

SIGMA INGENIEURGESELLSCHAFT

SOFTWARE

ROHR2	ROHR2fesu	SINETZ
Development	Sales	Support

ENGINEERING

Pipe Static and Dynamic Engineering - FE-Analysis
 Pressure and Temperature Loss - Component Analysis

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ROHR2

CAE-System for Component Analysis, Engineering and Structure-Analysis of Complex Piping Systems

SINETZ, SINETZfluid

Calculation of Flow Distribution, Pressure Drop and Temperature Drop in Piping Networks

Software Services

Training, Update-Service, Maintenance

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15.04

The Company

As a specialist in the field of pipe stress analysis and plant construction SIGMA Ingenieurgesellschaft offers a wide range of engineering services as well as software development, system integration, sales and maintenance services.

SIGMA Ingenieurgesellschaft mbH was founded 1989. After sixteen years in Dortmund-City our growing business requires more room. We moved to our new company office in Unna/Germany in November 2005.

The combination of modern working methods, up-to-date CAE-Software and the Know-How of more nearly 40 years in the pipe and plant business guarantees a reliable engineering and project consulting in

- Static and dynamic analysis of various projects as power plants, district heat networks, chemical plants, pump stations, refineries, ships, bridges, cranes, and other units in plant construction
- Calculation of Flow Distribution, Pressure Drop and Temperature Drop in Piping Networks,
- Finite -Element Analysis

Our qualified software engineers develop the programs

- ROHR2, ROHR2stoss, ROHR2fesu
- SINETZ, SINETZfluid
- CAD/CAE -Interfaces and
- additional software according to the customers needs

With our technology and service conceptions we globally support you reaching your targets and strategies.

An extended vocational training of our staff guarantees service on the on the highest level.

The staff of our user support are qualified engineers and program developers too to ensure a quick solution for each problem for the deployment of SIGMA software with highest efficiency. Part of our concept is the product- and project-oriented training of the program users.

The result of a continuous knowledge transfer between program developers and project engineers is a software product, developed according to the needs of the customers.

We are building software from engineers to engineers. Our team of engineers at the headquarter in Unna stands for a qualified and on time processing of your orders.

SIGMA Company info

SIGMA Engineering

Our Range of Service

Project Consulting

Engineering on the spot

Support in case of capacity bottlenecks

SIGMA is member of



Fachverband Dampfkessel-,
Behälter- und Rohrleitungsbau e.V.



The SIGMA Engineering department provides a wide range of services:

Pipe static analysis

Static analysis with linear and nonlinear boundary conditions, as well as special fields of pipe static analysis like

- Spring design
- Expansion joint check
- Support optimization
- Plastic piping with stress analysis (PE, GRP)
- jacket piping including collision check
- continuous elastic foundation of buried pipes
- nonlinear bedding
- hanger displacement and friction,

Pipe dynamic analysis

dynamic analysis acc. to modal response or direct integration method with linear and nonlinear boundary conditions

- eigen frequencies
- vibration analysis
- earthquake /seismic
- fluid hammer
- Time-History with considering any time dependent load

Fluid dynamics

Fluid dynamic Analyses , u.a. folgende Szenarien:

- Start up / shut down
- Valve closing
- Turbine trip
- Pump failure

Stress analyses

- ASME B31.1, B31.3, B31.4, B31.5, B31.8, EN 13480, EN 13941,
- FDBR, AGFW-1989, AGFW FW 401, CODETI, D1101
- KRV, WAVISTRONG GFK, British Standard 7159 , ISO 14692
- VGLSR , VGLSP
- ASME Cl. 1,2,3
- KTA 3201.2, KTA 3211.2,
- RCC-M Cl.1,2,3

Calculation of steel structural sections

Supports and pipe racks according to DIN 18800

Pressure and temperature loss

Calculation of pressure and temperature loss in intermeshed pipe systems with compressible and incompressible media

