ABS Software™ Brochure

The **ABS Software™** is a fully integrated, linear programming software package that will optimize site specific melting economics. Your customized solution could include the following:

Least Cost Charge Design	***Least Cost Alloy Additions***	***Inventory Control***	***Chemistry Routing***
Scrap Control	***Purchase Evaluation***	***Month to Date Consumables***	***Material Forecasting***
	Management Reporting	***Dynamic Formula Processor***	

The **ABS Software™** modules may be licensed separately or as a complete package. Custom modifications, if needed and/or desired, are available.
The **ABS Software™** is available in single or multi-user versions and operates on Intel compatible hardware platforms utilizing the Windows operating system.
TMS International Corporation provides complete documentation and training on the **ABS Software™**. Free upgrades and support are provided for the first 60 days after installation. Several plans for on-going software maintenance and support are available.

Available ABS Software Programs

MIX ***Least Cost Charge Design***	***MIX*** reduces metal mix costs by optimizing the use of raw materials. MIX ensures production of a more consistent final product and generally provides a higher quality control over the finished heat. MIX also helps reduce off-analysis heats caused by manual calculation errors.
TAP ***Least Cost Alloy Additions***	***TAP*** calculates the least costly combination of alloys required to meet your final chemistry working aims. TAP performs alloy addition calculations at computer speed, thus aiding in the reduction of tap time and unnecessary additions.
INV ***Inventory Control***	***INV*** maintains a database of current raw material information. The INV program is used to process new material receipts, record material usage and provides many standard inventory reports. Also available is the Month-to-Date ***(MTD)*** program for organizing MTD and YTD inventory data which can be exported to other programs.
DFP ***Dynamic Formula Processor***	***DFP*** is a very powerful add-on product for users of the ABS Software™. With DFP you can optimize virtually any linear formula or elemental relationship. Whether you use DFP to control the total residuals going into the charge or to control for a specific chemical relationship, least cost optimization techniques will automatically be utilized.
CHRIS ***Chemistry Routing System***	***CHRIS*** is an interface product that automates the collection and dissemination of analytical test results from your spectrometer to the various ABS Software™ databases. Interfaces for most major spectrometers are available. Custom interfaces can also be provided.
PURE ***Purchase Evaluation Program***	***PURE*** is a complete decision support sub-system for raw materials purchasing. PURE is used to aid in reducing inventory by providing detailed material usage information, determining the break-even price for quoted materials and reacting intelligently to material shortages by calculating the effects before they occur.
MFP ***Material Forecasting Program***	***MFP*** is also a decision support sub-system for raw material requirements planning. MFP utilizes linear programming techniques to determine the most economical materials to purchase in order to satisfy your melt schedule. MFP easily adjusts to schedule changes too.
MARS ***Management Reporting System***	***MARS*** is used to prepare historical consumption and chemistry reports. MARS is also used to select and export consumption and chemistry data for external use in spreadsheets, database systems and SPC analysis.
SCS ***Scrap Control System***	***SCS*** expedites the processing of newly purchased scraps and recycled material by linking actual chemical test results (*from your spectrometer)* with the material receiving information. With SCS, you essentially operate a hands-free chemistry collection and distribution system.

For pricing information
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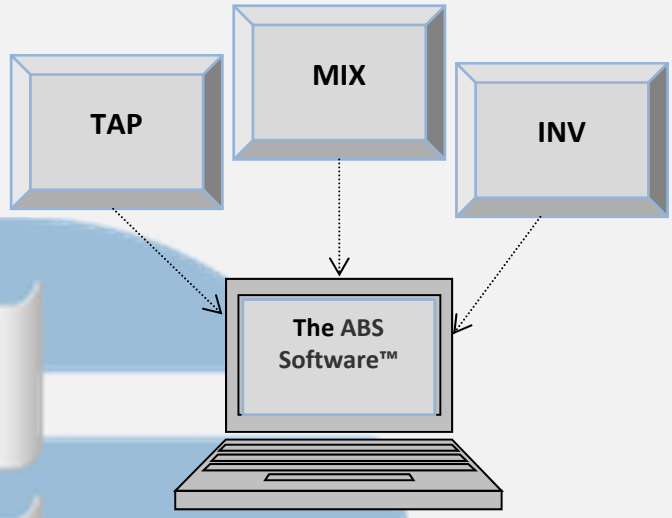
ABS Software™

MIX
Least Cost Charge Design

The Least Cost Charge Design Program ***(MIX)*** uses linear programming techniques to obtain the least costly combination of raw materials required to meet your desired chemistry working aims. Two versions of the MIX program are available. They are Batch and Melter/Holder.

