Technical Information

CROSSARM

- Series 801-3401 Light Duty
- Series 801-3402 Standard Duty
- Series 801-3403 Heavy Duty
- Series 801-4602 Standard Duty
- Series 801-4603 Heavy Duty

ATROPOS
COMPOSITES

Table of Content

ATROPOS COMPOSIT CROSSARMS

High Efficiency

The Atropos composite crossarm system provides a cost, performance, and handling efficiency unmatched by traditional materials.

Superb Strength

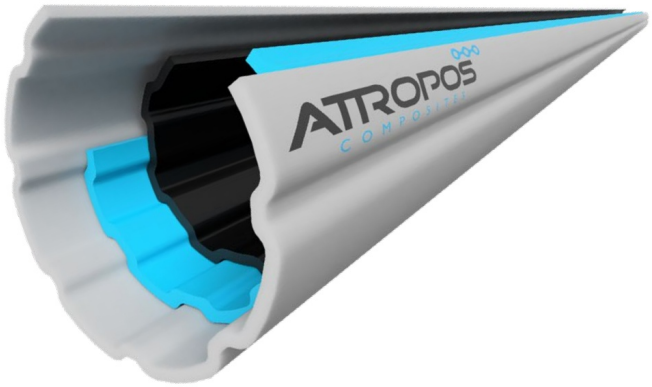
Owing to a polyurethane foam filling, a multi-layered UV protection, and field drilling options, the customer can be confident they will consistently get the superb strength and UV performance they demand.

Long Lifespan

With a long product lifespan and extreme durability, the customer can rest assured that their system is hardened against the elements for years to come. Over the course of the product's long life, an Atropos crossarm will quickly and reliably result in a positive ROI thanks to fewer replacements and outages.

Multi-Layered Design

- The streamlined manufacuturing processe esures the integration of all the different functional layers and produces reliable and cost-effective composite crossarm products.
- Third parties testing agencies are used to verify specifications and product performances.
- In-house quality programs are implemented to manufacture reliably compliant products.



Fire Resistance

As a solution for high-risk fire zones, we provide a fire-resistant option designed to protect and safeguard your assets, giving you peace of mind in the most demanding environments. The fire-resistant option can be applied to any of the crossarm series in any configuration with an upcharge. Please note all product lines without the fire-resistant add-on are non-halogenated; applying the fire-resistant chemical makes the product halogenated.

Product Overview

Atropos offers a wide range of crossarm products to accommodate for our customers needs.

- Identify the use case and configuration of the installation site. For example, all series are offered in the following standard configurations: tangent and deadend. Other configurations are available upon request.
- Refer to the data sheets of the configuration, then select the product series and length based on your load and deflection requirements.
- Apply the customer-specified drilling pattern to crossarms as applicable.
- Request additional lengths of the standard crossarm profiles.
- Apply the fire-resistant option to the installation site in a high-risk area for an upcharge. All product series are non-halogenated by default. If the customer wishes to apply the fire-resistant option, it will make the final product halogenated.

3400 Series

801-3401 Light Duty

Series 801-3401 is a light duty crossarm product desgined and manufacutred by Atropos Composites. For its load bearing properties compared to the other series, see the Product Specifications section.
OD: 3.375" x 4.625"

801-3402 Standard Duty

Series 801-3402 is a standard duty crossarm product desgined and manufacutred by Atropos Composites. For its load bearing properties compared to the other series, see the Product Specifications section.
OD: 3.375" x 4.625"

801-3403 Heavy Duty

Series 801-3403 is a heavy duty crossarm product desgined and manufacutred by Atropos Composites. For its load bearing properties compared to the other series, see the Product Specifications section.
OD: 3.375" x 4.625"

4600 Series

801-4602 Standard Duty

Series 801-4602 is a standard duty crossarm product desgined and manufacutred by Atropos Composites. For its load bearing properties compared to the other series, see the Product Specifications section.
OD: 4" x 6"

801-4603 Heavy Duty

Series 801-4603 is a heavy duty crossarm product desgined and manufacutred by Atropos Composites. For its load bearing properties compared to the other series, see the Product Specifications section.
OD: 4" x 6"

