

# Your guide to pet food, treats and animal feed



Create high-performing pet food products with ingredient solutions from Ingredion

Starches | Grain-free starches | Gums | Prebiotic fibers | Flours | Plant-based proteins

Ingredion  
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IDEAS TO SOLUTIONS

# PET FOOD, TREATS AND ANIMAL FEED

Non-GMO starches, flours and gums for canned, semi-moist and extruded dry pet food/treats; non-GMO prebiotic fiber for pets and livestock

APPLICATION	KEY FUNCTIONALITY	RECOMMENDATION	USE LEVEL	BASE	LABEL	CLEAN LABEL	GRAIN-FREE GLUTEN-FREE	NON-GMO	ADDITIONAL FEATURES
Canned pet foods/gravies	Provides fill viscosity for suspension of particulates	NATIONAL™ 150	2-5%	WC	Food starch modified			✓	Provides high initial viscosity with high breakdown, very little to no residual viscosity after retorting
		NATIONAL™ 1545	2-5%	WC	Food starch modified			✓	Provides high initial viscosity with high breakdown, moderate residual viscosity after retorting
		HEMOCRAFT® Create 390	3-5%	T	Tapioca flour	✓	✓	✓	Provides high upfront viscosity at pre-cooking to suspend particulates
		PENPURE® 10	2-5%	P	Potato starch	✓	✓	✓	Provides high initial viscosity with high breakdown, very little to no residual viscosity after retorting
		PENPURE® 50	2-5%	T	Tapioca starch	✓	✓	✓	Provides high initial viscosity with high breakdown, very little to no residual viscosity after retorting
		PENPURE® 60	2-5%	P	Potato extract	✓	✓	✓	Provides high initial viscosity with high breakdown, very little to no residual viscosity after retorting
		PENPURE® 80	2-5%	WP	Potato starch	✓	✓	✓	Provides upfront viscosity at pre-cooking for suspending particulates
		PENPURE® UM	2-5%	P	Potato starch	✓	✓	✓	Provides instant viscosity to replace gum
		PENPURE® 55	2-5%	T	Tapioca starch	✓	✓	✓	Provides instant viscosity to replace gum
	Provides end (final) gravy viscosity	NOVATION PRIMA® 300/600	3-4%	WC	Corn starch	✓		✓	Maintains viscosity during filling and retorting, improves visual appearance (sheen and clarity), provides stability throughout extended shelf life
		NOVATION® 8300/8600	3-4%	WR	Rice starch	✓		✓	Maintains viscosity during filling and retorting, improves visual appearance (sheen and clarity), provides stability throughout extended shelf life
		NOVATION® 3300/3600	3-5%	T	Tapioca starch	✓	✓	✓	Maintains viscosity during filling and retorting, improves visual appearance (sheen and clarity), provides stability throughout extended shelf life
		HEMOCRAFT® Create 835	3-5%	R	Rice flour	✓		✓	Provides high upfront viscosity and high viscosity in the finished product, provides high/low temperature freeze/thaw stability
		HEMOCRAFT® Create 335	3-5%	T	Tapioca flour	✓	✓	✓	Provides high upfront viscosity and high viscosity in the finished product, provides high/low temperature freeze/thaw stability
		PURITY® W	2-4%	WC	Food starch modified			✓	Maintains viscosity during filling and retorting, improves visual appearance (sheen and clarity), provides stability throughout extended shelf life
PENBIND® 1015		3-5%	P	Food starch modified			✓	✓	Maintains viscosity during filling and retorting, improves visual appearance (sheen and clarity), provides stability throughout extended shelf life
NATIONAL™ FRIGEX	3-5%	T	Food starch modified			✓	✓	Maintains viscosity during filling and retorting, improves visual appearance (sheen and clarity), provides stability throughout extended shelf life	

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Non-GMO starches, flours and gums for canned, semi-moist and extruded dry pet food/treats; non-GMO prebiotic fiber for pets and livestock

