



VINYL RECORD MANUFACTURING GUIDE

The Manufacturing Steps:

- **Audio Mastering and Lacquer Cutting** – A cutting engineer uses a lathe with sapphire or ruby stylus to etch sound waves into lacquer-coated aluminum disc
- **Lacquer Silvering** – Lacquer is cleaned rinsed and coated with liquid silver to make it electrically conductive
- **Electroplating (Nickel Bath)** – Silvered lacquer submerged in chemical baths with electric currents; dissolved nickel pellets form mirror image after 12 hours
- **Father/Mother/Stamper Creation** – Nickel copy removed from lacquer (destroying it) and replicated to create stampers. From father: ~3 mothers. From each mother: ~5 stampers. Each stamper makes up to 2000 records
- **Stamper Preparation** – Stampers punched out at centers edges shaped with machinery
- **Vinyl Pressing** – PVC pellets heated to 250°F molded into hockey-puck biscuit. Hydraulic press compresses two stampers applying heat through high-pressure steam
- **Cooling and Trimming** – Pressing takes 20-30 seconds followed by 10-second water cooling. Finished vinyl trimmed cooled packaged

THE CRITICAL FRAGILITY OF LACQUERS

Lacquers are the most dangerous point in vinyl production. Understanding fragility protects your investment.

What Makes Lacquers Fragile:

- Lacquer discs have aluminum base with thin lacquer layer—malleable soft with spring-back
- Every turntable placement degrades quality adding pops and skips
- Over-tightening clamping nuts deforms soft aluminum base risking plating issues
- Loose washers fly around leaving nasty scratches that ruin lacquers
- Groove clashes occurs when lacquers knock during shipping—outer edges flex and facing discs touch destroying audio

Lacquer Shelf Life Timeline:

Time Window	Status	Risk Level
0-2 hours after cutting	Sweet spot for plating	Minimal
Under 24-48 hours	Recommended electroplating window	Low
24-48 hours	Must electroplate within this window	Moderate
Over 2 weeks	Deterioration begins without excessive heat	High
Over 4 weeks	Significant degradation risk	Extreme

Industry standard is electroplating within 24-48 hours after cutting. Longer lacquers sit more susceptible to damage.

LACQUER SHIPPING: CRITICAL PROTOCOLS

Box Requirements:

- Pizza-style box with reinforced corner columns (essential)
- Brand new box (not softened by repeated shipping)
- Maximum 6-8 lacquers per box, never more
- Don't ship more than 3 boxes as single parcel

Spacing Protocol:

- Top and bottom reinforced to create cocoon around lacquers
- Scrap lacquer placed last to prevent heavy knocks damaging top lacquer
- Bottom lacquer face up raised from bottom by 7-8mm using spacing washers
- All following lacquers face down after bottom
- 7-8mm space between facing sides withstands most normal transport
- After first pair remaining 4-6 lacquers go face down with 4-5mm spacing

Bolt and Washer Specifications:

- Bolt: M6 metal bolt (NOT plastic—plastic breaks)
- Nut: Metal nylon-lined non-loosening nut
- Washers: Fibre washers 8mm internal diameter 30mm outer diameter (standard); some use up to 60mm
- Bolt/nut must be metal; washers must be fibre or plastic to absorb shock

- Wrap tape around exposed bolt top if not using nylon-lined nut to stop loosening

Shipping Method:

- Use next-day delivery service especially in height of summer
- Label outside with: catalogue number each lacquer number of sides recat identification (2 or 3) customer name pressing plant destination
- Issues extremely rare but temperature sensitivity is real

Shipping Distance Dangers:

- Long-distance shipping dramatically increases damage risk
- Cumulative weight compromises cardboard rigidity making package prone to damage
- International shipping requires wood boxes (like Agnew Analog) for thermal insulation but have hefty return shipping charges

TEMPERATURE EXTREMES AND ENVIRONMENTAL DANGERS

Vinyl Temperature Thresholds:

Temperature	Effect
65°F-70°F (18°C-21°C)	Ideal storage temperature
140°F (60°C)	Warping begins even if stored properly
170°F (77°C)	Any pressure or lean almost certainly leaves warped record
212°F (100°C)	Vinyl melts
Extreme cold	Makes records brittle can crack

