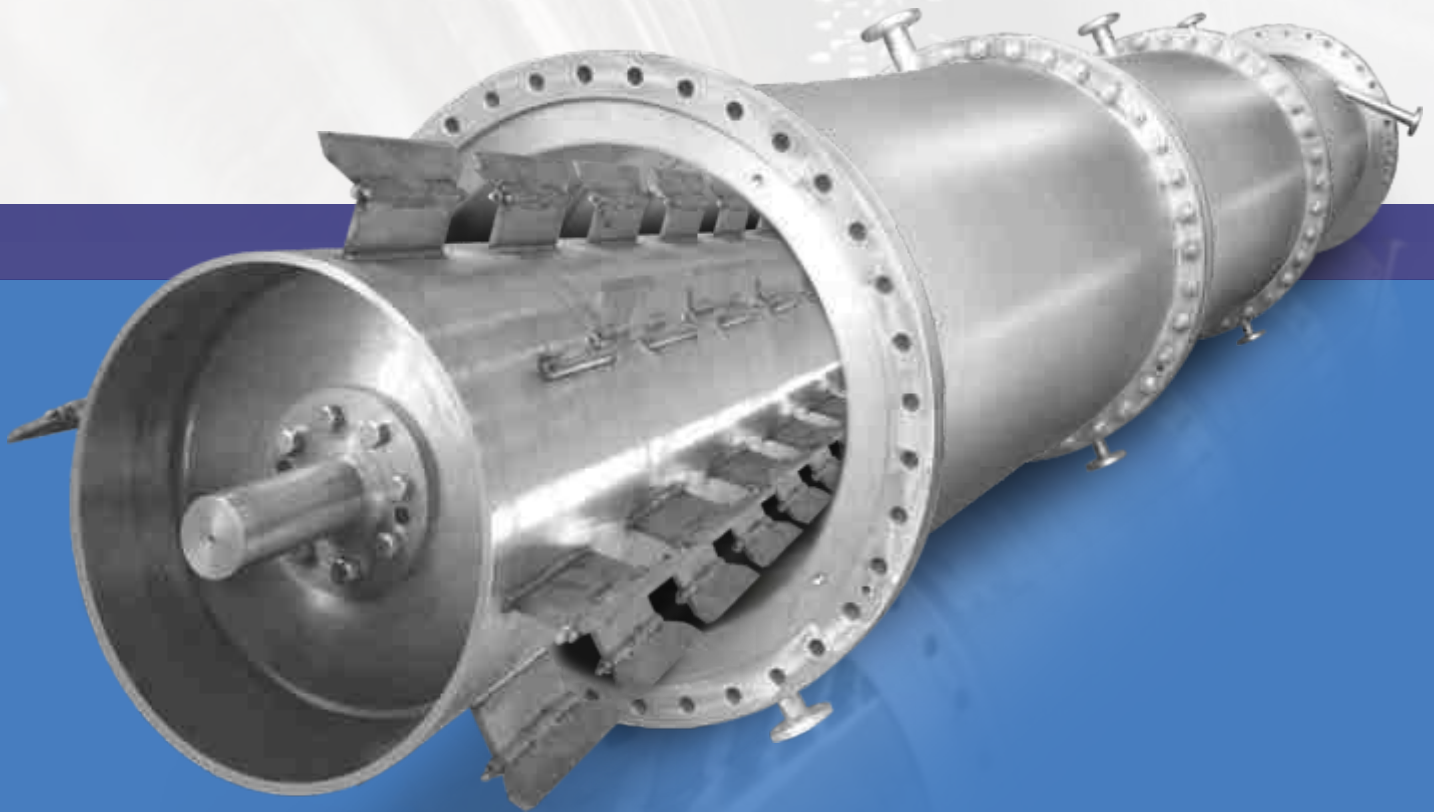




**Balaji**  
THIN FILM TECHNOLOGIES

Value for Reliability

**Self-Cleaning and Robust  
Thin Film Technologies**



Concentrated Slurry to  
Zero Liquid Discharge (Dry Powder)

## We

The leading specialty in thin film technology. Our technical engineering solutions are based on experiences. We manufacture system and equipments in the field of evaporation, drying and high viscosity applications.

We also manufacture special equipments supported by comprehensively equipped test centers with pilot system.

Our project management team develops both individual and economical solution for the process of engineering requirements.

Globally active company have trust on us for quality manufacturing.

## Vision

Having team of experienced process engineers as well as specialized machining engineers who are capable of carrying out basic engineering, process design of equipments and precise machining by utilizing their in depth knowledge and experience.

