



High-throughput process development

PreDictor™ 96-well filter plates and Assist software

PreDictor 96-well filter plates (Fig 1) are prefilled with GE Healthcare Life Sciences' BioProcess™ chromatography resins. PreDictor plates support high-throughput process development (HTPD) by allowing parallel screening of chromatographic conditions, either in a manual or in an automated workflow. Assist software supports the PreDictor workflow from set up of experimental design to data evaluation. Data generated using PreDictor plates show good correlation with data from chromatography columns, making the plates an excellent tool for initial screening of process conditions.

Using PreDictor plates and Assist software shortens time to market and increases productivity in the process development laboratory by:

- reducing experimental time for screening from weeks to hours
- significantly lowering sample consumption
- increasing process understanding by exploring an enlarged experimental space

Parallel screening in a miniaturized format allows for higher throughput, better process understanding, and low sample consumption. The availability of PreDictor 96-well filter plates prefilled with BioProcess chromatography resins and Assist software for experimental setup and data evaluation enables high-throughput screening of downstream purification process conditions while keeping sample consumption at a minimum.



Fig 1. PreDictor 96-well filter plates.

High-throughput process development for increased process understanding

Development of robust purification processes requires significant time and resources. The quality-by-design initiative by the FDA might put additional demands on process development work because a higher degree of process understanding is needed. This understanding can be obtained if a larger experimental space is investigated and/or more detailed studies are performed. Employing high-throughput techniques for process development aids in addressing these challenges.

HTPD is a way of working that shortens development time and increases the amount of information available during early process development while keeping sample consumption low. Chromatographic conditions are evaluated in a parallel manner using 96-well filter plates. As a result, a large number of experimental conditions can be evaluated simultaneously. This allows screening of a large experimental space to identify the subspace that is favorable with respect to one or several defined responses. Once this subspace has been found, optimization and scale-up can be done on columns and ÄKTA™ systems. The complete conceptual workflow is shown in Figure 2.

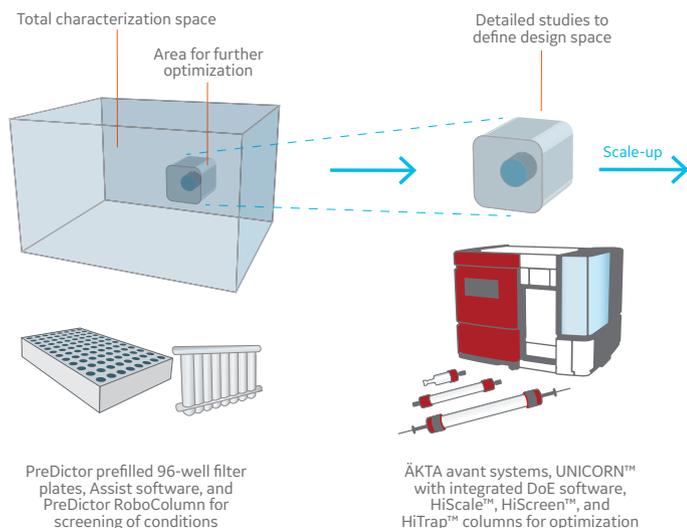


Fig 2. Conceptual visualization of a workflow for process development. Parallel screening using PreDictor plates or PreDictor RoboColumn units makes it possible to explore a large experimental space for best conditions. Once these have been identified, fine tuning and verification are carried out on columns and ÄKTA systems. Finally, scale-up is done under conditions in which a robust production scale process can be operated.

HTPD workflow

The HTPD workflow consists of the following steps:

1. Plan: systematic approach for experimental setup
2. Perform: testing of various experimental conditions in a parallel manner
3. Analyze: high-throughput analysis
4. Evaluate: data analysis and evaluation

Plan: systematic approach for experimental setup

An experimental setup should take advantage of the possibility to test many different conditions (factors) simultaneously. Preferentially, this is done by using design of experiments (DoE), which employs statistics to identify and define the factors having the greatest impact on the process/product. This involves construction of a carefully selected set of experiments in which all relevant factors are varied and evaluated simultaneously to maximize the information gained. However, other experimental setups can be used as well.

Before starting, the experimental objectives should be defined. These can include:

Screening

- Which factors are most important (i.e., have significant effect on the response)?
- What factor range should be explored?

Optimization

- What is the optimal combination of settings for the important factors?
- If there is more than one response, is it possible to find common factor settings that satisfy all responses, or is a compromise needed?

