

Shipping, taxes and customs

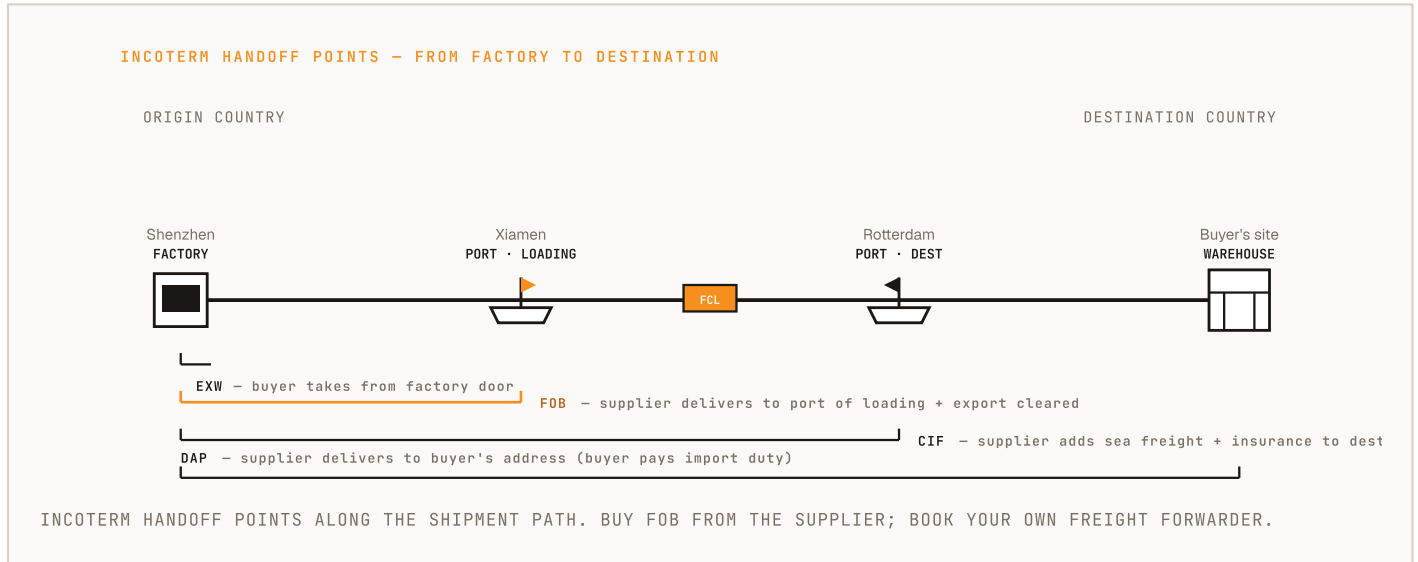
Reference for moving hardware from an Asian factory to a US or EU destination — Incoterms, freight modes, customs value, duty calculation, HS codes, free-trade preferences, and the document set.

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ABSTRACT

Once the factory is paid and cartons are palletised, the project shifts from engineering to logistics: Incoterms, HS codes, bills of lading, customs bonds, freight rates, broker hand-off. Individually these are not difficult; collectively, small mistakes compound into demurrage, seized cartons, or duty assessments above expected landed cost.

This document covers Incoterms (Section 1), sea vs. air freight economics (Section 2), customs value and duty calculation in the US, EU, and UK (Section 3), HS code classification (Section 4), free-trade preferences (Section 5), and the document set for pre-arrival clearance (Section 6).



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1. Incoterms 2020

Incoterms define which party is responsible for each leg of the shipment. ICC publishes the current version (Incoterms 2020). Cite the version in contracts: "FOB Shanghai (Incoterms 2020)".