## Mission

To be a world leading equipment supplier through archiving proven track record of quality and performance.

## We offer

- Feasibility studies
- ATFD / ATFE trials for laboratory and pilot plants performed at the your premise with Mobile Pilot plant
- Basic and detailed engineering
- Delivery of turnkey plants for R&D, pilot, and industrial applications
- Plant start-up, commissioning, and process optimization
- Leak detection, maintenance, and repair
- Spare parts service
- Consulting and support through our worldwide network

## Quality Standards

Our Thin film Technologies are Manufacture as per ISO quality certified facilities. Welding, design and fabrication process are employed according to ASME section VIII Div - 1



# ATFD

## Agitated Thin Film Dryer

### We recommend the DRY CONTROLFILM ROTOR:

Designed for product recovery and other severe service applications such as yours, This drying technology arises from over years experience in soap plant glycerine and inorganic salt recovery. We have optimized the dryer technology for glycerine recovery as well as inorganic salts.

We have special precision designed centrifugally balanced blade design that has higher efficiency compared with other types of dryers. The balance and weighting cause the blade to ride truer and quieter on the film and give higher product quality due to heavily reducing entrainment. The advanced wipers geometry reduce splashing to a minimum, which means less wet salt gets into rotor blade slots. This wet salt causes build up which shuts operations down. In fact the time between required wash cycles are at least three to four times as long as previously experienced. The balanced design means less wear, and less jamming or lockup of blades. The design lifetime is proving to be much longer than previous of wipers due to special mechanical design.

The discharge system has also been enhanced in recent years and can be discussed personally. It is proprietary but not necessarily confidential.

Instead of providing any valves to discharge system we recommend maximum up time or directly trolley to removes the bottom products.

### How ATFD work:

Wet product in form of slurry (range from 30 to 50 % w/w) fed through the inlet nozzle is conveyed steadily by the rotor blades along the heated dryer wall in a thin film (With the help of steam or Hot Oil or any heating media), normally several millimeters thick, preventing buildup and continuously exposing every particle of the product to the heated surface. Vapors pass counter currently to the product flow and exit the dryer through the feed nozzle, as configured above. Moisture levels from a few tenths of a percent up to 5%+ can be achieved. Residence time is typically controlled as per requirement.

Our thin-film dryers are widely used throughout the process industries to convert liquids, slurries, and pastes to free-flowing solids in continuous, single pass operation.

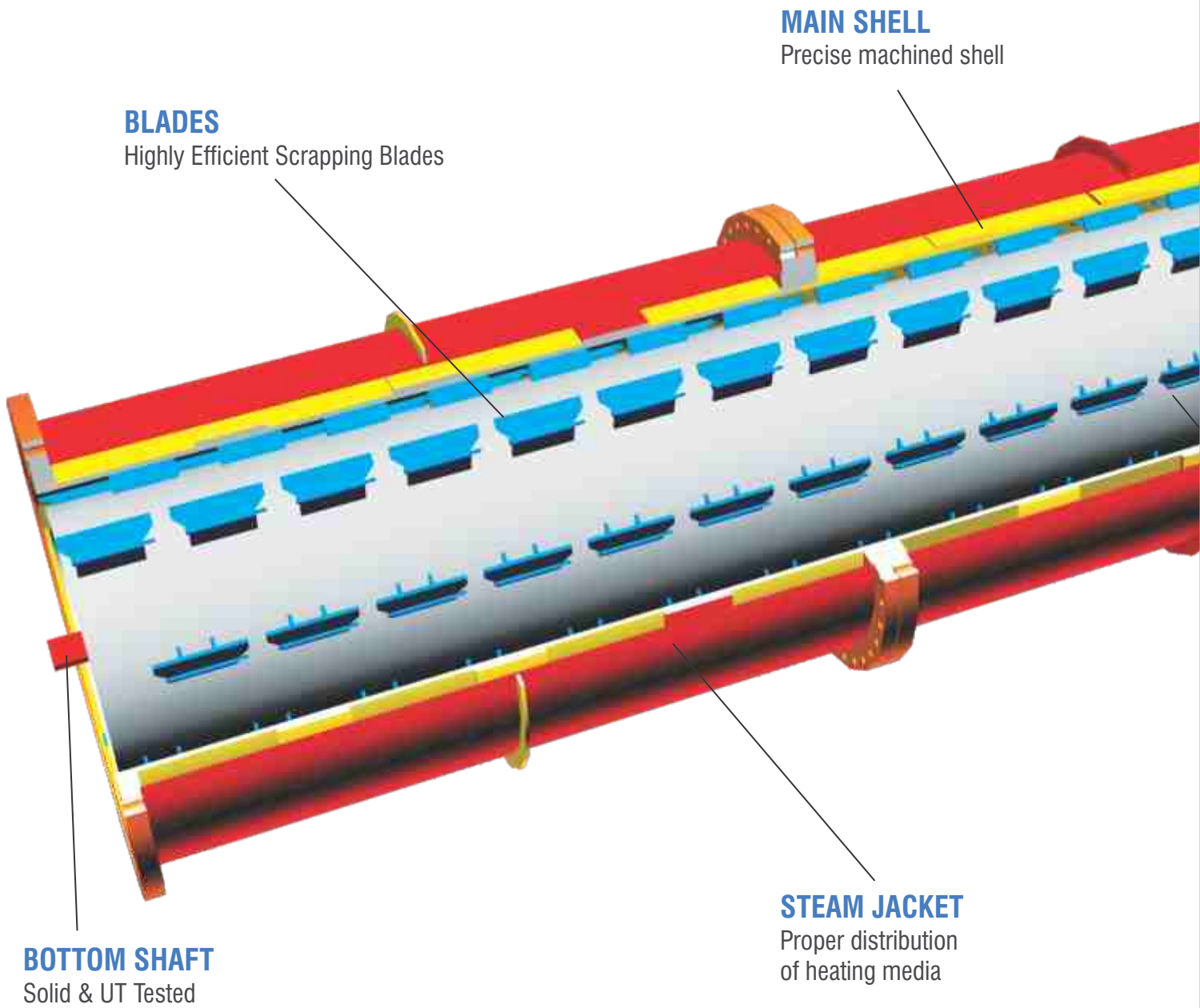
Our Thin-film Dryers have a short residence time and are very effective in processing heat sensitive products, due to low "hold-up" and self-cleaning heating surfaces.

