

TECHNICAL DATA SHEET

Process Specification & Product Parameters

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MANUFACTURING FACILITY

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VALIDATION AUTHORITY

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1. PRODUCT OVERVIEW & GENERAL SPECIFICATIONS

PARAMETER	SPECIFICATION DETAILS
Product Name	Commercial Preservative-Free Wet Dog Food (MDM Formulation)
Product Description	Thermally sterilized, commercially sterile wet dog food paste/paté formulated with Mechanically Deboned Meat (MDM), vegetable starch matrix, and essential lipid stabilizers.
Physical Appearance	Uniform, firm paste/paté texture; light reddish-brown hue; free from oil separation or water synaeresis.
Flavor & Aroma	Natural cooked meat profile; completely free from rancid, scorched, or off-odors.
Target Species	Domestic Canines (Healthy Adults, Seniors, Working Breeds).
Packaging Format	High-barrier multi-layer flexible retort pouches (PET / AL / PA / CPP).
Shelf Life & Storage	24 Months at ambient conditions (15°C to 35°C). 100% Preservative-Free (Zero BHA, BHT, Ethoxyquin, or Sorbates).

2. RAW MATERIAL & FORMULATION SPECIFICATIONS

2.1 Recipe Matrix Breakdown

COMPONENT CATEGORY	INCLUSION % (W/W)	TARGET FUNCTIONALITY
MDM Meat Base	50.0% – 65.0%	Primary protein engine, essential amino acids, myofibrillar binding.
Carb & Dietary Fiber Matrix	15.0% – 25.0%	Sweet potato, pumpkin, rice; gelatinization & digestive motility.
Functional Lipid Blend	2.0% – 4.0%	Salmon oil & Coconut oil; Omega-3/6 for dermal/coat health.
Hydrocolloids & Binders	1.5% – 3.0%	Guar, xanthan, modified tapioca; thermal viscosity control.
Thermostable Micronutrients	1.0% – 2.0%	Chelated Minerals (Zn, Fe, Mn), Iodine, Selenium, Vitamin B-Complex.
Calcium Balancer	0.5% – 1.2%	Calcium carbonate / eggshell powder; offsets high MDM phosphorus.

2.2 Proximate Chemical Analysis (As-Fed vs. Dry Matter)

NUTRIENT PARAMETER	AS-FED TARGET (%)	DRY MATTER (DM) (%)	TESTING STANDARD / METHOD

3. PROCESS ENGINEERING & THERMAL STERILIZATION

3.1 Emulsification & Filling Parameters

- **Pre-Grind Temperature (MDM):** -2°C to 2°C (Maintains protein structure during shear).
- **Emulsification Speed:** High-shear micro-cut milling at 2,800 – 3,200 RPM.
- **Target Filling Temperature:** 60°C – 68°C (Hot fill to reduce initial air entrapped within matrix).
- **Vacuum Flushing Level:** -0.85 bar to -0.92 bar prior to heat sealing.
- **Headspace Clearance:** 8.0 mm – 10.0 mm uniform gas headspace.
- **Hermetic Seal Width:** ≥ 10.0 mm continuous heat seal with ribbed impression.

3.2 Retort Cycle Schedule & Kinetics

RETORT CYCLE PHASE	OPERATIONAL PARAMETER	CONTROL LIMITS
System Type	Air Overpressure Water Spray	Saturated Overpressure Steam-Air
Processing Temp (T_p)	121.1°C (250.0°F)	± 0.5°C Control Band
Retort Pressure	2.2 bar – 2.4 bar	Overpressure air counter-balancing
Target Sterilization Value	$F_0 = 4.5$ to 6.0 minutes	Cold Spot Core Validation
Thermal Cooling Phase	Pressure Cooling	Pouch core temperature < 38°C

Thermal Sterilization Lethality Formula (F_0 Calculation)

$$F_0 = \int_0^t 10^{(T(t) - 121.1) / z} dt$$

Where: $T(t)$ = Core temperature at cold spot at time t ; $z = 10.0^\circ\text{C}$ (thermal death time slope factor for *Clostridium botulinum*). Minimum required lethality threshold is $F_0 \geq 3.0$ minutes (12D reduction). Pot & Ladle enforces a safety operational target of $F_0 = 4.5 - 6.0$ minutes.

4. QUALITY ASSURANCE, TESTING & COMPLIANCE

4.1 Micro Stability & Packaging Integrity

QUALITY TEST PARAMETER	ACCEPTANCE CRITERIA	TESTING STANDARD METHOD
Commercial Sterility (37°C / 14 Days)	No swelling, deformation, or pH drop (>0.2 units)	IS 2162 / ISO 4833
Commercial Sterility (55°C / 14 Days)	Zero flat-sour thermophilic survival	IS 2162 Thermophilic Incubation
Burst Pressure Strength	≥ 2.5 bar (36.2 PSI)	ASTM F2054
Seal Peel Strength	≥ 35 N / 15 mm width	ASTM F88
Heavy Metal Limits (BIS IS 11968)	Pb ≤ 1.0 mg/kg, As ≤ 0.5 mg/kg, Cd ≤ 0.5 mg/kg	ICP-MS Analysis

5. STORAGE & REGULATORY COMPLIANCE

STORAGE & HANDLING

REGULATORY FRAMEWORK