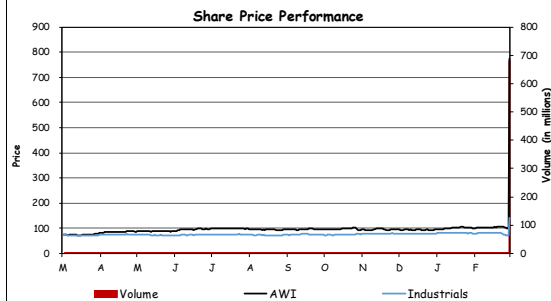


Armstrong World Industries, Inc.	Symbol: AWI
Analyst	Eric Almond
Buy below	\$88.31
Sell above	\$121.94
Probability of Price Increase	100%
Last Price	\$100.15
Intrinsic Value	\$97.55
Target Dividends	\$0.00
Target Price	\$110.39



## Description

Armstrong World Industries, Inc. designs, manufactures, and sells ceiling systems primarily for use in the construction and renovation of residential and commercial buildings in the United States, Canada, and Latin America.

Sector	Industrials
Industry	Building Products
Last Guidance	December 11, 2018
Next earnings date	NM

## People

Grizzle, Victor, President, CEO & Director  
 MacNeal, Brian, Senior VP & CFO  
 Hershey, Mark, Chief Compliance Officer, Senior VP, General Co  
 Romano, Ellen, Senior Vice President of Human Resources  
 Chiappone, Charles, Senior Vice President of Ceilings & Wall Soluti  
 Waters, Thomas, Vice President of Treasury & Investor Relations

## Top Competitors

	2565 --
	43830 --
	1181.344 --
	959.909 --
	0 --

## Market Statistics

Market Capitalization (mil)	\$4,805.96
Last Price per share	\$100.15
52 week high	\$111.46
52-week low	\$72.11
Volatility	26.56%
Daily volume (mil)	0.88
Short interest	1.87%
Days to cover short interest	2.82
Beta	0.38

## Financials

Profitability	AWI (LTM)	AWI Historical	Peers' Median (LTM)
Return on Capital	7.7%	9.63%	6.67%
Adjusted EBITDA Margin	23.4%	17.02%	10.37%
Return on Equity	33.6%	43.7%	10.4%
Adjusted Net margin	17.8%	9.7%	6.0%
Invested Funds	AWI (LTM)	AWI Historical	Peers' Median (LTM)
Cash/Capital	3.6%	12.6%	6.0%
NWC/Capital	-4.3%	-20.2%	9.7%
Operating Assets/Capital	95.4%	106.4%	47.1%
Goodwill/Capital	5.4%	0.0%	30.8%
Capital Structure	AWI (LTM)	AWI Historical	Peers' Median (LTM)
Total Debt/(Market Cap.+ Other Claims on Capital)	0.13	0.28	0.35
Minority Interest/(Market Cap.+ Other Claims on Capital)	0.0%	0.0%	0.0%
Preferred Equity/(Market Cap.+ Other Claims on Capital)	0.0%	0.0%	0.0%
CGFS Credit Rating	BBB		CC
Credit Rating Model	bb to bb+		bb to bb+
Probability of Default Model	a+ to aa-		bb to bb+
Likely Current Cost of Debt	5.32%		4.44%
Likely Current Cost of Equity (Cost of Debt + MRP)	10.80%		9.92%
Likely Current WACC	10.01%		8.2%

## Investment Thesis

## UNIQUE LONG-TERM GROWTH PROSPECTS AND MARGIN EXPANSION

I am initiating coverage of Armstrong World Industries with a buy at the current market price of \$100.15. To me the company has great growth prospects with continuous growth in revenues year over year, along with EBITDA margins of 30-40% over the past decade. Armstrong is not quite a mature company, and has a lot of ground to cover before becoming mature, but shows great signs of financial strength for their industry, with a slight decline in price due to the recent market fiasco. There is currently a negative view on the market which is prevalent across all sectors, but I believe when the correction takes place, Armstrong will be a security you will want to have in your portfolio. I believe Armstrong is one of manufactures offering strong organic growth opportunities that fits our IPS. Another great promising aspect about this company is the fact there is very little short interest, and 99% of the shares for the company are publicly traded. This is a positive sign because this means there is a common sentiment in the market that the company will continue to grow, and that is shown by the fact that only 1.89% of the float is short interest.

