Tuna Canning at IOT

Indian Ocean Tuna Ltd, Victoria, Seychelles

Tuna Canning at IOT

Indian Ocean Tuna Ltd, Victoria, Seychelles

Overview

- **Location:** Victoria, Seychelles
- **Capacity:** 335 tons/day round fish processing
- **Production:** 1.5-2 million cans per day
- **Cold Storage:** 12,000 tons capacity
- **Employment:** 1,800 workers (largest private employer)
- **Export Markets:** 95% to EU (France, Italy, UK)

> **Note**
>
> Thai Union's 3rd largest factory globally - Two distinct processing streams

---

Processing Routes

Raw Pack (RP)

- Large tuna (big size fish)
- Raw filling directly into cans
- Single cooking step (in-can only)
- **Recovery: 62%**
- Juicier texture, natural oils
- Faster processing

Pre-Cook (PC)

- Smaller tuna
- Pre-cooked then filled
- Double cooking process
- **Recovery: 45%**
- Cleaner taste

- Premium portion control

> ⚠ Warning
>
> Recovery rate difference: 17 percentage points (38% more yield for raw pack!)

Step 1: Cold Storage

Three Storage Facilities

Location	Type	Capacity	Shifts
IOT Main	Frozen raw tuna	5,000 tons	3
CCCS	Frozen raw tuna	4,500 tons	1
Containers	Frozen raw tuna	2,500 tons	1

Total capacity: 12,000 tons

- Tuna arrives frozen from Port Victoria
- Maintained at optimal temperature
- Species: Yellowfin and Skipjack

Step 2: Sizing & Sorting

Three Sorting Lines

Line	Workers	Shifts	Capacity (tons/day)
Table 1	8 sorters	3	1,958
Table 2	7 sorters	2	1,142
CCCS	18 sorters	1	979

Total capacity: 4,080 tons/day
Efficiency: 85%

> 💡 Tip
>
> Size determines processing route: Large fish → RP, Smaller fish → PC

Raw Pack Process: Overview

Complete Flow (7 Steps)

1. Thawing in temperature-controlled tanks

2. Sizing/cutting raw fish
3. Raw filling directly into cans
4. Adding liquid (oil/brine/water)
5. Seaming for hermetic seal
6. Retort sterilization (cooking in-can)
7. Cooling, labeling, packing

> **Note**
>
> Fish cooks in its own juices during sterilization - preserves natural flavor

---

RP Step 3: Thawing

Thawing Specifications

- **160 tanks** with 204 scows per bay
- Average weight per scow: 0.70 kg
- **Thaw time:** 14 hours
- **Efficiency:** 85%
- **Daily capacity:** 163.2 tons

> **Warning**
>
> ⚠ CRITICAL BOTTLENECK for Raw Pack production!

RP Step 9: Raw Pack Canning

Filling Equipment

- **Marleen pump fillers**
- **CFT seamers**
- Operating hours: 20 hours/day
- Efficiency: 75%

Can Size	Speed (cans/min)	Daily Production	Fill Weight	Round Fish Needed
80g	300	270,000	0.06 kg	27.4 tons
132g	350	315,000	0.10 kg	52.8 tons
160g	350	315,000	0.13 kg	63.5 tons
190g	350	315,000	0.16 kg	83.3 tons
265g	250	225,000	0.21 kg	74.8 tons
400g	200	180,000	0.32 kg	91.7 tons

Raw Pack: Pros & Cons

✅ Advantages

- **62% recovery rate** (highest yield)
- **Natural flavor** preserved
- **Juicier texture**
- **Faster processing** (fewer steps)
- **Lower labor costs**
- Retains fish oils naturally

⚠️ Considerations

- More liquid exudate in can
- Stronger flavor profile
- Less uniform portions
- **Bottleneck:** Limited by thawing capacity (163 tons/day)

Pre-Cook Process: Overview

Complete Flow (10 Steps)

1. Sizing (no thawing - frozen fish used)
2. **Racking** - 245 kg per rack
3. **Pre-cooking** in steam cookers
4. **Extractor cooling**
5. **Further cooling** chambers
6. **Cleaning** - manual removal of skin/bones
7. Filling cooked meat into cans
8. Adding liquid medium
9. Seaming
10. Final retort sterilization

PC Step 4: Racking

Manual Racking Process

- Weight per rack: **245 kg/rack**
- **8 racker workers**, 3 shifts
- Target: 7 racks per hour per worker
- **Efficiency:** 85%
- **Daily capacity:** 251.9 tons

