

PROTECTIVE SPORTS EQUIPMENT: THE NORTH AMERICAN MARKET



AVM085A
July 2013

Andrew McWilliams
Project Analyst

ISBN: 1-56965-446-8

bcc | Research
Market Forecasting

BCC Research
49 Walnut Park, Building 2
Wellesley, MA 02481
866-285-7215, 781-489-7301
www.bccresearch.com
Custom Reports:
carol.laverty@bccresearch.com

TABLE OF CONTENTS

TOPIC	PAGE NO.
CHAPTER 1 INTRODUCTION	2
STUDY BACKGROUND	2
GOALS AND OBJECTIVES	2
INTENDED AUDIENCE	3
SCOPE AND FORMAT	3
METHODOLOGY	4
AUTHOR'S CREDENTIALS	4
RELATED BCC RESEARCH	5
BCC ONLINE SERVICES	5
DISCLAIMER	5
CHAPTER 2 SUMMARY	7
<i>SUMMARY TABLE SALES OF PROTECTIVE SPORT EQUIPMENT BY TYPE OF SPORT, THROUGH 2018 (\$ MILLIONS)</i>	7
<i>SUMMARY FIGURE SALES OF PROTECTIVE SPORT EQUIPMENT BY PART OF BODY PROTECTED, 2012-2018 (% OF TOTAL SALES)</i>	7
CHAPTER 3 OVERVIEW	10
SCOPE OF STUDY AND DEFINITIONS	10
HISTORY	10
BASEBALL	10
Catcher's Masks	10
Helmets	11
Shin Guards	11
FOOTBALL	11
Football Helmets	11
Football Pads	11
Athletic Supporter	12
HOCKEY	12
Pads	12
Masks	13
Helmets	13
SOCCER	13
Shin Guards	13
Goalie Gloves	14
Soccer Headgear	14
WRESTLING	14
Wrestling Headgear	14
CYCLING	15
Cycle Helmets	15
SNOW SPORTS	15
Ski Helmets	15
FENCING	16
Fencing Mask	16
Other Fencing Clothes	16
CLIMBING SPORTS	17

TOPIC	PAGE NO.
Climbing Helmets	17
Climbing Harnesses	17
LACROSSE	17
ROLLER SPORTS	18
Skateboard Helmets	18
TYPES OF PROTECTIVE EQUIPMENT	18
HEAD AND FACE PROTECTIVE EQUIPMENT	18
Helmets	18
<i>TABLE 1 TYPES OF SPORTS PROTECTIVE HELMET</i>	18
Face Guards	19
Throat Protection	19
Mouth Guards	19
Ear Guards	20
Eye Protection	20
TRUNK AND THORAX PROTECTIVE EQUIPMENT	20
Shoulder Pads	20
Chest Protectors and Rib Belts	20
Hip and Buttock Protectors	21
Groin and Genitalia Protectors	21
UPPER EXTREMITY PROTECTIVE EQUIPMENT	21
Elbow Protectors	21
Protective Gloves	21
LOWER EXTREMITY PROTECTIVE EQUIPMENT	22
Knee Protectors	22
Shin Protectors	22
MAJOR END-USER MARKETS	22
FOOTBALL	22
<i>FIGURE 1 U.S. FOOTBALL PARTICIPATION, 2012 (%)</i>	22
<i>FIGURE 2 NCAA FOOTBALL PARTICIPATION, 2007/2008-2010/2011 SEASON (NUMBER OF PLAYERS)</i>	23
<i>FIGURE 3 HIGH SCHOOL FOOTBALL PARTICIPATION, 2007/2008-2011/2012 SEASONS (NUMBER OF PLAYERS)</i>	23
ICE HOCKEY	24
<i>FIGURE 4 TRENDS IN AMERICANS PARTICIPATING IN ICE HOCKEY, 2007-2012 (NUMBER OF PARTICIPANTS)</i>	24
BASEBALL AND SOFTBALL	26
<i>FIGURE 5 TRENDS IN THE NUMBER OF AMERICANS PARTICIPATING IN BASEBALL AND SOFTBALL AT LEAST ONCE PER YEAR, 2005-2011 (MILLIONS)</i>	26
SOCCER	27
<i>FIGURE 6 TRENDS IN AMERICANS PARTICIPATING IN SOCCER, 2007-2011 (NUMBER OF PARTICIPANTS)</i>	27
CYCLING	28
<i>FIGURE 7 TRENDS IN THE NUMBER OF AMERICANS PARTICIPATING IN BICYCLING, 2007-2012 (MILLIONS)</i>	28
FENCING	29
<i>FIGURE 8 TRENDS IN AMERICANS PARTICIPATING IN FENCING, 2007-2012 (NUMBER OF PARTICIPANTS)</i>	30
SNOW SPORTS	31