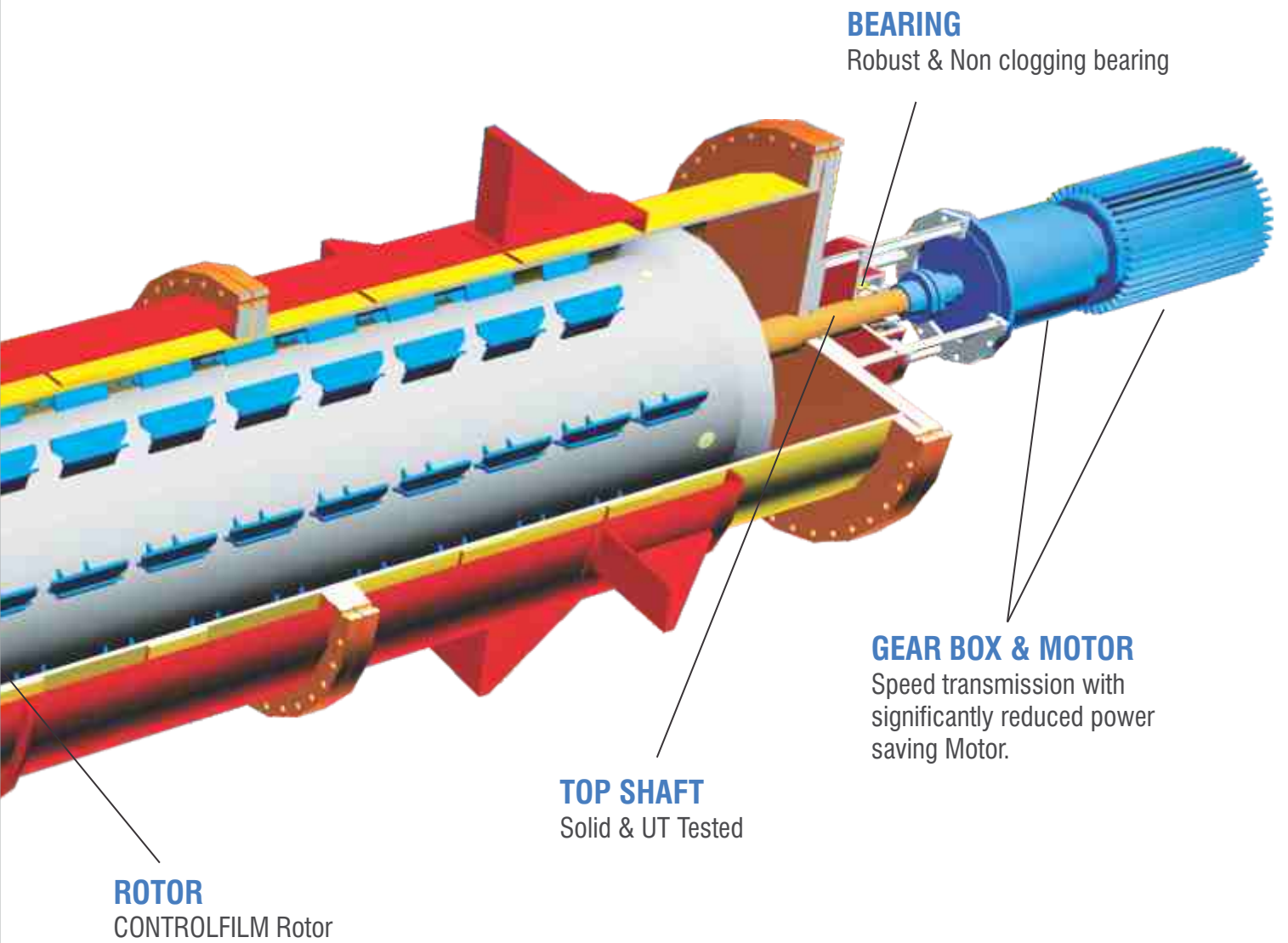
### Salient Features:

