Kurita AquaChemie Saudi Arabia Company
HSE Risk Assessment – 2026 Document No.: HSE-HRA-2026
Revision 01

KURITA RISK ASSESSMENT -2026

Activity: Chemical Receiving, Bulk Unloading, Warehouse Storage and Internal Transportation, Chemical Blending, Product Drumming, Laboratory Quality Control Testing, Equipment Maintenance, and Waste Handling Operations.

Location - Industrial Plant / Manufacturing Facility (Saudi Arabia)

Role	Position	Name	Date
Created By	EHS Manager	Abdullah Almarri	Jan--2026
Reviewed By	Operation Manager	Sapan parekh	March-22-2026
Approved By	Plant Manager	Mazen barajaa	March-26-2026

No.	Hazard	Risk	Risk rating score					Control Measures/ Recovery measures	Residual Risk			
			# of peoples affected	Severity	Probability	Risk Rating	Significant Risk		Severity	Probability	Risk Rating	Significant Risk
1	Bulk tanker truck raw chemical arrival and positioning at offloading bay.	Vehicle collision with Kurita plant assets, pedestrian crushing injuries, structural layout damage.	2	3	4	12	YES	• Mandatory Kurita flagman/banksman with reflective vest directing reverse maneuvers. • Physical rubber wheel chocks deployed immediately upon halting. • Strictly enforced internal terminal speed limits (max 10 km/h). • Vehicle ignition isolated during final alignment checks.	3	1	3	NO
2	Raw chemical hose connection/disconnection under residual pressure.	Sudden chemical splash, whipping hose impact, acute ocular/skin burns from concentrated raw material.	3	4	4	16	YES	• Verification of valid third-party inspection (TPI) certificates for chemical hoses. • Mandatory installation of whip-checks/safety cables across all active coupling joins. • Verification of zero line pressure via bleed valves before cracking connections. • Full Kurita chemical PPE (Slicker suit, face shield, PVC gloves, rubber boots).	4	1	4	NO

3	Bulk chemical storage tank replenishment and pump transfer loading.	Tank overfill, concrete bund breach, catastrophic environmental chemical release to surrounding soil.	10	5	3	15	YES	• Interlocked automated Emergency Shutdown Valves (ESDV) configured to trip at 90% tank capacity. • Secondary containment bund holding 110% volume of the single largest storage vessel. • Pre-loading instrumentation functionality checks executed before starting pump transfer.	5	1	5	NO
4	Unloading packed chemicals (drums, IBCs) from flatbed trucks via forklift.	Puncture of chemical packaging by forklift tines, tipping of palletized loads, crushing injuries.	2	3	4	12	YES	• Ground personnel restricted from entering forklift operational zone during active offloading. • Verification that vehicle brakes are set and bed stabilizers deployed before truck entry. • Availability of heavy-duty chemical spill response kits within 5 meters of unloading dock.	3	1	3	NO
5	Receiving inspection and chemical lot verification by warehouse personnel.	Skin exposure to residual chemical contamination on packaging exterior, inhalation of leaking vapors.	1	2	4	8	NO	• Mandatory use of basic PPE (nitrile gloves, safety glasses, steel-toe shoes) during all inspections. • Use of handheld gas detection sweeps for volatile organic cargo before opening enclosed container doors. • Immediate rejection and isolation of any weeping or physically compromised chemical containers. • Document verification handled at a clean, separate administrative station away from direct storage.	2	1	2	NO
6	Forklift transport of hazardous chemical drums, IBCs, and pallets inside warehouse.	Collision with warehouse racking, forklift tipping on ramps, hitting pedestrians along paths.	2	3	4	12	YES	• Forklift operation restricted to personnel holding active Kurita competency licenses. • Complete physical segregation barriers separating pedestrian paths from forklift avenues. • Mandatory use of certified drum-gripper hydraulic attachments for single drum movements.	3	1	3	NO