Batch Version: The standard or Batch version is for melting operations that essentially melts the charge and pours the entire heat, leaving only a small or no liquid heel for the next charge.

Melter/Holder Version: The Melter/Holder version was developed for clients utilizing a melter/holder type of operation. This version contains all of the features and capabilities of the Batch version, plus the added capability to calculate a charge for a holding furnace that is utilizing liquid metal from up to three on-line melters. The Melter/Holder version also has provisions for calculating a melter/holder back charge.



An unlimited number of grade or alloy specifications can be permanently created and accessed by MIX. The program allows you to specify up to 45 individual restrictions per grade or alloy. A restriction can be a specific material, a type of material or an entire file of materials. Restrictions can be expressed as either a fixed weight or a percentage of the design weight. Restrictions help you standardize the raw material inputs used to make your grades/alloys.

The MIX program will search through your inventory and prepare a list of the qualified candidates for the charge. The program then determines the optimum solution from as many as 2,200 material candidates.

The MIX program can solve for a single heat/charge or for a campaign of heats/charges. MIX calculates material requirements for either a cold charge (no metal exists in the furnace) or a hot charge (hot metal heel exists in the furnace). MIX distinguishes between available and committed inventory when calculating blends to ensure that previously reserved materials are not over committed.

After the optimum solution is calculated, the program provides a selection of Re-solve Options. One option allows you to change the restrictions and recalculate the solution *(there is no limit to the number of re-solves you can perform).* Another option will display the shadow prices showing the cost disadvantage for those materials considered for the charge but, for cost reasons, were not chosen.

Also, if you have raw materials that you believe should have been used in the solution but were not, MIX will tell you why those materials were not chosen.

When a solution meets all physical, chemical and operational requirements, MIX can reserve the materials and quantities, excluding them from further consideration.

MIX contains numerous setup options to customize the procedural flow of the program for your particular operating environment. Provisions are available for calculating optimum unit weight solutions and the system can be set up to work in either Imperial or Metric units.

The MIX program is a powerful tool that is very easy to operate and contains numerous help facilities for inexperienced users. MIX reflects refinements and improvements, implemented since 1975, and it is designed to meet most every client's needs.

Metal Brokers/Scrap Dealers: A specially developed MIX program is available for Metal Brokers and Scrap Dealers which contains all of the features and capabilities of the standard melt shop version, with the exception of heel processing. This version also contains a profit worksheet feature (not available on the standard melt shop version) which calculates and reports the costing and blend profitability information to assist in decision making. The blend profit can be calculated by either Gross Sales Price or Elemental Price. Both blended and unblended profit values and percentages are computed and reported.

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ABS Software™

TAP
Least Cost Alloy Additions

The Least Cost Alloy Additions Program ***(TAP)*** is used to calculate the least cost combination of alloys required to meet your intermediate or final chemistry working aims. TAP utilizes linear programming techniques to obtain the least cost alloys required.

An unlimited number of grade or alloy specifications can be permanently created and accessed by TAP. The program allows you to specify up to 40 individual restrictions per grade or alloy. A restriction can be a specific material, a certain type of material or an entire file of materials. Restrictions can be expressed as either a fixed weight or a percentage of the preliminary weight.

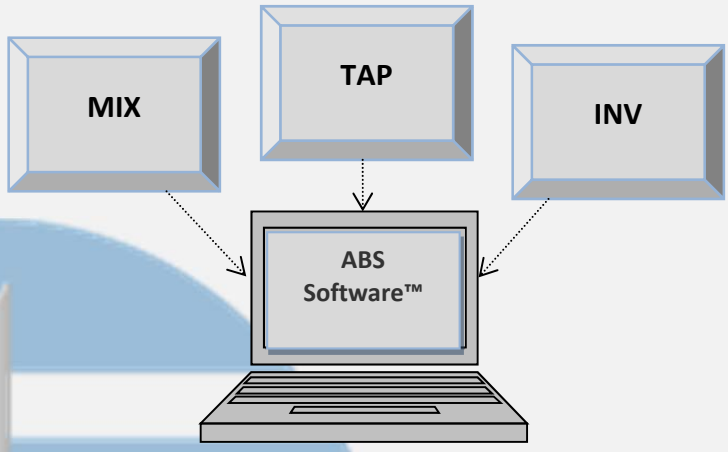
The program allows the user to designate the elements that will be controlled through metallurgical practice and those which will require a calculation for dilution. If the dilution requires more metal to be added than is possible or practical, the program will display a warning message and compute a minimum pour-off weight.

