

QUALITY SWEETENS.



Start-up Conditions for Food-grade
Lewatit® Ion Exchange Resins

X Lewatit®

QUALITY WORKS.

LANXESS
Energizing Chemistry

In the food industry, high demands are placed on products that come into contact with food. Ion exchange resins that meet food contact requirements with regard to their composition must be pretreated by the user in accordance with the manufacturer's instructions, to comply with the extraction limits described in the associated regulations. In this brochure, the start-up conditions are described according to the resin type and area of application in order to meet the manufacturer's declarations drawn up by LANXESS on the use of **Lewatit®** ion exchange resins in the food sector.



Recommended specifications for regeneration chemicals of **Lewatit®** ion exchange resins

Appearance	Sodium chloride	Hydrochloric acid	Sulfuric acid	Sodium hydroxide
Conc. NaCl	>97%			
Conc. HCl		>30%		
Conc. H ₂ SO ₄			>93%	
CO ₃ ²⁻ content				<0.2% (2,000 ppm)
Cl ⁻ content				<0.2% (2,000 ppm)
SO ₄ ²⁻ content	<1% (10,000 ppm)	<0.5% (5,000 ppm)		<0.1% (1,000 ppm)
SiO ₂ content				<0.004% (40 ppm)
Alkaline earth content (Ca ²⁺)	<0.4% (4,000 ppm) WS <100 ppm*			<0.01% (100 ppm)
Iron content (Fe ³⁺)	0.001% (10 ppm)	<0.002% (20 ppm)	<0.002% (20 ppm)	<0.001% (10 ppm)
Aluminum content (Al ³⁺)				<0.001% (10 ppm)
Mercury content (Hg ²⁺)				<0.001% (2 ppm)
Acid consumption (pH 8.2)	None			
Organochlorines		<0.02 g/l (approx. 17 ppm)	Nil	
Oxidants		<4 ppm Cl ₂	<12 ppm Cl ₂	<10 ppm O ₂

* For counter current regeneration process, when the lowest hardness leakage is required

These specifications are based on DIN 19604, DIN 19610, and DIN 19615. The concentrations are expressed in % or in ppm, based on the weight of reagent of 100%.

RECOMMENDED START-UP PROCEDURE

Demineralization with strong acid cation resin types

Standard regeneration

Hydrochloric acid/sulfuric acid

Form supplied

Sodium

Resin types

Lewatit® S 1568

Lewatit® S 1668

Lewatit® S 2568

Inversion/demineralization with strong acid cation resin types Softening and dealkalization with weak acid cation resin types

Standard regeneration

Hydrochloric acid/sulfuric acid

Form supplied

Hydrogen

Resin types

Lewatit® S 2328

Lewatit® S 2568 H

Lewatit® S 8528

Procedure

- 1** The resin should be transferred to the column and soaked in demineralized, soft, or drinking water for approximately one hour.
- 2** Backwash the resin for at least 30 minutes.
- 3** Let the resin bed settle and then drain to within 10 cm of the top of the bed.
- 4** Let 4 bed volumes of hydrochloric or sulfuric acid solution (6% HCl or H₂SO₄) pass through the column at a rate of 2 bed volumes per hour.
- 5** Rinse the resin with at least 4 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 6** Let 4 bed volumes of caustic soda solution (4% NaOH) pass through the column at a rate of 2 bed volumes per hour.
- 7** Rinse the resin with at least 4 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 8** Let 4 bed volumes of hydrochloric or sulfuric acid solution (6% HCl or H₂SO₄) pass through the column at a rate of 2 bed volumes per hour.
- 9** Rinse the resin with at least 5 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 10** Take the resin into service.