								• Comprehensive material handling equipment (MHE) check sheets filled out before shift kickoff.				
7	Improper vertical stacking and layout configuration of incompatible commodities.	Violent exothermic reactions, generation of highly toxic gas clouds, warehouse chemical fires.	10	5	3	15	YES	• Direct application of Kurita Chemical Compatibility Matrix criteria across warehouse sectors. • Physical segregation of incompatible materials by a minimum of 3 meters or fire-rated walls. • Solid block stacking restricted to maximum 2 tiers high for IBCs and 3 tiers high for pallets. • Separate containment drainage paths provided for acidic and alkaline warehousing sectors.	5	1	5	NO
8	Manual decanting and compounding of water-treatment formulas into blending vessels.	Chemical splash hazards, inhalation of toxic concentrated vapors, chemical contact dermatitis.	2	3	4	12	YES	• Use of specialized closed-loop chemical transfer pumps instead of gravity pouring. • Blending operations restricted to bays equipped with local chemical exhaust extraction systems. • Safety Data Sheets (SDS) and customized emergency chemical spill kits located in immediate vicinity. • Mandated deployment of air-purifying respirators fitted with chemical-specific cartridges.	3	1	3	NO
9	Charging powdered raw materials or solid additives into mixing systems.	Inhalation of airborne toxic chemical dust, localized eye irritation, dust deflagration hazards.	5	3	4	12	YES	• Use of integrated dust hoods and local exhaust ventilation (LEV) at vessel manways. • Mandatory use of half-face respirators with P100 particulate filters during powder dumping. • Installation of anti-static grounding clips on all powder transfer chutes and equipment frames. • Use of non-sparking plastic scoops or conductive tools to handle bulk solid materials.	3	1	3	NO

10	Operating high-speed agitators and thermal jacket mixing systems.	Mechanical entanglement with rotating shafts, thermal product burns from runaway exothermic reactions.	2	4	3	12	YES	• Mechanical interlocks installed on vessel lids to isolate agitator power when opened. • Dual redundant temperature sensors with high-temperature automated cooling water injection loops. • Thermal insulation blankets applied to all steam or hot oil jacket lines and vessel walls. • Clearly marked emergency stop buttons positioned at both the local skid and control room panel.	4	1	4	NO
11	Laboratory chemical sampling, analysis, and quality control processing.	Glass breakage lacerations, skin contact with testing reagents, volatile gas inhalation.	1	2	4	8	NO	• All reagent testing executed inside certified, functional laboratory chemical fume hoods. • Mandatory use of splash-proof safety goggles, lab aprons, and nitrile gloves at all times. • Use of automated pipettes and safety handling tools to eliminate direct contact hazards. • Specialized shatter-resistant containers used for chemical storage and sample transport.	2	1	2	NO
12	Routine manual pipeline valve alignments and system line-ups.	Accidental release of line fluid, toxic chemical exposure, operator slippage on chemical slick.	1	3	4	12	YES	• Explicit tagging and labels on all valves matching the plant Piping & Instrumentation Diagrams. • Implementation of the Kurita 'Two-Man Rule' verification protocol for critical process alteration. • Installation of permanent steel operational access platforms to eliminate unstable climbing. • Immediate logging, cleanup, and neutralization of any visible packing seal leaks.	3	1	3	NO
13	Automated packaging and drumming of finished liquid chemical products.	Overfilling and spillage on line, repetitive motion strain, conveyor crushing/pinching injuries.	2	2	4	8	NO	• Use of automated weight-triggered shutoff valves on filling nozzles to prevent drum overflows. • Fixed physical guarding screens installed over all moving conveyor belt pinch points. • Adjustable-height drum manipulation tools and ergonomic barrel-rolling aids provided on site. • Integrated drip trays routed beneath the automatic nozzle retraction path.	2	1	2	NO