The TAP program considers only materials that you have indicated are available for use during the intermediate or final additions phase of the heat/charge. The TAP program differs from the Least Cost Charge Design (MIX) program in that it begins with a determined bath weight and a specific chemistry to achieve.

An important feature of TAP is the ability to specify a minimum and or maximum tap weight required. This can improve melting yields and reduce scrap returns.

TAP was designed to interface with various spectrometers, so manual entry of the preliminary test results is usually not necessary.

The TAP program incorporates all of the re-solving features of the MIX program including the ability to change your working aims. Often by changing your aim, especially the upper limit, you are able to reduce the total alloy additions required due to unnecessary dilution. You can also lower the aims if you expect an elemental pickup from the previous heat/charge.



There is no limit to the number of times you can re-solve the solution before accepting the calculation.

When a solution meets all physical, chemical and operational requirements, TAP can reserve materials and quantities, excluding them from further considerations.

TAP contains numerous setup options to customize the procedural flow of the program for your particular operating environment. Provisions are available for calculating optimum unit weight solutions as well as metric solutions.

The TAP program is a powerful tool that is very easy to operate and contains numerous help facilities for inexperienced users. TAP reflects refinements and improvements implemented since 1975 and designed to meet most every client's needs.

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ABS Software™

INV
Inventory Control
MTD
Month-to-Date Consumables

The Inventory Control Program ***(INV)*** is a complete raw materials inventory management package. The INV program is used to process new material receipts, record material usage and provide various inventory reports.

With the installation of the INV program, you will have access to a perpetual inventory system. Purchasing, Operations and Management departments will all benefit from the INV program by having immediate access to current inventory levels and values, committed inventory information, daily inventory receiving, consumption information and much more.

The Inventory Receipts function provides the ability to enter both new raw materials and receiving information for existing raw materials. All receipts transactions are date and time stamped to ensure complete traceability.

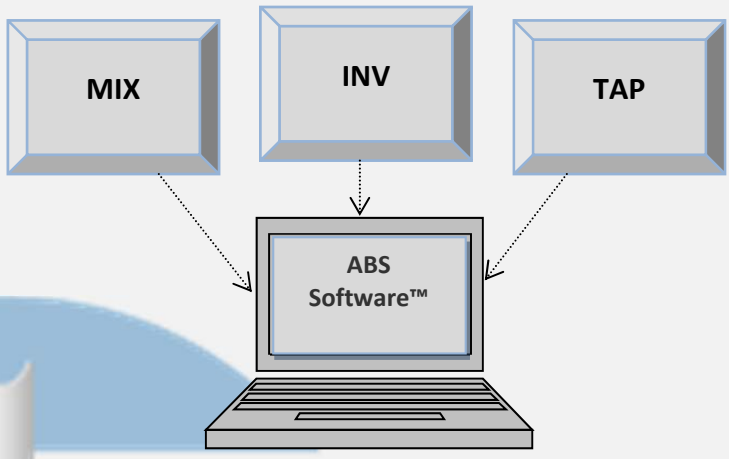
The detailed receiving report is prepared after the receipts have been posted. The detailed receipts information can optionally be stored and exported for use by existing in-house applications. The receipts data can also be stored and reported via the optional Month-To-Date Consumables (MTD) program.

The Inventory Usage function provides the ability to record actual raw material consumption or usage information. Only after the actual usage information is entered for a heat/charge is the inventory adjusted to reflect the new balance. All usage transactions are also date and time stamped to provide traceability.

The detailed usage report is automatically prepared after the usage figures have been posted. This report contains the actual weight and cost values for the heats/charges processed. The detailed usage information can optionally be stored and exported for use by existing in-house applications. The usage values can also be stored and reported via the optional MTD program.

The Inventory Reports function provides access to numerous standard inventory reports. Many reports provide both actual and/or standard costing information.

Standard INV reports are included with the program. Site-specific custom reports can be developed for your individual needs.