Robustness testing

- Is the process robust (i.e., unaffected by typical process variations)?
- How much will the product specifications vary due to process variations?

It is important to define the factors and responses to be studied. The selection of analytical techniques for the responses will affect the amount of sample needed for each experiment. We recommend replicates to allow for outlier analysis. The number of factors and the number of replicates will influence the plate setup. Assist software suggests plate layouts for different experimental designs.

Perform: testing of various experimental conditions in a parallel manner

The 96-well approach allows for high-throughput screening of a large number of experimental conditions. PreDictor plates are prefilled with different BioProcess chromatography resins. Experiments are performed in batch mode, which eliminates errors induced by nonoptimal formats or packing procedures. The principle is shown schematically in Figure 3. Removal of liquid through the bottom filter is done by either centrifugation or vacuum filtration.

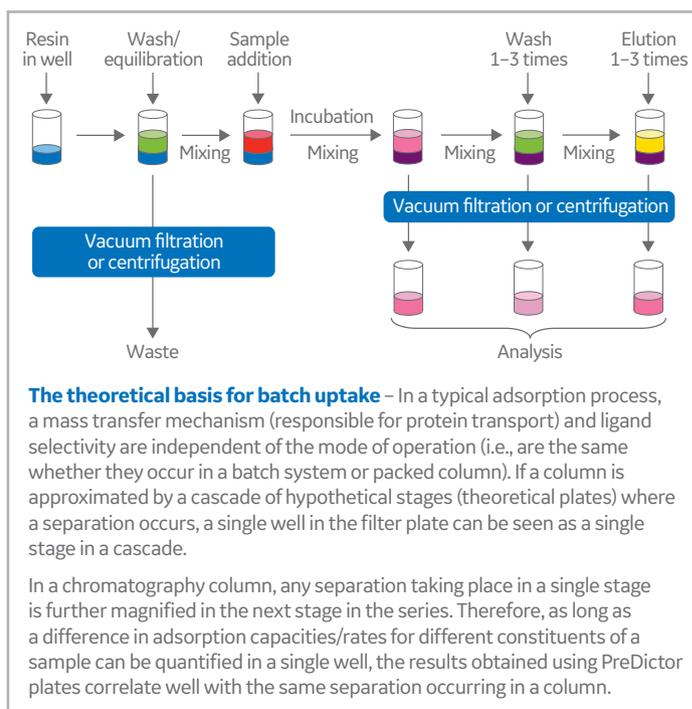


Fig 3. A batch uptake experiment occurring in the wells of PreDictor plates. The steps in PreDictor plate experiments are the same as in a typical chromatography experiment: equilibration, sample loading, wash, and elution.

Analyze: high-throughput analysis

The number of samples to analyze in the HTPD workflow will be numerous. Therefore, high-throughput analytical methods are preferred if available. In some cases, simple A280 measurements might be sufficient during the initial screening step.

During the initial screening phase, analyses should be limited to the most critical responses. Based on these results, selected conditions can be chosen for responses that require more advanced analytical methods.

Evaluate: data analysis and evaluation

Data are analyzed and evaluated by using traditional evaluation methods or dedicated software tools. Assist software supports the management and evaluation of data generated with PreDicator plates. Based on the results, further investigation in HTPD mode might be relevant before moving to column verification and fine-tuning.

Applications

Screening of chromatographic conditions

PreDicator plates can be used to screen different parts of the chromatographic cycle, for example, determination of binding, wash, and elution conditions. This can be done for different chromatography resins simultaneously using dedicated screening plates, or more thoroughly using plates with a single resin. Regardless of which, different applications will require different amounts of chromatography resins in the wells (see “PreDicator plate selection” and Table 3).

Determination of absolute amounts in the lower concentration range can be difficult as it cannot be excluded that, under unfavorable conditions, nonspecific adsorption to the plate might occur.

Determination of adsorption isotherms

Adsorption isotherms can also be determined in PreDicator plates. In short, the adsorption isotherm describes the relation between the concentrations of protein(s) in the liquid and solid phases at equilibrium under a given set of experimental conditions. This helps to understand and correctly describe what happens during protein uptake under different conditions. Dedicated PreDicator plates are available to facilitate experimental setups.

Application examples are described in references that are found under the “Related literature” section.

