APPENDIX A: ACRONYMS AND ABBREVIATIONS

2DTBC	two-dimensional triaxially-braided composite
2D-WAXS	two-dimensional wide-angle x-ray scattering
3D	three-dimensional
A/SP	Auto/Steel Partnership
ABS	acrylonitrile-butadiene-styrene
ACC	Automotive Composites Consortium
ACD	after concept design
ACDC	after concept design analysis check
ADCB	asymmetric double-cantilever beam
AF	anisotropy factor
AFM	atomic-force microscope(y)
AFO	after final optimization
AFS	American Foundry Society
AHSS	advanced high-strength steel
AISI	American Iron & Steel Institute
AKDQ	aluminum-killed draw-quality
Al	aluminum
ALM	Automotive Lightweighting Materials
AMD	Automotive Metals Division
ANL	Argonne National Laboratory
ANSI	American National Standards Institute
AO	after optimization
AP	acidification potential
APC	American Plastics Council
APGE	Arizona Proving Grounds Exposure
ARA	(International) Automotive Recycling Association
ARC	(International) Automobile Recycling Congress
ASTM	American Society for Testing and Materials
ATR	attenuated total reflection
AWS	American Welding Society
BCC	body center cubic
BDE	brominated diphenyl ethers
BET	Brunauer-Emmett-Teller
BFO	before final optimization
BH	bake hardenable
BIW	body(ies)-in-white
BL	black liquor
BLRT	bond-line read-through
BO	before optimization
BOF	body-on-frame
BSEF	Bromine Science and Environmental Forum
BT	bond-line thickness
BW	bond width
CAABS	crash analysis of adhesively bonded structures
CAD	computer-aided design

CAE	computer-aided engineering
CANMET	an R&D entity of the Minerals and Metals Sector of Natural Resources Canada
CB	cylinder block
CCD	charge-coupled device
CCHT	combinatorial, combi, high-throughput
CCT	cosmetic corrosion test
CDA	critical damage area
CF	carbon fiber
CFSI	carbon fiber systems integration
CLTE	coefficient of linear thermal expansion
CMM	coordinate measuring machine
CMOS	complementary metal oxide semi-conductor
COM	Conference of Metallurgists
CP	cold pressed / complex phase
CPU	central processing unit
CRADA	Cooperative Research and Development Agreement
CrN	chromium nitride
CRTM	compression resin-transfer molding
CT	compact tension / computerized tomography
CTE	coefficient of thermal expansion
CWT	Changing World Technologies
CZ	cohesive zone
DC	direct current
DCB	double cantilever beam
DCX	DaimlerChrysler
DCZM	discrete cohesive zone model
DFEP	Die Face Engineering Project
DHαMS	dihydroxy-α-methylstilbene
DIC	digital image correlation
D-LFT	direct long-fiber thermoplastic
DMA	dynamic mechanical analysis
DOE	Department of Energy
DoE	design of experiment
DP	dual phase
DP800	Dual Phase 800
DQ	drawing quality
DQSK	drawing-quality special-killed
DRIFT®	Direct Reinforcement Fabrication Technology
DSC	differential scanning calorimetry / dispersion-strengthened copper
DTA	differential thermal analysis
DTUL	deflection temperature under load
DW	driven wedge
ECD	electron capture detector
EDS	energy-dispersive spectrometer(ry)
EDX	energy-dispersive X-ray analysis
EF	(thermal-drilling) extension factor
EH&S	environmental, health and safety.
ELV	end-of-life vehicle(s)
EMF	electromagnetic forming

