

Thermal Oil / Hot Water Pump

**VOLCANO**

**VLETY**

**Type Series Booklet**



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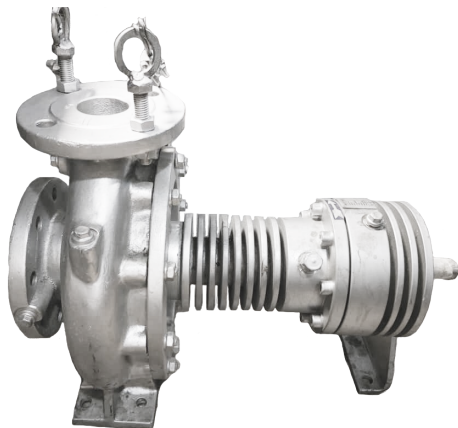
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## Centrifugal Pumps with Shaft Seal

### Thermal Oil Pumps / Hot Water Pumps

## VLETY



#### Main applications

- Heat transfer systems
- Hot water circulation

#### Fluids handled

- Thermal oil
- High-temperature hot water

#### Further information on fluids handled

#### Operating data

| Characteristic                 |          | Value      |       |
|--------------------------------|----------|------------|-------|
|                                |          | 50 Hz      | 60 Hz |
| Flow rate                      | Q [m³/h] | ≤ 625      | ≤ 754 |
| Head                           | H [m]    | ≤ 102      | ≤ 100 |
| Fluid temperature, thermal oil | T [°C]   | -30 – +350 |       |
| Fluid temperature, hot water   | T [°C]   | ≤ 180      |       |
| Operating pressure             | p [bar]  | ≤ 16       |       |

#### Design details

##### Design

- Volute casing pump
- Horizontal installation
- Back pull-out design
- Single-stage
- Dimensions and ratings to EN 733

#### Materials per country

- A = Europe, Middle East, North Africa
  - A1 = Default material variant
  - A2 = Optional material variant
- B = India
  - B1 = Default material variant
  - B2 = Optional material variant

#### Designation

**Example: Vlety 050-032-160 SG XDB08LA2**

| Code | Description                                         | Region |
|------|-----------------------------------------------------|--------|
| ETNY | Type series                                         |        |
|      | Vlety Vlety                                         | A, B   |
| 050  | Nominal suction nozzle diameter [mm]                | A, B   |
| 032  | Nominal discharge nozzle diameter [mm]              | A, B   |
| 160  | Nominal impeller diameter [mm]                      | A, B   |
| S    | Casing material                                     |        |
|      | S Nodular cast iron                                 | A      |
|      | E Cast steel                                        | B      |
| G    | Impeller material if different from casing material |        |
|      | G Cast iron                                         | A, B   |
|      | C Stainless steel                                   | A, B   |
|      | E Cast steel                                        | B      |
| X    | Special design                                      |        |
|      | <sup>1)</sup> Standard design                       | A, B   |
|      | X Special design                                    | A, B   |
| D    | Casing cover                                        |        |
|      | D Casing cover for SYT                              | A, B   |
| B    | Sealing system                                      |        |
|      | B Dead-end                                          | A, B   |
| 08   | Seal code                                           |        |
|      | 08 AQ,VGG                                           | A, B   |
| L    | Long-coupled design                                 |        |
|      | L Version for heat transfer fluid                   | A, B   |
| A    | Scope of supply                                     |        |
|      | A Pump only (Fig. 0)                                | A, B   |
| 2    | Shaft unit                                          |        |
|      | 2 WS_25_LS                                          | A, B   |

#### Further information on the designation

1) Blank

## Pump casing

- Radially split volute casing
- Volute casing with integrally cast pump feet
- Replaceable casing wear rings

## Impeller type

- Closed radial impeller with multiply curved vanes

## Shaft seal

- Reinforced single mechanical seal, installation dimensions to EN 12756
- Reinforced double mechanical seal, installation dimensions to EN 12756

## Bearings

Bearings

| Bearing design                     | Region |
|------------------------------------|--------|
| Plain bearing, pump end            | A, B   |
| Rolling element bearing, drive end | A, B   |

## Bearings used

Overview

| Version                                                                                            | Bearing bracket | Pump end     | Drive end | Region |
|----------------------------------------------------------------------------------------------------|-----------------|--------------|-----------|--------|
| Standard plain bearing (lubricated by fluid handled)                                               |                 |              |           |        |
|                                                                                                    | WS_25_LS        | Carbon (KHK) | -         | A, B   |
|                                                                                                    | WS_35_LS        | Carbon (KHK) | -         | A, B   |
|                                                                                                    | WS_55_LS        | Carbon (KHK) | -         | A, B   |
| Optional plain bearing (lubricated by fluid handled)                                               |                 |              |           |        |
|                                                                                                    | WS_25_LS        | SiC / SiC    | -         | A, B   |
|                                                                                                    | WS_35_LS        | SiC / SiC    | -         | A, B   |
|                                                                                                    | WS_55_LS        | SiC / SiC    | -         | A, B   |
| Rolling element bearing (grease lubrication / grease-packed for life with Klüber Asonic HQ 72-102) |                 |              |           |        |
|                                                                                                    | WS_25_LS        | -            | DIN 625   | A, B   |
|                                                                                                    | WS_35_LS        | -            | DIN 625   | A, B   |
|                                                                                                    | WS_55_LS        | -            | DIN 625   | A, B   |

Lubrication

| Bearing design                            | Region |
|-------------------------------------------|--------|
| Lubrication by the fluid pumped, pump end | A, B   |
| Grease lubrication, drive end             | A, B   |

## Automation

Automation options:

| Automation systems                                                                             | Region |
|------------------------------------------------------------------------------------------------|--------|
| PumpDrive, motor-mounted version<br>Only for fluid temperatures $\leq 140$ °C                  | A      |
| PumpDrive, motor-mounted and cabinet-mounted version<br>Only for fluid temperatures $> 140$ °C | A      |
| KSB SuPremE                                                                                    | A      |

## Coating and preservation

Coating and preservation

| Design                                   | Region |
|------------------------------------------|--------|
| Coating and preservation to KSB standard | A, B   |

## Product benefits

- Improved efficiency and  $NPSH_{req}$  by experimentally verified hydraulic design of impellers (vanes)

- Operating costs reduced by trimming the impeller diameter to match the specified duty point
- Little wear, low vibration levels and excellent smooth running characteristics thanks to good suction performance and virtually cavitation-free operation across a wide operating range
- Casing sealed reliably – even in varying operating conditions – by confined casing gasket
- Extended selection chart with additional pump sizes for small flow rates
- Easy to dismantle due to back pull-out design; no need to remove the pump casing from the piping
- Easy to dismantle with forcing screws provided at the interface of casing cover and bearing bracket lantern
- Optimum venting via the highly effective VenJet® venting chamber
- Top reliability by double mechanical seal in tandem arrangement
- High resistance by anti-seize product-lubricated carbon plain bearing or SiC/SiC bearing



## Acceptance tests and warranty

The following acceptance tests may be performed at a surcharge:

Overview of acceptance tests/warranty

| Acceptance tests / warranty                                                          | Region |
|--------------------------------------------------------------------------------------|--------|
| Materials testing                                                                    |        |
| ▪ Test report 2.2 on request                                                         | A, B   |
| Final inspection                                                                     |        |
| ▪ Inspection certificate 3.1 to EN 10204 on request                                  | A, B   |
| Hydraulic test                                                                       |        |
| ▪ The duty point of each pump is guaranteed according to ISO 9906/2B or ISO 9906/3B. | A, B   |
| ▪ NPSH test                                                                          | A, B   |
| Other inspections/tests on request                                                   | A, B   |
| Warranty                                                                             |        |
| ▪ Warranties are given within the scope of the valid delivery conditions.            | A, B   |

## Overview of fluids handled

Table of fluids handled and associated material combinations

**X** = standard

| Fluid handled                                                                    | Application limits <sup>2)</sup> | Casing/impeller materials            |                                       |                               |                                |                           | Shaft seal                        |                                                    |
|----------------------------------------------------------------------------------|----------------------------------|--------------------------------------|---------------------------------------|-------------------------------|--------------------------------|---------------------------|-----------------------------------|----------------------------------------------------|
|                                                                                  |                                  | Nodular cast iron/<br>grey cast iron | Nodular cast iron/<br>stainless steel | Cast steel/<br>grey cast iron | Cast steel/<br>stainless steel | Cast steel/<br>cast steel | Single mechanical seal<br>AQ, VGG | Double mechanical seal<br>tandem AQ, VGG / AQ, VGG |
|                                                                                  |                                  | SG                                   | SC                                    | EG                            | EC                             | EE                        | Code 08                           | Code 25                                            |
| Hot water <sup>3)</sup>                                                          | t ≤ 180 °C                       | <b>X</b>                             |                                       |                               |                                |                           | <b>X</b>                          | -                                                  |
|                                                                                  | p ≤ 16 bar                       |                                      |                                       |                               |                                |                           |                                   |                                                    |
| Thermal oil on mineral oil basis                                                 | t ≤ -30 to 350 °C                | <b>X</b>                             |                                       |                               |                                |                           | <b>X</b>                          | <b>X</b>                                           |
|                                                                                  | p ≤ 16 bar                       |                                      |                                       |                               |                                |                           |                                   |                                                    |
| Thermal oil on synthetic basis, vapour pressure ≤ 1 bar at operating temperature | t ≤ -30 to 350 °C                | <b>X</b>                             |                                       |                               |                                |                           | <b>X</b>                          | <b>X</b>                                           |
|                                                                                  | p ≤ 16 bar                       |                                      |                                       |                               |                                |                           |                                   |                                                    |
| Thermal oil on synthetic basis, vapour pressure ≥ 1 bar at operating temperature | t ≤ -30 to 350 °C                | <b>X</b>                             |                                       |                               |                                |                           | -                                 | <b>X</b>                                           |
|                                                                                  | p ≤ 16 bar                       |                                      |                                       |                               |                                |                           |                                   |                                                    |

2) The inlet pressure must not fall below atmospheric pressure.

3) Low-salt or fully desalinated water to VdTÜV technical instruction leaflet / AGFW technical instruction leaflet TCN 1466 (VdTÜV) 5/15 (AGFW), edition 02.89

## Pressure and temperature limits

### Test pressure limits and temperature limits

Pressure limits and temperature limits

| Material variant | Fluid temperature | Test pressure <sup>4)</sup> | Region |
|------------------|-------------------|-----------------------------|--------|
|                  | [°C]              | [bar]                       |        |
| S                | -30 to +350       | ≤ 25                        | A      |
| E                | -30 to +350       | ≤ 25                        | B      |

### In-service pressure limits and temperature limits

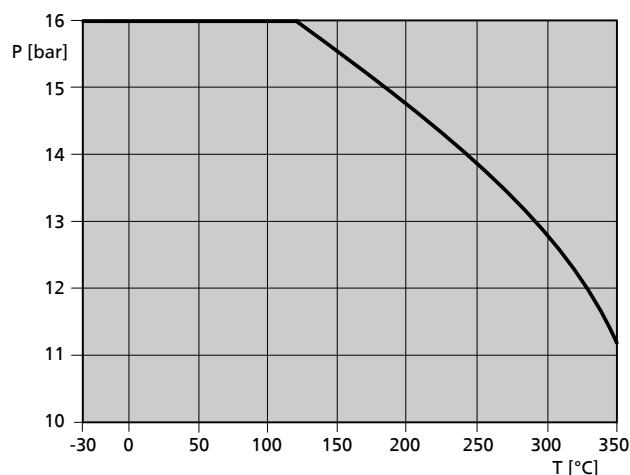


Fig. 1: Pressure/temperature correlation for flanges, material S, to EN 1092-2 and flanges drilled to ASME 125  
Pressure/temperature correlation for flanges, material E, to EN 1092-1 and flanges drilled to ASME 150

## Materials

Overview of available materials

| Part number | Description                      |                                                | Material variant |    |    |    |    |
|-------------|----------------------------------|------------------------------------------------|------------------|----|----|----|----|
|             |                                  |                                                | SG               | SC | EG | EC | EE |
| 102         | Volute casing                    | Nodular cast iron JS1030 / 536 Gr 60-40-18     | A1               | A1 | -  | -  | -  |
|             |                                  | GP240GH+N / A216 Gr WCB                        | -                | -  | B1 | B1 | B1 |
| 161         | Casing cover                     | Nodular cast iron JS1030 / A536 Gr 60-40-18    | A1               | A1 | -  | -  | -  |
|             |                                  | GP240GH+N / A216 Gr WCB                        | -                | -  | B1 | B1 | B1 |
| 210         | Shaft                            | Chrome steel 1.4021 + QTHRC50                  | A1               | A1 | -  | -  | -  |
|             |                                  | A276 TP 410 Cond H                             | -                | -  | B1 | B1 | B1 |
| 230         | Impeller                         | Grey cast iron JL1040 / A 48 CL 35B            | A1               | -  | B1 | -  | -  |
|             |                                  | Stainless steel 1.4408 / A743 Gr CF8M          | -                | A1 | -  | B2 | -  |
|             |                                  | Cast steel                                     | -                | -  | -  | -  | B2 |
| 310         | Plain bearing                    | Carbon (KHK)                                   | A1               | A1 | B1 | B1 | B1 |
|             |                                  | SiC / SiC                                      | A1               | A1 | B2 | B2 | B2 |
| 330         | Bearing bracket                  | Nodular cast iron JS1030 / A536 Gr 60-40-18    | A1               | A1 | B1 | B1 | B1 |
| 411.10/15   | Sealing elements                 | BU9593 / HDR                                   | A1               | A1 | -  | -  | -  |
|             |                                  | CrNi steel/graphite 1G                         | -                | -  | B1 | B1 | B1 |
| 502.01      | Casing wear ring, suction side   | Grey cast iron JL1040 / CI                     | A1               | A1 | B1 | B1 | B1 |
|             |                                  | Chrome hard 400                                | -                | -  | -  | B2 | B2 |
| 502.02      | Casing wear ring, discharge side | Grey cast iron JL1040 / CI                     | A1               | A1 | B1 | B1 | B1 |
|             |                                  | Chrome hard 400                                | -                | -  | -  | B2 | B2 |
| 902         | Studs                            | Steel 8.8                                      | A1               | A1 | -  | -  | -  |
|             |                                  | 1.7709+QT / A193 Gr B7                         | -                | -  | B1 | B1 | B1 |
| 903         | Plug                             | Steel                                          | A1               | A1 | B1 | B1 | B1 |
| 920         | Nut                              | 8+A2A / 8+B633 SC1 TP3                         | A1               | A1 | -  | -  | -  |
|             |                                  | 1.7218+QT+A2D / A194 Gr 7 / Gr 2H+B633 SC1 TP2 | -                | -  | B1 | B1 | B1 |
| 920.95      | Impeller nut                     | 8                                              | A1               | A1 | B1 | B1 | B1 |

4) The casing components are checked for leakage by means of internal pressure tests to AN 1897/75-03D00 with water.

### Technical data

#### Technical data

| Sizes         | Bearing bracket | Impeller              |                         |                   |         | Speed limit |         |
|---------------|-----------------|-----------------------|-------------------------|-------------------|---------|-------------|---------|
|               |                 | Impeller outlet width | Impeller inlet diameter | Impeller diameter |         | Maximum     | Minimum |
|               |                 |                       |                         | Maximum           | Minimum |             |         |
|               |                 | [mm]                  | [mm]                    | [mm]              | [mm]    | [rpm]       | [rpm]   |
| 040-025-160   | WS_25_LS        | 6,0                   | 45,2                    | 169               | 130     | 3500        | 800     |
| 040-025-200   | WS_25_LS        | 6,0                   | 45,2                    | 209               | 160     | 3500        | 800     |
| 050-032-125.1 | WS_25_LS        | 6,6                   | 52,4                    | 139               | 104     | 4300        | 800     |
| 050-032-160.1 | WS_25_LS        | 5,7                   | 52,7                    | 170               | 136     | 4400        | 800     |
| 050-032-200.1 | WS_25_LS        | 5,6                   | 54,0                    | 204               | 170     | 3800        | 800     |
| 050-032-160   | WS_25_LS        | 8,5                   | 60,6                    | 174               | 136     | 3500        | 800     |
| 050-032-200   | WS_25_LS        | 7,0                   | 62,9                    | 209               | 170     | 3700        | 800     |
| 050-032-250   | WS_25_LS        | 7,5                   | 62,6                    | 261               | 209     | 3600        | 800     |
| 065-040-160   | WS_25_LS        | 13,0                  | 70,0                    | 174               | 128     | 4400        | 800     |
| 065-040-200   | WS_25_LS        | 9,4                   | 69,4                    | 209               | 165     | 3700        | 800     |
| 065-040-250   | WS_25_LS        | 8,4                   | 74,1                    | 260               | 200     | 3600        | 800     |
| 065-040-315   | WS_35_LS        | 7,5                   | 75,3                    | 326               | 260     | 2300        | 800     |
| 065-050-160   | WS_25_LS        | 16,9                  | 86,9                    | 174               | 128     | 4400        | 800     |
| 065-050-200   | WS_25_LS        | 13,8                  | 83,1                    | 219               | 170     | 3400        | 800     |
| 065-050-250   | WS_25_LS        | 10,5                  | 84,0                    | 260               | 215     | 3500        | 800     |
| 065-050-315   | WS_35_LS        | 10,0                  | 87,0                    | 323               | 265     | 2400        | 800     |
| 080-065-160   | WS_25_LS        | 21,0                  | 92,0                    | 174               | 132     | 3900        | 800     |
| 080-065-200   | WS_25_LS        | 17,0                  | 99,7                    | 219               | 175     | 3600        | 800     |
| 080-065-250   | WS_35_LS        | 15,1                  | 101,0                   | 260               | 215     | 3600        | 800     |
| 080-065-315   | WS_35_LS        | 13,7                  | 108,2                   | 320               | 260     | 2400        | 800     |
| 100-080-160   | WS_25_LS        | 31,6                  | 124,0                   | 174               | 138     | 3500        | 800     |
| 100-080-200   | WS_35_LS        | 24,5                  | 115,0                   | 219               | 180     | 3500        | 800     |
| 100-080-250   | WS_35_LS        | 19,0                  | 115,0                   | 269               | 215     | 3500        | 800     |
| 100-080-315   | WS_35_LS        | 18,7                  | 115,6                   | 334               | 269     | 1900        | 800     |
| 125-100-160   | WS_35_LS        | 37,6                  | 135,0                   | 185               | 162     | 3600        | 800     |
| 125-100-200   | WS_35_LS        | 32,5                  | 142,0                   | 219               | 179     | 3300        | 800     |
| 125-100-250   | WS_35_LS        | 27,0                  | 145,0                   | 269               | 210     | 3500        | 800     |
| 125-100-315   | WS_35_LS        | 23,0                  | 142,0                   | 334               | 270     | 1800        | 800     |
| 150-125-200   | WS_35_LS        | 40,7                  | 159,0                   | 224               | 182     | 3500        | 800     |
| 150-125-250   | WS_35_LS        | 37,0                  | 162,4                   | 269               | 218     | 2000        | 800     |
| 150-125-315   | WS_55_LS        | 30,9                  | 162,0                   | 334               | 270     | 2300        | 800     |
| 150-125-400   | WS_55_LS        | 25,9                  | 162,4                   | 419               | 330     | 1800        | 800     |
| 200-150-315   | WS_55_LS        | 39,7                  | 191,5                   | 334               | 264     | 2100        | 800     |
| 200-150-400   | WS_55_LS        | 33,0                  | 191,4                   | 419               | 330     | 1600        | 800     |

## Dimensions

Fig. 0 pump

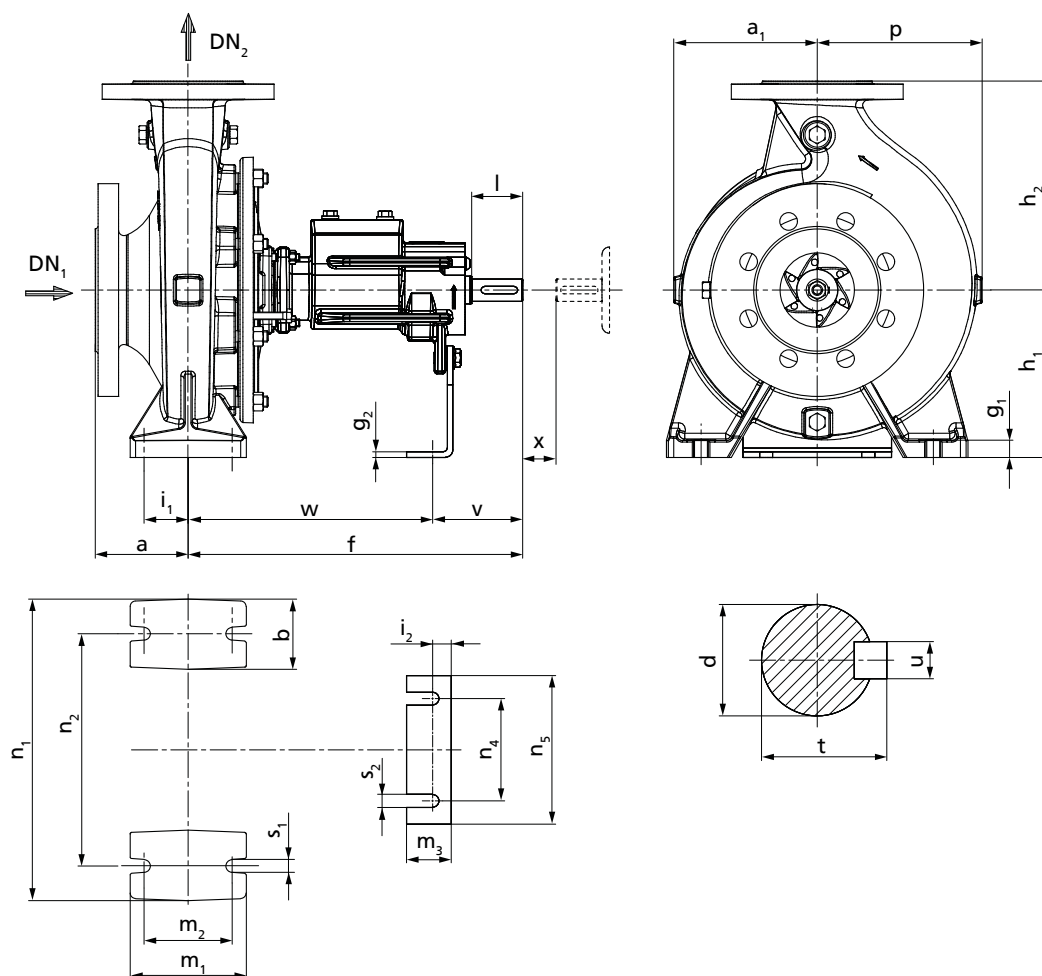


Fig. 2: Dimensions, Fig. 0

Pump dimensions [mm]

| Size          | Bearing bracket | $DN_1^{5)}$ | $DN_2^{5)}$ | $a^{5)}$ | $a_1$ | $b^{5)}$ | $d^{5)}$ | $f^{5)}$ | $g_1$ | $g_2$ | $h_1^{5)}$ | $h_2^{5)}$ | $i_1$ | $i_2$ | $l^{5)}$ | $m_1^{5)}$ | $m_2$ |
|---------------|-----------------|-------------|-------------|----------|-------|----------|----------|----------|-------|-------|------------|------------|-------|-------|----------|------------|-------|
| 040-025-160   | WS_25_LS        | 40          | 25          | 80       | 118   | 50       | 24       | 360      | 15    | 4     | 132        | 160        | 35    | 23    | 50       | 100        | 70    |
| 040-025-200   | WS_25_LS        | 40          | 25          | 80       | 142   | 50       | 24       | 360      | 15    | 4     | 160        | 180        | 35    | 23    | 50       | 100        | 70    |
| 050-032-125.1 | WS_25_LS        | 50          | 32          | 80       | 116   | 50       | 24       | 360      | 15    | 4     | 112        | 140        | 35    | 23    | 50       | 100        | 70    |
| 050-032-160.1 | WS_25_LS        | 50          | 32          | 80       | 116   | 50       | 24       | 360      | 15    | 4     | 132        | 160        | 35    | 23    | 50       | 100        | 70    |
| 050-032-200.1 | WS_25_LS        | 50          | 32          | 80       | 142   | 50       | 24       | 360      | 18    | 4     | 160        | 180        | 35    | 23    | 50       | 100        | 70    |
| 050-032-160   | WS_25_LS        | 50          | 32          | 80       | 118   | 50       | 24       | 360      | 15    | 4     | 132        | 160        | 35    | 23    | 50       | 100        | 70    |
| 050-032-200   | WS_25_LS        | 50          | 32          | 80       | 142   | 50       | 24       | 360      | 18    | 4     | 160        | 180        | 35    | 23    | 50       | 100        | 70    |
| 050-032-250   | WS_25_LS        | 50          | 32          | 100      | 169   | 65       | 24       | 360      | 18    | 6     | 180        | 225        | 47,5  | 25    | 50       | 125        | 95    |
| 065-040-160   | WS_25_LS        | 65          | 40          | 80       | 119   | 50       | 24       | 360      | 15    | 4     | 132        | 160        | 35    | 23    | 50       | 100        | 70    |
| 065-040-200   | WS_25_LS        | 65          | 40          | 100      | 142   | 50       | 24       | 360      | 18    | 4     | 160        | 180        | 35    | 23    | 50       | 100        | 70    |
| 065-040-250   | WS_25_LS        | 65          | 40          | 100      | 169   | 65       | 24       | 360      | 18    | 6     | 180        | 225        | 47,5  | 25    | 50       | 125        | 95    |
| 065-040-315   | WS_35_LS        | 65          | 40          | 125      | 207   | 65       | 32       | 470      | 18    | 6     | 225        | 250        | 47,5  | 24    | 80       | 125        | 95    |
| 065-050-160   | WS_25_LS        | 65          | 50          | 100      | 128   | 50       | 24       | 360      | 18    | 4     | 160        | 180        | 35    | 23    | 50       | 100        | 70    |
| 065-050-200   | WS_25_LS        | 65          | 50          | 100      | 144   | 50       | 24       | 360      | 18    | 4     | 160        | 200        | 35    | 23    | 50       | 100        | 70    |
| 065-050-250   | WS_25_LS        | 65          | 50          | 100      | 170   | 65       | 24       | 360      | 18    | 6     | 180        | 225        | 47,5  | 25    | 50       | 125        | 95    |
| 065-050-315   | WS_35_LS        | 65          | 50          | 125      | 207   | 65       | 32       | 470      | 18    | 6     | 225        | 280        | 47,5  | 24    | 80       | 125        | 95    |
| 080-065-160   | WS_25_LS        | 80          | 65          | 100      | 132   | 65       | 24       | 360      | 18    | 4     | 160        | 200        | 47,5  | 23    | 50       | 125        | 95    |
| 080-065-200   | WS_25_LS        | 80          | 65          | 100      | 155   | 65       | 24       | 360      | 18    | 6     | 180        | 225        | 47,5  | 25    | 50       | 125        | 95    |
| 080-065-250   | WS_35_LS        | 80          | 65          | 100      | 179   | 80       | 32       | 470      | 20    | 6     | 200        | 250        | 60    | 24    | 80       | 160        | 120   |

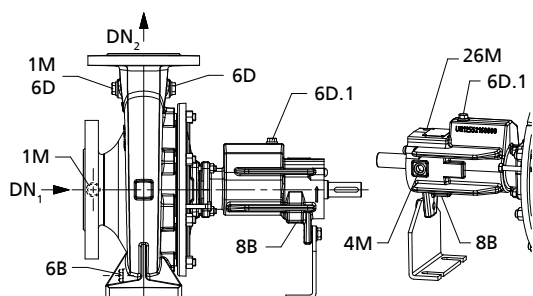
5) Dimensions to EN 733

| Size        | Bearing bracket | DN <sub>1</sub> <sup>5)</sup> | DN <sub>2</sub> <sup>5)</sup> | a <sup>5)</sup> | a <sub>1</sub> | b <sup>5)</sup> | d <sup>5)</sup> | f <sup>5)</sup> | g <sub>1</sub> | g <sub>2</sub> | h <sub>1</sub> <sup>5)</sup> | h <sub>2</sub> <sup>5)</sup> | i <sub>1</sub> | i <sub>2</sub> | l <sup>5)</sup> | m <sub>1</sub> <sup>5)</sup> | m <sub>2</sub> |
|-------------|-----------------|-------------------------------|-------------------------------|-----------------|----------------|-----------------|-----------------|-----------------|----------------|----------------|------------------------------|------------------------------|----------------|----------------|-----------------|------------------------------|----------------|
| 080-065-315 | WS_35_LS        | 80                            | 65                            | 125             | 209            | 80              | 32              | 470             | 20             | 6              | 225                          | 280                          | 60             | 24             | 80              | 160                          | 120            |
| 100-080-160 | WS_25_LS        | 100                           | 80                            | 125             | 138            | 65              | 24              | 360             | 18             | 6              | 180                          | 225                          | 47,5           | 25             | 50              | 125                          | 95             |
| 100-080-200 | WS_35_LS        | 100                           | 80                            | 125             | 159            | 65              | 32              | 470             | 18             | 4              | 180                          | 250                          | 47,5           | 22             | 80              | 125                          | 95             |
| 100-080-250 | WS_35_LS        | 100                           | 80                            | 125             | 183            | 80              | 32              | 470             | 18             | 6              | 200                          | 280                          | 60             | 24             | 80              | 160                          | 120            |
| 100-080-315 | WS_35_LS        | 100                           | 80                            | 125             | 218            | 80              | 32              | 470             | 20             | 6              | 250                          | 315                          | 60             | 24             | 80              | 160                          | 120            |
| 125-100-160 | WS_35_LS        | 125                           | 100                           | 125             | 178            | 80              | 32              | 470             | 18             | 6              | 200                          | 280                          | 60             | 24             | 80              | 160                          | 120            |
| 125-100-200 | WS_35_LS        | 125                           | 100                           | 125             | 173            | 80              | 32              | 470             | 18             | 6              | 200                          | 280                          | 60             | 24             | 80              | 160                          | 120            |
| 125-100-250 | WS_35_LS        | 125                           | 100                           | 140             | 188            | 80              | 32              | 470             | 18             | 6              | 225                          | 280                          | 60             | 24             | 80              | 160                          | 120            |
| 125-100-315 | WS_35_LS        | 125                           | 100                           | 140             | 225            | 80              | 32              | 470             | 18             | 6              | 250                          | 315                          | 60             | 24             | 80              | 160                          | 120            |
| 150-125-200 | WS_35_LS        | 150                           | 125                           | 140             | 189            | 80              | 32              | 470             | 20             | 6              | 250                          | 315                          | 60             | 24             | 80              | 160                          | 120            |
| 150-125-250 | WS_35_LS        | 150                           | 125                           | 140             | 226            | 80              | 32              | 470             | 20             | 6              | 250                          | 355                          | 60             | 24             | 80              | 160                          | 120            |
| 150-125-315 | WS_55_LS        | 150                           | 125                           | 140             | 243            | 100             | 42              | 530             | 20             | 6              | 280                          | 355                          | 75             | 25             | 110             | 200                          | 150            |
| 150-125-400 | WS_55_LS        | 150                           | 125                           | 140             | 277            | 100             | 42              | 530             | 20             | 6              | 315                          | 400                          | 75             | 25             | 110             | 200                          | 150            |
| 200-150-315 | WS_55_LS        | 200                           | 150                           | 160             | 255            | 100             | 42              | 530             | 20             | 6              | 280                          | 400                          | 75             | 25             | 110             | 200                          | 150            |
| 200-150-400 | WS_55_LS        | 200                           | 150                           | 160             | 289            | 100             | 42              | 530             | 20             | 6              | 315                          | 450                          | 75             | 25             | 110             | 200                          | 150            |

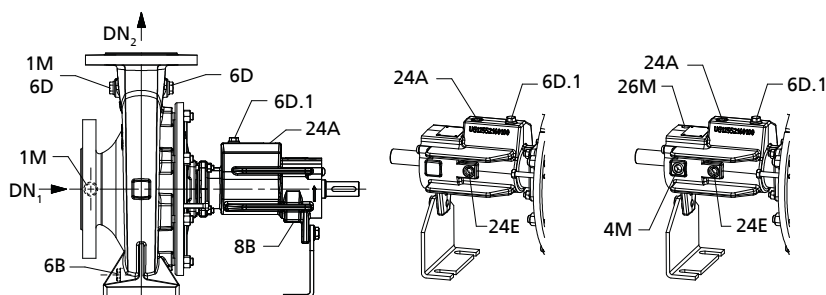
Pump dimensions, continued [mm]

| Size          | Bearing bracket | DN <sub>1</sub> <sup>5)</sup> | DN <sub>2</sub> <sup>5)</sup> | m <sub>3</sub> <sup>5)</sup> | n <sub>1</sub> <sup>5)</sup> | n <sub>2</sub> <sup>5)</sup> | n <sub>4</sub> | n <sub>5</sub> | p   | s <sub>1</sub> <sup>5)</sup> | s <sub>2</sub> <sup>5)</sup> | t  | u  | v   | w <sup>5)</sup> | x <sup>5)</sup> |
|---------------|-----------------|-------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|----------------|----------------|-----|------------------------------|------------------------------|----|----|-----|-----------------|-----------------|
| 040-025-160   | WS_25_LS        | 40                            | 25                            | 48                           | 240                          | 190                          | 110            | 160            | 118 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 040-025-200   | WS_25_LS        | 40                            | 25                            | 48                           | 240                          | 190                          | 110            | 160            | 142 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 050-032-125.1 | WS_25_LS        | 50                            | 32                            | 48                           | 190                          | 140                          | 110            | 160            | 116 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 050-032-160.1 | WS_25_LS        | 50                            | 32                            | 48                           | 240                          | 190                          | 110            | 160            | 121 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 050-032-200.1 | WS_25_LS        | 50                            | 32                            | 48                           | 240                          | 190                          | 110            | 160            | 142 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 050-032-160   | WS_25_LS        | 50                            | 32                            | 48                           | 240                          | 190                          | 110            | 160            | 128 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 050-032-200   | WS_25_LS        | 50                            | 32                            | 48                           | 240                          | 190                          | 110            | 160            | 143 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 050-032-250   | WS_25_LS        | 50                            | 32                            | 48                           | 320                          | 250                          | 110            | 160            | 178 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 065-040-160   | WS_25_LS        | 65                            | 40                            | 48                           | 240                          | 190                          | 110            | 160            | 134 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 065-040-200   | WS_25_LS        | 65                            | 40                            | 48                           | 265                          | 212                          | 110            | 160            | 155 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 065-040-250   | WS_25_LS        | 65                            | 40                            | 48                           | 320                          | 250                          | 110            | 160            | 179 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 065-040-315   | WS_35_LS        | 65                            | 40                            | 48                           | 345                          | 280                          | 110            | 160            | 207 | 14                           | 14                           | 35 | 10 | 130 | 340             | 100             |
| 065-050-160   | WS_25_LS        | 65                            | 50                            | 48                           | 265                          | 212                          | 110            | 160            | 149 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 065-050-200   | WS_25_LS        | 65                            | 50                            | 48                           | 265                          | 212                          | 110            | 160            | 163 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 065-050-250   | WS_25_LS        | 65                            | 50                            | 48                           | 320                          | 250                          | 110            | 160            | 186 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 065-050-315   | WS_35_LS        | 65                            | 50                            | 48                           | 345                          | 280                          | 110            | 160            | 215 | 14                           | 14                           | 35 | 10 | 130 | 340             | 100             |
| 080-065-160   | WS_25_LS        | 80                            | 65                            | 48                           | 280                          | 212                          | 110            | 160            | 160 | 14                           | 14                           | 27 | 8  | 100 | 260             | 100             |
| 080-065-200   | WS_25_LS        | 80                            | 65                            | 48                           | 320                          | 250                          | 110            | 160            | 178 | 14                           | 14                           | 27 | 8  | 100 | 260             | 140             |
| 080-065-250   | WS_35_LS        | 80                            | 65                            | 48                           | 360                          | 280                          | 110            | 160            | 199 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 080-065-315   | WS_35_LS        | 80                            | 65                            | 48                           | 400                          | 315                          | 110            | 160            | 229 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 100-080-160   | WS_25_LS        | 100                           | 80                            | 48                           | 320                          | 250                          | 110            | 160            | 174 | 14                           | 14                           | 27 | 8  | 100 | 260             | 140             |
| 100-080-200   | WS_35_LS        | 100                           | 80                            | 48                           | 345                          | 280                          | 110            | 160            | 188 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 100-080-250   | WS_35_LS        | 100                           | 80                            | 48                           | 400                          | 315                          | 110            | 160            | 209 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 100-080-315   | WS_35_LS        | 100                           | 80                            | 48                           | 400                          | 315                          | 110            | 160            | 242 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 125-100-160   | WS_35_LS        | 125                           | 100                           | 48                           | 360                          | 280                          | 110            | 160            | 225 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 125-100-200   | WS_35_LS        | 125                           | 100                           | 48                           | 360                          | 280                          | 110            | 160            | 212 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 125-100-250   | WS_35_LS        | 125                           | 100                           | 48                           | 400                          | 315                          | 110            | 160            | 219 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 125-100-315   | WS_35_LS        | 125                           | 100                           | 48                           | 400                          | 315                          | 110            | 160            | 255 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 150-125-200   | WS_35_LS        | 150                           | 125                           | 48                           | 400                          | 315                          | 110            | 160            | 242 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 150-125-250   | WS_35_LS        | 150                           | 125                           | 48                           | 400                          | 315                          | 110            | 160            | 275 | 19                           | 14                           | 35 | 10 | 130 | 340             | 140             |
| 150-125-315   | WS_55_LS        | 150                           | 125                           | 48                           | 500                          | 400                          | 110            | 160            | 280 | 24                           | 14                           | 45 | 12 | 160 | 370             | 140             |
| 150-125-400   | WS_55_LS        | 150                           | 125                           | 48                           | 500                          | 400                          | 110            | 160            | 309 | 24                           | 14                           | 45 | 12 | 160 | 370             | 140             |
| 200-150-315   | WS_55_LS        | 200                           | 150                           | 48                           | 550                          | 450                          | 110            | 160            | 304 | 24                           | 14                           | 45 | 12 | 160 | 370             | 140             |
| 200-150-400   | WS_55_LS        | 200                           | 150                           | 48                           | 550                          | 450                          | 110            | 160            | 331 | 24                           | 14                           | 45 | 12 | 160 | 370             | 140             |

## Connection types



Connections of a pump with single mechanical seal



Connections of a pump with double mechanical seal

## Connection types

| Connection  | Description               | Configuration                                 | Position                       | Region |
|-------------|---------------------------|-----------------------------------------------|--------------------------------|--------|
| 1M          | Pressure gauge connection | Drilled and closed or with pressure sensor    | DN <sub>2</sub>                | A      |
|             |                           | Drilled and closed                            |                                | B      |
| 1M optional | Pressure gauge connection | Drilled and closed or with pressure sensor    | DN <sub>1</sub>                | A      |
|             |                           | Drilled and closed                            |                                | B      |
| 4M          | Temperature measurement   | Drilled and closed or with temperature sensor |                                | A, B   |
| 6B          | Fluid drain               | Drilled and closed                            | -                              | A, B   |
| 6D          | Fluid priming and venting | Drilled and closed                            | DN <sub>2</sub> , suction side | A, B   |
| 6D optional | Fluid priming and venting | Drilled and closed                            | DN <sub>2</sub> , drive end    | A, B   |
| 6D.1        | Fluid priming and venting | Drilled and closed                            | -                              | A, B   |
| 8B          | Leakage drain             | Drilled                                       | -                              | A, B   |
| 24A         | Quench liquid outlet      | Drilled and closed or with quench piping      | -                              | A, B   |
| 24E         | Quench liquid inlet       | Drilled and closed or with quench piping      | -                              | A, B   |
| 26M         | Shock pulse measurement   | Drilled and closed or with vibration sensor   |                                | A, B   |

## Connection dimensions

| Size          | Bearing bracket | Material variant S               |                                    |                             | Material variant E               |
|---------------|-----------------|----------------------------------|------------------------------------|-----------------------------|----------------------------------|
|               |                 | Connections at the volute casing | Connections at the bearing bracket |                             | Connections at the volute casing |
|               |                 |                                  | 4M                                 | 6D.1 / 8B / 24A / 24E / 26M |                                  |
| 040-025-160   | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 040-025-200   | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 050-032-125.1 | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 050-032-160.1 | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 050-032-200.1 | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 050-032-160   | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 050-032-200   | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 050-032-250   | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 065-040-160   | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 065-040-200   | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |

| Size        | Bearing bracket | Material variant S               |                                    |                             | Material variant E               |
|-------------|-----------------|----------------------------------|------------------------------------|-----------------------------|----------------------------------|
|             |                 | Connections at the volute casing | Connections at the bearing bracket |                             | Connections at the volute casing |
|             |                 |                                  | 4M                                 | 6D.1 / 8B / 24A / 24E / 26M |                                  |
|             |                 | 1M / 6D / 6B                     |                                    |                             | 1M / 6D / 6B                     |
| 065-040-250 | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 065-040-315 | WS_35_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 065-050-160 | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 065-050-200 | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 065-050-250 | WS_25_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 065-050-315 | WS_35_LS        | G 1/4                            | M8                                 | G 1/4                       | 1/4-18 NPT                       |
| 080-065-160 | WS_25_LS        | G 3/8                            | M8                                 | G 1/4                       | 3/8-18 NPT                       |
| 080-065-200 | WS_25_LS        | G 3/8                            | M8                                 | G 1/4                       | 3/8-18 NPT                       |
| 080-065-250 | WS_35_LS        | G 3/8                            | M8                                 | G 1/4                       | 3/8-18 NPT                       |
| 080-065-315 | WS_35_LS        | G 3/8                            | M8                                 | G 1/4                       | 3/8-18 NPT                       |
| 100-080-160 | WS_25_LS        | G 3/8                            | M8                                 | G 1/4                       | 3/8-18 NPT                       |
| 100-080-200 | WS_35_LS        | G 3/8                            | M8                                 | G 1/4                       | 3/8-18 NPT                       |
| 100-080-250 | WS_35_LS        | G 3/8                            | M8                                 | G 1/4                       | 3/8-18 NPT                       |
| 100-080-315 | WS_35_LS        | G 3/8                            | M8                                 | G 1/4                       | 3/8-18 NPT                       |
| 125-100-160 | WS_35_LS        | G 1/2                            | M8                                 | G 1/4                       | 1/2-14 NPT                       |
| 125-100-200 | WS_35_LS        | G 1/2                            | M8                                 | G 1/4                       | 1/2-14 NPT                       |
| 125-100-250 | WS_35_LS        | G 1/2                            | M8                                 | G 1/4                       | 1/2-14 NPT                       |
| 125-100-315 | WS_35_LS        | G 1/2                            | M8                                 | G 1/4                       | 1/2-14 NPT                       |
| 150-125-200 | WS_35_LS        | G 1/2                            | M8                                 | G 1/4                       | 1/2-14 NPT                       |
| 150-125-250 | WS_35_LS        | G 1/2                            | M8                                 | G 1/4                       | 1/2-14 NPT                       |
| 150-125-315 | WS_55_LS        | G 1/2                            | M8                                 | G 1/4                       | 1/2-14 NPT                       |
| 150-125-400 | WS_55_LS        | G 1/2                            | M8                                 | G 1/4                       | 1/2-14 NPT                       |
| 200-150-200 | WS_55_LS        | G 1/2                            | M8                                 | G 1/4                       | 1/2-14 NPT                       |
| 200-150-400 | WS_55_LS        | G 1/2                            | M8                                 | G 1/4                       | 1/2-14 NPT                       |

## Flange design

Flange design by materials

| Material variant | Standard                            | Nominal diameter | Pressure class | Region |
|------------------|-------------------------------------|------------------|----------------|--------|
| S                | EN 1092-2                           | DN 25 - DN 200   | PN 16          | A      |
|                  | Drilled to ASME B16.1 <sup>6)</sup> | DN 25 - DN 200   | Class 125      | A      |
| E                | EN 1092-1                           | DN 25 - DN 200   | PN 16          | B      |
|                  | Drilled to ASME B16.5 <sup>6)</sup> | DN 25 - DN 200   | Class 150      | B      |

## Flange dimensions

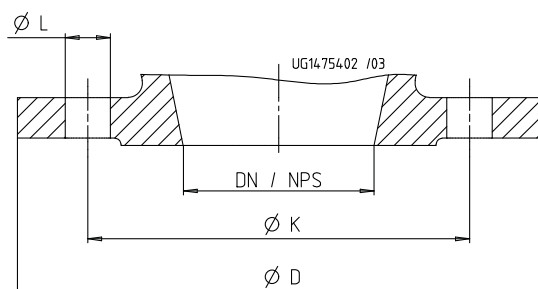


Fig. 3: Illustration of dimensions

6) DN 80 machined like DN 100

Flange dimensions [mm]

| DN / NPS                 | Standard           |           |                      |                    |                         |                      |                                  |                                                |                      |
|--------------------------|--------------------|-----------|----------------------|--------------------|-------------------------|----------------------|----------------------------------|------------------------------------------------|----------------------|
|                          | EN 1092-1          |           |                      | EN 1092-2          |                         |                      | ASME B 16.1<br>or<br>ASME B 16.5 |                                                |                      |
|                          | Material variant E |           |                      | Material variant S |                         |                      | Material variants S / E          |                                                |                      |
|                          | PN 16              |           |                      |                    |                         |                      | Class 125 or Class 150           |                                                |                      |
|                          | Ø K                | Ø D       | Number of<br>holes L | Ø K                | Ø D                     | Number of<br>holes L | Ø K                              | Ø D                                            | Number of<br>holes L |
| 25 / NPS 1               | 85                 | 115       | 4×Ø14                | 85                 | 115                     | 4×Ø14                | 79,2                             | 115                                            | 4×Ø15,7              |
| 32 / NPS 1 1/4           | 100                | 140       | 4×Ø18                | 100                | 140                     | 4×Ø19                | 88,9                             | 140                                            | 4×Ø15,7              |
| 40 / NPS 1 1/2           | 110                | 150       | 4×Ø18                | 110                | 150                     | 4×Ø19                | 98,6                             | 150                                            | 4×Ø15,7              |
| 50 / NPS 2               | 125                | 165       | 4×Ø18                | 125                | 165                     | 4×Ø19                | 120,7                            | 165                                            | 4×Ø19,1              |
| 65 / NPS 2 1/2           | 145                | 185       | 4×Ø18                | 145                | 185                     | 4×Ø19                | 139,7                            | 185                                            | 4×Ø19,1              |
| 80 / NPS 3 <sup>7)</sup> | 160                | 200 / 230 | 8×Ø18                | 160                | 200 / 229 <sup>8)</sup> | 8×Ø19                | 152,4                            | 200 / 229 <sup>8)</sup> /<br>230 <sup>8)</sup> | 4×Ø19,1              |
| 100 / NPS 4              | 180                | 230       | 8×Ø18                | 180                | 230                     | 8×Ø19                | 190,5                            | 230                                            | 8×Ø19,1              |
| 125 / NPS 5              | 210                | 255       | 8×Ø18                | 210                | 255                     | 8×Ø19                | 215,9                            | 255                                            | 8×Ø22,4              |
| 150 / NPS 6              | 240                | 285       | 8×Ø22                | 240                | 285                     | 8×Ø23                | 241,3                            | 285                                            | 8×Ø22,4              |
| 200 / NPS 8              | 295                | 345       | 12×Ø22               | 295                | 345                     | 12×Ø23               | 298,5                            | 345                                            | 8×Ø22,4              |

Equivalents of DN 80 for a flange drilled to ASME

| Size        | Bearing bracket | Material variants SG, SC |                  | Material variants EG, EC, EE |                  |
|-------------|-----------------|--------------------------|------------------|------------------------------|------------------|
|             |                 | DN 1<br>ASME 125         | DN 2<br>ASME 125 | DN 1<br>ASME 150             | DN 2<br>ASME 150 |
| 080-065-160 | 25              | NPS 4                    | NPS 2 1/2        | NPS 4                        | NPS 2 1/2        |
| 080-065-200 | 25              | NPS 4                    | NPS 2 1/2        | NPS 4                        | NPS 2 1/2        |
| 080-065-250 | 35              | NPS 4                    | NPS 2 1/2        | NPS 4                        | NPS 2 1/2        |
| 080-065-315 | 35              | NPS 4                    | NPS 2 1/2        | NPS 4                        | NPS 2 1/2        |

### Scope of supply

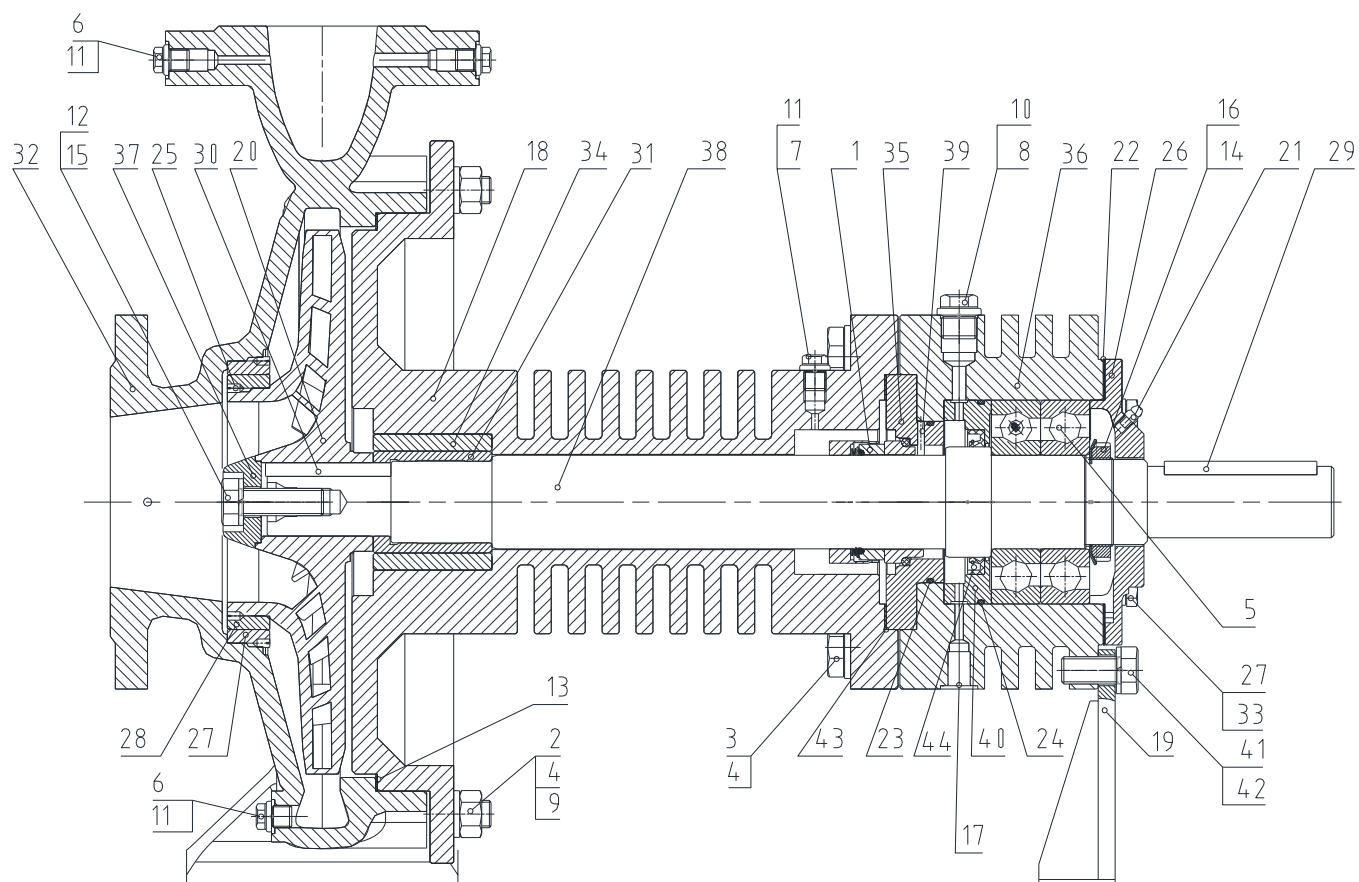
Depending on the model, the following items are included in the scope of supply:

Scope of supply

| Scope of supply                     | Region |
|-------------------------------------|--------|
| Pump                                | A, B   |
| Baseplate                           | A, B   |
| Coupling                            | A, B   |
| Coupling guard                      | A, B   |
| Drive                               | A, B   |
| Quench pot with pipework (optional) | A      |
| Special accessories as required     | A      |