Environmental Damage Factors:

- **Direct Sunlight** – UV rays fade artwork potentially damage vinyl; indirect sources through mirrors/glass transfer significant heat
- **Heat Vents/Radiators** – Excessive heat warps vinyl damages protective sleeves
- **High Humidity** – Moisture causes mold growth; keep between 45-50% relative humidity
- **Excessive Dryness** – Results in vinyl brittleness
- **Vibration** – Detrimental during playback; avoid washing machines stereo speakers high-traffic areas

- **Stacking** – Never stack records; causes inconsistent pressure leading to warping/cracking

Storage Best Practices:

- Store vertically like books on sturdy shelving without leaning
- Do not pack tightly together
- Keep in cool dry place in original packaging
- Avoid attic storage—poor insulation/ventilation makes humidity control impossible

33.3 VS. 45 RPM: SCIENTIFIC FACTORS AND CONSIDERATIONS

Speed selection affects sound quality side length and groove dynamics. Understanding the science helps optimize your release.

33.3 RPM vs. 45 RPM Comparison:

Factor	33.3 RPM	45 RPM
Linear speed	20 cm/s at 30cm radius	1.3x faster groove velocity
High-frequency response	Standard	Better—more groove space per second
Dynamic range	Standard	Superior—wider grooves possible
Surface noise	Standard	Lower—faster speed reduces audible noise
Maximum side length	Up to 22 minutes per side	Up to 15 minutes per side
Typical use	Full-length albums (LPs)	EPs singles audiophile releases

Scientific Factors:

Groove velocity determines audio quality. At 45 RPM the groove passes under the stylus 1.3 times faster than at 33.3 RPM. This means:

- More physical groove space per second of audio
- Higher frequencies have more room to oscillate
- Dynamic range improves by 2-4 dB
- Surface noise reduces because stylus tracks groove more accurately

Audio Quality Impact Chart:

Side Length	33.3 RPM Quality	45 RPM Quality
Under 12 minutes	Excellent	Excellent
12-18 minutes	Good	Excellent
18-22 minutes	Moderate	Poor
Over 22 minutes	Poor	Not possible

*Quality depends on content

Recommendation:

For EPs or releases under 30 minutes total use 45 RPM for superior sound. For full-length albums over 30 minutes 33.3 RPM is necessary to accommodate side length.

OPTIMAL SIDE LENGTHS: SCIENTIFIC CONSIDERATIONS

Side length directly affects audio quality due to groove geometry physics.

Why Side Length Matters:

- Grooves must be closer together for longer sides
- Closer grooves reduce amplitude (loudness) possible
- Inner groove distortion increases as radius decreases
- High frequencies degrade toward center of record

Optimal Side Length Guidelines:

Side Length	Audio Quality	Recommendation
Under 12 minutes	Excellent	Ideal for 45 RPM
12-18 minutes	Good	Acceptable for 45 RPM
18-22 minutes	Moderate	Use 33.3 RPM
22-25 minutes	Poor	Only for 33.3 RPM—avoid
Over 25 minutes	Very Poor	Do not exceed

Inner Groove Distortion Chart:

Radius Position	Frequency Loss	Dynamic Reduction
Outer edge (30cm)	0%	0%
Mid groove (20cm)	2-3%	1-2%
Inner groove (15cm)	5-8%	3-5%
Center (10cm)	10-15%	6-10%

Practical Recommendations:

- Keep each side under 22 minutes for acceptable quality
- Aim for 15-18 minutes per side for best results
- Place tracks with highest dynamics on outer grooves
- Avoid putting critical high-frequency content on inner groove
- Balance side lengths—make Side A longer than Side B to avoid disproportionate dead air

TIMELINE AND TURNAROUND TIMES

Standard Production Timelines (2024-2025):

- **12 inch Records in Jackets with spine** – 9-11 weeks with test pressings; 6-8 weeks without
- **12 inch Records in Jackets no spine (Euro)** – 7-9 weeks without test pressings
- **7 inch Records in Jackets** – 12-14 weeks with test pressings; 9-11 weeks without
- **12 inch 180 gram** – 2-3 months depending on specs/quantity
- **12 inch Standard weight (150 gram)** – 2-3 months (color variants take longer)
- **7 inch Records** – 2-3 months