APPLICATION	KEY FUNCTIONALITY	RECOMMENDATION	USE LEVEL	BASE	LABEL	CLEAN LABEL	GRAIN-FREE GLUTEN-FREE	NON-GMO	ADDITIONAL FEATURES	
<b>Canned pet foods/gravies</b>	"Single system" (provides fill and end viscosity)	NOVATION PRIMA® 300/600	3-6%	WC	Corn starch	✓		✓	Maintains viscosity during filling and retorting, improves visual appearance (sheen and clarity), provides stability throughout extended shelf life	
		NOVATION® 8300/8600	3-6%	WR	Rice starch	✓		✓	Maintains viscosity during filling and retorting, improves visual appearance (sheen and clarity), provides stability throughout extended shelf life	
		NOVATION® 3300/3600	3-6%	T	Tapioca starch	✓	✓	✓	Maintains viscosity during filling and retorting, improves visual appearance, provides stability throughout extended shelf life	
		NOVATION® 1600/1900	3-6%	P	Potato starch	✓	✓	✓	Maintains viscosity during filling and retorting, improves visual appearance, provides stability throughout extended shelf life	
		HEMOCRAFT® Create 365	3-5%	T	Tapioca flour	✓	✓	✓	Provides high upfront viscosity and high viscosity in the finished product, provides high/low temperature freeze/thaw stability	
		PENBIND® 1000	3-4%	P	Food starch modified			✓	✓	Maintains viscosity during filling and retorting, improves visual appearance (sheen and clarity), provides stability throughout extended shelf life
		FIRM-TEX®	3-4%	WC	Food starch modified				✓	Provides high initial viscosity with moderate to low breakdown, provides moderate to high residual viscosity/short texture after retorting, provides exceptional stability throughout extended shelf life
		GuarNT® USA 8/22	0.1-1.0%	Guar gum	Guar gum	✓	✓	✓	✓	Thickens, suspends, helps with moisture retention
		GuarNT® USA Flavor Free 5000	0.1-1.0%	Guar gum	Guar gum	✓	✓	✓	✓	Thickens, suspends, helps with moisture retention. Is flavorless and odorless
		Pre-Hydrated® GuarNT® USA 8/22	0.1-1.0%	Guar gum	Guar gum	✓	✓	✓	✓	Thickens, suspends, helps with moisture retention. Has fast hydration
		TIC Pretested® Locust Bean Gum POR/A2 Powder	0.15-0.75%	Locust bean gum	Locust bean gum	✓	✓	✓	✓	Thickens and helps with moisture retention
		TICALOID® 8090 S	0.5-4.0%	P, Guar gum, xanthan gum	Potato starch modified, guar gum, xanthan gum			✓	✓	Thickens, suspends, helps with moisture retention
<b>Canned pet food/formed meat pieces</b>	Provides firmness and structure, prevents separation	NOVATION® 6600	1-3%	P	Potato starch	✓	✓	✓	An instant high viscosity potato starch. Provides firmness and structure, prevents water and fat separation before and during cooking	
		NOVATION® 3300	1-3%	T	Tapioca starch	✓	✓	✓	A cook-up, high viscosity tapioca starch. Provides firmness and structure, prevents water and fat separation before and during cooking	
		NOVATION® 1600	1-3%	P	Potato starch	✓	✓	✓	A cook-up, high viscosity potato starch. Provides firmness and structure, prevents water and fat separation before and during cooking	
		PENBIND® 1000	1-3%	P	Food starch modified			✓	✓	A cook-up, high viscosity potato starch. Provides firmness and structure, prevents water and fat separation before and during cooking
		PENBIND® 1700	1-3%	WC	Food starch modified				✓	Provides high initial viscosity with moderate to low breakdown, provides moderate to high residual viscosity/short texture after retorting, provides exceptional stability throughout extended shelf life
		HEMOCRAFT® Create 330	1-3%	T	Tapioca flour	✓	✓	✓	✓	Provides moderate upfront viscosity and high viscosity, has slight gelling texture in the finished product
		NOVATION® 9330	1-3%	OT	Organic tapioca starch	✓	✓	✓	✓	Recommended for high temperature and shear food processing able to withstand the rigors of food processing and preparation without breaking down and losing viscosity and textural integrity
		THERMFLO® HV	1-3%	WC	Waxy maize				✓	A modified food starch for when exceptional tolerance to heat and shear is required. It is suited for many food systems including retorted foods canned foods
		FIRM-TEX®	1-3%	WC	Food starch modified				✓	Provides firmness and structure, excellent water and fat binding