TOPIC	PAGE NO.
<i>FIGURE 9 TRENDS IN AMERICANS PARTICIPATING IN SNOW SPORTS REQUIRING PROTECTIVE EQUIPMENT, 2007-2012 (NUMBER OF PARTICIPANTS)</i>	31
ROLLER SPORTS	32
<i>FIGURE 10 TRENDS IN AMERICANS PARTICIPATING IN ROLLER SPORTS, 2007-2012 (NUMBER OF PARTICIPANTS)</i>	32
LACROSSE	33
<i>FIGURE 11 TRENDS IN AMERICANS PARTICIPATING IN LACROSSE, 2007-2011 (NUMBER OF PARTICIPANTS)</i>	33
<i>FIGURE 12 TRENDS IN THE PER-PLAYER U.S. SALES OF LACROSSE PROTECTIVE EQUIPMENT, 2007-2012 (CONSTANT 2011 DOLLARS)</i>	34
WRESTLING	35
<i>FIGURE 13 TRENDS IN AMERICANS PARTICIPATING IN WRESTLING, 2007-2012 (NUMBER OF PARTICIPANTS)</i>	35
CLIMBING SPORTS	36
<i>FIGURE 14 TRENDS IN AMERICANS PARTICIPATING IN CLIMBING SPORTS, 2007-2012 (NUMBER OF PARTICIPANTS)</i>	37
WATER POLO	37
<i>FIGURE 15 TRENDS IN AMERICANS PARTICIPATING IN WATER POLO, 2007-2012 (NUMBER OF PARTICIPANTS)</i>	37
WHITewater RAFTING AND KAYAKING	39
<i>FIGURE 16 TRENDS IN AMERICANS PARTICIPATING IN WHITewater RAFTING AND KAYAKING, 2007-2012 (NUMBER OF PARTICIPANTS)</i>	39
OTHER SPORTS	39
Equestrian Sports	40
Boxing	40
<i>FIGURE 17 NUMBER OF U.S. PARTICIPANTS IN CONTACT BOXING, 2012 (%)</i>	40
REGULATIONS	41
ROLE OF GOVERNMENT AGENCIES	41
Occupational Safety and Health Administration	41
Consumer Product Safety Commission	41
State and Other Government Regulation	42
ROLE OF NONGOVERNMENT AGENCIES	42
National Operating Committee on Standards for Athletic Equipment	42
Hockey Equipment Certification Council	43
Canadian Standards Association	43
ASTM Committee F08 on Sports Equipment and Facilities	44
LITIGATION	44
NFL CONCUSSION LITIGATION	44
CHAPTER 4 SPORTS PROTECTION TECHNOLOGIES	47
TYPES OF SPORTS INJURY	47
<i>TABLE 2 COMMON TYPES OF SPORTS INJURIES</i>	47
ACHILLES TENDON INJURIES	48
ANKLE INJURIES	48
ANTERIOR CRUCIATE LIGAMENT INJURIES	48
CARPAL TUNNEL SYNDROME	49
CHONDRIMALACIA	49
CONCUSSIONS AND OTHER HEAD INJURIES	49

TOPIC	PAGE NO.
<i>FIGURE 18 MOST COMMON SPORTS-RELATED HEAD INJURIES TREATED IN U.S. EMERGENCY ROOMS, 2009 (NUMBER OF INJURIES)</i>	50
DISLOCATED SHOULDER	51
EYE INJURIES	51
GOLFER'S ELBOW	52
GROIN PULL	52
HAMSTRING INJURIES	52
ILIOTIBIAL BAND FRICTION SYNDROME	52
PLANTAR FASCIITIS	53
POSTERIOR CRUCIATE LIGAMENT INJURIES	53
ROTATOR CUFF TEARS	53
SHIN SPLINTS	54
SKIER'S THUMB	54
SPRAINS, FRACTURES AND BROKEN BONES	54
TAILBONE INJURIES	55
TENNIS ELBOW	55
TURF TOE	55
PRINCIPLES OF SPORTS PROTECTIVE EQUIPMENT	56
TRAUMA PROTECTION	56
REPETITIVE STRESS INJURY PROTECTION	57
MATERIALS	57
POLYMERS	58
<i>TABLE 3 POLYMERIC MATERIALS USED IN SPORTS PROTECTIVE EQUIPMENT</i>	58
Polycarbonate	59
Acrylonitrile Butadiene Styrene	59
Polyethylene	59
Polyurethane	60
Ethylene Vinyl Acetate	60
Polystyrene	60
Polypropylene	60
Fiberglass	60
Kevlar and Other Aramid Fibers	60
NXT	61
Zoombang	61
D30	61
Ultra-High Molecular Weight Polyethylene	61
CARBON FIBER	62
NANOMATERIALS	62
Nanoparticles	62
Nanocomposites	62
SMART MATERIALS	63
Shear Thickening Composite	63
CHAPTER 5 TYPES OF PROTECTIVE SPORTS EQUIPMENT	65
<i>TABLE 4 TYPES OF SPORTS PROTECTIVE EQUIPMENT</i>	65
HEAD AND FACE PROTECTION	65
HELMETS	65
<i>TABLE 5 HELMET SUPPLIERS</i>	66