14	Labeling, strapping, and shrink-wrapping finalized pallets of product.	Repressive heat gun burns, hand pinch points from tensioning tools, ergonomic lifting strain.	1	2	3	6	NO	• Implementation of automated mechanical stretch-wrap rotating turntables where applicable. • Heavy-duty leather safety gloves mandated when operating steel or plastic strapping tools. • Electric heat tunnels or insulated heat guns utilized to eliminate direct open flame use. • Training on proper manual handling techniques and safe lifting posture limits enforced.	2	1	2	NO
15	Staging completed chemical stock in the outbound logistics yard.	Exposure of chemical containers to extreme solar heat degradation, forklift collisions in tight space.	2	3	3	9	YES	• Staging area protected by shade structures to control thermal expansion pressure. • Clearly painted floor boundaries and physical bollards separating storage grid lines. • Mandatory placement of localized secondary spill catch trays under temporary yard pallets. • Weekly structural integrity checks on all containers held in the outdoor staging yard.	3	1	3	NO
16	Plant filter backwashing, membrane cleaning, and chemical regeneration cycles.	High-pressure line failures, acid/alkali rinse chemical splash, equipment overpressurization.	2	3	3	9	YES	• Automated system pressure interlocks to cut pump supply if thresholds are exceeded. • Pre-use inspection of all flexible CIP (Clean-In-Place) loop connection loops. • Enclosed neutralization tank system configuration to manage chemical wastewater streams. • Mandated use of safety glasses and neoprene aprons during chemical wash staging.	3	1	3	NO
17	Mechanical maintenance and seal overhauls on chemical process pumps.	Unexpected pump startup, crushing injuries from rotating parts, chemical fluid exposure.	2	4	3	12	YES	• Complete enforcement of Kurita Lockout/Tagout (LOTO) protocols with individual operator locks. • Zero-energy verification via local 'Try-Step' testing prior to tool application. • Positive physical line isolation using isolation blinds or double block and bleed configurations. • Deployment of task-appropriate impact-resistant and chemical-resistant mechanics gloves.	4	1	4	NO

18	Line breaking and flange cracking during piping modification or cleaning.	Pressurized liquid pocket spray, hazardous toxic chemical mist inhalation, severe facial injuries.	3	4	4	16	YES	• Issuance of a specialized Kurita Line Breaking Permit paired with a verified execution plan. • Line flushing with fresh water followed by nitrogen purging until gas testing limits clear. • Execution of 'First Break' safety positioning (loosening side away from operator first). • Standby placement of a mobile emergency safety shower unit within 5 meters of work.	4	1	4	NO
19	Confined space entry for internal inspection and cleaning of blending vessels.	Toxic gas entrapment (H2S/CO), oxygen depletion, heat exhaustion, restricted egress rescue bottlenecks.	3	5	3	15	YES	• Issuance of Kurita Confined Space Entry (CSE) permit backed by continuous gas level detection. • Uninterrupted operational deployment of positive-pressure mechanical air ventilation blowers. • Stationing of a dedicated Kurita CSE Standby Man maintaining an entry/exit communication log. • Placement of mechanical rescue tripods, full-body harnesses, and SCBA units at entry hatch.	5	1	5	NO
20	Working at heights on upper tank platforms and elevated structural frames.	Falls from heights causing severe physical trauma, dropped equipment hazards injuring ground staff.	2	4	4	16	YES	• Double-lanyard full-body safety harnesses connected to certified anchor nodes at all times. • Maintenance work restricted to engineered scaffolding structures carrying current inspection tags. • Deployment of tool lanyards and wrist anchors to prevent equipment drops. • Exclusion-zone barricading at ground floor with high-visibility warning signs deployed.	4	1	4	NO
21	Calibration and hot maintenance of chemical dosing pump instrumentation.	Minor chemical spray, electrical shock hazards, delicate component calibration damage.	1	2	3	6	NO	• Complete electrical isolation of the target dosing control enclosure before opening panels. • Low-pressure water rinse of pump head assemblies prior to mechanical adjustment. • Use of insulated calibrated electrical tools testing voltage parameters. • Mandatory safety glasses and secondary barrier gloves for instrument technicians.	2	1	2	NO