PreDicator product characteristics

96-well filter plates

PreDicator 96-well filter plates are made of polypropylene (PP) and polyethylene (PE) and are disposable. Each well has a total volume of 800 μL , and each plate is prefilled with a defined amount of chromatography resin per well. Table 1 summarizes the characteristics of PreDicator filter plates. For each chromatography resin, different plates with different resin volumes are available to fit various applications (Tables 2 and 3). The plates are sealed at the top and bottom at delivery. Plates are supplied in packs of four, which is sufficient to perform 128 tests in a study measured as triplicates. For larger studies, it is preferable to use PreDicator plates from the same lot.

Prefilled chromatography resins

Table 2 lists chromatography resins that are available in PreDicator plates. For details on the different resins, see corresponding data files listed under “Related literature”. Recommendations on which plate to use are given in Table 3.

Table 1. PreDicator plate characteristics

Plate size	127.8 \times 30.6 \times 85.5 mm (according to ANSI/SBS 1–2004, 3–2004 and 4–2004 standards)
Material	Polypropylene and polyethylene
Number of wells	96
Well volume	800 μL
Working volume/well when incubating on a microplate shaker	100 to 300 μL *
Volume sedimented resin/well	2, 6, 20, or 50 μL ; For PreDicator isotherm plates different in different wells: 2, 4, 6, 8, 20 and 50 μL
Resin suspensions in total volumes	200 μL for 2 μL sedimented resin/well 500 μL for 6, 20, and 50 μL sedimented resin/well For PreDicator isotherm plates: – 500 μL for 50 μL sedimented resin/well – 200 μL for 20 μL sedimented resin/well – 500 μL for 8 μL sedimented resin/well – 375 μL for 6 μL sedimented resin/well – 250 μL for 4 μL sedimented resin/well – 125 μL for 2 μL sedimented resin/well
Storage solution	PreDicator Capto™ S, Capto S ImpAct, Capto SP ImpRes, Capto MMC ImpRes, SP Sepharose™ Fast Flow, CIEX screening, Capto CIEX polishing screening, Capto SP ImpRes isotherm, Capto S isotherm, and SP Sepharose Fast Flow isotherm: 20% ethanol + 0.2 M sodium acetate; All other PreDicator plates: 20% ethanol
Recommended storage temperature	2°C to 8°C
Working temperature	4°C to 30°C
Centrifugation recommended	300 to 500 \times g (sample dependent)
Centrifugation maximum	700 \times g
Vacuum pressure recommended	-0.15 to -0.3 bar (sample dependent)
Vacuum pressure maximum	-0.5 bar
Microplate shaker mixing speed	1100 rpm with 3 mm circular centripetal movement, or sufficient mixing to maintain slurried chromatography resin in wells
Bar code	Placed on one of the short ends of the filter plate and containing article number, lot number, and individual identification number

* The lower volume in this interval indicates the working volume needed for effective mixing of sample/liquid on microplate shaker. The upper limit is the limiting volume for avoiding cross contamination between wells during mixing on a microplate shaker without sealing the top of the filter plate.

Note: The volume and the amount of protein needed for analysis are also to be taken into consideration.

Table 2. Available PreDicator plate products

Product	Single resin plate	Chromatography resin volume per well* (µL)
Ion exchange		
PreDicator Capto S ImpAct	Yes	2 or 20
PreDicator Capto Q	Yes	2 [†] , 20, or 50
PreDicator Capto DEAE	Yes	2, 20, or 50
PreDicator Capto Q ImpRes	Yes	6 or 20
PreDicator Capto SP ImpRes	Yes	6 or 20
Multimodal		
PreDicator Capto MMC	Yes	6 [†] , 20, or 50
PreDicator Capto adhere	Yes	6, 20, or 50
PreDicator Capto MMC ImpRes	Yes	6 or 20
PreDicator Capto adhere ImpRes	Yes	6 or 20
Affinity		
PreDicator MabSelect™ Prisma	Yes	6, 20, or 50
PreDicator MabSelect SuRe™ LX	Yes	6, 20, or 50
PreDicator MabSelect SuRe	Yes	6, 20, or 50
PreDicator Capto L	Yes	6, 20, or 50
Hydrophobic interaction		
PreDicator Capto Butyl	Yes	6 or 50
PreDicator Capto Octyl	Yes	6 or 50
PreDicator Capto Phenyl (high sub)	Yes	6 or 50
Screening plates		
PreDicator Capto CIEX polishing screening [‡]	No	2/6 or 20
PreDicator Capto AIEX polishing screening [§]	No	2/6 or 20
PreDicator Capto HIC screening plate [¶]	No	50
PreDicator AIEX screening ^{††}	No	2/6 or 20
PreDicator CIEX screening ^{**}	No	2/6 or 20
PreDicator HIC screening high hydrophobicity ^{‡‡}	No	6 or 50
PreDicator HIC screening low hydrophobicity ^{§§}	No	6 or 50
Isotherm plates		
PreDicator adsorption isotherm plate	No	Different resin volume in different wells (2, 4, 6, 8, 20, and 50)

* Note that the total resin suspension volume per well is larger than the chromatography resin volume. The total resin suspension volume per well is different depending on chromatography resin volume in the well. For total resin suspension volume per well, see Table 1.