1.1 The 11 Incoterms 2020 in scope

CODE	RISK TRANSFER	FREIGHT	INSURANCE	IMPORT CLEARANCE	BEST FOR
EXW	Factory door	Buyer	Buyer	Buyer	Strong buyer logistics
FCA	Carrier at named place	Buyer	Buyer	Buyer	First-time importers
FAS	Alongside ship	Buyer	Buyer	Buyer	Bulk / heavy cargo
FOB	On board ship	Buyer	Buyer	Buyer	Most first imports
CFR	Port of destination	Seller	Buyer	Buyer	Hands-off buyer
CIF	Port of destination	Seller	Seller (min)	Buyer	Hands-off + insured
CPT	Place of destination	Seller	Buyer	Buyer	Multi-modal
CIP	Place of destination	Seller	Seller (110 %)	Buyer	Multi-modal + insured
DAP	Buyer's address	Seller	Seller	Buyer	Experienced supplier
DPU	Unloaded at named place	Seller (incl. unload)	Seller	Buyer	Rare; specific cases
DDP	Buyer's address	Seller	Seller	Seller	Very experienced supplier

1.2 Recommended pattern for first import

- **Buy FOB from the supplier**
Supplier delivers to port of loading + export cleared.
- **Book your own forwarder for sea freight**
Visibility on cost, timing, and document flow.
- **Use a customs broker in the destination country**
Handles import clearance.
- **Avoid DDP from a new supplier**
Forces them to commit to duties and broker quality they likely don't actually understand.

WHY FOB BEATS EXW FOR NEW IMPORTERS

With EXW, the buyer is responsible for export clearance at origin. This means: - Permits and export licenses (where required) - Pickup from the factory door - Handling at the origin port - Coordination across language, time zone, and unfamiliar customs
The supplier already does this for every shipment they ship; they're cheaper and faster. FOB adds maybe \$100–500 to the quote vs. EXW. It's worth it for the first 5–10 shipments.

2. Sea vs. air freight

<250 kg

AIR FREIGHT

dense, high-value cargo

250+ kg

SEA FREIGHT

typical mass production

<2 m³

LCL

small first batch

2.1 Sea freight

– FCL (Full Container Load)

Above ~15 m³. Cheaper per m³.

– LCL (Less than Container Load)

Below 15 m³. Slower (deconsolidation at destination port), higher port hold-up risk.

– Transit time

Port-to-port:

– China → US West Coast: 14–20 days – China → US East Coast: 25–35 days – China → Europe (Rotterdam, Hamburg): 30–40 days – China → UK (Felixstowe): 32–42 days – China → Australia (Sydney): 18–25 days

2.2 Container reference (standard)

CONTAINER	INTERNAL DIM (L × W × H, M)	VOLUME (M ³)	MAX PAYLOAD (KG)	TYPICAL USE
20' standard (20'GP)	5.9 × 2.35 × 2.39	33	28 000	Heavy cargo, half-loads
40' standard (40'GP)	12.0 × 2.35 × 2.39	67	28 800	Most consumer goods
40' high cube (40'HC)	12.0 × 2.35 × 2.69	76	28 600	Lightweight, voluminous
45' high cube	13.6 × 2.35 × 2.69	86	27 600	Maximum European inland reach

Loading efficiency: target ~85–90 % of volume; below 70 % means LCL is cheaper.

2.3 LCL rate basis

– Per cubic meter (CBM) with a 1 CBM minimum.

– Or weight ton (1 CBM or 1 000 kg, whichever is higher)

favors dense cargo.

– Typical rate China → EU: \$60–120 / CBM + port charges.

– Typical rate China → US: \$40–90 / CBM + port charges.

– Port charges (THC, ISPS, doc fee)

Often \$300–600 per shipment; can exceed freight on small LCL.

2.4 Air freight

– Volumetric weight

Airlines charge whichever is greater: actual weight or volumetric.

– Volumetric formula

$(L \times W \times H \text{ in m}) \times 200$ for most carriers (167 for some couriers).

– Worked example: $0.82 \times 1.2 \times 0.65 \text{ m} = 0.64 \text{ m}^3 \text{ box}$.

- At 91 kg actual → volumetric 128 kg → **billed at 128 kg** (\$4.80/kg = \$614). - At 171 kg actual → volumetric 128 kg → **billed at 171 kg** (\$4.60/kg = \$787).

– **Transit time:**

- Courier (DHL, FedEx, UPS): 3–5 days door-to-door, customs included. - Standard air cargo: 5–10 days airport-to-airport, customs separate.