22	Water treatment chemical testing via pilot plants and trial injection skids.	Leaking temporary hoses, chemical cross-contamination, mechanical tripping hazards.	2	3	3	9	YES	• Rigid hard-piping setups used for pilot connections rather than temporary flexible tubes. • Pressure testing of skid network with clean utility water prior to chemical injection. • Distinct color-coded pipelines designating raw materials vs treated output channels. • Containment trays placed beneath all auxiliary pilot pump bases to trap drips.	3	1	3	NO
23	Hazardous process waste drum filling, labeling, and internal staging.	Inhalation of toxic gas emissions, drum rupture during moving, chemical mix contamination.	2	3	3	9	YES	• Waste collection restricted to UN-approved, structural heavy-duty chemical containment drums. • Strict segregation of volatile solvent-soaked materials from standard chemical residues. • Waste drums staged within a sheltered concrete bund footprint isolated from stormwater channels. • Clear hazardous waste identification decals stating exact chemical properties.	3	1	3	NO
24	Hot work operations (welding, cutting, grinding) within chemical utility areas.	Ignition of solvent vapors, chemical facility fires, severe personnel thermal burns.	5	4	3	12	YES	• Mandatory Kurita Hot Work Permit including thorough gas sniffing clearance (0% LEL). • Complete removal or sealing of any hazardous chemical inventory within a 15-meter radius. • Fire blanket draping over localized pipe frames paired with a dedicated Fire Watch standby. • Two functional, fully charged ABC dry chemical fire extinguishers kept on site.	4	1	4	NO
25	Loading finalized chemical products onto transport logistics vehicles.	Crush injuries from shifting heavy containers, chemical shipping spills, flatbed truck structural damage.	2	3	3	9	YES	• All outbound IBCs and drum skids secured with industrial-grade heavy ratcheting straps. • Complete inspection of transport truck flatbed decks for structural cracks before crane staging. • Forklift speeds limited to crawling speeds inside vehicle flatbed operational envelopes.	3	1	3	NO

								• Shipping manifesto documents cross-checked against exact container labels before closure.			

❖ RISK MATRIX EXPLANATION

The following 5x5 matrix is used for risk evaluation (Severity × Likelihood).

Likelihood ↓ / Severity →	1	2	3	4	5
1 (Likelihood)	1	2	3	4	5
2 (Likelihood)	2	4	6	8	10
3 (Likelihood)	3	6	9	12	15
4 (Likelihood)	4	8	12	16	20
5 (Likelihood)	5	10	15	20	25

1. The X-Axis: Likelihood

This measures the probability of the event occurring.

- **1 - Rare:** Highly unlikely to happen; may occur only in exceptional circumstances.
- **2 - Unlikely:** Could happen, but very rarely.
- **3 - Moderate / Possible:** Might occur at some point; a distinct possibility.
- **4 - Likely:** Very likely to occur; not surprising.
- **5 - Almost Certain:** Expected to occur in most circumstances.

2. The Y-Axis: Severity (Consequence)

This measures the magnitude of impact if the risk event takes place.

- **1 - Insignificant:** No injuries, negligible financial loss, or minor disruption.
- **2 - Minor:** Minor injuries requiring basic first aid, or minimal operational impact.
- **3 - Moderate:** Medical treatment required, temporary but significant loss of productivity.
- **4 - Major:** Major injuries, severe health impacts, or substantial financial and operational damage.
- **5 - Catastrophic / Severe:** Fatality, widespread system failure, or critical business disruption.

3. Risk Classification & Action Levels

The final risk score dictates the urgency and mitigation measures required.

- **Low Risk (1 - 4):** Acceptable. Monitor the hazard to ensure controls remain effective, but no immediate or heavy intervention is required.
- **Medium / Tolerable Risk (5 - 12):** Manageable, but requires planned mitigation. Introduce additional controls or safety measures when possible.
- **High Risk (13 - 19):** Requires immediate intervention. Activity should be reviewed, and new control measures must be implemented promptly.
- **Critical / Extreme Risk (20 - 25):** Unacceptable. Cease all related activities immediately until the hazard is eliminated or the risk is reduced to a lower level.

Risk Level Legend:
• 1-5: Low Risk (Green) - Acceptable with routine controls

- 6-10: Medium Risk (Yellow) - Additional controls recommended
- 11-15: High Risk (Orange) - Urgent action required
- 16-25: Critical Risk (Red) - Immediate intervention / Stop work

ALARP: All risks shall be reduced As Low As Reasonably Practicable.

Saudi Regulatory Compliance References

- Saudi Labor Law (including Midday Work Ban from 15 June to 15 September)
- High Commission for Industrial Security (HCIS) requirements
- National Center for Environmental Compliance (NCEC)

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