Timeline Reality:

- Even though orders generally take 2 months plan for at least 3 months
- Ultimate turnaround depends on specs and quantity
- For 10-week turnaround orders must be submitted with all assets ready (audio masters final artwork)

Delay Causes:

- Manufacturing process issues
 - High demand (30 million vinyl sold in US/UK in 2024)
 - Logistical challenges
 - Supply chain issues
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THE BROKER WARNING: WHY YOU MUST AVOID THEM

What Is a Vinyl Broker?

A broker is a middleman who places your order with a pressing plant without owning or operating manufacturing equipment. They take your money add markup and forward order to plant they do not control.

Seven Critical Reasons to NEVER Use a Broker:

- **No Quality Control** – Brokers do not operate equipment; cannot monitor pressing quality stamper condition vinyl blend consistency
- **Communication Blackout** – Brokers become barriers between you and plant delaying issue resolution
- **Hidden Plant Placement** – Brokers often do not disclose which plant presses your records; you may end up with unknown inexperienced manufacturers
- **Timeline Secrecy** – Brokers cannot guarantee production schedules; no access to real plant capacity or queue status
- **Extra Cost Layer** – Brokers add 15-40% markup for no added value
- **No Accountability** – When pressings fail brokers blame plant; plants blame broker; you have no recourse
- **Lacquer Handoff Risk** – Brokers may mishandle lacquer transfer between cutting studio and plant increasing damage probability

The Broker Damage Chain:

Your lacquers pass through: you → cutting studio → broker → unknown plant → unknown shipping → you. Each transfer increases damage risk. Brokers cannot confirm which plant stampers should be sent to.

How to Verify Direct Plant Relationship:

- Do they have proven track record? How long in business?
- Do they possess industry certifications or meet quality compliances?
- What do clients say? Look for testimonials reviews case studies
- Do they practice transparency? Open about processes timelines risks?
- Can they scale capacity reliably? Handle varying projects and rapid turnaround?
- What is their quality assurance approach? Rigorous QA protocols at every step?

QUESTIONS TO ASK THE MANUFACTURING PLANT

Critical Pre-Order Questions:

- **Do you have your own pressing equipment?** – They should operate presses not subcontract
- **What is your current production queue length?** – Transparent timeline expectations
- **Do you perform 100% QC or sampling?** – Rigorous QA protocols
- **What is your stamper replacement policy?** – How many records per stamper before replacement
- **Do you offer test pressings?** – Essential quality control before mass production
- **What vinyl blend do you use?** – 100% PVC vs recycled content affects quality
- **Can you provide batch certification?** – Supply chain security
- **What is your defect claim policy?** – Eligibility for scratches tears audio issues
- **Do you have backup solutions for equipment failures?** – Contingency plans minimize disruptions
- **What is your shipping method for finished records?** – Logistics and delivery approach

Test Pressing Requirements:

- Test pressing is vinyl created during production to ensure quality before mass production
- Typically 5-10 copies made first devoid of artwork labels decorative elements
- Purpose: identify imperfections (surface noise distortion anomalies)
- Always listen to 5-10 pressings from every run as sample
- Listen for extraneous noises not recorded pops clicks that might be part of vinyl
- Ensure audio not distorted hole not off-center records not warped

Defect Standards:

- **Scratches affecting audio** – Any scratch affecting audio quality
- **Scratches length/width** – Longer than 20mm AND wider than 0.5mm
- **Cover tears** – Exceed 30mm long AND text illegible or missing
- **Surface noise** – Poor vinyl quality or debris mixed during pressing

Audio Mastering Specifications:

- Send high-fidelity WAV files that sound exactly as you like

- Distortion near center (songs at end of sides) more likely mixing/mastering issue than pressing problem
- Check record is clean with no visible marks before assuming pressing problem

Packaging Considerations:

- Submit all assets ready (audio masters final artwork) for fastest turnaround
- Multiple color variants take longer than standard black vinyl
- Ensure barcode and catalogue number present (missing = red flag for authenticity)
- Check artwork quality—if blurry or poorly printed suspicious

REGIONAL PLANT RECOMMENDATION: ORDER LOCALLY

Strongly encourage ordering from regional plant due to shipping and weather factors.