INV standard reports include the following:

Aged Inventory
Quantity On-Hand
Inventory Value
Detailed Receipts/Usage
Elemental Analysis of Inventory
Inventory Changes/Corrections

The Inventory Export function is an optional feature that is also available. This function was developed for clients who wish to link the INV program with an existing in-house receiving, inventory or material consumption application. The Export function eliminates the need for the duplicate entry of receipts and usage information.

Month-To-Date Consumables *(MTD)*:

The MTD program collects all raw material usage and receipt information and provides reports displaying the month-to-date and year-to-date values. The month-to-date information is usually maintained for one month, whereupon existing values are rolled into the year-to-date file and the month-to-date file is initialized or cleared for the next month.

In addition to the normal reporting functions, the month-to-date and year-to-date information can be exported for use in other in-house applications.

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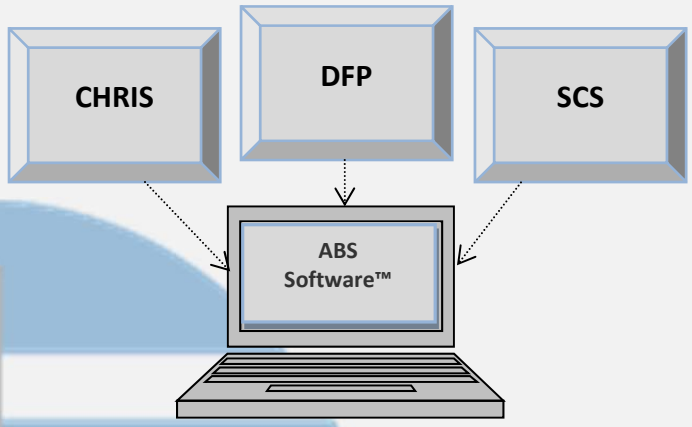
ABS Software™

DFP
Dynamic Formula Processor#

The Dynamic Formula Processor ***(DFP)*** is an extremely powerful add-on product for users of the ABS Software™. With the DFP program, you can optimize virtually any linear formula of elemental relationship. Whether you use the DFP program to control the total residuals going into the charge or to control for a specific chemical relationship; least cost optimization techniques will automatically be utilized.

The DFP program provides you with a new dimension in optimizing raw materials and controlling physical chemistry relationships.



The DFP program allows you to:

- Widen the working aims for your natural elements, including:
  - ***Cr***
  - ***Ni***
  - ***Mo***
- Simultaneously, DFP allows you to impose tighter controls on some of the more important elemental relationships such as:
  - ***Fe + Si***
  - ***Al + Ti***
  - ***Chrome Equivalence***
  - ***Nickel Equivalence***
  - ***Carbon Equivalence***
  - ***Total Sludge***
- Reduce your current alloy additions cost, often by hundreds of dollars per charge, over traditional computational methods.
- Maintain complete control and privacy of your formulas and easily modify them if they differ from industry standards.
- Quickly and cost-effectively adjust to your customers' requirements for new or additional chemistry relationships.

The DFP program is fully integrated with all of the existing ABS modules. Optimization of elemental relationships is automatically performed when designing charges, calculating least cost alloy additions, computing material requirements and even performing purchase evaluations.

If your shop operates with a heel (hot metal left in the furnace or melter), the MIX program will automatically calculate the complex elemental contribution the heel will provide.

If you are using the TAP program, the preliminary chemistry's complex elemental contribution will also be automatically calculated.

The DFP program is extremely easy to implement and use and there are four versions of the DFP program available.

These four versions allow you to establish as many as 5, 10, 15 or 20 dynamic formulas. Each formula can have a maximum of 10 sets of mathematical expressions.

If your customers are requiring you to meet tighter and more complex chemistry specifications, DFP can help.