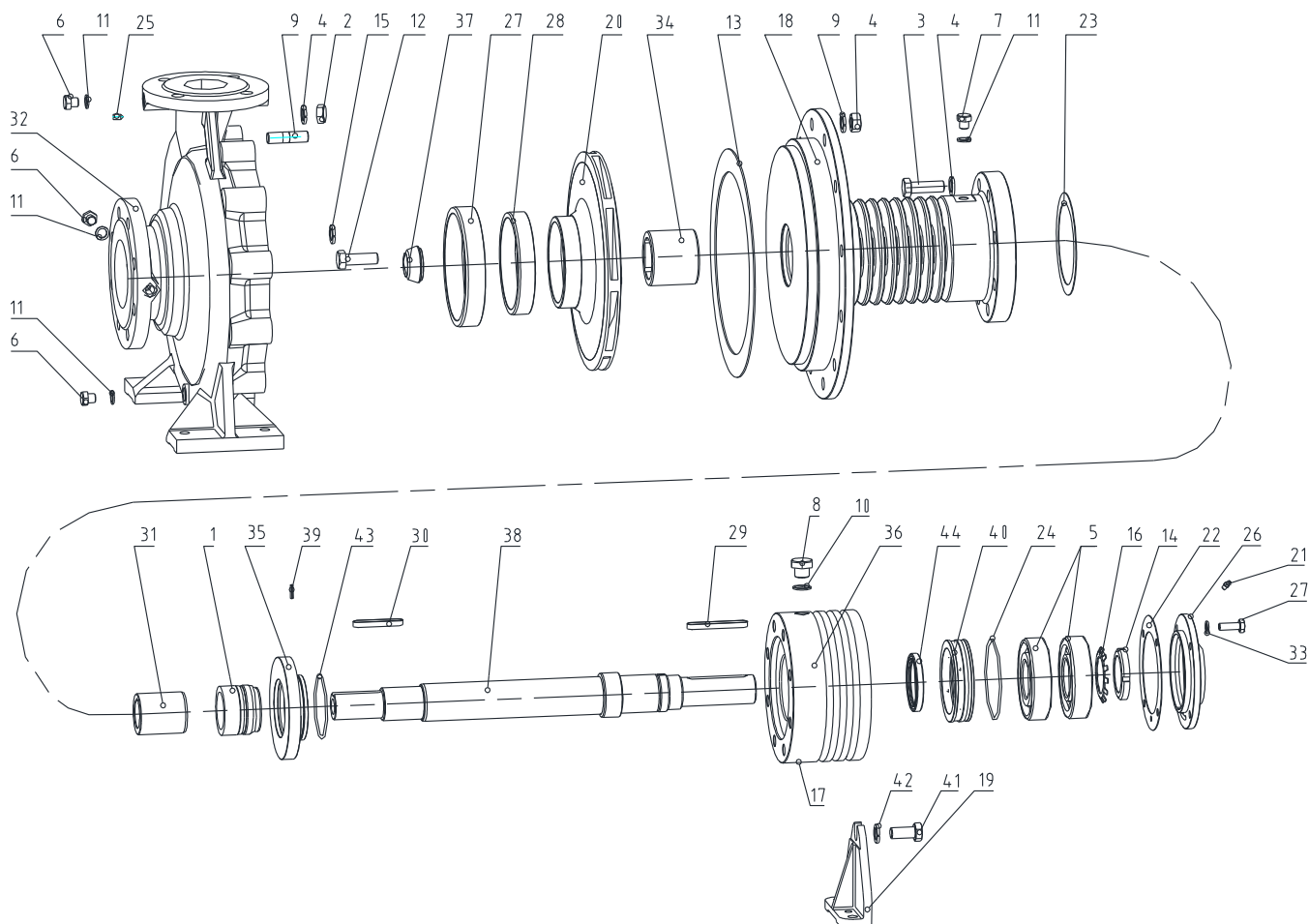


ASSEMBLY DRAWING WITH PART LIST



|    |                   |    |                          |    |                                |    |                       |
|----|-------------------|----|--------------------------|----|--------------------------------|----|-----------------------|
| 1  | Mechanical seal   | 12 | Impeller fixing screw    | 23 | O-ring                         | 34 | Plate bearing         |
| 2  | Nut               | 13 | Gasket                   | 24 | O-ring                         | 35 | Mechanical seal cover |
| 3  | Screw             | 14 | Lock nut                 | 25 | Screw for wearing rings fixing | 36 | Bearing bracket       |
| 4  | Washer            | 15 | Washer                   | 26 | Bearing cover                  | 37 | Disc                  |
| 5  | Ball bearings     | 16 | Locking washer           | 27 | Casing wearing ring            | 38 | Shaft                 |
| 6  | Screw             | 17 | Leakage connection R1/2" | 28 | Impeller wearing ring          | 39 | Spring pin            |
| 7  | Air venting crews | 18 | Volute casing cover      | 29 | Key                            | 40 | Seat ring holder      |
| 8  | Screw             | 19 | Foot                     | 30 | Key                            | 41 | Screw                 |
| 9  | Screw             | 20 | Impeller                 | 31 | Sleeve                         | 42 | Washer                |
| 10 | Washer            | 21 | Greaser                  | 32 | Volute casing                  | 43 | Gasket                |
| 11 | Washer            | 22 | Gasket                   | 33 | Washer                         | 44 | Lip seal              |

## PUMP EXPLODED VIEW



|    |                   |    |                       |    |                                |    |                       |
|----|-------------------|----|-----------------------|----|--------------------------------|----|-----------------------|
| 1  | Mechanical seal   | 12 | Impeller fixing screw | 23 | O-ring                         | 34 | Plate bearing         |
| 2  | Nut               | 13 | Gasket                | 24 | O-ring                         | 35 | Mechanical seal cover |
| 3  | Screw             | 14 | Lock nut              | 25 | Screw for wearing rings fixing | 36 | Bearing bracket       |
| 4  | Washer            | 15 | Washer                | 26 | Bearing cover                  | 37 | Disc                  |
| 5  | Ball bearings     | 16 | Locking washer        | 27 | Casing wearing ring            | 38 | Shaft                 |
| 6  | Screw             | 17 | Leakage connection    | 28 | Impeller wearing ring          | 39 | Spring pin            |
| 7  | Air venting screw | 18 | Volute casing cover   | 29 | Key                            | 40 | Seat ring holder      |
| 8  | Screw             | 19 | Foot                  | 30 | Key                            | 41 | Screw                 |
| 9  | Screw             | 20 | Impeller              | 31 | Sleeve                         | 42 | Washer                |
| 10 | Washer            | 21 | Greaser               | 32 | Volute casing                  | 43 | Gasket                |
| 11 | Washer            | 22 | Gasket                | 33 | Washer                         | 44 | Lip seal              |

# Vlety bearing bracket WS\_25\_LS with double mechanical seal

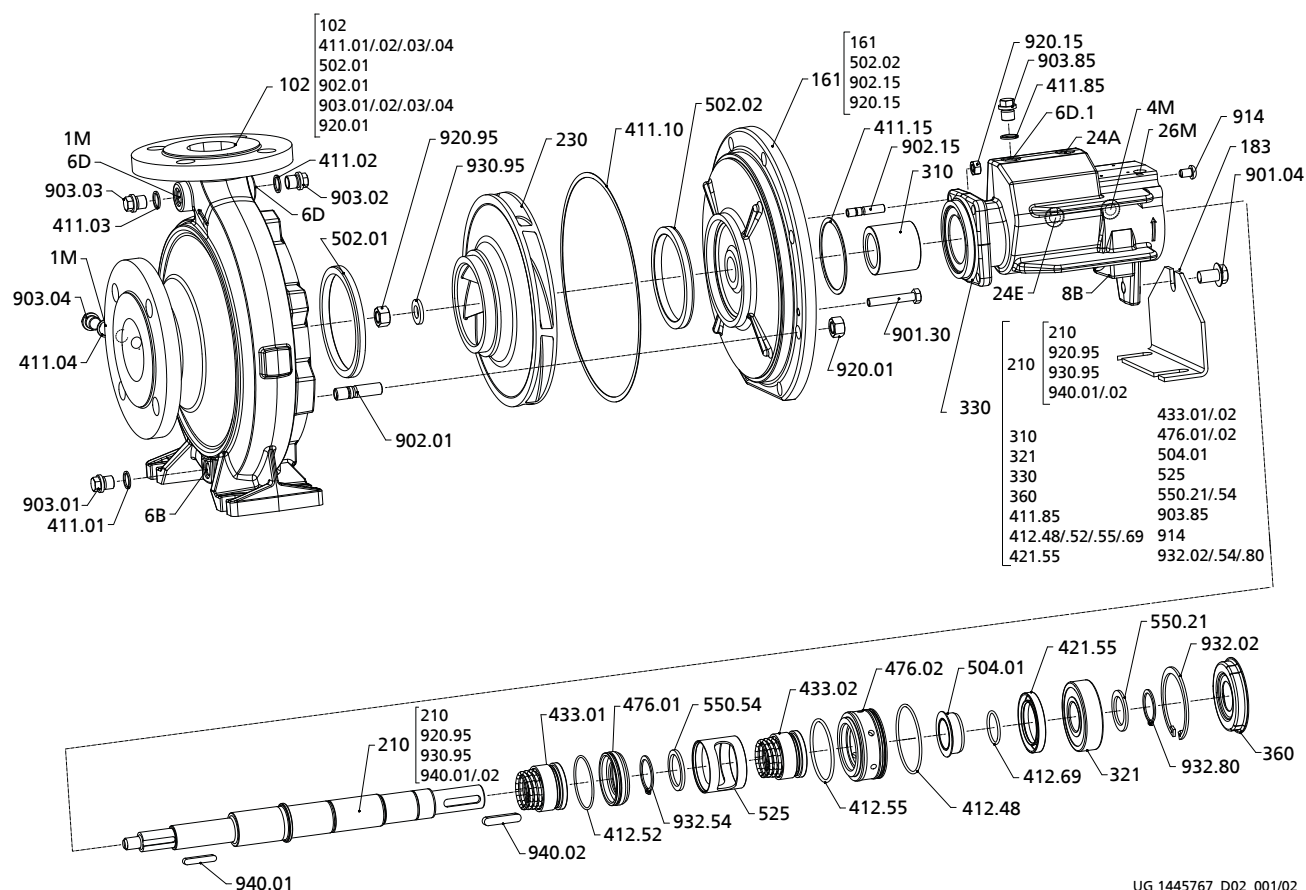


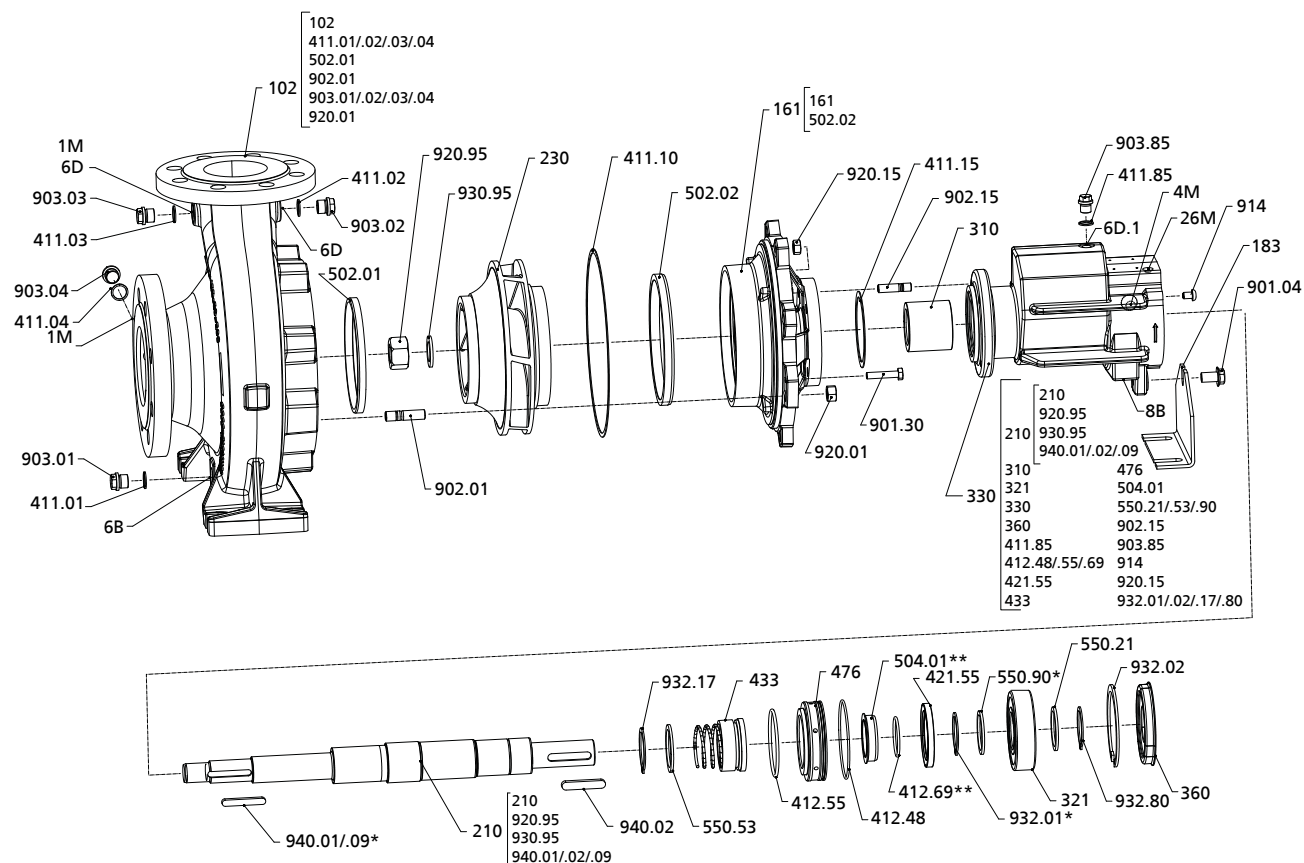
Fig. 5: Exploded view of an Vlety; bearing bracket WS\_25\_LS with double mechanical seal

UG 1445767\_D02\_001/02

## List of components

| Part number                    | Description         | Part number            | Description                        |
|--------------------------------|---------------------|------------------------|------------------------------------|
| 102                            | Volute casing       | 901.04/.30             | Hexagon head bolt                  |
| 161                            | Casing cover        | 902.01/.15             | Stud                               |
| 183                            | Support foot        | 903.01/.02/.03/.04/.85 | Screw plug                         |
| 210                            | Shaft               | 914                    | Pan head screw                     |
| 230                            | Impeller            | 920.01/.15/.95         | Nut                                |
| 310                            | Plain bearing       | 930.95                 | Safety device                      |
| 321                            | Radial ball bearing | 932.02/.54/.80         | Circlip                            |
| 330                            | Bearing bracket     | 940.01/.02             | Key                                |
| 360                            | Bearing cover       |                        |                                    |
| 411.01/.02/.03/.04/.10/.15/.85 | Joint ring          | <b>Connections</b>     |                                    |
| 412.48/.52/.55/.69             | O-ring              | 1M                     | Pressure gauge connection          |
| 421.55                         | Lip seal            | 4M                     | Temperature measurement connection |
| 433.01/.02                     | Mechanical seal     | 6B                     | Fluid drain                        |
| 476.01/.02                     | Mating ring carrier | 6D, 6D.1               | Fluid priming and venting          |
| 502.01/.02 <sup>10)</sup>      | Casing wear ring    | 8B                     | Leakage drain                      |
| 504.01                         | Spacer ring         | 24A                    | Quench liquid outlet               |
| 525                            | Spacer sleeve       | 24E                    | Quench liquid inlet                |
| 550.21/.54                     | Disc                | 26M                    | Shock pulse measurement connection |

**Vlety, bearing brackets WS\_35\_LS / WS\_55\_LS**

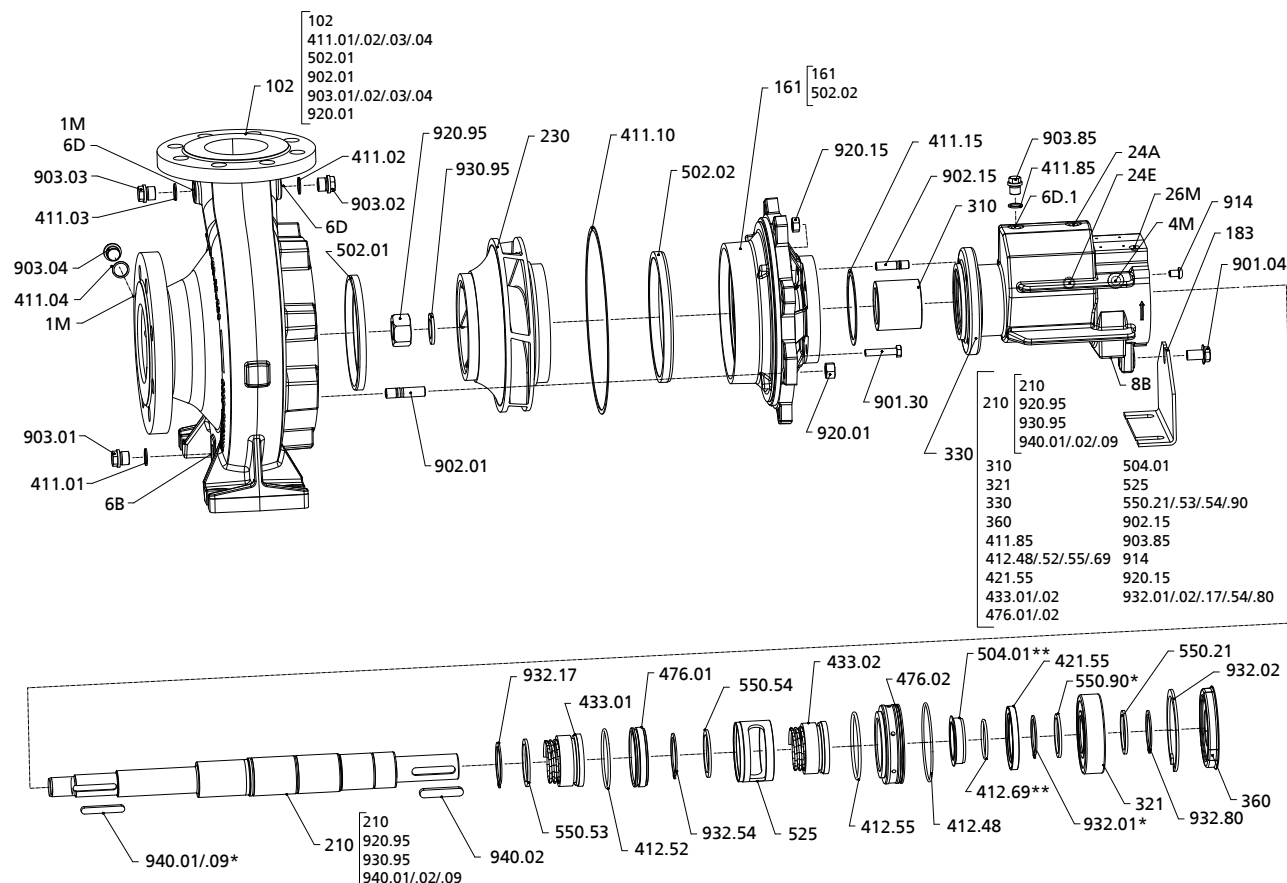


**Fig. 6:** Exploded view of an Vlety; bearing brackets WS\_35\_LS / WS\_55\_LS  
For WS\_55 only  
For WS\_35 only

## List of components

| Part number                    | Description         | Part number                        | Description                        |
|--------------------------------|---------------------|------------------------------------|------------------------------------|
| 102                            | Volute casing       | 901.04/.30                         | Hexagon head bolt                  |
| 161                            | Casing cover        | 902.01/.15                         | Stud                               |
| 183                            | Support foot        | 903.01/.02/.03/.04/.85             | Screw plug                         |
| 210                            | Shaft               | 914                                | Pan head screw                     |
| 230                            | Impeller            | 920.01/.15/.95                     | Nut                                |
| 310                            | Plain bearing       | 930.95                             | Safety device                      |
| 321                            | Radial ball bearing | 932.01 <sup>11)</sup> /.02/.17/.80 | Circlip                            |
| 330                            | Bearing bracket     | 940.01/.02/.09 <sup>12)</sup>      | Key                                |
| 360                            | Bearing cover       |                                    |                                    |
| 411.01/.02/.03/.04/.10/.15/.85 | Joint ring          | <b>Connections</b>                 |                                    |
| 412.48/.55/.69                 | O-ring              | 1M                                 | Pressure gauge connection          |
| 421.55                         | Lip seal            | 4M                                 | Temperature measurement connection |
| 433                            | Mechanical seal     | 6B                                 | Fluid drain                        |
| 476                            | Mating ring carrier | 6D, 6D.1                           | Fluid priming and venting          |
| 502.01/.02                     | Casing wear ring    | 8B                                 | Leakage drain                      |
| 504.01 <sup>13)</sup>          | Spacer ring         | 26M                                | Shock pulse measurement connection |
| 550.21/.53/.90 <sup>14)</sup>  | Disc                |                                    |                                    |

Vlety, bearing brackets WS\_35\_LS / WS\_55\_LS with double mechanical seal



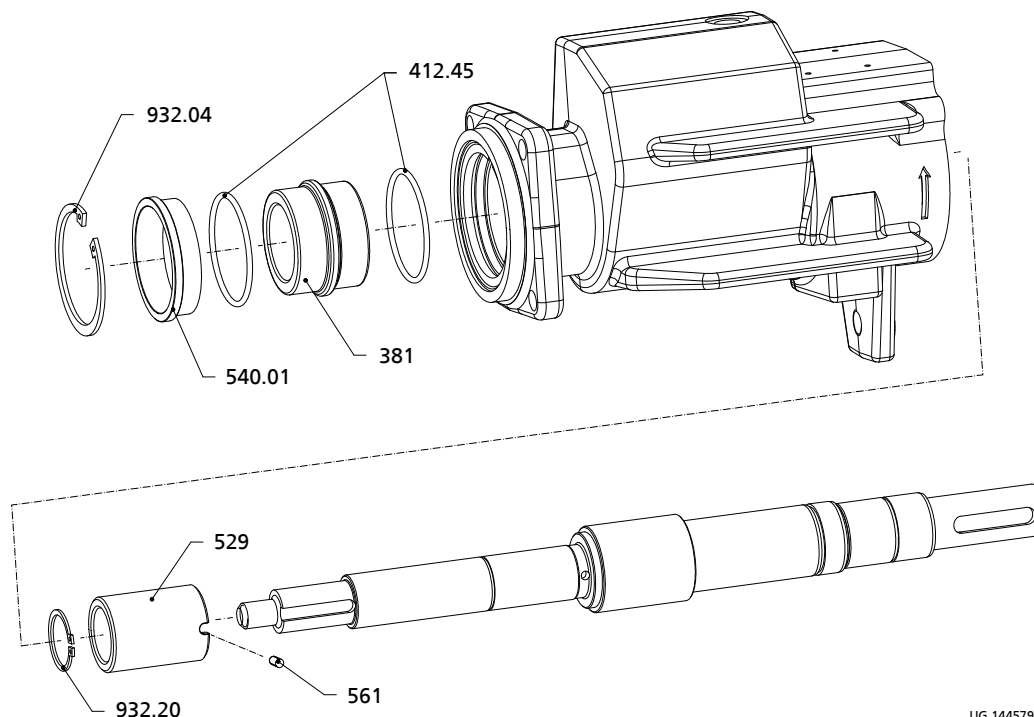
UG 1451331\_D02\_001/02

Fig. 7: Exploded view of an Vlety, bearing brackets WS\_35\_LS / WS\_55\_LS with double mechanical seal

List of components

| Part number                    | Description         | Part number                            | Description                        |
|--------------------------------|---------------------|----------------------------------------|------------------------------------|
| 102                            | Volute casing       | 901.04/.30                             | Hexagon head bolt                  |
| 161                            | Casing cover        | 902.01/.15                             | Stud                               |
| 183                            | Support foot        | 903.01/02/03/04/.85                    | Screw plug                         |
| 210                            | Shaft               | 914                                    | Pan head screw                     |
| 230                            | Impeller            | 920.01/.15/.95                         | Nut                                |
| 310                            | Plain bearings      | 930.95                                 | Safety device                      |
| 321                            | Radial ball bearing | 932.01 <sup>15)</sup> /.02/.17/.54/.80 | Circlip                            |
| 330                            | Bearing bracket     | 940.01/02/09 <sup>16)</sup>            | Key                                |
| 360                            | Bearing cover       |                                        |                                    |
| 411.01/02/03/04/.10/.15/.85    | Joint ring          | <b>Connections</b>                     |                                    |
| 412.48/52/55/69 <sup>17)</sup> | O-ring              | 1M                                     | Pressure gauge connection          |
| 421.55                         |                     | 4M                                     | Temperature measurement connection |
| 433.01/02                      | Mechanical seal     | 6B                                     | Fluid drain                        |
| 476.01/02                      | Mating ring carrier | 6D, 6D.1                               | Fluid priming and venting          |
| 502.01/02                      | Casing wear ring    | 8B                                     | Leakage drain                      |
| 504.01 <sup>18)</sup>          |                     | 24A                                    | Quench liquid outlet               |
| 525                            | Spacer sleeve       | 24E                                    | Quench liquid inlet                |
| 550.21/53/54/90 <sup>19)</sup> | Disc                | 26M                                    | Shock pulse measurement connection |

Vlety, bearing brackets WS\_25\_LS / WS\_55\_LS with SiC plain bearing



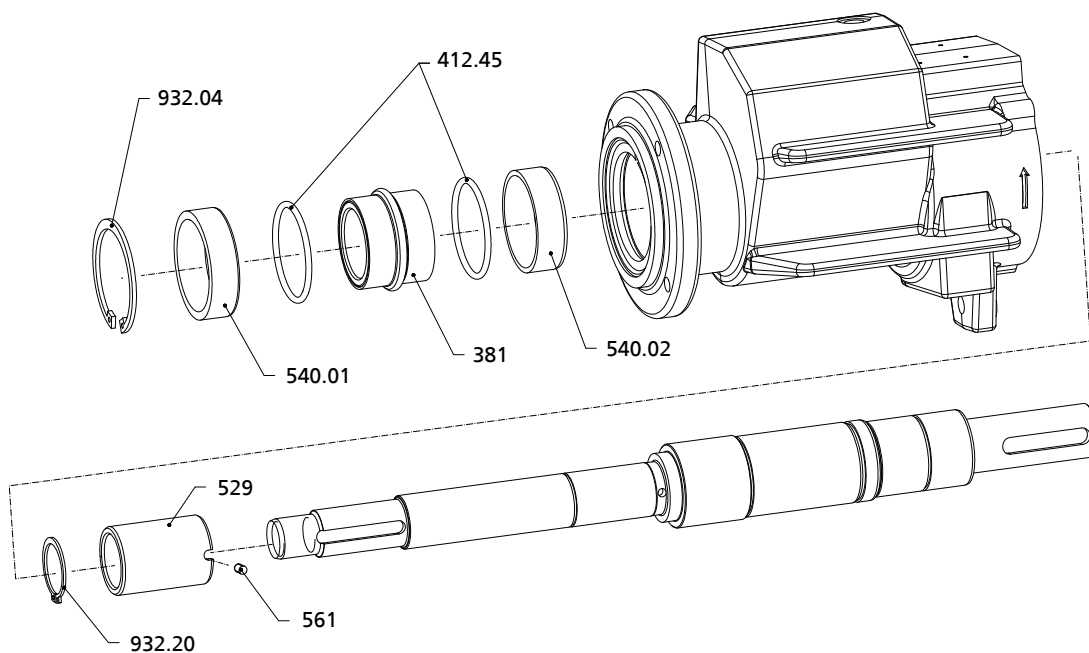
UG 1445795\_D02\_001/01

Fig. 8: Exploded view of an Vlety, bearing brackets WS\_25\_LS / WS\_55\_LS with SiC plain bearing

List of components

| Part No. | Description       | Part No.   | Description    |
|----------|-------------------|------------|----------------|
| 381      | Bearing cartridge | 561        | Grooved pin    |
| 540.01   | Bush              | 529        | Bearing sleeve |
| 412.45   | O-ring            | 932.04/.20 | Circlip        |

Vlety, bearing bracket WS\_35\_LS with SiC plain bearing



UG 1451348\_D02\_001/01

Fig. 9: Exploded view of an Vlety, bearing bracket WS\_35\_LS with SiC plain bearing

List of components

| Part No.   | Description       | Part No.   | Description    |
|------------|-------------------|------------|----------------|
| 381        | Bearing cartridge | 561        | Grooved pin    |
| 540.01/.02 | Bush              | 529        | Bearing sleeve |
| 412.45     | O-ring            | 932.04/.20 | Circlip        |



### Connections

#### Auxiliary connections for double mechanical seal

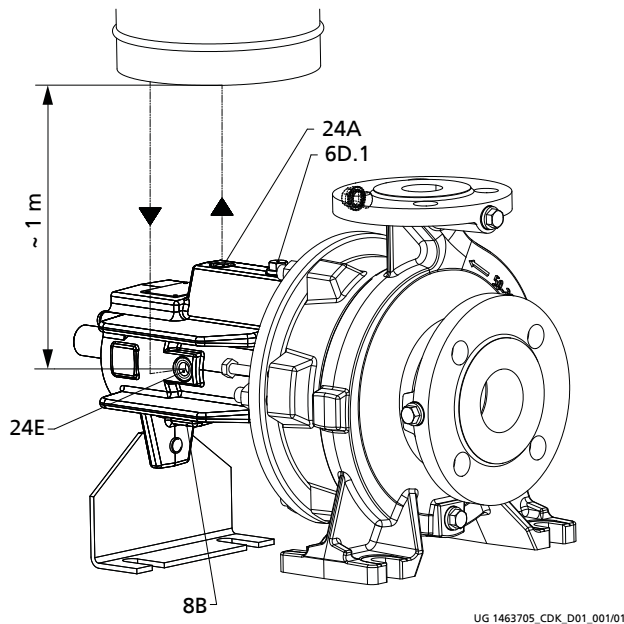


Fig. 10: Auxiliary connections for double mechanical seal

#### Overview

| Connection | Description               |
|------------|---------------------------|
| 8B         | Leakage drain             |
| 6D.1       | Fluid priming and venting |
| 24A        | Quench liquid outlet      |
| 24E        | Quench liquid inlet       |

#### Auxiliary connections for double mechanical seal and monitoring equipment

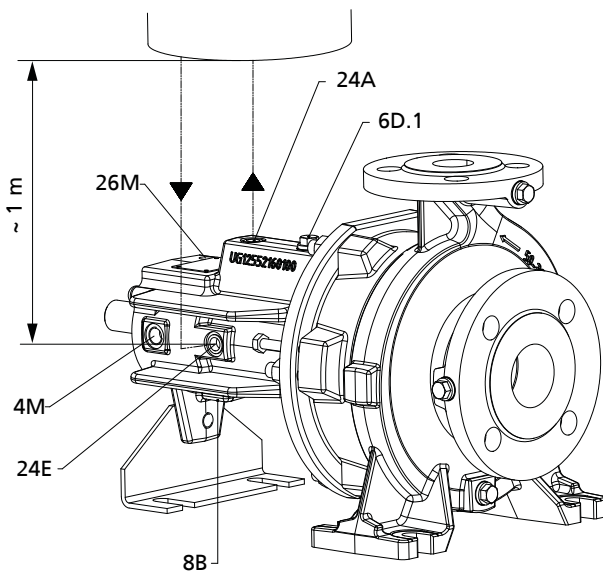


Fig. 11: Connections for double mechanical seal and monitoring equipment

#### Overview

| Connection | Description               |
|------------|---------------------------|
| 4M         | Temperature measurement   |
| 6D.1       | Fluid priming and venting |
| 8B         | Leakage drain             |
| 24A        | Quench liquid outlet      |
| 24E        | Quench liquid inlet       |
| 26M        | Shock pulse measurement   |

#### Auxiliary connections for single mechanical seal and monitoring equipment

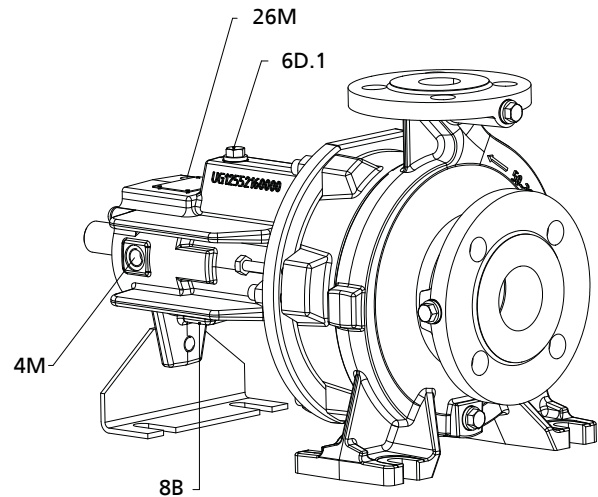


Fig. 12: Connections for single mechanical seal and monitoring equipment

#### Overview

| Connection | Description               |
|------------|---------------------------|
| 4M         | Temperature measurement   |
| 6D.1       | Fluid priming and venting |
| 8B         | Leakage drain             |
| 26M        | Shock pulse measurement   |



# Detailed designation

Designation example

| Position                      |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |                |    |    |    |    |    |    |    |    |
|-------------------------------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------------|----|----|----|----|----|----|----|----|
| 1                             | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28             | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| E                             | T | N | Y | 0 | 4 | 0 | - | 0 | 2  | 5  | -  | 2  | 0  | 0  |    | 5  | G  |    | D  | B  | 0  | 8  | L  | B  | 2  | 0  | 0              | 7  | 5  | 2  | B  | P  | D  | 2  |    |
| See name plate and data sheet |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | See data sheet |    |    |    |    |    |    |    |    |

Designation key

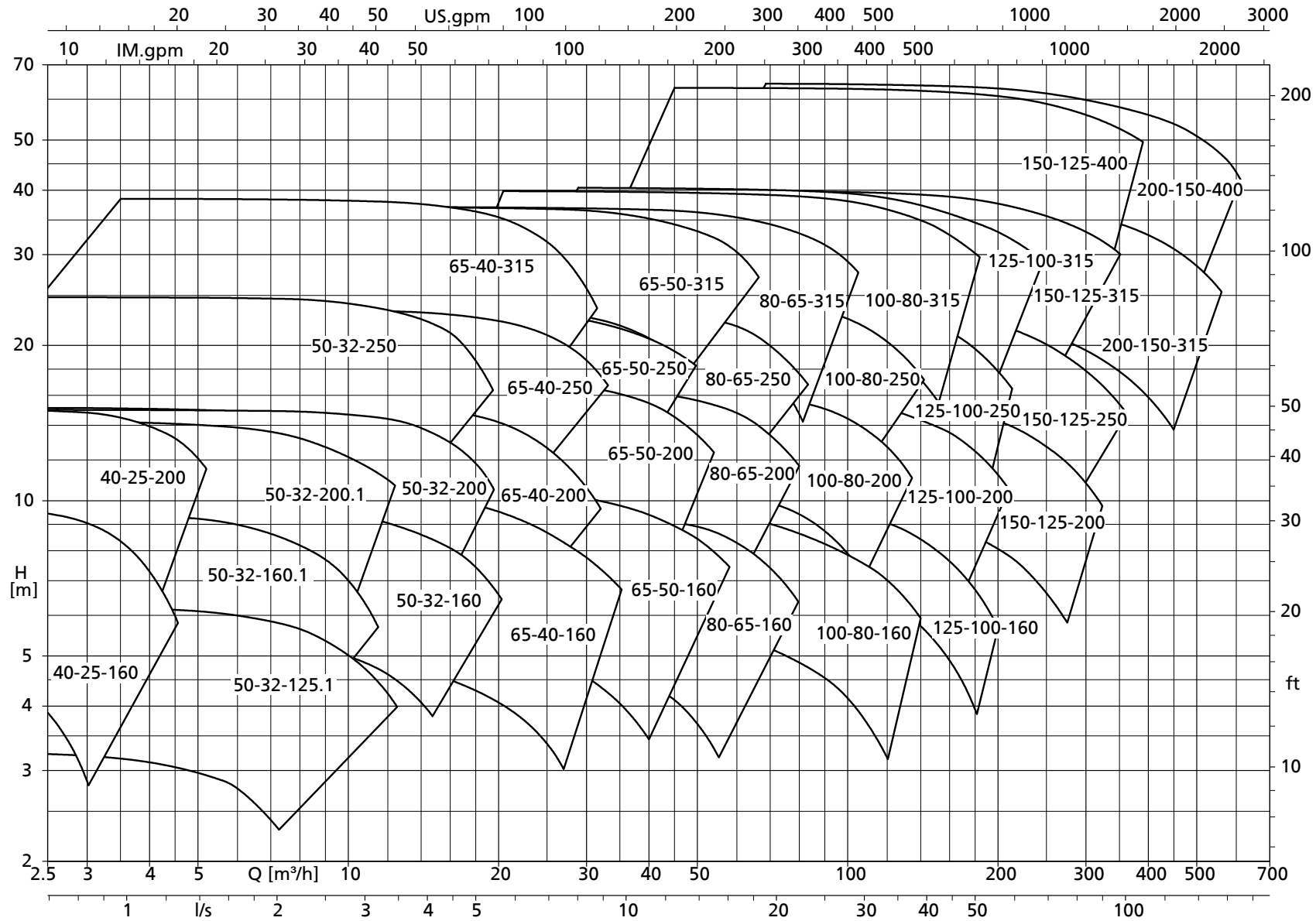
| Position | Code                 |         | Description                                      |
|----------|----------------------|---------|--------------------------------------------------|
| 1-4      | Pump type            |         |                                                  |
|          |                      |         | Vlety                                            |
| 5-16     | Size                 |         |                                                  |
|          |                      | 040     | Nominal suction nozzle diameter [mm]             |
|          |                      | 025     | Nominal discharge nozzle diameter [mm]           |
|          |                      | 200     | Nominal impeller diameter [mm]                   |
| 17       | Pump casing material |         |                                                  |
|          |                      | S       | EN-GJS-400-15                                    |
|          |                      | E       | GP240GH+N / A216 GR WCB                          |
| 18       | Impeller material    |         |                                                  |
|          |                      | G       | EN-GJL-250/A48 CL 35B                            |
|          |                      | C       | 1.4408 / A743 CF8M                               |
|          |                      | E       | GP240GH+N / A216 GR WCB                          |
| 19       | Special design       |         |                                                  |
|          |                      | 20)     | Standard                                         |
|          |                      | X       | Non-standard BT3D, BT3                           |
| 20       | Casing cover         |         |                                                  |
|          |                      |         | Casing cover                                     |
| 21       | Seal code            |         |                                                  |
|          |                      | B       | Dead-end                                         |
| 22-23    | Seal code            |         |                                                  |
|          |                      | 08      | M32N69 (SYT) AQ1VGG                              |
|          |                      | 25      | M32N67 (SYT) AQ1VGG M32N67 AQ1VGG                |
| 24       | Bearing bracket      |         |                                                  |
|          |                      | L       | Version for heat transfer fluid                  |
| 25       | Scope of supply      |         |                                                  |
|          |                      | A       | Pump only (Fig. 0)                               |
|          |                      | B       | Pump, baseplate                                  |
|          |                      | C       | Pump, baseplate, coupling, coupling guard        |
|          |                      | D       | Pump, baseplate, coupling, coupling guard, motor |
| 26       | Shaft unit           |         |                                                  |
|          |                      | 2       | Shaft unit 25, bearing bracket LS standard       |
|          |                      | 3       | Shaft unit 35, bearing bracket LS standard       |
|          |                      | 5       | Shaft unit 55, bearing bracket LS standard       |
| 27-30    | Motor rating         |         |                                                  |
|          |                      | 1 3 2 0 | 132 kW                                           |
|          |                      | 0 0 7 5 | 7,5 kW                                           |
|          |                      | 0 0 0 7 | 0,75 kW                                          |
| 31       | Number of poles      |         |                                                  |
|          |                      | 2       | 2 poles                                          |
|          |                      | 4       | 4 poles                                          |
|          |                      | 6       | 6 poles                                          |
| 32       | Product generation   |         |                                                  |
|          |                      | B       | Product generation Etanorm SYT 2014              |
| 33-36    | PumpDrive            |         |                                                  |
|          |                      | P D B   | PumpDrive 1st generation, Basic                  |
|          |                      | P D A   | PumpDrive 1st generation, Advanced               |
|          |                      | P D 2   | PumpDrive 2nd generation                         |
|          |                      | P D 2 E | PumpDrive 2nd generation, Eco                    |