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APPLICATION	KEY FUNCTIONALITY	RECOMMENDATION	USE LEVEL	BASE	LABEL	CLEAN LABEL	GRAIN-FREE GLUTEN-FREE	NON-GMO	ADDITIONAL FEATURES
<b>Canned loaf types</b>	Provides gelling, water and fat binding	ELASTIGEL® 1000J	1-3%	S	Food starch modified		✓	✓	Provides structure and gel, low hot viscosity, sets in the can to form loaf upon cooling
		PENPURE® 50	1-3%	T	Tapioca starch	✓	✓	✓	An instant moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture
		PENBIND® 1015	1-3%	P	Food starch modified		✓	✓	Gelatinizes during canning to produce firm, sliceable textures for “pate” style pet food
		PENBIND® 1700	1-3%	WC	Food starch modified			✓	Gelatinizes during canning to produce firm, sliceable textures for “pate” style pet food
		PENPURE® 10	1-3%	P	Potato starch	✓	✓	✓	Provides extremely high viscosity, water holding capacity and binding abilities
		HEMOCRAFT® Create 330	1-3%	T	Tapioca flour	✓	✓	✓	Provides structure and gel, low hot viscosity, set in the can to form loaf upon cooling
		HEMOCRAFT® Create 360	1-3%	T	Tapioca flour	✓	✓	✓	Provides structure and gel, low hot viscosity, set in the can to form loaf upon cooling
		THERMFLO® HV	1-3%	WC	Waxy maize			✓	A modified food starch for when exceptional tolerance to heat and shear is required. It is suited for many food systems including retorted foods canned foods
		NOVATION® 9330	1-3%	OT	Organic tapioca starch	✓	✓	✓	Recommended for high temperature and shear food processing. A clean label, organic starch that is able to withstand the rigors of food processing and preparation without breaking down and losing viscosity and textural integrity
		ADVANTA-GEL S	1-3%	S	Food starch modified		✓	✓	Provides structure and gel. An instant starch with low cold (mixing) viscosity and low hot viscosity, sets in the can to form loaf upon cooling
		PURITY® P 1304	2-5%	Pea	Pea starch	✓	✓	✓	Provides strong firmness and structure. Has low, hot viscosity, binds fat
		PURITY® P 1002	2-5%	Pea	Pea starch	✓	✓	✓	Provides firmness and structure. Has low, hot viscosity
		TICAXAN® Xanthan NON-GMO	0.05-0.35%	Xanthan gum	Xanthan gum	✓	✓	✓	Thickens, suspends and helps with moisture retention
		TICALOID® 825 Powder	0.1-2.75%	Carrageenan	Carrageenan	✓	✓	✓	Thickens, forms gels and helps with moisture retention
		Action Gum 8200 Powder	0.1-0.8%	Guar gum, Xanthan gum	Guar gum, xanthan gum	✓	✓	✓	Thickens, forms gels and helps with moisture retention
		TICALOID® 619	0.1-0.75%	Locust bean gum, xanthan gum	Locust bean gum, xanthan gum	✓	✓	✓	Thickens, forms gels and helps with moisture retention
		TICALOID® 8090 S	1.5-4.0%	P, Guar gum, xanthan gum	Potato starch modified, guar gum, xanthan gum		✓	✓	Thickens, forms gels and helps with moisture retention
		VITESSENCE® Pulse 1550 (pea protein concentrate)	2-10%	Pea	Pea protein	✓	✓	✓	Provides firmness, binds fat and boosts protein content
		VITESSENCE® Pulse 1853 (pea protein isolate)	2-10%	Pea	Pea protein	✓	✓	✓	Binds fat and boosts protein content
		HEMOCRAFT® Pulse 2101	2-5%	Lentil	Lentil flour	✓	✓	✓	Provides firmness and structure. Has low, hot viscosity, binds fat