The other benefit is the float. There are 48m shares outstanding, and 47.4m of these shares are available to the public for trading. This truncates the downside risk of the security because there is no large insider who is holding a significant portion of the company who may benefit from motivations other than the maximization of shareholder wealth. This is a great sign because at the very least, there will be fewer conflicts of interest between management and shareholders. The top holder of this security is T Rowe Price Associates, who hold 15.42% of the company. Blackrock is also one of the top holding institutional investors, holding 4.54%. The price to earnings is 20.9. A 5% required yield on \$1 invested (reciprocal of P/E in % form) is less than the United States equity market risk premium of 5.5%. This is fantastic to see, because this tells us that investors require less return per dollar invested, which translates to more security in the company as opposed to investing elsewhere ( Maybe because the VP is Siena Alum and is killing it?). Geographically, 961.3m of the 1.1b in total revenue comes from the United States. This can be interpreted in many ways but to me, I think it is a fantastic opportunity. Armstrong is an extremely healthy company and has only been operating for the most part domestically. I think that if management can find a solution to transcend the borders of the United States, and compete in foreign markets, this will spark an immediate increase in the stock price. Everywhere in the world needs what Armstrong provides, and if the company finds a way to locate and deliver their services to those clients, they will be very hard to compete with.

## Ownership

	Change in Ownership (over the past "Number" months)
Shares outstanding (mil)	47.99
Weighted Diluted shares outstanding (mil)	49.50
Options and Warrants (Shares equivalent)	0.15
% shares held by institutions	670%
% shares held by investments Managers	88%
% shares held by hedge funds	11.32%
% shares held by VC/PE firms	0.090%
% shares held by insiders	0.91%
Poison Pill and Type	NONE

## Quarterly Earning Surprises (Actual/Median Estimates)

Revenue	Last 5 quarters
12/31/2018	\$955.6 (-0.2%)
3/31/2019	\$968.4 (-1.7%)
6/30/2019	\$1088 (-2.6%)
9/30/2019	\$1108.4 (-4.4%)
12/31/2019	\$987.6 (-3.1%)
History:	Last 10 years
Mean Surprise	-13.71%
99th percentile "surprise" range	-77% to 49%
EBITDA	Last 5 quarters
12/31/2018	\$204.4 (-36.2%)
3/31/2019	\$299.6 (-15.8%)
6/30/2019	\$378.8 (-11.5%)
9/30/2019	\$333.99996 (-27.4%)
12/31/2019	\$392.8 (10.4%)
History:	Last 10 years
Mean Surprise	-31.09%
99th percentile "surprise" range	-81% to 19%



Armstrong World Industries, Inc.

Symbol: AWI

Analyst

Eric Almond

Buy below

\$88.31

Sell above

\$121.94

Probability of Price Increase

100%

Last Price

\$100.15

Intrinsic Value

\$97.55

Target Dividends

\$0.00

Target Price

\$110.39

## Cost of Capital Estimates

Implied Cost of Borrowing (AWI)

CGFS Credit Rating

Credit Rating Model

Probability of Default Model

Implied Cost of Borrowing (Peers)

3.8%

4.8%

3.0%

5.3%

4.7%

4.9%

Cost of New Debt Estimate

5.16%

Base Year

Explicit Period (15 years)