20) Blank

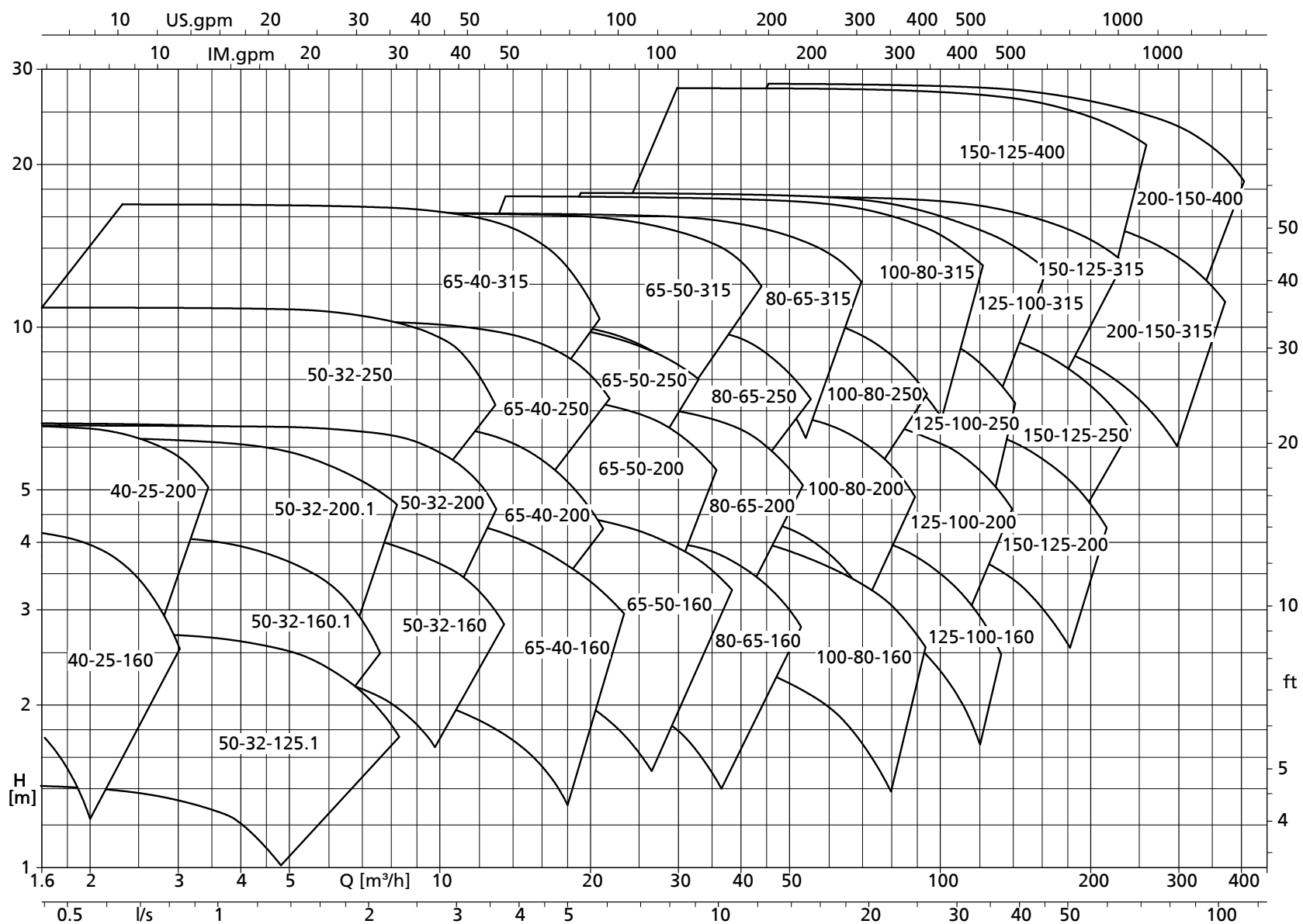
22



Vlety n = 1450 rpm



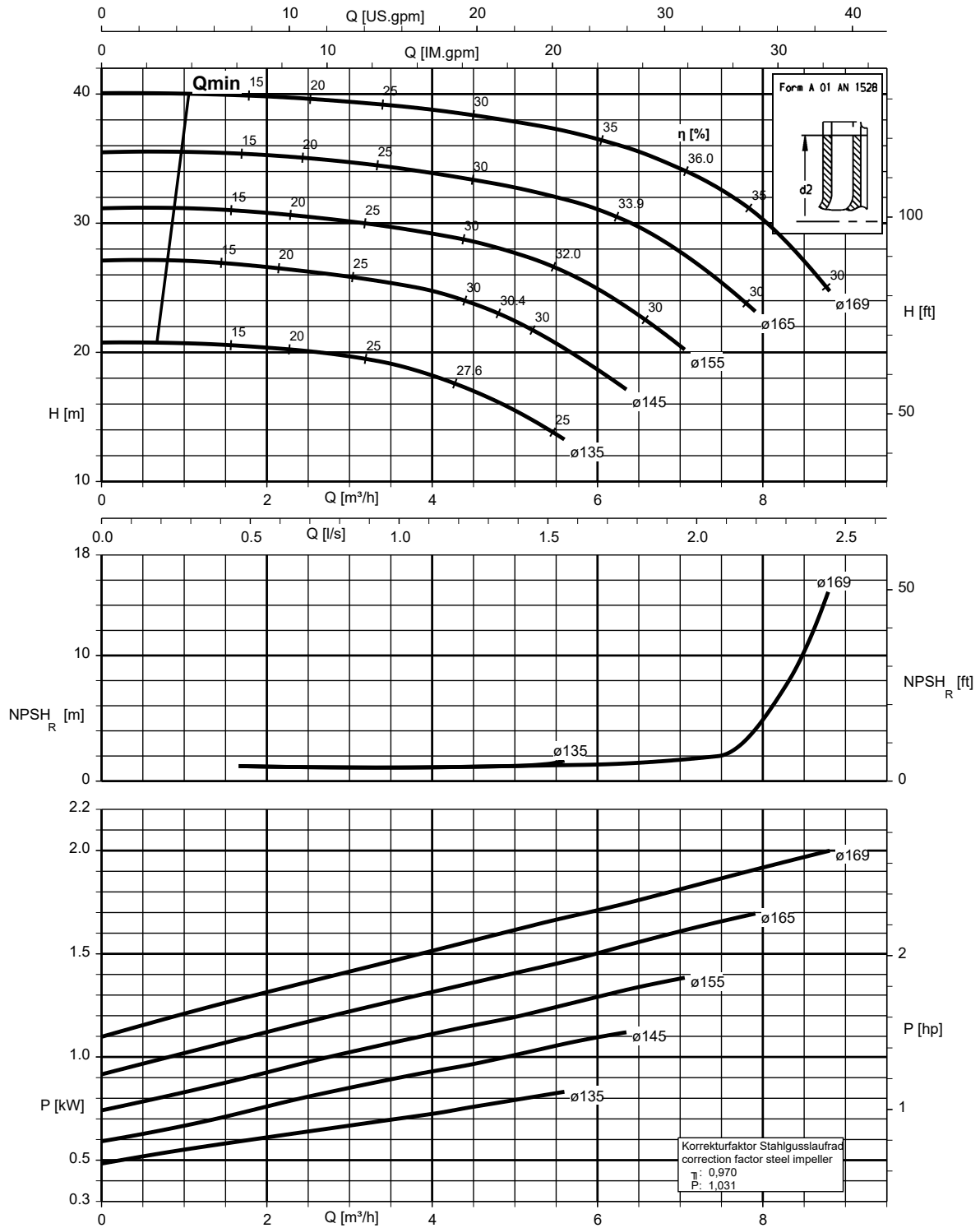
Vlety n = 960 rpm



## Characteristic curves

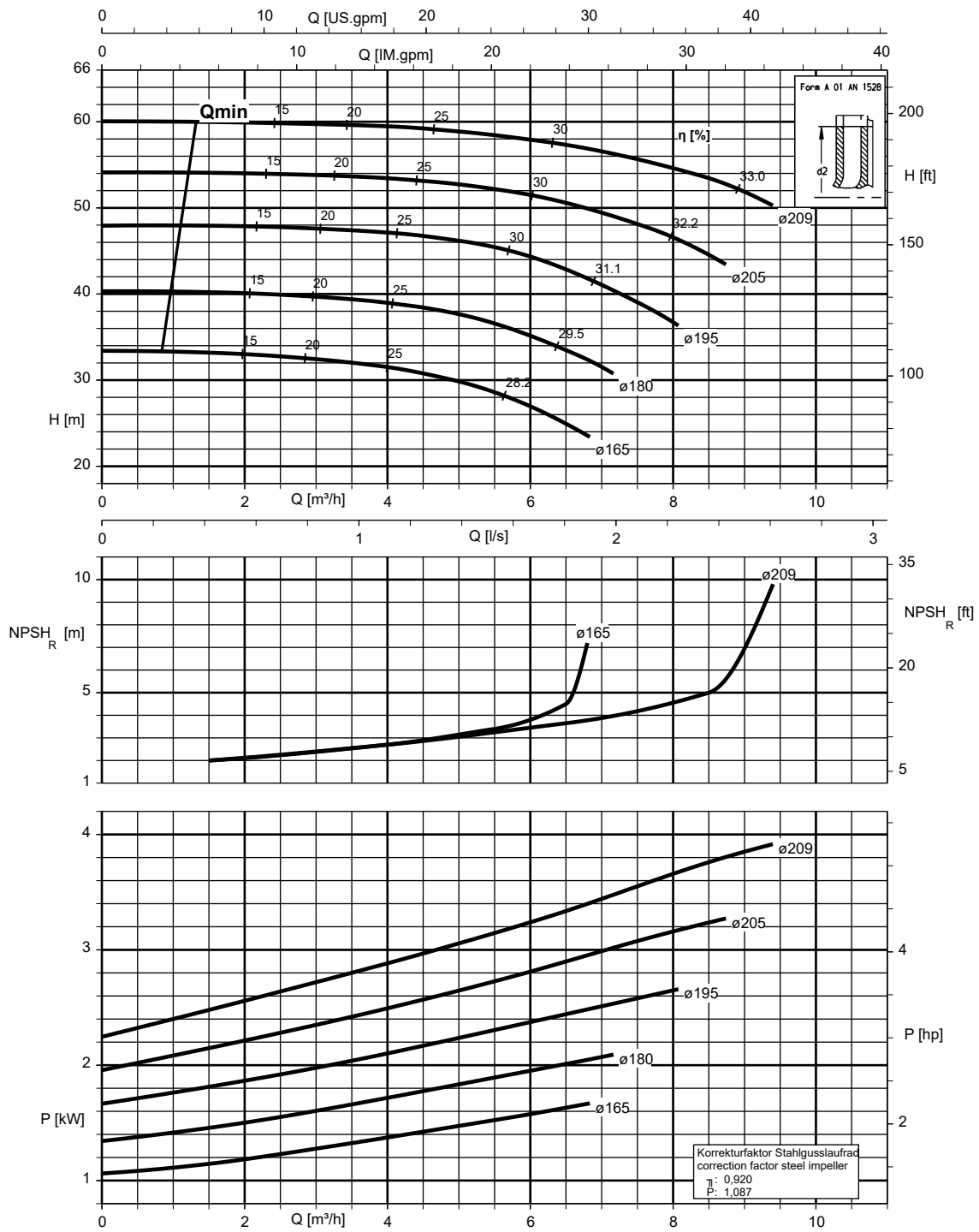
$n = 2900 \text{ rpm}$

Vlety 040-025-160,  $n = 2900 \text{ rpm}$



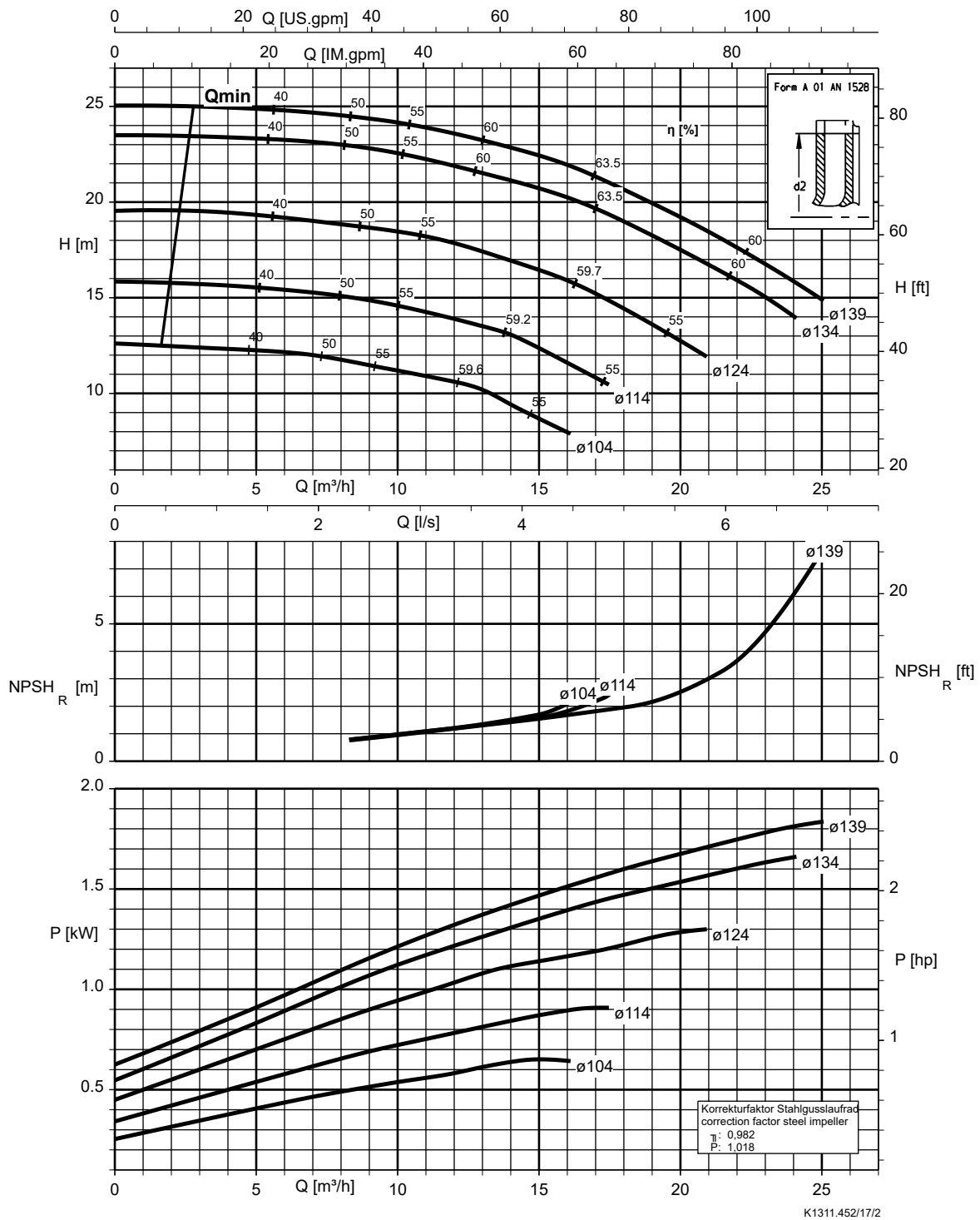
K1311.452/14/2

Vlety 040-025-200, n = 2900 rpm

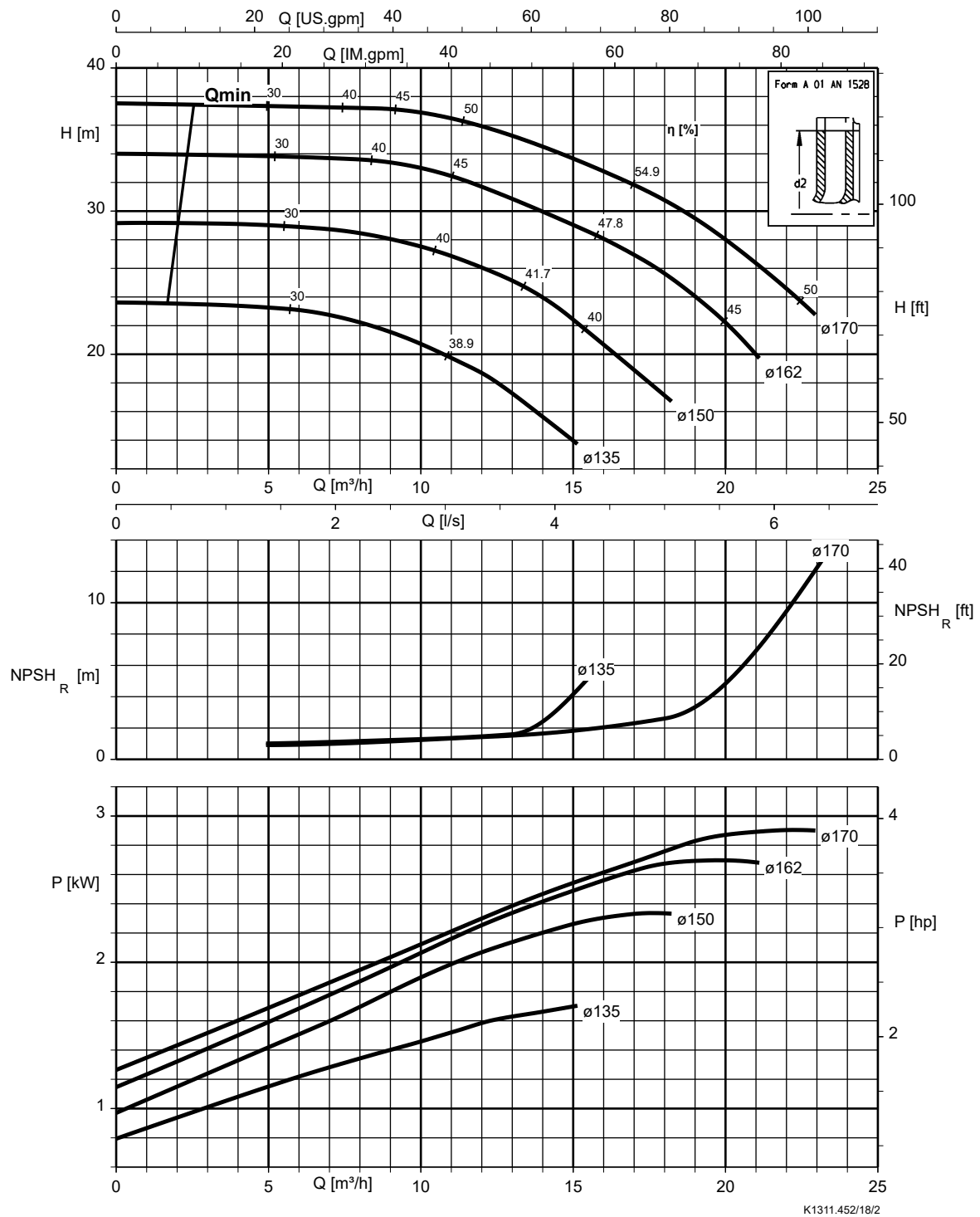


K1311/452/15/2

Vlety 050-032-125.1, n = 2900 rpm

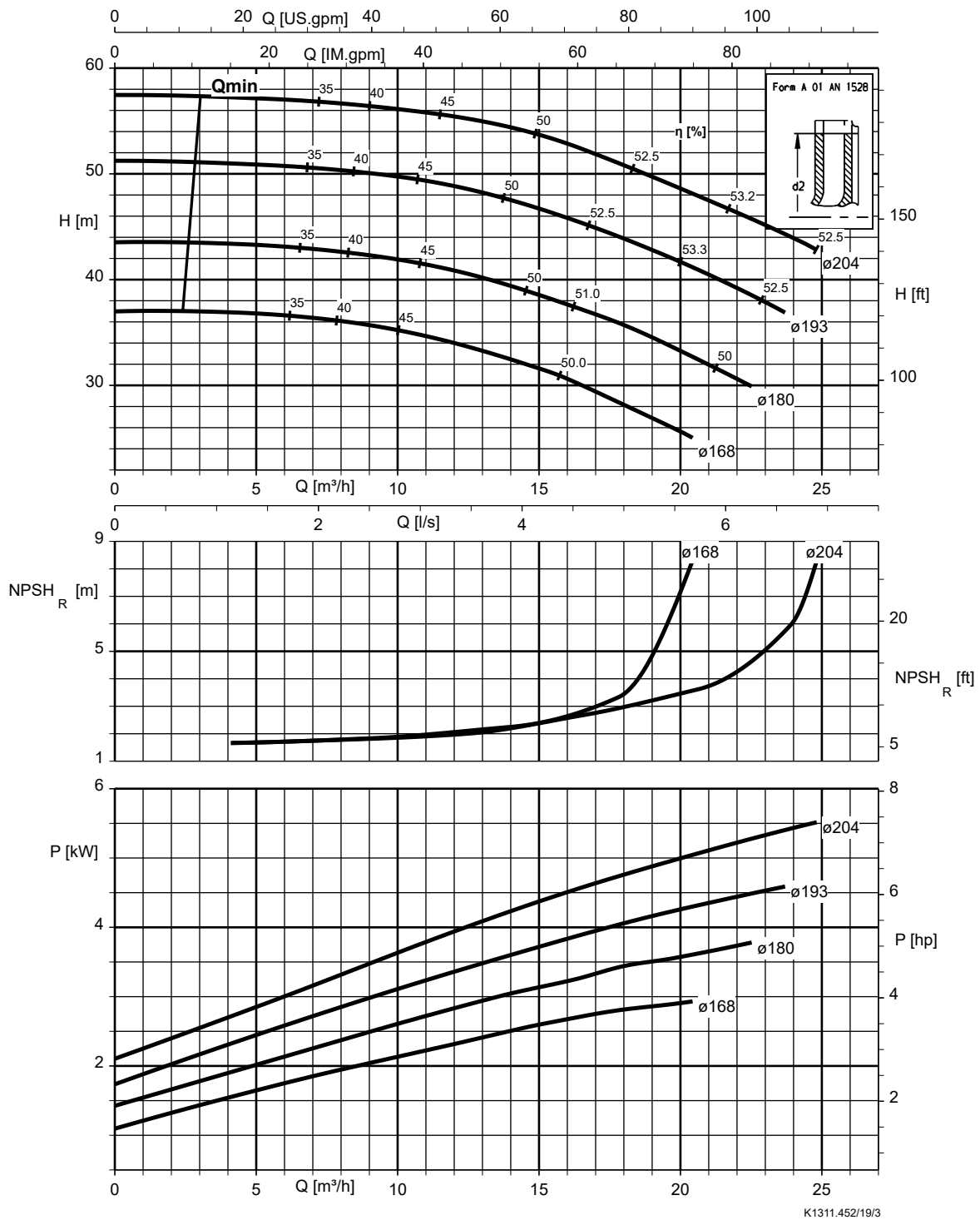


Vlety 050-032-160.1, n = 2900 rpm

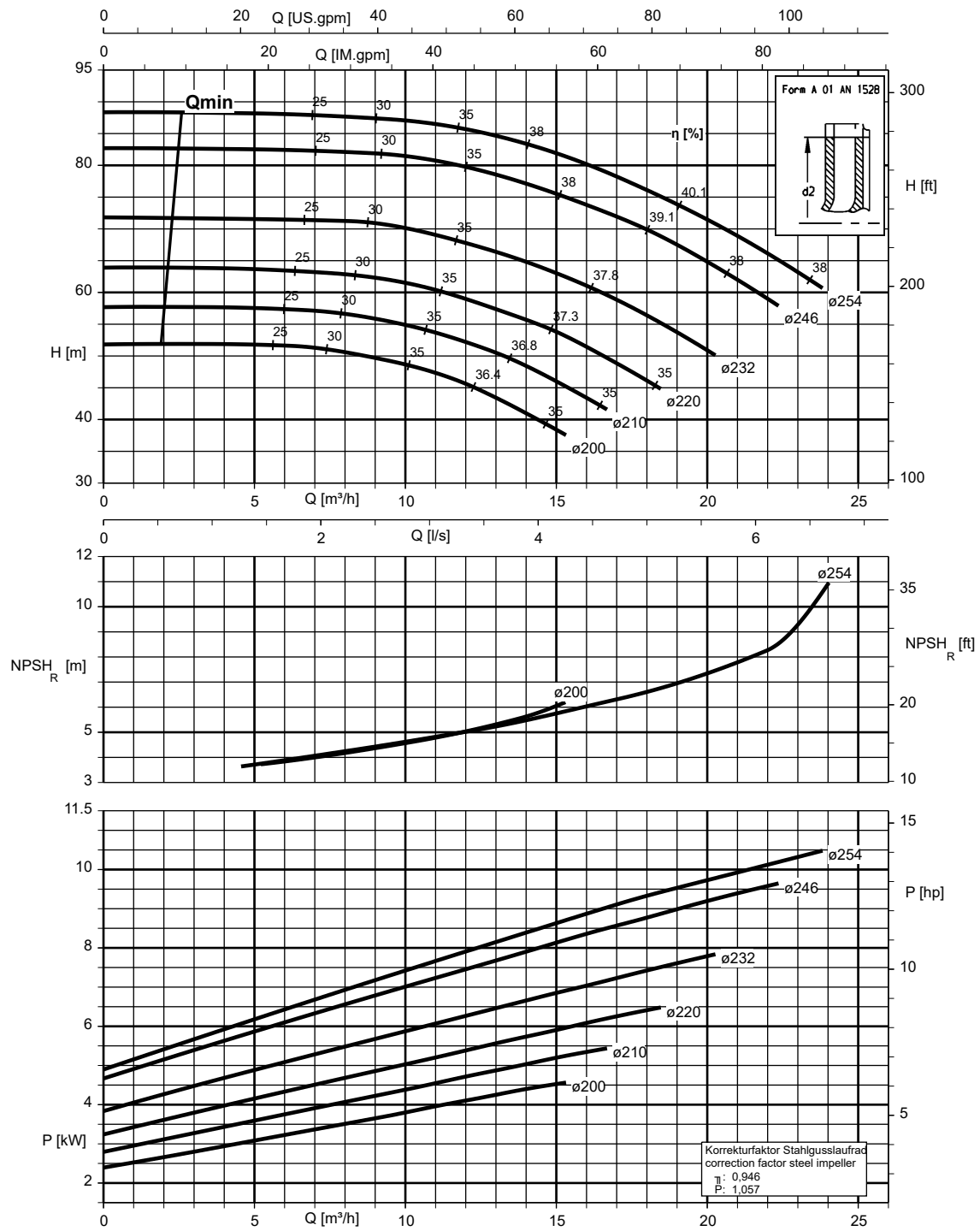




Vlety 050-032-200.1, n = 2900 rpm

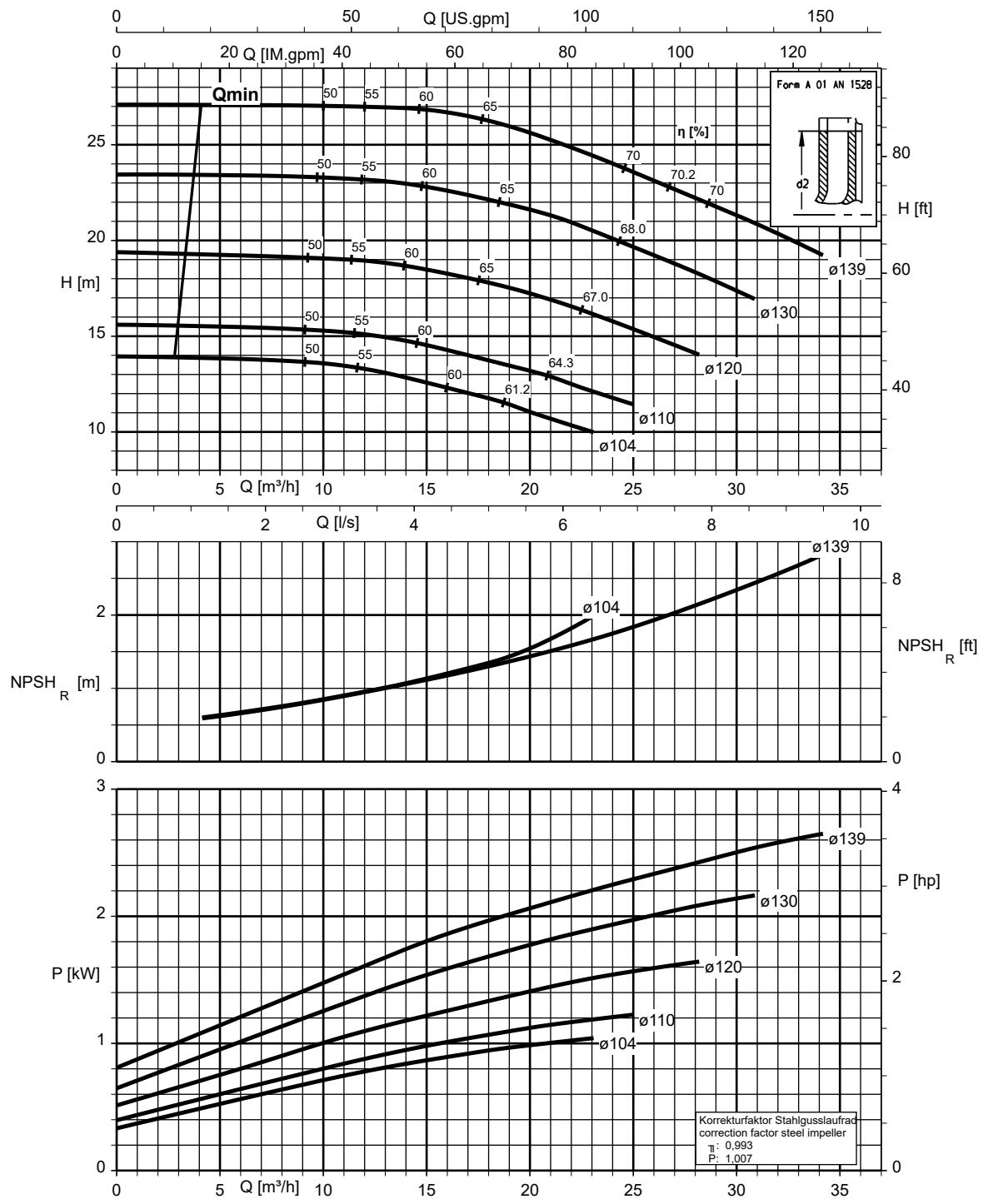


Vlety 050-032-250.1, n = 2900 rpm

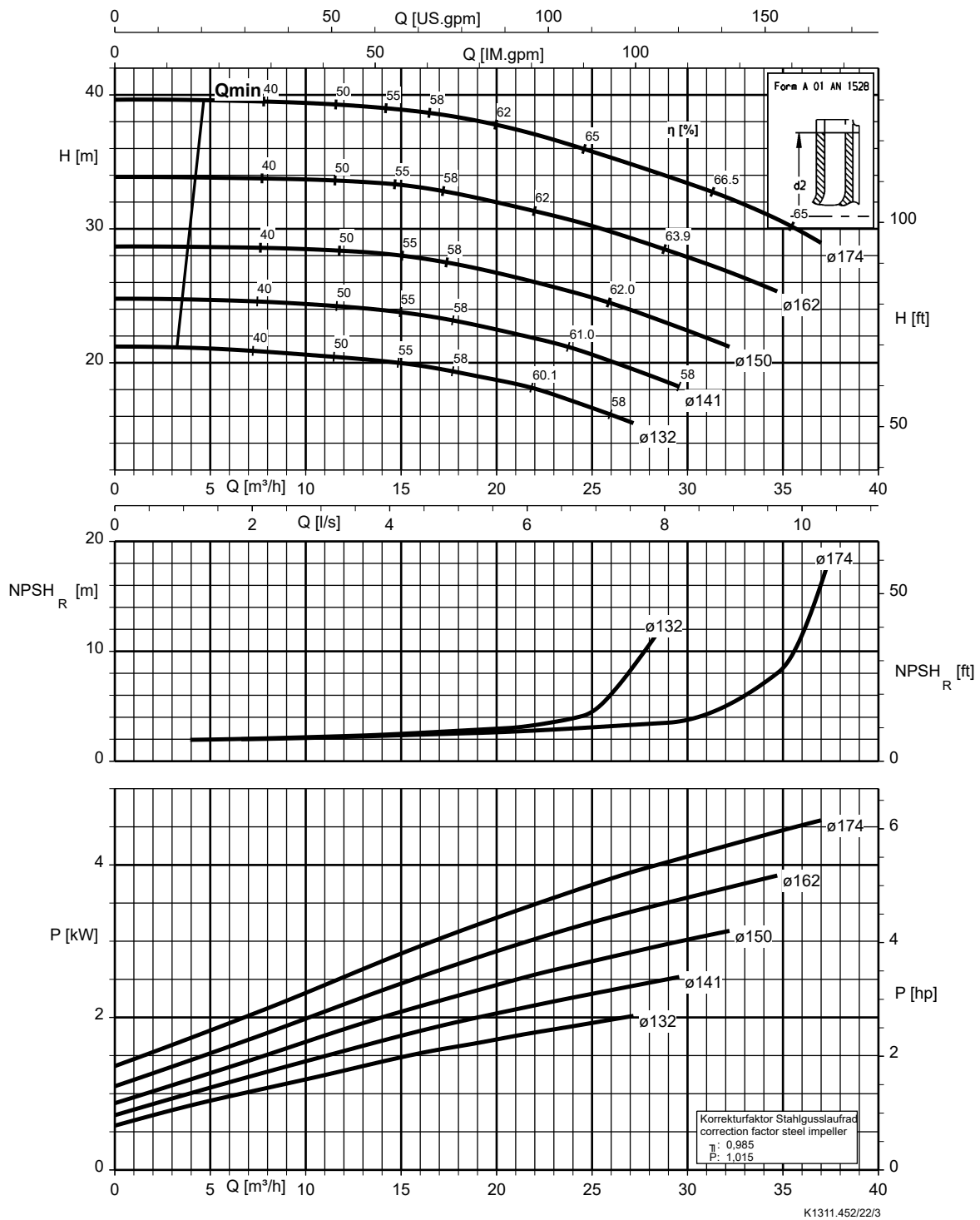


K1311.452/20/2

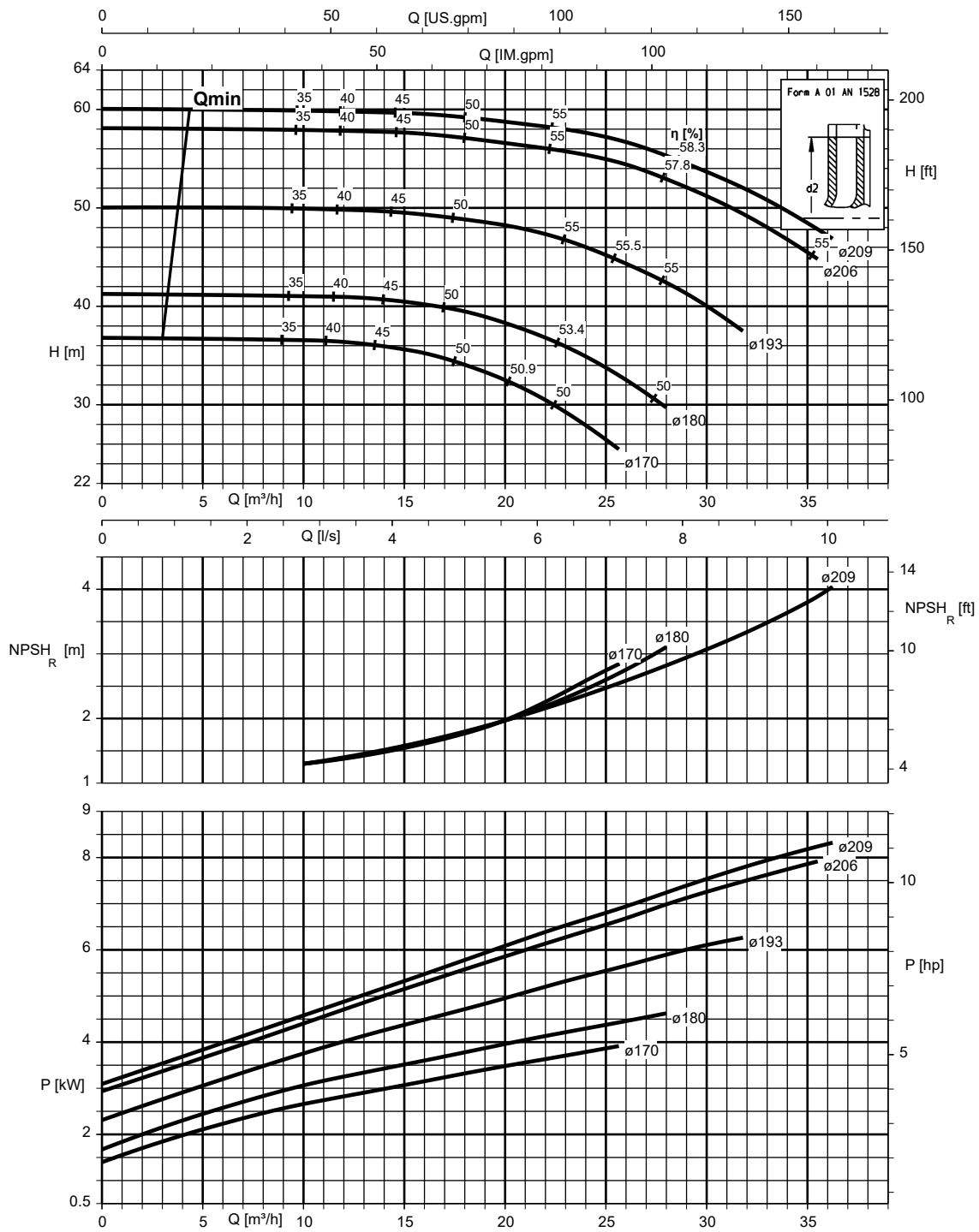
Vlety 050-032-125, n = 2900 rpm



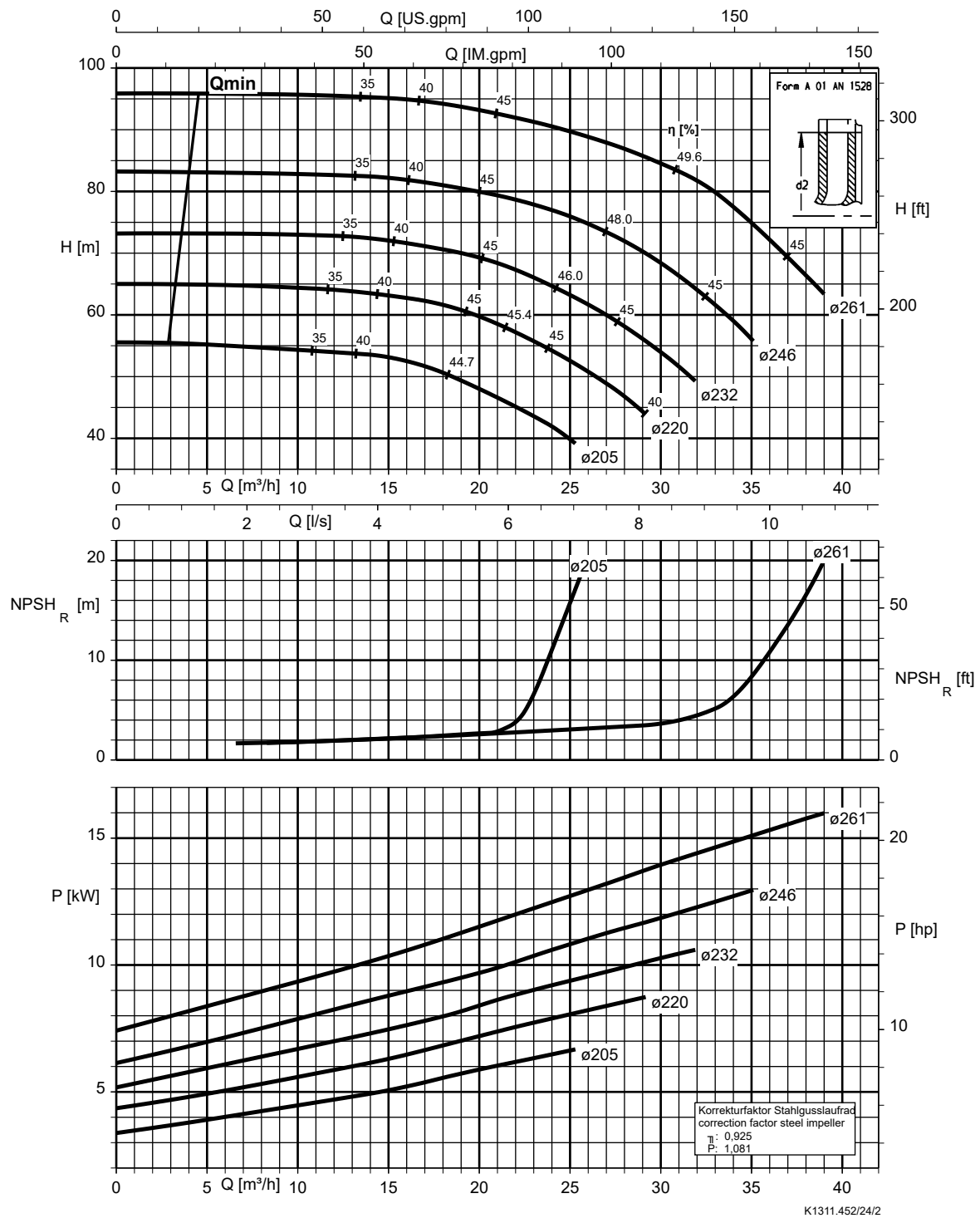
Vlety 050-032-160, n = 2900 rpm



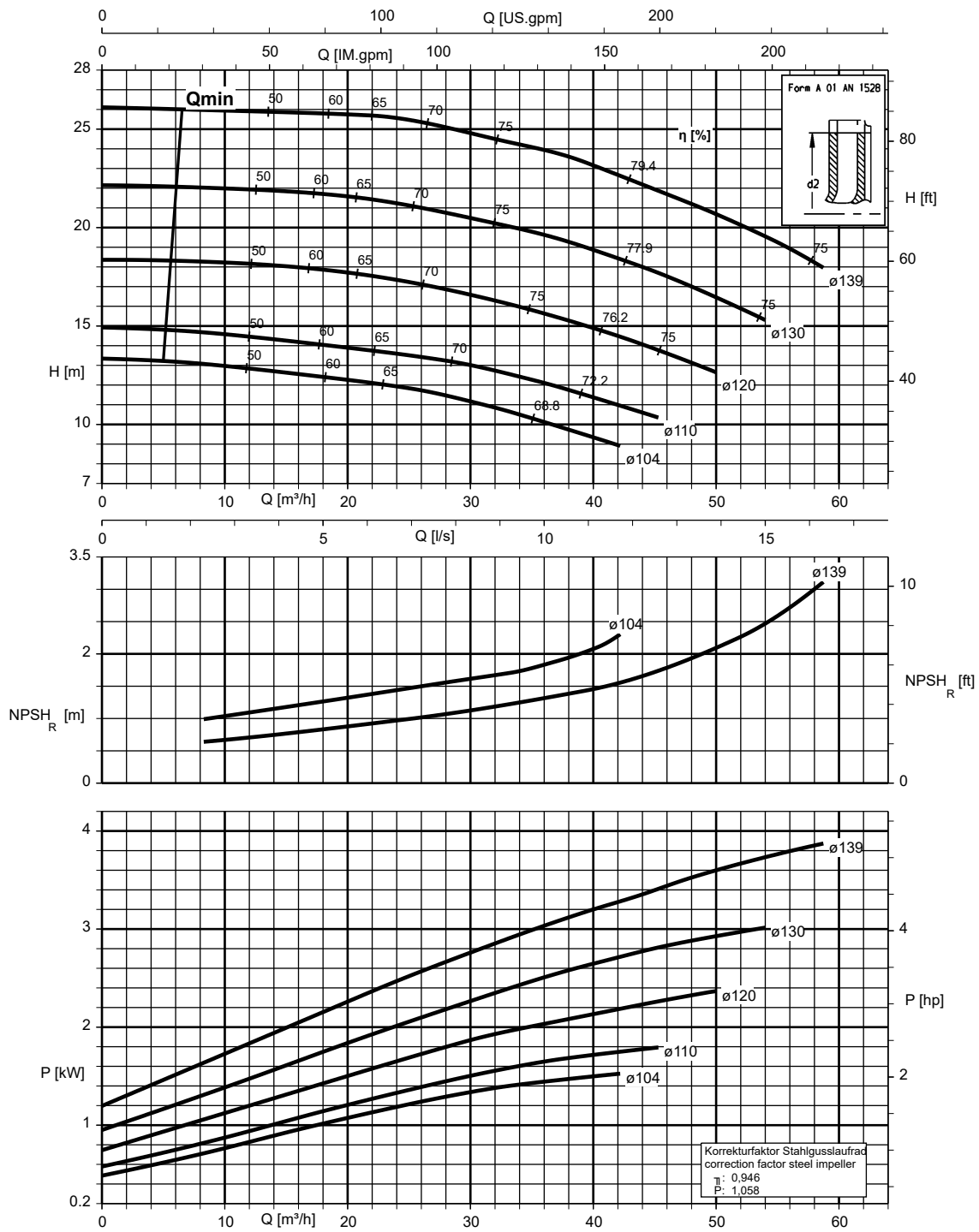
Vlety 050-032-200, n = 2900 rpm



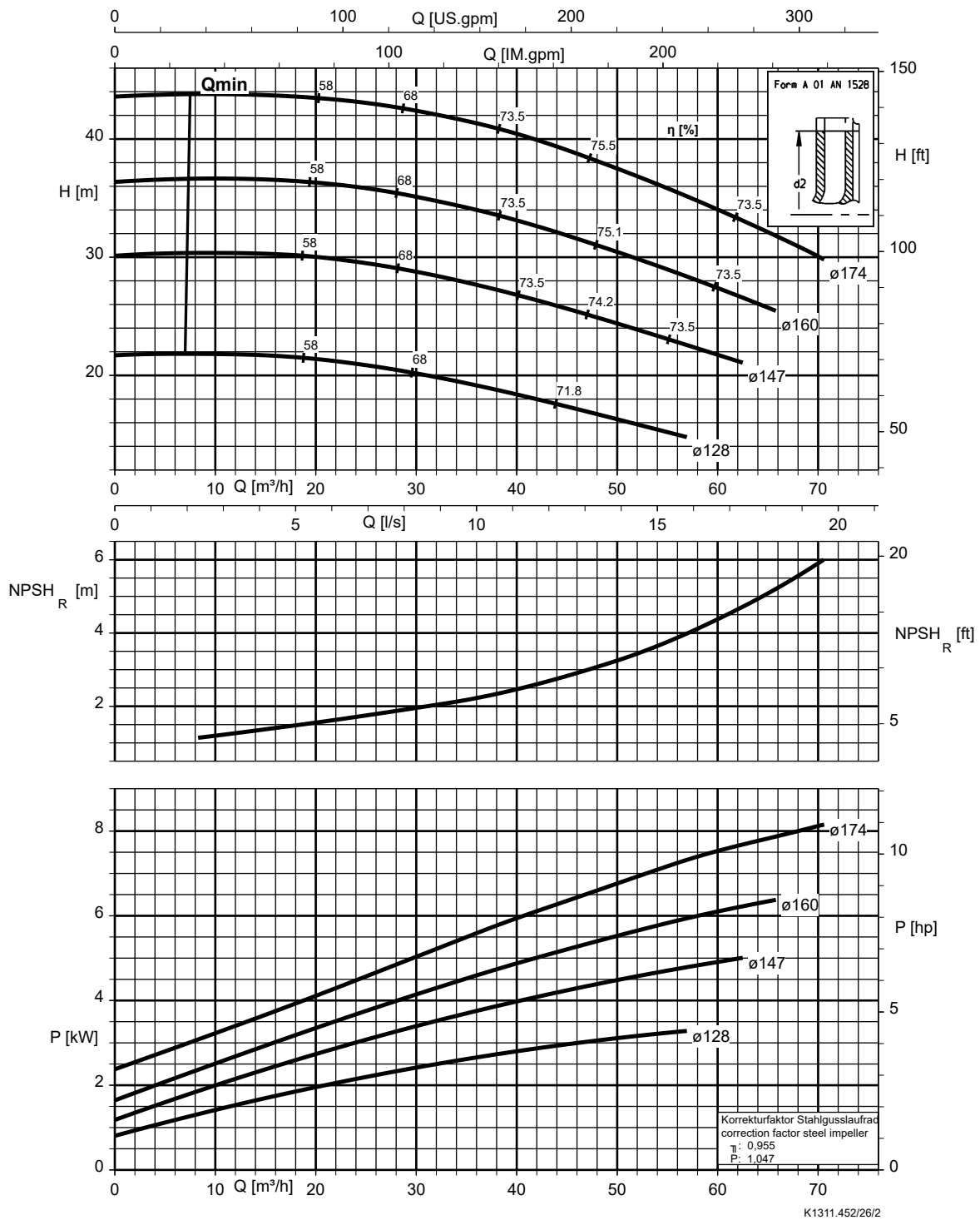
Vlety 050-032-250, n = 2900 rpm



Vlety 065-040-125, n = 2900 rpm

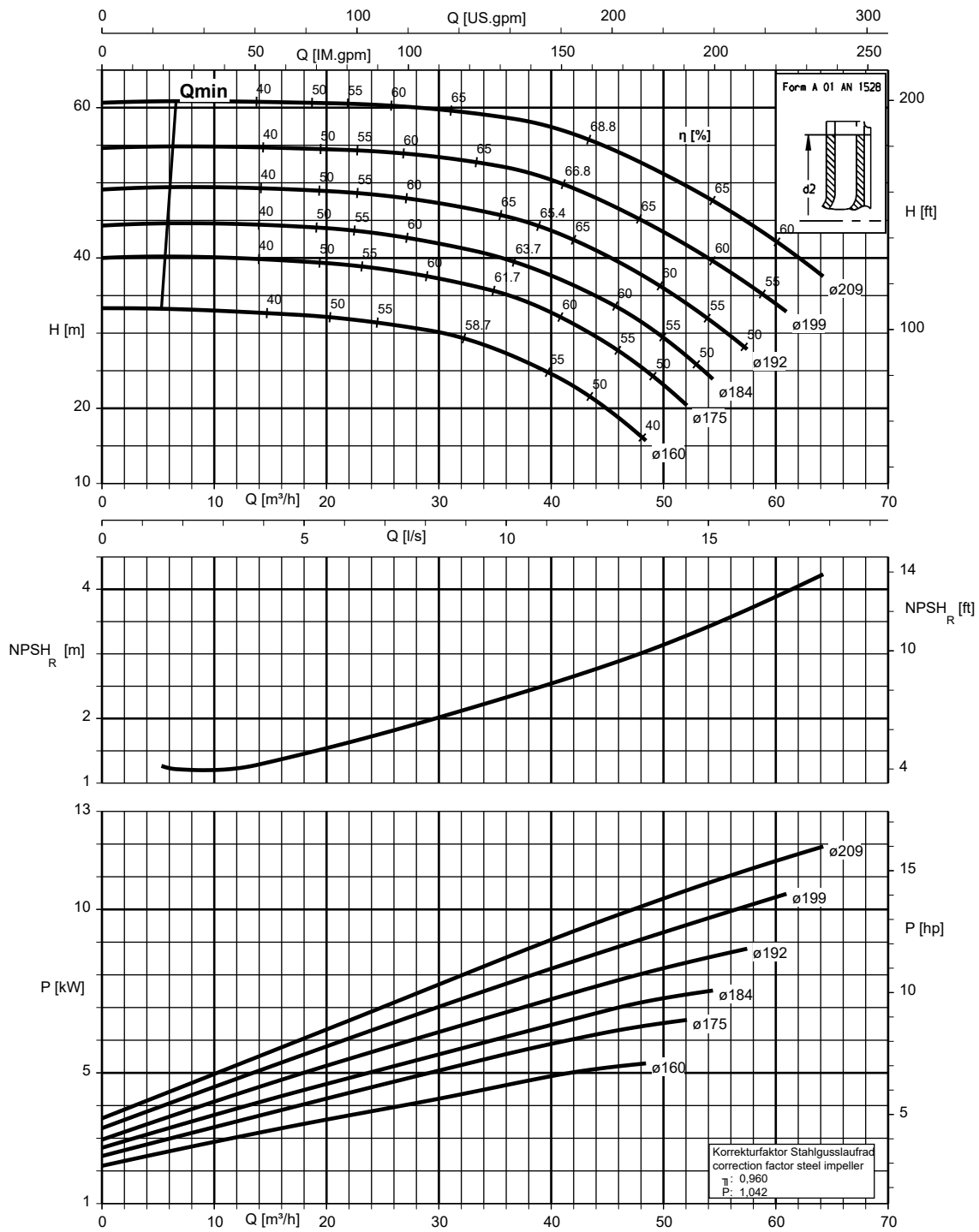


Vlety 065-040-160, n = 2900 rpm



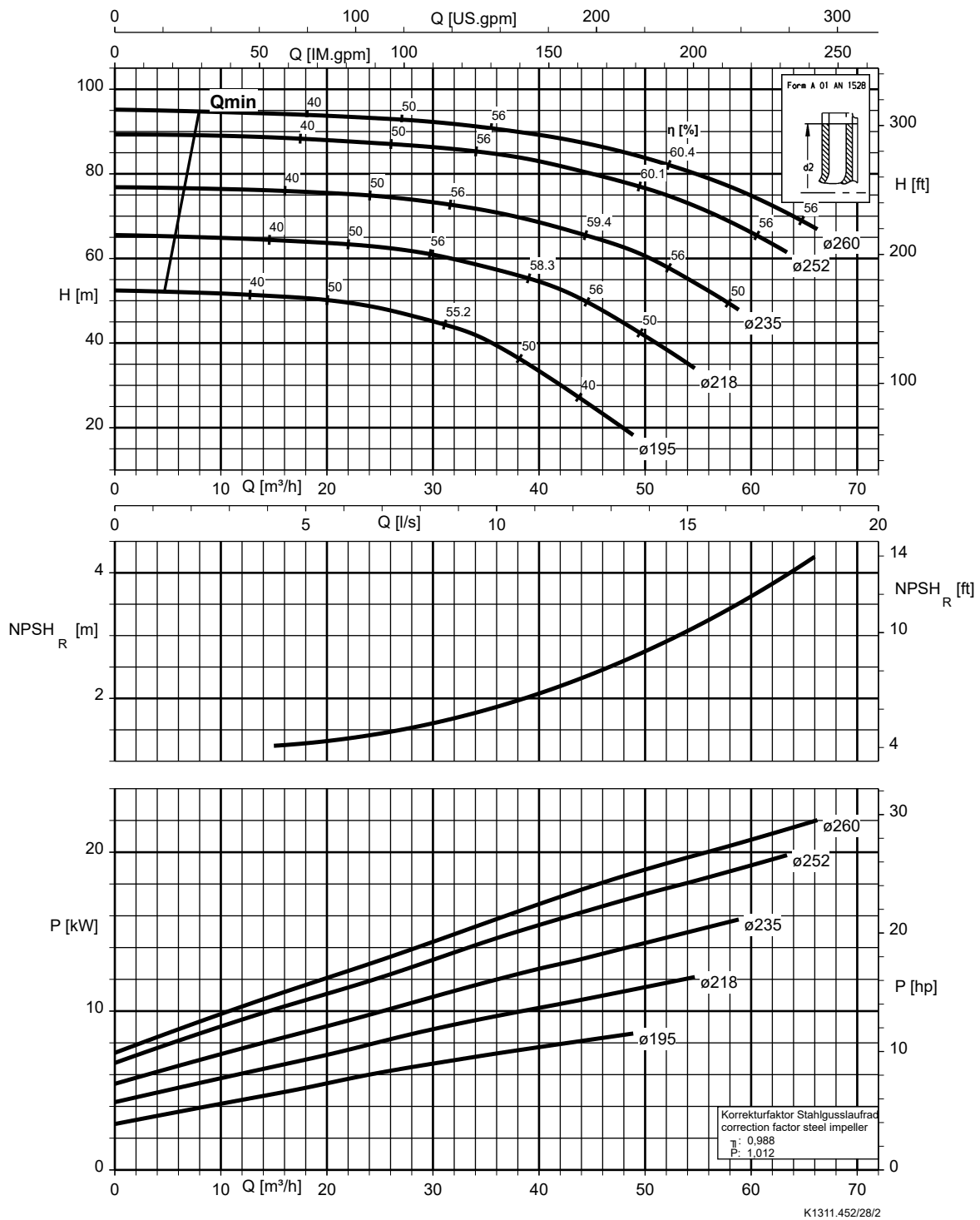


Vlety 065-040-200, n = 2900 rpm

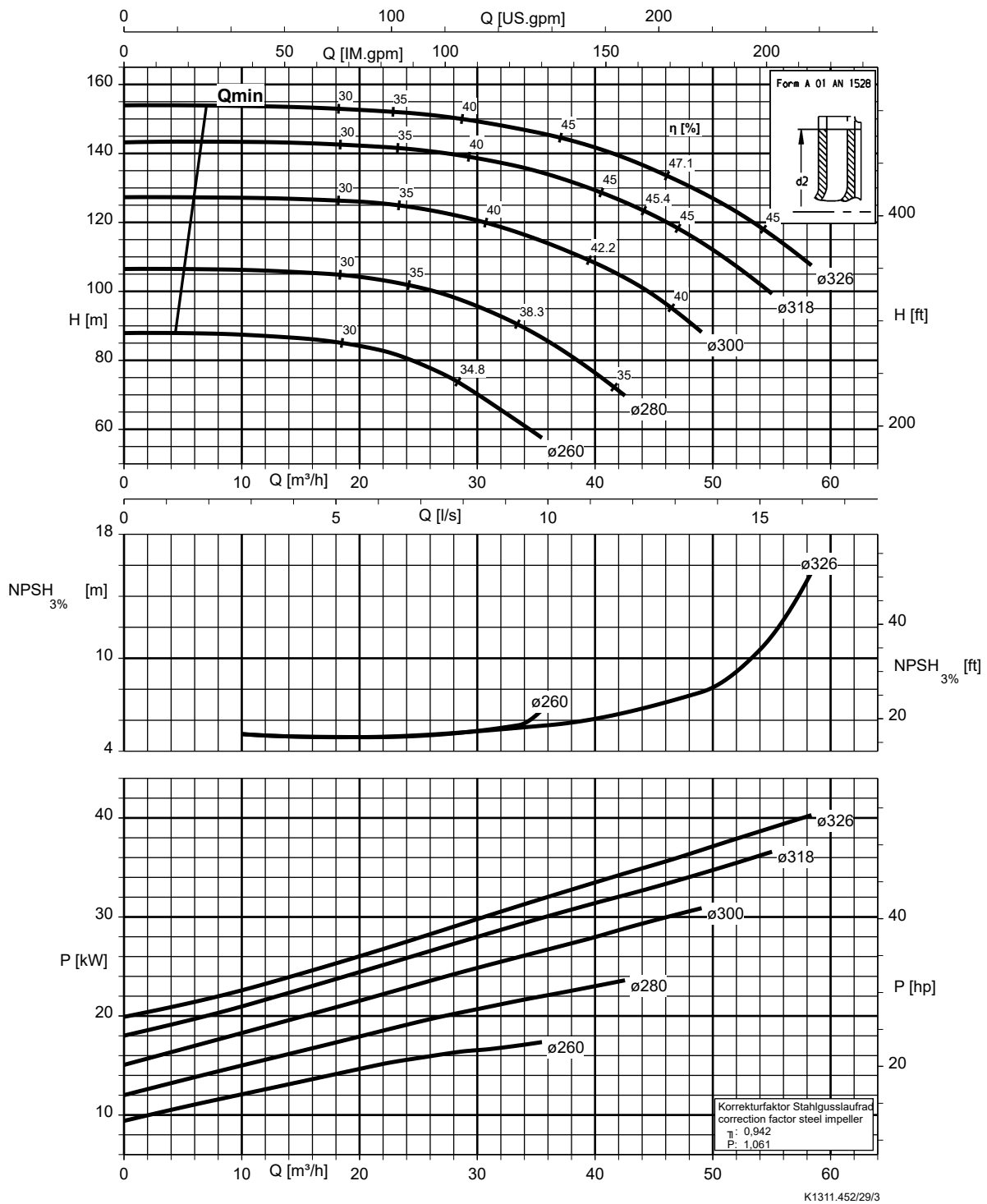


K1311.452/27/1

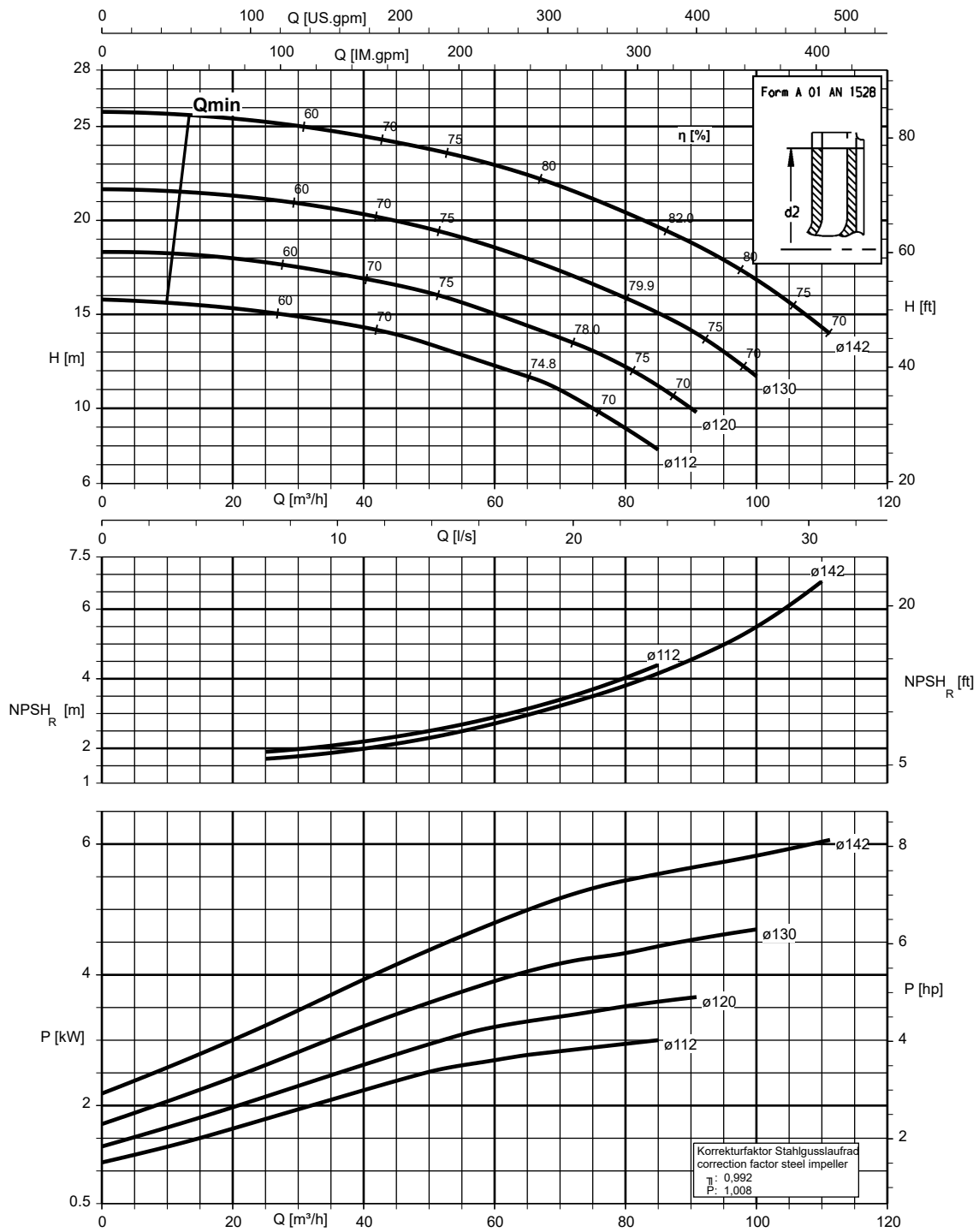
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Vlety 065-040-315, n = 2900 rpm

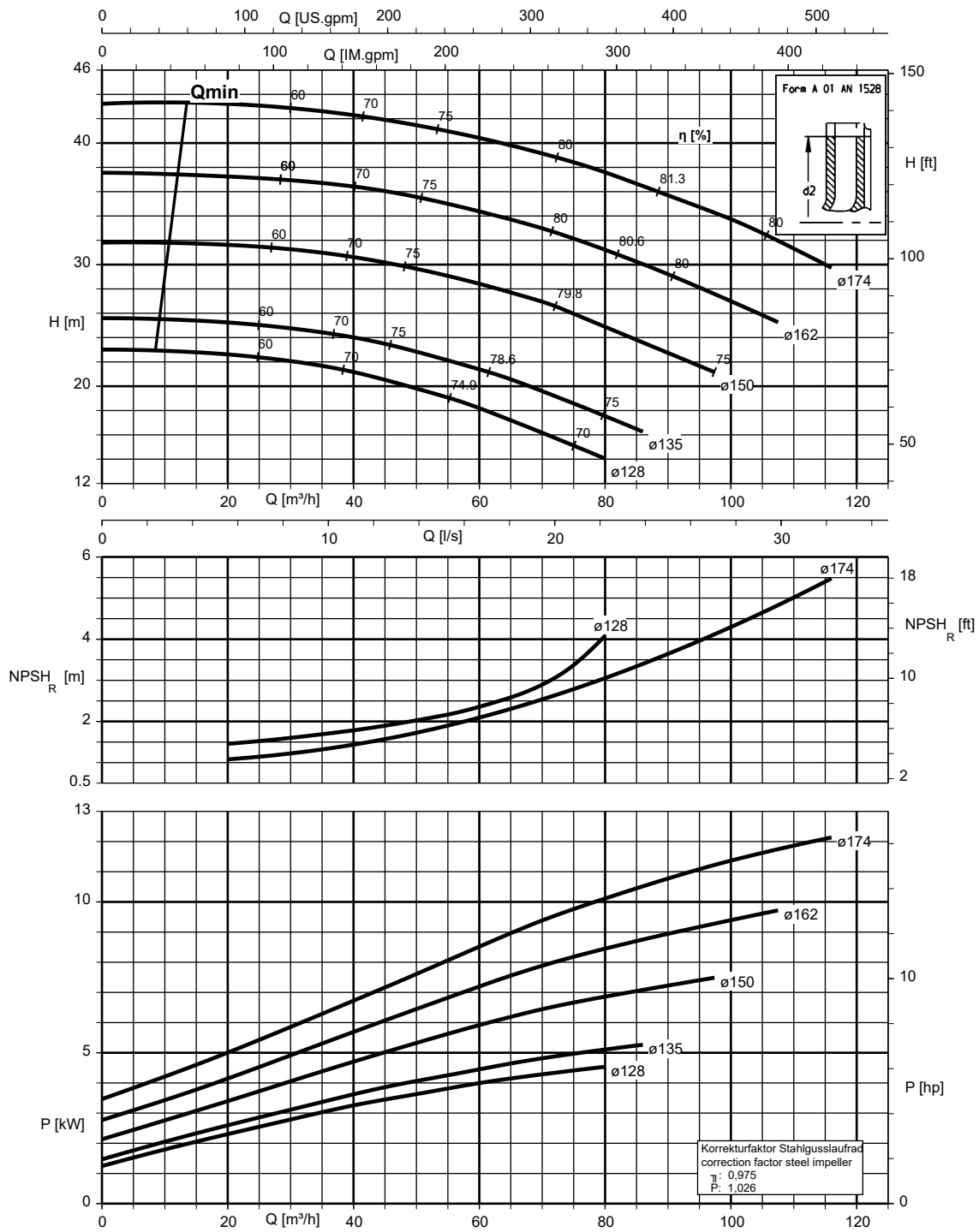


Vlety 065-050-125, n = 2900 rpm

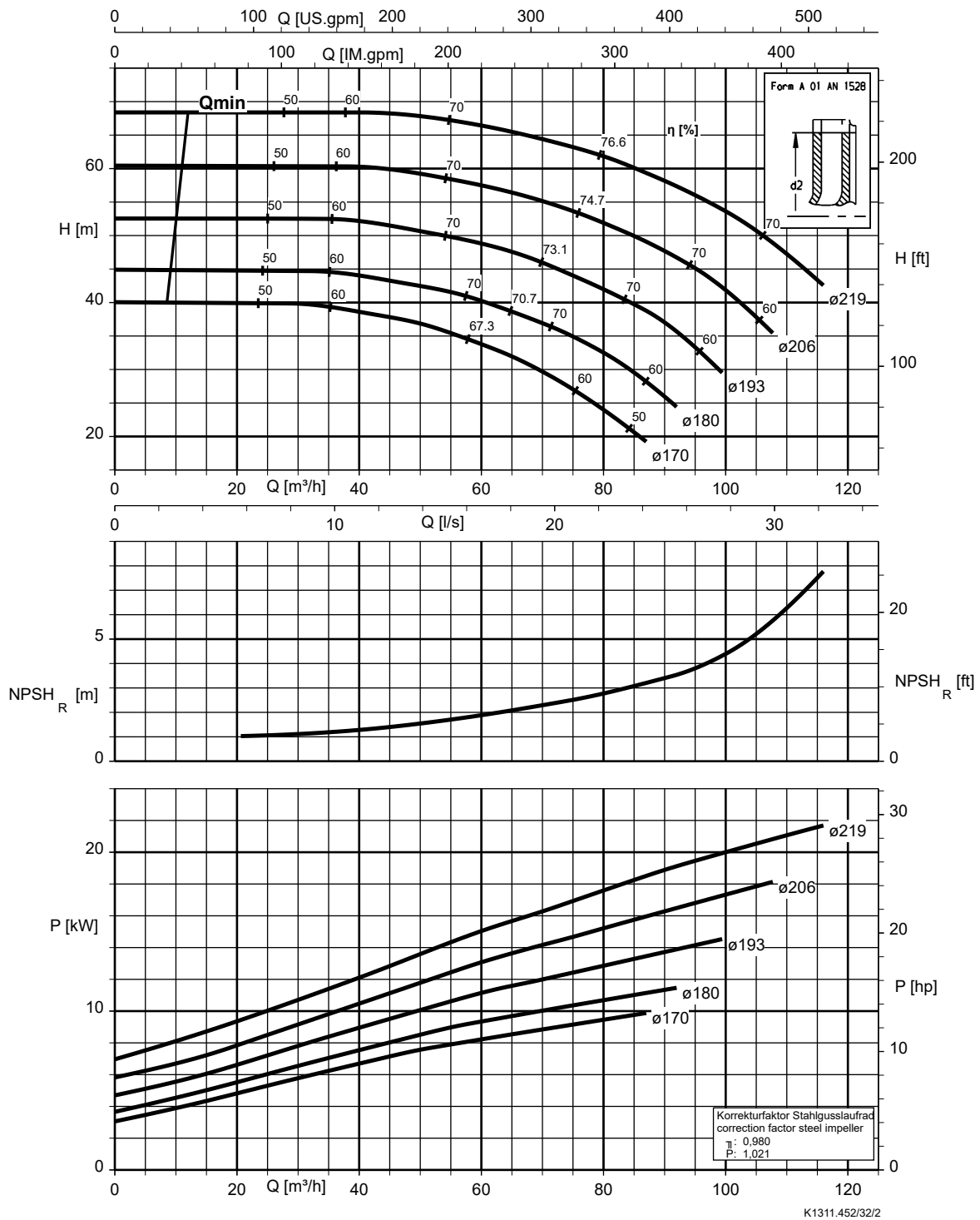


K1311.452/30/1

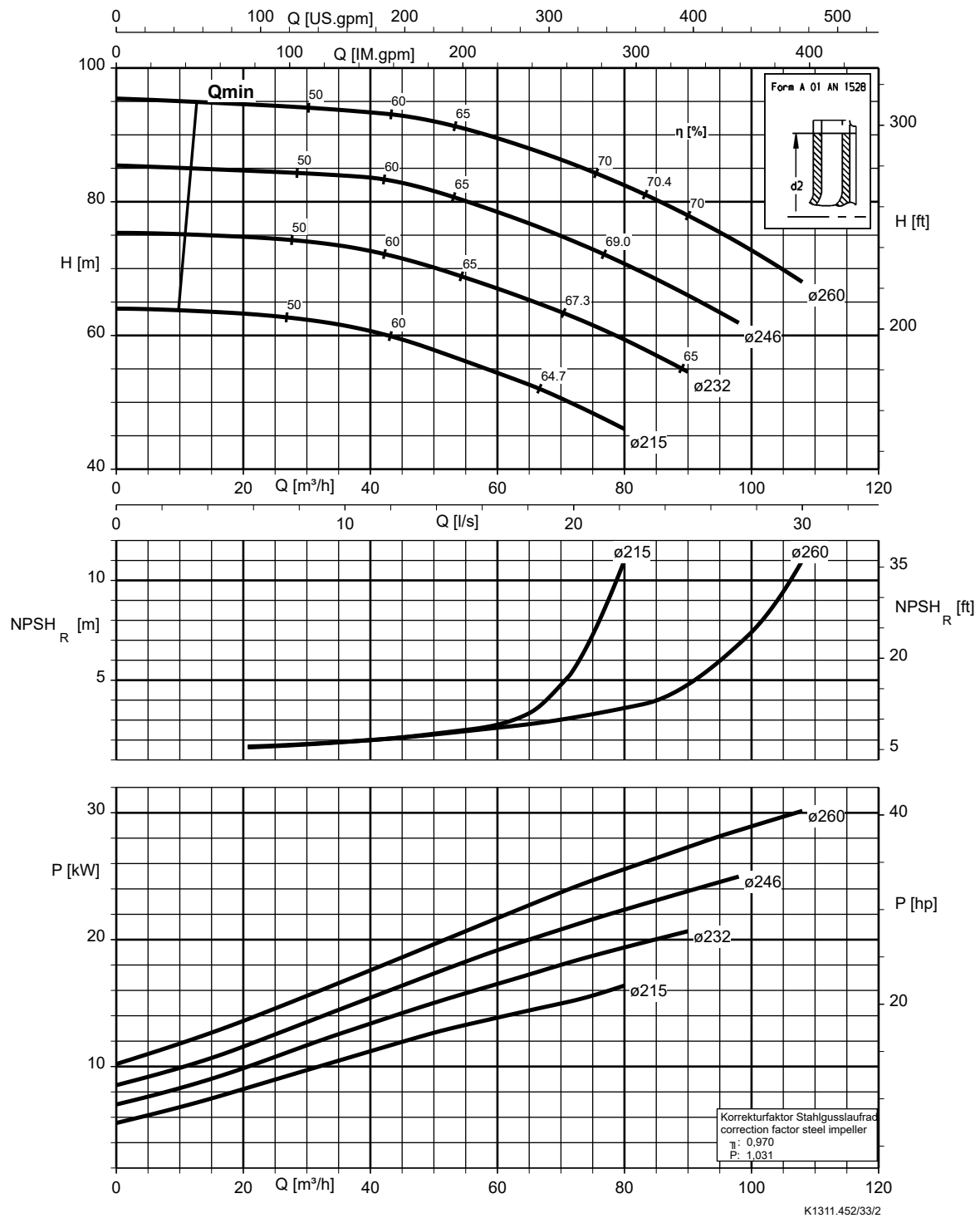
Vlety 065-050-160, n = 2900 rpm



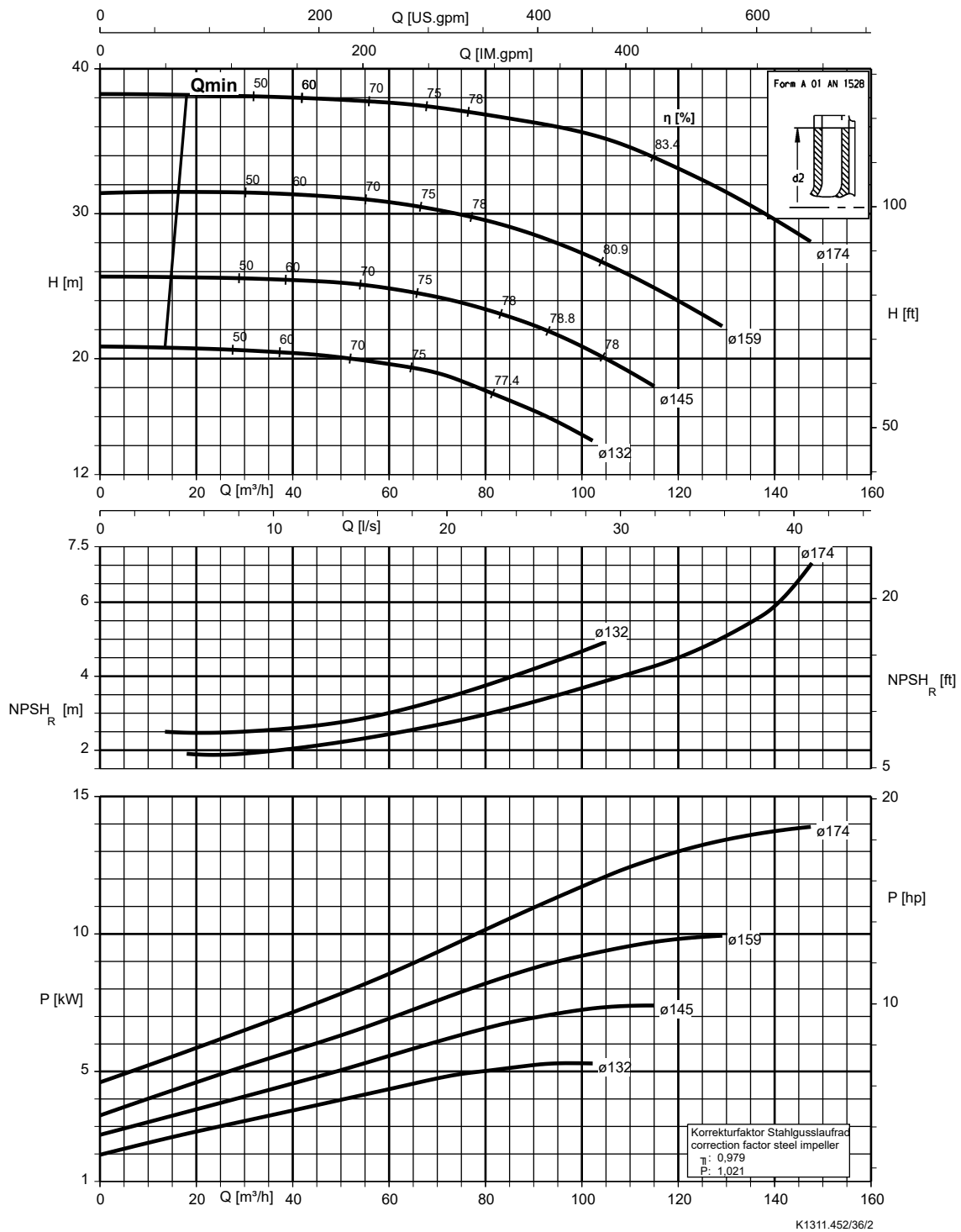
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Vlety 065-050-250, n = 2900 rpm