EP	eutrophication
EPA	Environmental Protection Agency
ERW	electric resistance welding
FCC	face-centered cubic
FCD	final concept design
FCVT	FreedomCAR and Vehicle Technologies
FE	finite element
FEA	finite-element analysis
FEC	front engine cover
FE/CV	finite-element/control volume
FEM	finite-element method/modeling
FGPC	Future Generation Passenger Compartment
FLD	fiber-length distribution or forming-limit diagram
FMBEM	Fast Multipole Boundary Element Method
FMVSS	Federal Motor Vehicle Safety Standard
FOP	fully-oxidized polyacrylonitrile
FP2	focal project 2
FP-3	focal project-3
FRP	fiber-reinforced plastic
FSSW	friction-stir spot welding
FSW	friction-stir welded
FTC	Federal Trade Commission
FT-IR	Fourier transform infrared
FY	fiscal year
GA	Galvaneeled
GaBi	Ganzheitliche Bilanzerung
GC	gas chromatography
GC/MS	gas chromatography/mass spectroscopy
GC-ECD	gas chromatography and electron-capture detector
GDIS	Great Designs in Steel
GF	glass fiber
GI	galvanized coating
GM	General Motors (Corporation)
GMAW	gas metal arc weld
GMT	glass-mat thermoplastic
GPEC	Global Plastics Environmental Conference
GPRA	Government Performance and Results Act of 1993
GWP	global warning potential
HAZ	heat-affected zone
HBA	hydroxybenzoic acid
HDG	heavy-duty galvanized / hot-dipped galvanized
HDPE	high-density polyethylene
HI-MAC	High-Integrity Magnesium Automotive Casting
HIPS	high-impact polystyrene
HNA	hydroxy-naphthoic acid
HPDC	high-pressure die casting
HSBS	hot-stamp(ed) boron steel
HSLA	high-strength low-alloy

HSS	high-strength steel
HTML	high-temperature materials laboratory
ICME	integrated computational materials engineering
IDDRG	International Deep Drawing Research Group
IF	interstitial free
IFU	University of Stuttgart
IIHS	Insurance Institute for Highway Safety
IISI	International Iron & Steel Institute
IP	instrument panel
IR	infrared
ISRI	Institute of Scrap Recycling Industries
ISV	internal state variable
ITP	International Titanium Powder (Inc.)
JCI	Johnson Controls, Inc
LBNL	Lawrence Berkeley National Laboratory
LC	liquid crystallines
LCM	liquid composite molding
LDH	limited dome height
LDPE	low-density polyethylene
LFT	long-fiber-reinforced injection-molded thermoplastics
LIMS	Liquid Injection Molding Simulation
LPPM	low-pressure permanent-mold
LW	laser-welded
LWB	laser-welded blanks
LWFS	lightweight front-end structure
MAP	microwave-assisted plasma
Mart	martensitic
MFE	magnesium front end
MFEDD	magnesium front end design and development
MFERD	magnesium front end research and development
MFR	melt flow rate
MHD	magnetohydrodynamic
MI	melt index
MIG	metal inert gas
Missu	Mississippi State University
M-K	Marciniak-Kuczynski
MLPD	magnesium low-pressure development
MMB	mixed-mode bending
MMV	multi-material vehicle
MOST	Ministry of Science and Technology (China)
MPCC	magnesium powertrain cast component
MS	martensitic steels / mass spectroscopy
MSS	mean/maximum shear strength
MTT	Materials Technical Team (FreedomCAR)
MW	Mead Westvaco
MWV	MeadWestvaco (Corporation)