[†] The plates with 2 and 6 µL are developed for the same application. Different volumes are used based on the properties of the resins: 2 µL is sufficient for the high-capacity ion exchangers, while for the other resins 6 µL is required for optimal results.

[‡] PreDicator Capto CIEX polishing screening 2 µL/6 µL contains the following resin volumes per well: Capto S ImpAct 2 µL, Capto S ImpRes 6 µL, and Capto MMC ImpRes 6 µL. PreDicator Capto CIEX polishing screening plate 20 µL contains 20 µL per well of the corresponding resins.

[§] PreDicator Capto AIEX polishing screening 2 µL/6 µL contains the following resin volumes per well: Capto Q 2 µL, Capto Q ImpRes 6 µL, Capto adhere 6 µL, and Capto adhere ImpRes 6 µL. PreDicator Capto AIEX polishing screening plate 20 µL contains 20 µL per well of the corresponding resins.

[¶] PreDicator HIC screening 50 µL contains the following resins: Capto Phenyl, Capto Butyl, Capto Octyl, Capto Phenyl ImpRes, and Capto Butyl ImpRes.

^{**} PreDicator AIEX screening 2 µL/6 µL contains the following resin volumes per well: Capto Q 2 µL, Capto DEAE 2 µL, Q Sepharose Fast Flow 6 µL, and Capto adhere 6 µL. PreDicator AIEX screening plate 20 µL contains 20 µL per well of the corresponding resins.

^{††} PreDicator CIEX screening 2 µL/6 µL contains the following resin volumes per well: Capto S 2 µL, SP Sepharose Fast Flow 6 µL, and Capto MMC 6 µL. PreDicator CIEX screening plate 20 µL contains 20 µL per well of the corresponding resins.

^{‡‡} PreDicator HIC screening high hydrophobicity contains the following resins: Phenyl Sepharose 6 Fast Flow (low sub), Capto Butyl, Phenyl Sepharose 6 Fast Flow (high sub), and Capto Phenyl (high sub).

^{§§} PreDicator HIC screening low hydrophobicity contains the following resins: Butyl-S Sepharose 6 Fast Flow, Octyl Sepharose 4 Fast Flow, Butyl Sepharose 4 Fast Flow, and Capto Octyl.

PreDicator plate selection

Different PreDicator plates

For optimal results, different applications and samples will require the use of the correct type of plate. Different PreDicator plates are therefore available to support different types of studies.

The plates can be divided into three main categories:

1. Single resin plates

- For binding, wash, or elution studies on a single chromatography resin
- Same volume in all wells on a plate
- For each chromatography resin, two to three different single resin plates are available, each with a different resin volume per well. Select plate depending on type of study (Table 3).

2. Resin screening plates

- For binding, wash, or elution studies on multiple chromatography resins
- Seven types of plates are available:
 1. PreDicator Capto CIEX polishing screening (Capto S ImpAct, Capto SP ImpRes, and Capto MMC ImpRes)
 2. PreDicator Capto AIEX polishing screening (Capto Q, Capto Q ImpRes, Capto adhere, and Capto adhere ImpRes)
 3. PreDicator Capto HIC screening plate (Capto Phenyl, Capto Butyl, Capto Octyl, Capto Phenyl ImpRes, and Capto Butyl ImpRes)
 4. PreDicator AIEX screening (Capto Q, Capto DEAE, Q Sepharose Fast Flow, and Capto adhere)
 5. PreDicator CIEX screening (Capto S, SP Sepharose Fast Flow, and Capto MMC)
 6. PreDicator HIC screening high hydrophobicity [Phenyl Sepharose 6 Fast Flow (low sub), Capto Butyl, Phenyl Sepharose 6 Fast Flow (high sub), and Capto Phenyl (high sub)]
 7. PreDicator HIC screening low hydrophobicity (Butyl-S Sepharose 6 Fast Flow, Octyl Sepharose 4 Fast Flow, Butyl Sepharose 4 Fast Flow, and Capto Octyl)
- For each plate type, two different resin screening plates are available, each with different resin volumes per well. Select plate depending on type of study (Table 3).