TOPIC	PAGE NO.
Football Helmets	67
Baseball Helmets	68
Snow Sports Helmets	69
Cycling Helmets	69
Ice Hockey Helmets	69
Equestrian Helmets	70
Whitewater Helmets	70
FACE GUARDS	70
<i>TABLE 6 FENCING MASK SUPPLIERS</i>	71
THROAT PROTECTORS	71
<i>TABLE 7 THROAT PROTECTOR SUPPLIERS</i>	71
EAR PROTECTORS	72
<i>TABLE 8 WRESTLING EAR PROTECTOR SUPPLIERS</i>	72
EYE PROTECTORS	72
<i>TABLE 9 SPORTS EYE PROTECTION SUPPLIERS</i>	73
MOUTH GUARDS	73
TORSO AND THORAX	74
SHOULDER PADS	74
<i>TABLE 10 SHOULDER PAD SUPPLIERS</i>	74
CHEST PADS AND RIB PROTECTORS	75
<i>TABLE 11 CHEST PAD AND RIB PROTECTOR SUPPLIERS</i>	75
THIGH AND BUTTOCK PROTECTORS	76
GROIN PROTECTORS	76
UPPER EXTREMITIES	76
GLOVES	76
Catcher's Mitts	76
Soccer	77
Hockey	77
Lacrosse	77
Boxing Gloves	77
Cycling Gloves	78
ELBOW PROTECTORS	78
LOWER EXTREMITIES	78
KNEE BRACES	78
SHIN GUARD	79
CHAPTER 6 U.S. MARKET FOR PROTECTIVE SPORTS EQUIPMENT	81
SUMMARY	81
MARKET SIZE AND GROWTH TRENDS	81
<i>FIGURE 19 U.S. MARKET FOR SPORTS PROTECTIVE EQUIPMENT, 2012-2018 (\$ MILLIONS)</i>	81
MARKET SEGMENTATION	82
Segmentation by Type of Sport	82
<i>TABLE 12 SALES OF PROTECTIVE SPORTS EQUIPMENT BY TYPE OF SPORT, THROUGH 2018 (\$ MILLIONS)</i>	82
<i>FIGURE 20 SALES OF PROTECTIVE SPORT EQUIPMENT BY TYPE OF SPORT, 2012-2018 (% OF TOTAL SALES)</i>	82
Segmentation by Type of Equipment	84

