law" of Japan in compliance with international security export control. JEOL Ltd. must provide the Japanese Government with "End-user's Statement of Assurance" and "End-user Certificate" in order to obtain the export license needed for export from Japan. If the product to be exported is in this category, the end user will be asked to fill in these certificate forms.

ARGENTINA
 COASIN S.A.C.IyF
 Virrey del Pino 4071,
 C1430CAM-Buenos Aires
 Argentina
 Tel. 54-11-4552-3165
 Fax. 54-11-4565-3321

AUSTRALIA & NEW ZEALAND
 JEOL (AUSTRALASIA) Pty.Ltd.
 Suite 1, L2 18 Aquatic Drive
 - Frenchs Forest NSW 2086
 Australia
 Tel. 61-2-9451-3855
 Fax. 61-2-9451-3822

AUSTRIA
 JEOL (GERMANY) GmbH
 Gute Aenger 30
 85356 Freising, Germany
 Tel. 49-8161-9845-0
 Fax. 49-8161-9845-100

BANGLADESH
 A.Q. CHOWDHURY SCIENCE & SYNERGY PVT. LTD.
 87, Sunwardy Avenue, Floor 2
 Bangshara, Dhaka1212
 Bangladesh
 Tel. 8802-9862272, 8953450, 8953501
 Fax. 8902-9854428

BELGIUM
 JEOL (EUROPE) B.V.
 Planet II, Gebouw B
 Louvensteijnweg 542,
 B-1930 Zaventem
 Belgium
 Tel. 32-2-720-0560
 Fax. 32-2-720-6134

BRAZIL
 JEOL Brasil Instrumentos Cientificos Ltda.
 Av. Jabaquara, 2958 5º andar conjunto 52 ;
 04046-500 Sao Paulo, SP
 Brazil
 Tel. 55-11-5070 4000
 Fax. 55-11-5070 4010

CANADA
 JEOL CANADA, INC.
 3275 1ere Rue, Local #8
 St-Hubert, QC J3Y-8Y6, Canada
 Tel. 1-450-678-8776
 Fax. 1-450-678-0694

CHINA
 JEOL (BEIJING) CO., LTD.
 Zhongkezyuan Building South Tower 2F,
 Zhongguancun Nanshanjie Street No. 6,
 Haidian District, Beijing, P.R.China
 Tel. 86-10-6804-6321
 Fax. 86-10-6804-6324

JEOL (BEIJING) CO., LTD., SHANGHAI BRANCH
 Shanghai 200040, China
 Tel. 86-21-6248-4487 / 4868
 Fax. 86-21-6248-4075

JEOL (BEIJING) CO., LTD., GUANGZHOU BRANCH
 N1601, World Trade Center Building,
 #371-375, Huan Shi Road East, Guangzhou,
 Guangdong Prov., 510095, P.R.China
 Tel. 86-20-8778-7849
 Fax. 86-20-8778-4268

JEOL (BEIJING) CO., LTD., WUHAN BRANCH
 Room #2118, Zhongshang Plaza Office Bldg.,
 No. 7 Zhongnan Road, Wuhan,
 Hubei, 430071, P.R.China
 Tel. 86-27-8713-2567
 Fax. 86-27-8713-2567

JEOL LTD. (BEIJING) CO., LTD., CHENGDU BRANCH
 1807A Zongfu Building,
 NO. 35 Zhongfu Road, Chengdu, Sichuan, 610016
 P.R. China
 Tel. 86-28-86622554
 Fax. 86-28-86622564

EGYPT
 JEOL SERVICE BUREAU
 3rd Fl. Nile Center Bldg., Nawal Street,
 Dokki, Cairo, Egypt
 Tel. 20-2-3335-7220
 Fax. 20-2-3338-4186

FRANCE
 JEOL (EUROPE) SAS
 Espace Claude Monet, 1 Allée de Giverny
 78290, Croissy-sur-Seine, France
 Tel. 33-13015-3737
 Fax. 33-13015-3747

GERMANY
 JEOL (GERMANY) GmbH
 Gute Aenger 30
 85356 Freising, Germany
 Tel. 49-8161-9845-0
 Fax. 49-8161-9845-100

GREAT BRITAIN & IRELAND
 JEOL (U.K.) LTD.
 JEOL House, Silver Court, Watchmead,
 Welwyn Garden City, Herts AL7 1LT, U.K.
 Tel. 44-1707-377117
 Fax. 44-1707-373254

GREECE
 N. ASTERFIADIS S.A.
 56-58, S. Trikoupi Str, P.O. Box 26140
 GR-10022, Athens, Greece
 Tel. 30-1-823-5383
 Fax. 30-1-823-9567

