FORMING

Material Formability Testing

EWI 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.

For additional information or a quote please contact Laura Zoller, Engineering Manager, at lzoller@ewi.org or Paul Zelenak, Applications Engineer at pzelenak@ewi.org.

Cup Drawing Testing		
Name	**Reference**	**Description**
B2 Erichsen Deep Draw Test for Evaluating Drawability	ISO 11 531	Evaluation of the material drawability and/or earing tendency using Erichsen Sheet Metal Machine with 2-in. drawing punch. Ten 5 x 5-in. square blanks are required for testing 0.2–3.0 mm.
B2 Erichsen Deep Draw Test — Additional Materials		Additional testing with pre-defined testing conditions.
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 range 0.2–3.0 mm.
Erichsen Cupping Test — Additional Materials		Additional testing with pre-defined testing conditions.
Biaxial Bulge Testing		
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. Square blanks that are 10 x 10 in. are required for testing. Five samples used for setup, and five samples for testing. Maximum tensile strength for this testing is 1100 MPa (160 ksi) with a maximum gage of 3.0 mm (0.118 in.).
Hydraulic Bulge Test with Digital Image Correlation — Additional Material		Additional testing with pre-defined testing conditions.
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 Erichsen Sheet Metal Machine. A set of 20 blanks (10-in. square) is 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.).
Forming Limit Diagram 5-point Test — Additional Materials		Additional testing with DIC using pre-defined testing conditions.

Material Formability Testing *cont.*

Limit Dome Height (LDH) Testing		
Name	**Resource**	**Description**
Limiting Dome Height Testing Full Sample		Evaluation of the material stretch forming ability (4-in drawing punch) using DIC with Erichsen Sheet Metal Machine. Square blanks that are 10 x 10-in. are required for testing. Five samples used for setup, and five samples for testing. Maximum tensile strength for this testing is 1100 MPa (160 ksi) with a maximum gage of 3.0 mm (0.118 in.).
Limiting Dome Height Testing Full Sample — Additional Materials		Additional testing with DIC using pre-defined testing conditions.
Hole Expansion Testing (HET)		
Hole Expansion Testing — Additional Materials		Additional testing with DIC using pre-defined testing conditions.
Hole Expansion Testing — Punching Holes		Shearing 10-mm or 40-mm holes at various clearances to be used in hole expansion testing.
Bend Testing		
VDA Tight Bend Testing	VDA 238-100	Evaluation of the bendability of a material using DIC. Twenty samples 60 mm x 60-mm samples are required.
VDA Tight Bend Testing — Additional Materials		Additional testing with DIC using pre-defined testing conditions.

Not included in scope of A2LA accreditation.