Procedure

- 1** The resin should be transferred to the column and soaked in demineralized, soft, or drinking water for approximately one hour.
- 2** Backwash the resin for at least 30 minutes.
- 3** Let the resin bed settle and then drain to within 10 cm of the top of the bed.
- 4** Let 4 bed volumes of hydrochloric or sulfuric acid solution (6% HCl or H₂SO₄) pass through the column at a rate of 2 bed volumes per hour.
- 5** Rinse the resin with at least 4 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 6** Let 4 bed volumes of hydrochloric or sulfuric acid solution (6% HCl or H₂SO₄) pass through the column at a rate of 2 bed volumes per hour.
- 7** Rinse the resin with at least 5 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 8** Take the resin into service.

RECOMMENDED START-UP PROCEDURE

Softening with strong acid cation resin types

Standard regeneration

Brine solution

Form supplied

Sodium

Resin types

Lewatit® S 1568

Lewatit® S 1668

Lewatit® S 2568

Procedure

- 1 The resin should be transferred to the column and soaked in demineralized, soft, or drinking water for approximately one hour.
- 2 Backwash the resin for at least 30 minutes.
- 3 Let the resin bed settle and then drain to within 10 cm of the top of the bed.
- 4 Exhaust the resin with 4 bed volumes CaCl₂ solution (5%) at a rate of 2 bed volumes per hour or exhaust the resin with normal drinking water at a flow rate of 5–20 bed volumes per hour.
- 5 Rinse the resin with at least 4 bed volumes of demineralized or soft water at a flow rate of 2 bed volumes per hour.
- 6 Regenerate the resin with 2–3 bed volumes of NaCl solution (10%) at a rate of 2 bed volumes per hour.
- 7 Rinse the resin with at least 4 bed volumes of demineralized or soft water at a flow rate of 2 bed volumes per hour.
- 8 Take the resin into service.

Thin juice softening/NRS process with strong acid cation resin types

Standard regeneration

Caustic soda

Form supplied

Sodium

Resin types

Lewatit® S 1568

Lewatit® S 1668

Procedure

- 1 The resin should be transferred to the column and soaked in demineralized water for approximately one hour.
- 2 Backwash the resin for at least 30 minutes.
- 3 Let the resin bed settle and then drain to within 10 cm of the top of the bed.
- 4 Regenerate the resin with 2 bed volumes of NaOH solution (4%) at a rate of 2 bed volumes per hour.
- 5 Rinse the resin with at least 4–8 bed volumes of demineralized or soft water at a flow rate of 2 bed volumes per hour.
- 6 Take the resin into service.

Demineralization with strong basic anion resin types

Standard regeneration

Caustic soda

Form supplied

Chloride

Resin types

Lewatit® S 6268
 Lewatit® S 6368
 Lewatit® S 6368 A
 Lewatit® S 6368 A SO4
 Lewatit® S 7468

Decolorization with strong basic anion resin types

Standard regeneration

Brine/alkalized brine solution

Form supplied

Chloride

Resin types

Lewatit® S 6268
 Lewatit® S 6368
 Lewatit® S 6368 A
 Lewatit® S 6368 A SO4
 Lewatit® S 5528

Procedure

- 1** The resin should be transferred to the column and soaked in demineralized, soft, or drinking water for approximately one hour.
- 2** Backwash the resin for at least 30 minutes.
- 3** Let the resin bed settle and then drain to within 10 cm of the top of the bed.
- 4** Let 4 bed volumes of caustic soda solution (4% NaOH) pass through the column at a rate of 2 bed volumes per hour.
- 5** Rinse the resin with at least 4 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 6** Let 4 bed volumes of hydrochloric or sulfuric acid solution (6% HCl or H₂SO₄) pass through the column at a rate of 2 bed volumes per hour.
- 7** Rinse the resin with at least 4 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 8** Let 4 bed volumes of caustic soda solution (4% NaOH) pass through the column at a rate of 2 bed volumes per hour.
- 9** Rinse the resin with at least 5 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 10** Take the resin into service.