ATROPOS
COMPOSITES

TESTING METHODS

Atropos crossarms are verified periodically and randomly by independent 3rd-party agencies who follow standard test procedures and produce unbiased reports. These tests results support the technical specifications of different product lines. To find out more about the testing procedures and results, please see the following:

- D149 Dielectric Strength
- D3801 Flammability
- D3916 Tensile Properties, Rods
- G154 UV Resistance, Weathering

D149 Dielectric Strength

Atropos composite crossarms are tested for electrical conductivity in accordance with the ASTM D649 testing standard by a third-party testing agency. The test results indicate the maximum electric field the material can withstand before breaking down or becoming conductive. A material with a rating of 300 V/mil or above is typically considered to have a "high" dielectric strength.

Specimen	Thickness	Breakdown		Dielectric Strength	
[#]	[in]	Time [s]	Voltage [kV]	[V/mil]	[kV/mm]
1	0.07	34	24.5	340.3	13.4
2	0.07	34	23.3	337.7	13.3
3	0.07	43	29.6	416.9	16.4
4	0.07	45	28.7	410	16.1
5	0.07	42	29.3	450.8	17.7
Average:	**0.07**	**39.3**	**27.08**	**391.13**	**15.4**

D3916 Tensile Properties, Rods

Atropos composite crossarms are tested for physical loading properties using both sample and full-scale testing. In the sample scale, the material has been tested for tensile and compressive qualities in accordance with the ASTM D695 (compression) and ASTM 3039 (tension) testing standards by a third-party testing agency. All testing results are within typical, expected ranges which is confirmed by full-scale load testing.

Compression Testing

Specimen #	Width [in]	Thickness [in]	Area [in]	Force [lbf]	Compression Deflection [in]	Compression Strength [psi]	Testing Speed [in/min]
1	0.5	0.503	0.251	4681.5	0.0409	18,632.84	0.05
2	0.497	0.503	0.25	4241.6	0.0407	17,384.43	0.05
3	0.496	0.503	0.249	4126.8	0.0323	16,557.61	0.05
4	0.498	0.512	0.255	4677.3	0.0392	18,362.44	0.05
5	0.5	0.5	0.25	4373.8	0.0389	17,512.75	0.05
Average:	**0.498**	**0.504**	**0.251**	**4440.2**	**0.0384**	**17,690.01**	**0.05**

Tension Testing

Specimen #	Width [in]	Thickness [in]	Overall Length [in]	Gage Length [in]	Area [sq in]
1	0.995	0.069	10.0	1.0	0.0687
2	1.005	0.064	10.0	1.0	0.0643
3	0.996	0.065	10.0	1.0	0.0647
4	1.001	0.069	10.0	1.0	0.0691
5	1.003	0.074	10.0	1.0	0.0742
Average:	**1**	**0.0682**	**10.0**	**1.0**	**0.0682**

Specimen #	Break Force [lbs]	Break Deflection [lbs]	Ultimate Tensile Strength [psi]	Percent Elongation at Break [%]	Modulus [psi]
1	3,714.50	0.0094	54,104.11	0.9	6,770,073.30
2	3,659.40	0.0086	56,893.49	0.9	6,543,125.50
3	3,545.20	0.0091	54,760.97	0.9	6,841,547.90
4	3,184.00	0.0076	46,098.63	0.8	6,155,873.10
5	3,619.50	0.0072	48,765.45	0.7	7,154,357.80
Average:	**3,544.50**	**0.0084**	**52,124.50**	**0.8374**	**6,692,995.50**

D3801 Flammability

The Flammability and Optical Smoke Density tests are performed on products with fire-resistant option added on. We have developed a two-part system of synergistic flammability additives which provide the highest level of flammability mitigation.

Flammability

Atropos composite crossarms achieve the highest rating of V-0 according to the UL94 flammability testing standard. The samples are tested for flammability in accordance with the UL94 (ASTM D3801 equivalent) testing standard by a third-party testing agency. During the test, the flame self-extinguished, burning material did not drip from the sample, no afterglow was observed, and the fire did not spread beyond the original burn site.