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Semi-moist pet treats	Provides binding and structure	ULTRA-TEX® 4	5-15%	WC	Food starch modified			✓	An instant, moderate viscosity thickener. Improves machinability, retains moisture	
		NOVATION® 4300	5-15%	WC	Corn starch	✓		✓	An instant moderate viscosity clean label thickener. Improves machinability, retains moisture	
		NOVATION® 6600	5-15%	P	Potato starch	✓	✓	✓	An instant moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture	
		PENBIND® 1000	5-15%	P	Food starch modified			✓	A moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture	
		PENBIND® 1700	5-15%	C	Food starch modified				✓	A moderate viscosity thickener. Improves machinability, retains moisture
		HEMOCRAFT® Express 390	5-15%	T	Tapioca flour	✓	✓	✓	An instant moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture	
		NATIONAL™ FRIGEX	5-15%	T	Food starch modified			✓	✓	A moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture
		PENCLING® 320	5-15%	P	Food starch modified			✓	✓	A moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture
		PENPURE® 10	5-15%	P	Potato starch	✓	✓	✓	A moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture	
		PENPURE® 30	5-15%	R	Rice starch	✓		✓	A moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture	
		PENPURE® 37	5-15%	WR	Waxy rice starch	✓			✓	A moderate viscosity thickener. Improves machinability, retains moisture
		PENPURE® 50	5-15%	T	Tapioca starch	✓	✓	✓	A moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture	
		PENPURE® 60	5-15%	P	Potato extract	✓	✓	✓	A moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture	
		PENPURE® 65	2-7%	P	Potato extract	✓	✓	✓	An instant moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture	
		PENPURE® 80	5-15%	WP	Potato starch	✓	✓	✓	Improves machinability, provides good binding properties, retains moisture	
		PENPURE® UM	5-15%	P	Potato pregel	✓	✓	✓	An instant moderate-high viscosity clean label thickener. Improves machinability, provides good binding properties, retains moisture	
		PENPURE® WR	5-15%	WR	Waxy rice pregel	✓			✓	An instant, moderate viscosity thickener. Improves machinability, retains moisture
		PURITY® P 1304	2-5%	Pea	Pea starch	✓	✓	✓	Provides firmness and structure. Has low, hot viscosity, binds fat	
		VITESSENCE® Pulse 1550 (pea protein concentrate)	5-10%	Pea	Pea protein	✓	✓	✓	Provides water and fat binding, a soft structure and protein enrichment	
		VITESSENCE® Pulse 1853 (pea protein isolate)	5-10%	Pea	Pea protein	✓	✓	✓	Provides water and fat binding, a soft structure and protein enrichment	
		HEMOCRAFT® Pulse 2101	2-5%	Lentil	Lentil flour	✓	✓	✓	Provides firmness and structure. Has low, hot viscosity, binds fat	
HEMOCRAFT® Pulse 4101	2-5%	Chickpea	Chickpea flour	✓	✓	✓	Provides firmness and structure. Has low, hot viscosity, binds fat			
VITESSENCE® Pulse 1803 (organic)	2-10%	Pea	Pea protein	✓	✓	✓	Provides water and fat binding, a soft structure and protein enrichment for organic products			