3. Adsorption isotherm plates

- For binding studies performed under equilibrium conditions to obtain fundamental thermodynamic understanding of the adsorption process
- Contains a single resin in all wells but with different volumes in different wells. This design allows simple and rapid construction of isotherms because different phase ratios are obtained without sample manipulations.

Table 3. PreDicator plate selection guide

Single resin plates	Binding conditions (µL/well)				Wash/elute conditions (µL/well)			
	2	6	20	50	2	6	20*	50†
Capto Q	++	NA	-	-	-	NA	++	+
Capto S ImpAct	++	NA	-	NA	-	NA	++	NA
Capto Q ImpRes	NA	++	-	NA	NA	-	++	NA
Capto SP ImpRes	NA	++	-	NA	NA	-	++	NA
Capto DEAE	++	NA	-	-	-	NA	++	+
Capto MMC	NA	++	-	-	NA	-	++	+
Capto MMC ImpRes	NA	++	-	NA	NA	-	++	NA
Capto adhere	NA	++	-	-	NA	-	++	+
Capto adhere ImpRes	NA	++	-	NA	NA	-	++	NA
MabSelect family	NA	++	-	-	NA	-	++	+
Capto L	NA	++	-	-	NA	-	++	+
Capto Butyl	NA	++	NA	-	NA	-	NA	++
Capto Octyl	NA	++	NA	-	NA	-	NA	++
Capto Phenyl (high sub)	NA	++	NA	-	NA	-	NA	++

Screening plates	2 or 6	20 or 50	2 or 6	20 or 50
Capto CIEX polishing screening plate	++	-	-	++
Capto HIC screening plate		++		++
Capto AIEX polishing screening plate	++	-	-	++
AIEX screening plate	++	-	-	++
CIEX screening plate	++	-	-	++

++ First choice + Possible - Not recommended NA Product not available

Isotherm plates

Resins volume per well (µL)

Different in different wells: 2, 4, 6, 8, 20, and 50

Resins available‡

Capto Q, Capto S, Capto SP ImpRes, Capto DEAE, Capto MMC, Capto adhere, Q Sepharose Fast Flow, SP Sepharose Fast Flow, MabSelect, MabSelect SuRe, and MabSelect Xtra™

Note: Only one type of resin per plate

* The 20 µL plate is the preferred plate for the first set of experiments.

† The 50 µL plate can be used for certain experiments, for example when protein concentrations are in the higher range or when there is a need for high amounts of sample for analysis.

‡ Additional resins available on request.

Operation

The standardized 96-well plate format gives considerable flexibility regarding mode of operation. PreDicator plates can be used in automated workflows using robotic systems, or operated manually using multichannel pipettes. Removal of liquid can be made by either centrifugation or vacuum. Recommendations on centrifugation speed or vacuum filtration are given in Table 1.

PreDicator plates and the chromatography resins are compatible with solutions commonly used in purification of biopharmaceuticals. Repeated loadings and long incubation times using buffers or samples containing certain detergents might induce leakage through the filter. Recommendations to minimize leakage when working with detergents are given in the PreDicator plate Instructions.

High well-to-well and plate-to-plate reproducibility

Consistent well-to-well and plate-to-plate performance is obtained regardless of mode of operation and ensures high reproducibility of results. Figure 4 shows binding capacities determined in a 2 µL PreDicator Capto S plate after overloading it with protein. The relative standard deviation (RSD) calculated over several plates is 4.5%. This low variation in binding capacity clearly demonstrates the low variation in resin volume between wells when compared to the variability of the UV assay (RSD = 3%).