Calculation of insulation thickness of pipes

Pressure and temperature loss calculation of district heat networks

Dimensioning and analysis of sprinkler systems

Internal pressure calculation

EN 13480, EN 13445, EN 12952, AD-2000 B Reihe,
ASME B31.1, B31.3

Design strength analysis of integrated components

Nozzles, cams, claws

Flanges and screws

Flange analysis

acc. to EN 1591-1:2011, EN 13445, ASME VIII, Div.1

Stability analysis

AD-2000 codes

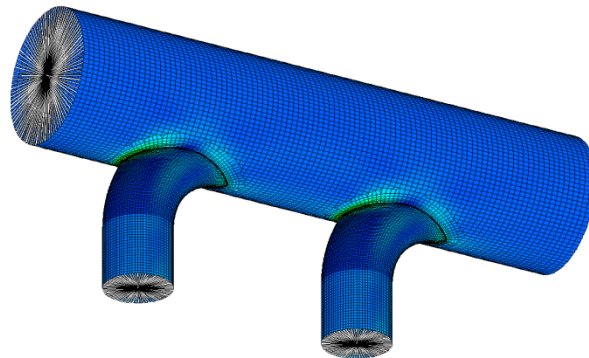
Vibration analysis

Finite Element Analysis

Components, e.g. branches under internal pressure and additional loads by ROHR2fesu or ANSYS/NASTRAN

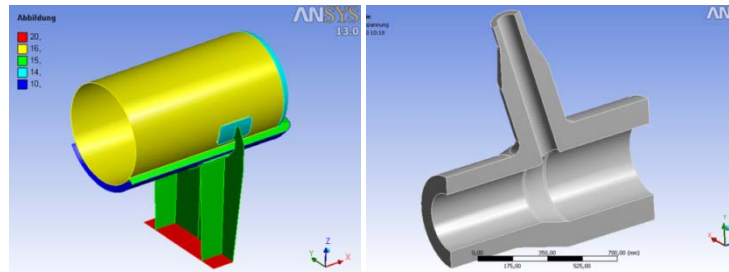
ROHR2FESU

FE-Analysis of substructures by means of a shell model, integrated into ROHR2 for rotation –symmetrical components like branches, nozzles and simple vessel geometries.



ANSYS

Detailed analyses of complex geometrical models. Modeling by shell or volume-model, consideration of non-linearities. Plasticization



Documentation

- Standard- or customer specified analysis documentation
- Documentation „Ready for certification“

On request, our project consulting service supports you in organizing and structuring your projects on the spot and develops possibilities of standardization and streamlining in integrated project teams together with you. In case of capacity bottlenecks, our experienced engineering team supports you.

SIGMA Engineering

Projects (extract)

Chemical plant engineering

- BYK Chemie, Wesel
- Begleitbeheizte Schmelzeleitung, div. Projekte, MH-ROHR, Kirchheim
- VC-Anlage Vintron, Krupp UHDE
- LDPE -Anlage NANPE, China, Krupp UHDE
- Carberes I, Rüttgers
- Suspensionsanlage Crompton Bergkamen
- Phosgenanlage Bayer Brunsbüttel Kapazitätserweiterung PVC, Solvay Rheinberg
- Solvay Bernburg, div. Projekte
- Erweiterung Anilinanlage, Bayer AG Ethylbenzol-Dehydrierung, BP Chemicals
- Husky Oil, Canada
- GRACE Worms
- Kata Leuna, BSL, Leuna
- Olefin-Anlage BP Gelsenkirchen
- Aromatenanlage, BP Gelsenkirchen
- Vakuumofen Abhitzesystem, Selas Linde
- Melaminanlage Peisteritz, Lurgi Life Science
- Ethylenstation, Versorgungsleitungen, Infracor Hüls
- Formalinanlage, Bakelite AG
- Schwefelsäurekonzentrierung, Stahl-/Email-Leitung, BTS Dormagen
- FAL-Reboiler, Cognis Malaysia
- Schwefelsäurekonzentrierung, Stahl-/Email-Leitung, Caoging, China
- LDF-line, INEOS Manufacturing Deutschland
- GRP Piping, Saipem
- Schwefelsäureleitung, Norddeutsche Affinerie AG
- Ineos, Kracker IV
- Ras Al-Khair, Power and Desalination Plant

Oil and Gas

- STATOIL, Ruhrgas
- Refinery MIRO, Karlsruhe
- DEA Heide, Wesseling
- Shell Godorf, div. Projekte