TOPIC	PAGE NO.
<i>TABLE 13 SALES OF PROTECTIVE SPORTS EQUIPMENT BY TYPE OF EQUIPMENT, THROUGH 2018 (\$ MILLIONS)</i>	84
<i>FIGURE 21 SALES OF PROTECTIVE SPORT EQUIPMENT BY TYPE OF EQUIPMENT, 2012-2018 (% OF TOTAL SALES)</i>	84
FOOTBALL PROTECTIVE EQUIPMENT	86
CURRENT MARKET	86
<i>FIGURE 22 U.S. SALES OF FOOTBALL PROTECTIVE EQUIPMENT, 2012 (%)</i>	86
MARKET DRIVERS	87
Concussion Risks	87
<i>FIGURE 23 TRENDS IN REPORTED NUMBER OF NATIONAL FOOTBALL LEAGUE CONCUSSIONS, 2008-2012 (NUMBER OF CONCUSSIONS)</i>	87
Football Participation Trends	89
PROJECTED SALES	90
<i>TABLE 14 SALES OF FOOTBALL PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)</i>	90
<i>FIGURE 24 SALES OF FOOTBALL PROTECTIVE EQUIPMENT, THROUGH 2018 (% OF TOTAL SALES)</i>	90
BASEBALL/SOFTBALL PROTECTIVE EQUIPMENT	92
CURRENT MARKET	92
<i>FIGURE 25 U.S. SALES OF BASEBALL/SOFTBALL PROTECTIVE EQUIPMENT, 2012 (%)</i>	92
MARKET DRIVERS	93
Declining Overall Baseball/Softball Participation	93
Introduction of New Safety Equipment	93
PROJECTED SALES	93
<i>TABLE 15 SALES OF BASEBALL/SOFTBALL PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)</i>	94
ICE HOCKEY	95
CURRENT MARKET	95
<i>FIGURE 26 U.S. SALES OF ICE HOCKEY PROTECTIVE EQUIPMENT, 2012 (%)</i>	95
MARKET DRIVERS	96
Increasing Player Participation	96
<i>TABLE 16 PROJECTED U.S. ICE HOCKEY PARTICIPANTS, 2012-2018 (NUMBER)</i>	97
Declining Average Expenditures on Protective Equipment	97
<i>FIGURE 27 AVERAGE EXPENDITURES ON ICE HOCKEY PROTECTIVE EQUIPMENT, 2012-2018 (\$ PER PARTICIPANT)</i>	97
PROJECTED SALES	98
<i>TABLE 17 SALES OF ICE HOCKEY PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)</i>	98
SOCCER	99
CURRENT MARKET	99
<i>FIGURE 28 U.S. SALES OF SOCCER PROTECTIVE EQUIPMENT, 2012 (%)</i>	99
MARKET DRIVERS	100
Soccer Participation	100
Growing Sales of New Types of Protective Equipment Leading to Growth of Average per-Player Expenditures	101
PROJECTED SALES	101
<i>TABLE 18 SALES OF SOCCER PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)</i>	101
LACROSSE	102

TOPIC	PAGE NO.
CURRENT MARKET	102
<i>FIGURE 29 U.S. SALES OF LACROSSE PROTECTIVE EQUIPMENT, 2012 (%)</i>	102
MARKET DRIVERS	103
Increasing Player Participation	103
<i>TABLE 19 PROJECTED U.S. LACROSSE PARTICIPANTS, THROUGH 2018 (NUMBER)</i>	104
Trends in Average Protective Equipment Expenditures	104
<i>TABLE 20 AVERAGE PER PLAYER EXPENDITURES ON LACROSSE PROTECTIVE EQUIPMENT, THROUGH 2018 (NUMBER/\$)</i>	105
PROJECTED SALES	105
<i>TABLE 21 SALES OF LACROSSE PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)</i>	105
CYCLING	106
CURRENT MARKET	106
<i>FIGURE 30 U.S. SALES OF CYCLING PROTECTIVE EQUIPMENT, 2012 (%)</i>	106
MARKET DRIVERS	107
Participation Rates	107
<i>TABLE 22 PROJECTED NUMBER OF U.S. CYCLING PARTICIPANTS, THROUGH 2018 (MILLIONS)</i>	108
Protective Clothing Market Penetration	108
PROJECTED SALES	109
<i>TABLE 23 SALES OF CYCLING PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)</i>	109
FENCING	109
CURRENT MARKET	109
<i>FIGURE 31 U.S. SALES OF FENCING PROTECTIVE EQUIPMENT, 2012 (%)</i>	110
MARKET DRIVERS	110
Participation Rates	111
<i>TABLE 24 PROJECTED U.S. FENCING PARTICIPANTS, THROUGH 2018 (NUMBER)</i>	111
Equipment Replacement Rates	111
PROJECTED SALES	111
<i>TABLE 25 AVERAGE PER PLAYER EXPENDITURES ON FENCING PROTECTIVE EQUIPMENT, THROUGH 2018</i>	112
<i>TABLE 26 SALES OF FENCING PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)</i>	112
SNOW SPORTS	113
CURRENT MARKET	113
<i>FIGURE 32 U.S. SALES OF SKIING/SNOWBOARDING PROTECTIVE EQUIPMENT, 2012 (%)</i>	113
MARKET DRIVERS	114
PROJECTED SALES	114
<i>TABLE 27 SALES OF SNOW SPORTS PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS/%)</i>	115
WRESTLING	115
CURRENT MARKET	115
<i>FIGURE 33 U.S. SALES OF WRESTLING PROTECTIVE EQUIPMENT, 2012 (%)</i>	116
MARKET DRIVERS	116
Increasing Participation	116
<i>TABLE 28 PROJECTED U.S. WRESTLING PARTICIPANTS, THROUGH 2018 (NUMBER)</i>	117
Replacement Sales	117