HONG KONG
 FARMING LTD.
 Unit No. 1009, 10/F, Prosperity
 663 King's Road, North Point, Hong Kong
 Tel. 852-2815-7299
 Fax. 852-2581-4635

INDIA
 JEOL INDIA PVT. LTD.
 Unit No.305, 3rd Floor,
 AEW Elegance Tower,
 Jasola District Centre,
 New Delhi 110 025, India
 Tel. 91-11-4595-8000
 Tel. 91-11-4595-8005
 Tel. 91-11-4595-8017

JEOL INDIA PVT. LTD, Mumbai Office
 214 E Square, Subhash Road,
 Vile Parle (EAST),
 Mumbai 400 057, India
 Tel. 91-22-2612-9387

JEOL INDIA PVT. LTD, Bangalore Office
 125, Brigade Road,
 Unit No.402, Level 4, Palms Square,
 Bangalore-560025, India
 Tel. 91-80-4375-3351

JEOL INDIA PVT. LTD, Kolkata Office
 Regus, The Legacy, 25 / A,
 Shakespear Sarani,
 Kolkata - 700017, India
 Tel. 91-96-3023-0484

INDONESIA
 PT. TEKNO LABINDO Penta Perkasa
 Komplek Gading Bukit Indah Blok I/11
 Jl. Bukit Gading Raya Kelapa Gading Permai,
 Jakarta 14240, Indonesia
 Tel. 62-21-45847057/58
 Fax. 62-21-45842729

ITALY
 JEOL (ITALIA) S.p.A.
 Palazzo Pacinotti - Milano 3 City,
 Via Ludovico il Moro, 6/A
 20080 Basiglio(MI) Italy
 Tel. 39-02-9041431
 Fax. 39-02-90414343

KOREA
 JEOL KOREA LTD.
 Dongwoo Bldg. 7F, 1443, Yangjae Daero,
 Gangdong-Gu, Seoul, 03555, Korea
 Tel. 82-2-511-5501
 Fax. 82-2-511-2635

KUWAIT
 Ashraf & CO. Ltd.
 P.O.Box 3555 Safat 13036, Kuwait
 Tel. 965-1806151
 Fax. 965-24335373

MALAYSIA
 JEOL (MALAYSIA) SDN.BHD.
 508, Block A, Level 5,
 Kelana Business Center,
 97, Jalan SS 7/2, Kelana Jaya,
 47301 Petaling Jaya, Selangor, Malaysia
 Tel. 603-7492-7722
 Fax. 603-7492-7723

MEXICO
 JEOL DE MEXICO S.A. DE C.V.
 Arkansas 11 Piso 2
 Colonia Napoles
 Delegacion Benito Juarez, C.P. 03810
 Mexico D.F., Mexico
 Tel. 52-5-55-211-4511
 Fax. 52-5-55-211-0720

Middle East
 JEOL GULF FZCO
 P.O. Box No. 371107
 Dubai Airport Free Trade Zone West Wing 5WA No. G12,
 Dubai, UAE
 Tel. 971-4-609-1497
 Fax. 971-4-609-1498

PAKISTAN (Karachi)
 ANALYTICAL MEASURING SYSTEM (PVT) LTD. (AMS LTD.)
 14-C Main Sehar Commercial Avenue Lane 4,
 Khayaban-e-Sehar,
 D.H.A-VII, Karachi-75500, Pakistan
 Tel. 92-21-35345581/35340747
 Fax. 92-21-35345582

PANAMA
 PROMED S.A.
 Parque Industrial Costa del Este
 Urbanizacion Costa del Este
 Apartado 0816-01755, Panama, Panama
 Tel. 507-303-3100
 Fax. 507-303-3115

PORTUGAL
 Izasa Portugal Lda.
 R. do Proletariado, 1
 2790-138 CARNAXIDE, Portugal
 Tel. 351-21-424-7300
 Fax. 351-21-418-60-20

QATAR
 Mannai Trading Company W.L.L.
 ALI Emadi Complex,
 Salwa Road P.O.Box 76, Doha, Qatar
 Tel. +974 4455-8216
 Fax. +974 4455-8214

RUSSIA
 JEOL (RUSS) LLC
 Krasnoprotetarskaya Street, 16,
 Bld. 2, 127473, Moscow,
 Russian Federation
 Tel. 7-495-748-7791/7792
 Fax. 7-495-748-7793

SAUDI ARABIA
 AL-DURGHAMAN ALGOSAIBI G.T.C. (Riyadh)
 Algosais Building-OH Airport Road
 P.O. Box 215, Riyadh-11411, Saudi Arabia
 Tel. 966-1-477-7932

