

# hapflex<sup>TM</sup>

by hapco inc.

- 500 Series
- 600 Series
- 700 Series
- 800 Series
- 1000 Series



*high performance hybrid elastomeric polymer alloys*

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# HAPFLEX SERIES

## HARDNESS SCALE

Shore A	HAPFLEX Product #	
20 A	1021	
35 A	1036 / 1036-5	
45 A	540 / 540-3	543
	541 / 541-3	
55 A	1056 / 1056-5	
60 A	560 / 560-6	
	561 / 561-6	564
65 A	765 / 765-5	
	766 / 766-5	
70 A	570 / 570-6	573
	571 / 571-6	
80 A	565 / 565-3	780 / 780-5
	566 / 566-3	781 / 781-5
	580 / 580-3	
	581 / 581-3	
90 A	790 / 790-5	791 / 791-5
95 A	595 / 595-3	598 / 598-3
	596 / 596-3	599

Shore D	HAPFLEX Product #	
50 D	650 / 650-3	651 / 651-3
60 D	660 / 660-3	663 / 663-3
	661 / 661-3	
65 D	665 / 665-3	668 / 668-3
	666 / 666-3	669 / 669-3
70 D	670 / 670-3	870 / 870-4
	671 / 671-3	871 / 871-4
	673 / 673-3	873 / 873-4

### GENERAL HARDNESS COMPARISONS

Rubber band	Computer mouse pad	Rubber stamp	Inner tube	Pencil eraser	Auto tire tread	Leather Belt	Running shoe sole	Phone cord / tap washer	Skateboard wheel	Pipe Stem	Textbook cover	Golf ball	Office desktop	Telephone / Wooden ruler	Fountain pen	Computer casings	Bowling ball	Bone	
20 A	30 A	40 A	50 A	60 A	70 A	80 A	90 A	100 A		40 D	50 D	60 D	70 D	80 D	90 D				
<b>SHORE A</b>										<b>SHORE D</b>									

## HAPFLEX SERIES APPLICATIONS

Abrasive resistant linings	Molds for polyester casting
Assembly fixtures	Molds for urethane casting
Bending fixtures	Molds for silicone
Contour trim line & checking fixtures	Open cast molding
Contour tracing masters	Parts
Core gluing fixtures	Paper forming dies
Die cutting surfaces	Paper-pulp molds
Drilling fixtures	Plaster molds
Duplicate models	Post forming dies/fixtures
Drop forge/hammer dies	Powdered metal forming molds
Figurines molds	Precast cement form liners
Forming dies	Precast cement molds
Forming fixtures	Pressure cast molds
Foundry:	Pressure forming assists
patterns, core boxes, sprues,	Robotic fixtures
gates, runners, & blow tubes	Roller covers & rollers
Gaskets	Router blocks
Gluing fixtures	Rubber prototype parts
Grinding fixtures	Sandblasting fixtures
Holding fixtures	Sculpture molds
Liquid models molds	Stamping pads
Liquid molded parts	Steel rule ejectors
Machining nests	Stretch forming dies
Match metal die molds	Thermoforming assists
Medical training models	Tracing masters
Models	Tube bending & fixtures
Molds for Liquid Molding	Vacuum casting molds
Molds for epoxy	Wax molds



## HAPFLEX 500 SERIES

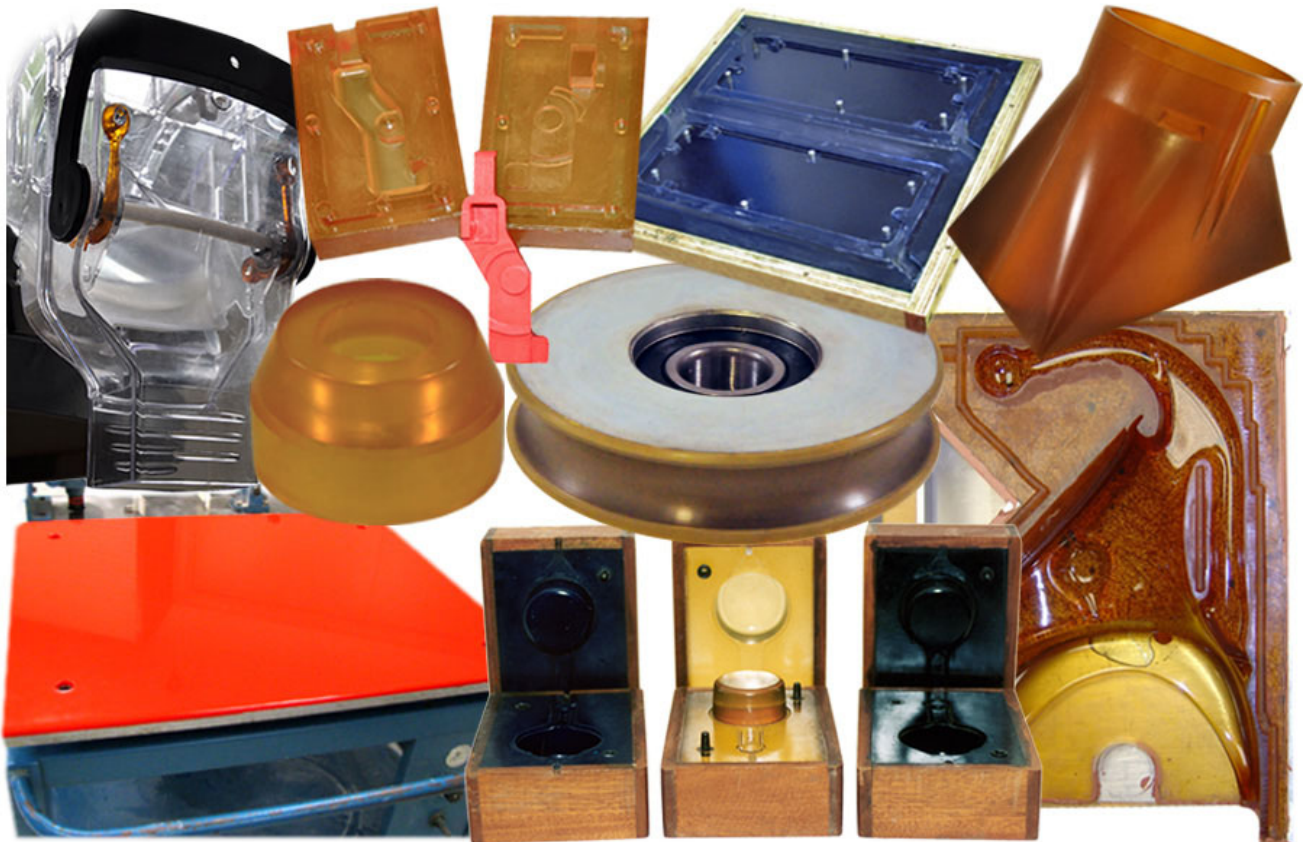
The **Hapflex 500 Series** offers soft durometer elastomers ranging from 45 - 95 Shore A. All are relatively fast, room curing, flexible systems that can be accelerated with moderate heat for faster cycle times. Most **500 Series** products are available in a slower speed (20-45 min.) when hand mixing, or a faster speed (3-6 min.) for use with Hapco's dispensing equipment.