Continuing Period

Country Risk Premium Estimate

5.48%

4.78%

4.78%

Cost of Equity Estimate

10.64%

5.48%

5.48%

WACC Estimate

7.28%

10.26%

10.26%

6.94%

6.94%

6.94%

## Forecast Assumptions

Fiscal Year	Revenue Growth	EBITDA Margin	CAPEX/Revenue	DPR/CAPEX	Other
Base Year (Actual)	7.18%	23.2%	6.9%	1.01	SBC/Revenue
year 1	6.35%	39.6%	6.5%	1.04	0.92%
year 2	5.93%	39.9%	6.1%	1.07	Constant/same as LTM
year 3	6.51%	40.5%	5.5%	1.14	Lease term
year 4	6.02%	39.6%	5.2%	1.13	Rent Expense/Revenue
year 5	5.52%	38.7%	5.0%	1.12	0.73%
year 6	5.03%	37.9%	4.7%	1.11	Tappers off to historical average
year 7	4.54%	37.0%	4.5%	1.10	R&D life
year 8	4.04%	36.1%	4.2%	1.09	10
year 9	3.55%	35.2%	4.0%	1.08	R&D Expense/Revenue
year 10	3.06%	34.3%	3.8%	1.07	1.67%
year 11	2.57%	33.4%	3.5%	1.06	Constant/same as LTM
year 12	2.07%	32.5%	3.3%	1.04	Tappers off to zero
year 13	1.58%	31.7%	3.0%	1.03	LIFO Reserve
year 14	1.09%	30.8%	2.8%	1.02	Non-operating pension costs
year 15	0.59%	29.0%	2.5%	1.01	Net financing pensions costs
Continuing Period	0.10%	29.0%	2%	1.03	Overfunded pension plans
					Tappers off to zero
					Capitalized interests
					Constant/same as LTM
					Dividends/Revenue
					0.00%
					Tax Rate
					25.06%

## Simulation Assumptions

Random Variables	Distribution Assumption	MAX	Likely	MIN	
Deviations in annual Revenue Growth--Expl. Per.	Triangular	0.83%	0%	-8.64%	Sensitivity: Price Variance Attribution Analysis
Deviations in annual Revenue Growth --Cont. Per.	Normal	1.39%	0%	-1.39%	
Deviations from EBITDA Margin base annual estimates	Triangular	8.13%	0%	-23.04%	
Deviations from CAPEX/Revenue base annual estimates	Triangular	11.09%	0%	0.64%	
Deviations from Kd base annual estimates	Triangular	1.22%	0%	-2.22%	
Deviations from CRP base annual estimates	Triangular	1.82%	0%	-1.92%	
Deviations from TEV/Revenue base estimate	Triangular	43801.02	0%	-28.45	
Deviations from TEV/Revenue base estimate	Triangular	98.39	0%	-45.69	
Change in P/BV (TTM)	Triangular	43826.81	0%	-14.90	
Change in P/E (FW)	Triangular	42718.05	0%	-7.11	
Recovery Rate	Triangular	10.00%	0%	-10%	
					Revenue growth
					EBITDA Margin
					CAPEX/Rev
					Discount Rate
					TEV/Rev
					TEV/EBITDA
					P/BV
					P/E
					Asset Recovery Rate

## Valuation

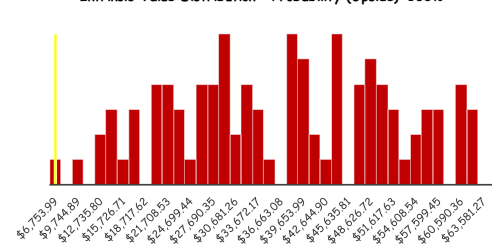
## DCF Valuation

	Base	Explicit Period (Average)	Continuing Period
Revenues	\$1,038.10	\$1,512.24	\$1,838.99
EBITDA Margin	23%	36%	29%
UFCF	-\$5.49	\$322.23	\$375.00
WACC	7.28%	6.94%	6.94%
ROIC	7.69%	18.57%	15.73%

## Relative Valuation

	Median Justified Multiple	Basis	Implied Equity Value
EV/Rev (FW)	29.0x	\$1,118.16	\$31,975.05
EV/EBITDA (FW)	8.4x	\$443.07	\$3,307.16
P/BV (TTM)	3.2x	\$642.80	\$2,053.60
P/E (FW)	16.9x	\$329.48	\$5,583.60

## Intrinsic Value Distribution--Probability (Upside)=100%



## Asset Based Valuation

Recovery Rate	60%
Capital	\$5,519.95
Intangibles	\$464.90
Claims	\$729.41
Implied Equity Value	\$2,303.62

## Valuation Summary

	Intrinsic Value	Target Price	Model Weight
DCF Valuation	\$ 110.29	\$ 119.91	50%
EV/Rev (FW)	\$ 643.96	\$ 690.81	7%
EV/EBITDA (FW)	\$ 66.60	\$ 71.45	5%
P/BV (TTM)	\$ 41.36	\$ 44.37	0%
P/E (FW)	\$ 112.45	\$ 120.63	0%
Asset Based Valuation	\$ 46.39	\$ 49.77	0%
Price per Share	\$ 103.55	\$ 111.89	62%