TOPIC	PAGE NO.
PROJECTED SALES	117
TABLE 29 AVERAGE PER-PLAYER EXPENDITURES ON WRESTLING PROTECTIVE EQUIPMENT, THROUGH 2018	117
TABLE 30 SALES OF WRESTLING PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	118
ROLLER SPORTS	118
CURRENT MARKET	118
FIGURE 34 U.S. SALES OF ROLLER SPORTS PROTECTIVE EQUIPMENT, 2012 (%)	118
MARKET DRIVERS	119
Declining Participation	119
TABLE 31 PROJECTED NUMBER OF U.S. ROLLER SPORTS PARTICIPANTS, THROUGH 2018 (MILLIONS)	119
PROJECTED SALES	120
TABLE 32 SALES OF ROLLER SPORTS PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	120
WATER POLO	120
CURRENT MARKET	120
MARKET DRIVERS	121
Increasing Participation	121
TABLE 33 PROJECTED NUMBER OF U.S. WATER POLO PARTICIPANTS, THROUGH 2018 (MILLIONS)	121
PROJECTED SALES	121
WHITewater RAFTING AND KAYAKING	121
CURRENT MARKET	121
FIGURE 35 ESTIMATED EXPENDITURES ON WHITewater SPORTS PROTECTIVE HELMETS, 2012 (%)	121
MARKET DRIVERS	123
Increasing Participation	123
TABLE 34 PROJECTED NUMBER OF U.S. WHITewater SPORTS PARTICIPANTS, THROUGH 2018 (MILLIONS)	123
PROJECTED SALES	123
TABLE 35 SALES OF WHITewater SPORTS PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	123
CLIMBING	124
CURRENT MARKET	124
FIGURE 36 U.S. SALES OF CLIMBING SPORTS PROTECTIVE EQUIPMENT, 2012 (%)	124
MARKET DRIVERS	125
Increasing Participation	125
TABLE 36 PROJECTED NUMBER OF U.S. CLIMBING SPORTS PARTICIPANTS, THROUGH 2018 (MILLIONS)	125
PROJECTED SALES	125
TABLE 37 SALES OF CLIMBING SPORTS PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	126
OTHER SPORTS	126
EQUESTRIAN SPORTS	126
TABLE 38 SALES OF EQUESTRIAN PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	127
BOXING	127
FIGURE 37 SALES OF BOXING PROTECTIVE EQUIPMENT, 2012 (%)	127

TOPIC	PAGE NO.
<i>TABLE 39 SALES OF BOXING PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)</i>	128
CHAPTER 7 COMPANY PROFILES	130
ADAMS USA	130
ADIDAS AG	130
AGON SPORT LLC	130
ALLSTAR FECHT-CENTER GMBH & CO. KG	130
ALL STAR SPORTS INC.	131
ASICS AMERICA CRO	131
BANGERZ SPORTS EYE PROTECTION	131
BAUER PERFORMANCE SPORTS LTC.	131
BELL SPORTS	132
BERN UNLIMITED	132
BIKE ATHLETIC CO.	132
BLUE GAUNTLET FENCING GEAR INC.	132
BOLLE INC.	133
BRUTE WRESTLING	133
BURTON SNOWBOARDS	133
C.A.M.P. USA	133
CASCADE SPORTS CO.	134
CHAMPRO SPORTS	134
CLIFF KEEN WRESTLING PRODUCTS	134
CCM HOCKEY INC.	134
CORNING S.A.S OPTHALMIC	135
D30 LAB	135
DOUGLAS PADS & SPORTS INC.	135
EASTON SPORTS INC.	135
EASTON-BELL SPORTS INC.	136
EVERLAST WORLDWIDE INC.	136
FINIS INC.	136
FULL 90 SPORTS	137
GEAR 2000	137
GIRO	137
IMPACT INNOVATIVE PRODUCTS LLC	137
IMPACT PROTECTIVE EQUIPMENT LLC	138
INTERCAST EUROPE S.P.A.	138
LEON PAUL EQUIPMENT COMPANY LTD.	138
MARKWORT SPORTING GOODS CO.	138
MATMAN WRESTLING CO.	139
MAVERIK LACROSSE	139
MISSION HOCKEY CO.	139
MIZUNO USA INC.	139
NASYCON	140
L. NEGRINI & F. SNC	140
NUTCASE INC.	140
PANOPTX	140
PBT FENCING	141