Fish loaded onto metal racks for steam pressure cooking

PC Step 5: Pre-Cooking

Seven Steam Pressure Cookers

Cooker	Racks	Kg/Rack	Cook Time	Cooks/Day	Efficiency	Tons/Day
1-7	34	245	4 hours	6	90%	44.98 each

Total capacity: 314.9 tons/day

> **Note**
>
> Pre-cooking removes excess oils and prepares fish for easy skin/bone removal

---

PC Step 6 & 7: Cooling

Two-Stage Cooling Process

Extractor Chambers (Air flow cooling) - 4 chambers: 32-38 racks each - Holding time: 2 hours - Capacity: 429.2 tons/day

Cooling Chambers (Extended cooling) - 4 chambers: 36-64 racks each - Holding time: 3 hours - Capacity: 446.9 tons/day

---

PC Step 8: Cleaning

Nine Cleaning Tables - Most Labor Intensive Step

Table	Operators	Kg/Cleaner/Hr	Hours/Day	Capacity (tons/day)
Tables 1-7	26 each	53	21	28.9 each
Table 8	18	53	21	20.0
Table 9	25	53	21	27.8

Total capacity: 251.4 tons/day
Total workers: ~200 people

> **Warning**
>
> ⚠️ CRITICAL BOTTLENECK for Pre-Cook production!

PC Step 10: Pre-Cook Canning

Nine Production Lines

Line	Product Type	Speed (cans/min)	Daily Cans	Recovery	Round Fish
1	Chunk oil	500	450,000	45%	20 tons
1	Chunk water	400	360,000	45%	16 tons
2-7	Chunk oil	200	180,000	45%	15.8 tons
2-7	Steak water	180	162,000	45%	14.3 tons
9	Steak oil	190	171,000	45%	16.5 tons

Products: Chunk, Flakes, Steak (in oil, water, or brine)
Can size: Typically 170-210g

Pre-Cook: Pros & Cons

✅ Advantages

- **Cleaner taste** (less strong flavor)
- **Precise portion control**
- **Premium appearance**
- **Better for chunk/flake products**
- Easier to remove all bones/skin
- More uniform product

⚠️ Considerations

- **45% recovery** (17% less than RP)
- More labor intensive (~200 cleaners)
- Higher processing costs
- Longer processing time
- Must add oils back
- **Bottleneck:** Cleaning tables limit to 251 tons/day

Step 11: Sterilization (Retort)

Critical Food Safety Step

Product	Can Size	Temp	Time	Cans/Basket	Cooks/Day
160g RP	1/5	121°C	41 min	1,200	6
190g RP	1/4	121°C	48 min	1,000	6
265g RP	1/3	121°C	55 min	600	6
400g RP	1/2	121°C	80 min	400	6

Product	Can Size	Temp	Time	Cans/Basket	Cooks/Day
170g PC	1/4	117°C	65 min	1,000	6
210g PC	1/3	117°C	72 min	600	6

> ! Important
>
> Eliminates *Clostridium botulinum* and ensures shelf stability. Note: PC uses lower temp (117°C) vs RP (121°C)

Step 12: Labeling & Packaging

Ten Packaging Lines (83% efficiency)
Line Types:

- **Lines 1, 2A/2B:** Clustering, shrinking, stickering
- **Line 3:** Manual and automated processes (traying, hood, casing)
- **Lines 4-9:** Specialized multi-pack configurations
- **Line 10:** Bulk packing (9,600 cans/pallet)

Pack configurations: 2-48 cans per carton
Daily capacity: Varies by line and product (400-850 cases/hour)

Labeling Examples

Line	Product	Process	Cases/Hour	Cases/Day
1	80g x2	Clustering + shrinking	400	5,976
3	132g x24	Traying + shrinking	600	8,964
6	145g x48	Auto-cartoning	357	5,333
8	265g x24	Traying + shrinking	765	11,429

Processes include: sleeving, capping, traying, shrink-wrapping, cartoning, and stickering

---

Step 13: Containerization

Export Preparation
Most Common Container Loads:

- 160g x48: 19.78% of containers (2,160 cases/container)
- 132g x48: 11.74% of containers (2,688 cases/container)
- 80g x96: 7.00% of containers (2,400 cases/container)

Destinations:

- France (Petit Navire)
- UK (John West)
- Italy (Mareblu)