All **Hapflex** elastomers are medium-low viscosity, making them easy to handle and pour, while still providing precise duplications of surface details.

In addition, the **Hapflex** elastomers are shock resistant and virtually unbreakable, making them exceptionally well suited for permanent molds or parts that will not crack or chip during use or storage. A major advantage its performance in low temperatures.

Precision tracing patterns, instrument grips, gaskets, fixtures, and flexible parts and molds are just a few applications of the **Hapflex 500 Series**.

## HAPFLEX 500 SERIES IN ACTION



**hapco inc.**

353 Circuit Street Hanover, Massachusetts 02339  
Toll Free # 877 SAY HAPCO (729-4272) Fax# 781-826-9544 [www.hapcoincorporated.com](http://www.hapcoincorporated.com)

# HAPFLEX 500 SERIES

PHYSICAL PROPERTIES		TEST METHOD	540 540-3	541 541-3	543	560 560-6	561 561-6	564
PHYSICAL PROPERTIES	Mix Ratio by volume A:B	Calculation	100:50	100:50	100:50	100:50	100:50	100:50
	by weight A:B		100:50	100:50	100:50	100:55	100:55	100:55
	Gel time 100 grams @ 25°C	ASTM D-2971	20 min. 3 min.	20 min. 3 min.	20 min.	45 min. 6 min.	45 min. 6 min.	45 min.
	Color (cured)	Visual	Black	Clear Amber	Green	Black	Clear Amber	Grey
	Hardness Shore	ASTM D-2240	45 A	45 A	45 A	65 A	65 A	65 A
	Viscosity mixed @ 25°C cps	ASTM D-4878	2,600	2,600	2,600	3,400	3,400	3,400
	Specific Gravity mixed @ 25°C	ASTM D-4669	1.04	1.04	1.04	1.07	1.07	1.07
	Shrinkage inch/inch See shrinkage paragraph	ASTM D-2566	.002-.003	.002-.004	.002-.003	.002-.004	.002-.004	.002-.003
	Demold time @ 70°F 1/8" thick	HAPCO TEST	18-24 hrs. 1-2 hrs.	18-24 hrs. 1-2 hrs.	18-24 hrs.	16-24 hrs. 1-2 hrs.	16-24 hrs. 1-2 hrs.	16-24 hrs.
	Weight per cubic inch (lbs.)	Calculation	0.0365	0.0365	0.0365	0.0383	0.0383	0.0383
PRODUCT PROPERTIES	Tensile Strength (psi)	ASTM D-638	630	630	630	1,294	1,294	1,294
	Elongation %	ASTM D-638	449	449	449	756	756	756
	Tear Strength (pli)	ASTM 624 Die C	103	103	103	215	215	215
	Modulus of Elasticity (ksi)	ASTM D-638	0.16	.16	.16	0.48	0.48	0.48
	Izod Impact (ft.lbs/in.) notched unnotched	ASTM D-256	No Break	No Break	No Break	No Break	No Break	No Break
	Heat Distortion Temperature (°C) 66 psi 264 psi	ASTM D-648	NA	NA	NA	NA	NA	NA
	Flexural Strength (psi)	ASTM D-790	NA	NA	NA	NA	NA	NA
	Flexural Modulus (ksi)	ASTM D-790	NA	NA	NA	NA	NA	NA

**NOTE: Post curing these materials is strongly recommended. Before use, reference material handling, processing, and safety notes located on pages 23-24.**