Criteria Conditions	94V-0	94V-1	94V-2
Afterflame time for each individual specimen t1 or t2	≤ 10s	≤ 30s	≤ 30s
Total afterflame time for any condition (t1 plus t2 for the 5 specimens)	≤ 50s	≤ 250s	≤ 250s
Afterflame plus afterglow time for each individual specimen after the second flame application (t2 + t3)	≤ 30s	≤ 60s	≤ 60s
Afterflame of afterglow of any specimen up to the holding clamp	No	No	No
Cotton indicator ignited by flaming particles or drops	No	No	Yes

Preconditioned at 23°C and 50 % relative humidity for 48 hours							
Specimen [#]	t_1 [sec]	t_2 [sec]	$t_1 + t_2$ [sec]	t_3 [sec]	$t_2 + t_3$ [sec]	Burn to Clamp [yes/no]	Cotton Ignition [yes/no]
1	0	8	8	0	8	no	no
2	0	4	4	0	4	no	no
3	0	2	2	0	2	no	no
4	0	6	6	0	6	no	no
5	0	4	4	0	4	no	no
Total:	**0**	**24**	**24**	**0**	**24**		
Average:	**0**	**4.8**	**4.8**	**0**	**4.8**		

Preconditioned at 23°C and 50 % relative humidity for 48 hours							
Specimen [#]	t_1 [sec]	t_2 [sec]	$t_1 + t_2$ [sec]	t_3 [sec]	$t_2 + t_3$ [sec]	Burn to Clamp [yes/no]	Cotton Ignition [yes/no]
1	0	8	8	0	8	no	no
2	0	4	4	0	4	no	no
3	0	2	2	0	2	no	no
4	0	6	6	0	6	no	no
5	0	4	4	0	4	no	no
Total:	**0**	**24**	**24**	**0**	**24**		
Average:	**0**	**4.8**	**4.8**	**0**	**4.8**		

D3801 Flammability

Optical Smoke Density

Atropos composite crossarms are tested for smoke density in accordance with the ASTM E662 testing standard by a third-party agency.

Specimen [#]	Thickness [in]	Weight [g]	Tmin [%]	Dm [20.0 min]	T [%]	Dc [clear]	Dm [corr]	Ds [1.5 min.]	Ds [4.0 min.]	Color of Smoke
1	0.258	69.61	67.74	22.33	96.87	1.83	20.5	0	0	Grey
2	0.2435	66.68	77.18	14.85	96.71	1.92	12.93	0	0	Grey
3	0.2455	66.81	77.13	14.88	98.21	0.99	13.89	0	0.99	Grey

Specimen [#]	Thickness [in]	Weight [g]	Tmin [%]	Dm [20.0 min]	T [%]	Dc [clear]	Dm [corr]	Ds [1.5 min.]	Ds [4.0 min.]	Color of Smoke
4	0.2575	66.52	5.69	164.34	54.1	35.21	129.13	0.33	35.26	Grey
5	0.2475	66.41	0.84	273.77	58.62	30.62	243.15	0.91	62.48	Grey
6	0.2525	67	3.12	198.7	55.57	33.68	165.03	0.97	40.61	Grey

G154 UV Resistance, Weathering

Atropos composite products are made with long term performance in mind. One of the key, primary sources of part wear and damage during typical use is UV degradation. Our two-part UV protection system is designed to protect your parts from fiber bloom and general UV damage for decades. Furthermore, our parts have been thoroughly tested above and beyond all relevant existing testing standards.

How our two-part system effectively fights UV degradation:

1. UV Veil
   The first layer in our UV protection system is a synthetic UV-protective veil. This veil is designed to serve as a sacrificial resin-rich layer on the surface of the part between the outside world and the structural core of the material. This concentrates the UV-inhibitors on the surface of the part to intercept the damaging UV rays.