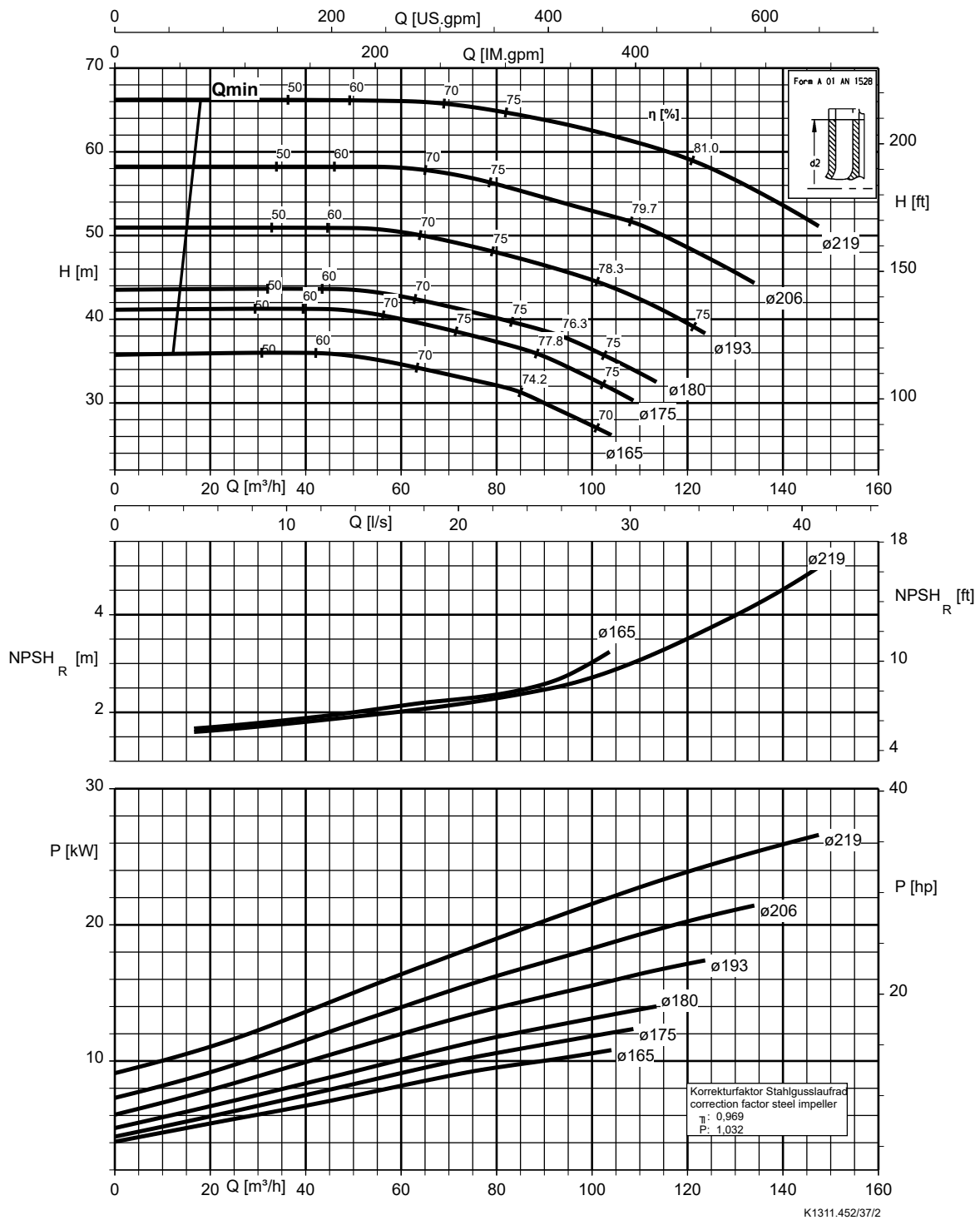


Vlety 080-065-160, n = 2900 rpm

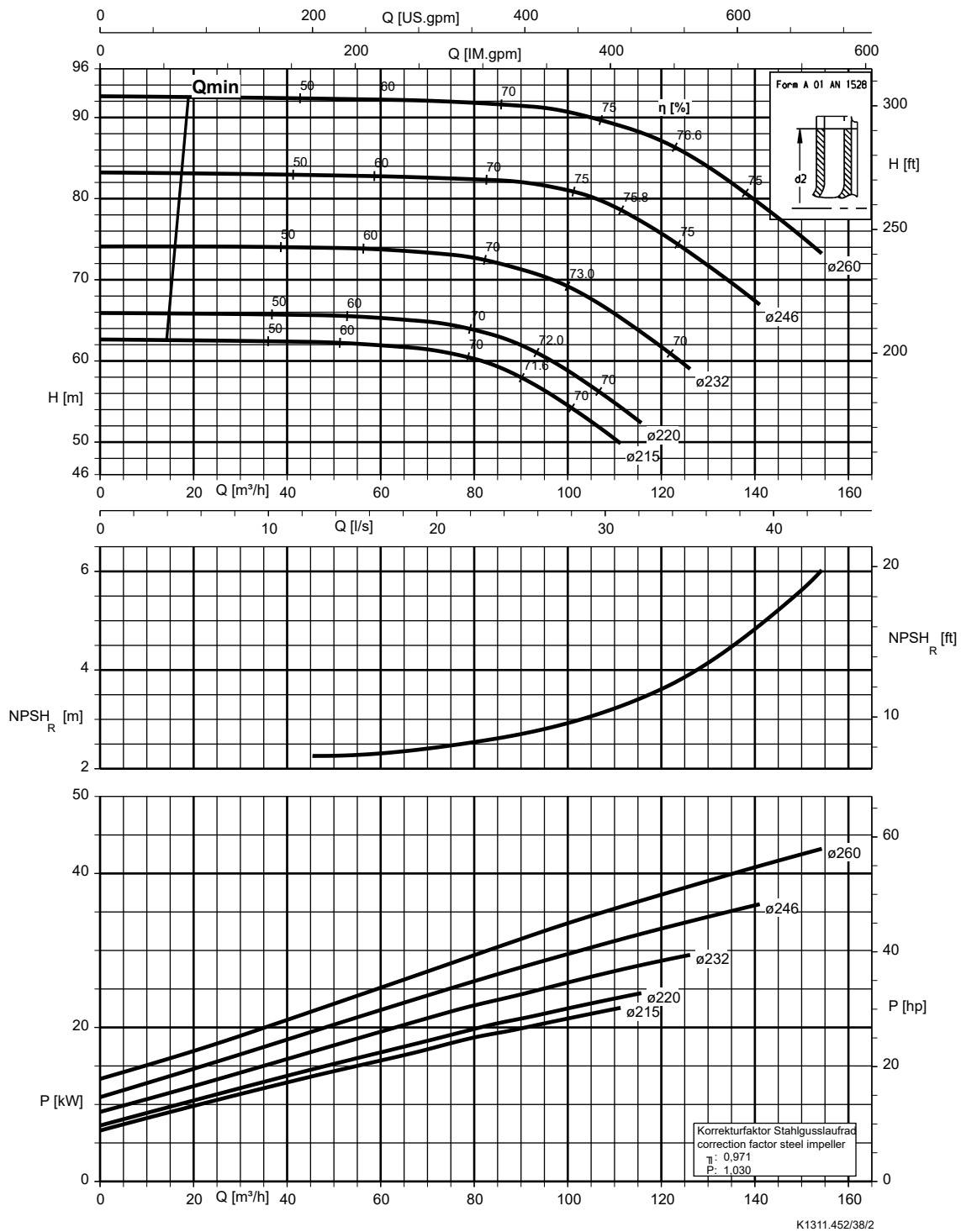




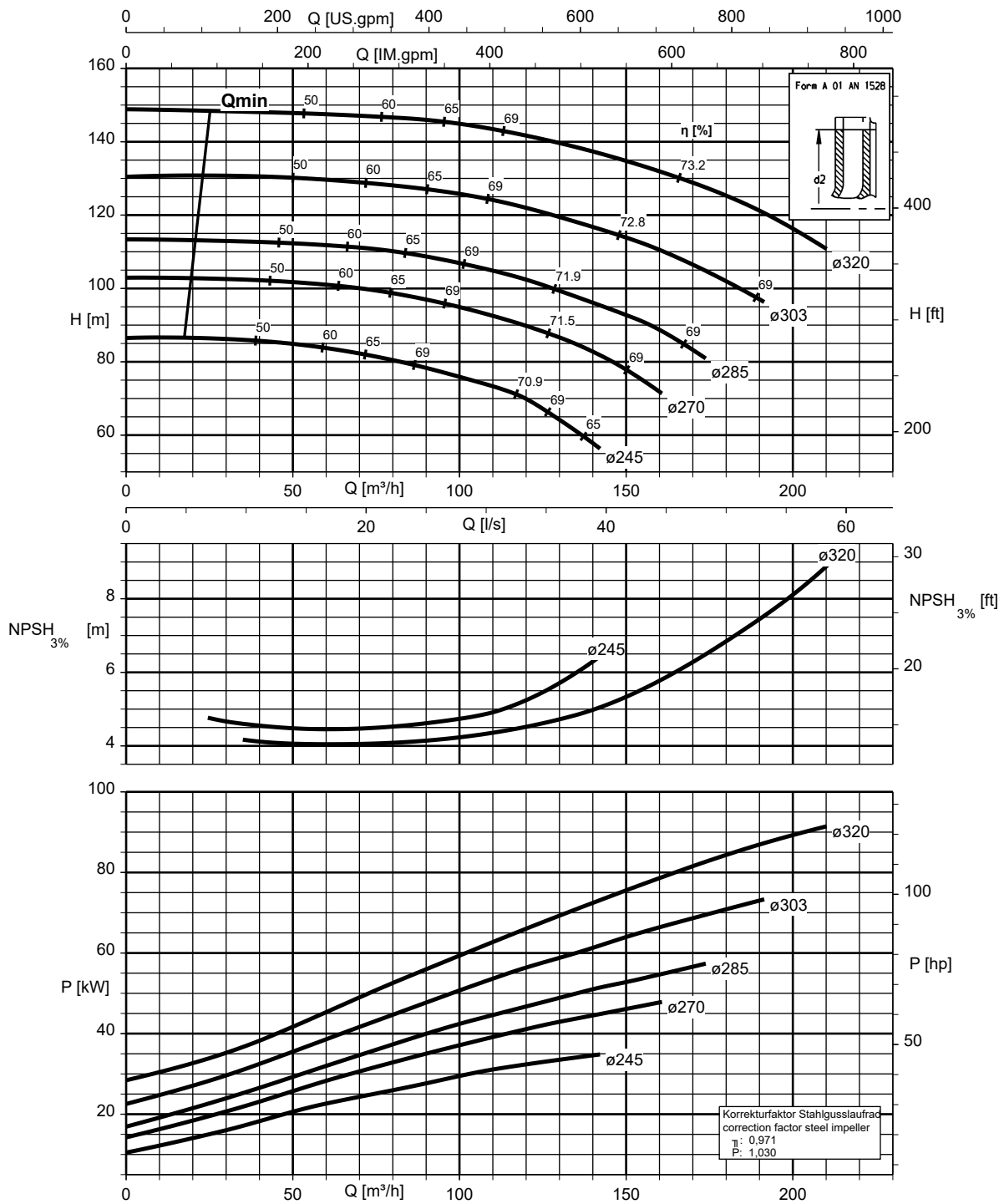
Vlety 080-065-200, n = 2900 rpm



Vlety 080-065-250, n = 2900 rpm

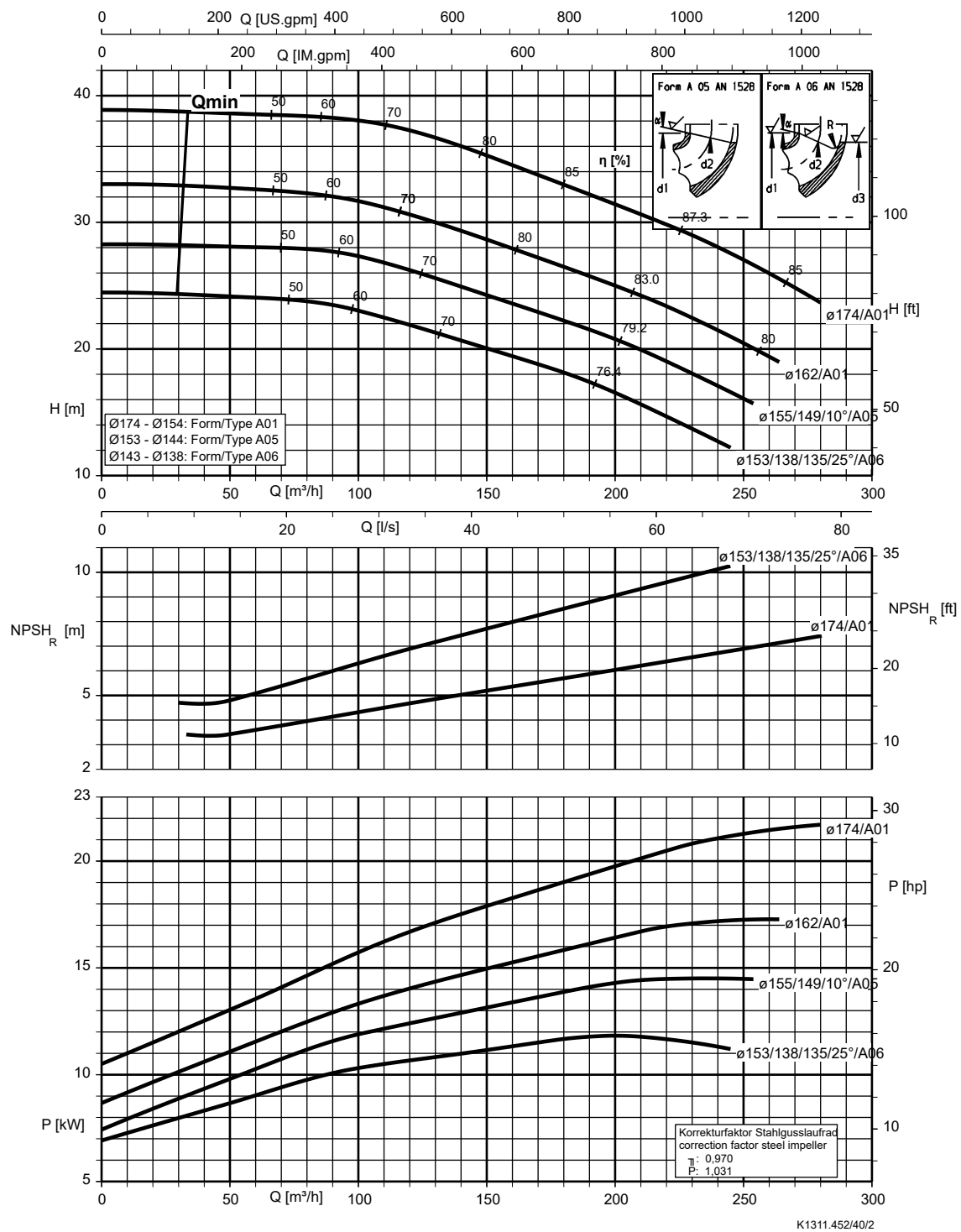


Vlety 080-065-315, n = 2900 rpm

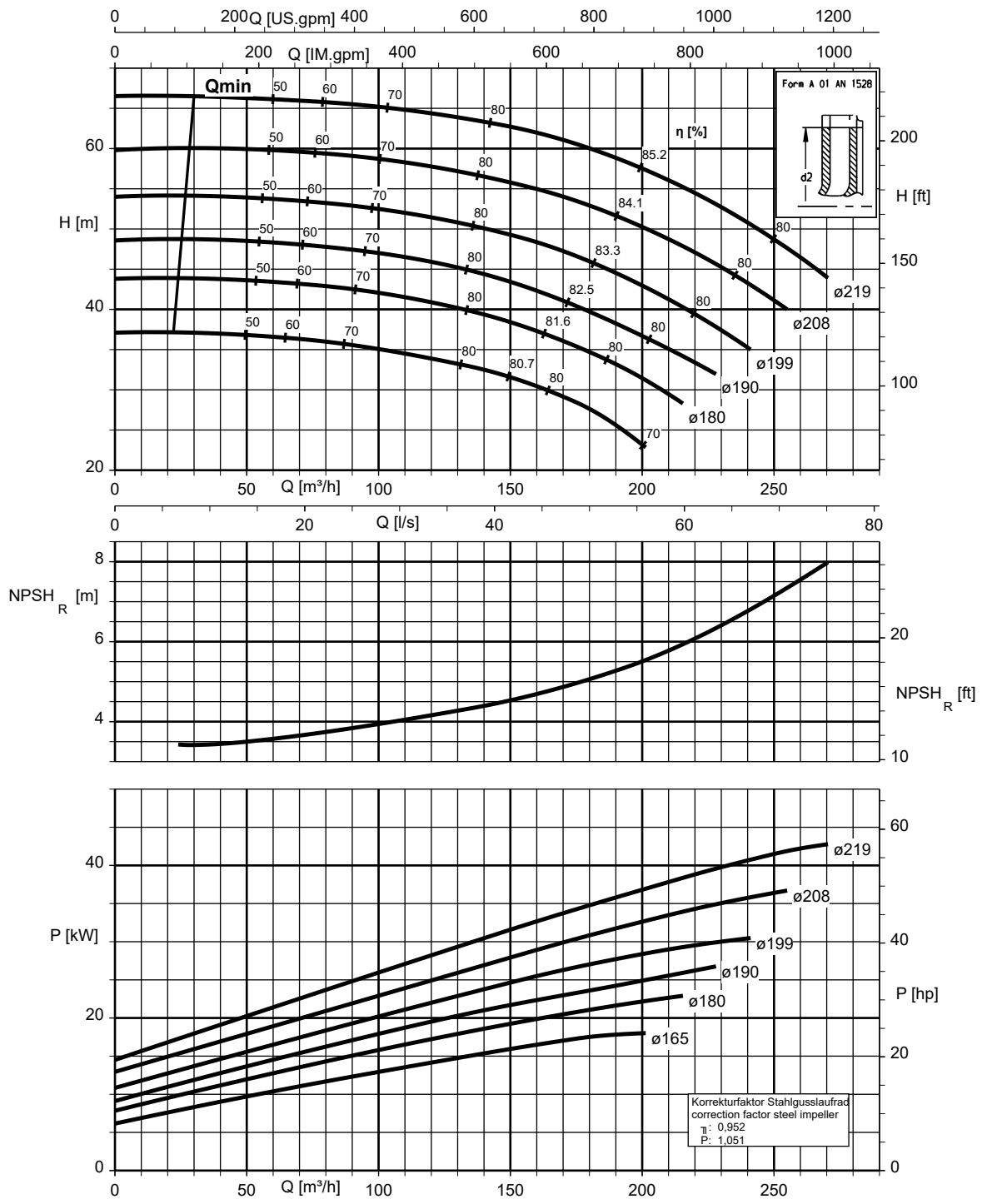


K1311.452/39/4

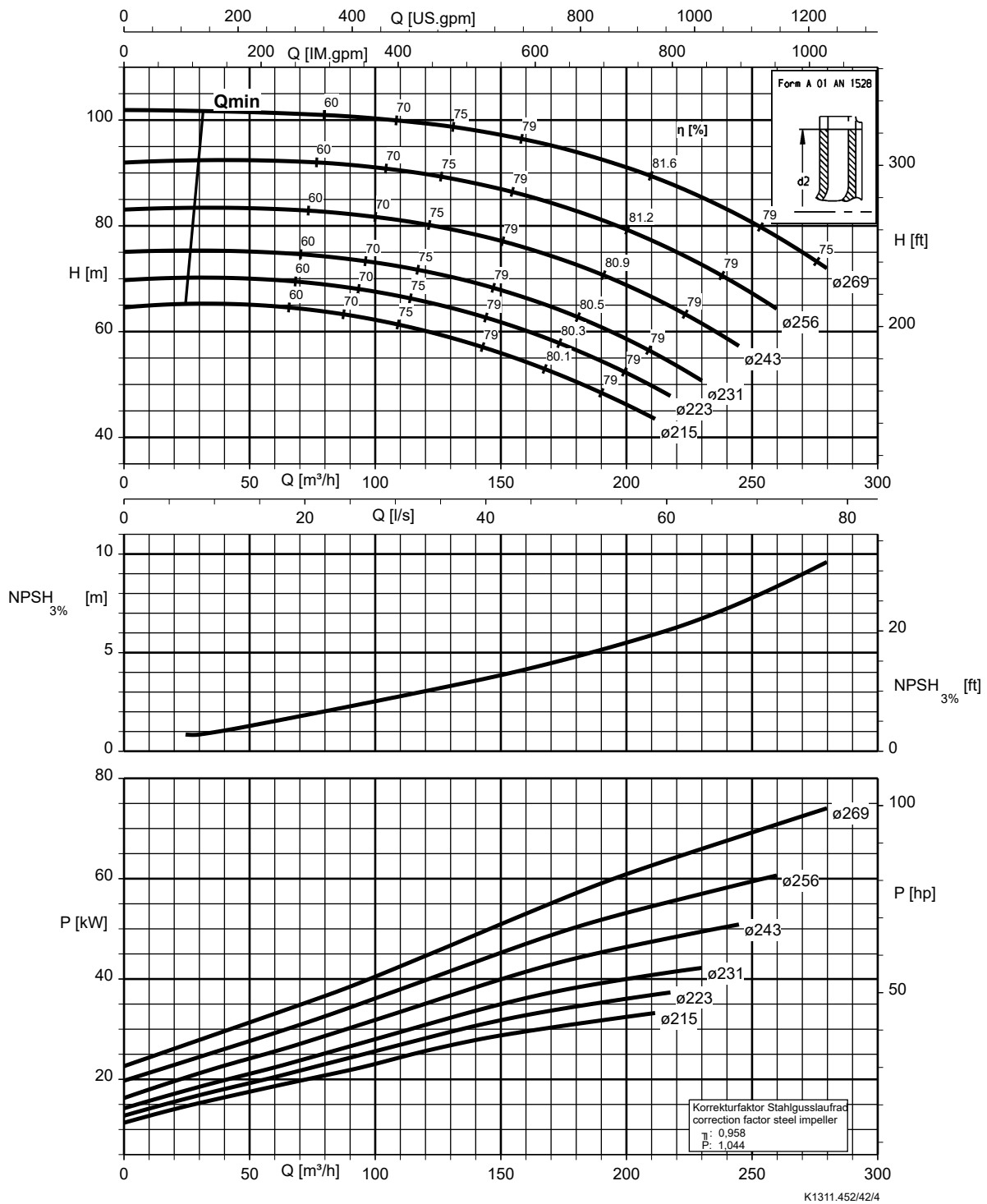
Vlety 100-080-160, n = 2900 rpm



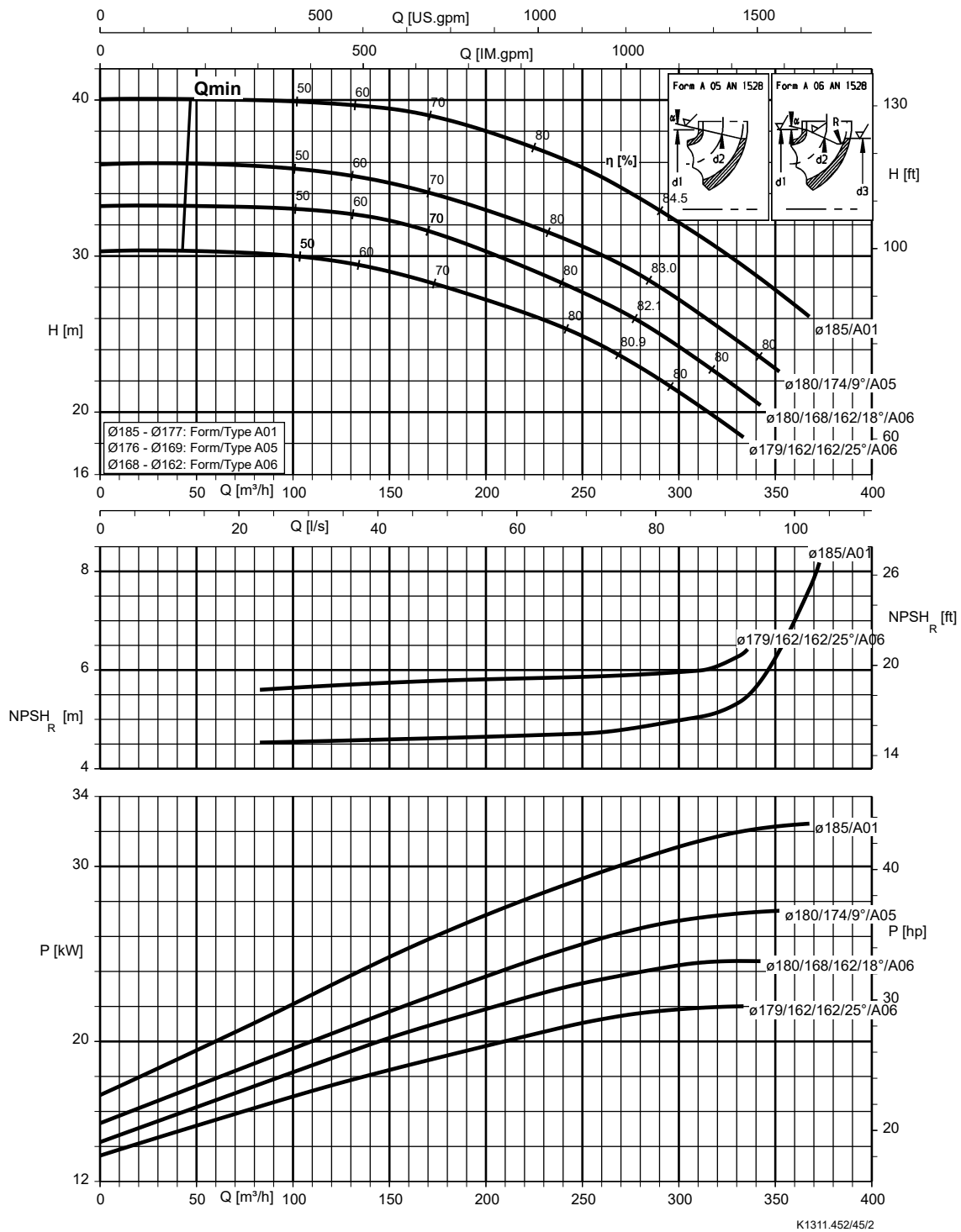
Vlety 100-080-200, n = 2900 rpm



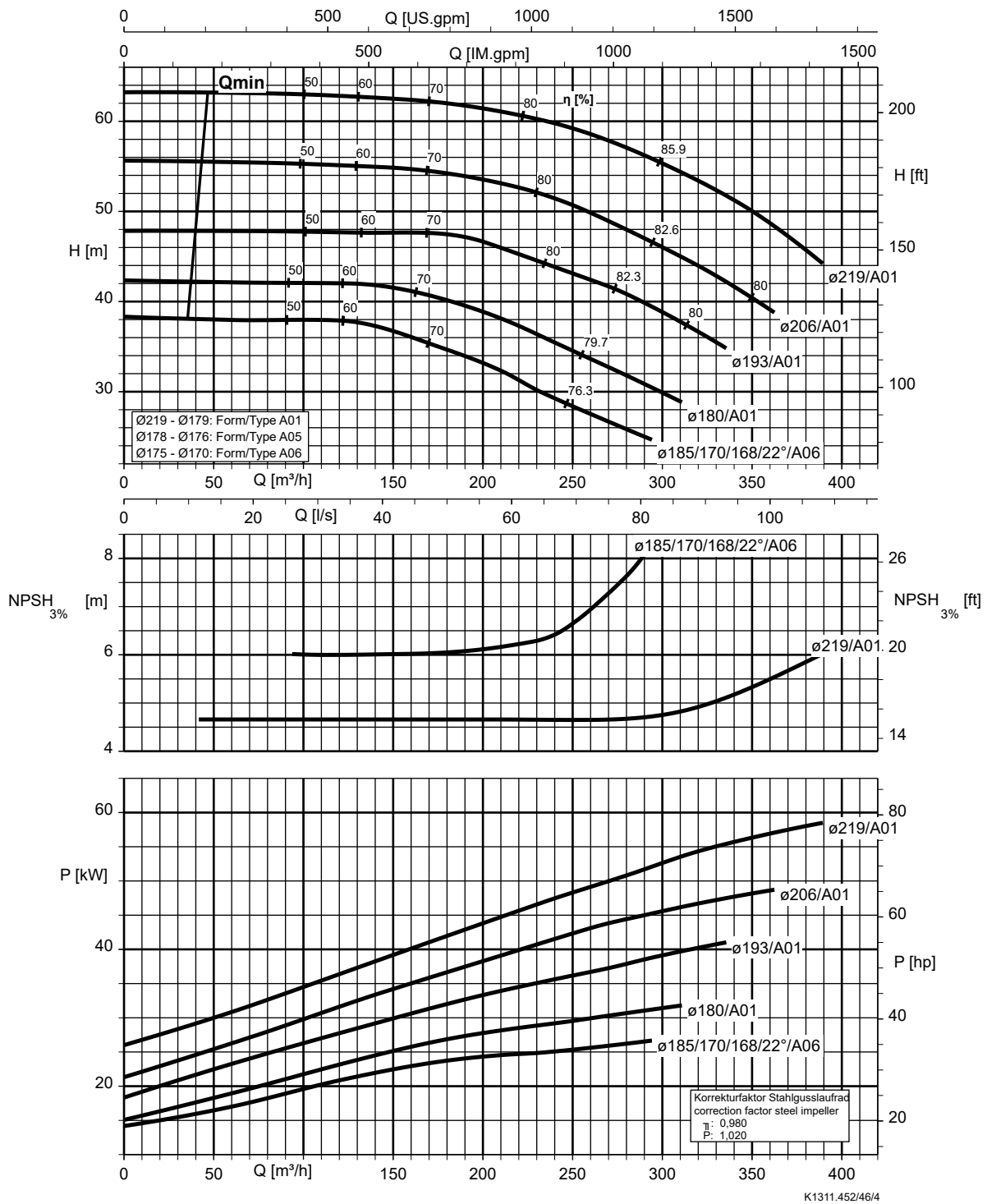
Vlety 100-080-250, n = 2900 rpm



Vlety 125-100-160, n = 2900 rpm

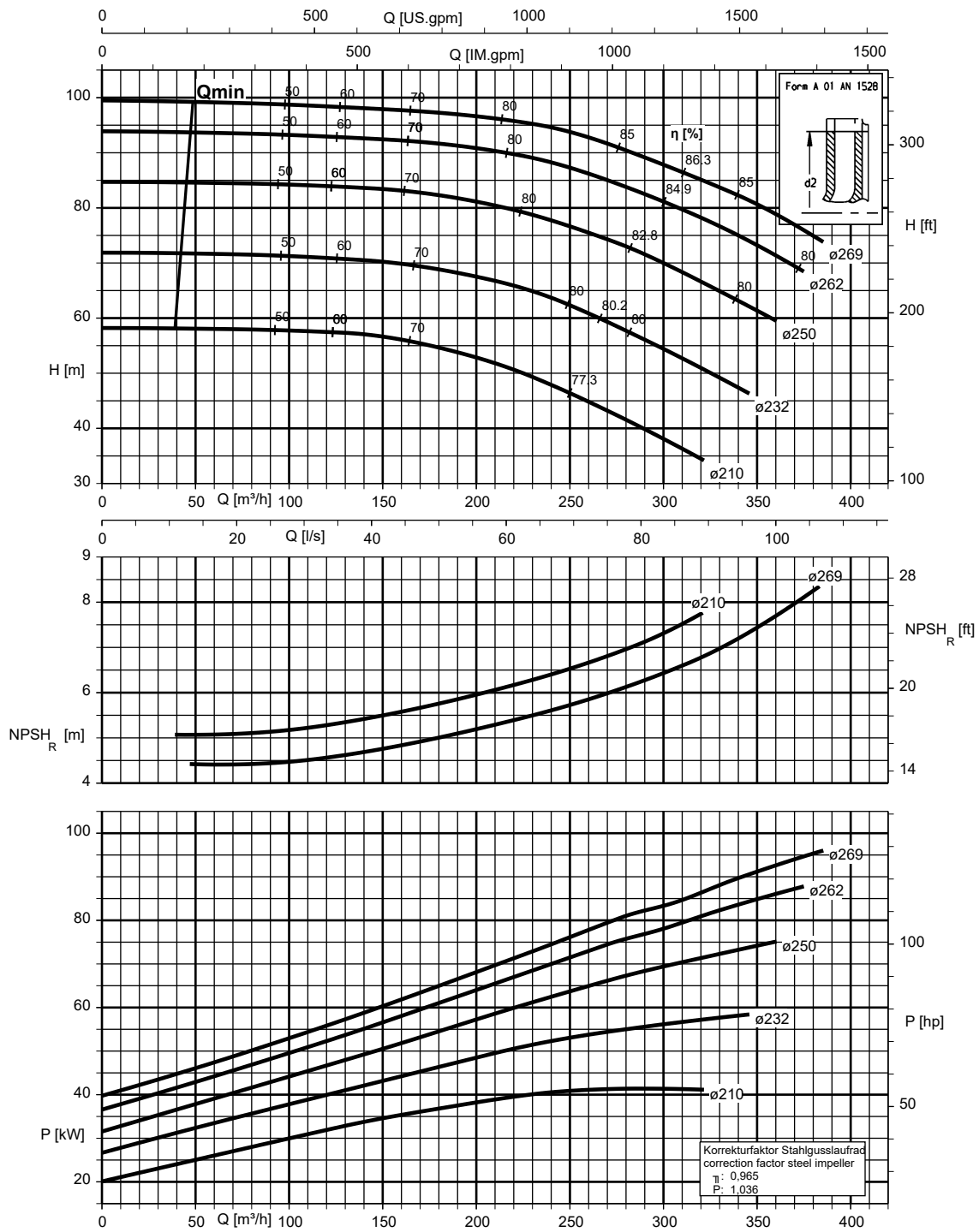


Vlety 125-100-200, n = 2900 rpm



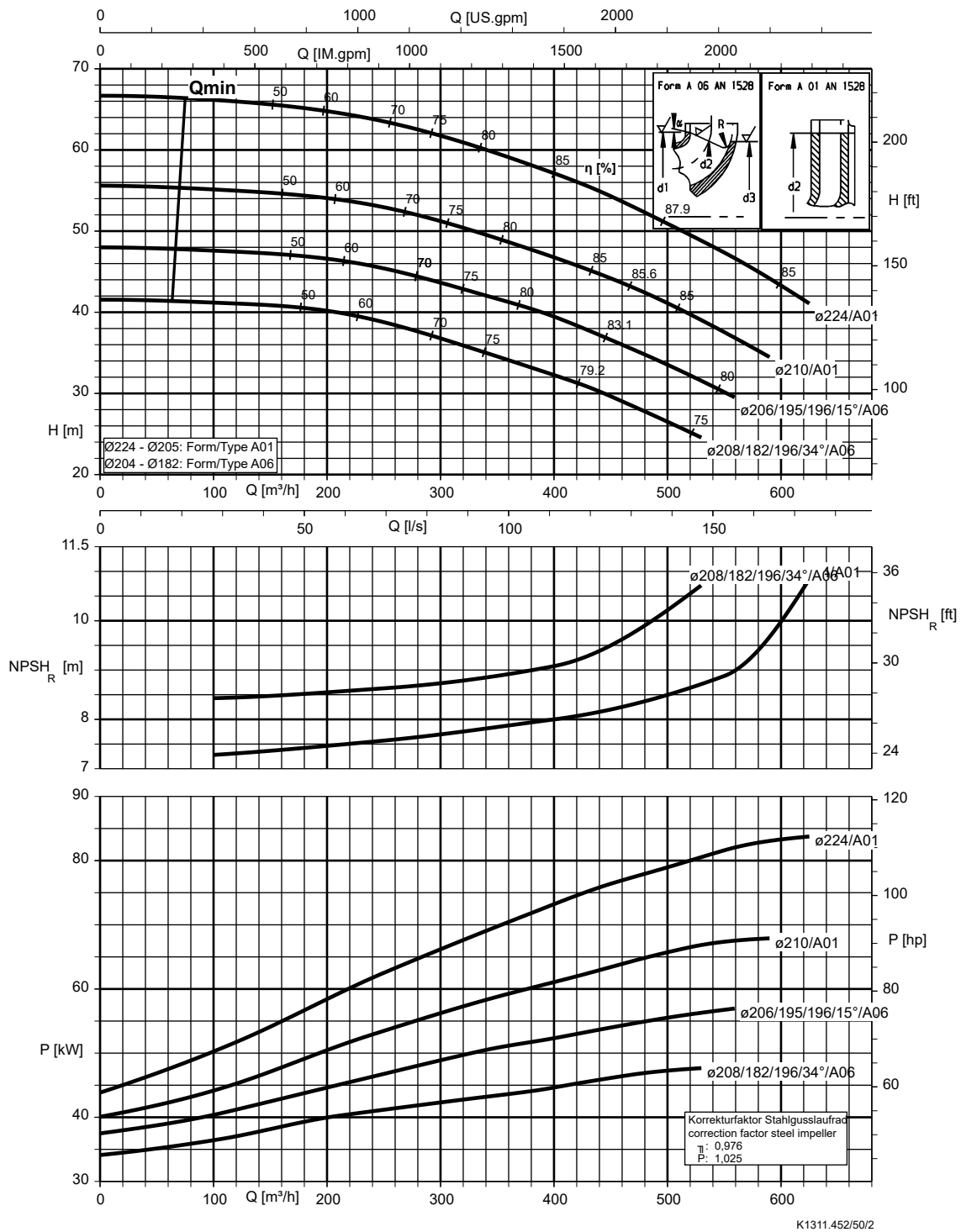


Vlety 125-100-250, n = 2900 rpm



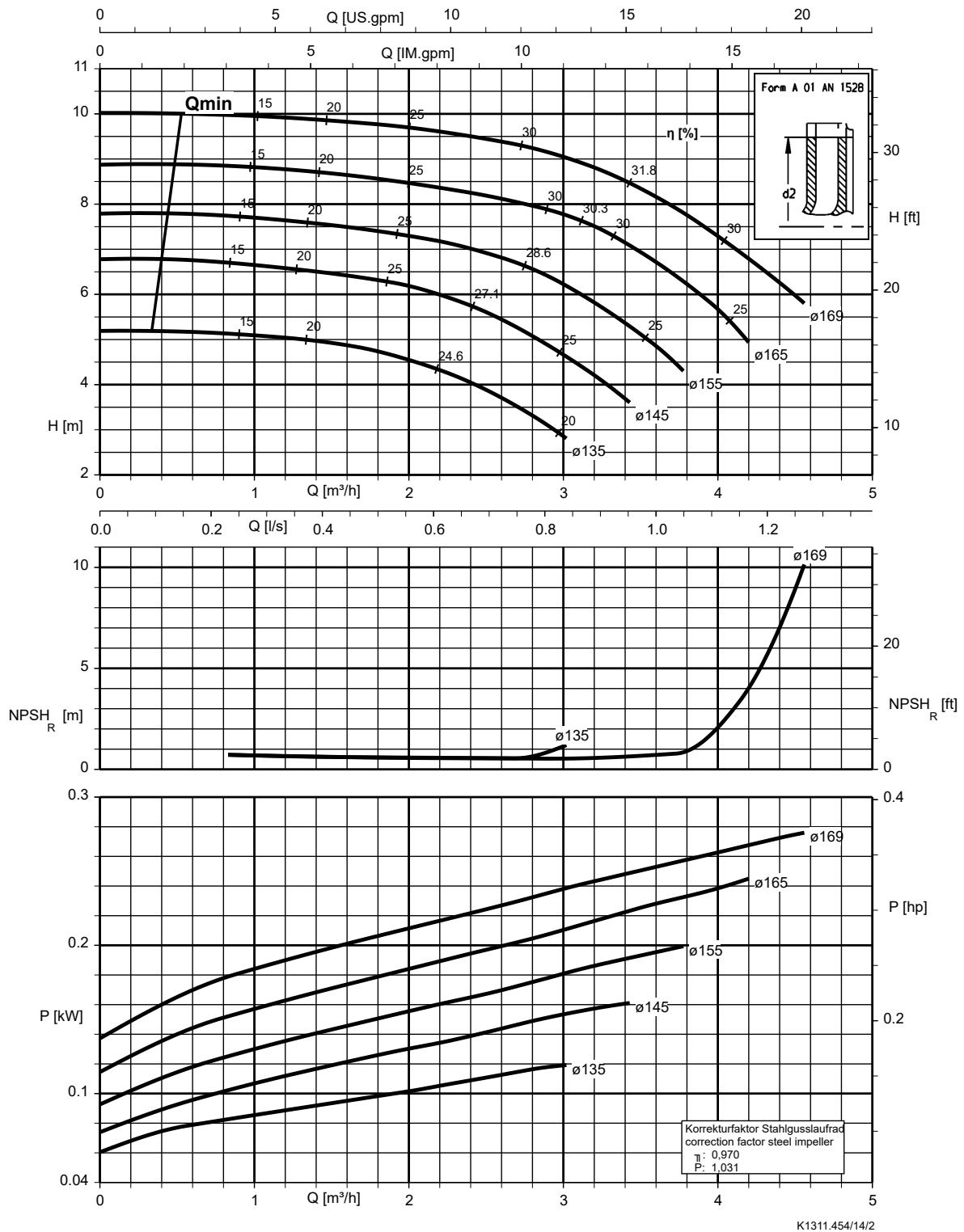
K1311.452/47/2

Vlety 150-125-200, n = 2900 rpm

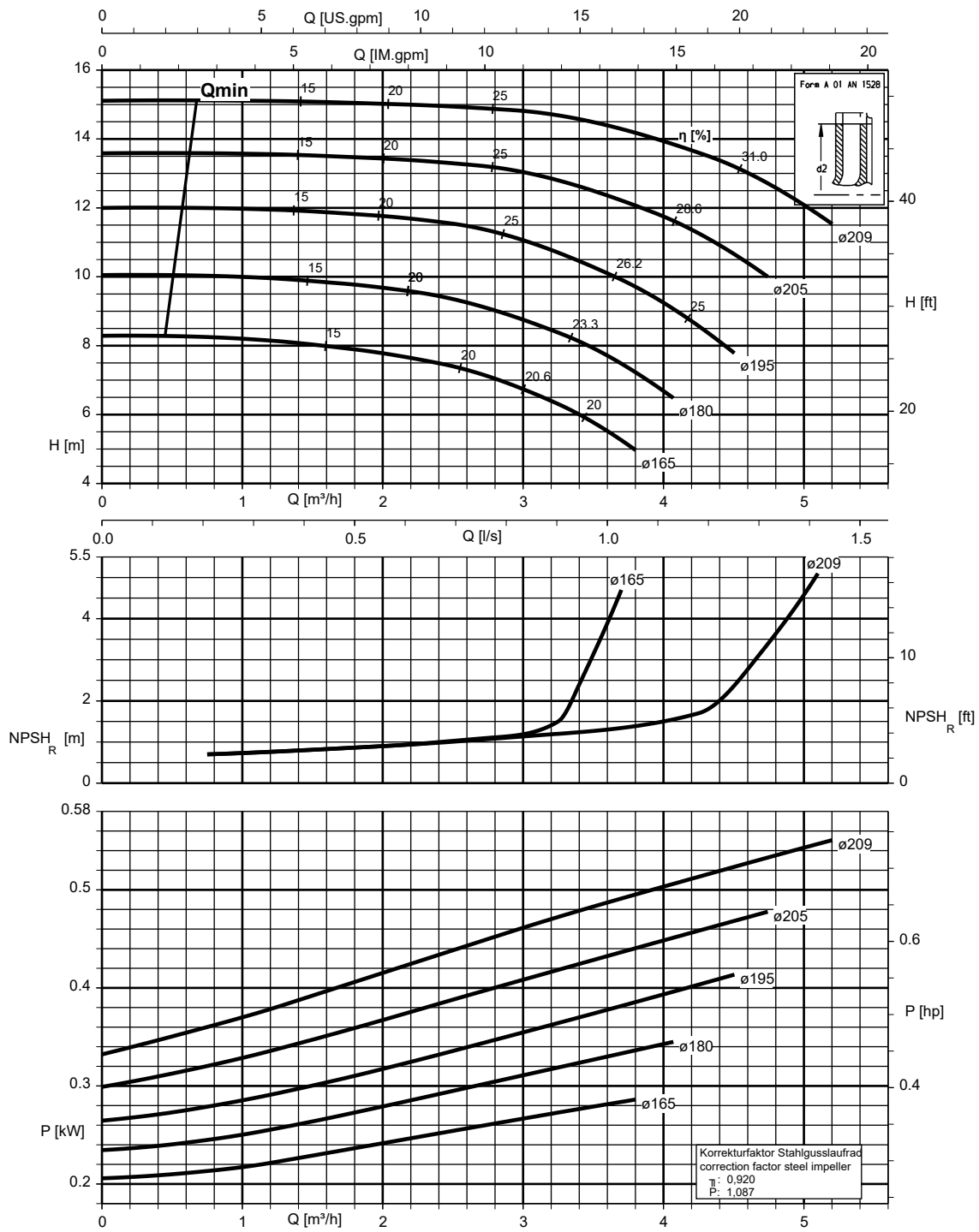


$n = 1450 \text{ rpm}$

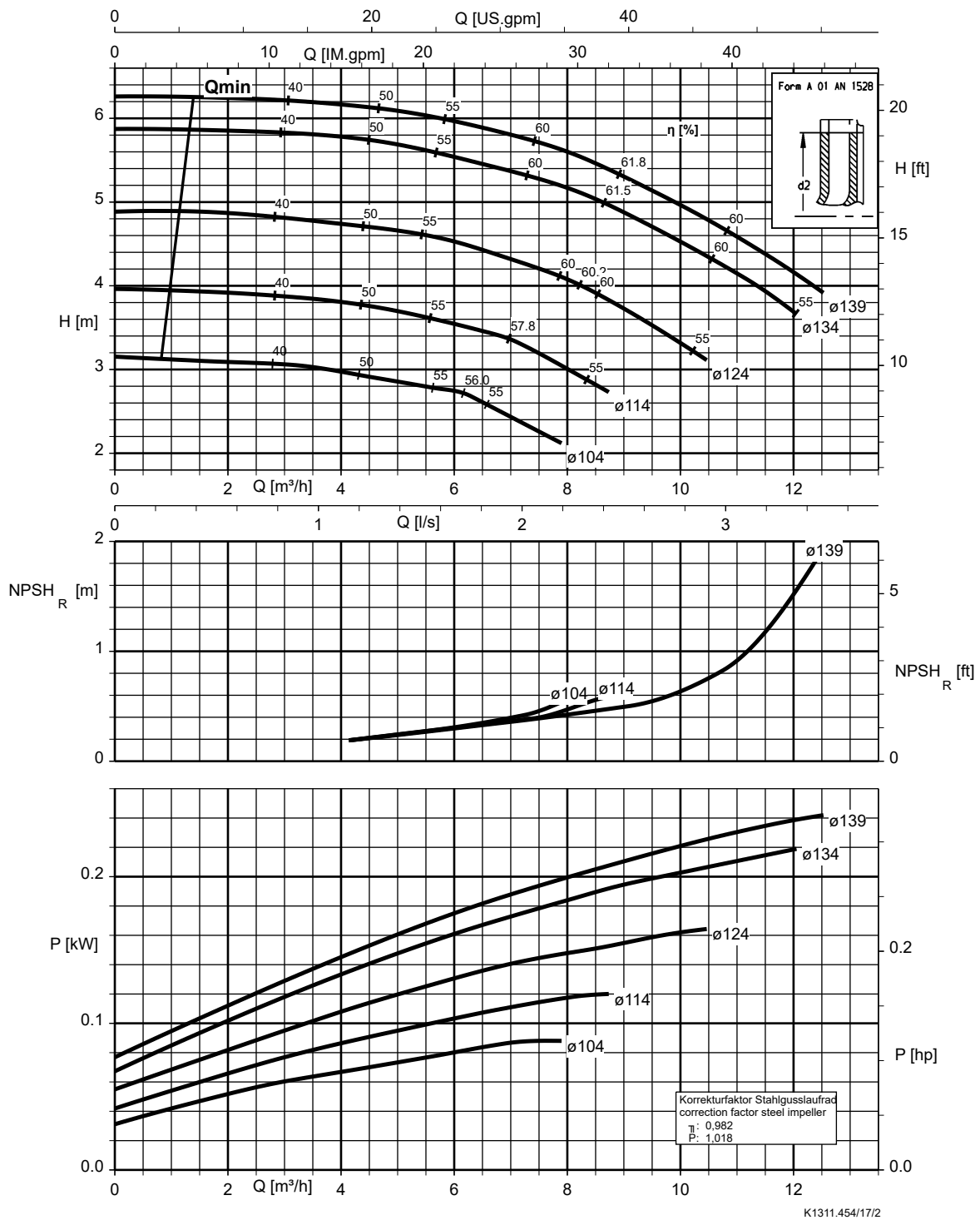
Vlety 040-025-160,  $n = 1450 \text{ rpm}$