# HAPFLEX 500 SERIES

PHYSICAL PROPERTIES	TEST METHOD	565	566	570	571	573	
		565-3	566-3	570-6	571-6		
PHYSICAL PROPERTIES	Mix Ratio by volume A:B	Calculation	100:85	100:85	100:35	100:35	100:35
	by weight A:B		100:100	100:100	100:40	100:40	100:40
	Gel time 100 grams @ 25°C	ASTM D-2971	20 min. 3 min.	20 min. 3 min.	40 min. 6 min.	40 min. min. 6 min.	40 min.
	Color (cured)	Visual	Black	Clear Amber	Black	Clear Amber	Orange
	Hardness Shore +/-5	ASTM D-2240	80 A	80 A	70 A	70 A	70 A
	Viscosity mixed @ 25°C cps	ASTM D-4878	2,100	2,100	3,700	3,700	3,700
	Specific Gravity mixed @ 25°C	ASTM D-4669	1.1	1.1	1.05	1.05	1.05
	Shrinkage inch/inch See shrinkage paragraph	ASTM D-2566	.002-.003	.002-.003	.002-.003	.002-.003	.002-.003
	Demold time @ 70°F 1/8" thick	HAPCO TEST	4-6 hrs. 30- 60 min.	4-6 hrs. 30- 60 min.	8-12 hrs. 2-4 hrs.	8-12 hrs. 2-4 hrs.	8-12 hrs.
	Weight per cubic inch (lbs.)	Calculation	0.0379	0.0379	0.0386	0.0386	0.0386
PRODUCT PROPERTIES	Tensile Strength (psi)	ASTM D-638	1,118	1,118	1,709	1,709	1,709
	Elongation %	ASTM D-638	240	240	692	692	692
	Tear Strength (pli)	ASTM 624 Die C	192	192	312	312	312
	Modulus of Elasticity (ksi)	ASTM D-638	3.87	3.87	0.62	0.62	0.62
	Izod Impact (ft.lbs/in.) notched unnotched	ASTM D-256	No Break	No Break	No Break	No Break	No Break
	Heat Distortion Temperature (°C) 66 psi 264 psi	ASTM D-648	NA	NA	NA	NA	NA
	Flexural Strength (psi)	ASTM D-790	NA	NA	NA	NA	NA
	Flexural Modulus (ksi)	ASTM D-790	NA	NA	NA	NA	NA

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# HAPFLEX 500 SERIES

PHYSICAL PROPERTIES	TEST METHOD	580	581	595	596	598	599	
		580-3	581-3	595-3	596-3	598-3		
PHYSICAL PROPERTIES	Mix Ratio by volume A:B	Calculation	100:60	100:60	100:50	100:50	100:50	100:50
	by weight A:B		100:70	100:70	100:50	100:50	100:50	100:50
	Gel time 100 grams @ 25°C	ASTM D-2971	40 min. 3 min.	40 min. 3 min.	45 min. 3 min.	45 min. 3 min.	45 min. 3 min.	45 min.
	Color (cured)	Visual	Black	Clear Amber	Black	Clear Amber	Clear Blue	Grey
	Hardness Shore	ASTM D-2240	85 A	85 A	95 A	95 A	95 A	95 A
	Viscosity mixed @ 25°C cps	ASTM D-4878	2,500	2,500	2,700	2,700	2,700	2,700
	Specific Gravity mixed @ 25°C	ASTM D-4669	1.08	1.08	1.06	1.06	1.06	1.06
	Shrinkage inch/inch See shrinkage paragraph	ASTM D-2566	.002-.003	.002-.003	.002-.003	.002-.003	.002-.003	.002-.003
	Demold time @ 70°F 1/8" thick	HAPCO TEST	7-10 hrs. 1-2 hrs.	7-10 hrs. 1-2 hrs.	5-8 hrs. 20 min. -40	5-8 hrs. 20 min. -40	5-8 hrs. 20 min. -40	5-8 hrs.
Weight per cubic inch (lbs.)	Calculation	0.0383	0.0383	0.0383	0.0383	0.0383	0.0383	
PRODUCT PROPERTIES	Tensile Strength (psi)	ASTM D-638	1,891	1,891	2,048	2,048	2,048	2,048
	Elongation %	ASTM D-638	289	289	227	227	227	227
	Tear Strength (pli)	ASTM 624 Die C	305	305	418	418	418	418
	Modulus of Elasticity (ksi)	ASTM D-638	6.3	6.3	12.1	12.1	12.1	12.1
	Izod Impact (ft.lbs/in.) notched unnotched	ASTM D-256	No Break	No Break	No Break	No Break	No Break	No Break
	Heat Distortion Temperature (°C) 66 psi 264 psi	ASTM D-648	NA	NA	NA	NA	NA	NA
	Flexural Strength (psi)	ASTM D-790	NA	NA	NA	NA	NA	NA
Flexural Modulus (ksi)	ASTM D-790	NA	NA	NA	NA	NA	NA	

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# HAPFLEX 600 SERIES

PHYSICAL PROPERTIES	TEST METHOD	650	651	660	661	663	
		650-3	651-3	660-3	661-3	663-3	
PHYSICAL PROPERTIES	Mix Ratio by volume A:B	Calculation	100:75	100:75	100:55	100:55	100:55
	by weight A:B		100:85	100:85	100:60	100:60	100:60
	Gel time 100 grams @ 25°C	ASTM D-2971	25 min. 3 min.	25 min. 3 min.	25 min. 3 min.	25 min. 3 min.	25 min. 3 min.
	Color (cured)	Visual	Black	Clear Amber	Black	Clear Amber	Red
	Hardness Shore	ASTM D-2240	50 D	50 D	60 D	60 D	60 D
	Viscosity mixed @ 25°C cps	ASTM D-4878	3,400	3,400	3,700	3,700	3,700
	Specific Gravity mixed @ 25°C	ASTM D-4669	1.08	1.08	1.06	1.06	1.06
	Shrinkage inch/inch See shrinkage paragraph	ASTM D-2566	.001-. .003 .003-. .005	.001-. .003 .003-. .005	.001-. .003 .003-. .005	.001-. .003 .003-. .005	.001-. .003 .003-. .005
	Demold time @ 70°F 1/8" thick	HAPCO TEST	2-5 hrs. 20- 35 min.	2-5 hrs. 20- 35 min.	2-5 hrs. 20- 35 min.	2-5 hrs. 20- 35 min.	2-5 hrs. 20- 35 min.
Weight per cubic inch (lbs.)	Calculation	0.0365	0.0365	0.0375	0.0375	0.0375	
PRODUCT PROPERTIES	Tensile Strength (psi)	ASTM D-638	2,594	2,594	3,779	3,779	3,779
	Elongation %	ASTM D-638	157	157	147	147	147
	Tear Strength (pli)	ASTM 624 Die C	457	457	611	611	611
	Modulus of Elasticity (ksi)	ASTM D-638	53.1	53.1	64.2	64.2	64.2
	Izod Impact (ft.lbs/in.) notched unnotched	ASTM D-256	1.4 4.4	1.4 4.4	2.2 No Break	2.2 No Break	2.2 No Break
	Heat Distortion Temperature (°C) 66 psi 264 psi	ASTM D-648	106°C NA	106°C NA	96°C 63°C	96°C 63°C	96°C 63°C
	Flexural Strength (psi)	ASTM D-790	840	840	1,660	1,660	1,660
	Flexural Modulus (ksi)	ASTM D-790	11.7	11.7	24.6	24.6	24.6