2. Resin additives
   Our parts integrate general, broad-spectrum UV additives into the resin system itself. This means that our UV inhibitors are distributed throughout the part. As well, working synergistically with the UV Veil (above), a layer of high UV-inhibitor concentration is left on the surface of the part. As the resin in this layer is degraded, the structure of the composite remains protected while the veil prevents any potential for fiber blooming.

Why not a painted or coated solution?

With our two-part system, we can guarantee complete UV coverage while avoiding unreliable coating and paint systems. Painted parts, and all exterior coatings, are susceptible to compromised protection and introduce excessive points of failure into the manufacturing process. These exterior coatings can be incorrectly or inconsistently applied, can be wiped or smeared in the manufacturing process, and can be scratched or abraded during delivery and deployment. At Atropos, we choose solutions with the consistency, longevity, and durability to stand up to your needs.

How we test our parts:

At Atropos we use an accelerated weather tester, "QUV", from Q-Labs, an internationally recognized testing agency. Our UV system has been tested for 10,000 hours following the ASTM G154 & D4329 testing standards. Over this testing period of accelerated weather testing, our samples have experienced slight color fade but no fiber bloom.

Atropos composite parts are expected to last over 60 years of typical service. The parts will experience some fade in color, and slight change to surface texture, but will experience no fiber blooming and the mechanical performance core of the material will remain protected.

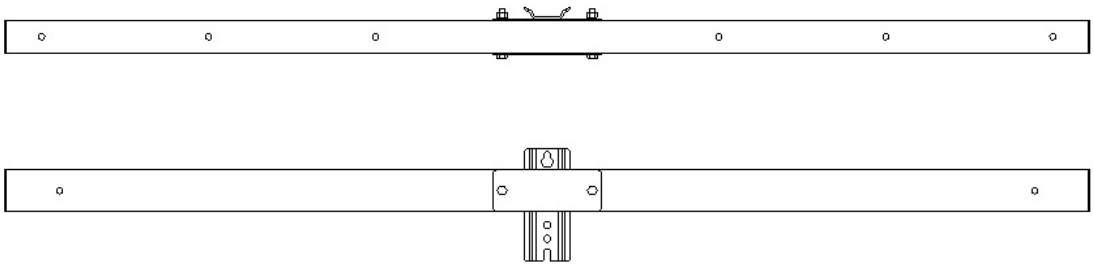
ATROPOS
COMPOSITES

PRODUCT SPECIFICATIONS

Atropos has a product line for a wide range of usecase and budgets. If you need further information, contact our support team for the Engineer's Guide to Atropos Crossarms. Configurations we offer are as follows:

- Tangent
- Deadend

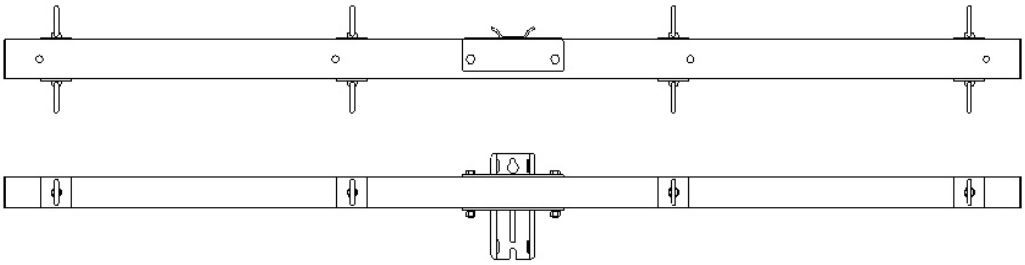
TANGENT



- Atropos tangent crossarm configuration is available in all five series, satisfying a wide range of performance requirements and budgets. These technical specifications aim to help customers select products that meet their standards. For more details, please request the Engineer's Guide.
- Atropos's crossarms adhere to the standard pole mounting spacing and provide suitable mounting hardware kits for the series. For detailed dimensions or custom hole patterns, please contact us.
- Standard offerings include lengths 6ft, 8ft, 10ft, and 12ft. For special applications, more custom lengths are available upon request.