Regional Benefits:

- Shorter shipping distance reduces transit time and damage probability
- Weather exposure minimized—temperature extremes humidity spikes seasonal hazards avoided
- Next-day delivery achievable for lacquer shipping
- Can visit plant in person if issues arise
- Communication faster with no time zone delays
- Shipping costs lower saving money on lacquers and finished records

Regional Risks to Avoid:

- International shipping requires wood boxes for thermal insulation but have hefty return charges
- Cross-country shipping increases weather exposure during seasonal extremes (summer heat winter cold)
- Multiple handoffs when shipping across regions increase groove clash probability
- Customs delays affect international orders adding unpredictable timeline extensions

Always prioritize pressing plants within your region or country. Cost savings on shipping and reduced lacquer damage risk far outweigh perceived price advantages from distant brokers or plants.

KNOW YOUR CUTTING ENGINEER: CRITICAL REQUIREMENT

Must know your cutting engineer's name. This is not optional—essential for quality control accountability and project success.

Why Knowing Your Cutting Engineer Matters:

- **Direct Impact** – Engineer physically etches music onto lacquer. Skill level experience attention determine sonic quality of every record
- **Accountability** – If audio issues arise need to know who cut lacquer to determine mastering-related vs pressing-related problem
- **Quality Verification** – Research engineer reputation past work client reviews before committing to plant
- **Communication** – Direct contact allows discussing specific mastering choices formatting preferences potential issues
- **Continuity** – Future releases with same engineer ensure consistent sound across projects
- **Insurance** – If plant experiences equipment failure staff turnover can request same engineer at another facility

How to Verify Your Cutting Engineer:

- Ask plant directly: "Who will be cutting my lacquer?"
- Request engineer's full name—not just department or title
- Search engineer online for past work client testimonials industry reputation
- Ask to hear samples of previous cuts they made
- Confirm engineer is available for project date—some have limited availability

Warning Signs:

- Plant refuses to name cutting engineer
- Engineer name vague (like "our mastering team")
- No samples or portfolio available for review
- Engineer cannot be contacted for questions

Red flags indicate plant may use anonymous or inexperienced cutters dramatically increasing poor sound quality risk.

QUALITY CONTROL CHECKLIST

Evaluate manufacturer reliability before ordering:

- **Consistent production schedules** – Timely predictable for deadline-sensitive distribution
- **Robust supply chain** – Strong network of trusted suppliers for raw materials
- **Responsive customer service** – Quick effective support to resolve issues
- **Contingency plans** – Backup solutions for equipment failures material shortages

- **Technological innovation** – Advanced technologies ensure efficiency reduce errors
 - **Transparent logistics** – Known for meeting delivery deadlines consistently
 - **Industry certifications** – Adherence to standards strengthens credibility
 - **Proven track record** – Completed projects with similar clients
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FINAL RECOMMENDATIONS

- Plan for 3 months minimum—not 2 months—for production timeline
- Electroplate lacquers within 24-48 hours after cutting
- Ship lacquers via next-day delivery especially in summer
- Use only pizza-style boxes with reinforced corners—never boxes without them
- Never exceed 6-8 lacquers per box
- Use M6 metal bolt with nylon-lined nut—never plastic bolts
- Maintain 7-8mm spacing between bottom facing lacquers
- Store finished vinyl at 65-70°F with 45-50% humidity
- Never stack records—always store vertically
- Listen to 5-10 test pressings from every run
- NEVER use brokers—work directly with plants that own equipment
- Verify plant credentials using reliability checklist
- Order from regional plant to minimize shipping and weather risks
- Know your cutting engineer's name—do not accept vague responses
- Keep each side under 22 minutes for acceptable quality
- Aim for 15-18 minutes per side for best results
- Use 45 RPM for EPs under 30 minutes total; 33.3 RPM for full-length albums over 30 minutes