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# HAPFLEX 600 SERIES

PHYSICAL PROPERTIES	TEST METHOD	665	666	668	669	
		665-3	666-3	668-3	669-3	
Mix Ratio by volume A:B	Calculation	100:50	100:50	100:50	100:50	
		100:50	100:50	100:50	100:50	
by weight A:B		100:50	100:50	100:50	100:50	
Gel time 100 grams @ 25°C	ASTM D-2971	25 min. 3 min.	25 min. 3 min.	25 min. 3 min.	25 min. 3 min.	
Color (cured)	Visual	Black	Clear Amber	Red	Grey	
Hardness Shore	ASTM D-2240	65 D	65 D	65 D	65 D	
Viscosity mixed @ 25°C cps	ASTM D-4878	4,000	4,000	4,000	4,000	
Specific Gravity mixed @ 25°C	ASTM D-4669	1.04	1.04	1.04	1.04	
Shrinkage inch/inch See shrinkage paragraph	ASTM D-2566	.001- .003 .003- .005	.001- .003 .003- .005	.001- .003 .003- .005	.001- .003 .003- .005	
Demold time @ 70°F 1/8" thick	HAPCO TEST	1-2 hrs. 10- 20 min.	1-2 hrs. 10- 20 min.	1-2 hrs. 10- 20 min.	1-2 hrs. 10- 20 min.	
Weight per cubic inch (lbs.)	Calculation	0.0368	0.0368	0.0368	0.0368	
PRODUCT PROPERTIES	Tensile Strength (psi)	ASTM D-638	4,506	4,506	4,506	4,506
	Elongation %	ASTM D-638	237	237	237	237
	Tear Strength (ksi)	ASTM 624 Die C	863	863	863	863
	Modulus of Elasticity (ksi)	ASTM D-638	52	52	52	52
	Izod Impact (ft.lbs/in.) notched unnotched	ASTM D-256	11.8 No Break	11.8 No Break	11.8 No Break	11.8 No Break
	Heat Distortion Temperature (°C) 66 psi 264 psi	ASTM D-648	110°C 71°C	110°C 71°C	110°C 71°C	110°C 71°C
	Flexural Strength (psi)	ASTM D-790	2,770	2,770	2,770	2,770
	Flexural Modulus (ksi)	ASTM D-790	58.14	58.14	58.14	58.14

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# HAPFLEX 600 SERIES

PHYSICAL PROPERTIES		TEST METHOD	670 670-3	671 671-3	673 673-3
<b>PHYSICAL PROPERTIES</b>	Mix Ratio by volume A:B	Calculation	100:65	100:65	100:65
	by weight A:B		100:65	100:65	100:65
	Gel time 100 grams @ 25°C	ASTM D-2971	18 min. 3 min.	18 min. 3 min.	18 min. 3 min.
	Color (cured)	Visual	Black	Clear Amber	Red
	Hardness Shore	ASTM D-2240	70 D	70 D	70 D
	Viscosity mixed @ 25°C cps	ASTM D-4878	3,100	3,100	3,100
	Specific Gravity mixed @ 25°C	ASTM D-4669	1.05	1.05	1.05
	Shrinkage inch/inch See shrinkage paragraph	ASTM D-2566	.001-.003 .003-.005	.001-.003 .003-.005	.001-.003 .003-.005
	Demold time @ 70°F 1/8" thick	HAPCO TEST	1-2 hrs. 10-20 min.	1-2 hrs. 10-20 min.	1-2 hrs. 10-20 min.
	Weight per cubic inch (lbs.)	Calculation	0.0383	0.0383	0.0383
<b>PRODUCT PROPERTIES</b>	Tensile Strength (psi)	ASTM D-638	4,512	4,512	4,512
	Elongation %	ASTM D-638	87	87	87
	Tear Strength (pli)	ASTM 624 Die C	660	660	660
	Modulus of Elasticity (ksi)	ASTM D-638	55	55	55
	Izod Impact (ft.lbs/in.) notched unnotched	ASTM D-256	6.4 No Break	6.4 No Break	6.4 No Break
	Heat Distortion Temperature (°C) 66 psi 264 psi	ASTM D-648	133°C 124°C	133°C 124°C	133°C 124°C
	Flexural Strength (psi)	ASTM D-790	3,665	3,665	3,665
	Flexural Modulus (ksi)	ASTM D-790	78.55	78.55	78.55

