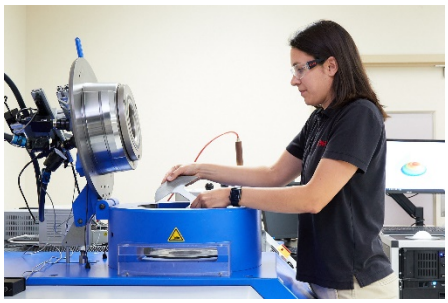
EWI Forming Center: Material Formability Testing

EWI's Forming Center offers material formability testing of various types of sheet material including steel, aluminum, titanium, and nickel alloys. These tests include cup draw testing, biaxial bulge testing, and forming limit diagram (FLD) testing. EWI engineers evaluate the results of these tests to provide recommendations on lubricants, coatings, and materials for your specific application.



Name	Reference	Description	Rate*
Cup Drawing Testing			
Cup Draw Test for Evaluating Stamping Lubricants		Evaluation of the material drawability and/or performance of stamping lubricants using a hydraulic press and a 6-in. diameter punch. Nine 12-in. diameter blanks are required for each lubricant or material. Maximum sheet thickness is 2.54-mm (0.1-in.). Maximum tensile strengths 1200-MPa with a maximum gage of 12-mm (0.048-in.).	$5,975
Cup Draw Test — Additional Materials		Additional testing with pre-defined testing conditions such as forming speed, blank holder force, and lubricant.	$2,485
B2 Erichsen Deep Draw Test for Evaluating Drawability	ISO 11 531	Evaluation of the material drawability and/or earing tendency using an Erichsen Sheet Metal Machine with a 2-in. drawing punch. Ten 5 x 5-in. blanks are required for testing. Material thickness: 0.2 - 3.0-mm.	$4,125
B2 Erichsen Deep Draw Test — Additional Materials		Additional testing with pre-defined testing conditions.	$2,185
B2 Erichsen Deep Draw Test at Elevated Temperatures		Standard deep draw test at elevated temperature (up to 932°F).	$4,950
B2 Erichsen Deep Draw Test at Elevated Temperatures — Additional Materials		Additional testing at elevated temperature with pre-defined testing conditions.	$3,035
Erichsen Cupping Test	ISO 20482	Evaluate of the material's ability to undergo plastic deformation in stretch forming conditions with a 20-mm or 15-mm punch diameter. Material thickness: 0.2 - 3.0-mm.	$2,900
Erichsen Cupping Test — Additional Materials		Additional testing with pre-defined testing conditions.	$1,700

For additional information or a quote please contact Laura Zoller, Project Engineer at lzoller@ewi.org or Brad Nagy at bnagy@ewi.org. 614.688.5000 / 1250 Arthur E. Adams Drive, Columbus, OH 43221 EWI.org/technologies/labservices

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Name	Reference	Description	Rate*
Biaxial Bulge Testing			
Viscous Pressure Bulge Test		Equi-biaxial tension test to obtain the biaxial stress-strain curve of sheet material. Five 10-in. square blanks are required for this testing. Maximum sheet thickness for this testing is 2.54-mm (0.1-in). Maximum tensile strength for this testing is 1200-MPa (170-ksi) with a maximum gage of 1.2-mm (0.048-in.).	$6,200
Viscous Pressure Bulge Test — Additional Materials		Additional testing with the pre-defined testing conditions.	$2,400
Hydraulic Bulge Test with Digital Image Correlation (DIC)		Equi-biaxial tension test using compressed oil to obtain the flow stress-strain curve of the sheet material using DIC. Ten 10-in. square blanks are required for this testing. Maximum tensile strength for this testing is 1100-MPa (160-ksi) with a maximum gage of 3.0-mm (0.118-in.).	$5,025
Hydraulic Bulge Test with Digital Image Correlation — Additional Material		Additional testing with pre-defined testing conditions.	$2,485
Forming Limit Diagram (FLD) Testing			
Forming Limit Diagram 5-point Test	ISO 12004	Standard Nakajima or Marciniak (4-in. drawing punch) testing to obtain a full scale 5-point FLD using DIC with an Erichsen Sheet Metal Machine. Twenty 10-in. square blanks are required for testing. Maximum tensile strength for this testing is 1100-Mpa (160-ksi) with a maximum gage of 3.0-mm (0.118-in.).	$6,800
Forming Limit Diagram 5-point Test — Additional Materials		Additional testing with DIC using pre-defined testing conditions.	$5,600
Forming Limit Diagram 5-point Test at Elevated Temperatures		Standard 5-point FLD testing at elevated temperatures (up to 932°F) with DIC (cold punch with elevated temperature blank).	$10,200
Forming Limit Diagram 5-point Test at Elevated Temperatures — Additional Materials		Additional testing at elevated temperature (up to 932°F) with DIC using pre-defined testing conditions.	$7,000