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APPLICATION	KEY FUNCTIONALITY	RECOMMENDATION	USE LEVEL	BASE	LABEL	CLEAN LABEL	GRAIN-FREE GLUTEN-FREE	NON-GMO	ADDITIONAL FEATURES	
<b>Dry pet food and extruded treats</b>	Provides structure and modifies chew	HYLON® V	5-10%	HC	Corn starch	✓		✓	Provides hard and short structure, maintains shape, improves extrusion efficiency	
		CRISP FILM®	5-10%	HC	Food starch modified			✓	Provides hard and flexible structure, maintains shape, improves extrusion efficiency	
		VERSAFIBE™ 1490	5-10%	P	Food starch modified		✓	✓	Provides significant amount of TDF (Total Dietary fiber) in extruded products	
		PENPURE® 10	5-15%	P	Potato starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time	
		PENPURE® 30	5-15%	R	Rice starch	✓		✓	Provides structure, increases chew time, retains moisture	
		PENPURE® 37	5-15%	WR	Waxy rice starch	✓		✓	Provides soft structure, improves stability, retains moisture	
		PENPURE® 50	5-15%	T	Tapioca starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture	
		PENPURE® 60	5-15%	P	Potato extract	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture	
		PENPURE® 65	2-7%	P	Potato extract	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture, has high instant viscosity	
		PENPURE® 80	5-15%	WP	Potato starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture	
		PENPURE® UM	2-7%	P	Potato pregel	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture	
		PENPURE® WR	2-7%	WR	Waxy rice pregel	✓		✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture, high viscosity	
		HEMECRAFT® Express 390	5-10%	T	Tapioca flour	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture, high viscosity	
		HEMECRAFT® Create 835	5-10%	R	Rice flour	✓		✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture, high viscosity	
		HEMECRAFT® Create GF 10	5-10% or more	R, T	Rice flour, tapioca flour	✓		✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture, high viscosity	
		HEMECRAFT® Create GF 20	5-10% or more	T, R	Tapioca flour, rice flour	✓		✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture, high viscosity	
		PENCLING® 320	5-15%	P	Food starch modified			✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture, high viscosity
		PENBIND® 800	5-15%	P	Food starch modified			✓	✓	Provides structure and strength, reduces breakage, increases chew time
		PENBIND® 1180	5-15%	P	Food starch modified			✓	✓	Provides structure and strength, reduces breakage, provides flexible/pliable texture, binds water
		ELASTIGEL® 1000J	5-10%	S	Food starch modified			✓	✓	Provides structure and strength, reduces breakage, increases chew time
		PURITY® P 1304	2-5%	Pea	Pea starch	✓	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time
		VITESSENCE® Pulse 1556 (pellet form)	5-10%	Pea	Pea protein concentrate	✓	✓	✓	✓	Modifies texture, reduces viscosity, lowers product density, enhances product nutrition value
		VITESSENCE® Pulse 1550 (pea protein concentrate)	5-10%	Pea	Pea protein	✓	✓	✓	✓	Provides protein enrichment and is a binding agent for consistent and uniform structure and shape
		VITESSENCE® Pulse 1853 (pea protein isolate)	5-10%	Pea	Pea protein	✓	✓	✓	✓	Provides protein enrichment and is a binding agent for consistent and uniform structure and shape
		HEMECRAFT® Pulse 2101	2-5%	Lentil	Lentil flour	✓	✓	✓	✓	Provides firmness and structure. Has low, hot viscosity, binds fat
HEMECRAFT® Pulse 4101	2-5%	Chickpea	Chickpea flour	✓	✓	✓	✓	Provides firmness and structure. Has low, hot viscosity, binds fat		