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# HAPFLEX 700 - 800 SERIES

PHYSICAL PROPERTIES	TEST METHOD	765	766	780	781			
		765-5	766-5	780-5	781-5			
PHYSICAL PROPERTIES	Mix Ratio by volume A:B	Calculation	100:20	100:20	100:25	100:25		
	by weight A:B		100:20	100:20	100:25	100:25		
	Gel time 100 grams @ 25°C	ASTM D-2971	23 min. 5 min.	23 min. 5 min.	20 min. 5 min.	20 min. 5 min.		
	Color (cured)	Visual	Black	Colorless	Black	Colorless		
	Hardness Shore	ASTM D-2240	65 A	65 A	80 A	80 A		
	Viscosity mixed @ 25°C cps	ASTM D-4878	4,000	4,000	3,000	3,000		
	Specific Gravity mixed @ 25°C	ASTM D-4669	1.04	1.04	1.01	1.01		
	Shrinkage inch/inch See shrinkage paragraph	ASTM D-2566	.001- .003	.002- .004	.001- .003	.002- .004	.001- .003	.002- .004
	Demold time @ 70°F 1/8" thick	HAPCO TEST	16-24 hrs. 3-6 hrs.	16-24 hrs. 3-6 hrs.	10-16 hrs. 2-4 hrs.	10-16 hrs. 2-4 hrs.		
	Weight per cubic inch (lbs.)	Calculation	0.0375	0.0375	0.0365	0.0365		
PRODUCT PROPERTIES	Tensile Strength (psi)	ASTM D-638	800	800	2,150	2,150		
	Elongation %	ASTM D-638	950	950	520	520		
	Tear Strength (pli)	ASTM 624 Die C	170	170	260	260		
	Modulus of Elasticity (ksi)	ASTM D-638	NA	NA	NA	NA		
	Izod Impact (ft.lbs/in.) notched unnotched	ASTM D-256	No Break	No Break	No Break	No Break		
	Heat Distortion Temperature (°C) 66 psi 264 psi	ASTM D-648	NA	NA	NA	NA		
	Flexural Strength (psi)	ASTM D-790	NA	NA	NA	NA		
	Flexural Modulus (ksi)	ASTM D-790	NA	NA	NA	NA		

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# HAPFLEX 700 - 800 SERIES

PHYSICAL PROPERTIES	TEST METHOD	790	791	870	871	873	
		790-5	791-5	870-4	871-4	873-4	
PHYSICAL PROPERTIES	Mix Ratio by volume A:B	Calculation	100:15	100:15	100:32	100:32	100:32
	by weight A:B		100:15	100:15	100:32	100:32	100:32
	Gel time 100 grams @ 25°C	ASTM D-2971	20 min. 5 min.	20 min. 5 min.	20 min. 4 min.	20 min. 4 min.	20 min. 4 min.
	Color (cured)	Visual	Black	Colorless	Black	Colorless	Red
	Hardness Shore	ASTM D-2240	90 A	90 A	72 D	72 D	72 D
	Viscosity mixed @ 25°C cps	ASTM D-4878	4,000	4,000	4,300	4,300	4,300
	Specific Gravity mixed @ 25°C	ASTM D-4669	1.03	1.03	1.03	1.03	1.03
	Shrinkage inch/inch See shrinkage paragraph	ASTM D-2566	.001-.003 .002-.004	.001-.003 .002-.004	.0015-.0040 .0025-.0045	.0015-.0040 .0025-.0045	.0015-.0040 .0025-.0045
	Demold time @ 70°F 1/8" thick	HAPCO TEST	10-16 hrs. 2-4 hrs.	10-16 hrs. 2-4 hrs.	8-12 hrs. 1-3 hrs.	8-12 hrs. 1-3 hrs.	8-12 hrs. 1-3 hrs.
	Weight per cubic inch (lbs.)	Calculation	0.0372	0.0372	0.0372	0.0372	0.0372
PRODUCT PROPERTIES	Tensile Strength (psi)	ASTM D-638	3,530	3,530	3,700	3,700	3,700
	Elongation %	ASTM D-638	420	420	65	65	65
	Tear Strength (pli)	ASTM 624 Die C	350	350	620	620	620
	Modulus of Elasticity (ksi)	ASTM D-638	NA	NA	6	6	6
	Izod Impact (ft.lbs/in.) notched unnotched	ASTM D-256	No Break	No Break	1.5 6.3	1.5 6.3	1.5 6.3
	Heat Distortion Temperature (°C) 66 psi 264 psi	ASTM D-648	NA	NA	54°C 40°C	54°C 40°C	54°C 40°C
	Flexural Strength (psi)	ASTM D-790	NA	NA	2,350	2,350	2,350
	Flexural Modulus (ksi)	ASTM D-790	NA	NA	13.9	13.9	13.9

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# HAPFLEX 1000 SERIES

The **HAPFLEX 1000 Series** products are soft, colorless, Shore A elastomers. These materials are available in both a fast and slow version.

The **HAPFLEX 1000 Series** is colorless and will take pigments very well; however, because of its chemistry, only "MP" color dispersions should be used. These have been specially formulated for use with the **1000 series** and can be found in the Color Dispersion section of this brochure.

**HAPFLEX 1000 Series** products are used in both Liquid Molding applications (i.e. parts, gaskets, molds) and electrical insulation applications (i.e. potting and encapsulating).

**HAPFLEX 1000 Series** products are available in a 25, 35 and 55A hardness.

## HAPFLEX 1000 SERIES IN ACTION



**hapco inc.**

353 Circuit Street Hanover, Massachusetts 02339  
Toll Free # 877 SAY HAPCO (729-4272) Fax# 781-826-9544 [www.hapcoincorporated.com](http://www.hapcoincorporated.com)



# HAPFLEX 1000 SERIES

PHYSICAL PROPERTIES	TEST METHOD	1021	1036	1056	
			1036-5	1056-5	
PHYSICAL PROPERTIES	Mix Ratio by volume A:B	Calculation	100:200	100:300	100:400
	by weight A:B		100:200	100:300	100:400
	Gel time 100 grams @ 25°C	ASTM D-2971	16 min.	16 min. 5 min.	16 min. 5 min.
	Color (cured)	Visual	Colorless	Clear / Translucent	Colorless / Slightly Cloudy
	Hardness Shore	ASTM D-2240	25 A	35 A	55 A
	Viscosity mixed @ 25°C cps	ASTM D-4878	2,500	3,000	4,500
	Specific Gravity mixed @ 25°C	ASTM D-4669	1.15	1.16	1.16
	Shrinkage inch/inch See shrinkage paragraph	ASTM D-2566	.001-.003	.001-.003 .002-.004	.001-.003 .002-.004
	Demold time @ 70°F 1/8" thick	HAPCO TEST	6 - 8 hrs.	6 - 8 hrs. 2 - 4 hrs.	4 - 6 hrs. 1 - 2 hrs.
	Weight per cubic inch (lbs.)	Calculation	0.0415	0.0419	0.0419
PRODUCT PROPERTIES	Tensile Strength (psi)	ASTM D-638	300	450	650
	Elongation %	ASTM D-638	>1,200	1,000	950
	Tear Strength (pli)	ASTM 624 Die C	65	85	120
	Modulus of Elasticity (ksi)	ASTM D-638	NA	NA	NA
	Izod Impact (ft.lbs/in.) notched unnotched	ASTM D-256	No Break	No Break	No Break
	Heat Distortion Temperature (°C) 66 psi 264 psi	ASTM D-648	NA	NA	NA
	Flexural Strength (psi)	ASTM D-790	NA	NA	NA
	Flexural Modulus (ksi)	ASTM D-790	NA	NA	NA