- Flexible through exchangeable rotor elements
- Continuous, fully enclosed processing
- Short residence time
- Low residual volatile in final powder
- Superior mixing efficiency
- Self-cleaning of heating surface
- Low energy consumption
- Minimal product hold-up
- High Reliability
- Low Maintenance



# Self-Cleaning and Robust Thin Film Technologies





**BEARING**

Robust & Non clogging bearing

**GEAR BOX & MOTOR**

Speed transmission with significantly reduced power saving Motor.

**TOP SHAFT**

Solid & UT Tested

**ROTOR**

CONTROLFILM Rotor

# ATFE

## Agitated Thin Film Evaporator

**Agitated Thin Film Evaporators are successfully used for the purification of organic compounds that are heat sensitive, viscous and have high boiling points.**

### ATFE Systems Experience

The key to the successful use of the ATFE is the proper selection and installation of ancillary equipment and instrumentation required to allow the ATFE to operate at its full capability.

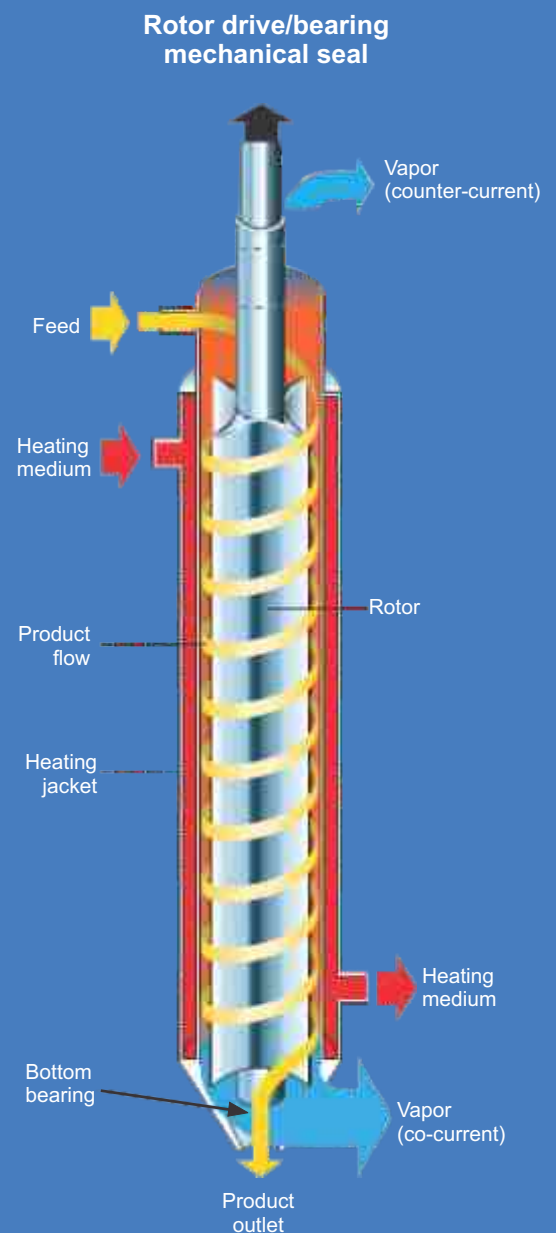
ATFE, Balaji Thin Film Technology has been designing and supplying comprehensive WFE Systems to solve different processing problems for domestic and international clientele. Systems can vary in scope from simple to complex, multistage ATFE Systems that include the following:

- Feed degasses
- Multiple ATFES
- Level tanks and pumps
- Tempered water systems
- Multi-stage vacuum systems
- Thermal fluid systems
- Utility and process piping
- Instrumentation and controls
- Modular assembly on support steel (12 ft. x 12 ft. x 40 ft. high)
- Operating/maintenance

ATFE Systems are our business. Our experienced project engineers will match your process objectives with a well-defined system that will satisfy all of your process and other special requirements.

### Typical Applications for ATFE / Column Systems

- Typical operating pressures in the range of 10-30 torr and in special cases, as low as 100 microns.
- Distillation step previously done in batch reactor
  - Eliminates heat history and minimizes thermal degradation
  - Thin film improves stripping of VOCs
  - Higher operating vacuums
  - Efficiently processes viscous solutions
- Product quality improvement
  - Eliminates color bodies
  - Increases purity; minimizes impurities
  - Continuous operation
  - Low residence time eliminates thermal degradation
- Enhanced product recovery
  - Recovers additional bottoms product from overhead
  - Eliminates loss due to thermal degradation
  - Recovers additional distillate product from bottoms
- Separation of close-boiling compounds



A vertical thin-film evaporator

## Applications

- Pharmaceuticals
- Waste Sludges
- Solvent recovery from effluent
- Press cakes and Pigments
- Fine chemicals
- Herbicides
- Agrochemicals (Atrazine etc.)
- Wastewater and spent liquors
- Chlorides
- Bromides
- Sulfates
- Chemical intermediates
- Solvent recovery from waste
- Carbonates
- Phosphates
- Dyes and pigments
- Glycerin recovery from salt



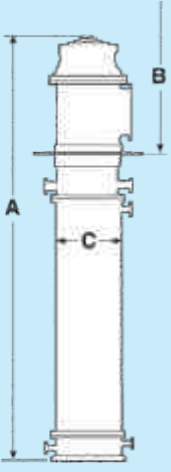
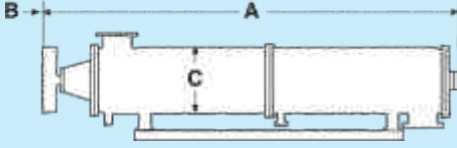
## Mobile Test facility / Process Guarantees

**Our Mobile Test Facility, can process your product to demonstrate the utility of the ATFE / ATFD. Computer-controlled operating parameters allow us to handle many different product characteristics and provide data for a comprehensive report of the test results. Balaji can provide a process guarantee based on these test results that will ensure commercial success for you.**



# Our Capabilities

Dimensional Information (approximate)

|            | Area (m <sup>2</sup> ) | A Overall Length (mm) | B Rotor Withdrawal (mm) | C Diameter (mm) |   |
|------------|------------------------|-----------------------|-------------------------|-----------------|---|
| VERTICAL   | 1                      | 2375                  | 3200                    | 345             |  |
|            | 2                      | 3130                  | 4050                    | 453             |   |
|            | 4                      | 4385                  | 5450                    | 619             |   |
|            | 5                      | 4795                  | 6000                    | 735             |   |
|            | 6                      | 5295                  | 6500                    | 735             |   |
|            | 8                      | 5785                  | 7150                    | 841             |   |
|            | 12                     | 6920                  | 8450                    | 990             |   |
|            | 18                     | 9630                  | 9850                    | 1140            |   |
|            | 24                     | 10815                 | 11140                   | 1350            |   |
|            | 32                     | 12450                 | 12620                   | 1550            |   |
|            | 40                     | 13700                 | 13550                   | 1865            |   |
| HORIZONTAL | 1                      | 2490                  | 2410                    | 304             |   |
|            | 3                      | 3930                  | 3510                    | 530             |   |
|            | 5                      | 4510                  | 4000                    | 620             |   |
|            | 8                      | 6140                  | 5650                    | 735             |   |
|            | 14                     | 7400                  | 6000                    | 990             |   |
|            | 20                     | 9600                  | 6650                    | 1140            |   |
|            | 30                     | 11050                 | 8350                    | 1550            |   |
|            | 40                     | 12650                 | 9550                    | 1865            |   |



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