2.5 Rate benchmarks (2025, USD)

ROUTE	LCL (\$/CBM)	FCL 40' GP (\$/CONT)	AIR COURIER (\$/KG)
China → US West Coast	\$50–80	\$2 000–3 500	\$5–8
China → US East Coast	\$70–100	\$3 500–5 500	\$6–9
China → EU (Rotterdam)	\$80–120	\$3 000–5 000	\$5–8
China → UK (Felixstowe)	\$90–130	\$3 500–5 500	\$5–8
China → AU (Sydney)	\$80–110	\$2 500–4 000	\$4–7

Rates fluctuate significantly with peak season (Chinese New Year, Q4), fuel, geopolitical disruption. Verify current rates with 2–3 forwarders before each shipment.

2.6 Required documents

Bill of Lading (B/L)	Carrier-issued ownership document — original or telex-released
Commercial Invoice	Declared customs value, signed by supplier
Packing List	Cartons, weights, dimensions, item count per carton
Certificate of Origin	Required to claim FTA preferences (RCEP, EU-Vietnam, USMCA, etc.)
Material Safety Data Sheets	For batteries, chemicals, certain electronics
Phytosanitary Cert (ISPM 15)	For wood packaging (heat-treated stamp)
Test Reports	Sometimes required for clearance (FCC ID for US electronics, e.g.)
Importer of Record details	EIN (US), EORI (EU), GST/HST (CA)

2.7 Export packaging

– **Carton wall**

Double-wall corrugated minimum for export (BC or DC flute).

– **Edge protection**

Foam corner protectors for stacking.

– **Pallet wrap**

Stretch wrap for unit-loading; banding for security.

– **Master carton sealing**

Reinforced packaging tape; not just standard tape.

– **Wood pallets**

Must be ISPM 15 heat-treated (HT stamp). Plastic or pressed-fiber pallets exempt.

– **Loading photos**

Request before container doors close.

TIP – PRE-ARRIVAL ENTRY SAVES DEMURRAGE

In the US, a customs broker can file the entry **before** the ship docks, reducing transit time at port to 1–3 days. Send all documents (commercial invoice, packing list, B/L, certificate of origin, FCC IDs) **5–7 days before arrival**.

In the EU, declaration goes through ICS2 (Import Control System 2, 2024+); pre-arrival data is mandatory for safety/security, but full declaration is per-shipment. Send to broker 3–5 days before arrival.

Demurrage starts after the free port period (5–7 days). Storage charges: \$50–300 per container per day.

3. Customs value and duties

Customs value is the dollar amount duty and VAT are calculated on. It is *not* the price paid; different countries calculate it differently.

CUSTOMS VALUE FORMULA – US vs. EU

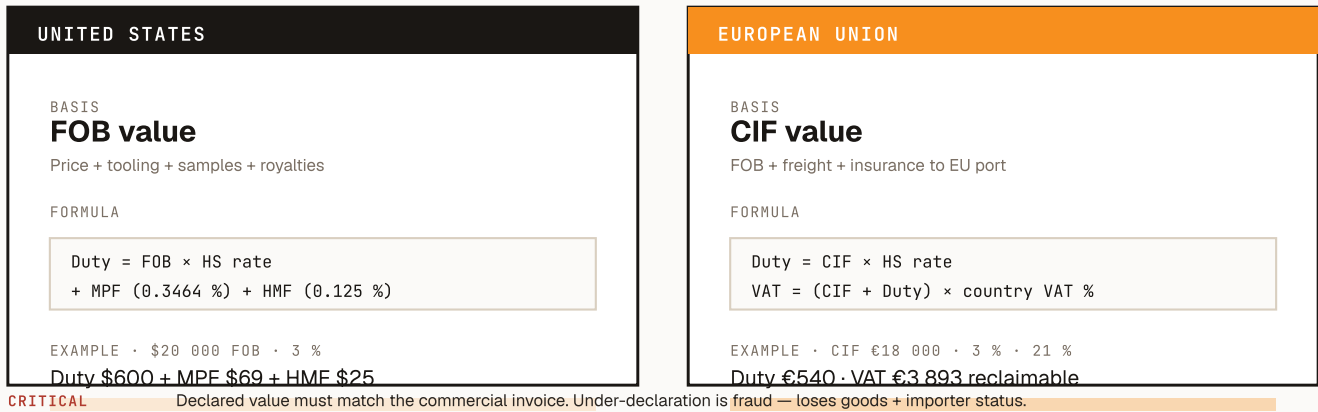


FIG 3.1 CUSTOMS VALUE FORMULA. US USES FOB BASIS; EU USES CIF BASIS. SAME FOB PRICE + SAME DUTY RATE PRODUCES A DIFFERENT TOTAL IN EACH MARKET.