**NOTE: Post curing these materials is strongly recommended. Before use, reference material handling, processing, and safety notes located on pages 23-24.**



# HAPFLEX FR STATUS

**THE HAPFLEX 500 & 600 Series** products are formulated to be flame retardant. **HAPFLEX 565 FR and 671 FR** have been certified by Underwriter's Laboratory(UL) to pass the 94V test with a V-0 and V-1 rating respectively. All flame retardant materials that are not UL certified have been qualified by Hapco's testing lab. The following sequence depicts the 94V test as it is conducted in Hapco's lab.

## Flame Test Sequence



With the test sample suspended vertically, the technician moves the flame directly under the sample for ten seconds and then removes it. This is repeated once more when the sample self extinguishes. The times are then recorded and averaged. Depending on the results, the material is given one of three ratings as explained in the chart below.

## Flame Ratings

<b>V-0</b> Vertical Burn	Burning stops within 10 seconds after two applications of ten seconds each of a flame to a test bar. <i>No</i> flaming drips are allowed.
<b>V-1</b> Vertical Burn	Burning stops within 60 seconds after two applications of ten seconds each of a flame to a test bar. <i>No</i> flaming drips are allowed.
<b>V-2</b> Vertical Burn	Burning stops within 60 seconds after two applications of ten seconds each of a flame to a test bar. Flaming drips <i>are</i> allowed.

If you would like more information on our flame retardant materials, please contact a Hapco Representative or view our online certification page at:

<http://www.hapcoincorporated.com/ul-listed-products/>



# HAPFLEX UL PRODUCTS

PHYSICAL PROPERTIES	TEST METHOD	565 FR	671 FR
Mix Ratio by volume A:B	Calculation	100:85	100:60
by weight A:B		100:100	100:65
Gel time 100 grams @ 25°C	ASTM D-2971	20 min.	25 min.
Color (cured)	Visual	Black	Clear Amber
Hardness Shore	ASTM D-2240	80A	70D
Viscosity mixed @ 25°C cps	ASTM D-4878	670	2,200
Specific Gravity mixed @ 25°C	ASTM D-4669	1.09	1.09
Shrinkage inch/inch See shrinkage paragraph	ASTM D-2566	.002-.004	.001-.003
Demold time @ 70°F 1/8" thick	HAPCO TEST	4-6 hrs.	1-2 hrs.
Weight per cubic inch (lbs.)	Calculation	0.0394	0.0394
Tensile Strength (psi)	ASTM D-638	1,118	4,512
Elongation %	ASTM D-638	240	87
Tear Strength (pli)	ASTM 624 Die C	192	660
Modulus of Elasticity (ksi)	ASTM D-638	3.9	55
Izod Impact (ft.lbs/in.) notched unnotched	ASTM D-256	No Break	6.4 No Break
Heat Distortion Temperature (°C) 66 psi 264 psi	ASTM D-648	NA	133°C 124°C
Flexural Strength (psi)	ASTM D-790	NA	3,665
Flexural Modulus (ksi)	ASTM D-790	NA	78.55
Flame Rating	94V	UL 94V-0	94V-1

**NOTE: Post curing these materials is strongly recommended. Before use, reference material handling, processing, and safety notes located on pages 23-24.**



# PD COLOR DISPERSION SERIES

## OPAQUE COLOR DISPERSIONS



**PD-6 M  
RED**

0.03 (3%) by weight  
in Ultralloy 206/207



**PD-15 M  
ORANGE**

0.03 (3%) by weight  
in Ultralloy 206/207



**PD-3 M  
YELLOW**

0.03 (3%) by weight  
in Ultralloy 206/207



**PD-25 M  
YELLOW**

0.03 (3%) by weight  
in Ultralloy 206/207



**PD-4 M  
GREEN**

0.03 (3%) by weight  
in Ultralloy 206/207



**PD-9 M  
BROWN**

0.03 (3%) by weight  
in Ultralloy 206/207



**PD-1 M  
DARK BLUE**

0.03 (3%) by weight  
in Ultralloy 206/207



**PD-26 M  
BLUE**

0.03 (3%) by weight  
in Ultralloy 206/207



**PD-8 M  
LIGHT GREY**

0.03 (3%) by weight  
in Ultralloy 206/207



**PD-11 M  
DARK GREY**

0.03 (3%) by weight  
in Ultralloy 206/207



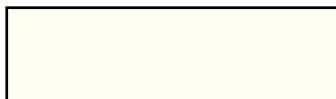
**PD-2 M  
CARBON BLACK**

0.02 (2%) by weight  
in Ultralloy 206/207



**PD-512 M  
BLACK OXIDE**

0.02 (2%) by weight  
in Ultralloy 206/207



**PD-7 M  
WHITE**

0.05 (5%) by weight  
in Ultralloy 206/207

**PD - Mix Ratio:** Add 1 - 5% (0.01-0.05) by weight to Part B, mix well. In above results, ratios were added by weight to Ultralloy 206/207 Part B, then mixed and cured.

Color Dispersions are compatible with most Hapco Resin Systems except those listed under the MP Color Series. Read product list for MP Color Series. All of Hapco Color Dispersions are appropriate for standard and/or Food and Drug applications.

