

TRAINING PROGRAMME FOR ETP OPERATORS IN TEXTILE INDUSTRY

Promotion of Sustainability in the Textile and Garment Industry in Asia - FABRIC

Pre-treatment - troubleshooting

GIZ FABRIC – ETP Operator Course



Contents

- Role of ETP operator
- Responding to operational issues in screening
- Responding to operational issues in equalization

Role of ETP operator in trouble shooting

Role of ETP operator

- Inadequate performance of pre-treatment units or failure of any such units.
 - Small issues in screening or equalization tank potential to derail performance of entire ETP.
- **Trouble shooting** integral **responsibility of ETP operators**
 - Ability and knowledge to **recognize problems**
 - Ability and knowledge to **analyse problems**
 - Ability and knowledge to **promptly and effectively react**
 - Especially when ETP manager not present
 - Ability and confidence in **advising ETP manager** and others



Responding to operational issues in screening

Operational issues - Screens & grit removal

Common issues

- Non-collection of screenings
- No prompt **removal of collected screenings** resulting in unsightly appearance and sometimes foul odour
- **Missing grit removal**
- Poor condition and **maintenance of** manually cleaned **screens**
- Bar **spacing of screens too wide** (e.g. above 50 mm) and not effectively capturing solids



Operational issues - Screens & grit removal

Issue	Possible reasons	Common solutions
Rise of water levels in channel	<ul style="list-style-type: none">Blocked screenToo narrow screen channel	<ul style="list-style-type: none">Ensure cleaning every shift.Control flow and increase width of channel.
Bad odour from the screen chamber	<ul style="list-style-type: none">Sludge accumulation at bottom of screen chamber	<ul style="list-style-type: none">Ensure no free space at bottom of screen.Periodic cleaning of channel.
Solids bypassing screens	<ul style="list-style-type: none">Gap between channel wall and screenMissing bars in screens.	<ul style="list-style-type: none">Fix screen on frames attached to channel wall.Replace screens
Screen bar space increasing, teeth missing	<ul style="list-style-type: none">Construction of screen in mild steelHigh level of corrosion in screen.	<ul style="list-style-type: none">Construct screen in polypropylene or stainless steel.Protect screen with coating.

Operational issues – Manually cleaned screens

Problem	Possible reasons	Common solutions
Too many solids passing through screens	<ul style="list-style-type: none"> • Bar spacing in screens is too high. • Bars missing in screen. 	<ul style="list-style-type: none"> • Install coarse screens with bar spacing 20 - 40 mm. • Replace screen.
Blockage in screen	<ul style="list-style-type: none"> • Too small bar spacing in screen. • Too many large solids in effluent 	<ul style="list-style-type: none"> • Keep bar spacing of 20-40 mm • Install additional coarse screens with incremental spacing.
Cleaning not effective	<ul style="list-style-type: none"> • Teeth in bar rakes/fork is missing. • Spindle not long enough. 	<ul style="list-style-type: none"> • Get new fork (ideally stainless steel) • Have correct length of spindle.
Unpleasantness & bad odour from screening collection	<ul style="list-style-type: none"> • Screened material kept in drain chamber for too long • Drainage of chamber not functioning properly 	<ul style="list-style-type: none"> • Remove collected screenings from drain chamber promptly. • Clean and wash drain chamber • Clean with bleach

Operational issues – Mechanically cleaned bar screens

Problem	Possible reasons	Common solutions
Excessive grit in bar screen chamber	<ul style="list-style-type: none"> • Surging in chamber due to increased water level. • Flow velocity too low 	<ul style="list-style-type: none"> • Remove bottom irregularity or re-slope bottom. • Increase flow velocity in chamber or flush with hose.
Screen clogging	<ul style="list-style-type: none"> • Too much debris in influent • Drains used for disposal 	<ul style="list-style-type: none"> • Use coarser pre-screen • Advise factory management to instruct all staff
Rake not working	<ul style="list-style-type: none"> • Jammed mechanism 	<ul style="list-style-type: none"> • Remove obstruction
Rake not working, but motor running	<ul style="list-style-type: none"> • Broken chain or cable • Broken limit switch 	<ul style="list-style-type: none"> • Replace chain or cable • Replace limit switch
Foul odour from screen area	<ul style="list-style-type: none"> • Too much accumulation of screenings 	<ul style="list-style-type: none"> • Increase frequency of screening removal and disposal

Operational issues – Brush screens

Problem	Possible reasons	Common solutions
Solids leaking through the screen	<ul style="list-style-type: none">• Gaps between screen wall and screen.	<ul style="list-style-type: none">• Reinstall screen properly.• Use sealants to close gaps.
Screen getting clogged.	<ul style="list-style-type: none">• Too many coarse solids in influent• Screen pores blocked	<ul style="list-style-type: none">• Install coarse screen before brush screen• Check wash and ensure its operation• Use water jet to clean screen
Brush does not scoop out screening	<ul style="list-style-type: none">• Rake arm bristles clogged with screenings• Rake arm bristles are worn out.• Misalignment of brush and plates	<ul style="list-style-type: none">• Clean brush and physically remove entangled solids• Replace bristles• Re-align rake arm & plates.

Operational issues – Brush screens

Problem	Possible reasons	Common solutions
Screening falls back to filtered effluent	<ul style="list-style-type: none">• Scooped screenings are full• Misalignment	<ul style="list-style-type: none">• Re-align• Remove the screenings daily.