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ABS Software™

CHRIS
Chemistry Routing System#

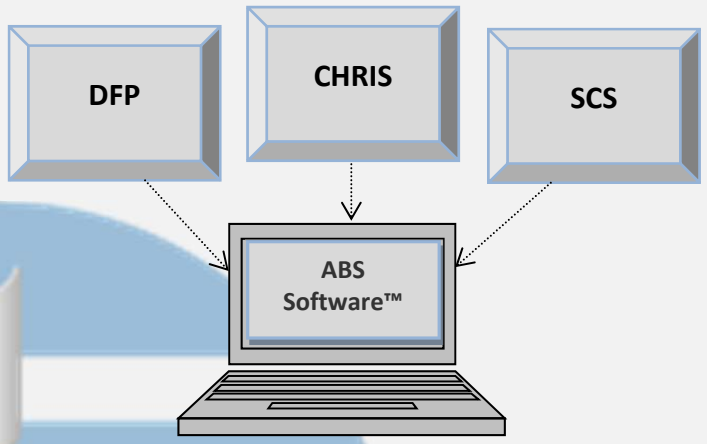
The Chemistry Routing System ***(CHRIS)*** is an add-on product that automates the collection and dissemination of analytical test results. CHRIS was designed and developed to enhance the ABS Software™ by providing improved shop chemistry control and eliminating manual chemistry input errors. CHRIS will:

- Process and distribute heel and preliminary chemistry test results directly to the Least Cost Charge Design (MIX) and the Least Cost Alloy Additions (TAP) programs.
- Process and distribute chemistry test results for all incoming scraps and recycled materials directly to the Scrap Control System (SCS) program.
- Process and distribute final test results directly to the Management Reporting System (MARS) program.
- Provides a hands-free chemistry collection, distribution and data storage system.
- Interfaces with most major manufacturers' analytical instruments, thereby providing more cost-effective utilization of existing analytical testing equipment.

The CHRIS program can process and distribute the following lab tests:

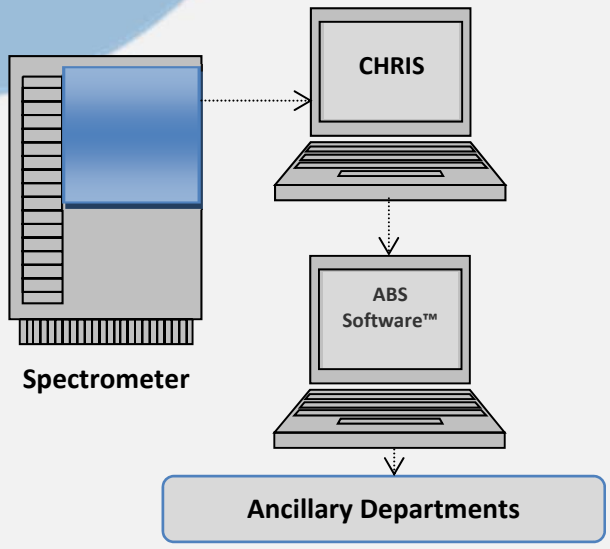
Hot Metal Chemistry – The first lab test the CHRIS program can process is hot metal chemistry. Hot metal chemistry tests are either heel samples or preliminary samples. CHRIS will distribute the heel or preliminary chemistry to the appropriate ABS Software™ program. This important function eliminates the possibility of manual input errors. In most instances this function also helps reduce the total charge time thereby helping to reduce total operating costs.

Scrap Chemistry – The second lab test that the CHRIS program can process is incoming or recycled scrap chemistry. Scrap chemistry results are distributed and stored in the received scrap chemistry database. The SCS program provides the ability to later transfer the scrap chemistry to the active ABS Software™ inventory. When scrap chemistries are transferred to the active inventory, the scrap receipts and scrap transferred databases are updated. Therefore, all scrap chemistry information is collected and distributed without any manual intervention. This hands-off chemistry distribution system enables better chemistry control.



Final Chemistry – The third lab test that the CHRIS program can process is final chemistry. Final chemistry results are the results taken at tap or casting time. CHRIS collects and stores the final chemistry results in an historical database, which can be made available to virtually anyone connected to the network. This chemistry data bank eliminates the redundant collection and distribution of the final chemistry test results. Information in the chemistry data bank can be selected by various key identifiers such as alloy code, tap date, etc. and exported to the SCS program or other preferred database products.