Weigh the color additions accurately for batch to batch uniformity. The above colors may be blended to form additional colors.

### NOTES:

All above Ratios are % added by weight to **Ultralloy 206/207 Part B**, then mixed and cured.

**Packaging Available:** 1/2 pint cans, 1 quart cans, 1 gallon pails, and 5 gallon pails.



# TD COLOR DISPERSION SERIES

## \* TRANSLUCENT COLOR DISPERSIONS



**TD-22 M  
RED**  
0.005 (1/2%) by weight  
in Ultralloy 206/207



**TD-24 M  
YELLOW**  
0.005 (1/2%) by weight  
in Ultralloy 206/207



**TD 20 M  
VIOLET**  
0.005(1/2%) by weight  
in Ultralloy 206/207



**TD-21 M  
ORANGE**  
0.005 (1/2%) by weight  
in Ultralloy 206/207



**TD-23 M  
BLUE**  
0.005 (1/2%) by weight  
in Ultralloy 206/207



**TD-28 M  
BLACK**  
0.005 (1/2%) by weight  
in Ultralloy 206/207

**TD - Mix Ratio:** Add 1/10 - 2% (0.001-0.02) by weight to Part B, mix well. In above results, ratios were added by weight to Ultralloy 206/207 Part B, then mixed and cured. Less than 1/10% (0.001) by weight may be added to the Part B for very translucent colors, 1/2% (0.005) to 2% (0.02) may be added to Part B to form opaque colors.

Color Dispersions are compatible with most Hapco Resin Systems except those listed under MP Color Series. Read product list for MP Color Series. All of Hapco Color Dispersions are appropriate for standard and/or Food and Drug applications.

Weigh the color additions accurately for batch to batch uniformity. The above colors may be blended to form additional colors.

### NOTES:

All above Ratios are % added by weight to **Ultralloy 206/207 Part B**, then mixed and cured.

**Packaging Available:** 1/2 pint cans, 1 quart cans, 1 gallon pails, and 5 gallon pails.

\*Translucent color dispersions are not translucent in some Liquid Molding Systems. Consult your Hapco Representative for more details.



# MP COLOR DISPERSION SERIES

## TRANSLUCENT\* and OPAQUE COLOR DISPERSIONS for

- Hapflex 1021, 1036, 1036-5, 1056, 1056-5
- Steralloy 2021, 2021-5, 2036, 2036-5, 2056, 2056-5
- Di-Pak 4021, 4036, 4036-5, 4056, 4056-5



**TD-22 MP  
RED**  
0.005 (1/2%) by weight  
in Ultralloy 206/207



**TD-24 MP  
YELLOW**  
0.005 (1/2%) by weight  
in Ultralloy 206/207



**TD-23 MP  
BLUE**  
0.005 (1/2%) by weight  
in Ultralloy 206/207



**TD-21 MP  
ORANGE**  
0.005 (1/2%) by weight  
in Ultralloy 206/207



**PD-3 MP (Opaque)  
YELLOW**  
0.03 (3%) by weight  
in Ultralloy 206/207



**PD-7 MP (Opaque)  
WHITE**  
0.05 (5%) by weight  
in Ultralloy 206/207



**PD-2 MP (Opaque)  
BLACK**  
0.02 (2%) by weight  
in Ultralloy 206/207



**TD-28 MP  
BLACK**  
0.005 (1/2%) by weight  
in Ultralloy 206/207

**TD - Mix Ratio:** Add 0.005 - 0.05% by weight to Part B, mix well.

Less than 1/10% or less than 0.001 by weight can be added to the Part B for very translucent colors, 1/2% (0.005) - 2% (0.02) may be added to the Part B, by weight, for opaque coloring.

**PD - Mix Ratio:** Add 1—5% (0.01-0.05) by weight to Part B, mix well.

Weigh the color additions accurately for batch to batch uniformity. The above colors may be blended to form additional colors.

**NOTES:**

All above Ratios are % added by weight to **Ultralloy 206/207 Part B**, then mixed and cured.

**Packaging Available:** 1/2 pint cans, 1 quart cans, 1 gallon pails, and 5 gallon pails.

\*Translucent color dispersions are not translucent in some Liquid Molding Systems. Consult your Hapco Representative for more details.



## **HAPFLEX SERIES**

### **MATERIAL HANDLING & SAFETY NOTES**

#### **POSTCURE:**

Postcure Heat: 100-175°F (38-79°C) for a *minimum* of 6-12 hours.

Post curing will expedite the cross-linking process and properly align the polymer's molecules, increasing physical properties (e.g., tensile strength, flexural strength, and heat distortion temperature) above what the material would normally achieve at room temperature. Generally speaking, 25A-95A Hapflex materials are post cured at 100-150°F (38-65°C) for 8-24 hours, whereas 50D-72D materials can be postcured up to 175°F(80°C) for 8-24 hrs.

#### **DEMOLD & CURE TIMES:**

To reach full cure, polymers require at least 7-10 days at room temperature. Final cure for faster gel materials (3-6 min.) is 3-7 days. Demold and final cure time can be accelerated with the addition of postcure heat 100-175°F (38-79°C). To retain working life, heat the mold not the material. Increasing the mold temperature to 80-100°F (26-38°C) will accelerate demold and cure times by up to 50%. Please be aware that size and mass effect demold and cure times.

#### **HARDNESS NOTE:**

The hardness progresses more slowly in the longer working life systems. The hardness progression can be accelerated by using the faster version or by curing with mild heat. Hardness and cure progress will be slowed down when the temperature falls below 70°F.