- RWE DEA compressor station Brammer
- Gas long distance pipe EUROPIPE Dornum
- Natural Gas Project, Portugal
- Gas-Speicher Verdichterstation Breitbrunn
- Metering Station EUROPIPE Emden
- Gas-compressor stations: Werne, Epe, Bierwang, Porz ME11/12, Mittelbrunn, Schwarzach, Etzel, Waidhaus, Wardenburg, Krumhörn
- Interconnector, Compressor Station Zeebrügge
- Gas optimization pipelines Lingen, Werne

- Sirte Oil Company, Compressor Station
- B-NET, Stations Vohburg, Neustadt and Münchsmünster
- Northstream (Ostsee-Pipeline), Anlandestation Greifswald
- Northstream (Ostsee-Pipeline), Verdichterstationen Greifswald, Radeland
- Erweiterung Verdichterstation Bierwang
- Station Etzel III

Renewable Energy

- Kuraymat, hybrid power plant, heat transfer system
- Andasol, solar power plant, heat transfer system
- Los Arenales, solar power plant, HTF and TES

SIGMA Engineering

References (extract)

The reference list is intended to give an overview on the engineering tasks, SIGMA carried out in the last years. The projects are presented by their original names. We will always be at your disposal to explain and discuss completed projects and engineering potentialities in English.

Power Plants

- KW Lippendorf, KW Weisweiler, KW Schwarze Pumpe,
- KW Boxberg, KW Schwarzheide, KW Schkopau, KW Wedel
- KW Phönix Leipzig, Robert Frank, KW Ibbenbüren Block B
- GK Mannheim, Block 7
- HKW Dresden, Nossener Brücke
- HKW Berkenbrücker Chaussee
- HKW Troplast, Troisdorf
- HKW Kassel, HKW Kaiserslautern
- Holtzmann Papier, Varell
- KW Moorburg, HD-Systeme
- KW Walsum, HD-Systeme
- KW Neurath, BoA 2/3, Main Steam, Cold- / Hot Reheat
- GuD KW Hamm
- GuD KW Herdecke
- KW Westfalen, HD-Systems
- KW Eemshaven, HD-Systems
- E.ON KW Maasvlakte, div. Systems
- Trianel KW Lünen, div. Systems

- Amercentrale, Niederlande
- C.T. Alcudia, Foix, Spanien
- Chandrapur, GUD-URAN, Indien
- Marmara, Iskenderun Türkei
- Sines I und II, Lacerda IV
- Nicola Tesla, Bl. 3, Serbia
- Nicola Tesla, Bl. 4, Serbia
- Alunorte, Brasilien, Main Steam
- Elbistan, Unit II, Turkey Main Steam, Hot / Cold Reheat
- Turcbilek, Unit IV, Turkey Steam, Hot / Cold Reheat
- Vasilikos Phase III, Cyprus - Main Steam
- Maasvlakte power station, NL
- Sostanj, UNIT6 Combined Cycle

Nuclear Power Plants

- **Germany**
Biblis, Brokdorf, Hamm-Uentrop, Kalkar, Stade, Würgassen
Krümmel, Philippsburg
- **Europe**
Doel, Belgium
Gösgen, Leibstadt, Switzerland
Olkiluoto 3, Finland
Flamanville III, France
Leningrad, Russia
- **Asia**
Guangdong, China
Taishan, China
Ling AO II, China
Hong-Yang_He, China
Kakrapar, India
- **America**
Atucha, Argentina

Incineration plants

- Arhus, Dänemark, Feedwater, Main Steam
- Vestforbraending, Dänemark, Feedwater, Main Steam
- Neapel, Italien, Feedwater, Main Steam
- MVA Oberhausen, Feedwater, Main Steam
- MVA Hameln, Feedwater, Main Steam
- Riihimäki, Finnland, Feedwater, Main Steam
- Jönköping, Sweden, Feedwater, Main Steam
- Borlänge, Sweden, Feedwater, Main Steam
- Uddevalla, Sweden, Feedwater, Main Steam

District Heating

- Several projects in Germany, e.g.
Hamm, Duisburg, Wuppertal, Gera, Halle, Mainova AG

Various projects

- Schwelgern Coking Plant, Thyssen Krupp Encoke
- Kältererzeugung Charité Berlin
- OMV Wien, Aromates
- ASU Köping, Schweden
- Kronos Titan
- Cooling water system HDPE, KST Wolfsburg
- Supply lines Gotthard Tunnel, Sedrun (CH)
- Zentis Aachen, various steam, condensate and gas pipes
- Siemens, Mega Test Center
- ThyssenKrupp Steel, cold blast distribution