SCANDINAVIA
 SWEDEN
 JEOL (Nordic) AB
 Hammarbacken 6A, Box 716, 191 27 Sollentuna
 Sweden
 Tel. 46-8-28-2800
 Fax. 46-8-29-1647

SINGAPORE
 JEOL ASIA PTE.LTD.
 2 Corporation Road
 #01-12 Corporation Place
 Singapore 618494
 Tel. 65-6565-9989
 Fax. 65-6565-7552

SOUTH AFRICA
 ADI Scientific (Pty) Ltd.
 370 Angus Crescent,
 Northlands Business Park, 29 Newmarket Road
 Northriding, Randburg, Republic of South Africa
 Tel. 27-11-462-1363
 Fax. 27-11-462-1466

SPAIN
 IZASA Scientific S.L.U.
 Argoneses, 13, 28108 Alcobendas,
 Madrid, Spain
 Tel. 34 902 20 30 80
 Fax. 34 902 20 30 81

SWITZERLAND
 JEOL (GERMANY) GmbH
 Gute Aenger 30
 85356 Freising, Germany
 Tel. 49-8165-77346
 Fax. 49-8165-77312

TAIWAN
 JIE DONG CO., LTD.
 7F, 112, Chung Hsiao East Road,
 Section 1, Taipei, Taiwan 10023 (R.O.C.)
 Tel. 886-2-2395-2978
 Fax. 886-2-2322-4655

For NMR & Mass Spectrometer Products
 Videtron Technologies Corp.
 No.8-2, No.77, Sec.2, Zhonghua E Rd.,
 East Dist., Tainan City 701, Taiwan (R.O.C.)
 Tel. 886-6-289-1943
 Fax. 886-6-289-1743

(For Mass Spectrometer Products)
 TechMax Technical Co., Ltd.
 5F, No.11, Wuguang 2nd Rd., Wugu Dist.,
 New Taipei City 248, Taiwan (R.O.C.)
 Tel. 886-2-8980-1773
 Fax. 886-2-8990-2559

For Semiconductor Products:
 JEOL TAIWAN SEMICONDUCTORS LTD.
 2F-2, No. 192, Dongguang Rd.
 East Dist., Hsinchu City 30069,
 Taiwan (R.O.C.)
 Tel. 886-3-571-5656
 Fax. 886-3-571-5151

THAILAND
 BECTHAI BANGKOK EQUIPMENT & CHEMICAL CO., Ltd.
 300 Phaholyothin Rd, Phayathai, Bangkok 10400,
 Thailand
 Tel. 66-2-615-2399
 Fax. 66-2-615-2350/2351

JEOL ASEAN TECHNICAL CENTER (JATC)
 MTEC Building room 533
 114 Moo5, Trialland Science Park
 Patholyothin Rd., Klong 1, Klong Luang,
 Pathumthani 12120
 THAILAND
 Tel. 66-2-564-7738
 Fax. 66-2-564-7739

THE NETHERLANDS
 JEOL (EUROPE) B.V.
 Lireweg 4, NL-2153 PH Nieuw-Vennep,
 The Netherlands
 Tel. 31-252-623500
 Fax. 31-252-623501

TURKEY
 Takser A.S.
 Kartal Cad. No: 55/3 Inonu Wah,
 Atasehir 34755, Istanbul, Turkey
 Tel. 90-216-5736470
 Fax. 90-216-5736475

USA
 JEOL USA, INC.
 11 Dearborn Road, Peabody, MA 01960, U.S.A.
 Tel. 1-978-535-5900
 Fax. 1-978-536-2205/2206

JEOL USA, INC. WEST OFFICE
 5653 Stoneridge Drive Suite #110
 Pleasanton, CA 94588, U.S.A.,
 Tel. 1-925-737-1740
 Fax. 1-925-737-1749

VENEZUELA
 GOMSA Service and Supply C.A.
 Urbanizacion Montalban III
 - Residencias Don Andres - Piso 7 - Apartamento 74
 Avenida 3, entre calles 7 y 6
 Montalban, Caracas, Venezuela
 Tel. 58-212-443-4342
 Fax. 58-212-443-4342

VIETNAM
 TECHNICAL MATERIALS AND RESOURCES
 IMPORT-EXPORT JOINT STOCK COMPANY(REXCO)
 Hanoi Branch
 SALES & SERVICE
 155-157 Lang Ha Street, Dong Da District, Hanoi, Vietnam
 Tel. +84 (43) 562 0516
 Fax. +84 (43) 853 2511