> **Note**
>
> Temperature-controlled containers ensure quality during shipping

---

Equipment: Fillers & Seamers

Raw Pack Line

- **Marleen pump fillers** handle raw fish pieces
- Filling rate: 200-350 cans/min
- Seaming occurs **before cooking**
- Equipment tolerates raw product variations
- Fill weights: 0.06-0.32 kg per can

Pre-Cook Line

- Multiple filler systems across 9 lines
- Filling rate: 180-500 cans/min (Line 1 fastest)
- Seaming occurs **after filling cooked meat**
- Greater precision and consistency
- Fill weights: 0.05-0.10 kg per can

> **Tip**
>
> Seamer function identical in both—creating hermetic vacuum seals

---

Comparison: RP vs PC

Factor	Raw Pack (RP)	Pre-Cook (PC)
Fish Size	Large tuna (big size)	Smaller tuna
Cooking Steps	1 (in-can only)	2 (pre-cook + retort)
Recovery	62%	45%
Texture	Juicier, firmer	Tender, flaky
Flavor	Stronger, natural	Milder, cleaner
Labor	Lower	Higher (200+ cleaners)

Factor	Raw Pack (RP)	Pre-Cook (PC)
Speed	200-350 cpm	180-500 cpm
Processing Time	6-7 steps	10 steps
Bottleneck	Thawing (163 t/d)	Cleaning (251 t/d)
Product Type	Various sizes	Chunk/Flake/Steak

Bottleneck Analysis

Raw Pack Chain

1. Sorting: 4,080 t/d ✓
2. **Thawing: 163 t/d** ⚠️
3. Filling: ~92 t/d ✓
4. Sterilization: Variable ✓

CRITICAL BOTTLENECK:
Thawing limits RP to 163 tons/day

Pre-Cook Chain

1. Sorting: 4,080 t/d ✓
2. Racking: 252 t/d ⚠️
3. Pre-cooking: 315 t/d ✓
4. Cooling: 447 t/d ✓
5. **Cleaning: 251 t/d** ⚠️
6. Filling: ~16-20 t/d/line ✓

CRITICAL BOTTLENECK:
Cleaning tables limit PC to 251 tons/day

Capacity Utilization Analysis

Process	Bottleneck Step	Capacity	Impact
Raw Pack	Thawing	163 tons/day	Maximum RP throughput
Pre-Cook	Cleaning	251 tons/day	Maximum PC throughput
Combined Theoretical	Both	414 tons/day	If running at max
Actual Factory	Mixed	335 tons/day	81% utilization

> **i** Note
>
> Factory operates below theoretical max—likely due to production scheduling, maintenance, and demand mix

Recommendations to Increase Capacity

To Expand Raw Pack (Currently 163 t/d max)

1. **Add thawing tanks** - primary constraint
2. Increase thawing bay capacity
3. Reduce thaw time through optimization

To Expand Pre-Cook (Currently 251 t/d max)

1. **Add cleaning tables** - primary constraint
2. **Automate cleaning process** where possible
3. Improve cleaner productivity (currently 53 kg/hr)
4. Extend cleaning operating hours beyond 21 hrs/day

Quality Control & Food Safety

Critical Control Points (CCPs)

Throughout Process: - Temperature monitoring at all stages - Metal detection before packing - Seal integrity testing (vacuum checks) - Retort process validation - Daily quality cuttings

Quality Metrics Checked: - Vacuum, appearance, smell - Texture, style of pack - Cleanliness, flavor - Fill weight accuracy

---

Certifications & Standards

Food Safety

- HACCP certified
- ISO 22000
- EU/UK export approval

Sustainability

- Dolphin-safe certification
- MSC Chain of Custody
- SeaChange® 2030 commitments

Quality

- Daily sampling and testing
- Third-party audits
- Customer specifications met

Sustainability & By-Products

Resource Recovery

- **Heads, frames, guts:** Converted to fishmeal and fish oil
- **Wastewater:** On-site treatment plant (new $9.9M facility)
- **Energy:** Solar panels covering 30% of plant (8% of energy needs)