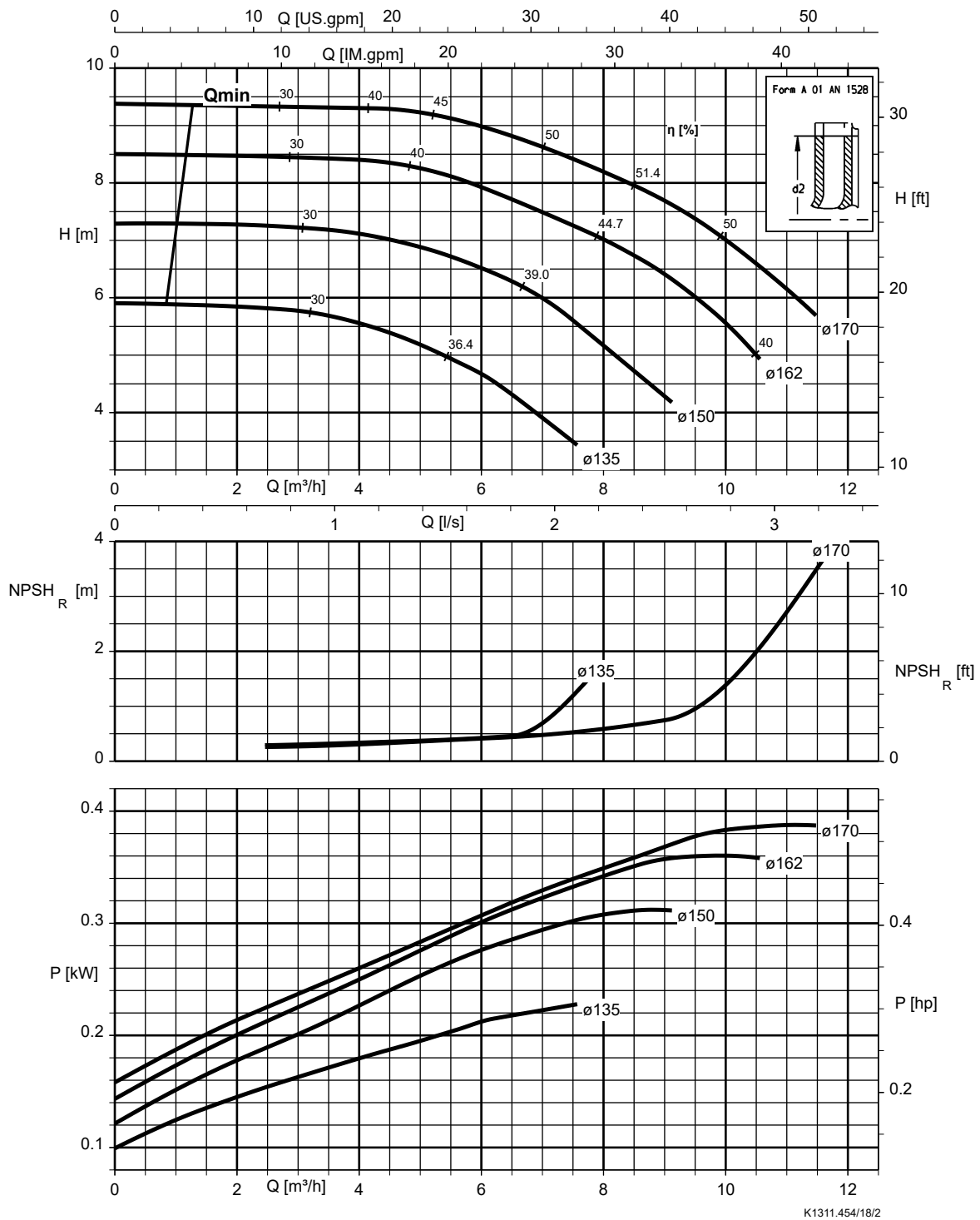
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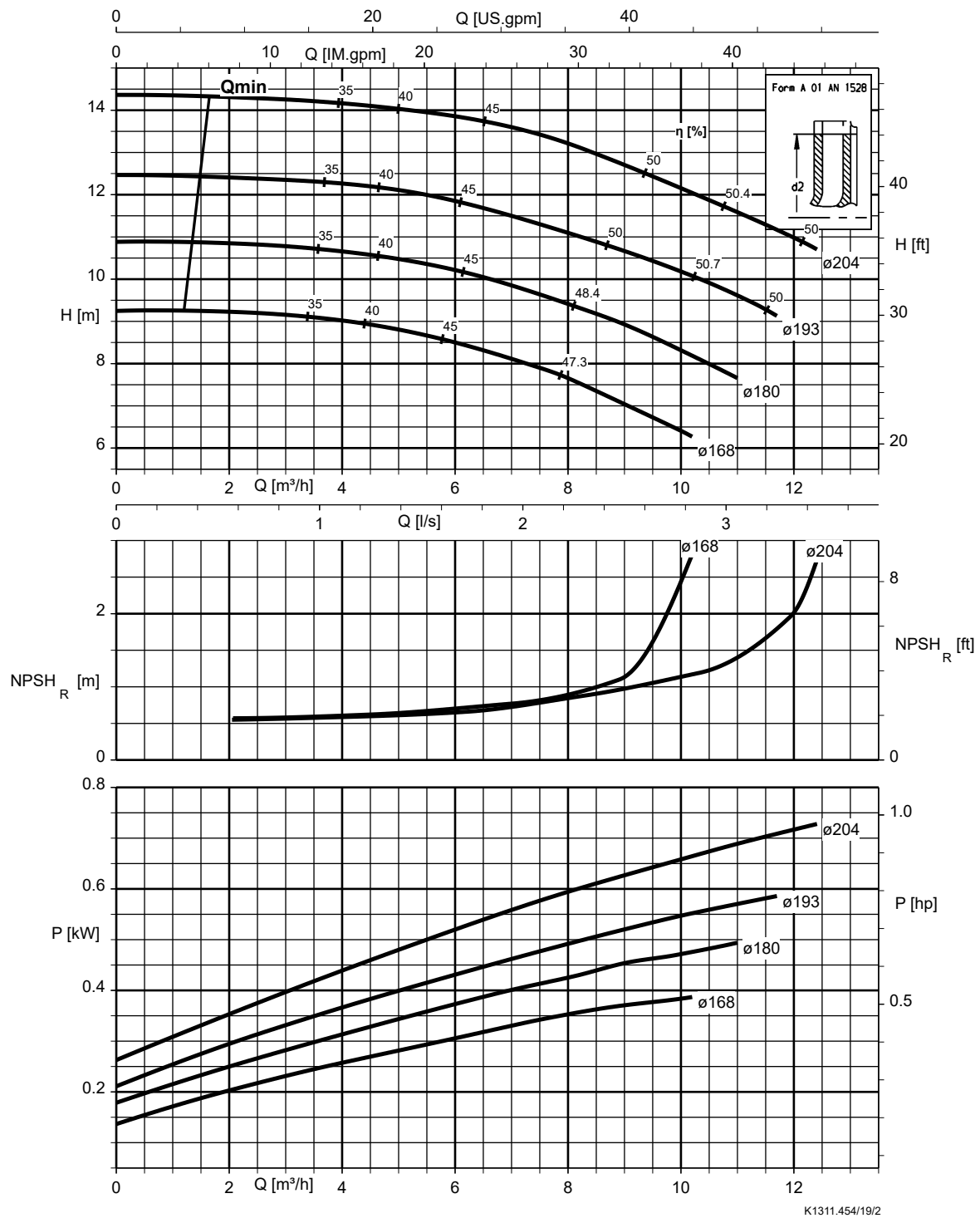
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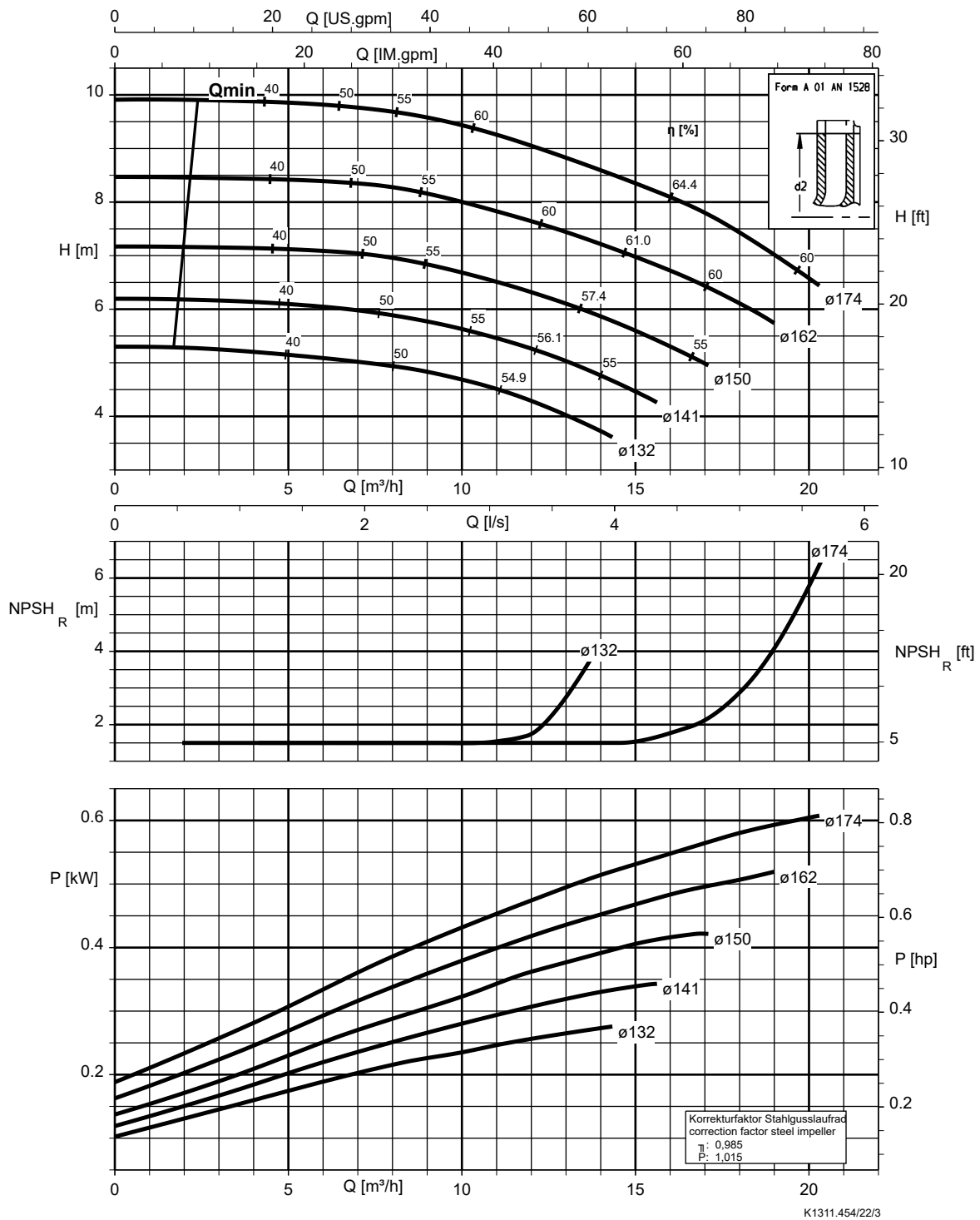
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Vlety 050-032-200.1, n = 1450 rpm