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<b>Dry gravy mixes</b>	Thickens and provides texture	NOVATION® 5600	2-3% in final product	WC	Corn starch			✓	Easily dispersible, no heating required/cold water thickening
		ULTRA-SPERSE® 2000	2-3% in final product	WC	Food starch modified			✓	Easily dispersible, no heating required/cold water thickening
		ULTRA-SPERSE® 3	2-3% in final product	T	Food starch modified		✓	✓	Easily dispersible, no heating required/cold water thickening. Based on tapioca starch
<b>Extruded fish pellets</b>	Provides expansion and structure	NOVATION® 2700	5-15%	WC	Corn starch	✓		✓	A cook-up clean label starch. Provides moderate to high viscosity
		HEMECRAFT® Express 390	5-10%	T	Tapioca flour	✓	✓	✓	Provides moderate to high viscosity
		PURITY® W	5-15%	WC	Food starch modified			✓	A cook-up starch. Provides moderate viscosity
	Controls expansion and aids in oil retention	FIRM-TEX®	5-15%	WC	Food starch modified			✓	A cook-up starch. Provides high viscosity
		NOVATION® 4600	5-15%	WC	Corn starch	✓		✓	A clean label, instant starch. Provides moderate viscosity
		ULTRA-TEX® 4	5-15%	WC	Food starch modified			✓	An instant starch. Provides moderate viscosity
		ULTRA-TEX® 2000	5-15%	WC	Food starch modified			✓	An instant starch. Provides high viscosity
<b>Dog and cat food</b>	Prebiotic and digestive health: Increased production of short-chain fatty acids in large intestine	FORTIFEED® P95 (powder)/ L95 (liquid)	Dogs: 0.5-1.5% of formula Cats: 0.5-1% of formula	scFOS	Fructooligosaccharides	✓	✓	✓	Scientifically shown to support digestive, immune and reduced fecal odor claims
<b>Equine</b>	Promotes prebiotic and digestive health	FORTIFEED® P95 (powder)/ L95 (liquid)	High stress (racing) 20g-30g/day Senior & brood mares: 12g-15g/day Foals: 8g-10g/day	scFOS	Fructooligosaccharides	✓	✓	✓	Scientifically shown to support digestive, immune and reduced fecal odor claims
<b>Aquaculture - fish/shrimp</b>	Promotes growth	FORTIFEED® P95 (powder)/ L95 (liquid)	0.02% to 0.05% depending on application	scFOS	Fructooligosaccharides	✓	✓	✓	Helps control nitrogen waste, enhances resistance to pathogen such as Vibrio, lessens black spots, increases immune/disease response by optimizing gut microflora, improves shrimp performance and helps increase production levels
<b>Broilers, layers &amp; turkeys</b>	Promotes growth	FORTIFEED® P95 (powder)/ L95 (liquid)	Chicks: 0.06% to 0.15% Broilers: 0.05%-0.8% Layers: 0.05%-0.8% Turkey: 0.4%-2%*	scFOS	Fructooligosaccharides	✓	✓	✓	Improves microflora balance by selectively stimulating beneficial bacteria and excluding pathogens like salmonella, improves cecal SCFA in turkeys, reducing the quantity of dirty eggs due to fewer cecal droppings, helps reduce salmonella contamination risk due to microflora modification
<b>Cattle</b>	Promotes growth	FORTIFEED® P95 (powder)/ L95 (liquid)	5g - 7g/day in calves or cattle	scFOS	Fructooligosaccharides	✓	✓	✓	Improves digestive health by altering intestinal conditions such as pH, fatty acids, microbial content and activity, helps provide positive impact on feed efficiency, increases growth performance and average daily weight gain (ADG), increases volatile fatty acid production, increases microbial activity, balances microbiota by reducing pathogens and increasing beneficial bacteria

C: Corn, HC: High amylose corn, R: Rice, S: Sago, T: Tapioca, OT: Organic Tapioca, WC: Waxy corn, P: Potato, WP: Waxy potato, WR: Waxy rice, R: Rice, PEA : Pea, SCFOS : Short-Chain Fructooligosaccharides