3.1 What's included in customs value

- Product price paid to the supplier (per the commercial invoice).
- Tooling and mold costs amortised into unit price (or as a separate "assist" line for US).
- Sample costs paid earlier (yes, prior prototype invoices).
- Royalties or license fees tied to the import (where condition of sale).
- Buyer-supplied materials ("assists"): if the buyer provides parts the supplier uses, add to customs value.

3.2 US procedure

- **Customs value**
Based on **FOB** (price only; freight excluded). Per 19 CFR § 152.
- **Duty**
Customs value × HS rate (typically 0–6 % for consumer goods).
- **MPF (Merchandise Processing Fee)**
0.3464 % (min \$32, max \$634 per entry, 2025).
- **HMF (Harbor Maintenance Fee)**
0.125 % (sea freight only).
- **Customs bond**
Required for shipments over \$2 500. Single-entry \$50–200 OR continuous bond \$400–800/year covering \$50 000+ entries.
- **Importer of Record**
Requires EIN (free from IRS) and CBP Form 5106 filing.

3.3 EU procedure

- **Customs value**
Based on **CIF** (price + freight + insurance to first EU port).

- **Duty**
CIF × HS rate.

- **VAT**
(CIF + Duty) × destination country VAT rate.

- **VAT reclaim**
Available to VAT-registered businesses; cash flow impact remains until refund.

- **EORI number**
Required for any commercial EU import (one-time, free).

3.4 EU VAT rates by member state (2025)

COUNTRY	STANDARD VAT	REDUCED (SOME PRODUCTS)
Germany	19 %	7 %
France	20 %	5.5 % / 10 %
Spain	21 %	10 %
Italy	22 %	4 % / 5 % / 10 %
Netherlands	21 %	9 %
Belgium	21 %	6 % / 12 %
Sweden	25 %	6 % / 12 %
Poland	23 %	5 % / 8 %
Ireland	23 %	9 % / 13.5 %
Hungary	27 % (highest in EU)	5 % / 18 %

3.5 UK procedure (post-Brexit)

- **Customs value**
CIF basis (same as EU).

- **UK duty**
Customs value × UK Global Tariff rate (typically same as EU for now; 0–6 %).

- **UK VAT**
Standard 20 % (or 0 % / 5 % for some categories).

- **GB EORI**
Required separately from EU EORI.

3.6 Worked customs calculations

Scenario: 5 000 wristwatches, FOB Shanghai \$4.00 each, HS code 9102.11 (mechanical watch).

US import (Los Angeles):

- **FOB value: \$20 000**

- **HS 9102.11 duty rate (US HTSUS): 3.1 % = \$620**

- **MPF: 0.3464 % = \$69 (within min/max)**

- **HMF: 0.125 % = \$25**

- **Customs bond (single entry): \$80**

- **Broker fee: ~\$150**

– Total US import cost: \$20 944 (\$4.19/unit, +4.7 %)

EU import (Rotterdam → Germany):

– FOB value: \$20 000

– Sea freight to Rotterdam: \$2 100

– Insurance: \$50

– CIF value: \$22 150

– HS 9102.11 EU duty (TARIC): 4.5 % = \$997

– VAT base: \$23 147

– VAT (German 19 %): \$4 398 (reclaimable for B2B)

– Broker fee: ~\$200

– Total landed: \$26 747 (\$5.35/unit, +33.7 %)

– Cash cost after VAT reclaim: \$22 349 (\$4.47/unit, +11.7 %)

CRITICAL – NEVER UNDER-DECLARE

Declared value lower than the actual invoice is customs fraud. Penalties: - US: Civil penalty up to 8× the lost duty + criminal liability for intentional fraud - EU: Goods seizure, fines up to 200 % of evaded VAT/duty, criminal prosecution

Customs agencies share data across borders; the same supplier exports to multiple countries and inconsistencies are easy to spot. The savings of a "small" under-declaration is dwarfed by the downside.