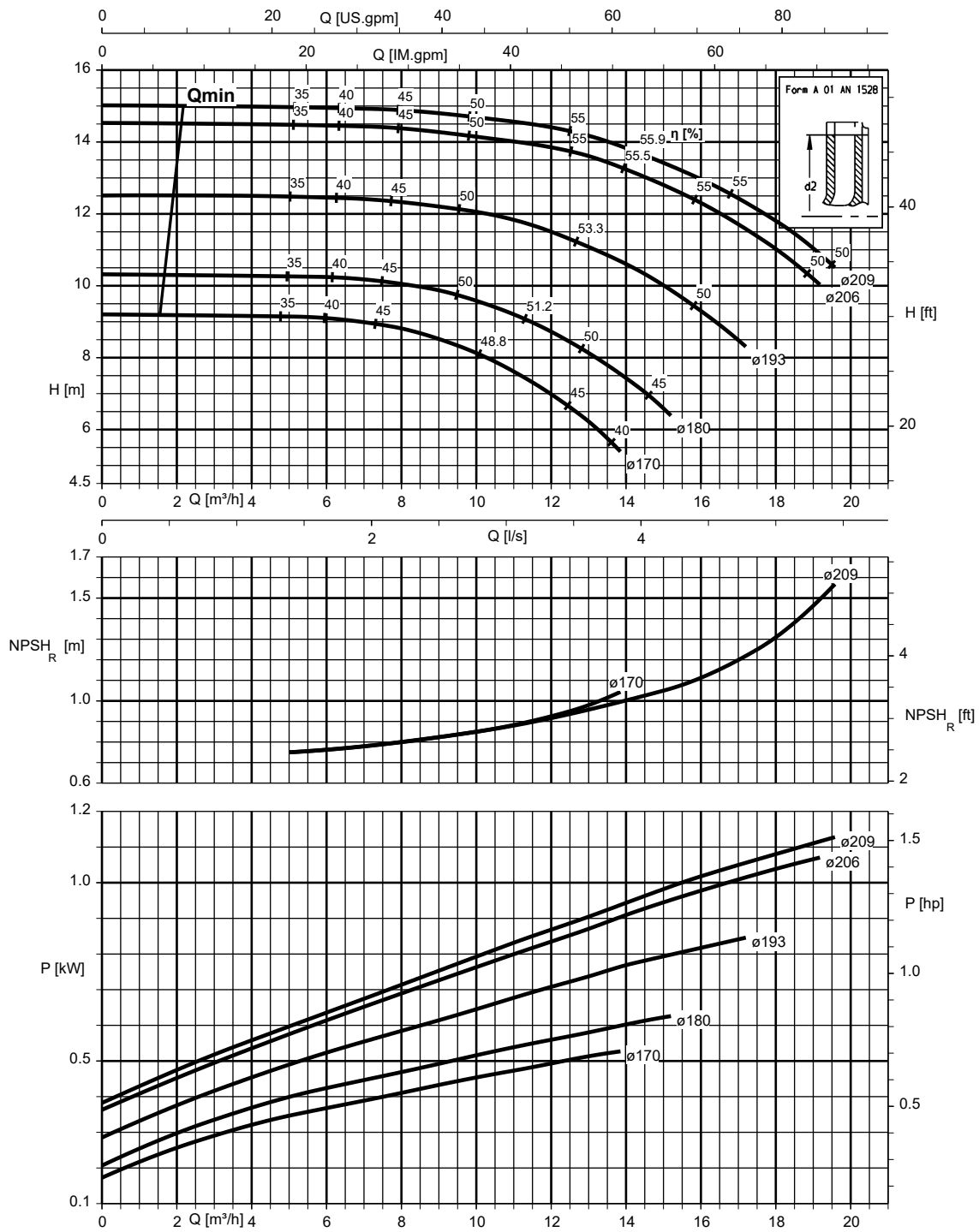


Vlety 050-032-160, n = 1450 rpm



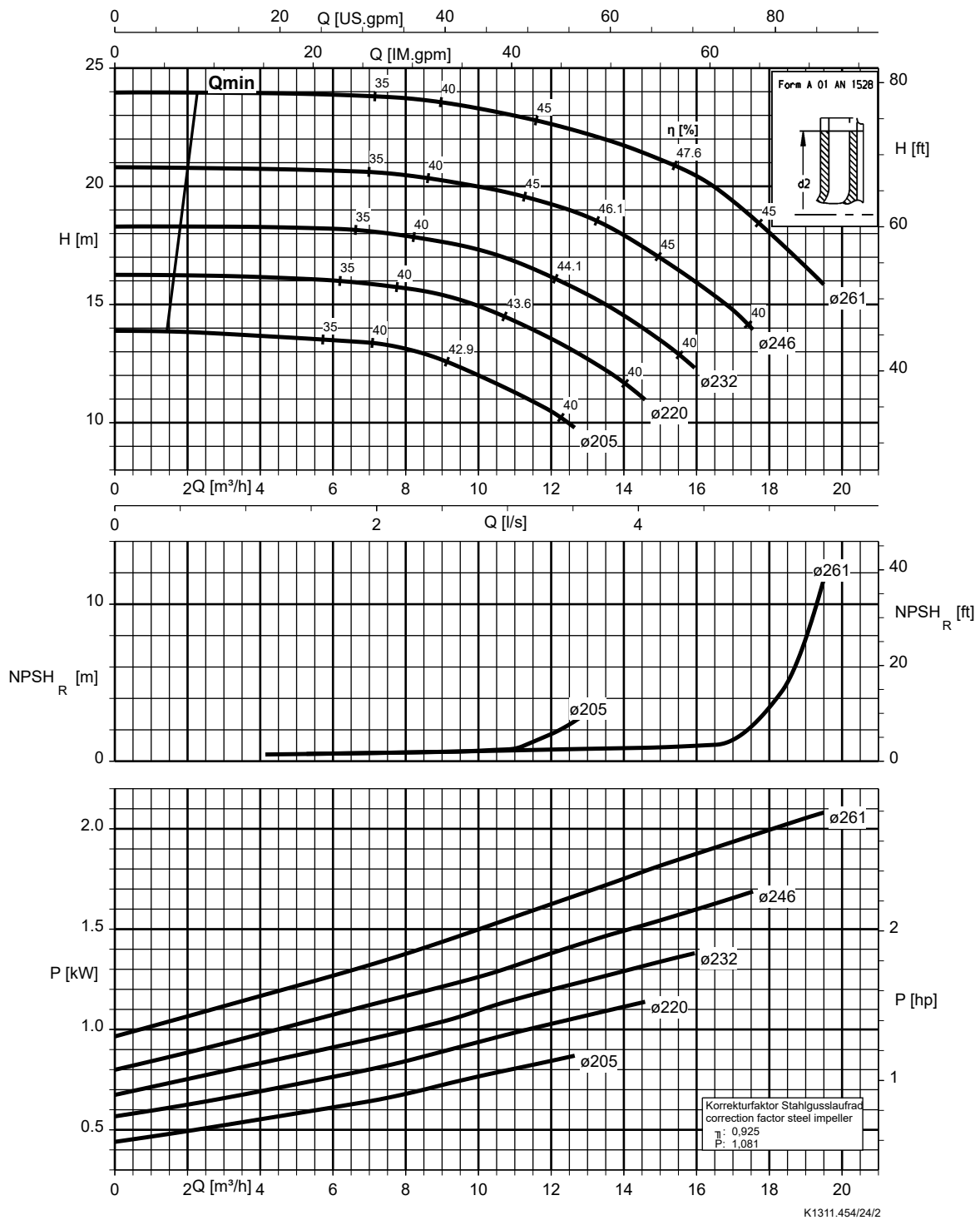


Vlety 050-032-200, n = 1450 rpm

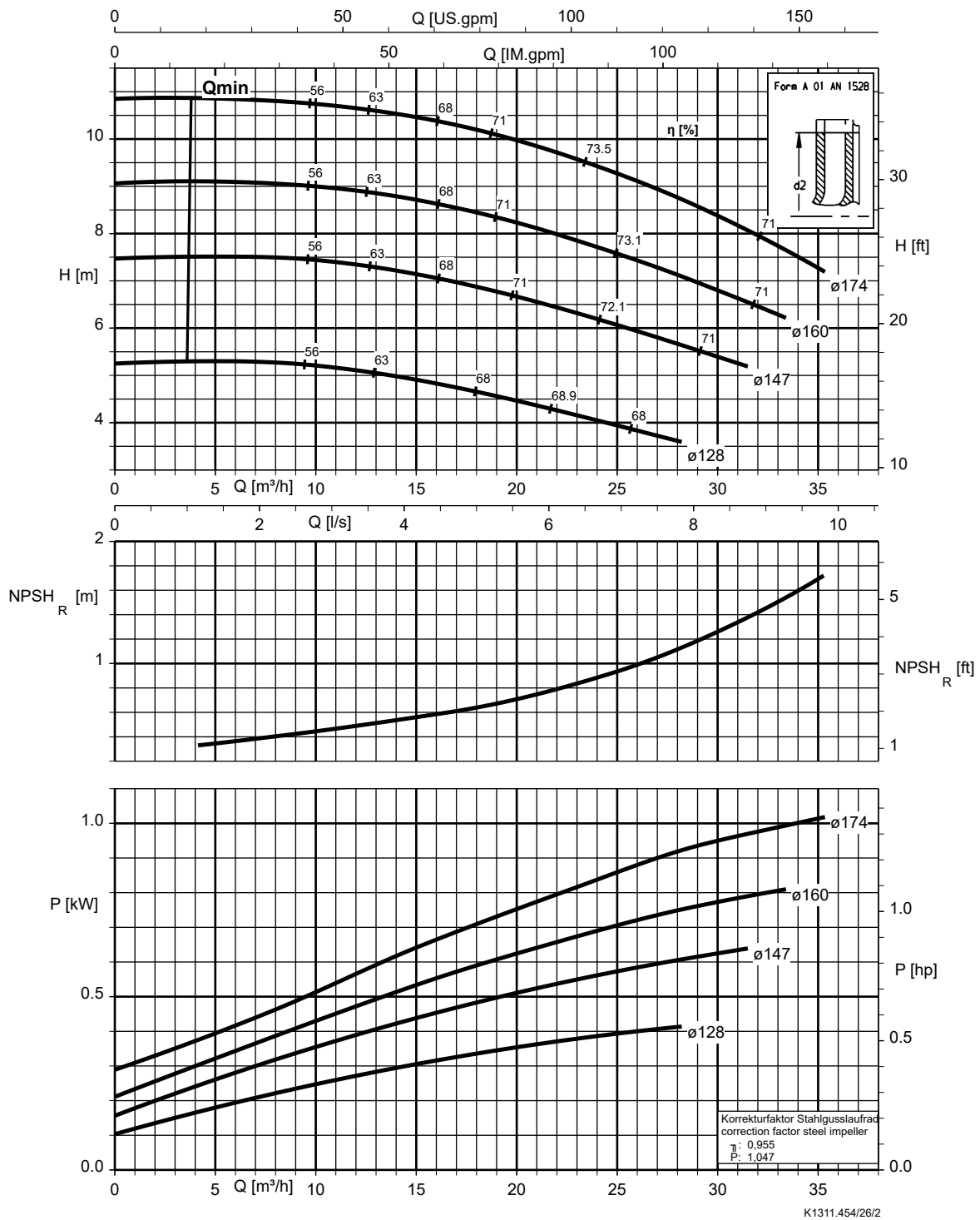


K1311.454/23/1

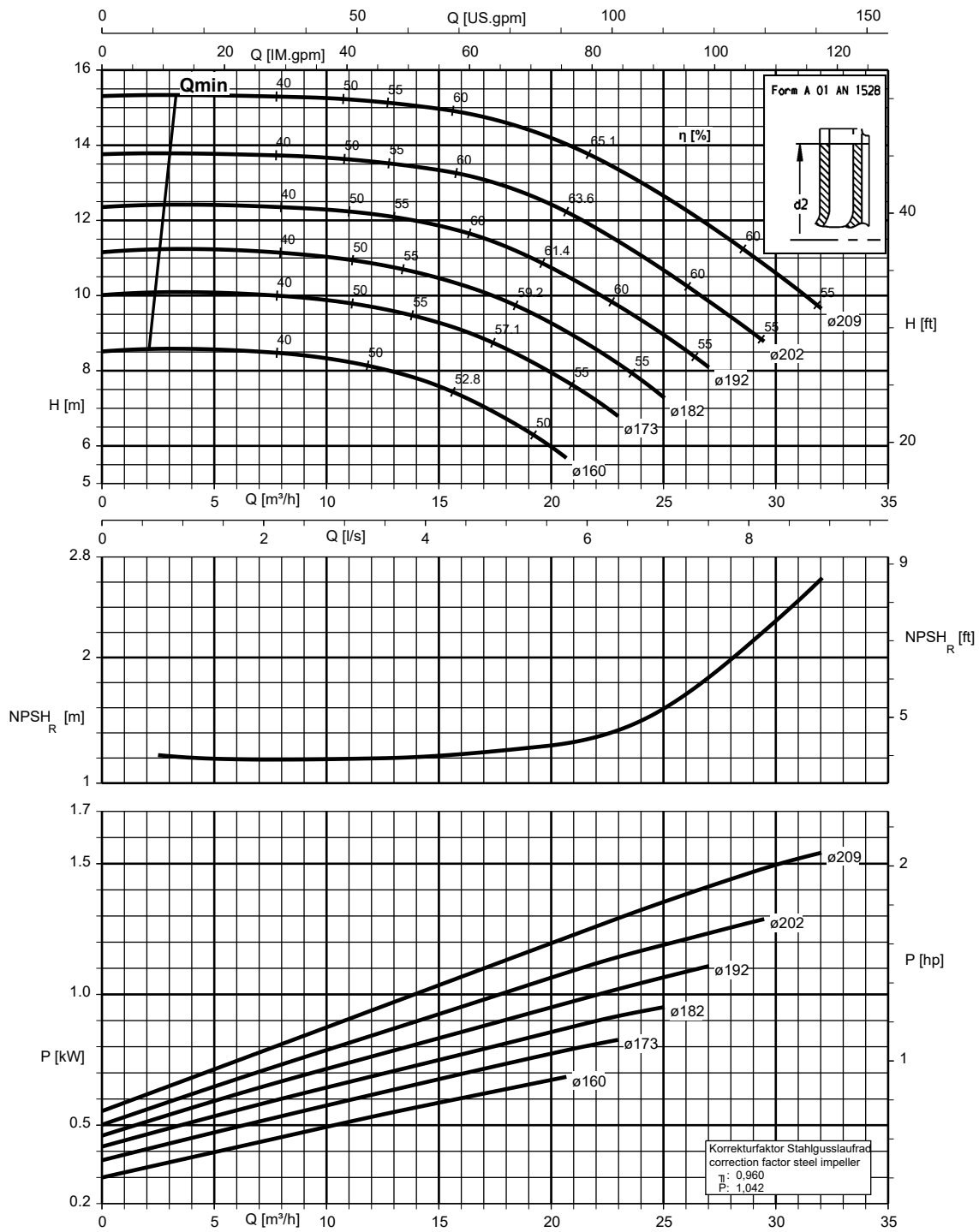
Vlety 050-032-250, n = 1450 rpm



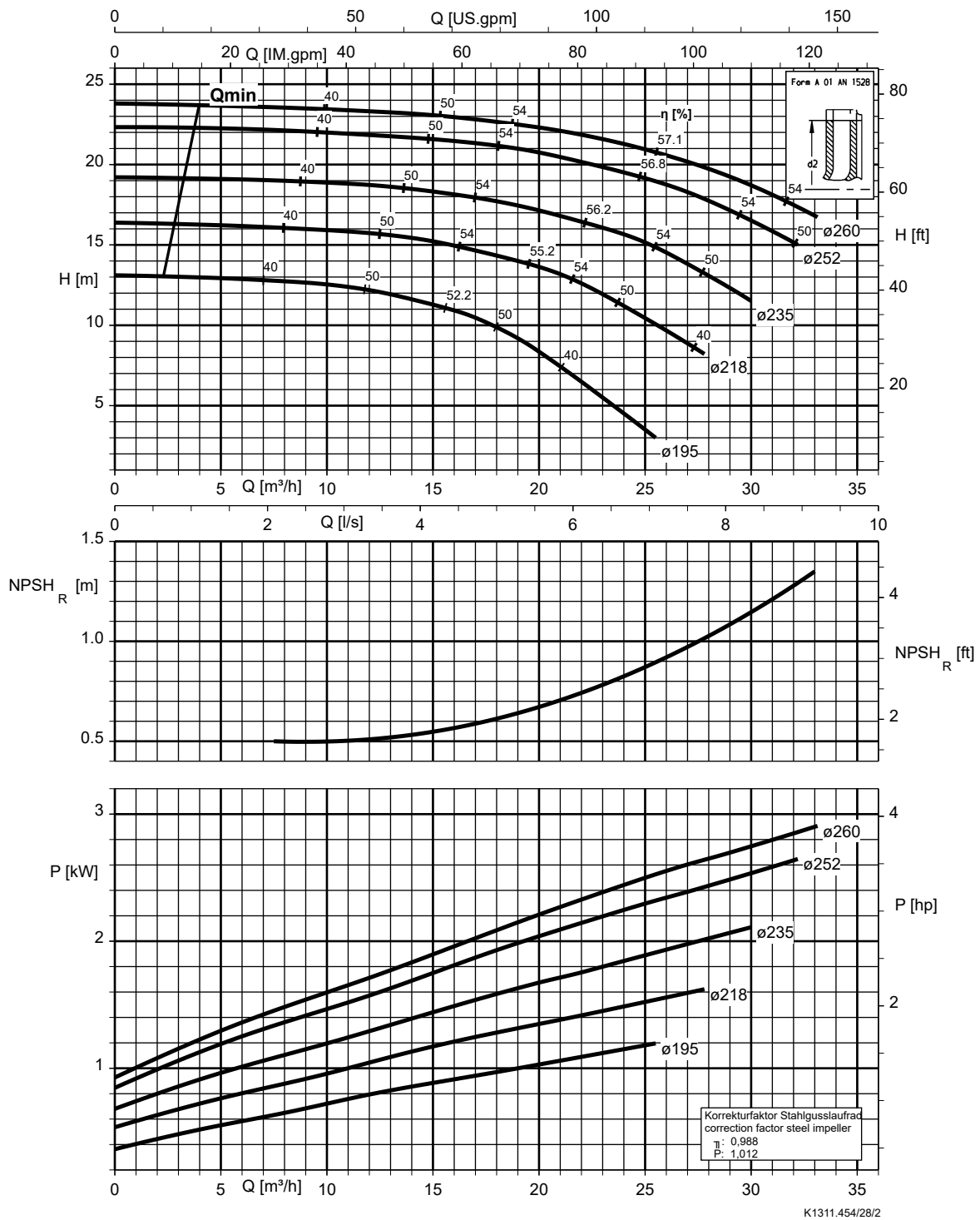
Vlety 065-040-160, n = 1450 rpm



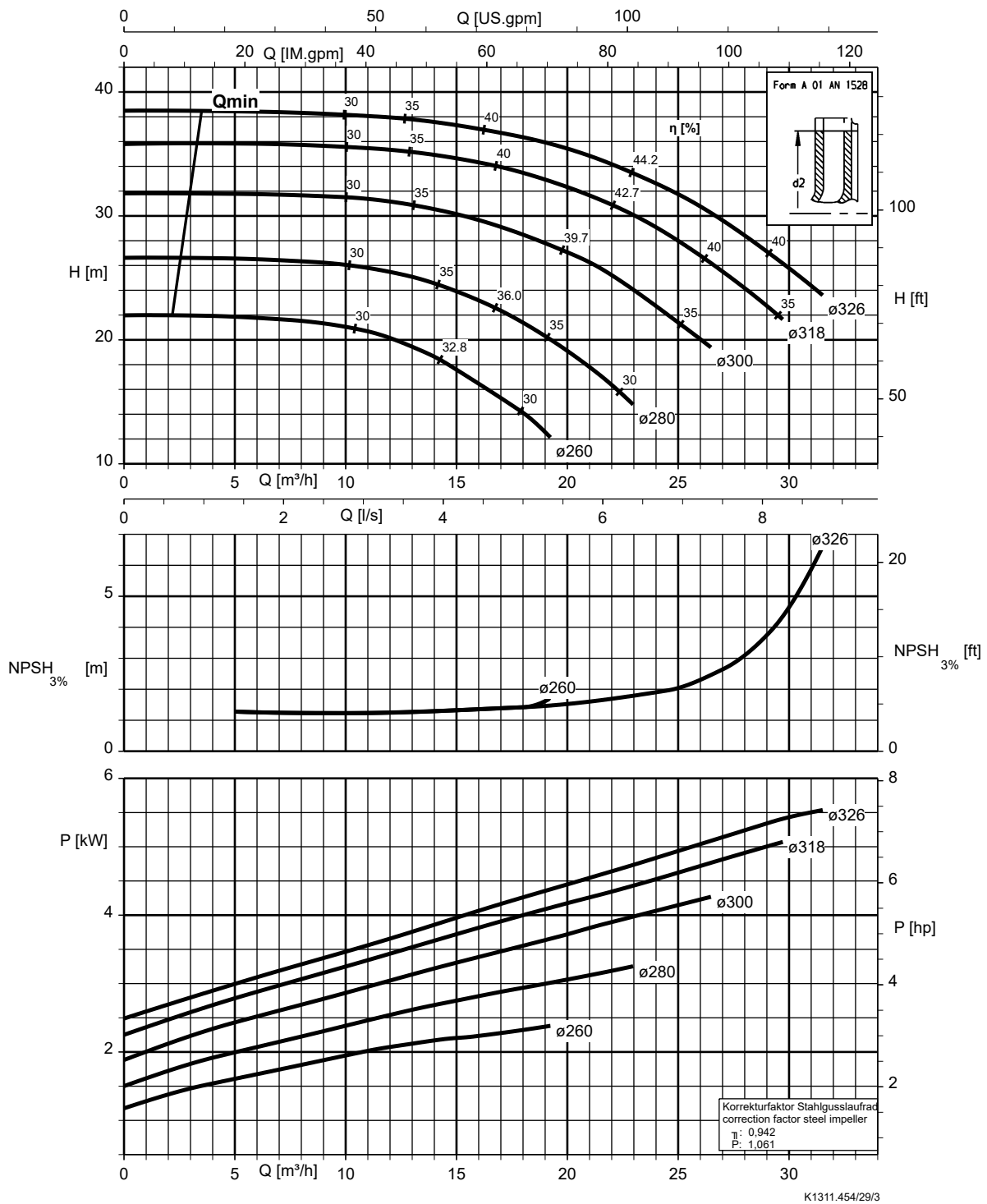
Vlety 065-040-200, n = 1450 rpm



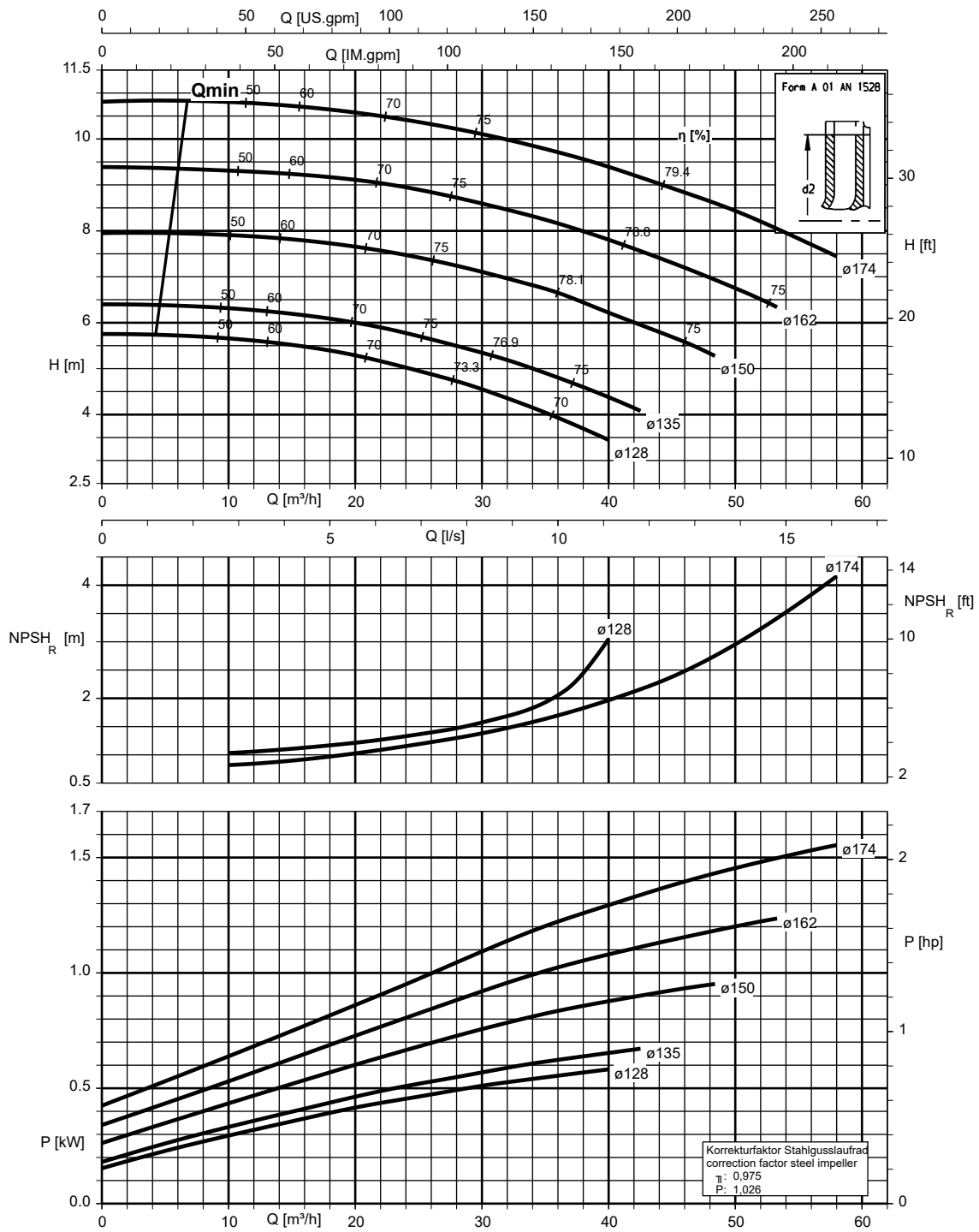
Vlety 065-040-250, n = 1450 rpm



Vlety 065-040-315, n = 1450 rpm

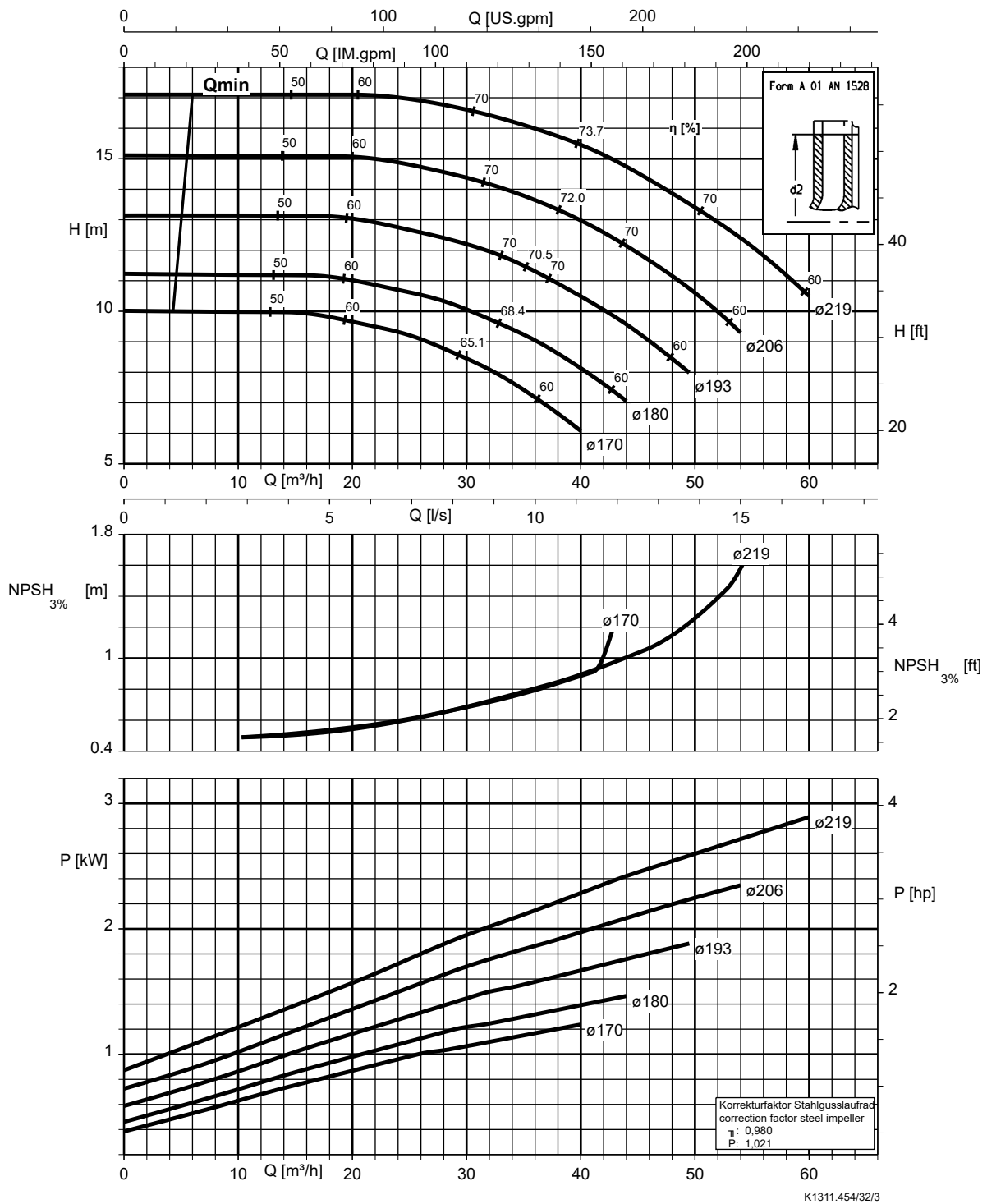


Vlety 065-050-160, n = 1450 rpm



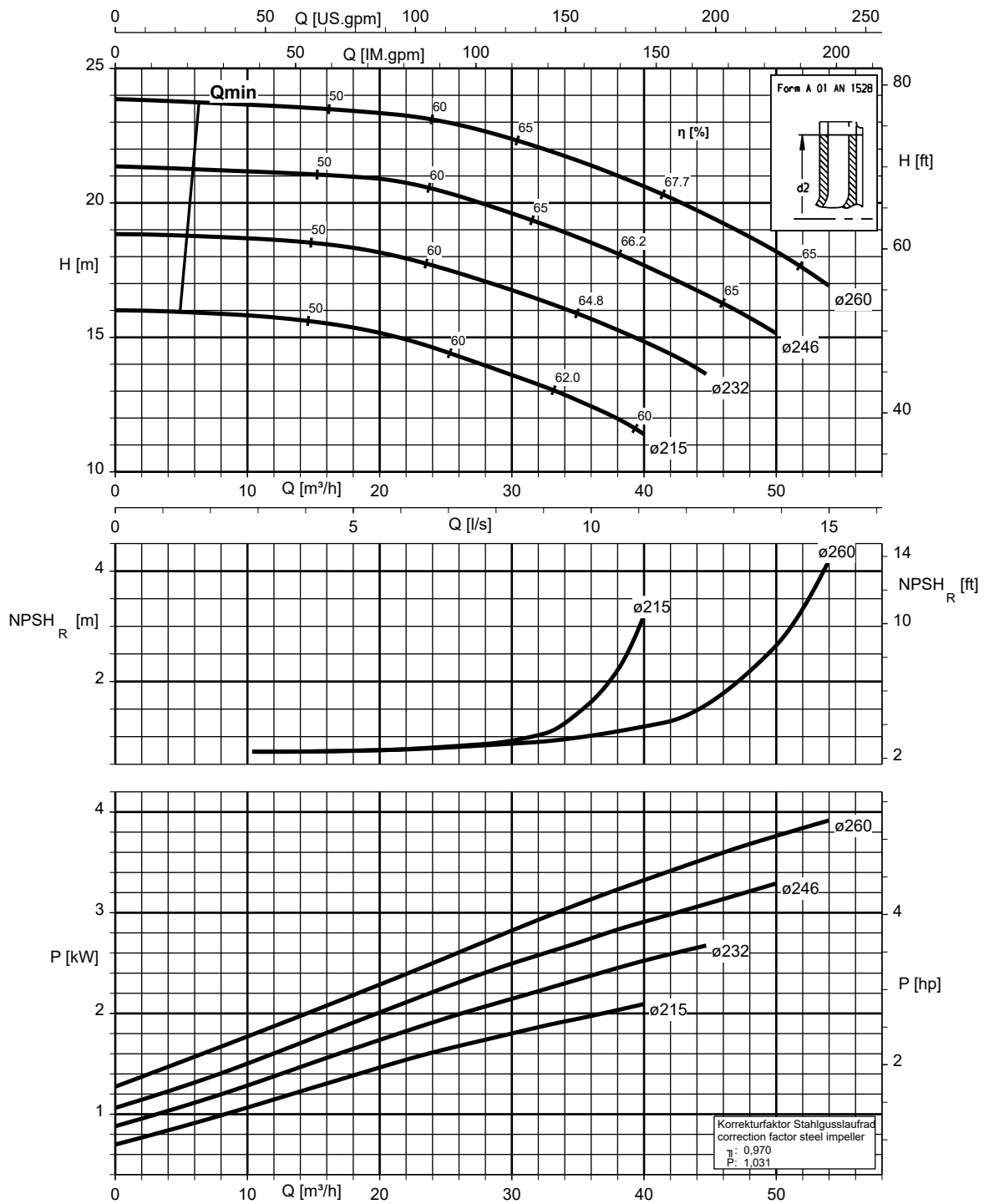
K1311.454/31/1

Vlety 065-050-200, n = 1450 rpm



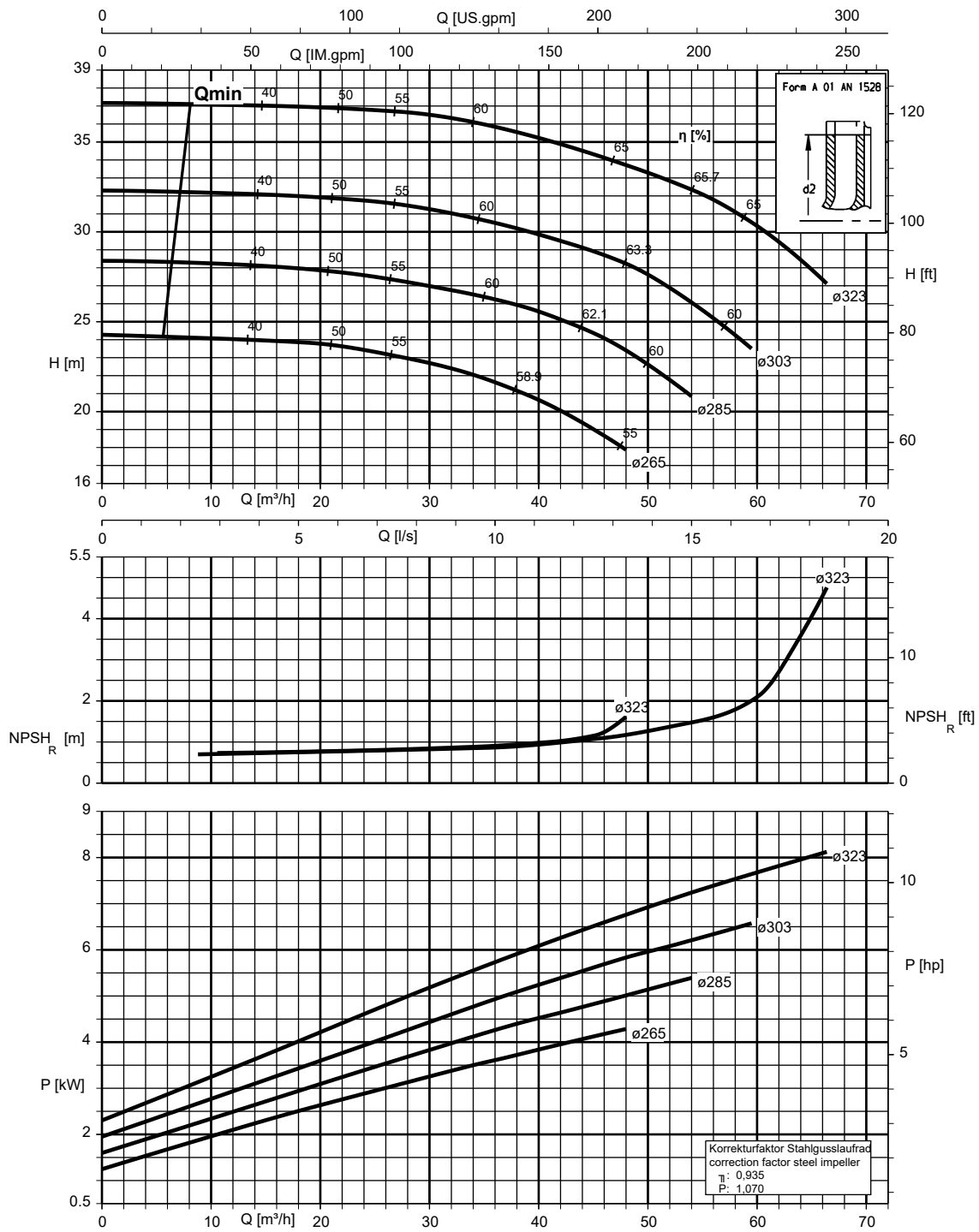


Vlety 065-050-250, n = 1450 rpm

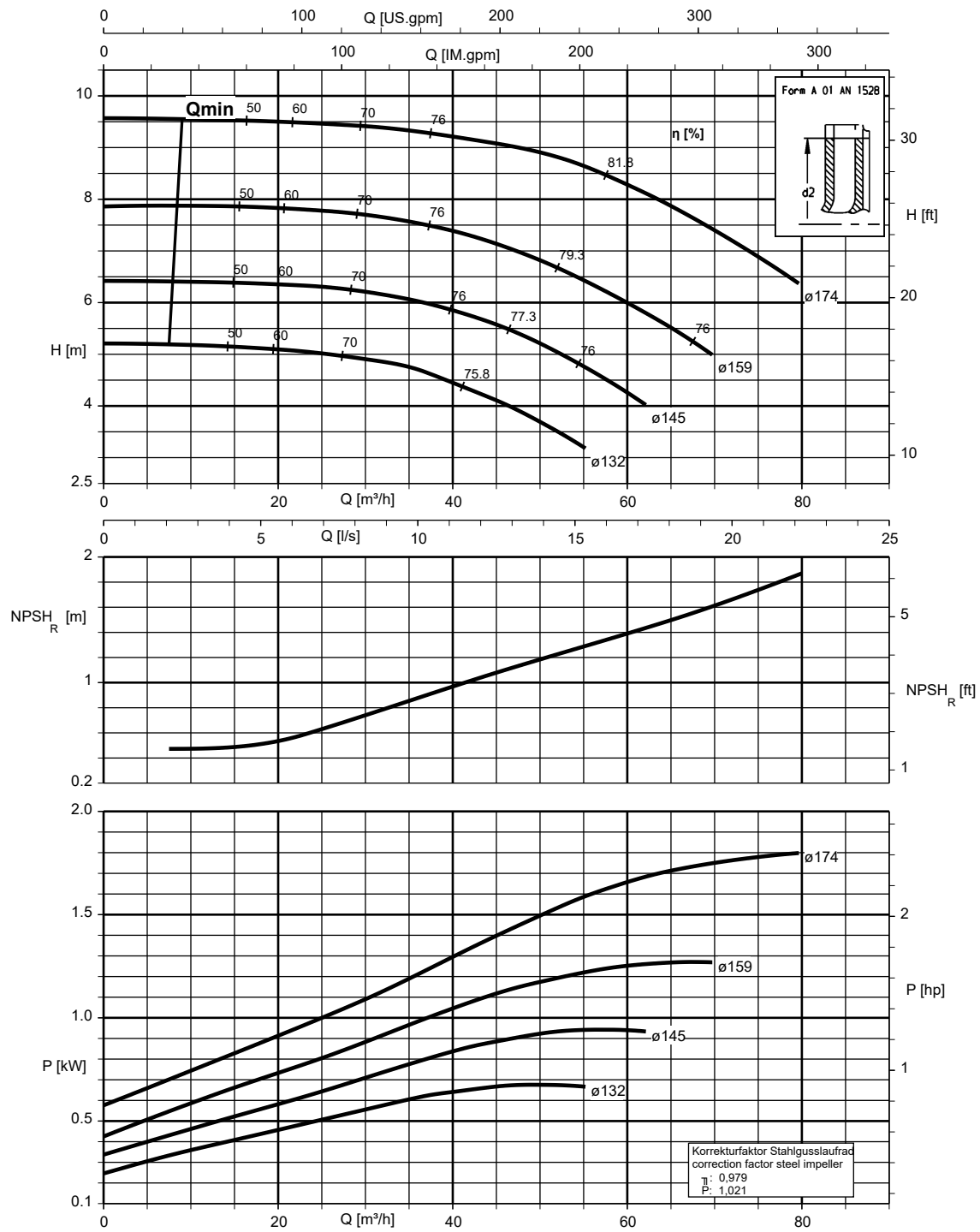


K1311.454/33/2

Vlety 065-050-315, n = 1450 rpm

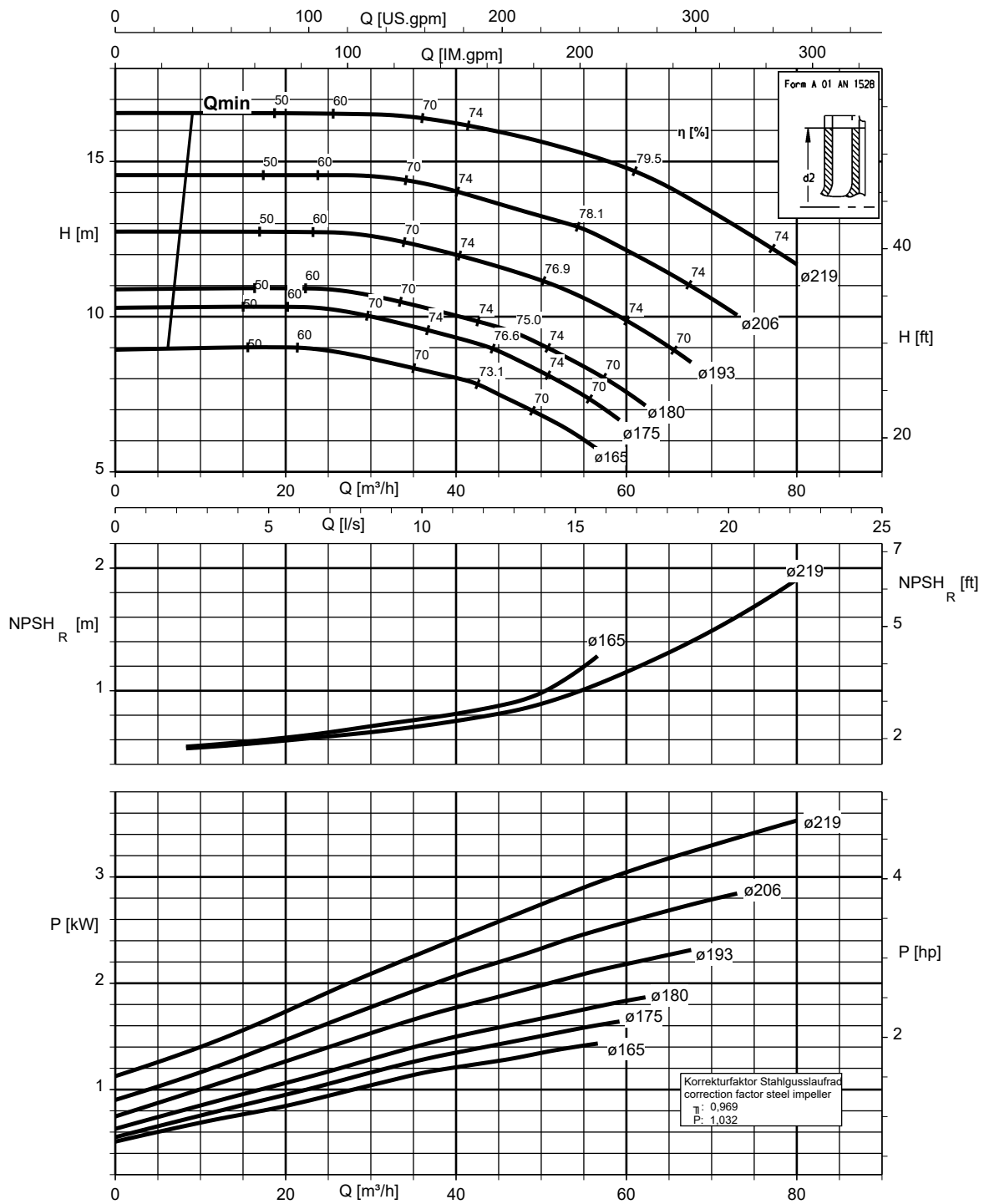


Vlety 080-065-160, n = 1450 rpm



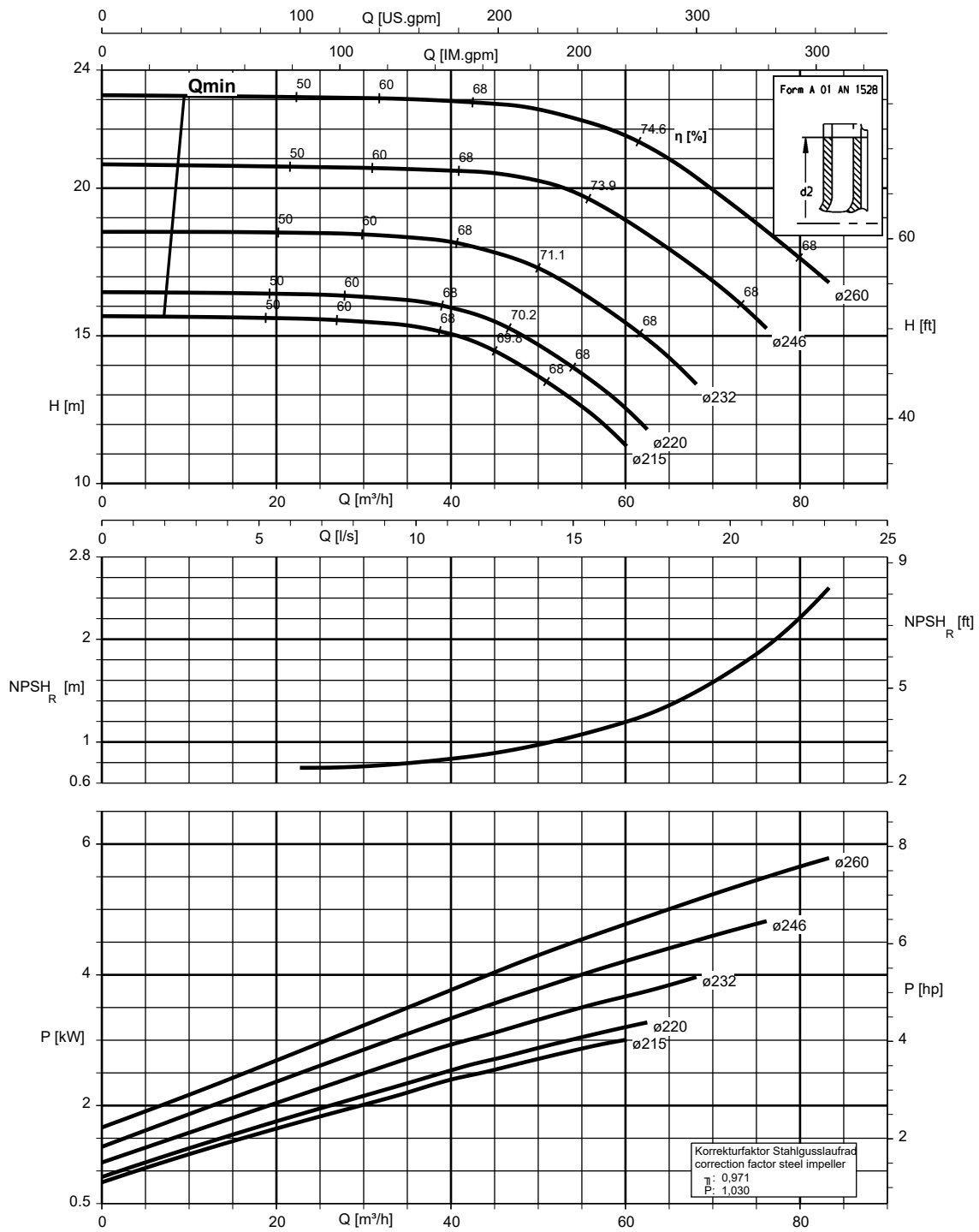
K1311.454/36/2

Vlety 080-065-200, n = 1450 rpm



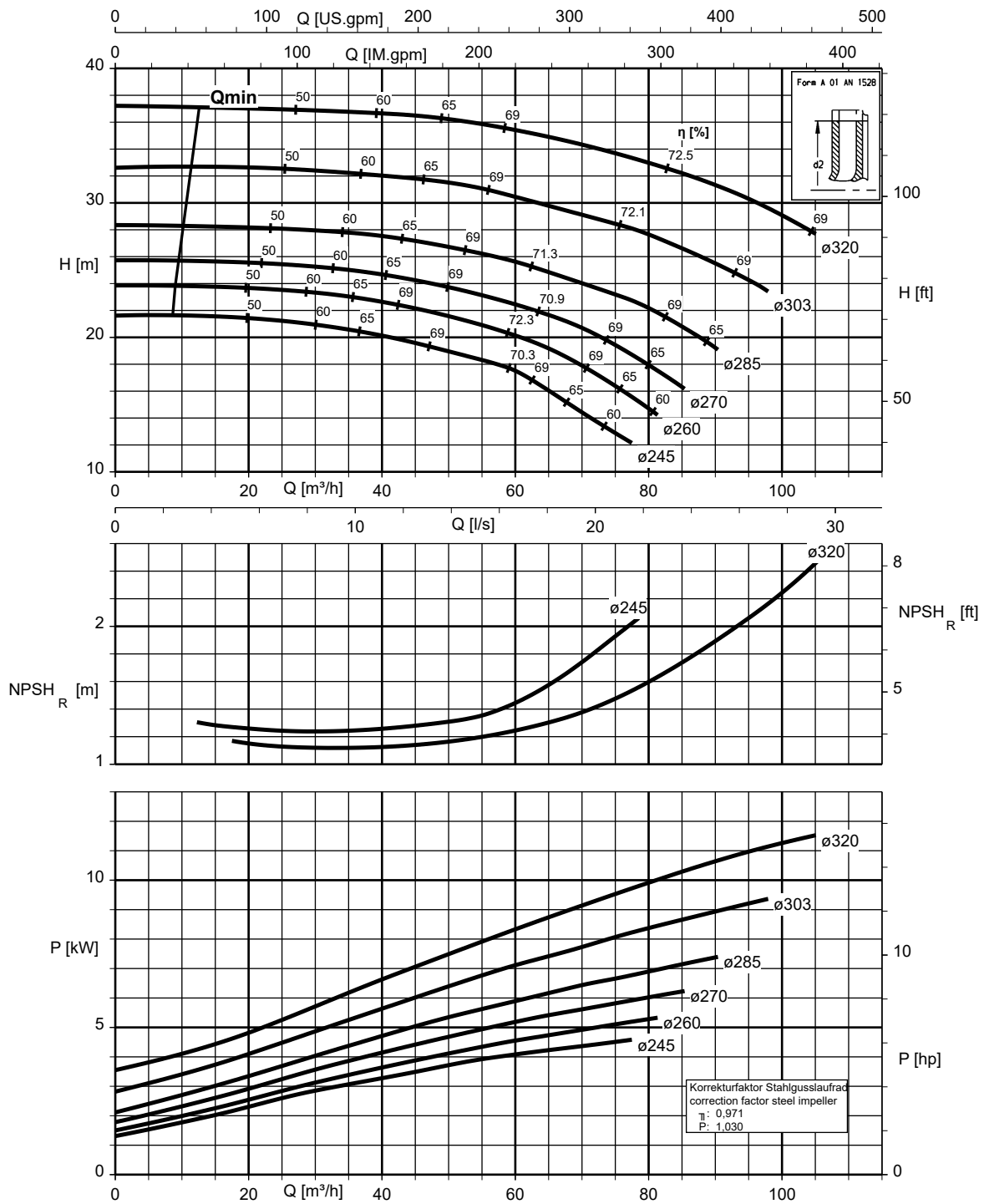
K1311.454/37/2

Vlety 080-065-250, n = 1450 rpm



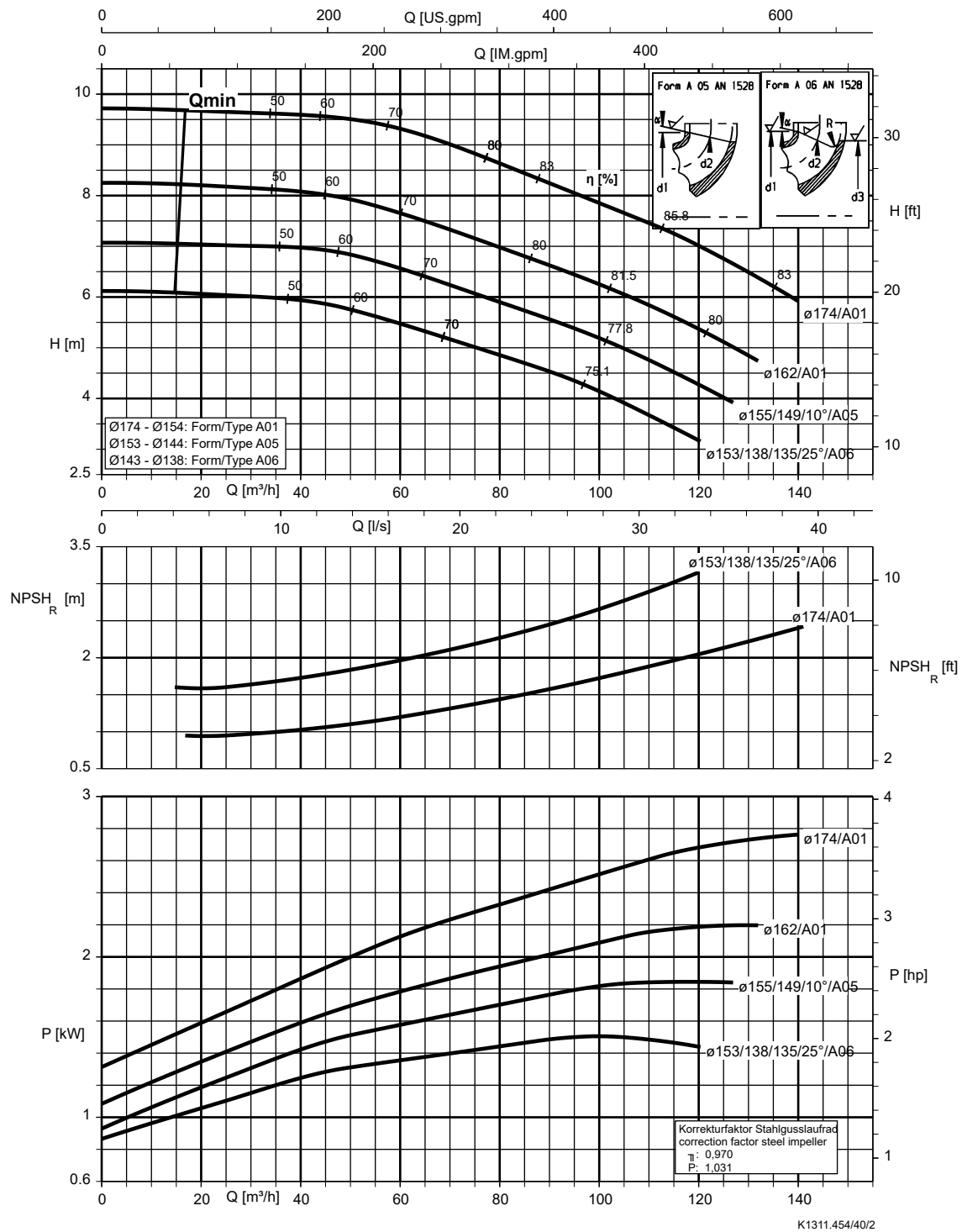
K1311.454/38/2

Vlety 080-065-315, n = 1450 rpm

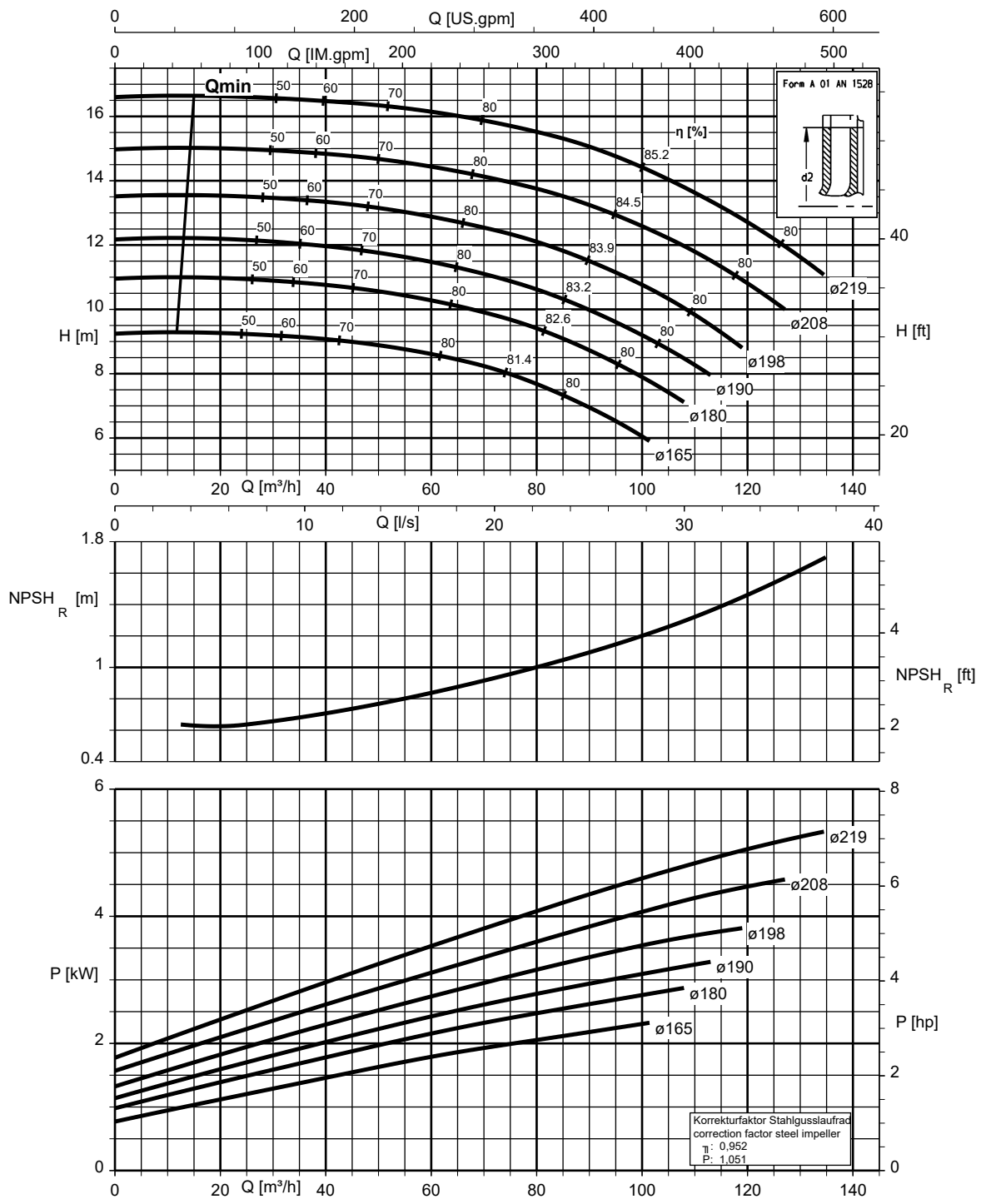


K1311.454/39/2

Vlety 100-080-160, n = 1450 rpm

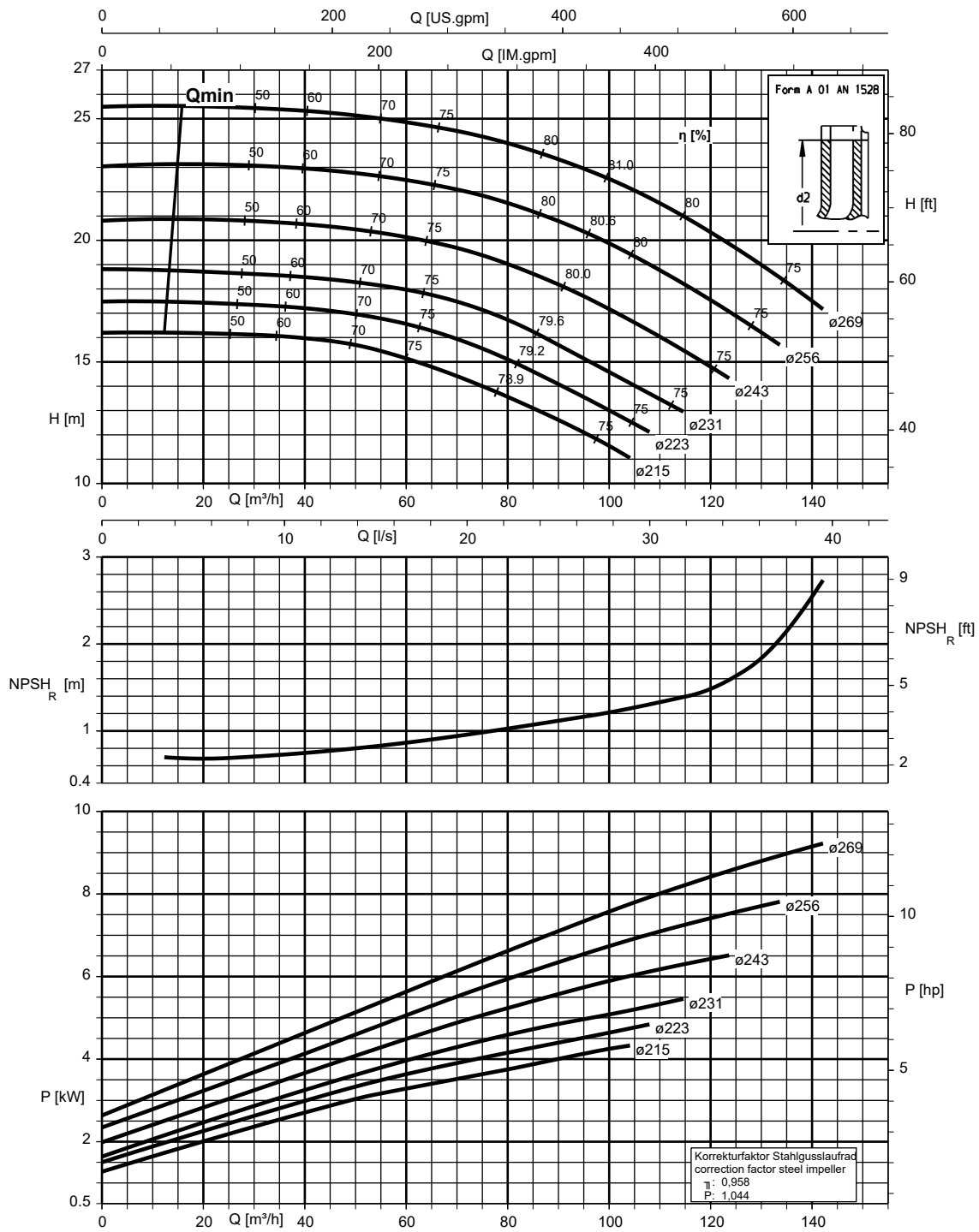


Vlety 100-080-200, n = 1450 rpm

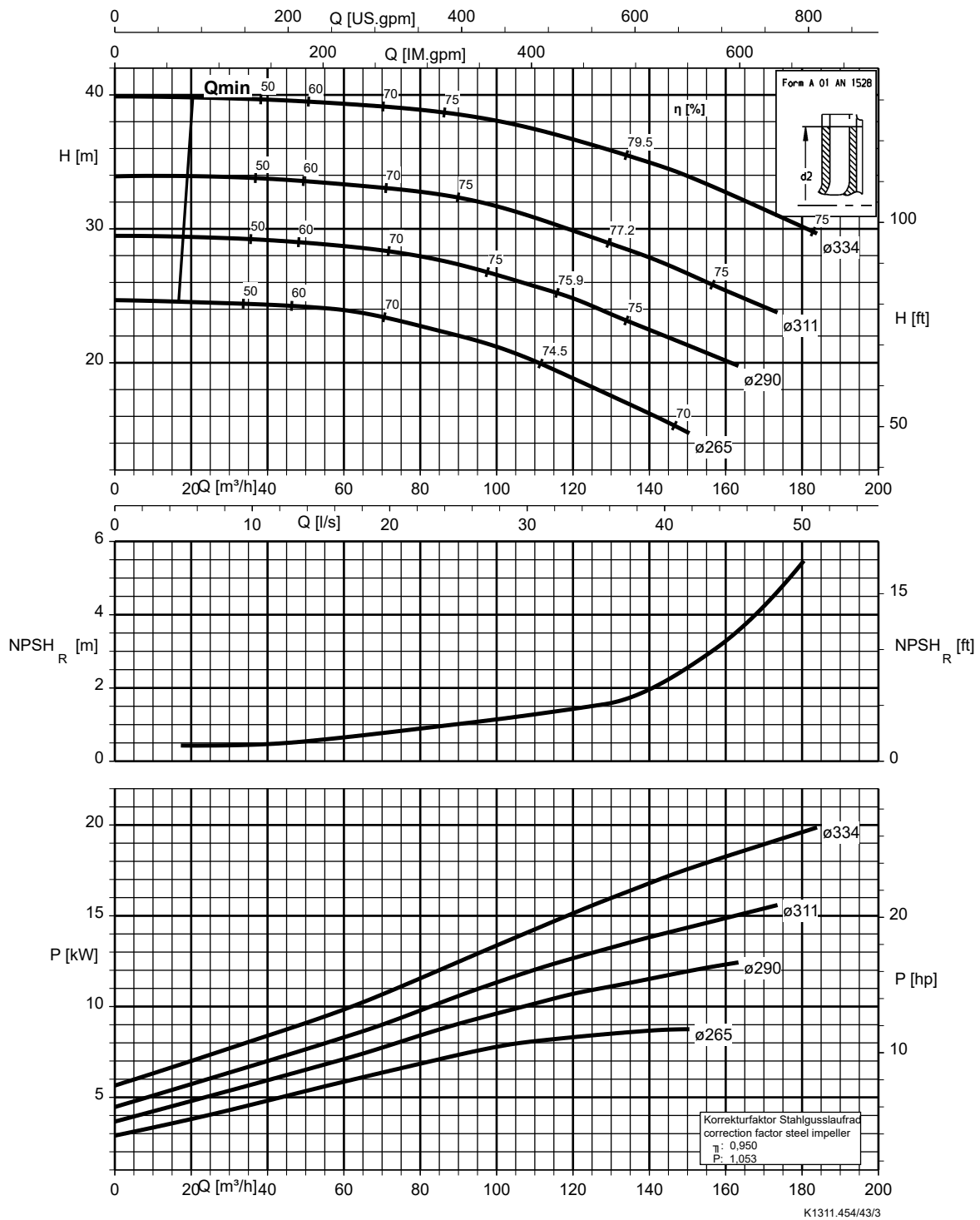




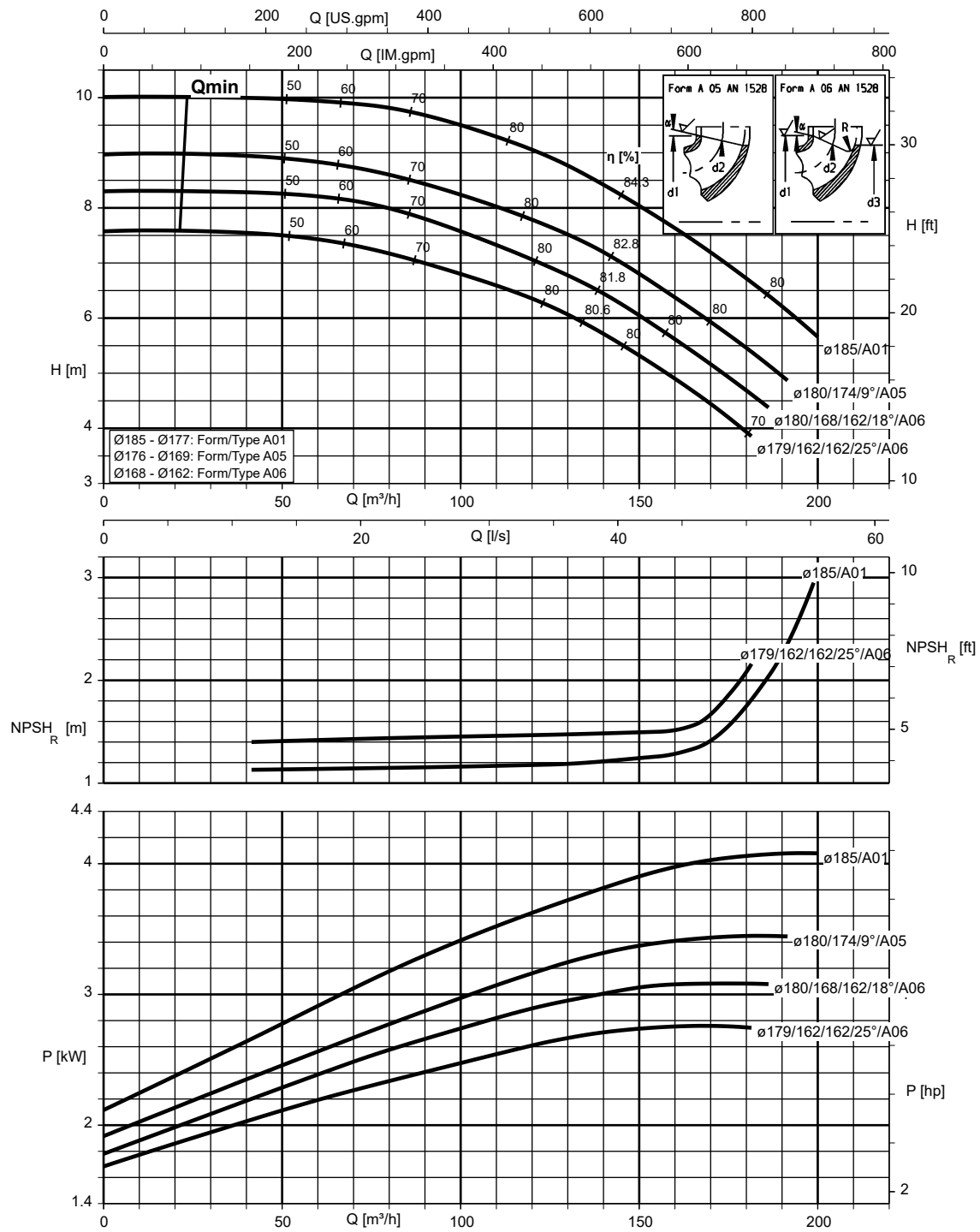