TOPIC	PAGE NO.
PETZL INTERNATIONAL	141
POC VENTURES LLC	141
PREDATOR DESIGNS INC.	142
PRORIDER	142
PRO-TEC	142
PROTECTIVE SPORTS EQUIPMENT	142
RAWLINGS SPORTING GOODS CO. INC.	143
REEBOK INTERNATIONAL LTD.	143
RIDDELL	143
ROCK ON DISTRIBUTION	144
SCHUTT SPORTS INC.	144
SG HELMETS	145
SHOCK DOCTOR INC.	145
SHRED READY	145
SMITH SPORT OPTICS INC.	145
THERMOPRAXIS LLC	146
TOUR HOCKEY	146
TRIPLE EIGHT	146
TROXEL LLC	146
UHLMANN FECHTSPOORT GMBH & CO. KG	147
UNDER ARMOUR INC.	147
UNEQUAL TECHNOLOGIES CO.	147
UVEX SPORTS GMBH & CO. KG	147
VAUGHN CUSTOM SPORTS USA	148
WARRIOR SPORTS INC.	148
WHITewater RESEARCH AND SAFETY INSTITUTE INC.	148
WILSON SPORTING GOODS CO.	148
XENITH LLC	149
CHAPTER 8 PATENT ANALYSIS	151
<i>FIGURE 38 SPORTS PROTECTIVE EQUIPMENT PATENTS ISSUED AND PATENT APPLICATIONS PENDING AS OF APRIL 15, 2013 (%)</i>	151
<i>FIGURE 39 TRENDS IN NUMBER OF HELMET-RELATED U.S. PATENTS ISSUED ANNUALLY (NUMBER OF PATENTS)</i>	153
<i>FIGURE 40 DISTRIBUTION OF HELMET-RELATED U.S. PATENTS AND PATENT APPLICATIONS BY SPORT (% OF TOTAL PATENTS/APPLICATIONS)</i>	153
<i>FIGURE 41 DISTRIBUTION OF HELMET-RELATED U.S. PATENTS AND PATENT APPLICATIONS BY TYPE OF ORGANIZATION/INDIVIDUAL (% OF TOTAL PATENTS/APPLICATIONS)</i>	155
<i>TABLE 40 PRINCIPAL SPORTS HELMET IP PORTFOLIO (NUMBER OF PATENTS)</i>	157

LIST OF TABLES

TABLE HEADING	PAGE NO.
SUMMARY TABLE SALES OF PROTECTIVE SPORT EQUIPMENT BY TYPE OF SPORT, THROUGH 2018 (\$ MILLIONS)	7
TABLE 1 TYPES OF SPORTS PROTECTIVE HELMET	18
TABLE 2 COMMON TYPES OF SPORTS INJURIES	47
TABLE 3 POLYMERIC MATERIALS USED IN SPORTS PROTECTIVE EQUIPMENT	58
TABLE 4 TYPES OF SPORTS PROTECTIVE EQUIPMENT	65
TABLE 5 HELMET SUPPLIERS	66
TABLE 6 FENCING MASK SUPPLIERS	71
TABLE 7 THROAT PROTECTOR SUPPLIERS	71
TABLE 8 WRESTLING EAR PROTECTOR SUPPLIERS	72
TABLE 9 SPORTS EYE PROTECTION SUPPLIERS	73
TABLE 10 SHOULDER PAD SUPPLIERS	74
TABLE 11 CHEST PAD AND RIB PROTECTOR SUPPLIERS	75
TABLE 12 SALES OF PROTECTIVE SPORTS EQUIPMENT BY TYPE OF SPORT, THROUGH 2018 (\$ MILLIONS)	82
TABLE 13 SALES OF PROTECTIVE SPORTS EQUIPMENT BY TYPE OF EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	84
TABLE 14 SALES OF FOOTBALL PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	90
TABLE 15 SALES OF BASEBALL/SOFTBALL PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	94
TABLE 16 PROJECTED U.S. ICE HOCKEY PARTICIPANTS, 2012-2018 (NUMBER)	97
TABLE 17 SALES OF ICE HOCKEY PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	98
TABLE 18 SALES OF SOCCER PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	101
TABLE 19 PROJECTED U.S. LACROSSE PARTICIPANTS, THROUGH 2018 (NUMBER)	104
TABLE 20 AVERAGE PER PLAYER EXPENDITURES ON LACROSSE PROTECTIVE EQUIPMENT, THROUGH 2018 (NUMBER/\$)	105
TABLE 21 SALES OF LACROSSE PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	105
TABLE 22 PROJECTED NUMBER OF U.S. CYCLING PARTICIPANTS, THROUGH 2018 (MILLIONS)	108
TABLE 23 SALES OF CYCLING PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	109
TABLE 24 PROJECTED U.S. FENCING PARTICIPANTS, THROUGH 2018 (NUMBER)	111
TABLE 25 AVERAGE PER PLAYER EXPENDITURES ON FENCING PROTECTIVE EQUIPMENT, THROUGH 2018	112
TABLE 26 SALES OF FENCING PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	112
TABLE 27 SALES OF SNOW SPORTS PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS/%)	115
TABLE 28 PROJECTED U.S. WRESTLING PARTICIPANTS, THROUGH 2018 (NUMBER)	117
TABLE 29 AVERAGE PER-PLAYER EXPENDITURES ON WRESTLING PROTECTIVE EQUIPMENT, THROUGH 2018	117
TABLE 30 SALES OF WRESTLING PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	118
TABLE 31 PROJECTED NUMBER OF U.S. ROLLER SPORTS PARTICIPANTS, THROUGH 2018 (MILLIONS)	119
TABLE 32 SALES OF ROLLER SPORTS PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	120
TABLE 33 PROJECTED NUMBER OF U.S. WATER POLO PARTICIPANTS, THROUGH 2018 (MILLIONS)	121