4. HS code classification

HS = Harmonized System. 6-digit international code; extended to 8 digits (EU HS-CN) or 10 digits (US HTSUS, UK Global Tariff). Same first 6 digits worldwide.

4.1 Common HS codes for electronics

HS CODE	PRODUCT	EU DUTY	US DUTY	NOTES
8517.62	Routers, switches, NICs	0 %	0 %	Common networking
8517.71	Modems, repeaters	0 %	0 %	
8517.69	Other comms equipment	0 %	0 %	
8528.59	LCD monitors, TVs <14"	14 %	0 %	Consumer electronics
8526.92	Radio remote control	3.7 %	0 %	RC, key fobs
8543.70	Other electrical machines	2.7 %	0 %	Catch-all electronics
9006.59	Other cameras	4.2 %	0 %	
9018.19	Medical devices, general	0 %	0 %	
9028.30	Electricity meters	2.1 %	0 %	
8504.40	Power supplies, chargers	3.3 %	0 %	Adapters, USB chargers
8507.60	Lithium-ion batteries	2.7 %	3.4 %	
9102.11	Mechanical watches	4.5 %	3.1 %	
6307.90	Apparel accessories, other	6.3 %	7 %	Strap, lanyard
4202.92	Bags, cases, plastic outer	9.7 %	17.6 %	Carry cases

4.2 Classification rules

– General Rules of Interpretation (GRI)

Apply in order 1 through 6.

– GRI 1

Heading title + section/chapter notes. Most products classify here.

– GRI 3(a)

Most specific description prevails.

– GRI 3(b)

Essential character (for mixed/composite goods).

– Get a binding ruling for uncertain cases

US: CBP eRulings (free, 30 days). EU: BTI (Binding Tariff Information, free, 1–4 months).

4.3 Classification cost of being wrong

– Customs reclassifies up: pay difference + interest + ~5–8 % penalty

– Customs reclassifies down: refund possible within 1 year (US: liquidation)

– Intentional misclassification: fraud penalties up to 8× the lost duty

5. Free trade preferences

Eligible imports under an FTA can be duty-free or reduced. Requires Certificate of Origin.

5.1 Major FTAs in 2025

FTA	MEMBERS	NOTES
USMCA	US, Canada, Mexico	Replaced NAFTA 2020; rules of origin per product
RCEP	China, Japan, Korea, ASEAN, AU, NZ	Largest by GDP; effective 2022
EU-Vietnam EVFTA	EU + Vietnam	Phased duty elimination through 2030
EU-Singapore EUSFTA	EU + Singapore	In force 2019
EU-Japan EPA	EU + Japan	In force 2019
EU-Korea FTA	EU + South Korea	In force 2011
EU-UK TCA	EU + UK	Post-Brexit 2021; complex rules of origin
UK-Australia FTA	UK + Australia	In force 2023
UK-Japan CEPA	UK + Japan	In force 2021
China-AU ChAFTA	China + Australia	In force 2015

5.2 Rules of origin

— Wholly obtained

Mined, grown, or born in the FTA territory.

— Substantial transformation

Sufficient manufacturing in the FTA territory to change HS code (typically 4-digit shift).

— Regional value content (RVC)

Local content threshold (typically 40–60 %).

— Specific process rules

For textiles, autos, electronics.

5.3 Cost of claiming preference

— Certificate of Origin

Required document; issued by chamber of commerce or self-certified per FTA.

— Origin verification

Random post-clearance audit by customs. Keep documentation for 5 years.

— Cost of error

If origin claim disallowed: pay full duty + penalty (~10 %).

FINAL NOTE. shipping and customs is a discipline of paperwork and timing. The savings of a great freight forwarder over a mediocre one are typically 3–8 % of landed cost. The savings of a great broker over a careless one are bigger — they prevent the demurrage, the customs hold, and the misclassification penalty. Build the relationships before you need them.