Vlety 100-080-250, n = 1450 rpm



Vlety 100-080-315, n = 1450 rpm

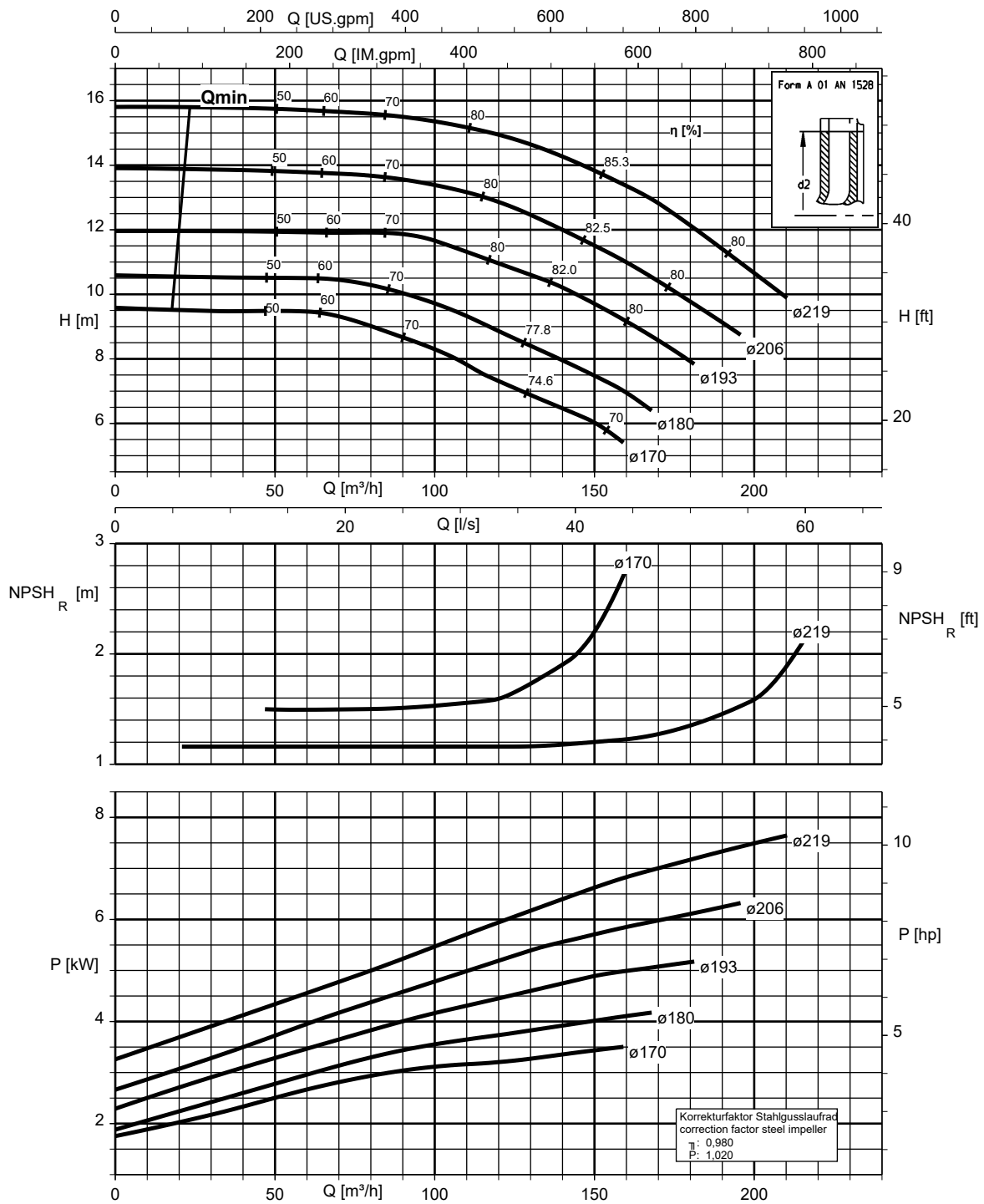


Vlety 125-100-160, n = 1450 rpm



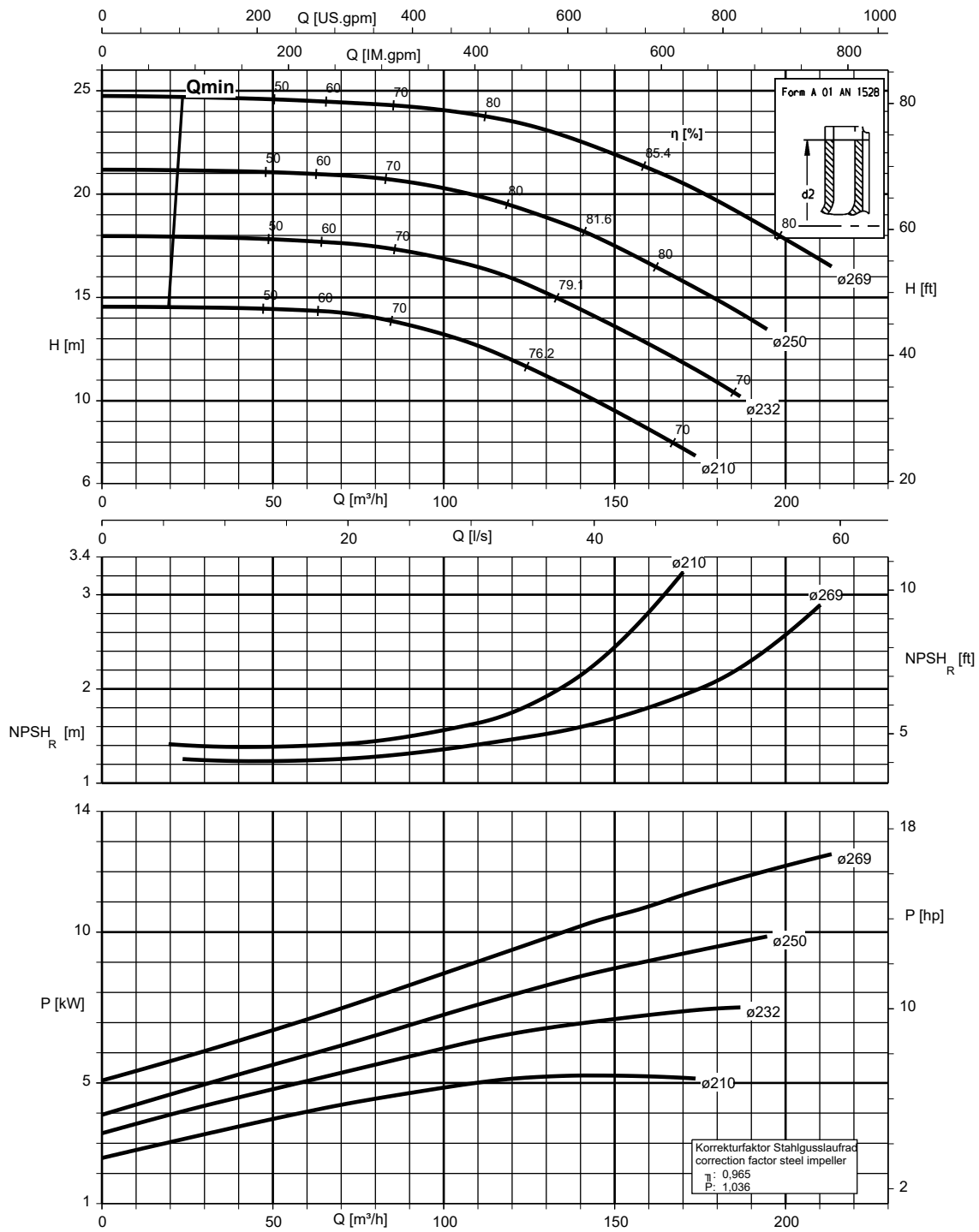
K1311.454/45/2

Vlety 125-100-200, n = 1450 rpm

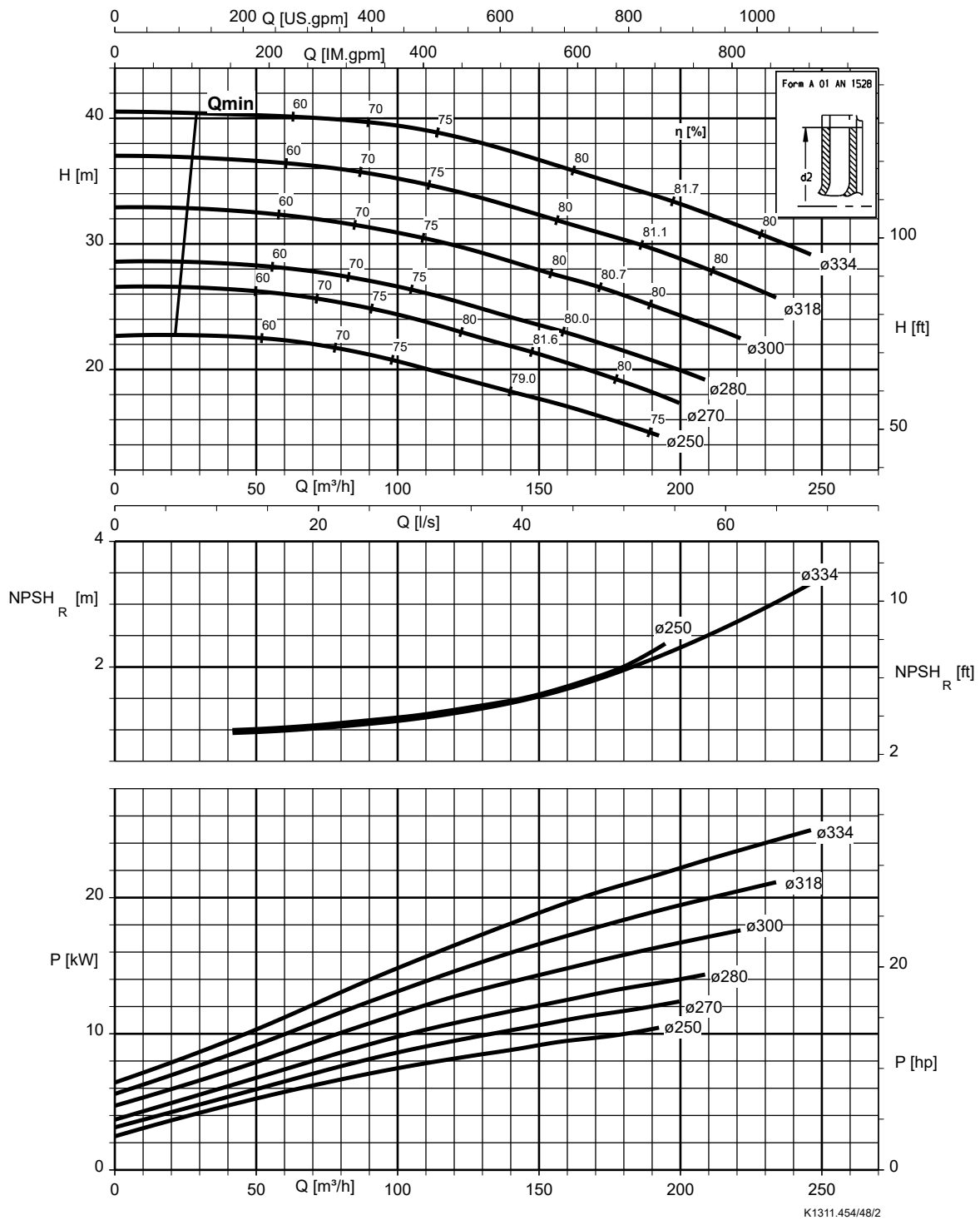


K1311.454/46/2

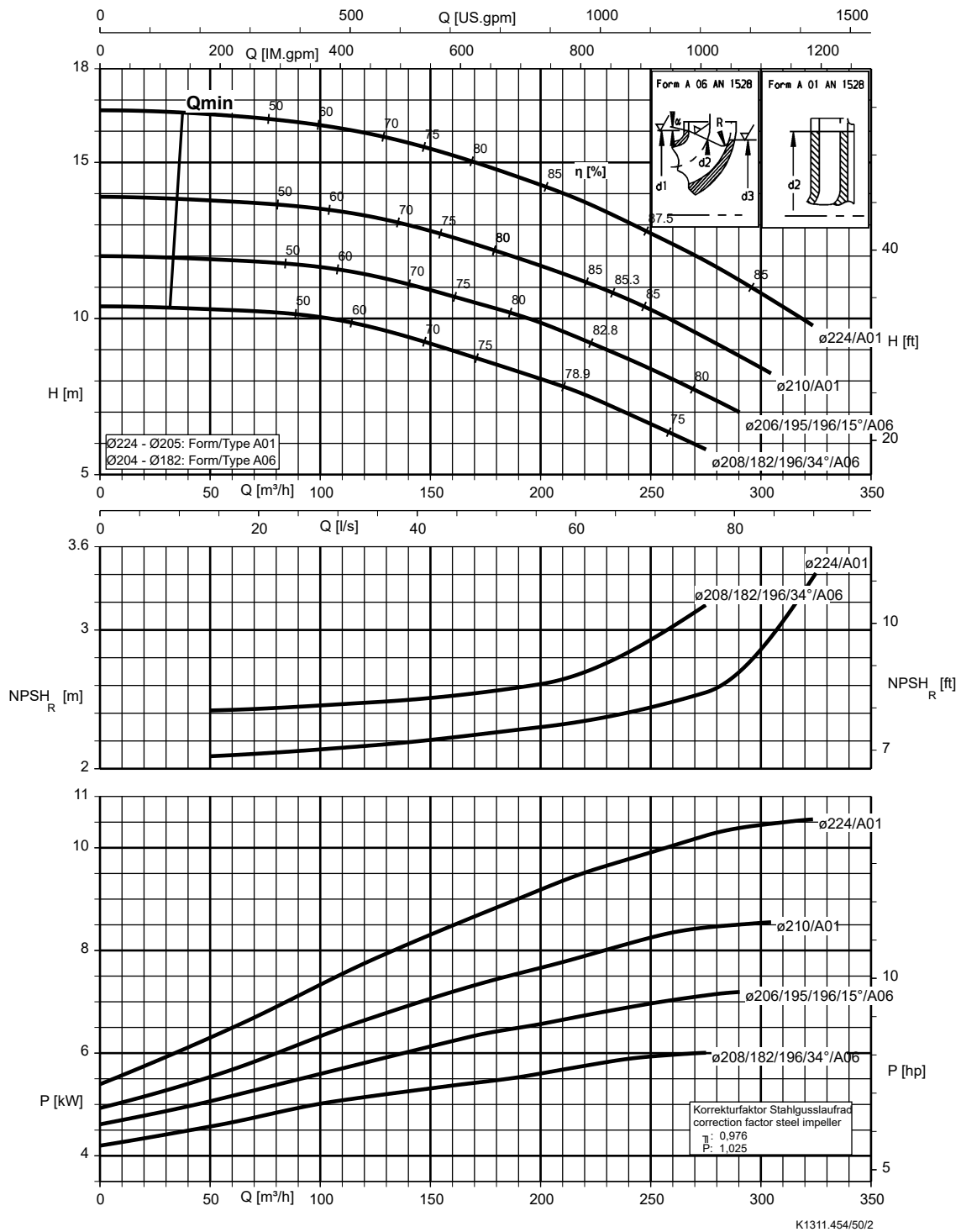
Vlety 125-100-250, n = 1450 rpm



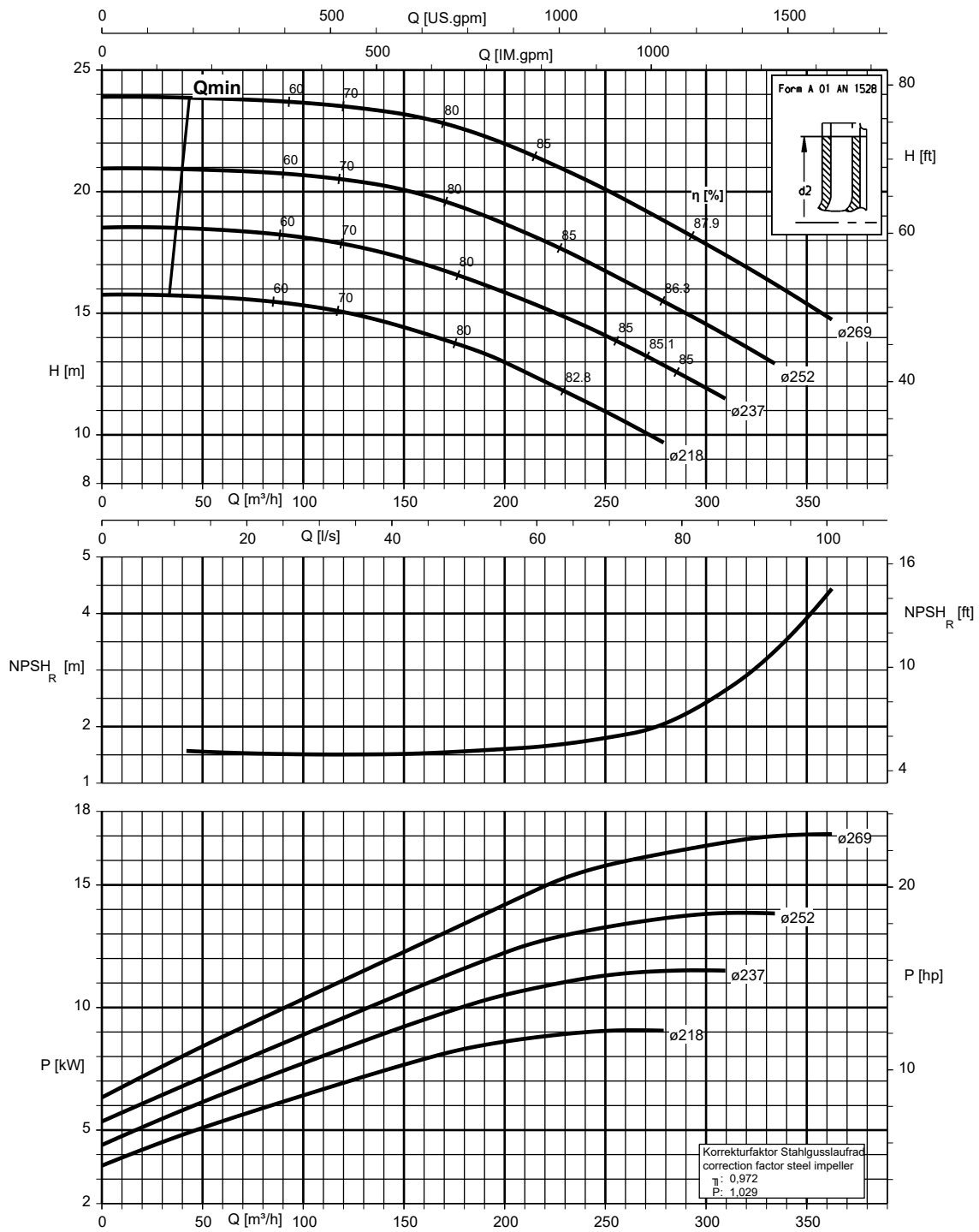
Vlety 125-100-315, n = 1450 rpm



Vlety 150-125-200, n = 1450 rpm



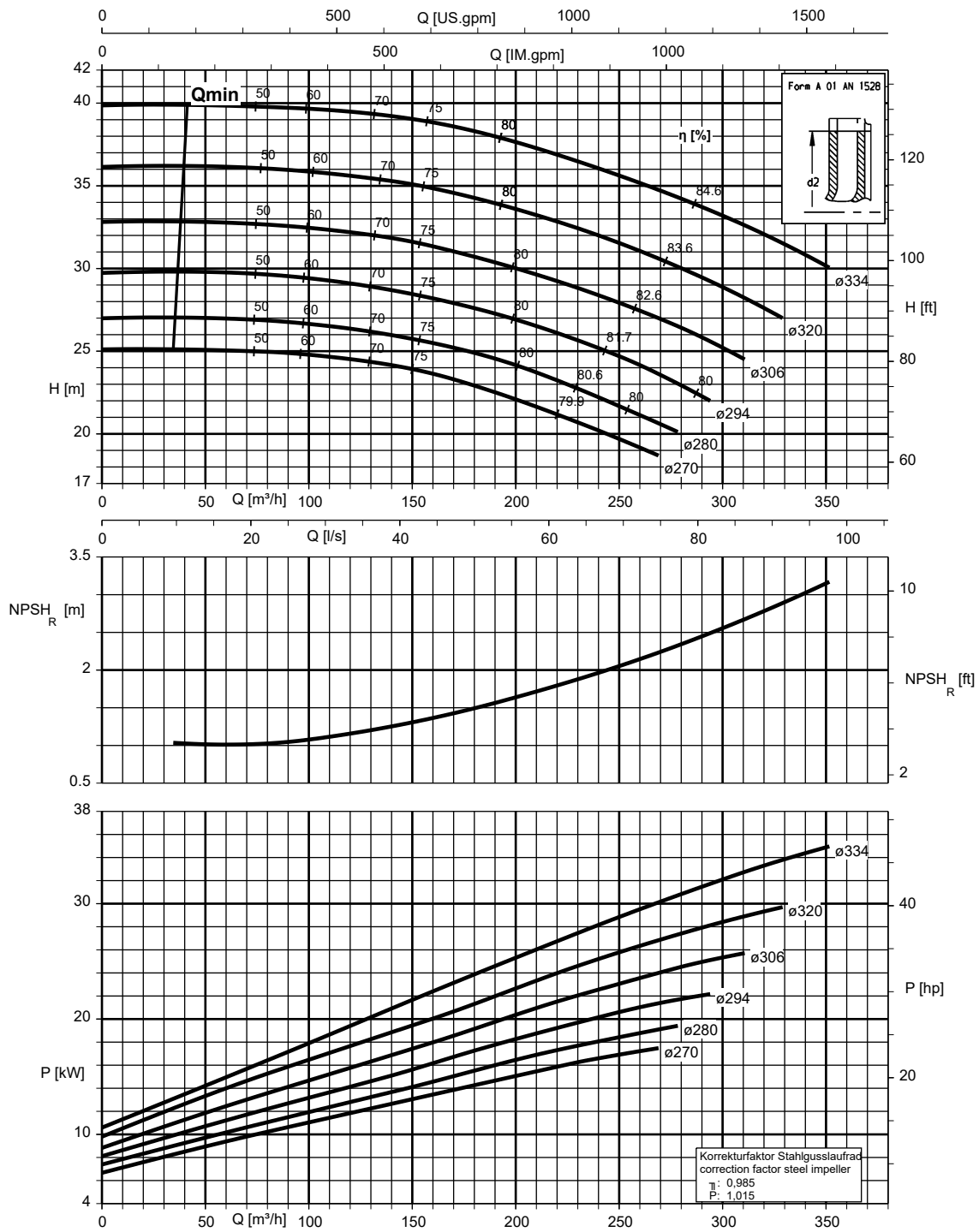
Vlety 150-125-250, n = 1450 rpm



K1311.454/51/2

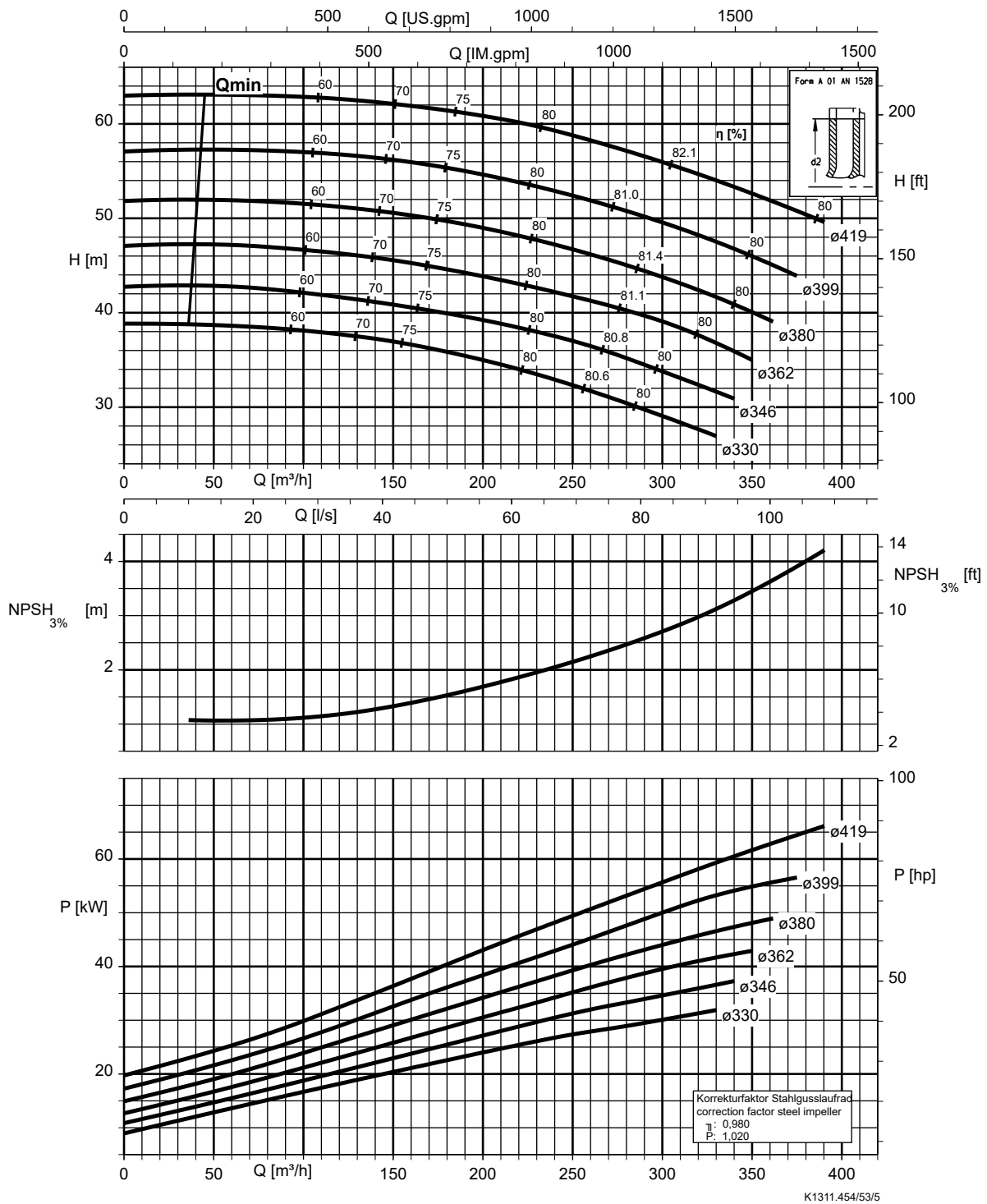


Vlety 150-125-315, n = 1450 rpm

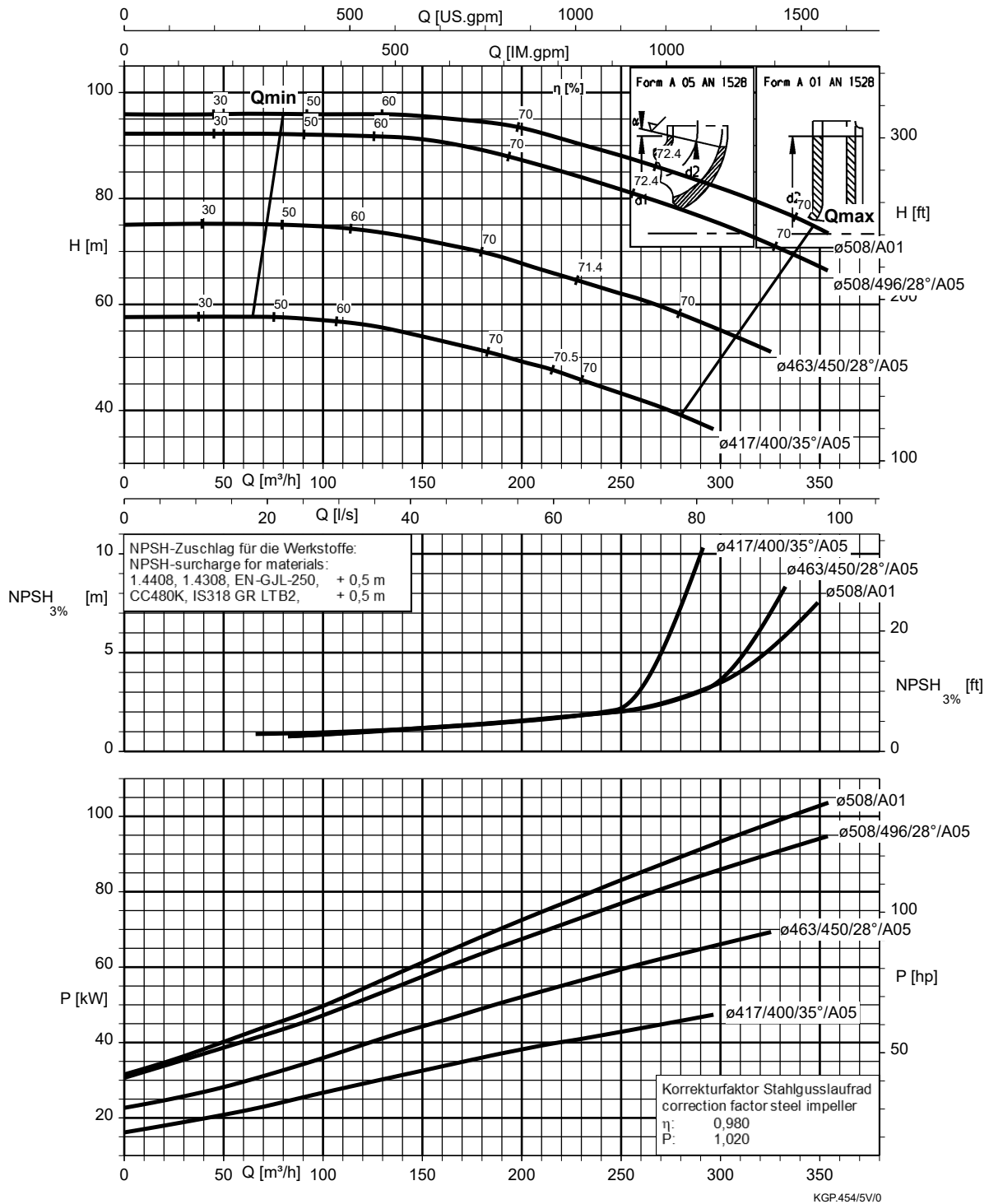


K1311.454/52/2

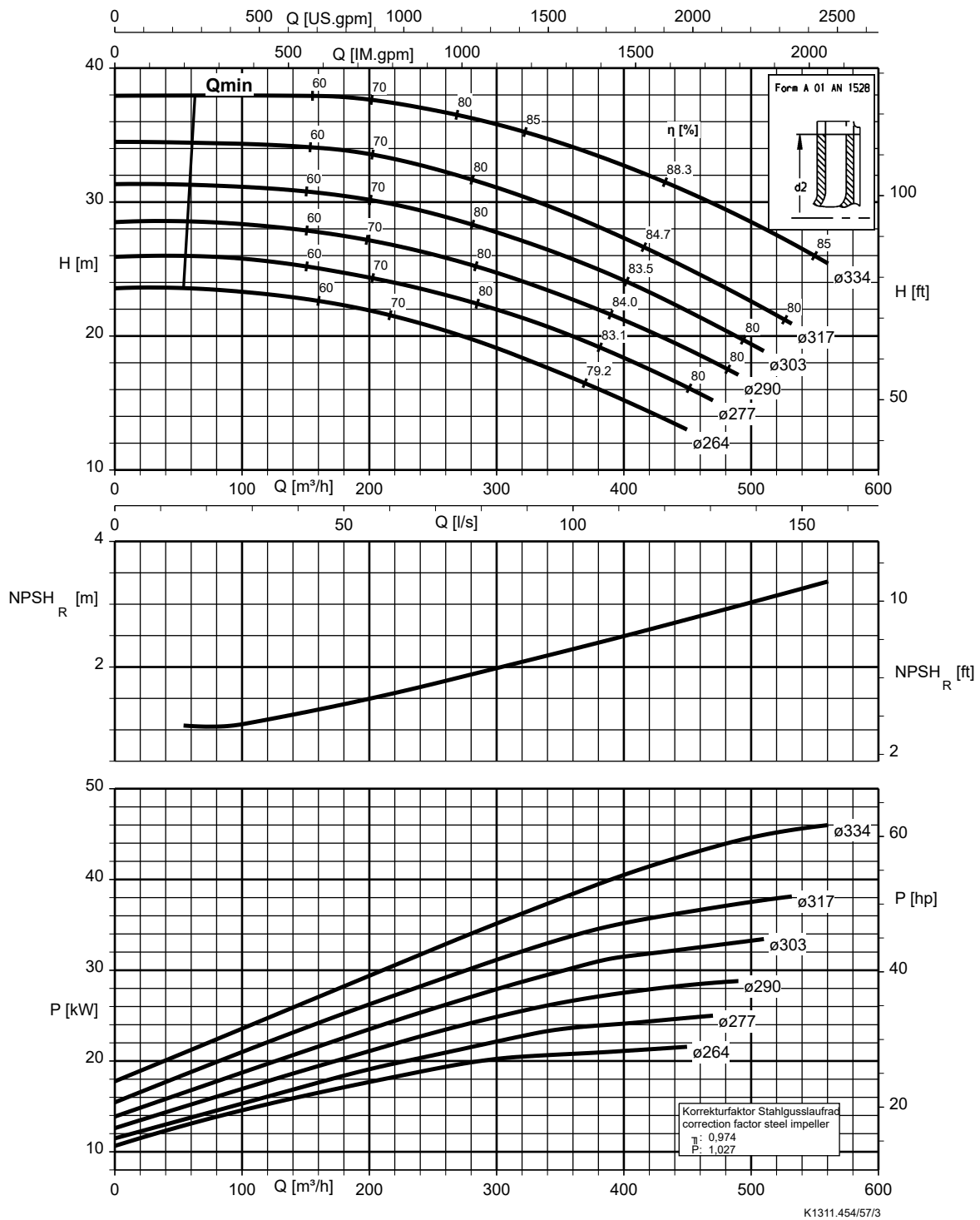
Vlety 150-125-400, n = 1450 rpm



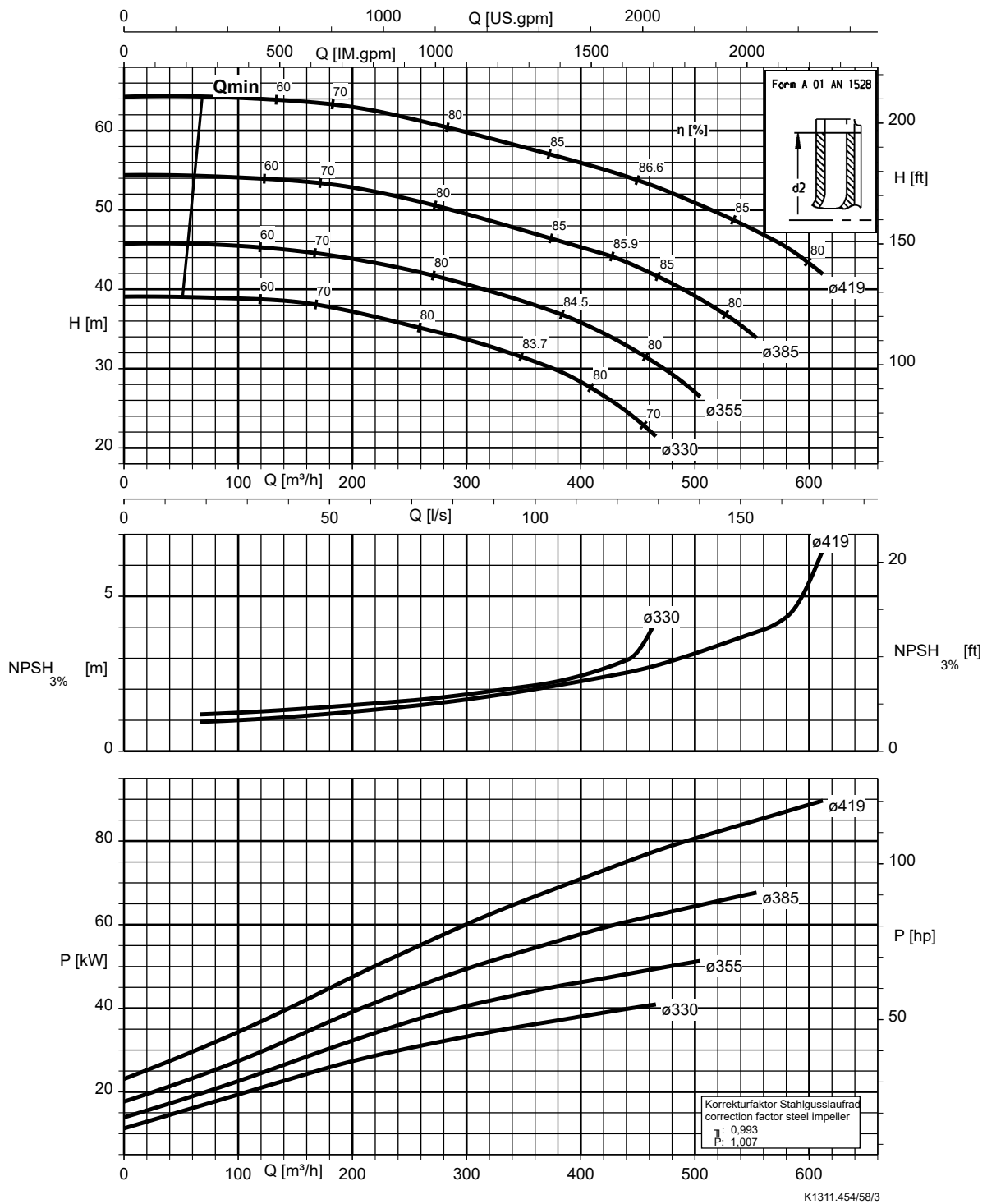
Vlety 150-125-510, n = 1450 rpm



Vlety 200-150-315, n = 1450 rpm

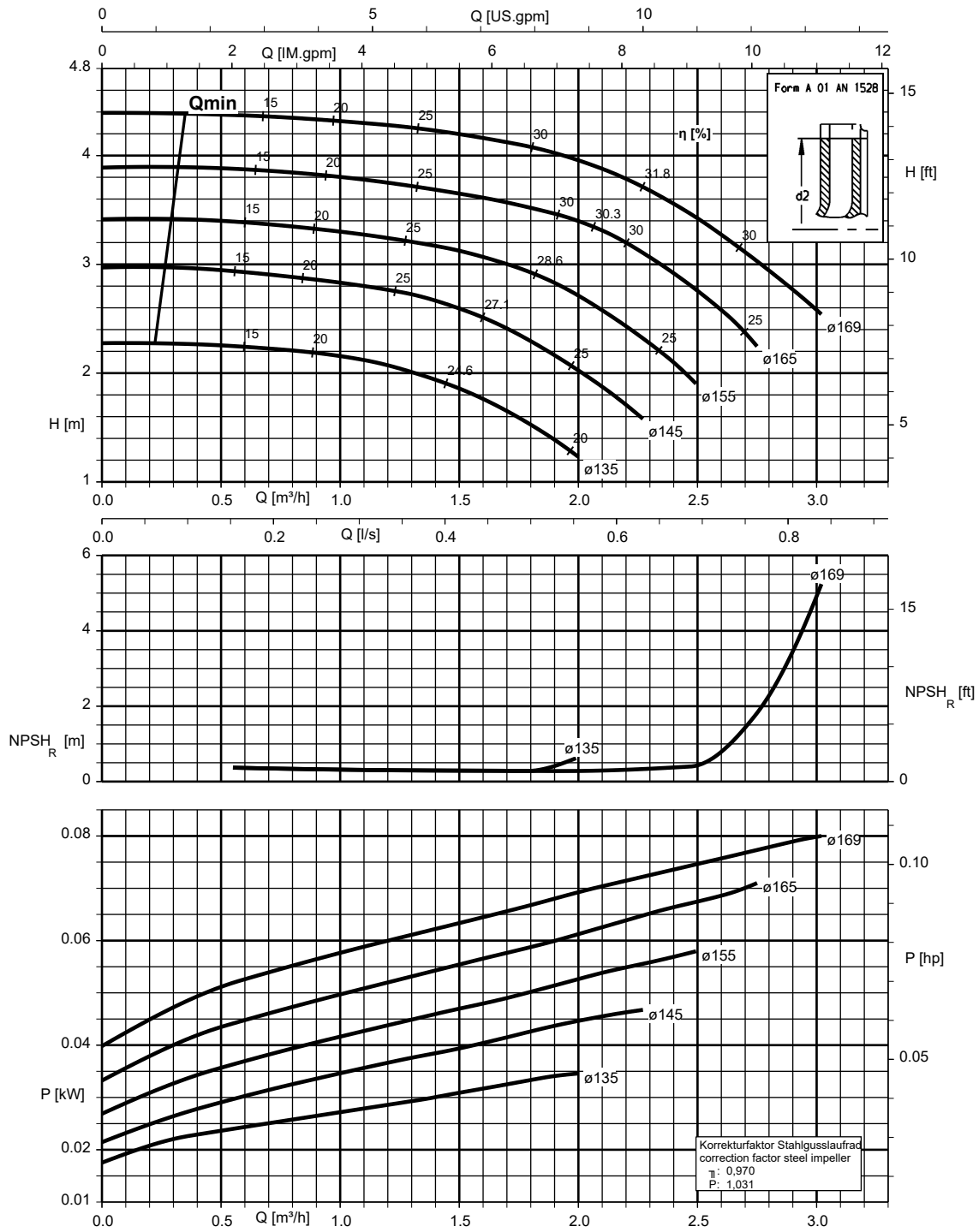


Vlety 200-150-400, n = 1450 rpm

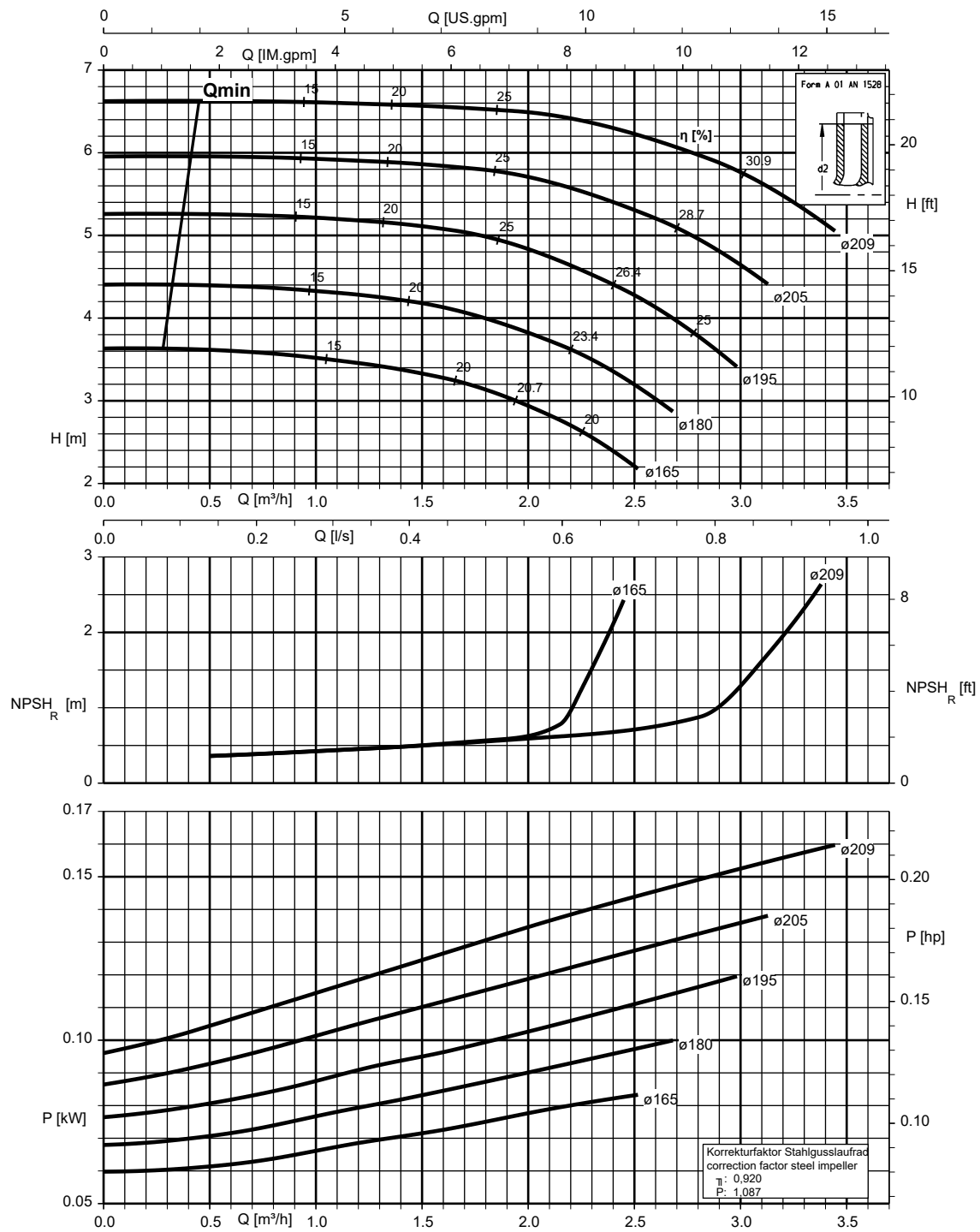


$n = 960 \text{ rpm}$

Vlety 040-025-160,  $n = 960 \text{ rpm}$

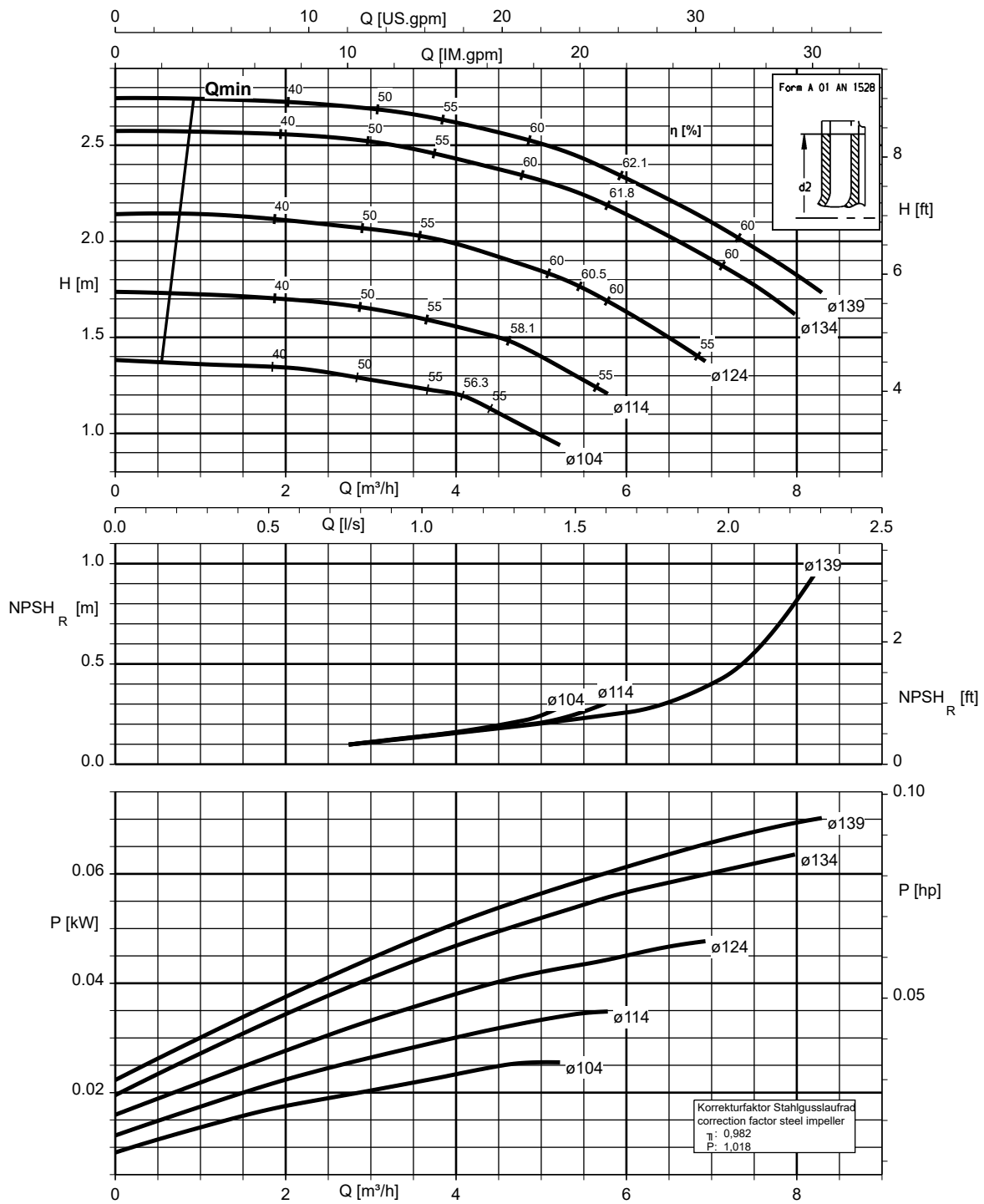


Vlety 040-025-200, n = 960 rpm



Vlety 050-032-125.1, n = 960 rpm

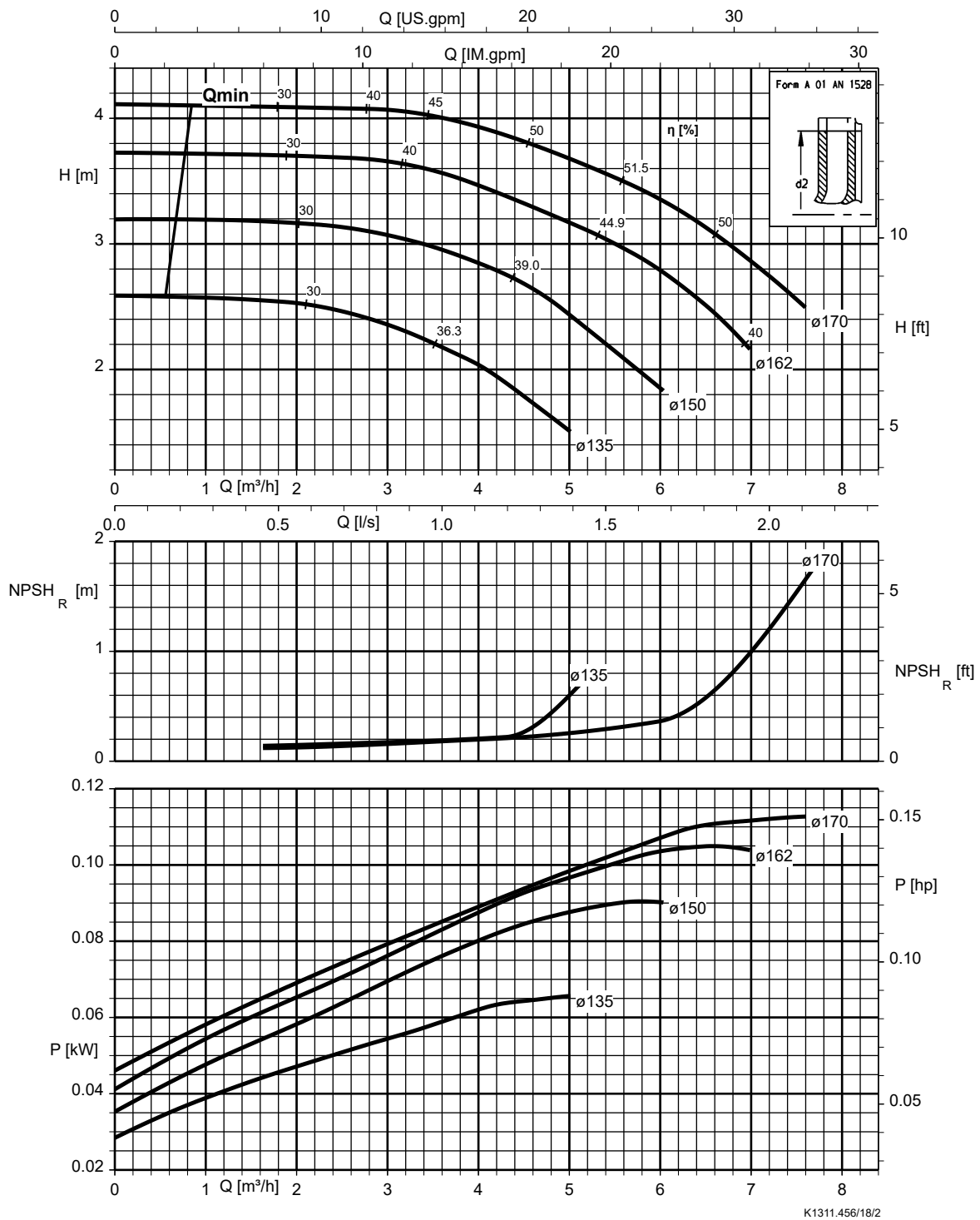
Thermal Oil and Hot Water Pump



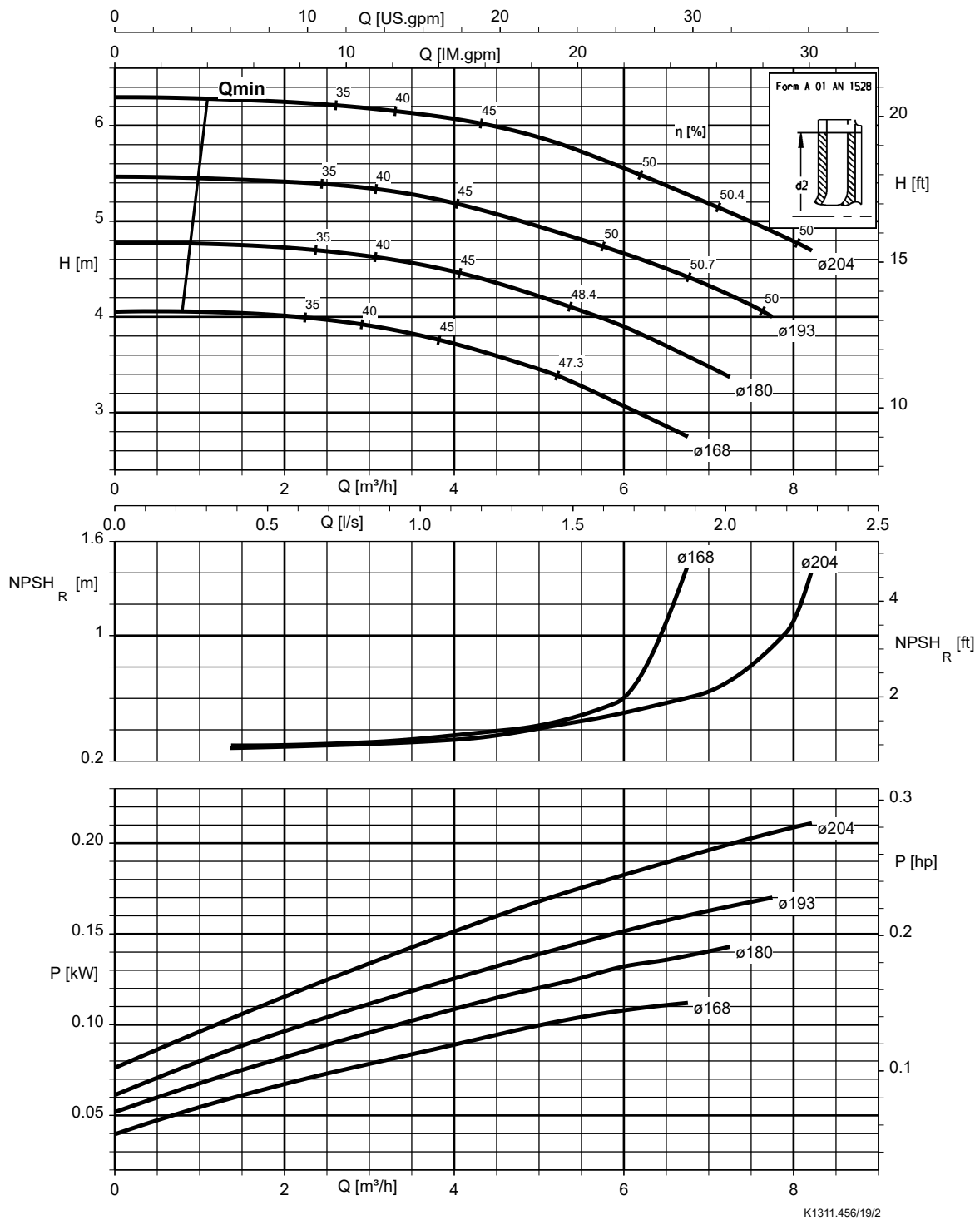
K1311.456/17/2



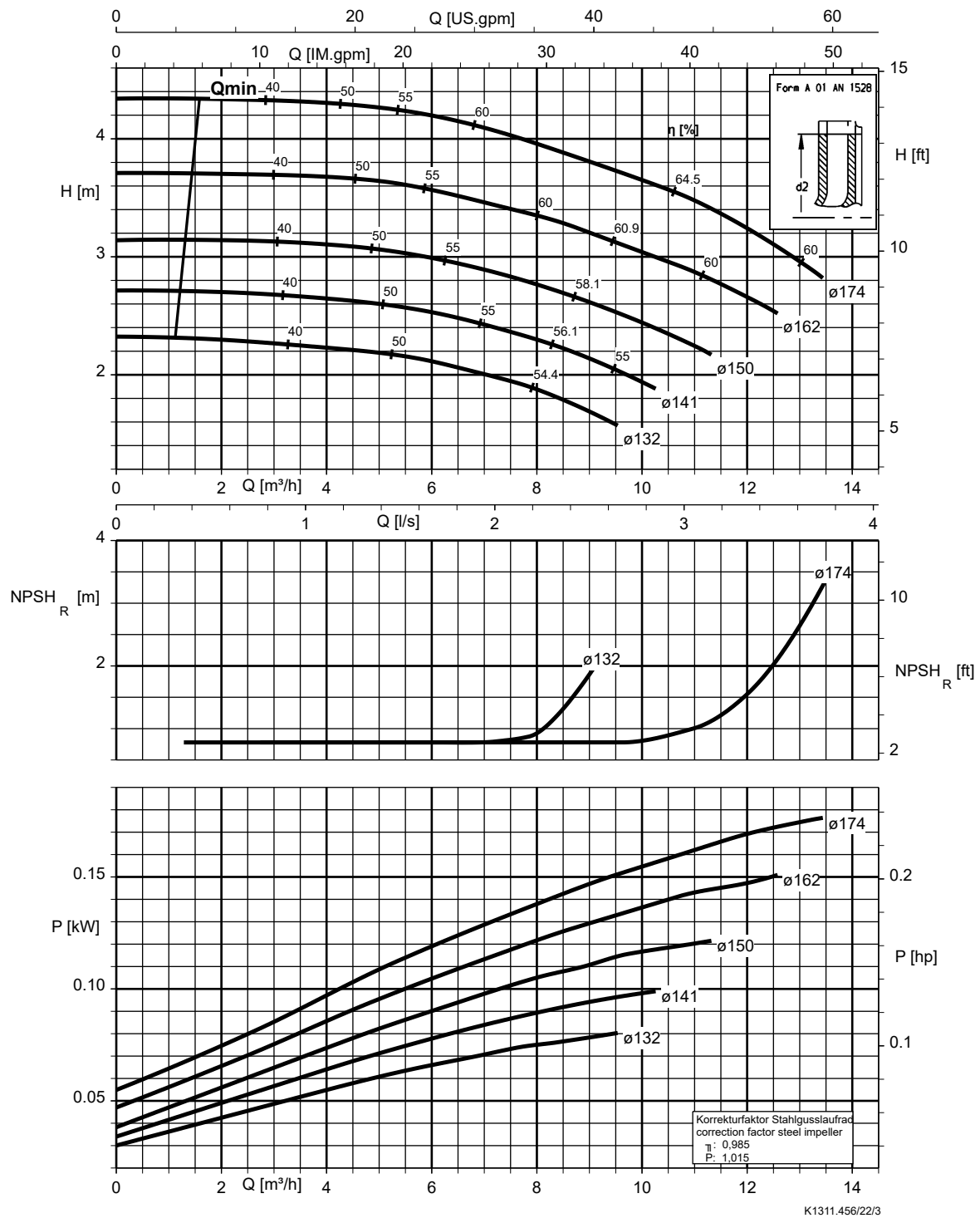
Vlety 050-032-160.1, n = 960 rpm



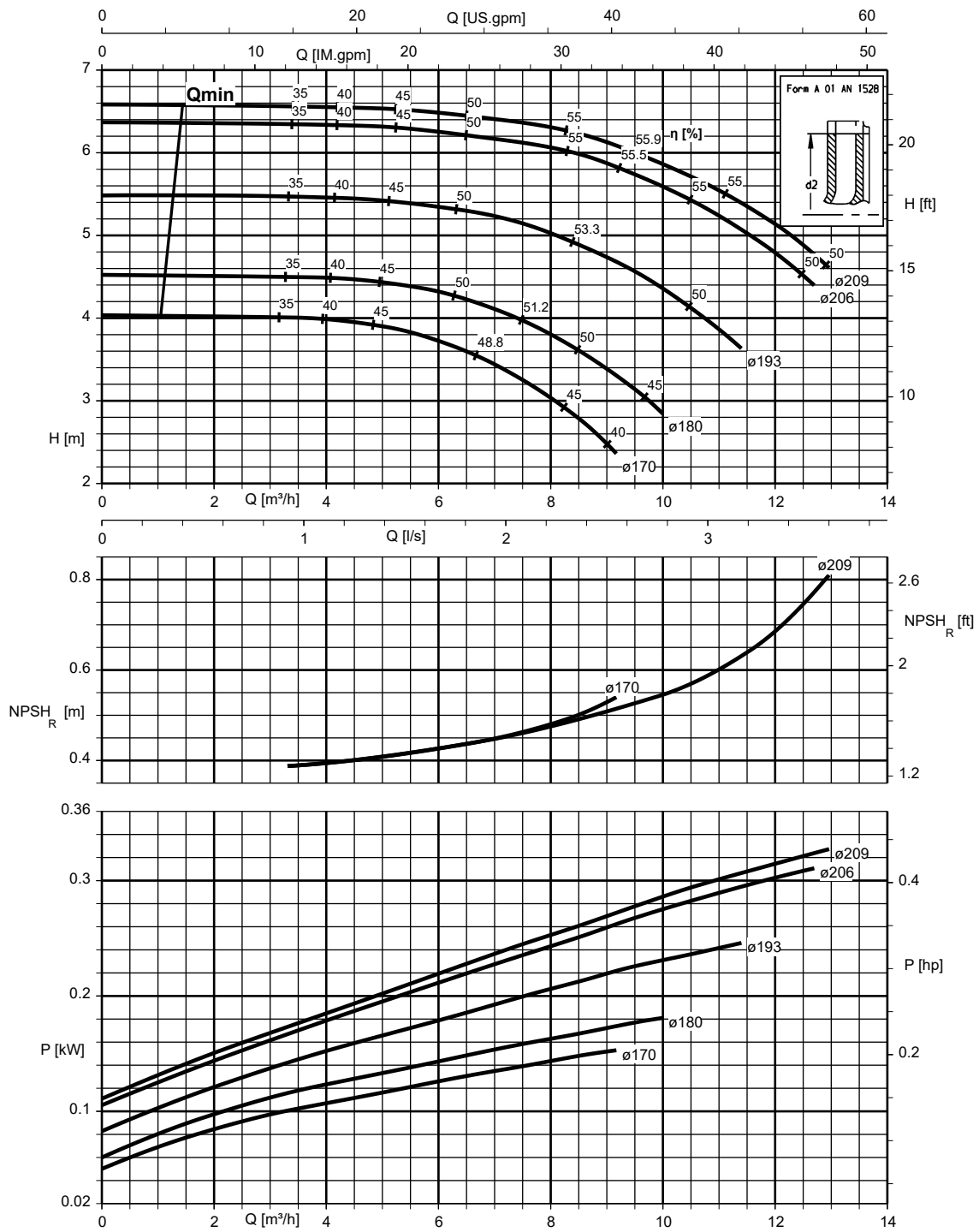
Vlety 050-032-200.1, n = 960 rpm



Vlety 050-032-160, n = 960 rpm