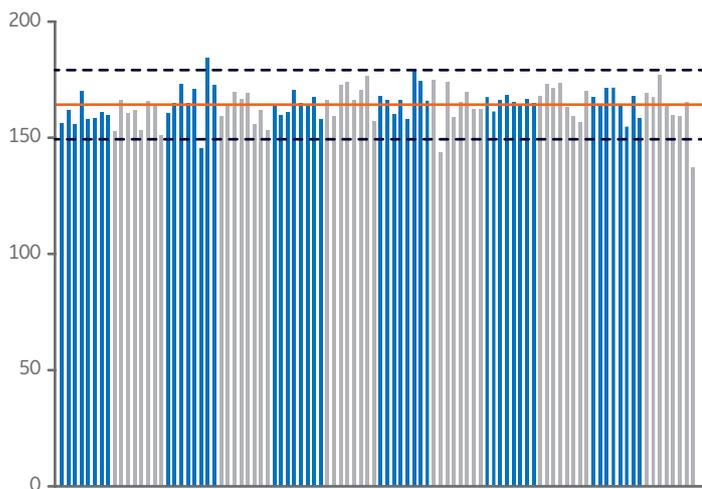


Fig 4. Reproducibility of capacities for chymotrypsin (60 min incubation) determined in a 2 μ L PreDicator Capto S plate. The solid red line corresponds to the average value, and the dashed lines denote ± 2 standard deviations. Columns 1 to 12 on the PreDicator plate are denoted by the alternating colored bars, indicating the absence of any significant edge effects.

Easy scale-up with reliable results

The optimized purification protocol can easily be scaled up as a majority of the resins are available in prepacked columns and all are available as bulk resins. The correlation between data obtained with PreDicator plates and those obtained in column experiments is very good, which makes the plates an excellent tool for initial screening of process conditions. Figure 5 shows the results from screening for optimal loading conditions for conalbumin on Capto S, with the same experiment performed both on PreDicator plates (Fig 5A) and in a packed column (Fig 5B).

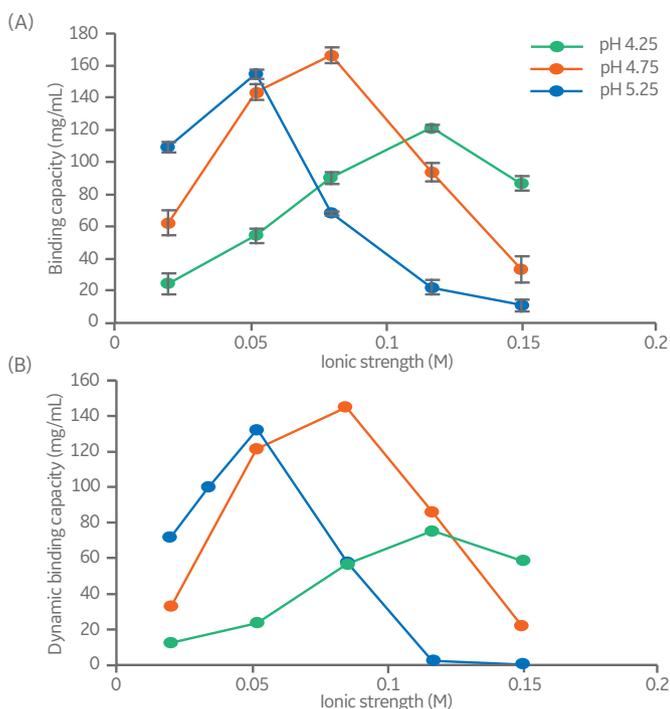


Fig 5. Determination of loading conditions for conalbumin on Capto S resin. (A) Binding capacities at 60 min in PreDicator Capto S 2 μ L plates. Error bars represent one standard deviation, based on triplicates; (B) Dynamic binding capacities at 10% breakthrough. Residence time 2 min, column Tricorn™ 5/100 (column volume 2 mL).

Conalbumin shows nontraditional behavior when binding to the cation exchanger (i.e., the highest binding capacity is obtained at intermediate ionic strength instead of at lowest ionic strength). The results clearly show that this non-traditional behavior is captured equally well in the plate as in the column experiment. For further details on nontraditional behavior, see application note *Screening and optimization of loading conditions on Capto S* (28407816).

Assist software for PreDicator plates

In order to facilitate the high-throughput methodology, Assist software has been developed to support PreDicator plates.

The software guides the user through the experimental workflow, assists in setting up the experiments, and manages and evaluates the data (Fig 6). Assist software can be downloaded free of charge from gelifesciences.com.

Assist software suggests an experimental design based on the type of study (e.g., binding, wash, elution, or determination of adsorption isotherms), and experimental conditions (e.g., buffer system, pH, or salt concentration). It also documents the chosen experimental design.