SIGMA Engineering

Projects (Excerpt)

FE-Analyses

- Rührwerksauflage, Schering Bergkamen
- Supports at bends, Bayer AG Köln
- Miterb end with splines and nozzles, Bayer AG Dormagen
- Vessel with outriggers considering additional loads, PKB Gelsenk
- Vessel with tangential nozzle and reinforcing pad and add. loads , PKB Gelsenkirchen
- Spin heads, HD-Formstücke, Barmag AG Remscheid
- Supports at bends, Pratzennachweise, Thyssen Krupp AG
- Behälter mit tangentialem Rechteckstützen unter Zusatzlast, FASAM GmbH
- Übergangsstück rechteckig / rund unter Innendruck und Zusatzlast, Tebodin Gelsenkirchen
- Gummierter Behälter mit Dach, Konus und Mantel, SMS Demag AG
- HP- und LP-Sammler mit Unterstützungskonstruktion unter Zusatzlast aus HD-Leitungen, EHR Essen
- Behälter mit Tragpratzen / Ringlagerung, Standsicherheitsnachweise gegen Eigengewicht, Wind und Erdbeben unter Berücksichtigung von Stützenbelastungen, APL Dormagen
- MH-Rohr GmbH, Verteilerstücke /Volumenelemente
- E.O.N. Anlageservice GmbH, Gelsenkirchen, Temperaturverteilung durch die Wand / Volumenelemente
- PSE Engineering GmbH, Behälter mit Auslaufstützen

SIGMA Engineering

References (extract)