SeaChange® 2030 Goals

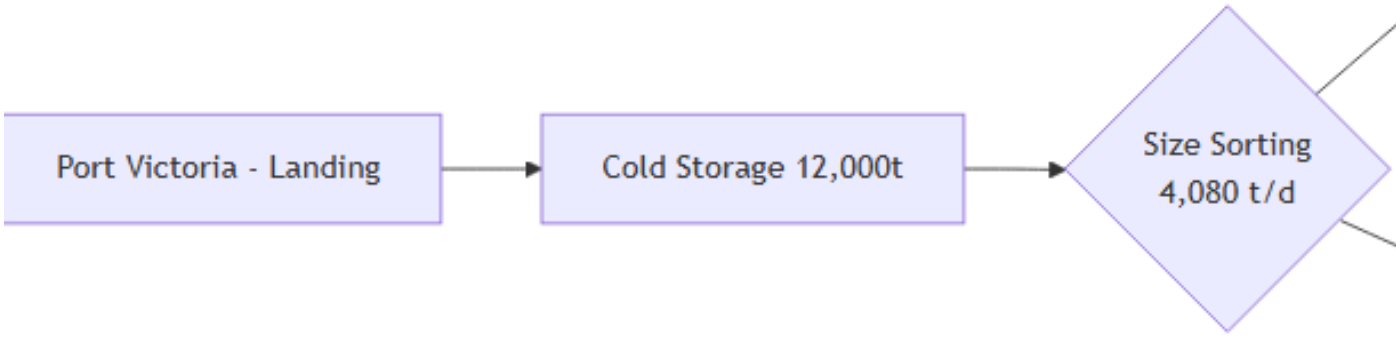
- Zero water discharge by 2030
- Zero waste to landfill by 2030
- Zero food loss by 2030
- 42% GHG emissions reduction by 2030
- Net zero by 2050

Environmental Initiatives

- **Water recycling systems** operational
- **Solar energy integration** (30% roof coverage planned)
- **Sustainable fishing partnerships** (ISSF, SeaBOS member)
- **Waste minimization programs**
- **Cold storage efficiency improvements**
- **50% female leadership target** (achieved)

> Tip
>
> IOT ranked #1 in food industry on Dow Jones Sustainability Index 2022

Complete Process Flow



Production Statistics

Daily Capacity Breakdown

- **Total Stated Capacity:** 335 tons/day round fish
- **Theoretical Maximum:** 414 tons/day (if both at max)
- **Utilization Rate:** 81%

Possible Production Mix

- **Scenario 1:** ~140 tons RP + ~195 tons PC
- **Scenario 2:** Alternating production days
- **Scenario 3:** Mixed with maintenance windows

Annual Output

- **~100,000 tons** processed annually
- **1.5-2 million cans** produced daily
- **1,800 employees** across all operations

Economic Impact

IOT's Role in Seychelles

- **95%** of Seychelles manufacturing exports
- **88%** of Seychelles' exports to EU
- **Largest private employer** (1,800 workers)
- Second-largest industry after tourism

- Critical during COVID-19 (overtook tourism temporarily)
- **€50M+** invested in past 5 years
- Additional **€10M** investment planned

Ownership & Brands

Ownership Structure

- **Thai Union Group:** 60% (Thai Union Europe subsidiary)
- **Seychelles Government:** 40% (via SSI)

Product Brands

- **Petit Navire** (France)
- **John West** (UK)
- **Mareblu** (Europe)
- Various private label brands

Summary - Key Takeaways

1. **Two distinct methods:** Raw Pack (62% recovery) vs Pre-Cook (45% recovery)
2. **Raw Pack:** Single cooking, juicier, faster—bottlenecked by thawing (163 t/d)
3. **Pre-Cook:** Double cooking, cleaner taste—bottlenecked by cleaning (251 t/d)
4. **Factory operates at 335 t/d** (81% of theoretical 414 t/d capacity)
5. **1.5-2 million cans/day** serving major European brands
6. **Strong sustainability focus** with SeaChange® 2030 commitments
7. **Critical economic contributor** to Seychelles economy

Future Opportunities

Capacity Expansion

- Add thawing capacity for Raw Pack
- Automate or expand cleaning for Pre-Cook
- Optimize production scheduling

Sustainability

- Complete solar panel installation
- Achieve zero waste goals by 2030
- Carbon neutrality by 2050

Market Development

- New product formats
- Additional export markets
- Value-added products

Thank You

Questions?
Indian Ocean Tuna Limited
Fishing Port, Victoria, Mahé, Seychelles
Tel: +248 4282500

Parent Company: Thai Union Group PCL
Website: www.thaiunion.com

> **i** Note
>
> Part of Thai Union's global network - World's leading seafood company

---