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<b>Swine</b>	Promotes growth	FORTIFEED® P95 (powder)/ L95 (liquid)	Piglet: 0.15% to 0.25% Weaned pigs: 0.18% to 0.28% Sows: 2g/day"	scFOS	Fructooligosaccharides	✓	✓	✓	Increases growth performance and average daily weight gain (ADG), helps support intestinal lining and higher beneficial bacteria counts, increases bacterial fermentation	
<b>Pet biscuits</b>	Provides, texture, binding, strength and reduces breakage	PENPURE® 10	5-15%	P	Potato starch	✓	✓	✓	Provides structure and strength, reduces breakage, creates crisp texture	
		PENPURE® 30	5-15%	R	Rice starch	✓		✓	Provides structure and strength, reduces breakage, creates crisp texture	
		PENPURE® 37	5-15%	WR	Waxy rice starch	✓		✓	Provides structure and strength, reduces breakage	
		PENPURE® 85D	2-8%	WP	Potato starch	✓	✓	✓	Provides structure and strength, reduces breakage in gluten-free products, replaces gelatin	
		PENPURE® WR	2-8%	WR	Rice starch	✓		✓	Provides structure and strength, reduces breakage in gluten-free products	
		HEMOCRAFT® Express 390	5-15%	T	Tapioca flour	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture	
		HEMOCRAFT® Create GF 10	5-15%	R, T	Rice flour, tapioca flour	✓		✓	Replaces wheat flour, provides structure and strength, reduces breakage, increases chew time, retains moisture	
		HEMOCRAFT® Create GF 20	5-15%	T, R	Tapioca flour, rice flour	✓		✓	Replaces wheat flour, provides structure and strength, reduces breakage, increases chew time, retains moisture	
		PENBIND® 800	10-20%	P	Food starch modified			✓	✓	Provides structure and strength, reduces breakage
		GuarNT® USA 8/22	0.1-1.0%	Guar gum	Guar gum	✓	✓	✓	Provides structure and hardness	
		GuarNT® USA Flavor Free 5000	0.1-1.0%	Guar gum	Guar gum	✓	✓	✓	Provides structure and hardness. Is flavorless and odorless	
		Pre-Hydrated® GuarNT® USA 8/22	0.1-1.0%	Guar gum	Guar gum	✓	✓	✓	Provides structure and hardness. Exhibits fast hydration	
		TICACEL 100 Cellulose Powder	1-6%	Cellulose powder	Cellulose powder	✓	✓	✓	Provides structure and hardness	
		TICAXAN® Xanthan Non-GMO	0.05-0.35%	Xanthan gum	Xanthan gum	✓	✓	✓	Provides structure and hardness	
		PURITY® P 1304	5-10%	Pea	Pea starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time	
		VITESSENCE® Pulse 1550 (pea protein concentrate)	5-10%	Pea	Pea protein	✓	✓	✓	Provides structure and is a protein alternative to animal by-product proteins	
		VITESSENCE® Pulse 1853 (pea protein isolate)	5-10%	Pea	Pea protein	✓	✓	✓	Provides structure and is a protein alternative to animal by-product proteins	
		HEMOCRAFT® Pulse 2101	2-5%	Lentil	Lentil flour	✓	✓	✓	Provides firmness and structure. Has low, hot viscosity, binds fat	
HEMOCRAFT® Pulse 4101	5-10%	Chickpea	Chickpea flour	✓	✓	✓	Provides firmness and structure. Has low, hot viscosity, binds fat			



# PET FOOD, TREATS AND ANIMAL FEED

Non-GMO starches, flours and gums for canned, semi-moist and extruded dry pet food/treats; non-GMO prebiotic fiber for pets and livestock

APPLICATION	KEY FUNCTIONALITY	RECOMMENDATION	USE LEVEL	BASE	LABEL	CLEAN LABEL	GRAIN-FREE GLUTEN-FREE	NON-GMO	ADDITIONAL FEATURES
<b>Injection molded treats</b>	Provides texture and increases chew time	PENPURE® 10	10-50%	P	Potato starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PENPURE® 30	10-50%	R	Rice starch	✓		✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PENPURE® 37	10-50%	WR	Waxy rice starch	✓		✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PENBIND® 800	10-20%	P	Food starch modified		✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PENPURE® 50	10-50%	T	Tapioca starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PENPURE® 60	10-50%	P	Potato extract	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PENPURE® 65	10-50%	P	Potato extract	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PENPURE® 80	10-50%	WP	Potato starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PENPURE® UM	10-50%	P	Potato starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PENPURE® WR	10-20%	WR	Rice starch	✓		✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PENPURE® 85D	10-20%	WP	Potato starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture, enables gelatin replacement
		PENCLING® 320	10-30%	P	Food starch modified		✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		NOVATION® 6600	5-15%	P	Potato starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		HEMECRAFT® Express 390	5-20%	T	Tapioca flour	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		PURITY® P 1304	10-50%	Pea	Pea starch	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time, retains moisture
		VITESSENCE® Pulse 1550	5-20%	Pea	Pea protein concentrate	✓	✓	✓	Modifies texture, reduces viscosity, lowers product density, enhances product nutrition value
		VITESSENCE® Pulse 1556 (pellet form)	5-20%	Pea	Pea protein concentrate	✓	✓	✓	Modifies texture, reduces viscosity, lowers product density enhances product nutrition value
		HEMECRAFT® Pulse 2101	10-30%	Lentil	Lentil flour	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time
HEMECRAFT® Pulse 4101	10-30%	Chickpea	Chickpea flour	✓	✓	✓	Provides structure and strength, reduces breakage, increases chew time		



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Delivering solutions.™

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