Affolter engineering & consulting, CH-Chur
AGENS Engineering, München, Klagenfurt
AE Energietechnik, Graz, Wien
Air Liquide AGS GmbH, Krefeld
Alstom Power Austria AG, Wien
Alstom Power, CH-Baden
Alstom Energy Systems GmbH
Aker Kvaerner, Niederlande
Aker Process GmbH
ALLWEILER AG, Radolfzell
AMR Engineering, D-Essen
AMS Anlagenplanung und Medienserviceleistungen GmbH & Co. KG, Bottrop
ANTROK Piping, D-Emden
APL Apparatebau, Dormagen
APOLLO Gössnitz
APRO Ingenieurbüro GmbH
Arens Rohrleitungsbau GmbH, Saterland
Aurubis AG, Hamburg
Aventis Pharma GmbH, Frankfurt
B+B Engineering GmbH, D-Magdeburg
Babcock Hitachi, Oberhausen
BABCOCK Industry and Power GmbH, Oberhausen
Balcke Dürr Austria GmbH, A-Wien
BARMAG AG, Remscheid
Basell Polyolefine GmbH, Wesseling
BASF SE, Ludwigshafen, Antwerpen
BASF Personal Care and Nutrition GmbH, Berlin Düsseldorf
Bayer Antwerpen NV
Bayer HealthCare, Bayer Schering Pharma
Bayer MaterialScience AG, Leverkusen
Bayer MaterialScience (China) co. Ltd., Schanghai
Bayer Technology Services, Leverkusen, Krefeld, Dormagen
Belak Ing.-Büro
Bilfinger Piping Technologies GmbH
Bilfinger Schweben GmbH, D-Erkrath
BIS E.M.S. GmbH
BP Chemicals, Marl
BP Europe SE
Boehling Rohrleitungs- und Apparatebau, Hamburg, Karlsruhe, Velbert
Brockhaus Umwelt GmbH, Plettenberg
Cargill Deutschland GmbH, Krefeld
Caverion Deutschland GmbH, Stuttgart
Carantec Engineering GmbH, A-Klagenfurt
Chemieanlagenbau Chemnitz GmbH, Chemnitz
Chemtura Organometallics GmbH, Bergkamen
Classen Apparatebau, Wiesloch
CLIMATIC GmbH, Berlin
Cognis Oleochemicals, Malaysia
Deutsche Voest-Alpine, Düsseldorf
Didier-M&P Energietechnik GmbH
DSD Dillinger Stahlbau GmbH, Düsseldorf, Saarlouis, Berlin
ECL Engineering Consulting Lorenz
E&C, Ingenieurbüro GmbH, A-Wels
ELF Bitumen, Brunsbüttel
ENCOS GmbH, Greifswald
EnviCon & Plant Engineering GmbH, Nürnberg
Envirotherm GmbH, Essen
E.ON Fernwärme GmbH, D-Gelsenkirchen
E.ON Gas Storage GmbH, Essen
E.ON Ruhrgas E&P GmbH, Essen
E.ON Technologies GmbH, Gelsenkirchen
E.ON Anlagenservice GmbH, Gelsenkirchen
EPC Engineering GmbH, Rudolstadt
EPI Industrieanlagenplanung, Oer-Erkenschwick
ETABO Energietechnik und Anlagenservice GmbH, Bochum
European Gas Turbines, Essen
Everair Technology GmbH, Hilden
F.A. Neuman Anlagentechnik GmbH
Fabricom B.V., NL- Moerdijk
FASAM GmbH, Brüggen-Bracht
FAUDI Filter Systems, Stadtallendorf
Ferchau Engineering GmbH, Köln, Hamburg, Dresden
Ferrostaal Air Technology GmbH, Saarwellingen
Babcock Environment GmbH
Flagsol GmbH, Köln
Freudenberg Service KG, Weinheim
GABEG Anlagenbau, Berlin
Gährken Planungsges. im Anlagenbau GmbH
GASCADE Gastransport GmbH
GAZ de France GmbH, Lingen
GEA Luftkühler GmbH, D-Herne
GESA Ingenieurges. für Technische Gesamtplanung mbH, Dresden
GET Ges. für Energie- und Trocknungstechnik GmbH, Schwetzingen
J&P AVAX SA, GR-Athen
GRACE GmbH & Co KG, Worms
H&G Hegmanns GmbH, Gelsenkirchen
HEAT Wärmetechn. Anlagen GmbH, A-Biedermansdorf
HERA Maintenance GmbH, Marl
Henkel KGaA, Düsseldorf
Hexion B.V., Niederlande
HUGO PETERSEN GmbH, Wiesbaden
Hoechst AG, Frankfurt
Ingenieurbüro Plan Team PTG GmbH, Lohmar
IKR Engineering GmbH, Schönwalde
INEOS Manufacturing Deutschland GmbH, Köln
Innovene Deutschland GmbH (Deutsche BP)
INPLAN Industrieplanung GmbH, Brunsbüttel
Imtech Deutschland GmbH & Co KG, Frankfurt
IRB Rohrco GmbH, Bremen
IVG Kavernenbetriebsführungsgesellschaft mbH Friedsburg
Jacobs Projects GmbH, Köln, Gelsenkirchen
John Zink KEU GmbH, Krefeld
Kasseler Fernwärme GmbH, Kassel
Keypro Engineering GmbH, Hamburg
Kiefer & Voss GmbH, Erlangen
Kiel Engineering, Wesseling
KI PLAN GmbH, Pinneberg
Kompaflex AG, CH-Steinebrunn
Kraftanlagen München GmbH, München, Essen, Hamburg
Kuraray Europe GmbH, Frankfurt
Küsters Technologie GmbH & Co. KG, Krefeld
Leobersdorfer Maschinenfabrik GmbH & Co. KG
LONZA AG, CH
Lurgi Lentjes AG, Düsseldorf
Lurgi AG, Frankfurt