Tangent Crossarms		Length (ft)	Beam Size W x H (in)	Weight (lbs)	Ultimate Load Per Side (lbs)	Deflection at Ultimate Load (in)	Deflection per 1000 lbs (in)	Deflection at 60% Ultimate Load (in)
3400 Series	3401 Light Duty	6	3⅝ x 4⅝	17.37	2,677	1.01	0.377	0.605
		8	3⅝ x 4⅝	23.16	2,112	1.60	0.757	1.009
		10	3⅝ x 4⅝	28.94	1,623	2.34	1.441	1.423
	3402 Standard Duty	6	3⅝ x 4⅝	22.01	4,547	1.36	0.300	0.819
		8	3⅝ x 4⅝	29.34	3,609	2.19	0.606	1.371
		10	3⅝ x 4⅝	36.68	2,928	3.30	1.127	1.981
	3403 Heavy Duty	8	3⅝ x 4⅝	41.08	6,949	2.83	0.408	1.862
		10	3⅝ x 4⅝	51.34	5,536	4.63	0.836	2.833
		12	3⅝ x 4⅝	61.61	5,435	7.44	1.368	4.465
4600 Series	4602 Standard Duty	8	4 x 6	36.21	3,625	2.15	0.593	1.389
		10	4 x 6	45.27	2,765	2.61	0.944	1.624
		12	4 x 6	54.32	2,184	3.60	1.650	2.191
	4603 Heavy Duty	8	4 x 6	50.91	6,713	2.22	0.330	1.360
		10	4 x 6	63.64	5,846	3.76	0.644	2.300
		12	4 x 6	76.36	5,435	6.10	1.122	3.702

DEADEND



- Atropos deadend crossarm configuration is available in all five series, satisfying a wide range of performance requirements and budgets. These technical specifications aim to help customers select products that meet their standards. For more details, please request the Engineer's Guide.
- Atropos's crossarms adhere to the standard pole mounting spacing and provide suitable mounting hardware kits for the series. For detailed dimensions or custom hole patterns, please contact us.
- Standard offerings include lengths 6ft, 8ft, 10ft, and 12ft. For special applications, more custom lengths are available upon request.

Deadend Crossarms		Length (ft)	Beam Size W x H (in)	Weight (lbs)	Ultimate Load Per Side (lbs)	Deflection at Ultimate Load (in)	Deflection per 1000 lbs (in)	Deflection at 60% Ultimate Load (in)
3400 Series	3401 Light Duty	6	3⅝ x 4⅝	17.37	5,060	1.49	0.295	0.894
		8	3⅝ x 4⅝	23.16	3,983	2.41	0.606	1.506
		10	3⅝ x 4⅝	28.94	2,842	3.29	1.157	2.001
	3402 Standard Duty	6	3⅝ x 4⅝	22.01	7,144	1.65	0.232	0.997
		8	3⅝ x 4⅝	29.34	6,288	3.14	0.499	1.997
		10	3⅝ x 4⅝	36.68	5,559	5.05	0.909	3.031
	3403 Heavy Duty	8	3⅝ x 4⅝	41.08	10,932	2.78	0.254	1.757
		10	3⅝ x 4⅝	51.34	9,480	5.22	0.550	3.190
		12	3⅝ x 4⅝	61.61	7,614	8.14	1.070	4.928
4600 Series	4602 Standard Duty	8	4 x 6	36.21	7,732	2.21	0.285	1.317
		10	4 x 6	45.27	7,441	3.25	0.436	1.966
		12	4 x 6	54.32	6,098	4.71	0.773	2.860
	4603 Heavy Duty	8	4 x 6	50.91	11,541	1.99	0.173	1.243
		10	4 x 6	63.64	11,170	3.51	0.314	2.162
		12	4 x 6	76.36	10,763	5.66	0.526	3.439

ATROPOS
COMPOSITES

CONTACT US

For more information on Atropos composite crossarms and other atropos infrastructure products, please contact us.

- Phone: 314-451-3140
- Email: sales@atropos.build
- Website: www.atropos.build