The CHRIS program can operate in a single or network environment. The following illustrates a typical network configuration:



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ABS Software™

SCS
Scrap Control System#

The Scrap Control System ***(SCS)*** is an add-on product for the ABS Software™ that is used to automate the actual linking of chemical test results for newly purchased scraps, internally recycled scraps, re-melts, etc., with the purchased or recycled raw material receiving information. With the SCS program, you will:

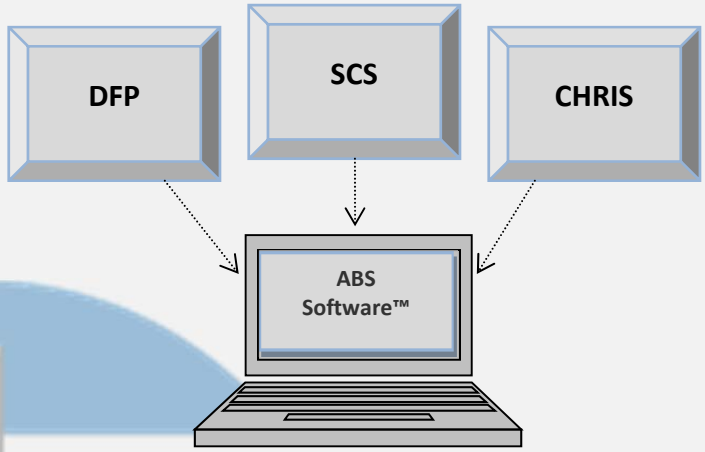
- Improve the certainty and accuracy of all your raw material chemistry information.
- Expedite the time required to qualify raw materials for use by the Least Cost Charge Design (MIX) program and the Least Cost Alloy Additions (TAP) program.
- Reduce or virtually eliminate data entry errors that would occur with manual data entry of raw material chemistry information.
- Maximize your spectrometer investment.

With the SCS program, you essentially build a raw material receipts record. This is accomplished by extracting the desired chemistry information from the scrap chemistry database and desired quantity, cost, vendor, etc. information from the scrap receipts file. New scrap receipts can be imported from existing in-house receiving systems, including bar code readers, or entered via the Scrap Receipts program.

The SCS program is fully integrated with the CHRIS program. After the incoming or recycled scrap chemistry test results are taken they are distributed and stored in a scrap chemistry database via CHRIS. Within SCS you can select the desired chemistry record and assign the chemistry to a received scrap record.

With SCS you can select and assign the test results from a single test sample or have the average chemistry from as many as 3,000 samples assigned. SCS automatically computes the average chemistry of all test samples selected.

SCS also provides the ability to transfer a scrap record directly to the active ABS Software™ inventory. When a scrap record is transferred, the detailed scrap receipts and the scrap chemistry databases are updated. With SCS, scrap chemistry information is collected and distributed without any manual input.



This hands-free chemistry collection and distribution system ensures better chemistry control by elimination of manual entry errors.

The SCS program can operate without a spectrometer interface. However, SCS is most beneficial when interfaced directly with your spectrometer. The following illustration depicts the program and databases used by the basic scrap control system.

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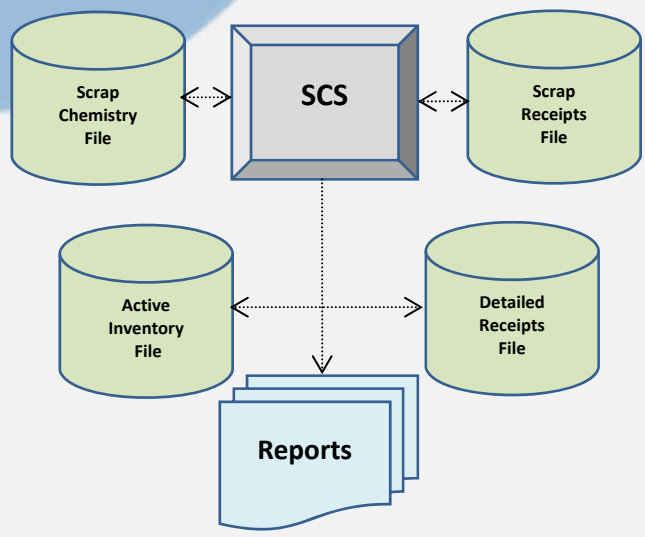

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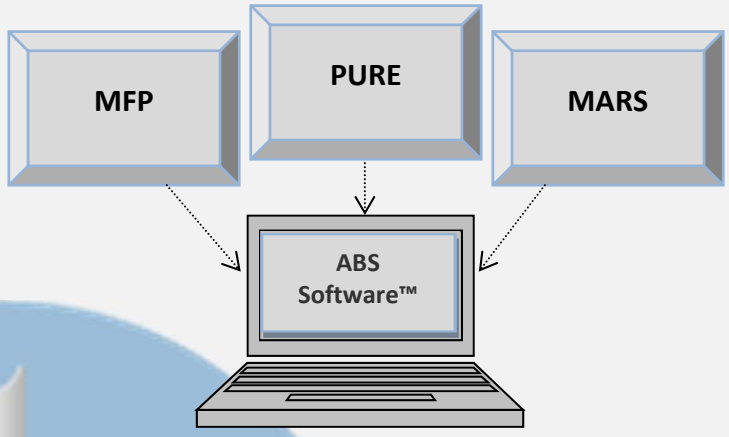
ABS Software™