SIGMA Company info

M+W Inducon GmbH
MAN Turbo AG, Oberhausen, Essen, Hamburg,
MAN Diesel & Turbo Schweiz AG
MAN Oil & Gas Division
MAX STREICHER Anlagentechnik GmbH & Co. KG
MEGAL GmbH
Messer AGS, Krefeld
Meuser + Wirtz RLB GmbH, Jüchen
MH-Rohr GmbH, Kirchheim/Teck
Michaelis GmbH & Co. KG, Kaarst
Mineralölraffinerie Oberrhein GmbH, Karlsruhe
Mitsubishi Hitachi Power Systems Europe GmbH,
Oberhausen
M+W Germany GmbH
Novatec Solar GmbH, Karlsruhe
Open Grid Europe GmbH, Essen
Outotec GmbH, Köln
P² Plant & Pipeline Engineering GmbH, Essen
Paul Wurth Umwelttechnik GmbH, Essen
PKB Ingenieurgesellschaft mbH, Gelsenkirchen
Plantech Engineering GmbH, Selm
PLE Pipeline Engineering GmbH, Berlin
Praxair Deutschland GmbH, Düsseldorf
PS Engineering, Quakenbrück
RAB Rohrleitungs- und Anlagenbau GmbH ,
Beerwalde
Raffinerie Heide
RKG Energietechnik GmbH, A-Wien
RUI Rohr- und Industrieanlagenbau GmbH, Austria
RWE Power AG
Sachtleben Chemie GmbH
Sandvik Process Systems, D-Fellbach
Sanofi -Aventis Deutschland GmbH
SCHWING Fluid Technik AG
SEDECC STE, F-Belfort
Seonghwa Ind. Co., Ltd, Korea
Shell Deutschland Oil GmbH, Wesseling
Shell Global Solutions (Deutschland) GmbH
Siemens Axiva GmbH & Co. KG, Frankfurt
Siemens AG Energy Sector, Erlangen, Duisburg,
Mühlheim
Solvay Chemicals GmbH, Rheinberg, Bernburg
SPX Cooling Technologies / Balcke / Hamon Dry
Cooling/ Marley, Ratingen
SRG STAHL- U. ROHRBAU STRENK U. GROßE
GMBH, Recklinghausen

Stadtwerke Bochum , Düsseldorf, Hamm, Kassel, So-
lingen

Standardkessel, Duisburg
Steinmüller Babcock Environment GmbH (FISIA)
Stulz-Planaqua GmbH, Hamburg
STRABAG AG, D-Osterwald
szs engineering GmbH
TGE Marine Gas Engineering GmbH, Bonn
Technip GmbH, Düsseldorf, Frankfurt
Tokheim Service GmbH & Co. KG
TPR Fiberdur GmbH, Aldenhoven
Thyssen Schachtbau GmbH, Mülheim
ThyssenKrupp Steel Europe AG , Duisburg
TRESCH + KIELIGER GmbH, CH - Rapperswil
Trianel Gaskraftwerk GmbH & Co. KG, Hamm
TRIPLAN AG, Gelsenkirchen, Burghausen
Untergrundspeicher- und Geotechnologie-Systeme
GmbH , Mittenwalde
UNIC.SYSTEMS GmbH, Gladbeck
Uhde GmbH, Dortmund, Bad Soden
VAS Energy Systems GmbH, A-Grossgmain
VEMATECH GmbH, Korschenbroich
Vescon Systems AG, Frankenthal
VGB PowerTech e. V., Essen
Voith Industrial Services Engineering GmbH
VOITH Paper GmbH Co. KG
Vorwerk-ASA GmbH, Herne
VPT Kompressoren GmbH, Remscheid
VTA Verfahrenstechnik und Automatisierung GmbH,
Gelsenk.
Weber Engineering GmbH & Co KG, Pulheim
Westinghouse Electric Germany GmbH, Mannheim
WINGAS GmbH & Co. KG, Kassel
Wuppertaler Stadtwerke GmbH

Software Development

ROHR2

ROHR2iso

ROHR2fesu

ROHR2stoss

ROHR2-Interfaces

CAE-System for Component Analysis, Engineering and Structure Analysis of Complex Piping Systems

ALSTOM POWER - ALTRAN - AE&E LENTJES - AIB VINÇOTTE - ANDRITZ - AREVA - AXIMA - BABCOCK BORSIG - BABCOCK & WILCOX - BALCKE DÜRR - BASF - BATEMAN - BAYER - BHEL - BGR BOILERS - BILFINGER PIPING TECHNOLOGIES - BP - BURMEISTER & WAIN - CIMTAS - CITEC - CNEC WorleyParsons - DD-TEP - DONGFANG TURBINE CO. - DOOSAN BABCOCK - DP CLEAN TECH - DSD - ESKOM - ESTEQ - ENBW - E.ON - EVONIK - FERCHAU - FISIA - FIVES NORDON - FMT INDUSTRIEHOLDING - FOTAV RT - GASCADE - GEA - GRONTMIJ - GUANGDONG ELECTRIC - HITACHI - IDEA LTD - IHI CORPORATION - IMTECH - INFOSYS - INFRASERV - ISRAEL ELECTRIC - JACOBS - J&P-AVAX - J. CHRISTOF - KAE - KRAFTANLAGEN HEIDELBERG - KRAFTANLAGEN MÜNCHEN - LAHMEYER - LENZING TECHNIK - LEWA - LURGI LENTJES - M+W GERMANY - MAN DIESEL - MAN FERROSTAAL - MEYER WERFT - MCE ENERGIETECHNIK - NOELL - NORDON INDUSTRIES - OUTOTEC - OSCHATZ - OMV AG - PAUL WURTH - PÖYRY ENERGY - PETROBRAS - RAMBØLL - RWE - SENER - SEONGHWA IND - SHELL - SIEMENS ENERGY - SMS SIEMAG - SPX COOLING SYSTEMS - STANDARDKESSEL - STEAG - STEINMUELLER - STRABAG - TGE Marine Gas - THYSSENKRUPP UHDE - TECHNIP - TUEV NORD - TUEV SÜD - TÜV AUSTRIA - VATTENFALL - VEBA RUHR OEL - VAM - VOESTALPINE STAHL - WESTINGHOUSE

