

ARGUS



Optical Forming Analysis

Full-Field Forming Measurement
in Sheet Metal Stamping

ARGUS

Optical Forming Analysis

The optimization of the sheet metal forming process taking into account the correct material selection and the optimization of tools is a decisive factor for competitiveness, particularly in the automotive industry.

The forming analysis system ARGUS supports such optimization processes particularly by convincing and precise results of the forming distribution on the components. In addition, it provides full-field results for the verification of numerical forming simulations.

The results from the ARGUS system provide full-field information about:

- 3D coordinates of the component's surface
- Form change (major and minor strain)
- Thickness reduction
- Forming Limit Diagram (FLD)
- Sheet metal hardening

All results are presented in a fine resolution mesh created from the determination of the 3D coordinates and reflecting the surface of the measured object. These results are graphically displayed and may be exported as ASCII data set.

In the Forming Limit Diagram the measured deformations are compared to the material characteristics of the blank (Forming Limit Curve).

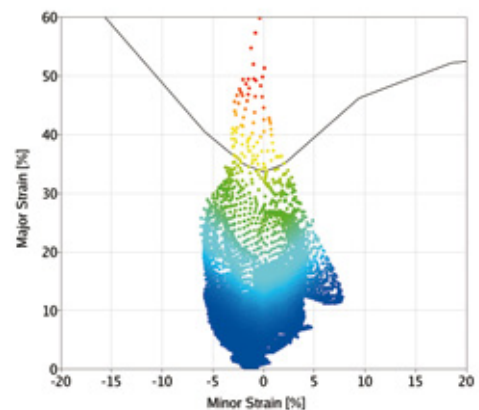
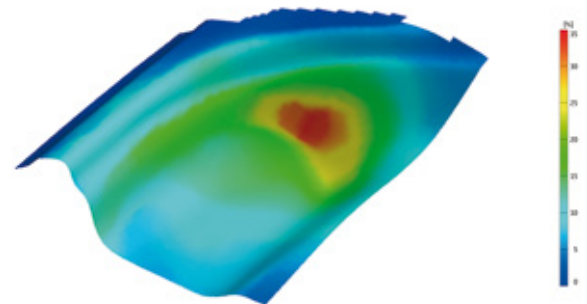
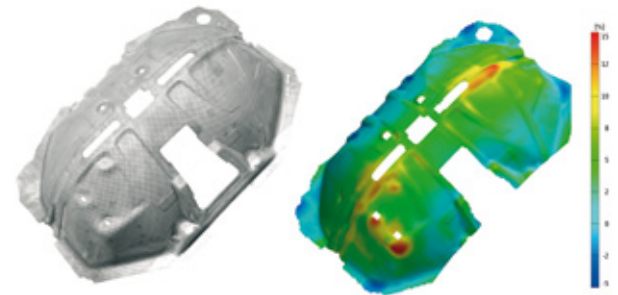
ARGUS takes up conventional and proven methods of the forming analysis which are based on the structuring of the blank. The measuring system operates independent of the material. It can be used to analyze components made from flat blanks, tubes or other components manufactured by an internal high pressure forming process (IHPF).

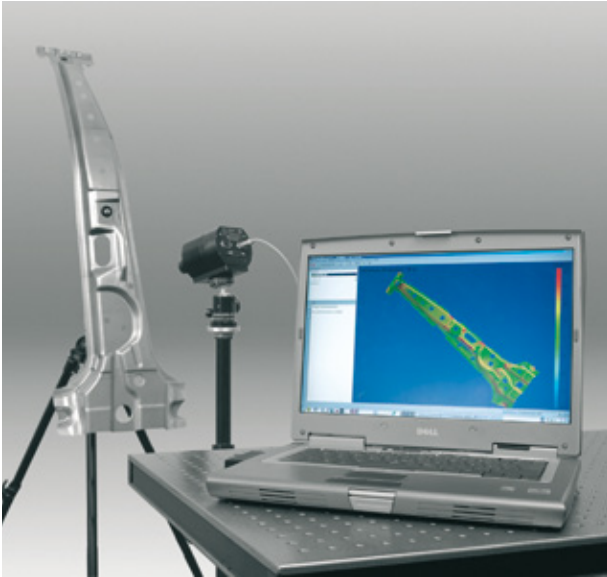
The optical forming analysis using ARGUS has become a proven tool for evaluating forming processes and verifying simulations. In particular, the precise, accurate and user-independent measuring procedure as well as the surface representation of deformation distributions strengthened the acceptance of this measuring technology. This unique possibility to measure complex sheet metal parts with a high scanning density opens up new aspects for the verification of forming simulations.