PURE
Purchase Evaluation Program#

The Purchase Evaluation Program ***(PURE)*** is a complete support sub-system to assist in the decision making process of determining the economic worth of raw materials. PURE uses linear programming techniques to determine:

- The break-even price of materials that are quoted for purchase.
- The useable quantities for each quoted material.
- The metal mix cost impact that would occur due to the loss of a material source or supplier.



The PURE program provides immediate benefits by producing detailed material utilization information, prior to purchase, in order to help reduce excess inventory. PURE can also be used to perform financial what-if scenarios and analysis.

PURE has two major decision making functions. The first is to assist you in evaluating raw materials for purchase and the second is for performing impact studies.

The evaluation function is used to determine the economic worth that materials quoted as available have to your current metal mix cost.

The evaluation adheres to your metallurgical requirements and current inventory position when performing cost analysis. PURE also considers a market file which acts as a stabilizer to project a more reasonable analysis. The result of the evaluation is either positive or negative.

If the result is positive, PURE reports the anticipated quantities, the cost savings over current cost per pound or kilogram, melting expense and the break-even price for the quoted or external material. The break-even price is the price at which no further savings will be achieved. If the result is negative, PURE computes the cost per pound or kilogram necessary to make the material favorable for your use.

The impact function is used to perform the what-if studies. Some examples of what-if scenarios are:

- We must pay more for a raw material when our current contract expires.
- We are unable to use a material due to equipment failure, weather conditions, contaminations, etc.
- We limit or curtail the use of certain scraps below current usage levels.

The impact function also provides detailed reports outlining actual and anticipated metal mix variances for the impact study.

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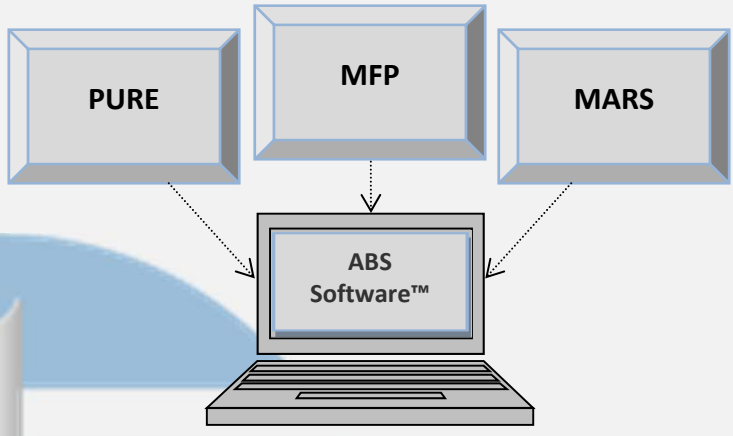
MFP
Material Forecasting Program

The Material Forecasting Program ***(MFP)*** is a complete support sub-system to assist in the decision making process used for raw material requirements planning. Purchasing personnel, who are often unfamiliar with metallurgical practices, must make the complicated and time consuming long and short term buying decisions. These decisions must accurately reflect their requirements based on vendor specifications. MFP uses linear programming techniques to determine the most economical materials to purchase in order to satisfy your anticipated melting schedule or campaign.



The MFP program is integrated with the existing the ABS Software™ modules to take full advantage of current inventory information. It will enable you to project your raw material requirements more accurately while using least cost techniques; thereby creating a least cost shopping list. Also, MFP fully considers the metallurgical practices, melting restrictions and elemental recoveries that will be applied at melting time to further qualify the material's worth.

MFP can be used to calculate short or long term requirements. Provisions exist within the MFP program to compensate for expected shop returns that will occur during the campaign period.

The MFP program derives its raw material requirements from these three sources:

- ***Current Inventory***
- ***Market File***
- ***Quoted File***

The market file is a list of approved suppliers and material stock available for use and consideration. The quoted file is an optional second source of materials. Usually, the quoted materials are short runs, one-time buys or materials that have a highly fluctuating availability or cost.