#### **SURFACE PREPARATION TO PREVENT ADHESION:**

To prevent adhesion to the mold, choose one of Hapco's GREASE-IT release agents: GREASE-IT II, GREASE-IT IV, GREASE-IT V, GREASE-IT WAX P, GREASE-IT WAX LT and GREASE-IT FDG when a Food & Drug grade release is required. For best results, apply in a few thin coats, drying between coats. Porous surfaces, such as wood or plaster, must be sealed thoroughly before release is applied. Use multiple coats of a good coating, such as a high grade lacquer or urethane lacquer.

**NOTE:** Silicone release agents and silicone rubber molds may adversely affect the **HAPFLEX 700 & 800 Series** surface. It is up to the user to test the appropriateness and judge the above products for use with Hapflex materials.

#### **SURFACE PREPARATION FOR ADHESION:**

For applications where adhesion is desired, the surface must be cleaned, abraded and dried. Sandblasting and mechanical roughing are the preferred ways of abrading surfaces to be bonded. For added adhesion to metals, use Primer 200 and for added adhesion to plastic, use Primer 810. Make sure all surfaces are clean, dry, and free from moisture.

#### **COLD TEMPERATURES:**

**CAUTION** - Part A may freeze or crystallize in cold temperatures. Part A may appear to be striated or solidify. This situation can easily be corrected. Place the cover on the Part A loosely (do not seal) and place in an oven set at 125-150°F (51-65°C) for 3-8 hours or 8-12 hours for drums. Reseal, allow to cool, and then mix thoroughly.

**CAUTION** - Part B may freeze or crystallize in cold temperatures. Part B may turn thicker, appear to be striated, thicken, or solidify. **To prevent this see storage.**

This situation can be easily corrected. To reverse crystallization, loosen the cover on Part B and heat to 170-180°F (77-82°C) for 3-6 hours, drums, 6-12 hours. Allow to cool before using. If contents are pigmented, mix thoroughly.

#### **MIXING:**

**IMPORTANT:** *Before each use, mix pigmented Part B thoroughly before proportioning out the required amount.*

Components may separate and should be mixed before each use. Mix, only when ready to use, by adding the curing agent to the resin portion and blending together thoroughly. Be sure to scrape and stir in all material sticking to the sides and bottom of the mixing container. Do not use paper containers or wooden mixing sticks. They may contain moisture. For best results, use plastic or coated containers, and metal or plastic sticks.

#### **MACHINE MIXING AND DISPENSING:**

Use Hapco's **RAPIDFIL**, **MINIFIL**, and/or **RAPIDSHOT** dispensing machines for fast, reliable, and efficient mixing without the air entrapment, measuring, or mess associated with hand processing.



## **HAPFLEX SERIES**

### **MATERIAL HANDLING & SAFETY NOTES (cont.)**

#### **CASTING:**

Pour in a thin unbroken stream into the lowest point in the cavity or mold. This will help break up some of the air entrapped during mixing. For best results, Hapco recommends meter mix dispensing, vacuum degassing and/or pressure casting at 70-80 PSI.

#### **SHRINKAGE:**

Shrinkage or dimensional variation is largely influenced by 5 factors:

1. Mass (total volume and thickness)
2. The temperature of the material
3. Maximum temperature reached during the exotherm (reaction).  
The faster the gel time, the higher the exotherm, the greater the shrinkage.
4. The temperature of the mold
5. The thermal properties of the mold material.(Insulator vs. Conductive)

Geometry, part thickness, and total volume vary in each design, therefore, the customer is responsible to test and determine the shrinkage factor to be used. The values in the brochures are for comparative reference only, using ASTM testing procedures.

#### **SILICONE MOLDS:**

Silicone molds should be post cured overnight, 16-24 hours, in an oven at 120°F (48°C). When using a tin based Silicone mold, make sure the mold is open when it is in the oven during postcure. Improperly cured Silicone can cause a sticky surface on molded parts. This process extends mold life and reduces the problem of sticky surface cures. **HAPFLEX 700/800 Series products may have a negative reaction to silicone rubber molds.**

#### **AIR RELEASE:**

Use Hapco's ANTI-AIR to aid in air release when vacuum degassing (see Technical Bulletin). In some products, ANTI-AIR can cause a slight haze to cloudiness. This has no effect on properties.

#### **CLEAN UP:**

Cured polymers are difficult to remove. It is best to clean tools and equipment immediately after use. For best results use Hapco's A-TAK.

#### **STORAGE:**

Store both components in an area with a temperature range of 68-90°F (20-32°C). Store in a dry place off of cement floors and on shelving if possible. Containers should be kept tightly closed.

#### **SHELF LIFE:**

Polymer systems have a minimum shelf life of six months when unopened. The shelf life on Hapco products begins from the date of invoice for that product shipment. Hapco's shelf life only pertains to containers that are unopened and in their original condition. Once the container is opened Hapco has no control or responsibility for the shelf life.

#### **RESEALING:**

Many polymers are moisture sensitive. Containers should be resealed using one of the following methods: Blanket with nitrogen or use a hair dryer for 30 seconds to cover with dry air.

#### **PRECAUTIONS:**

**CAUTION:** The MSDS should be read thoroughly before using this product.

Skin or eye contact with polymers should be avoided. The use of gloves and eye protection are strongly recommended. All polymers, as a general practice, should be used in well-ventilated areas. Spot ventilation is most effective. Contaminated clothing should be removed immediately and the skin washed with soap and water or waterless skin cleaner. Should accidental eye contact occur, wash thoroughly with water and consult a physician.

The information presented here is based on carefully conducted laboratory tests and is believed to be accurate. However, results cannot be guaranteed and it is suggested that customers confirm results under their conditions and in their applications before production use.

**Important:** Hapco Inc. makes no warranty, whether expressed or implied, including warranties of merchantability or of fitness for a particular purpose. Under no circumstances shall Hapco Inc. be liable for incidental, consequential, or other damages from alleged negligence, breach of warranty, strict liability, tort contract, or any other legal theory, arising out of the use of handling of this product. The sole remedy of purchaser and sole liability of Hapco Inc. shall be for the purchase price of the product which is the subject of the claim.