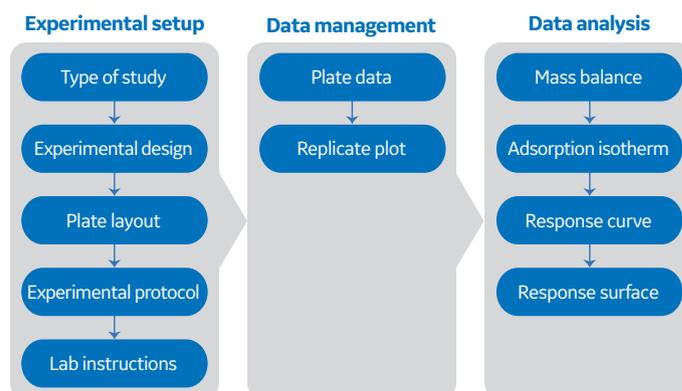


Fig 6. Overview of functionalities provided by Assist software for PreDicator plates.

Data evaluation includes calculation and visualization of mass balance, and calculation and visualization of response curves and surface plots. In this way, the effects of experimental conditions on responses, such as binding capacity or yield, can easily be identified. Table 4 summarizes the specifications for Assist software.

Table 4. Specifications for Assist software

Operating system	Windows XP®, Windows Vista®, or Windows® 7 32-bit
Workstation	Intel™ dual-core recommended 500 MB (1 GB recommended) Video card capable of 24-bit or 64-bit color Screen resolution min. 1024 × 768 pixels CD or DVD drive required.
E-licenses	Required

Ordering Information

Note: The pack size of all PreDictor plates is 4 × 96-well filter plates except the Capto HIC screening plate that is provided as 1 × 96-well filter plates.

Single resin plates Product code

Ion exchange

PreDictor Capto Q, 2 µL	28925773
PreDictor Capto Q, 20 µL	28925806
PreDictor Capto Q, 50 µL	28925807
PreDictor Capto S ImpAct, 2 µL	17371716
PreDictor Capto S ImpAct, 20 µL	17371717
PreDictor Capto DEAE, 2 µL	28925811
PreDictor Capto DEAE, 20 µL	28925812
PreDictor Capto DEAE, 50 µL	28925813
PreDictor Capto SP ImpRes, 6 µL	17546816
PreDictor Capto SP ImpRes, 20 µL	17546817
PreDictor Capto Q ImpRes, 6 µL	17547016
PreDictor Capto Q ImpRes, 20 µL	17547017
PreDictor ReadyToProcess Adsorber Q	17372119
PreDictor ReadyToProcess Adsorber S	17372149

Multimodal

PreDictor Capto MMC, 6 µL	28925814
PreDictor Capto MMC, 20 µL	28925815
PreDictor Capto MMC, 50 µL	28925816
PreDictor Capto MMC ImpRes, 6 µL	17371630
PreDictor Capto MMC ImpRes, 20 µL	17371631
PreDictor Capto adhere, 6 µL	28925817
PreDictor Capto adhere, 20 µL	28925818
PreDictor Capto adhere, 50 µL	28925819
PreDictor Capto adhere ImpRes, 6 µL	17371530
PreDictor Capto adhere ImpRes, 20 µL	17371531

Single resin plates Product code

Affinity

PreDictor MabSelect PrismA, 6 µL	17549830
PreDictor MabSelect PrismA, 20 µL	17549831
PreDictor MabSelect PrismA, 50 µL	17549832
PreDictor MabSelect SuRe, 6 µL	28925823
PreDictor MabSelect SuRe, 20 µL	28925824
PreDictor MabSelect SuRe, 50 µL	28925825
PreDictor MabSelect SuRe LX, 6 µL	17547430
PreDictor MabSelect SuRe LX, 20 µL	17547431
PreDictor MabSelect SuRe LX, 50 µL	17547432
PreDictor Capto L, 6 µL	17547830
PreDictor Capto L, 20 µL	17547831
PreDictor, Capto L, 50 µL	17547832

Hydrophobic interaction

PreDictor Butyl Sepharose 4 Fast Flow, 6 µL	17098016
PreDictor Butyl Sepharose 4 Fast Flow, 50 µL	17098017
PreDictor ButylS Sepharose 6 Fast Flow, 6 µL	17097816
PreDictor ButylS Sepharose 6 Fast Flow, 50 µL	17097817
PreDictor Capto Butyl, 6 µL	17545916
PreDictor Capto Butyl, 50 µL	17545917
PreDictor Capto Octyl, 6 µL	17546516
PreDictor Capto Octyl, 50 µL	17546517
PreDictor Capto Phenyl (high sub), 6 µL	17545116
PreDictor Capto Phenyl (high sub), 50 µL	17545117
PreDictor ReadyToProcess Adsorber Phen	17372169