Applications

ARGUS provides full-field results with high local resolution for small as well as for large components. Therefore, it is ideal for numerous sheet metal forming tasks:

- Detection of critical deformation areas
- Solving complex forming problems
- Optimization of forming processes
- Verification of tools
- Verification and optimization of numerical simulations

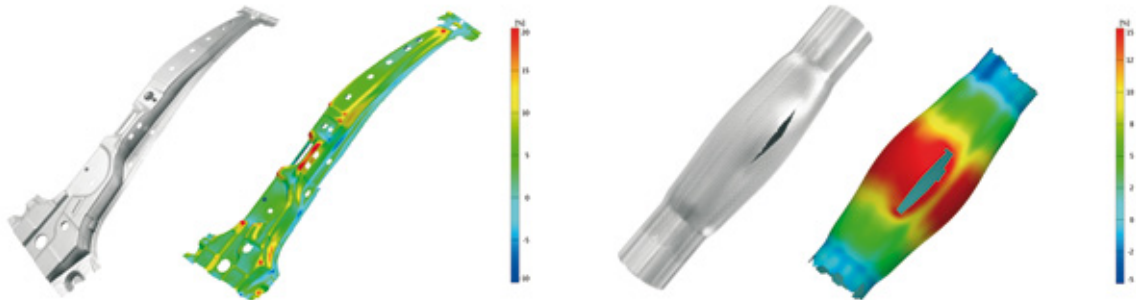




Technical Data

System Configurations	2 M / 5 M / 12 M
Setup mobile/stationary	90 x 70 x 120 mm ³
Weight	0.7 kg
Transport Case	465 x 195 x 400 mm ³

Camera Resolution (2 M)	1600 x 1200 pixels
Camera Resolution (5 M)	2448 x 2050 pixels
Camera Resolution (12 M)	4280 x 2840 pixels
Measuring Area	100 mm ² up to >> m ²
	Freely adjustable
Measured Points	10 000 to 1 000 000
Strain Range	0.5 % up to > 300 %
Strain Accuracy	up to 0.1 %
Calibration	Self-calibrating
Computer	2 GHz P4M Notebook or 64 bit PC



Technology

The specimen is recorded by means of high-resolution images which are then evaluated using the ARGUS software. With the help of point finding algorithms and a mathematical adjustment computation, a precise model is automatically calculated from ray intersections, camera positions and lens distortions. The resulting 3D object coordinates on the component's surface are arranged in a fine resolution mesh which corresponds to the pattern applied to the blank. The mesh reflects the surface of the test object.

From the 3D coordinates of the object points, the actual results of the forming and the sheet metal thickness are calculated taking into account the component's geometry and following the rules of the plasticity theory. These calculations may also be carried out for the center of the sheet metal as may be suitable for thicker sheet metals or smaller radii.

First, the form changes are displayed in a false-color 3D mesh of up to one million points. Labels help to represent special points on the surface with their respective measuring values. In diagrams, any sections can be represented.

A Forming Limit Diagram can be created from the forming results in which imported Forming Limit Curves allow the evaluation of the forming behavior. Freely definable reports provide for a time-effective creation of measuring reports. For repeated measurements, the complete evaluation and the creation of the measuring report can be carried out automatically at the push of a button.

The entire measuring, evaluation and documentation process is built on an easy, safe and fast workflow. The system is self-calibrating, thus a complicated calibration is not required. In the industry, ARGUS is an established and proven measuring system for forming analysis.