TABLE HEADING	PAGE NO.
TABLE 34 PROJECTED NUMBER OF U.S. WHITEWATER SPORTS PARTICIPANTS, THROUGH 2018 (MILLIONS)	123
TABLE 35 SALES OF WHITEWATER SPORTS PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	123
TABLE 36 PROJECTED NUMBER OF U.S. CLIMBING SPORTS PARTICIPANTS, THROUGH 2018 (MILLIONS)	125
TABLE 37 SALES OF CLIMBING SPORTS PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	126
TABLE 38 SALES OF EQUESTRIAN PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	127
TABLE 39 SALES OF BOXING PROTECTIVE EQUIPMENT, THROUGH 2018 (\$ MILLIONS)	128
TABLE 40 PRINCIPAL SPORTS HELMET IP PORTFOLIO (NUMBER OF PATENTS)	157

LIST OF FIGURES

FIGURE TITLE	PAGE NO.
SUMMARY FIGURE SALES OF PROTECTIVE SPORT EQUIPMENT BY PART OF BODY PROTECTED, 2012-2018 (% OF TOTAL SALES)	7
FIGURE 1 U.S. FOOTBALL PARTICIPATION, 2012 (%)	22
FIGURE 2 NCAA FOOTBALL PARTICIPATION, 2007/2008-2010/2011 SEASON (NUMBER OF PLAYERS)	23
FIGURE 3 HIGH SCHOOL FOOTBALL PARTICIPATION, 2007/2008-2011/2012 SEASONS (NUMBER OF PLAYERS)	23
FIGURE 4 TRENDS IN AMERICANS PARTICIPATING IN ICE HOCKEY, 2007-2012 (NUMBER OF PARTICIPANTS)	24
FIGURE 5 TRENDS IN THE NUMBER OF AMERICANS PARTICIPATING IN BASEBALL AND SOFTBALL AT LEAST ONCE PER YEAR, 2005-2011 (MILLIONS)	26
FIGURE 6 TRENDS IN AMERICANS PARTICIPATING IN SOCCER, 2007-2011 (NUMBER OF PARTICIPANTS)	27
FIGURE 7 TRENDS IN THE NUMBER OF AMERICANS PARTICIPATING IN BICYCLING, 2007-2012 (MILLIONS)	28
FIGURE 8 TRENDS IN AMERICANS PARTICIPATING IN FENCING, 2007-2012 (NUMBER OF PARTICIPANTS)	30
FIGURE 9 TRENDS IN AMERICANS PARTICIPATING IN SNOW SPORTS REQUIRING PROTECTIVE EQUIPMENT, 2007-2012 (NUMBER OF PARTICIPANTS)	31
FIGURE 10 TRENDS IN AMERICANS PARTICIPATING IN ROLLER SPORTS, 2007-2012 (NUMBER OF PARTICIPANTS)	32
FIGURE 11 TRENDS IN AMERICANS PARTICIPATING IN LACROSSE, 2007-2011 (NUMBER OF PARTICIPANTS)	33
FIGURE 12 TRENDS IN THE PER-PLAYER U.S. SALES OF LACROSSE PROTECTIVE EQUIPMENT, 2007-2012 (CONSTANT 2011 DOLLARS)	34
FIGURE 13 TRENDS IN AMERICANS PARTICIPATING IN WRESTLING, 2007-2012 (NUMBER OF PARTICIPANTS)	35
FIGURE 14 TRENDS IN AMERICANS PARTICIPATING IN CLIMBING SPORTS, 2007-2012 (NUMBER OF PARTICIPANTS)	37
FIGURE 15 TRENDS IN AMERICANS PARTICIPATING IN WATER POLO, 2007-2012 (NUMBER OF PARTICIPANTS)	37
FIGURE 16 TRENDS IN AMERICANS PARTICIPATING IN WHITEWATER RAFTING AND KAYAKING, 2007-2012 (NUMBER OF PARTICIPANTS)	39
FIGURE 17 NUMBER OF U.S. PARTICIPANTS IN CONTACT BOXING, 2012 (%)	40
FIGURE 18 MOST COMMON SPORTS-RELATED HEAD INJURIES TREATED IN U.S. EMERGENCY ROOMS, 2009 (NUMBER OF INJURIES)	50
FIGURE 19 U.S. MARKET FOR SPORTS PROTECTIVE EQUIPMENT, 2012-2018 (\$ MILLIONS)	81
FIGURE 20 SALES OF PROTECTIVE SPORT EQUIPMENT BY TYPE OF SPORT, 2012-2018 (% OF TOTAL SALES)	82
FIGURE 21 SALES OF PROTECTIVE SPORT EQUIPMENT BY TYPE OF EQUIPMENT, 2012-2018 (% OF TOTAL SALES)	84
FIGURE 22 U.S. SALES OF FOOTBALL PROTECTIVE EQUIPMENT, 2012 (%)	86
FIGURE 23 TRENDS IN REPORTED NUMBER OF NATIONAL FOOTBALL LEAGUE CONCUSSIONS, 2008-2012 (NUMBER OF CONCUSSIONS)	87
FIGURE 24 SALES OF FOOTBALL PROTECTIVE EQUIPMENT, THROUGH 2018 (% OF TOTAL SALES)	90
FIGURE 25 U.S. SALES OF BASEBALL/SOFTBALL PROTECTIVE EQUIPMENT, 2012 (%)	92
FIGURE 26 U.S. SALES OF ICE HOCKEY PROTECTIVE EQUIPMENT, 2012 (%)	95
FIGURE 27 AVERAGE EXPENDITURES ON ICE HOCKEY PROTECTIVE EQUIPMENT, 2012-2018 (\$ PER PARTICIPANT)	97