Screening plates Product code

PreDictor AIEX screening, 2 µL/6 µL	28943288
PreDictor AIEX screening, 20 µL	28943289
PreDictor CIEX screening, 2 µL/6 µL	28943290
PreDictor CIEX screening, 20 µL	28943291
PreDictor Capto HIC Screening Kit, 50 µL	29305795

Adsorption isotherm plates Product code

PreDictor Capto Q Isotherm ¹	28943278
PreDictor Capto SP ImpRes isotherm ¹	17546818
PreDictor Capto DEAE Isotherm ¹	28943280
PreDictor Capto MMC Isotherm ¹	28943281
PreDictor MabSelect Isotherm ¹	28943283
PreDictor MabSelect SuRe Isotherm ¹	28943284

¹ Plates manufactured on request.

Software Product code

Assist 1.2 Software package	28996917
Assist 1.2 1-User License*	28945397

* Assist v1.2 also works with previous software versions 1.0 and 1.1.

Related products

Accessories Quantity Product code

Collection Plate, 500 µl V-bottom	5 × 96 well plates	28403943
Microplate Foil, 96-well	100 × self-adhesive, transparent plastic foils	BR100578

Prepacked columns Quantity Product code

HiScreen Capto Q	1 × 4.7 mL	28926978
HiScreen Capto S	1 × 4.7 mL	28926979
HiScreen Capto S ImpAct	1 × 4.7 mL	17371747
HiScreen Capto DEAE	1 × 4.7 mL	28926982
HiScreen Capto MMC	1 × 4.7 mL	28926980
HiScreen Capto adhere	1 × 4.7 mL	28926981
HiScreen Capto adhere ImpRes	1 × 4.7 mL	17371520
HiScreen Capto MMC ImpRes	1 × 4.7 mL	17371620
HiScreen Capto SP ImpRes	1 × 4.7 mL	17546815
HiScreen Capto Q ImpRes	1 × 4.7 mL	17547015
HiScreen MabSelect	1 × 4.7 mL	28926973
HiScreen MabSelect SuRe	1 × 4.7 mL	28926977
HiScreen MabSelect SuRe LX	1 × 4.7 mL	17547415
HiScreen MabSelect PrismA	1 × 4.7 mL	17549815
HiScreen MabSelect Xtra	1 × 4.7 mL	28926976
HiScreen Capto L	1 × 4.7 mL	17547814
HiScreen Butyl FF	1 × 4.7 mL	28926984
HiScreen Butyl-S FF	1 × 4.7 mL	28926985
HiScreen Octyl FF	1 × 4.7 mL	28926986
HiScreen Phenyl FF (high sub)	1 × 4.7 mL	28926988
HiScreen Phenyl FF (low sub)	1 × 4.7 mL	28926989
HiScreen Capto Phenyl (high sub)	1 × 4.7 mL	28992472
HiScreen Capto Butyl	1 × 4.7 mL	28992473

Related literature

PreDictor literature	Product code	Additional literature	Product code
Handbook		Data files	
High throughput process development with PreDictor plates	28940358	PreDictor RoboColumn	28988634
		Capto S, Capto Q, and Capto DEAE	11002576
		Capto S ImpAct	29067018
		Capto MMC	11003545
		Capto adhere	28907888
		Capto MMC ImpRes	29035674
		Capto adhere ImpRes	29034497
		MabSelect PrismaA	KA553200917DF
		Capto SP ImpRes and Capto Q ImpRes	28983763
		MabSelect	18114994
		MabSelect SuRe	11001165
		MabSelect SuRe LX	28987062
		MabSelect Xtra	11001157
		Capto L	29010008
		Sepharose Fast Flow IEX resin and prepacked formats	18102066
		Capto Phenyl (high sub) and Capto Butyl	28955857
		Butyl-S Sepharose 6 Fast Flow	11002634
		Phenyl Sepharose 6 Fast Flow (low sub) and Phenyl Sepharose 6 Fast Flow (high sub)	18102053
		Butyl Sepharose 4 Fast Flow	18102070
Application notes			
Screening of loading conditions on Capto S using a new high-throughput format, PreDictor plates	28925840		
High-throughput screening of elution pH for monoclonal antibodies on MabSelect SuRe using PreDictor plates	28927792		
Adsorption equilibrium isotherm studies using a high-throughput method	28940362		
High-throughput screening and optimization of a protein capture step in a monoclonal antibody process	28946858		
High-throughput screening and process development for capture of recombinant pro-insulin from E. coli	28996622		
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