Argentina
ROBTEC ARGENTINA
Phone +54 11 4787 6800
info@robtec.com

Australia
MOSS Pty Ltd
Phone +61 3 9946 1086
scan3d@iprimus.com.au

Austria
Westcam Datentechnik GmbH
Phone +43 5223 5550 90
office@westcam.at

Brazil
ROBTEC DO BRASIL
Phone +55 11 3318 5100
info@robtec.com

China
Dom 3D Ltd.
Phone +862 1 2898 6108
info@dom-3d.com.cn

China
Pro-Technic Machinery Ltd.
Phone +852 2428 2727
atd@protechnic.com.hk

China, Taiwan
Road Ahead Technologies
Phone +886 2 2999 6788
marcel@rat.com.tw

Columbia
USM Columbia S.A.
Phone +57 4279 9000
gerencia@usm.com.co

Croatia, Slovenia
Topomatika d.o.o.
Phone +385 91 5046 239
info@topomatika.hr

Czech Republic
MCAE Systems s.r.o.
Phone +420 549 128 811
mcae@mcae.cz

Denmark
Zebicon
Phone +45 7650 9152
info@zebicon.com

Finland
Cascade Computing AB
Phone +358 40 515 3341
info@cascade.fi

Greece
EXPERTCAM
Phone +30 210 2757 410
expirtcam@otenet.gr

Hungary
R-Design Studio Ltd.
Phone +36 1 365 10 89
info@r-design.hu

India
APM Technologies
Phone +91 11 4163 1416
apmtech@vsnl.net

Indonesia
PT Henindo
Phone +62 21 489 9675
henvgs@attglobal.net

Iran
Fadak Sanat Gostar (FSG)
Phone +98 21 88 730 735
info@fadaksanat.com

Israel
Globus Technical Equipments Ltd.
Phone +972 9 9560444
nir@globus.co.il

Japan
Marubeni Solutions Corp.
Phone +81 3 5778 8571
Sato-Yoshiyuki@marubeni-sys.com

Malaysia, Singapore
First High Tech Sdn Bhd
Phone +603 7665 2188
info@1st.com.my

Mexico
CIM Co.
Phone +52 55 5565 6633
info@cimco.com.mx

Pakistan
Ultimate CAD Solutions Ltd
Phone +92 51 5467572
shakir@ucs-int.com

Poland
ITA
Phone +48 61 222 5800
info@ita-polska.com.pl

Portugal
S3D
Phone +35 12 4457 3100
suporte@s3d.pt

Romania
SPECTROMAS SRL
Phone +40 21 3105190
info@spectromas.ro

Russia, Kazakhstan
NIAT
Phone +7 495 3111198
info@niat-ntk.ru

South Africa
RGC Engineering Pty
Phone +27 11 531 0766
info@rgcengineering.co.za

South-Korea
OMA Co.
Phone +82 42 822 9501
support@omagom.co.kr

Spain
Metronic S.A.
Phone +34 943 121400
comercial@metronicnet.com

Sweden
Cascade Computing AB
Phone +46 31 84 0870
info@cascade.se

Thailand
Mentel Co., Ltd.
Phone +662 719 6969
info@mentel.co.th

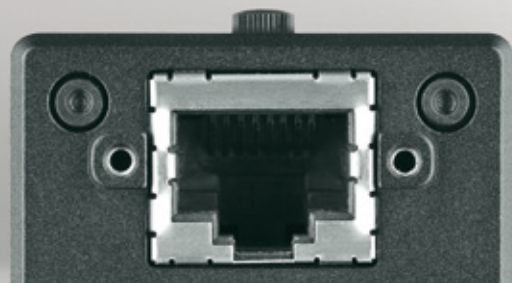
Turkey
Cadem A.S.
Phone +90 216 557 64 64
gom@cadem.com.tr

USA, Canada
Capture 3D Inc.
Phone +1 714 546 7072
info@capture3d.com

USA, Canada
Trillion Quality Systems LLC
Phone +1 215 710 3000
info@trillion.com

Venezuela
AT Group Software Inc
Phone +58 212 9432 446
dkinz@atgroup.com.ve

Vietnam
AIE
Phone +84 43 7345 435
aie@vnn.vn



gom
Optical Measuring Techniques

GOM mbH
Mittelweg 7-8
38106 Braunschweig
Germany
Tel +49 531 390 29 0
Fax +49 531 390 29 15
info@gom.com

GOM France SAS
10 Quai de la Borde
91130 Ris Orangis
France
Tel +33 1 60 47 90 50
Fax +33 1 69 06 63 60
info-france@gom.com

GOM International AG
Bremgarterstrasse 89B
8967 Widen
Switzerland
Tel +41 5 66 31 04 04
Fax +41 5 66 31 04 07
international@gom.com

GOM Branch Benelux
Interleuvenlaan 15 F
3001 Leuven
Belgium
Tel +32 16 408 034
Fax +32 16 408 734
info-benelux@gom.com

GOM UK Ltd
Unit 14 The Cobalt Centre
Coventry, CV3 4PE
United Kingdom
Tel +44 2476 639920
Fax +44 2476 516990
info-uk@gom.com

GOM Italia Srl
Via Lomellina 10/6
20090 Buccinasco (MI)
Italy
Tel +39 02 457 01 564
Fax +39 02 457 12 801
info-italia@gom.com

www.gom.com