Operational issues – Drum screens

Problem	Possible reasons	Common solutions
Screenings falling back into filtered effluent	<ul style="list-style-type: none"> • Doctor blades not operating properly. 	<ul style="list-style-type: none"> • Clean doctor blades • Replace if needed.
Drum bars getting clogged	<ul style="list-style-type: none"> • Flush water jet not effective. • Water supply maybe cut-off 	<ul style="list-style-type: none"> • Check nozzles and replace if necessary.
Screenings not collected properly	<ul style="list-style-type: none"> • Screw conveyor not working properly 	<ul style="list-style-type: none"> • Align conveyor with tray. • Clean any deposit in channel tray
Solids overflow from drum	<ul style="list-style-type: none"> • Too much coarse solids in effluent • Influent pumping rate too high 	<ul style="list-style-type: none"> • Install coarse screen before drum screen • Reduce pumping rate
Screen tripping	<ul style="list-style-type: none"> • Overload of effluent • Conveyor tray jammed 	<ul style="list-style-type: none"> • Maintain designed flow • Clean the conveyor tray

Operational issues – Grit remover

Problem	Possible reasons	Common solutions
Excessive grit in bar screen chamber	<ul style="list-style-type: none">• Collector operating too fast• Bucket elevator or grit conveyor operating at too low speed	<ul style="list-style-type: none">• Reduce collector speed• Increase grit conveyor speed
Foul smell in grit chamber	<ul style="list-style-type: none">• Too much organics in grit separated.• Submerged debris	<ul style="list-style-type: none">• Clean chamber and dose with hypochlorite• Empty chamber daily
Excessive corrosion of metal parts	<ul style="list-style-type: none">• Accumulation of organic solid• Inadequate ventilation	<ul style="list-style-type: none">• Ensure removal of settled solids• Increase ventilation
Surface turbulence in aerated grit chamber too low	<ul style="list-style-type: none">• Diffuser/nozzles covered by dirt.• Problems in air lines	<ul style="list-style-type: none">• Clean diffusers/nozzles• Check and repair air lines.

Operational issues – Grit remover

Problem	Possible reasons	Common solutions
Low recovery rate of grits	<ul style="list-style-type: none">• Bottom scour• Too much aeration• Not enough retention time	<ul style="list-style-type: none">• Maintain velocity after deflectors at around 0.3 m/s.• Reduce aeration.• Increase retention time/reduce flow
Overflowing of grit chamber	<ul style="list-style-type: none">• Pump surge problem	<ul style="list-style-type: none">• Adjust pump control
Gas bubbles in grit chamber	<ul style="list-style-type: none">• Accumulation of organic solid in grit chamber	<ul style="list-style-type: none">• Ensure wash unit operating properly• Full removal of grit daily,
Vibration or tripping of grit remover	<ul style="list-style-type: none">• Too many solids accumulation in chamber.• Loose parts/mis-alignment	<ul style="list-style-type: none">• Clean chambers in fully.• Align/tighten scrapper

Responding to operational issues in equalization

Operational issues - Equalization

Common issues

- Importance of good **equalization** often **underestimated**
 - More than just large collection tank (!)
- Effluent often **pumped straightway** into treatment without homogenization or self neutralization
- Heavy **accumulation of sludge** and resultant issues
- **Postponement of cleaning** leading to damage of diffusers and reduced ETP performance
 - Tank to be emptied for cleaning



Operational issues - Equalization

Problem	Possible reasons	Common solutions
Dead aeration spots in equalization tanks	<ul style="list-style-type: none">• Too much grit in inlet to tank• Diffusers getting clogged.• Sludge accumulation too much.• Discontinuous aeration leading to sludge settling and disposition.	<ul style="list-style-type: none">• Install grit removal system.• Clean diffusers at least once in six months.• Do not stop aeration in tank for not more than 4 hours
Wide variations in pH and TSS loads in equalized effluent	<ul style="list-style-type: none">• Lack of maintenance of minimum level in tank for homogenization• Mixing not effective	<ul style="list-style-type: none">• Maintain minimum 1 m level always• Operate aeration continuously.• If needed supplement with mixers.

Operational issues - Equalization

Problem	Possible reasons	Common solutions
Tank surface & walls appears dirty	<ul style="list-style-type: none">• Too much organics in effluent• Algae/fungus growth on surface	<ul style="list-style-type: none">• Clean tank thoroughly once in three months.• Use bleach liquor for cleaning.
Too much foam	<ul style="list-style-type: none">• Presence of wetting agents• Aeration is vigorous	<ul style="list-style-type: none">• Use de-foamers or water spray• Optimize aeration.
Foul odour from equalization tank	<ul style="list-style-type: none">• Too many organic solids in effluent.• High accumulation of sludge• Inadequate aeration/mixing	<ul style="list-style-type: none">• Optimize aeration• If needed, supplement with mixing (mixing power needed $>30 \text{ W/m}^3$)• Clean tank regularly using bleach

Operational issues - Equalization

Problem	Possible reasons	Common solutions
Equalized effluent black in color	<ul style="list-style-type: none">Anaerobic conditions in tankToo much sludge accumulation in tank	<ul style="list-style-type: none">Operate aeration continuouslyEnsure mixed as neededClean tank periodically
Tank volume lost due to solids settling	<ul style="list-style-type: none">Insufficient aeration/mixingToo many settleable solids in raw effluent.	<ul style="list-style-type: none">Ensure minimum aeration/mixingIf needed, install pre-settler prior to equalization tank
Diffusers getting brittle and damaged quickly	<ul style="list-style-type: none">Too high calcium content in effluent.	<ul style="list-style-type: none">Clean diffusers with oxalic acid once in three months

**Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH**

Registered offices
Bonn and Eschborn

GIZ Bangladesh
PO Box 6091, Gulshan 1
Dhaka 1212, Bangladesh
T +880 2 5506 8744-52, +880 9666 701 000
F +880 2 5506 8753
E giz-Bangladesh@giz.de
I www.giz.de/bangladesh