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Name	Reference	Description	Rate*
Limiting Dome Height (LDH) Testing			
Limiting Dome Height Testing Full Sample		Evaluation of the material stretch forming ability (4-in drawing punch) using DIC with an Erichsen Sheet Metal Machine. Ten 10-in. square blanks are required for this testing. Maximum tensile strength for this testing is 1100-MPa (160-ksi) with a maximum gage of 3.0-mm (0.118-in.).	$4,065
Limiting Dome Height Testing Full Sample — Additional Materials		Additional testing with DIC using pre-defined testing conditions.	$1,800
Limiting Dome Height Testing Full Sample at Elevated Temperatures		Standard LDH Testing at elevated temperatures (up to 932°F) with DIC.	$5,530
Limiting Dome Height Testing Full Sample at Elevated Temperatures — Additional Material		Additional testing at elevated temperatures (up to 932°F) with DIC using pre-defined testing conditions.	$2,400
Limiting Dome Height Testing Half Sample		Evaluation of edge cracking failures (4-in. drawing punch) using DIC with an Erichsen Sheet Metal Machine. Ten 5 x 10-in. blanks are required for testing.	$4,065
Limiting Dome Height Testing Half Sample — Additional Materials		Additional testing with DIC using pre-defined testing conditions.	$1,800
Hole Expansion Testing (HET)			
Hole Expansion Testing	ISO 16630	Evaluation of a pre-cut hole (10-mm according to ISO16630 or 40-mm) failure during forming with a conical drawing punch using DIC and an Erichsen Sheet Metal Machine. Ten 5 x 5-in. square blanks are required for testing.	$3,290
Hole Expansion Testing — Additional Materials		Additional testing with DIC using pre-defined testing conditions.	$1,150
Hole Expansion Testing — Punching Holes		Shearing 10-mm or 40-mm holes at various clearances to be used in hole expansion testing.	Contact EWI for a quote.

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Name	Reference	Description	Price
Bend Testing			
VDA Tight Bend Testing	VDA 238-100	Evaluation of the bendability of a material using DIC. Twenty 60 x 60-mm samples are required for testing.	Contact EWI for a quote.
VDA Tight Bend Testing — Additional Materials		Additional testing with DIC using pre-defined testing conditions.	Contact EWI for a quote.
Other Forming Center Resources			
Simulation Services		Sheet metal forming simulation support using commercial finite element method (FEM) codes such as ABAQUS, Autoform, DEFORM, LS-DYNA, and PAM-STAMP.	Contact EWI for a quote.
Servo Press Die Try-Out (Full Day)		Die try-out using EWI's 3000 kN AIDA Servo Press with 250 kN blank-holder force. EWI provided die or customer die. Contact EWI for press specifications.	$5,000
Hydraulic Press Die Try-Out (Full Day)		Die try-out using EWI's 160-ton Minster hydraulic press with 100-ton CNC-controlled hydraulic cushion system for blank holder force. EWI provided die or customer die. Contact EWI for press specifications.	$5,000
Hydraulic Press Die Try-Out with Warm Forming Cell (Full Day)		Die try-out using EWI's 160-ton Minster hydraulic press and an integrated warm forming cell (up to 1832°F). EWI provided die or customer die. Contact EWI for press specifications.	$5,000
ARGUS Strain Analysis EWI Part		ARGUS strain analysis of one part stamped at EWI's stamping press. Outputs are final forming strains and thickness of formed part.	$1,200
ARGUS Strain Analysis Customer Part		ARGUS strain analysis of one industry sized part stamped at customer's facility. Outputs are final forming strains and thickness of formed part.	$2,100
ATOS Blue Light Scanner EWI Part		ATOS Blue Light scan data of one part stamped at EWI's stamping press. Outputs dimensional accuracy checks using CAD data.	$1,500
ATOS Blue Light Scanner Customer Part		ATOS Blue Light scan data of one industry sized part stamped at customer's facility. Outputs dimensional accuracy checks using CAD data.	$2,100

*Rates subject to change.

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