SINETZ, SINETZfluid

Calculation of Flow Distribution, Pressure Drop and Temperature Drop in Piping Networks.

For more than 40 years ROHR2 is a leading Software for Pipe Stress Analysis, a standard tool for pipe static and structural framework analysis, covering a variety of specifications like EN, ASME, ISO 14692, KTA, CODETI, RCCM and others.

The software is equipped by a range of additional features enhancing the engineer's daily job, as there are FEM analysis (ROHR2fesu), isometric capabilities (ROHR2iso) and a wide range of CAD and CAE interfaces.

ROHR2 is developed, distributed and supported by SIGMA Ingenieurgesellschaft in Germany. SIGMA is known as one of the leading engineering specialists in the Pipe Stress Business, offering field tested products, strongly adapted to the user's needs.

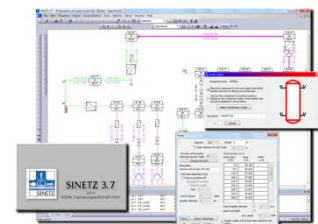
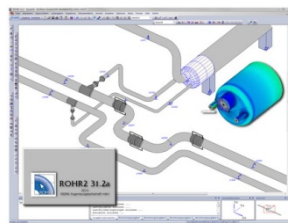
Static and dynamic analysis of complex piping and skeletal structures.

For about 40 years ROHR2 has supported the industry with an extensive application area and permanently revised and updated program releases.

A lot of well-known national and international plant producers, safety standards authorities, a large number of engineering companies, as well as operating companies of the energy-, chemical- and petrochemical industry trust in the quality of ROHR2.

Parts of the system are optional available programs like

- interfaces for communication of ROHR2 with CAD/CAE-systems,
- ROHR2iso (dimensioned isometric drawings and part lists),
- ROHR2fesu, Finite-Element Analysis of components in pipes
- ROHR2stoss, Structure Analysis of Fluid Hammer using Direct Integration



SINETZ

Calculation of Flow Distribution, Pressure Drop and Temperature Drop in Branched and Intermeshed Piping Networks for compressible and incompressible media

SINETZfw

Additional program District Heat Piping SINETZfw, Calculation of Pressure Drop and Temperature Drop in District Heating Pipe Networks

SINETZfluid

Calculation of Pressure Drop of incompressible media in Piping Networks

Software Services

Training
Update-Service
Maintenance

Software-Training

In order to boost the efficiency of the ROHR2 users, SIGMA proposes a concept of user trainings, which have proven their effectiveness for many years.

Possible training units are:

- Basic Trainings
- Trainings for users with experience in other pipe calculation software.
- Expert training
- Trainings for program updates
- Trainings to special topics on demand

In case of urgent questions or project related needs which do not justify the organization of a complete one or two-day training we propose internet based training.

Maintenance and Update service, Program user advice

SIGMA offers Software-maintenance contracts including user support, software development and update service.

All programs are equipped with a detailed application documentation. At questions about the documentation competent contact persons of the ROHR2 hotline supports the user.

The update of the software by extensive updates is a further essential component of the maintenance agreement. The software is developed continuously.

This makes use of the software possible for the user due to the current stand of technology which is demanded by the legislator in the current norms and laws.

Developing Software Solutions specified to the customer needs

- Integration of SIGMA Software into networks
- CAD/CAE-Interfaces
- Adaption of SIGMA Software to existing hardware systems