Procedure

- 1** The resin should be transferred to the column and soaked in demineralized, soft, or drinking water for approximately one hour.
- 2** Backwash the resin for at least 30 minutes.
- 3** Let the resin bed settle and then drain to within 10 cm of the top of the bed.
- 4** Let 3–4 bed volumes of alkalinized brine solution (10% NaCl/1% NaOH) pass through the column at a rate of 2 bed volumes per hour at room temperature.
- 5** Displace the regenerant solution with 1.5 bed volumes of demineralized or soft water at a rate of 2 bed volumes per hour.
- 6** Rinse the resin with at least 5 bed volumes of demineralized or soft water at a flow rate of 2–5 bed volumes per hour.
- 7** Take the resin into service.

RECOMMENDED START-UP PROCEDURE

Demineralization with weak basic anion resin types

Standard regeneration

Caustic soda

Form supplied

Free base/chloride

Resin types

Lewatit® S 4268
Lewatit® S 4228
Lewatit® S 4328
Lewatit® S 4468
Lewatit® S 4528
Lewatit® S 5228
Lewatit® S 5221
Lewatit® S 5328

Procedure

- 1 The resin should be transferred to the column and soaked in demineralized, soft, or drinking water for approximately one hour.
- 2 Backwash the resin for at least 30 minutes.
- 3 Let the resin bed settle and then drain to within 10 cm of the top of the bed.
- 4 Let 4 bed volumes of caustic soda solution (4% NaOH) pass through the column at a rate of 2 bed volumes per hour.
- 5 Rinse the resin with at least 4 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 6 Let 4 bed volumes of hydrochloric or sulfuric acid solution (6% HCl or H₂SO₄) pass through the column at a rate of 2 bed volumes per hour.
- 7 Rinse the resin with at least 4 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 8 Let 4 bed volumes of caustic soda solution (4% NaOH) pass through the column at a rate of 2 bed volumes per hour.
- 9 Rinse the resin with at least 5 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 10 Take the resin into service.

Chromatography with strong acid cation resin types

Standard regeneration

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Form supplied

Sodium, calcium, potassium, hydrogen

Resin types

Lewatit® MDS 1368 Ca/MDS 1268 Ca
Lewatit® MDS 1368 Na / MDS 1268 Na
Lewatit® MDS 1368 K / MDS 1268 K

Lewatit® MDS 1369 Ca / MDS 1269 Ca
Lewatit® MDS 1369 Na / MDS 1269 Na
Lewatit® MDS 1369 K / MDS 1269 K

Lewatit® MDS 2368

Procedure

- 1 The resin should be transferred to the column and soaked in demineralized water for approximately one hour.
- 2 Backwash the resin for at least 30 minutes.
- 3 Let the resin bed settle and then drain to within 10 cm of the top of the bed.
- 4 Rinse the resin with at least 2–4 bed volumes of demineralized water at a flow rate of 1 bed volume per hour (preferably at operating temperature).
- 5 Take the resin into service.

Polish with adsorbent resin types**Standard regeneration**

Caustic soda
Ethanol

Form supplied

Nonfunctional

Resin types

Lewatit® S 7968

Lewatit® AF 5

Procedure

- 1** The resin should be transferred to the column and soaked in demineralized, soft, or drinking water for approximately one hour.
- 2** Backwash the resin for at least 30 minutes.
- 3** Let the resin bed settle and then drain to within 10 cm of the top of the bed.
- 4** Let 2 bed volumes of caustic soda solution (4% NaOH) pass through the column at a rate of 2 bed volumes per hour.
- 5** Rinse the resin with at least 4 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 6** Let 0.5 bed volumes of hydrochloric or sulfuric acid solution (0.5% HCl or H₂SO₄) pass through the column at a rate of 2 bed volumes per hour.
- 7** Rinse the resin with at least 4 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 8** Take the resin into service.

Alternative regeneration with ethanol **1 – **3** as above**

- 4** Let 2 bed volumes of ethanol (50–96%) pass through the column at a rate of 2 bed volumes per hour.
- 5** Rinse the resin with at least 4 bed volumes of demineralized water at a flow rate of 2 bed volumes per hour.
- 6** Take the resin into service.



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