FIGURE TITLE	PAGE NO.
FIGURE 28 U.S. SALES OF SOCCER PROTECTIVE EQUIPMENT, 2012 (%)	99
FIGURE 29 U.S. SALES OF LACROSSE PROTECTIVE EQUIPMENT, 2012 (%)	102
FIGURE 30 U.S. SALES OF CYCLING PROTECTIVE EQUIPMENT, 2012 (%)	106
FIGURE 31 U.S. SALES OF FENCING PROTECTIVE EQUIPMENT, 2012 (%)	110
FIGURE 32 U.S. SALES OF SKIING/SNOWBOARDING PROTECTIVE EQUIPMENT, 2012 (%)	113
FIGURE 33 U.S. SALES OF WRESTLING PROTECTIVE EQUIPMENT, 2012 (%)	116
FIGURE 34 U.S. SALES OF ROLLER SPORTS PROTECTIVE EQUIPMENT, 2012 (%)	118
FIGURE 35 ESTIMATED EXPENDITURES ON WHITEWATER SPORTS PROTECTIVE HELMETS, 2012 (%)	121
FIGURE 36 U.S. SALES OF CLIMBING SPORTS PROTECTIVE EQUIPMENT, 2012 (%)	124
FIGURE 37 SALES OF BOXING PROTECTIVE EQUIPMENT, 2012 (%)	127
FIGURE 38 SPORTS PROTECTIVE EQUIPMENT PATENTS ISSUED AND PATENT APPLICATIONS PENDING AS OF APRIL 15, 2013 (%)	151
FIGURE 39 TRENDS IN NUMBER OF HELMET-RELATED U.S. PATENTS ISSUED ANNUALLY (NUMBER OF PATENTS)	153
FIGURE 40 DISTRIBUTION OF HELMET-RELATED U.S. PATENTS AND PATENT APPLICATIONS BY SPORT (% OF TOTAL PATENTS/APPLICATIONS)	153
FIGURE 41 DISTRIBUTION OF HELMET-RELATED U.S. PATENTS AND PATENT APPLICATIONS BY TYPE OF ORGANIZATION/INDIVIDUAL (% OF TOTAL PATENTS/APPLICATIONS)	155