N/D or N.D.	Not detected
NA	North America(n)
NANO	new application of nano obstacles
NC	numerical control
NCAP	New Car Assessment Program
NCC	National Composites Center
NCC-ET	North Carolina Central Campus—Emerging Technologies
NDE	non-destructive evaluation
NDI	non-destructive inspection
NEXAFS	near-edge x-ray absorption fine structure
NIST	National Institute for Standards and Technology
NMR	nuclear magnetic resonance
NSF	National Science Foundation
NSJS	normalized static joint strength
NTRC	National Transportation Research Center
NVH	noise, vibration, and harshness
OC	Owens Corning (Corporation)
OEM	original equipment manufacturer
ORNL	Oak Ridge National Laboratory
P/M	powder metallurgy
P4	programmable powdered preform process
PAN	polyacrylonitrile
PBDEs	polybrominated diphenyl ethers
PBT	polybutylene terephthalate
PC	polycarbonate
PCBN	polycrystalline cubic boron nitride
PCBs	polychlorinated biphenyls
PDE	partial differential equation
PE	polyethylene
PEY	partial electron yield
PI	principal investigator
PMC	polymer-matrix composite
PNNL	Pacific Northwest National Laboratory
POCP	photochemical ozone creation potential
PP	polypropylene
PP/PE	polypropylene/polyethylene
PPM	parts per million
PPO	polyphenylene oxide
PPS	post-peak softening
PS	polystyrene
PSC	Project Steering Committee
PTC	Project Technical Committee
PTT	Phan-Thien Tanner
PU	polyurethane
PVC	polyvinyl chloride
R&D	Research and Development
RFQ	request for quotes
RIS	radiographic inspection standards

RPM	revolutions per minute
RSC	rear seal cover / reduced strain closure
RSW	resistance spot-welding
RTM	resin-transfer molding
RUC	representative unit cell
RVE	representative volume element
RWD	rear-wheel drive
SAE	Society of Automotive Engineers
SAMPE	Society for the Advancement of Materials and Process Engineering
SCMD	structural cast magnesium development
SD	standard deviation
SDSM&T	South Dakota School of Mines and Technology
SEA	specific energy absorption
SEM	scanning election microcope(y)
SERR	strain-energy release rate
SFT	short-fiber-reinforced injection-molded thermoplastics
SG	specific gravity
SLB	single-leg bend
SLC	sub-liquidus casting
SMARTS	Spectrometer for MAterials Research at Temperature and Stress
SMC	sheet molding compound
SNL	Sandia National Laboratories
SOCs	substances of concern
SOP	standard operating procedure / structural oil pan
SORPAS	Simulation and Optimization of Resistance, Projection and Spot Welding Processes
SOW	statement of work
SRF	strain reduction factor
SRI	Southern Research Institute
SRIM	structural reaction-injection molding
SSM	semi-solid metal
ST	schapery-like, thermodynamically-based theory
SUV	sport utility vehicle
SWE	spot-weld element
SWSG	structural weld sub-group
TBD	to be determined
TC	transcrystalline region
TDM	Troy Design and Manufacturing
TFF	thread-forming fastener
TGA	thermo-gravimetric analysis
ThD	thermal drilling
TLCP	thermotropic liquid-crystalline polymer
TMAC	Test Machine for Automotive Crashworthiness
TMS	The Minerals, Metals, and Materials Society
TPI	Troy Polymers, Inc.
TPO	thermoplastic olefins
TP-P4	thermoplastic P4
TRIP	transformation-induced plasticity
TS	tensile strength
TTSP	time temperature superposition principle

TWB	tailor-welded blank
TWT	tailor welded tube
TYE	tensile, yield and elongation properties
UAB	University of Alabama-Birmingham
UD	unidirectional
UDRI	University of Dayton Research Institute
UEL	used-defined element
UHMW	ultra-high molecular weight
UHSS	ultra high strength steel
ULC	ultra-large casting
ULSAB-AVC	Ultralight Steel Auto Body-Advanced Vehicle Concepts
UPA	units per annum
UPE	unsaturated polyester
USAMP	United States Automotive Materials Partnership
USCAR	United States Council for Automotive Research
USPTO	United States Patent and Trademark Office
UT	University of Tennessee
UTK	University of Tennessee, Knoxville
UTS	ultimate tensile strength
UV	ultraviolet
VARTM	vacuum-assisted resin-transfer molding
VE	vinylester
VPB	viscous pressure bulge
VRP	Vehicle Recycling Partnership
VUMAT	vectorized user material
VW	Volkswagen
W25Re	25 wt% rhenium
WDS	wavelength-dispersive spectrometer(ry)
Wpm	welds per minute
XFEM	extended finite-element method
XRD	x-ray diffraction
YAG	yttrium-aluminum-garnet
YS	yield strength