The MFP program produces a series of material requirement reports. These reports include:

- ***Anticipated Melting Variance***
- ***Elemental Requirements***
- ***Detailed Requirements***
- ***Summary Requirements***
- ***Forecasted Cash Requirements***

MFP can easily adapt to changes in your melting schedule and recalculate the new material requirements. MFP is extremely easy to use and it greatly reduces the clerical effort required with most manual forecasting methods used today.

The MFP program helps you reduce your overall inventory investment by diminishing or eliminating the purchasing of unfavorable or slow moving items.

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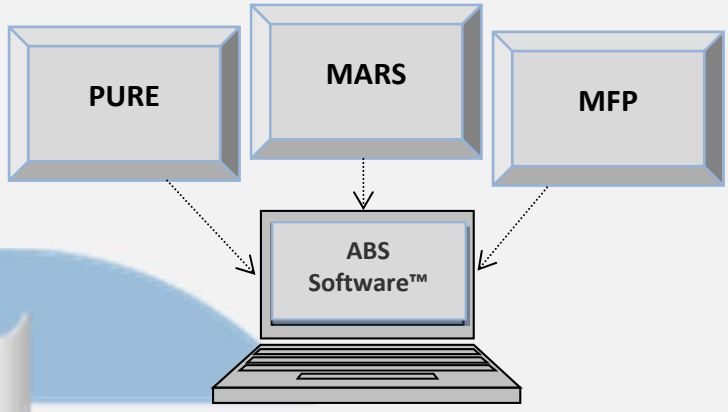
MARS
Management Reporting System#

The Management Reporting System ***MARS*** is an independent program for the collection and reporting of production and chemical information for each heat, blend or cast produced.

When used in conjunction with ABS Software™ INV program, CHRIS program and the optimization programs MIX and TAP, the MARS program completely automates the tedious task of collecting this critical data. MARS data can be used to produce detailed melting reports as well as graphical representation of production and chemistry data.



The MARS program is typically accessed and used by the Management, Purchasing, Operations and Quality Control departments. Reports, graphs and spreadsheets can be designed to highlight the operational variables that relate to each manager's area of responsibility.

The standard MARS program is generally used to capture and report data for two major purposes:

Production Performance

The Production and Costing Report option provides five (5) standard reports. They include:

- ***Detailed or Summary Consumption***
- ***Detailed Log***
- ***Total Average Consumption***
- ***Elemental Consumption***
- ***Cost Variance by grade code or grade family***

Many reports provide either detailed or summary variations.

Chemistry Control

The Chemistry Reporting option provides twelve (12) standard chemistry information reports. They include

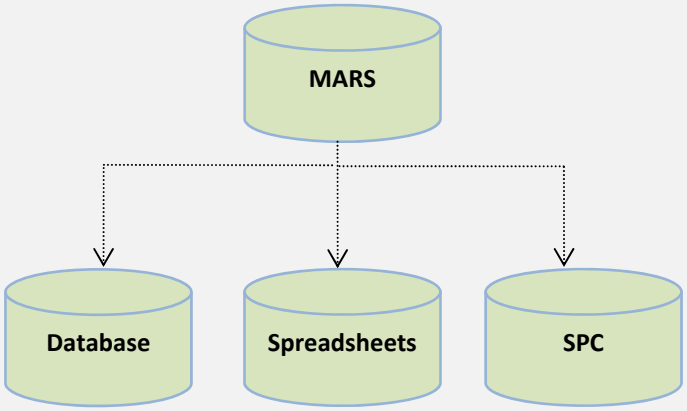
P1	**Heel Chemistry**	**Intermediate Aim**
P2	**Elemental Usage**	**Intermediate Recovery**
Final	**Total Recovery**	**Charge Aim**
Final Aim	**Final Recovery**	**Charge Recovery**

The standard MARS program also includes database utilities for deleting, auditing, exporting and importing log records, as well as viewing log status information.

One of the more frequently used features of the MARS program is the Export function. With the Export function data records can be easily selected and exported for use in spreadsheets, database systems and the SPC program.

TMS International Corporation can expand the standard MARS program
or develop custom-designed reports for your unique melting and management reporting structure. Typical custom reports requested include the following:

- ***Detailed Melt Logs***
- ***Melt Variance***
- ***Melt Shop Production***
- ***Elapsed Time***
- ***Ingots Cast***
- ***Man-Hours per Ton***



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