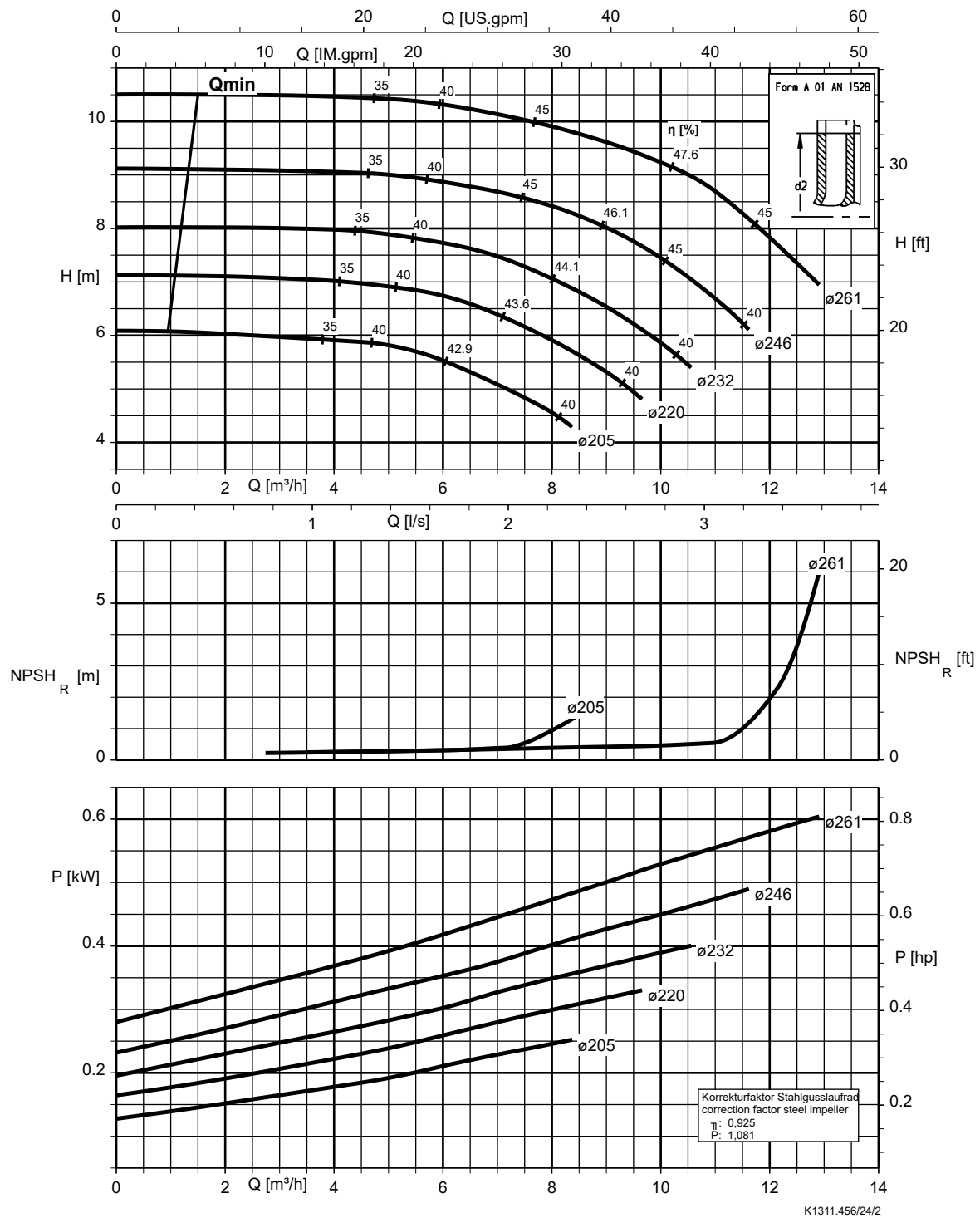


Vlety 050-032-200, n = 960 rpm

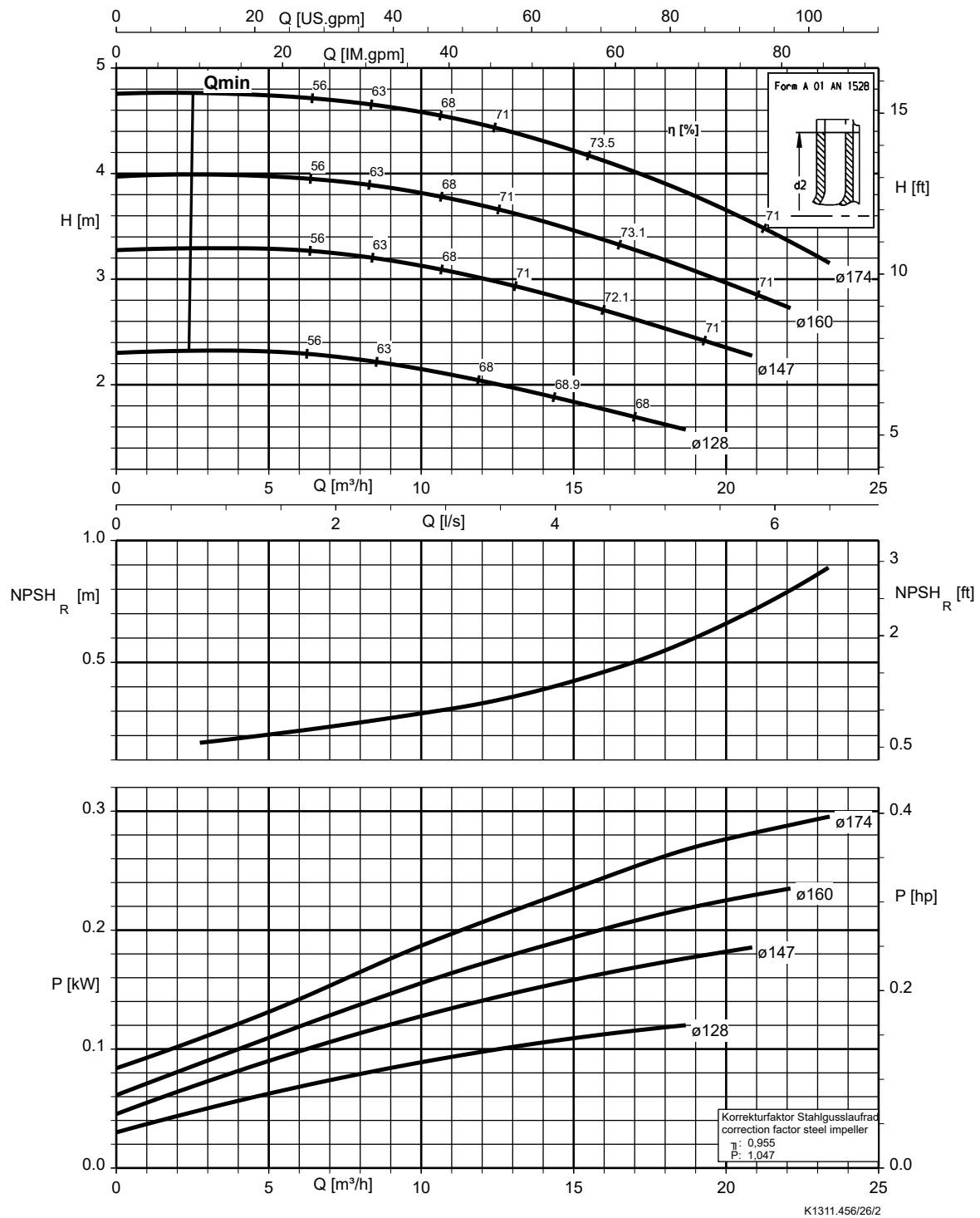


K1311.456/23/1

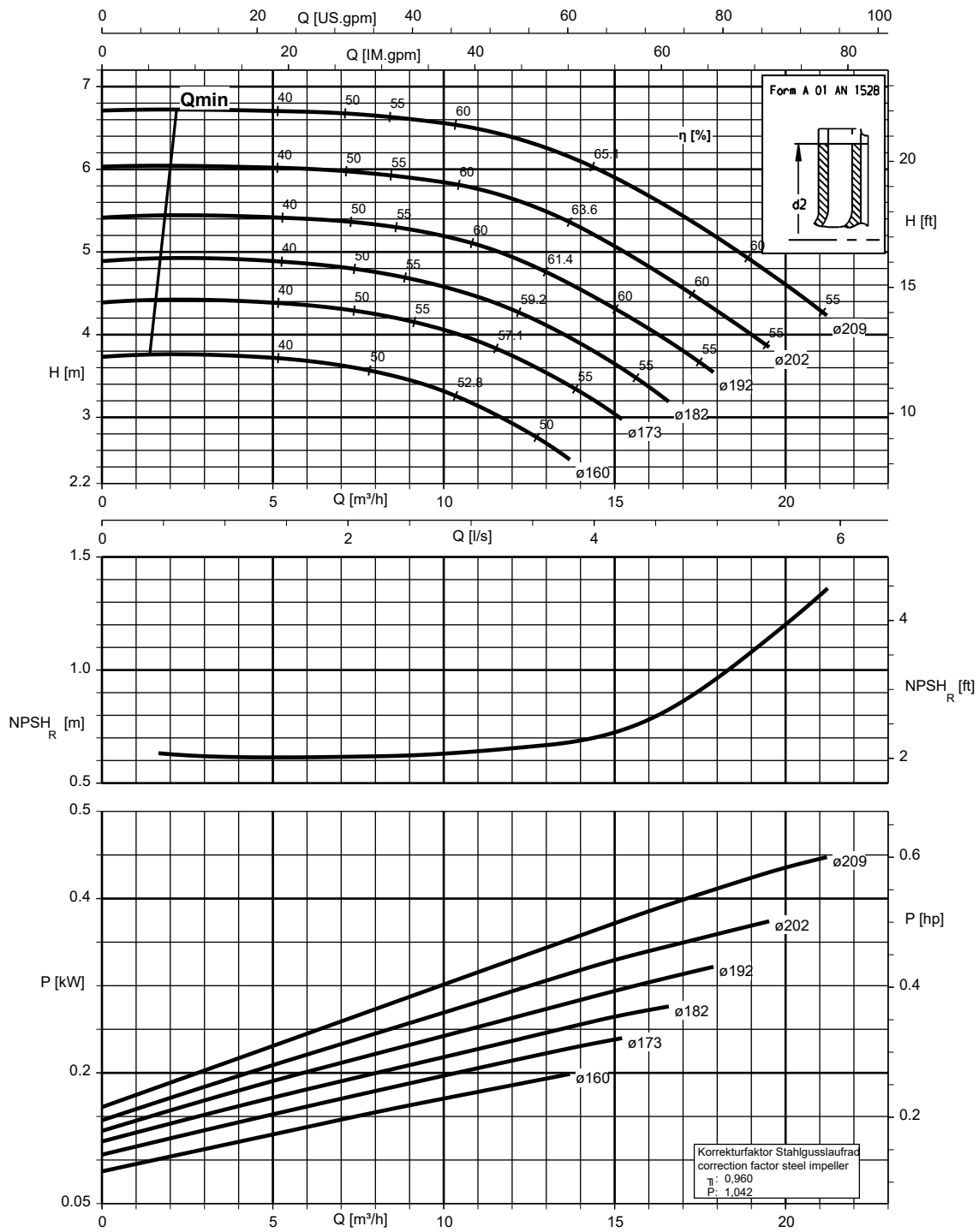
Vlety 050-032-250, n = 960 rpm



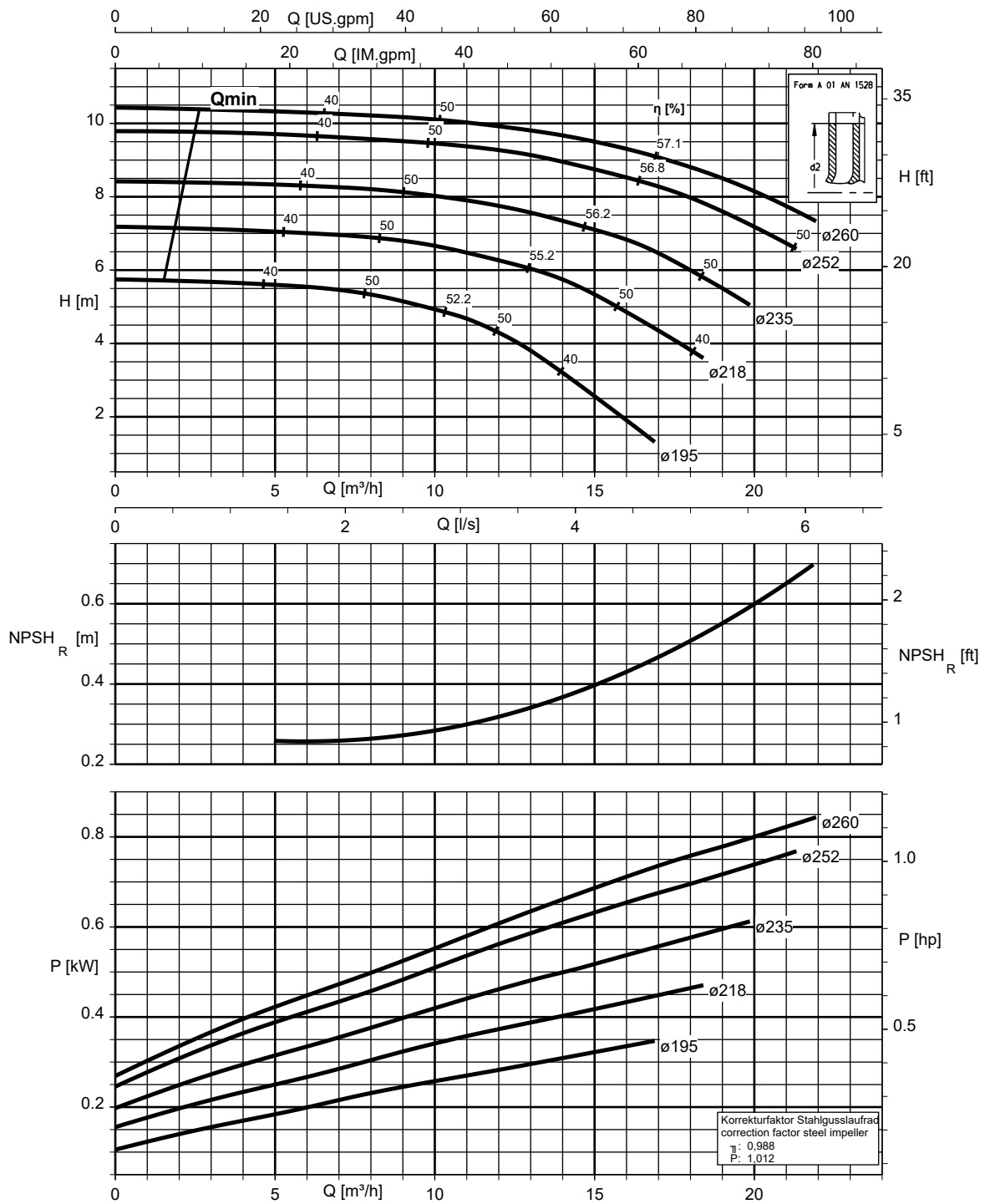
Vlety 065-040-160, n = 960 rpm



Vlety 065-040-200, n = 960 rpm

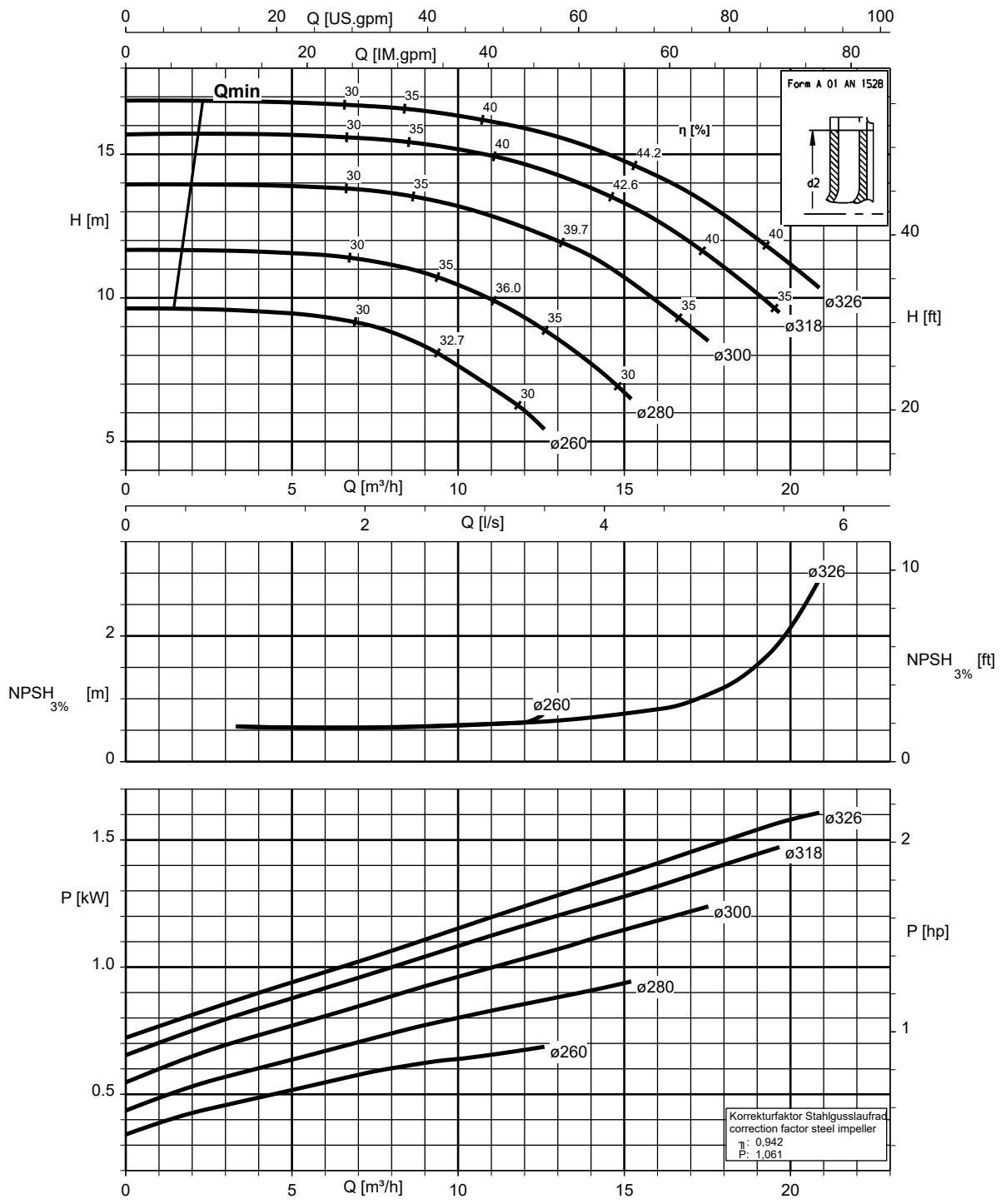


Vlety 065-040-250, n = 960 rpm

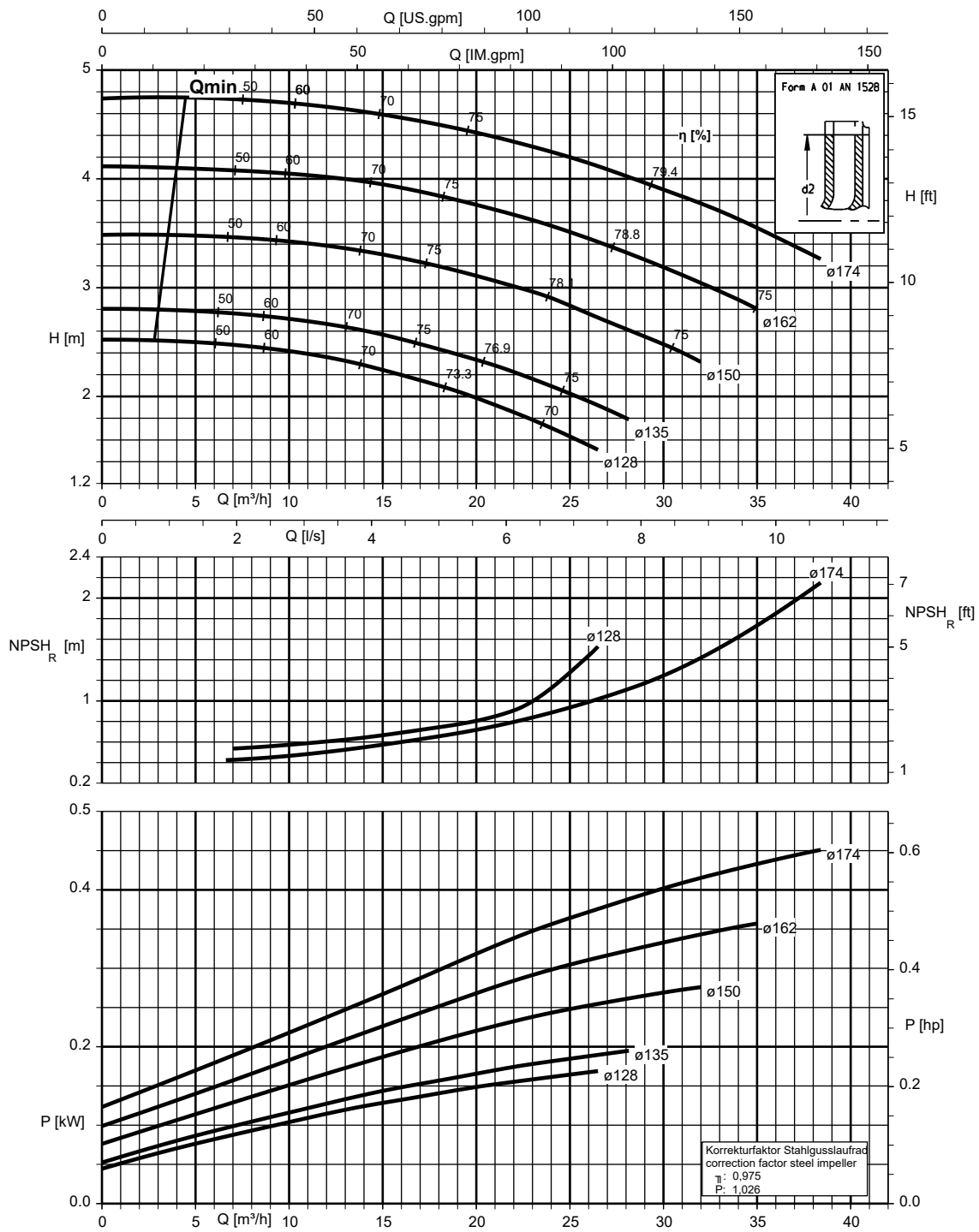




Vlety 065-040-315, n = 960 rpm

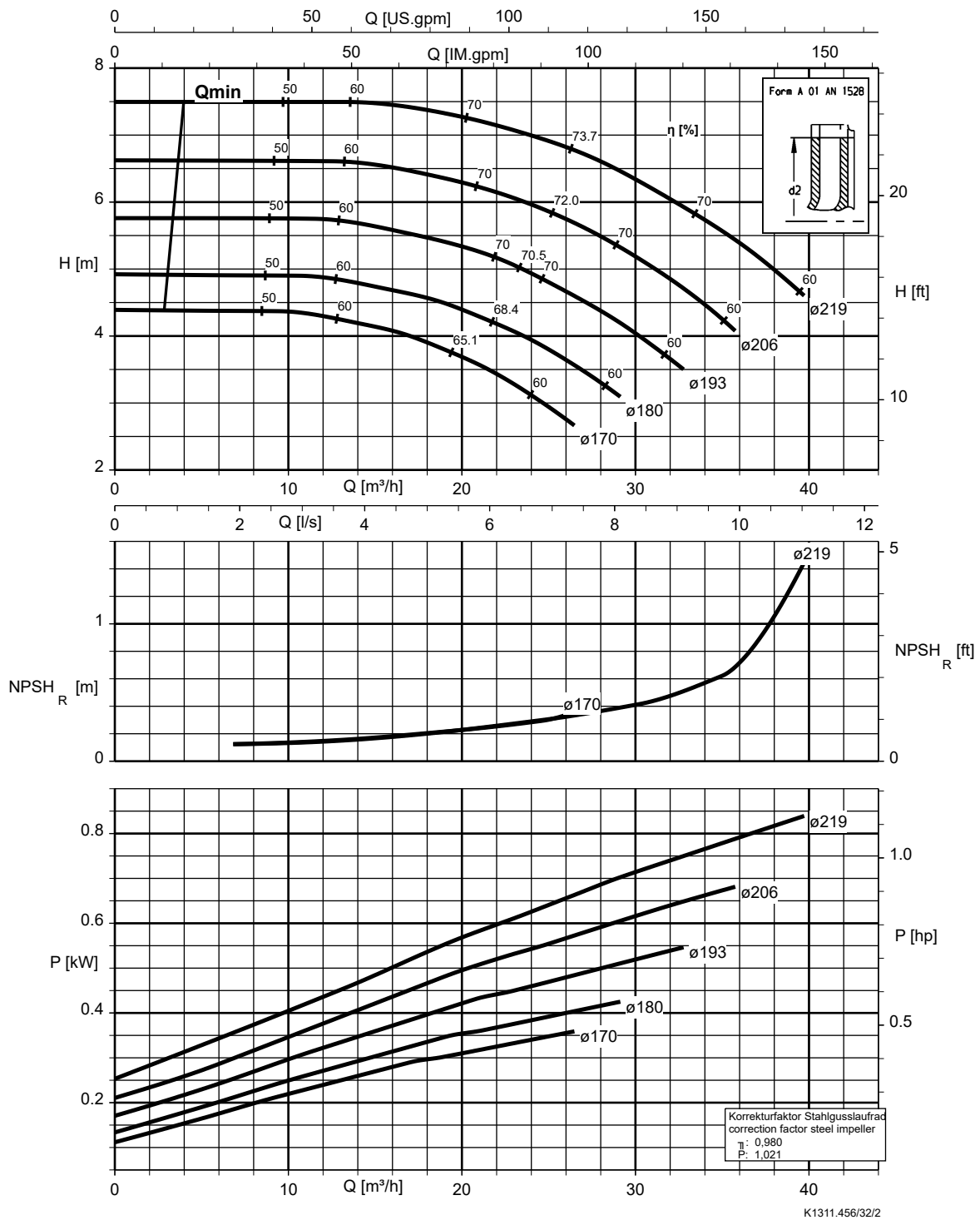


Vlety 065-050-160, n = 960 rpm

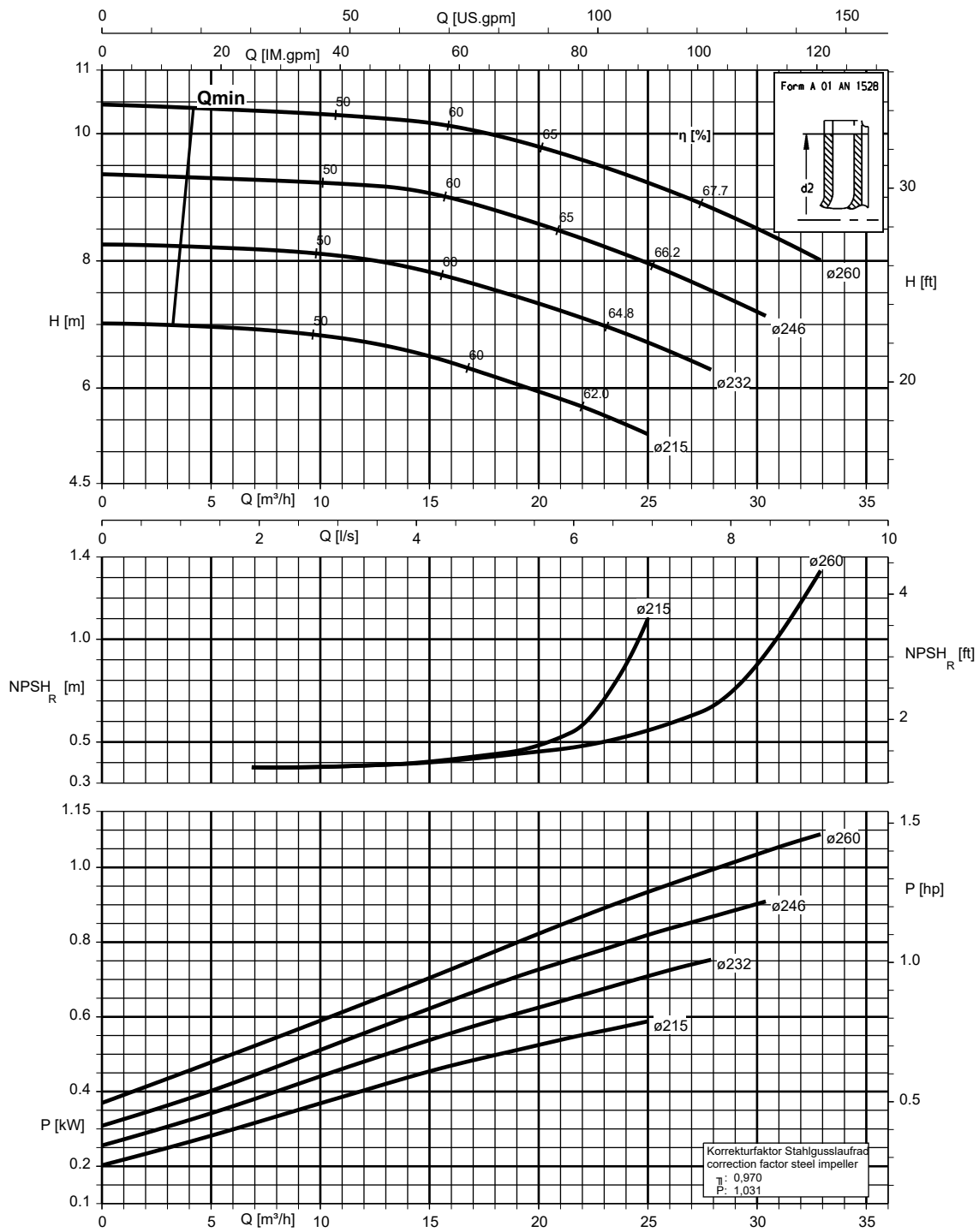


K1311.456/31/1

Vlety 065-050-200, n = 960 rpm

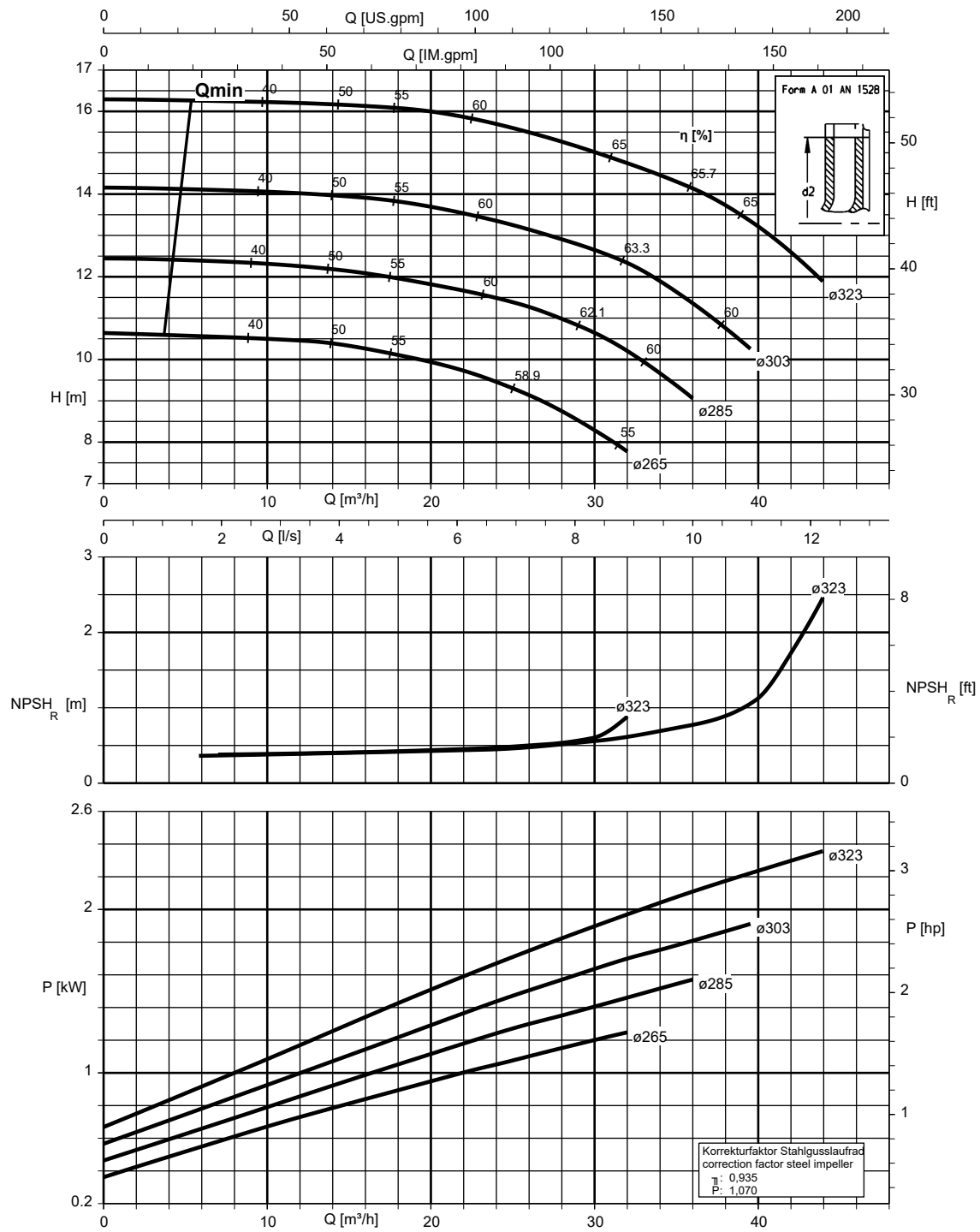


Vlety 065-050-250, n = 960 rpm



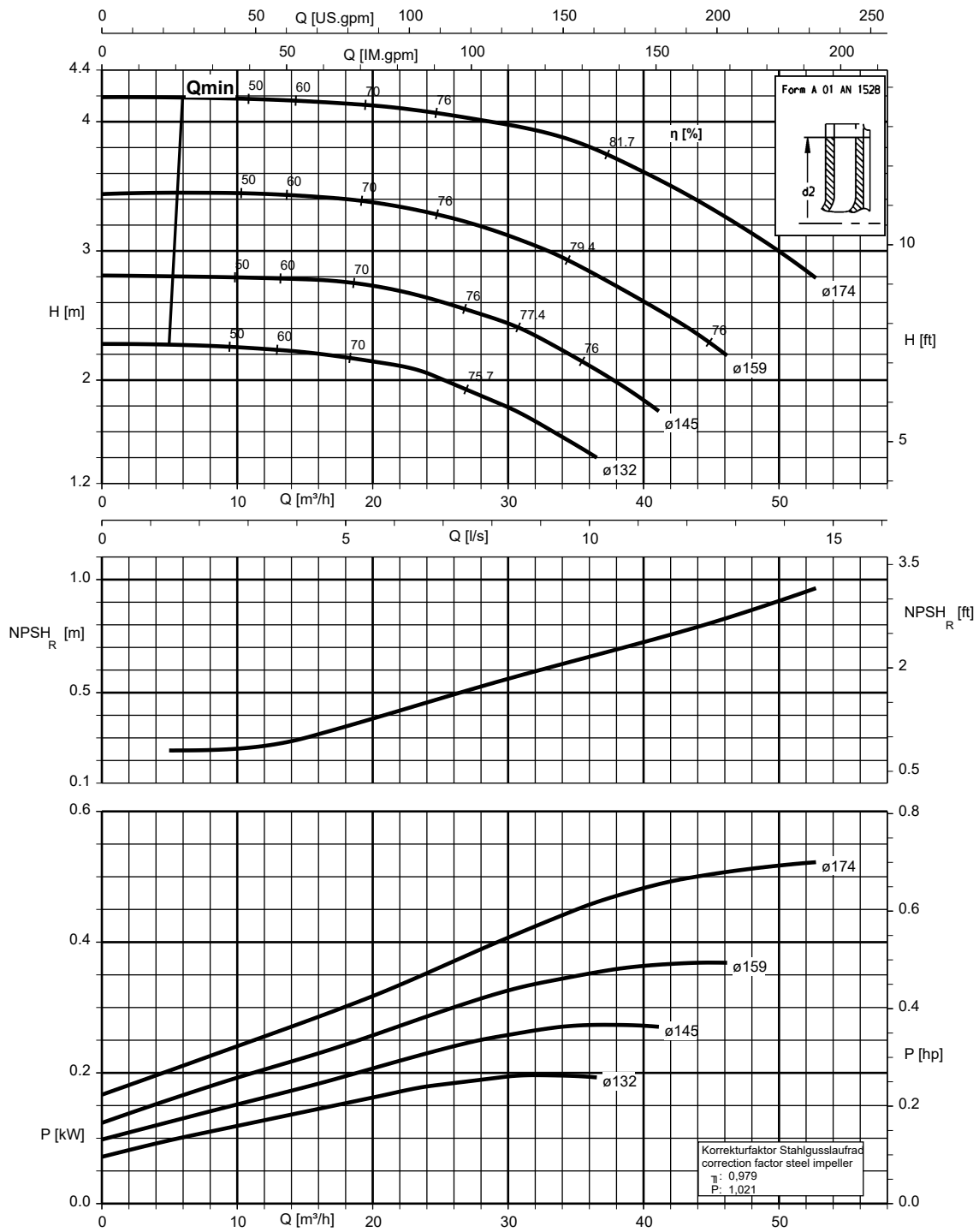
K1311.456/33/1

Vlety 065-050-315, n = 960 rpm



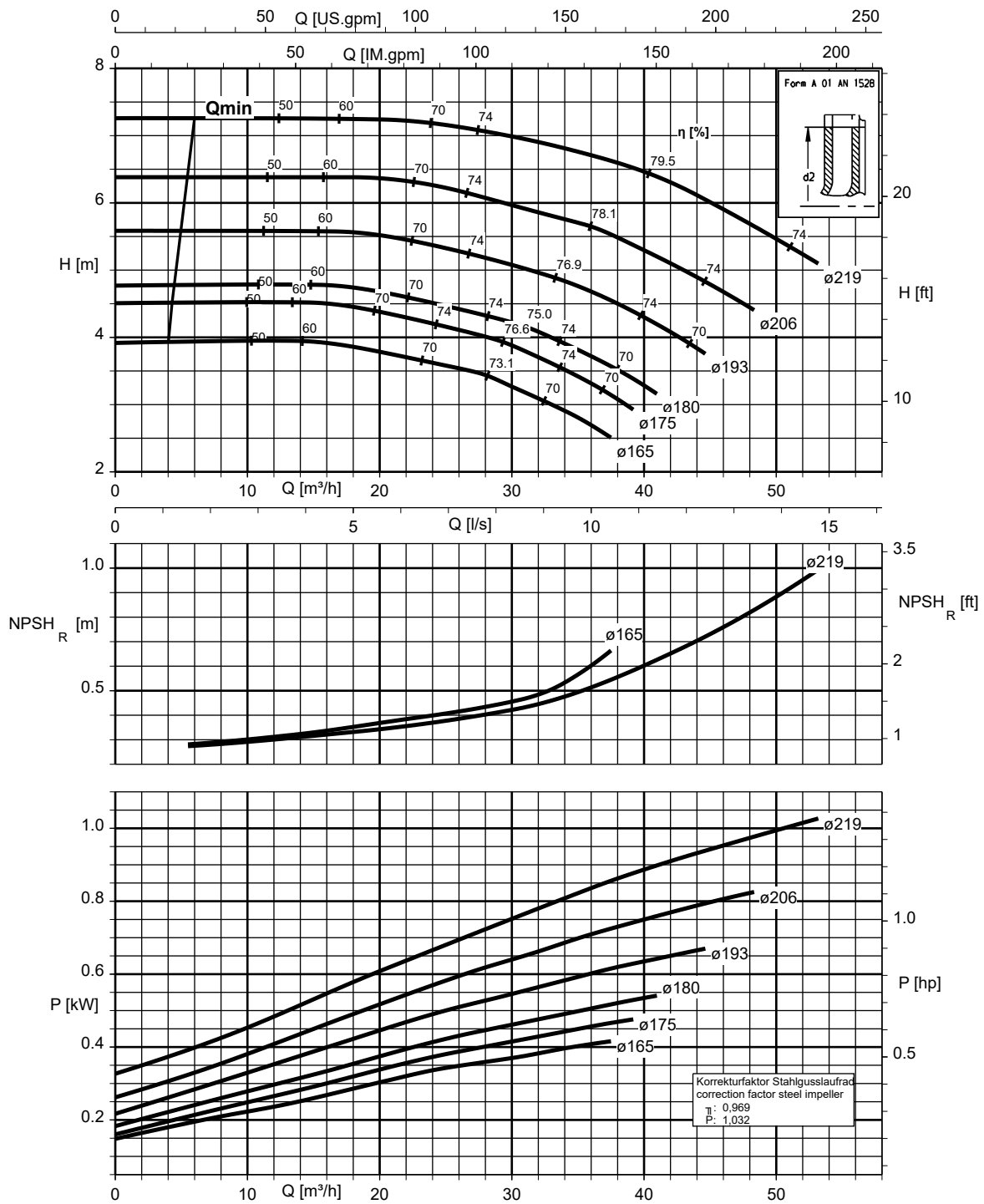
K1311.456/34/2

Vlety 080-065-160, n = 960 rpm



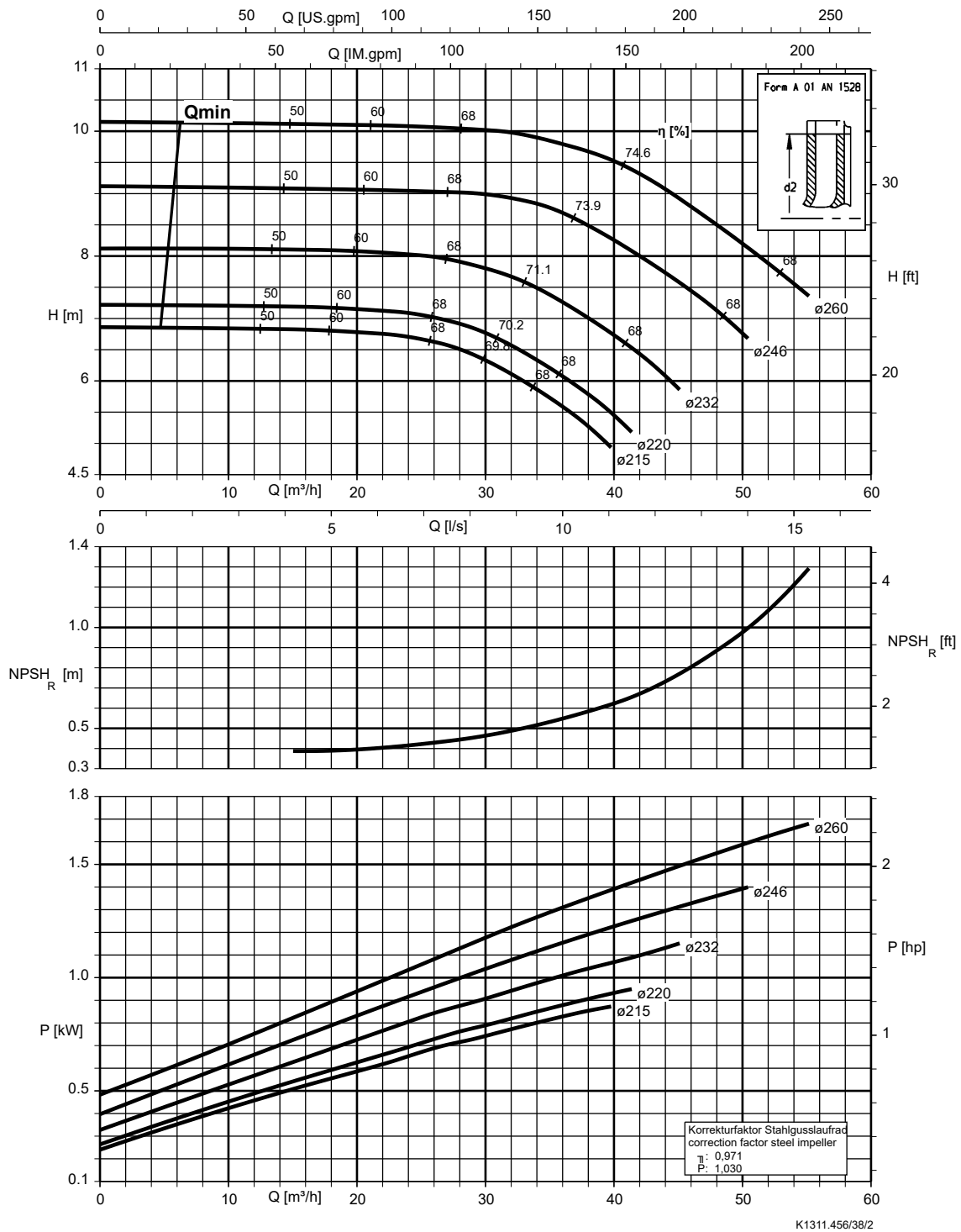
K1311.456/36/2

Vlety 080-065-200, n = 960 rpm



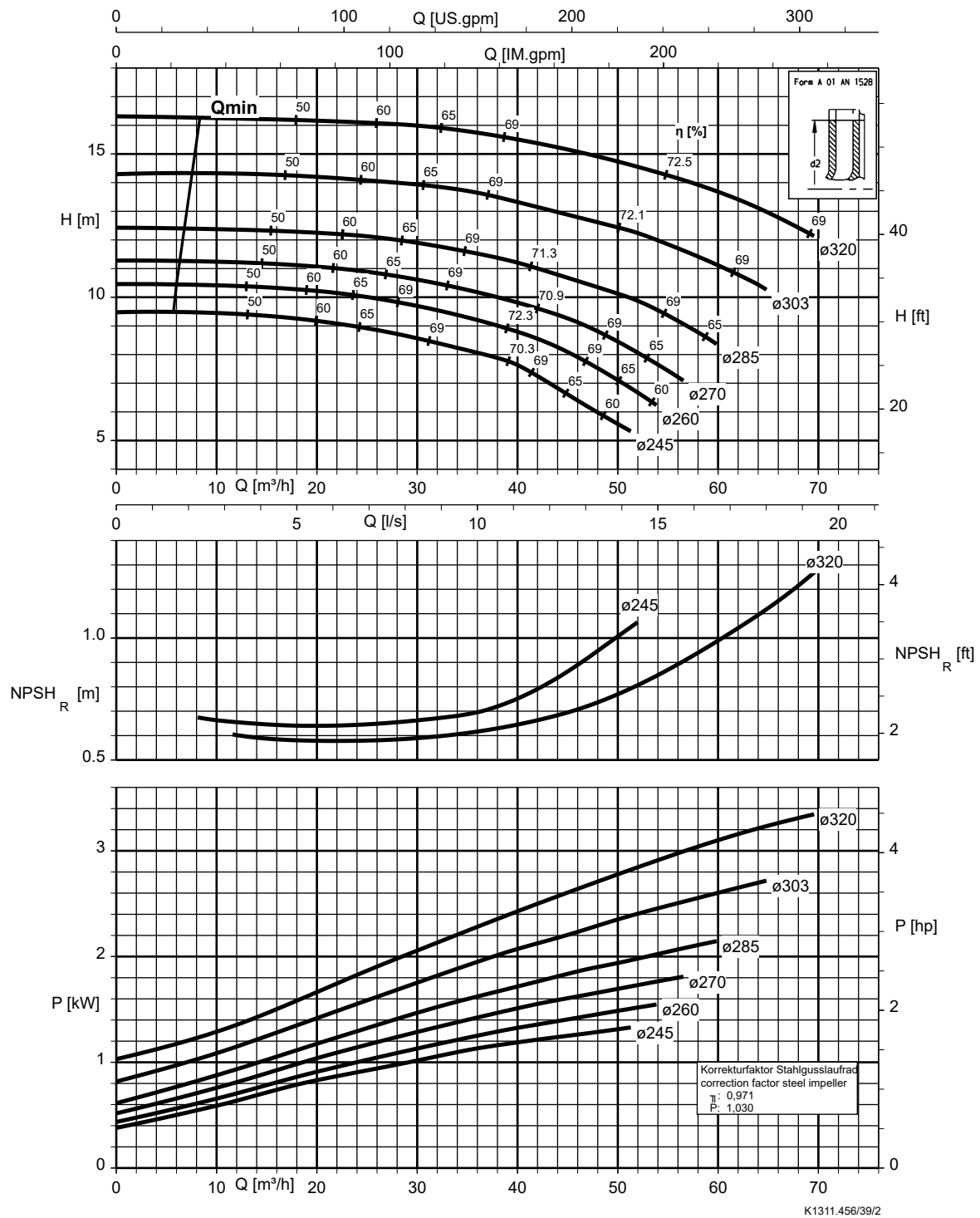
K1311.456/37/2

Vlety 080-065-250, n = 960 rpm

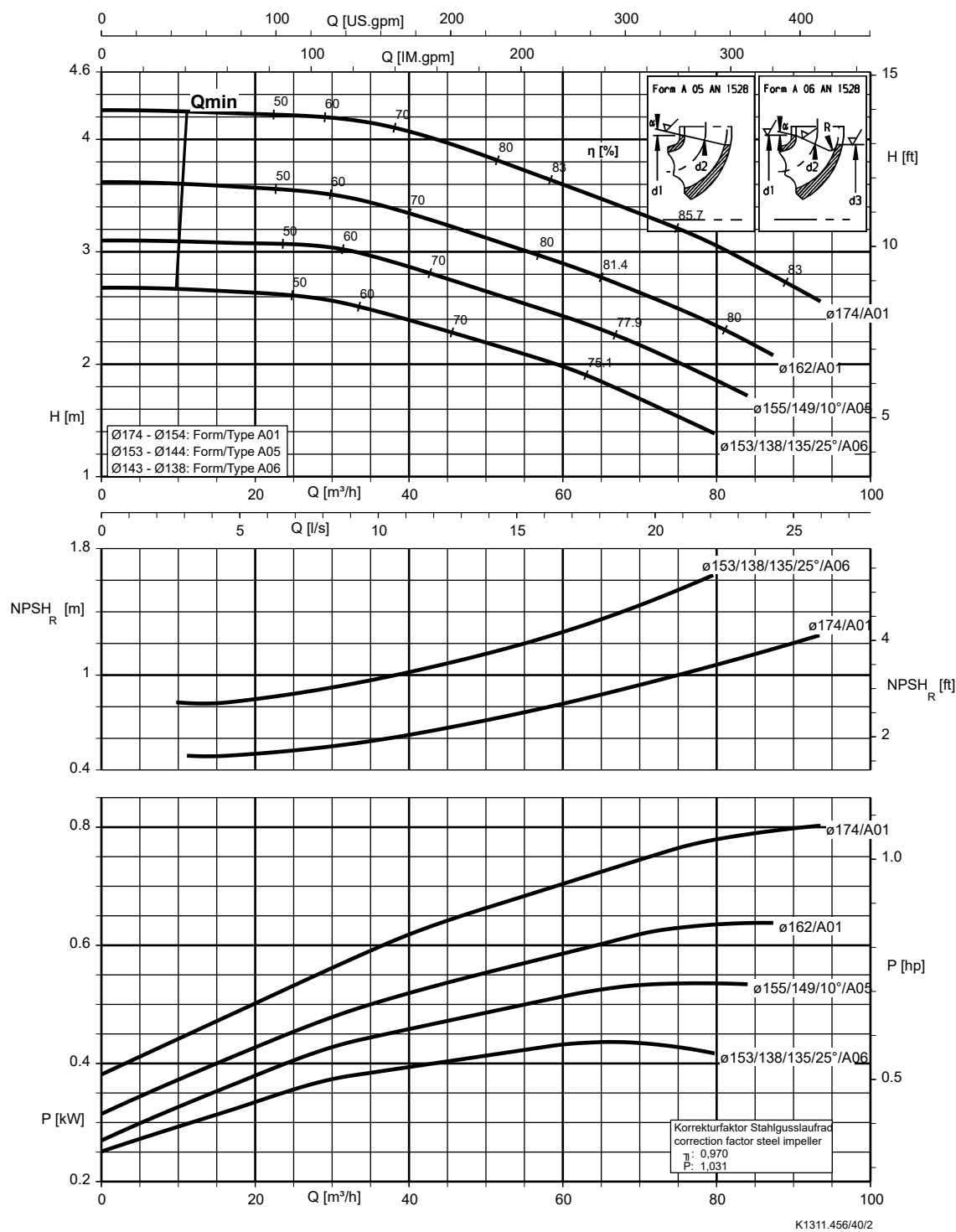




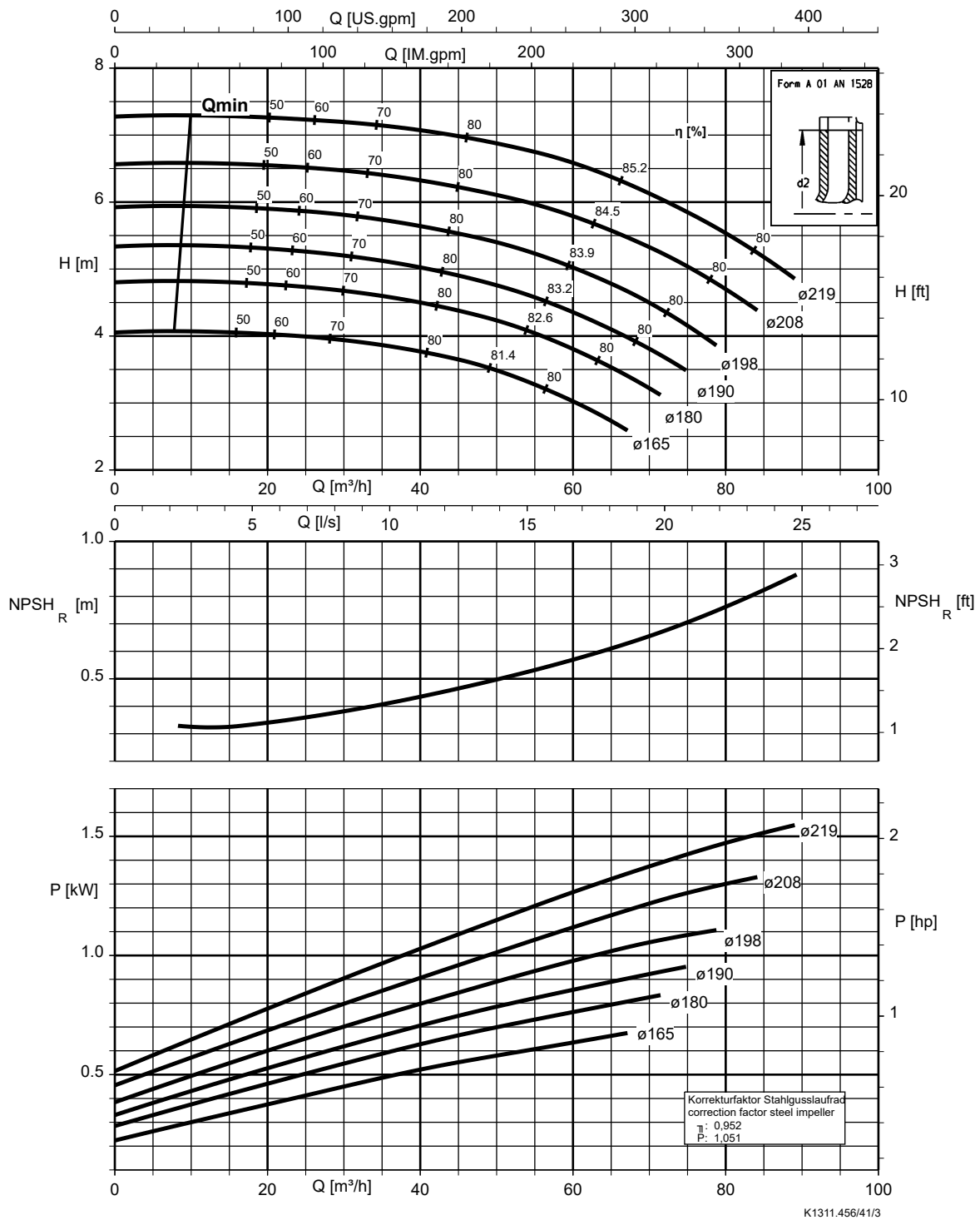
Vlety 080-065-315, n = 960 rpm



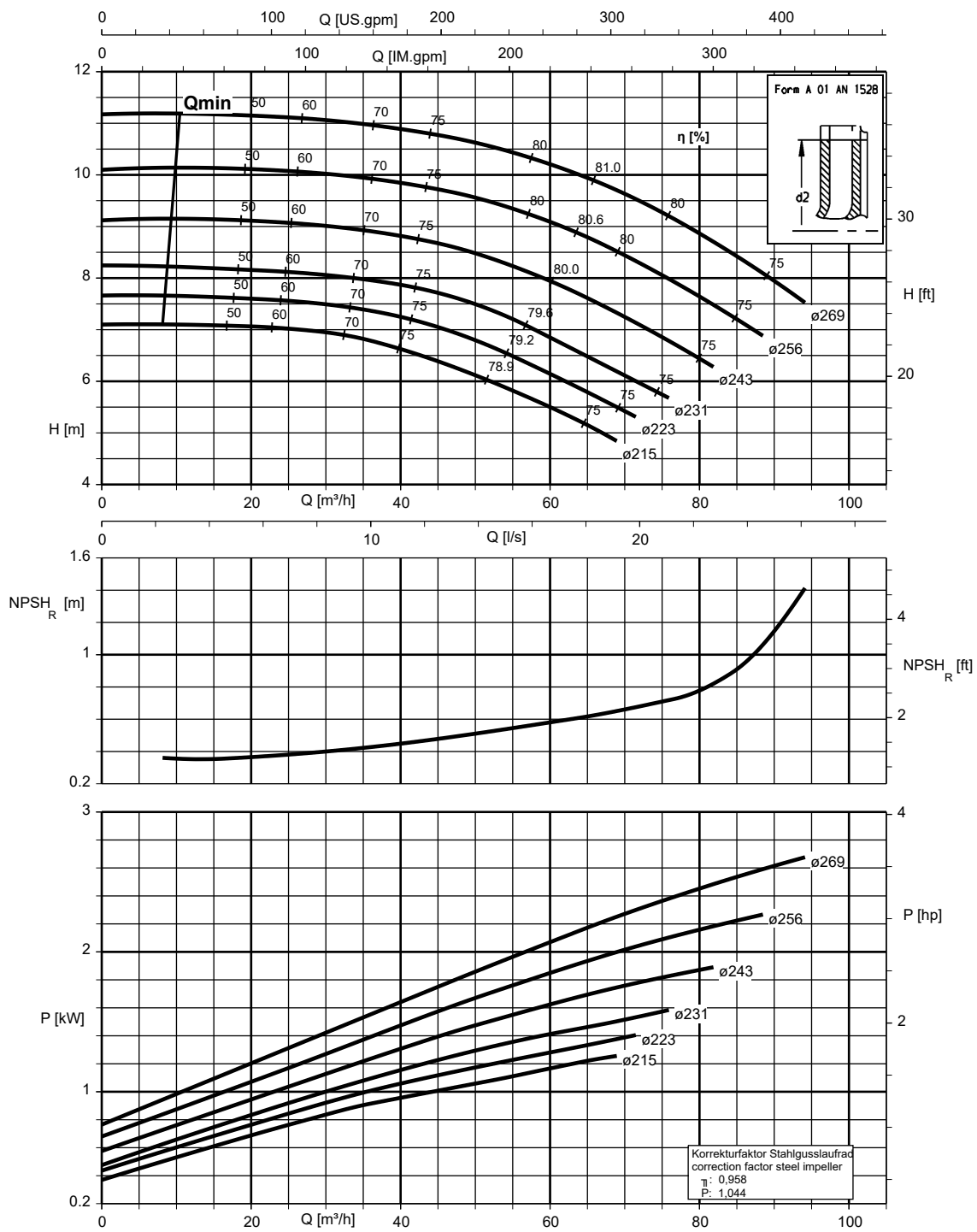
Vlety 100-080-160, n = 960 rpm



Vlety 100-080-200, n = 960 rpm

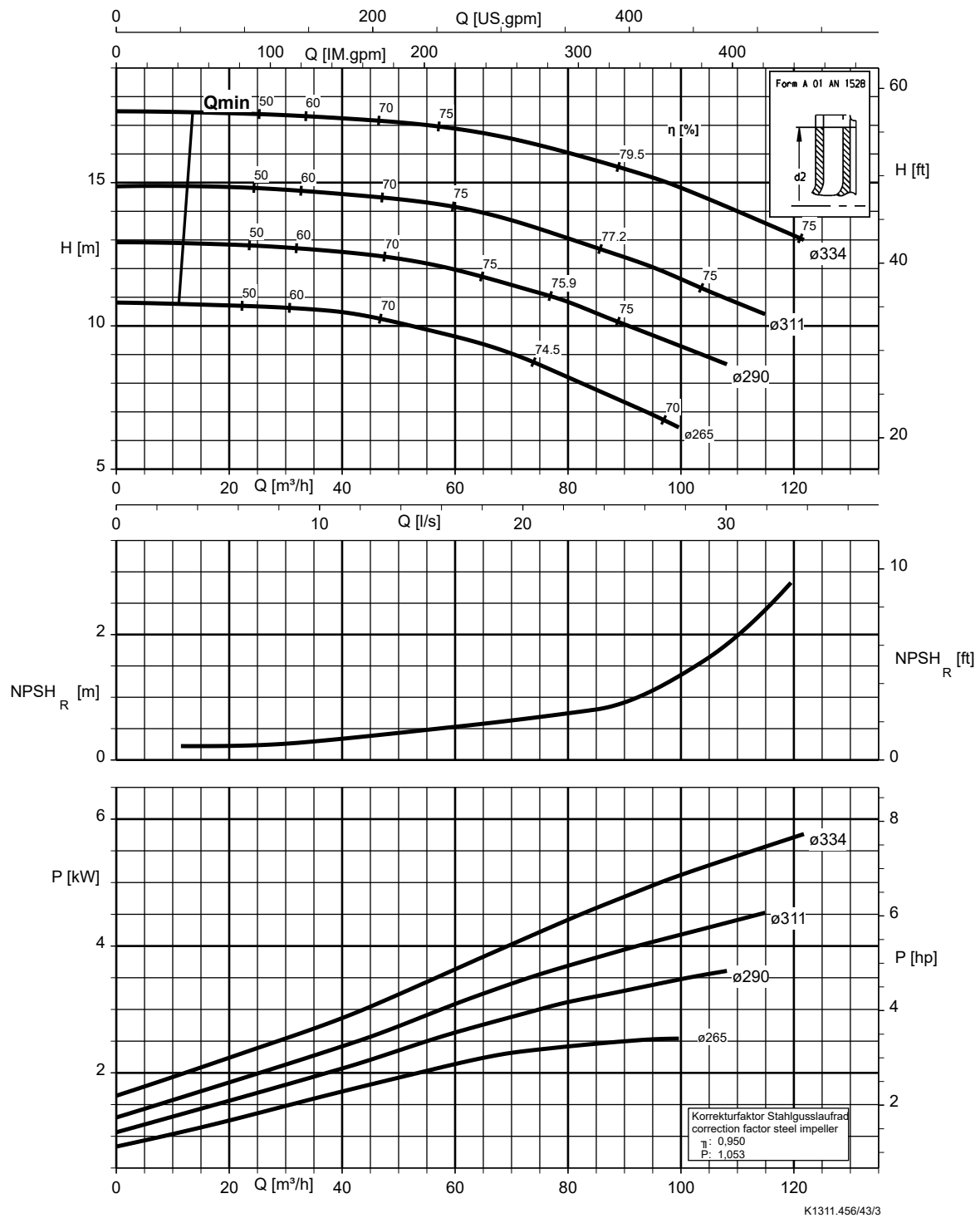


Vlety 100-080-250, n = 960 rpm

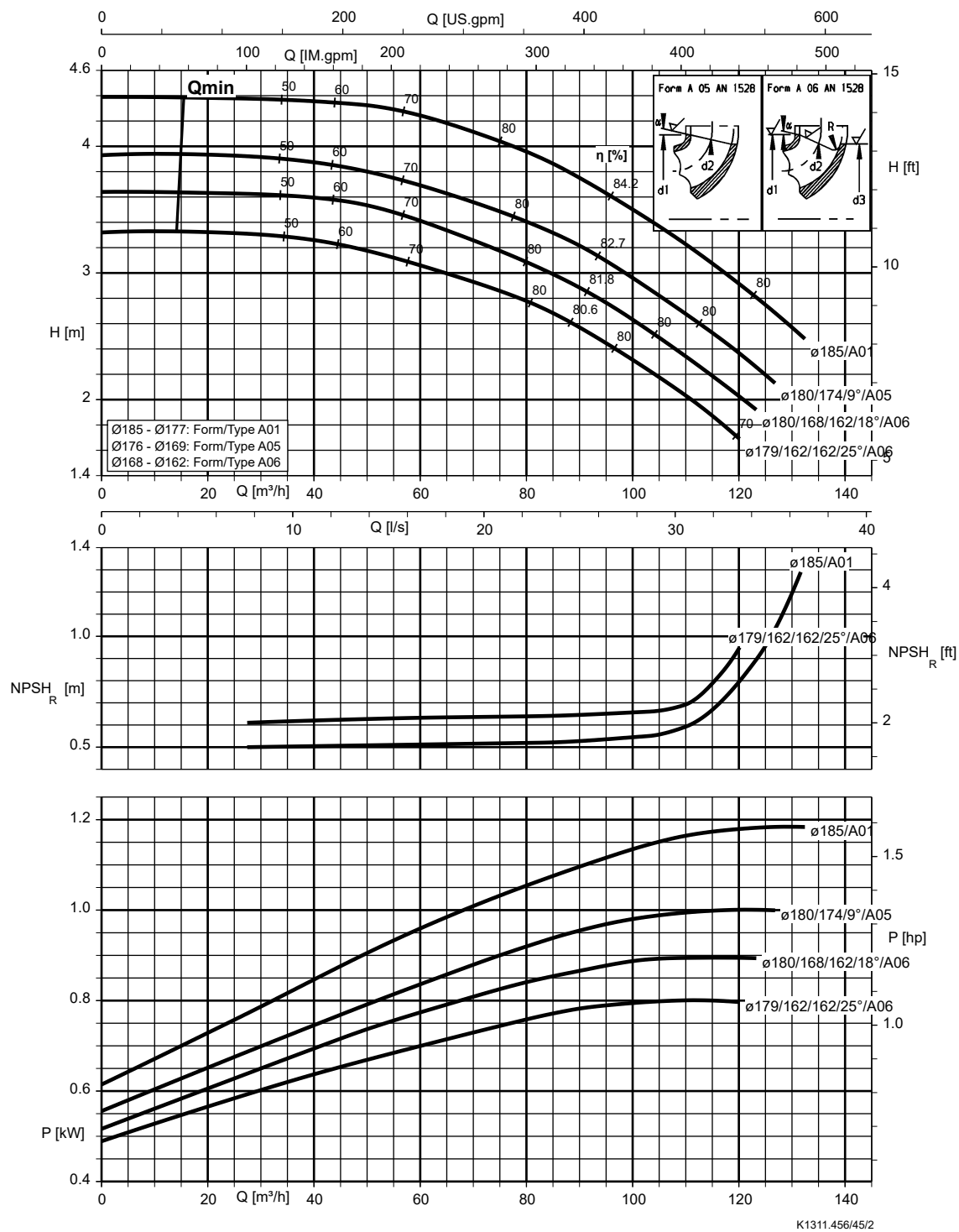


K1311.456/42/2

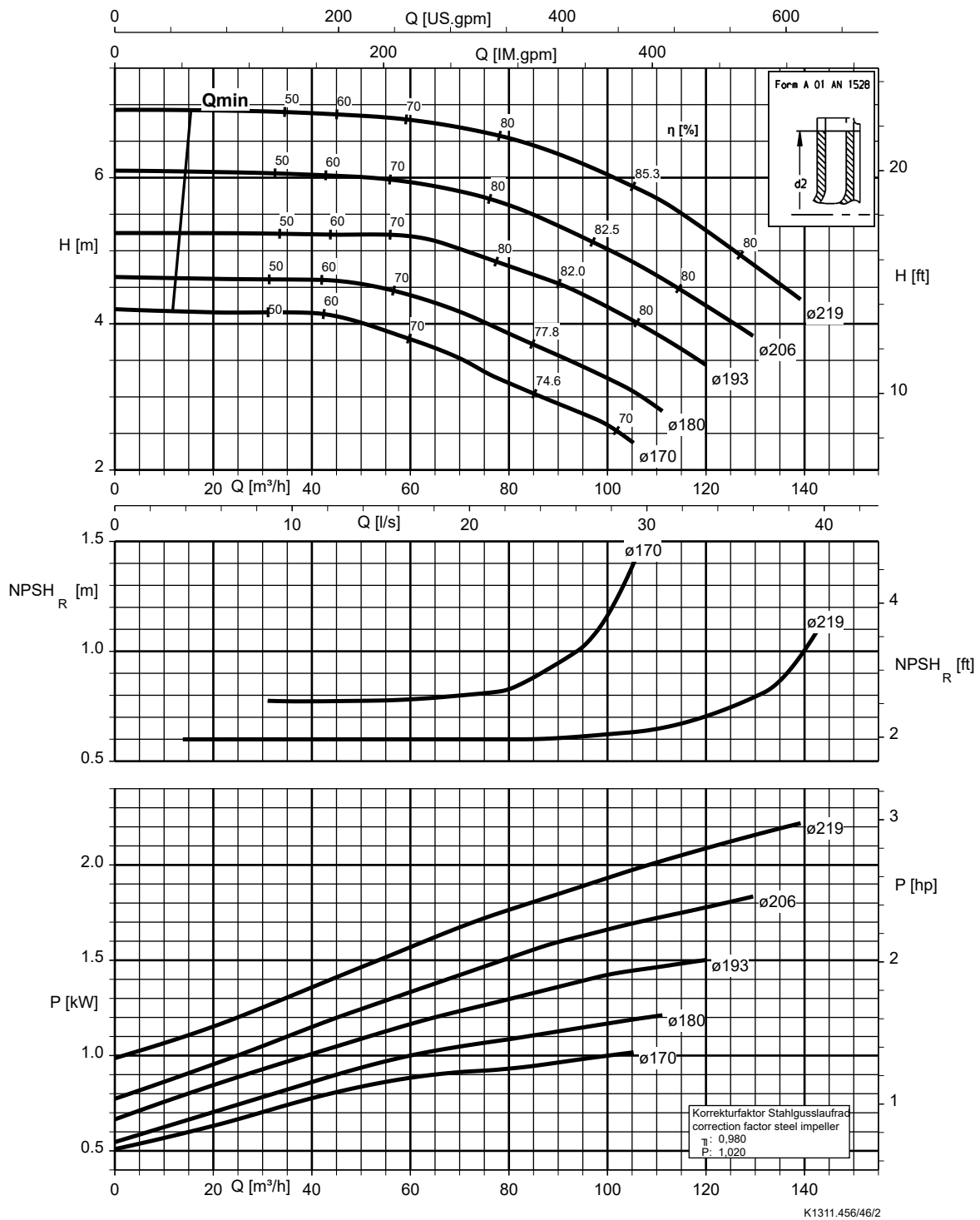
Vlety 100-080-315, n = 960 rpm



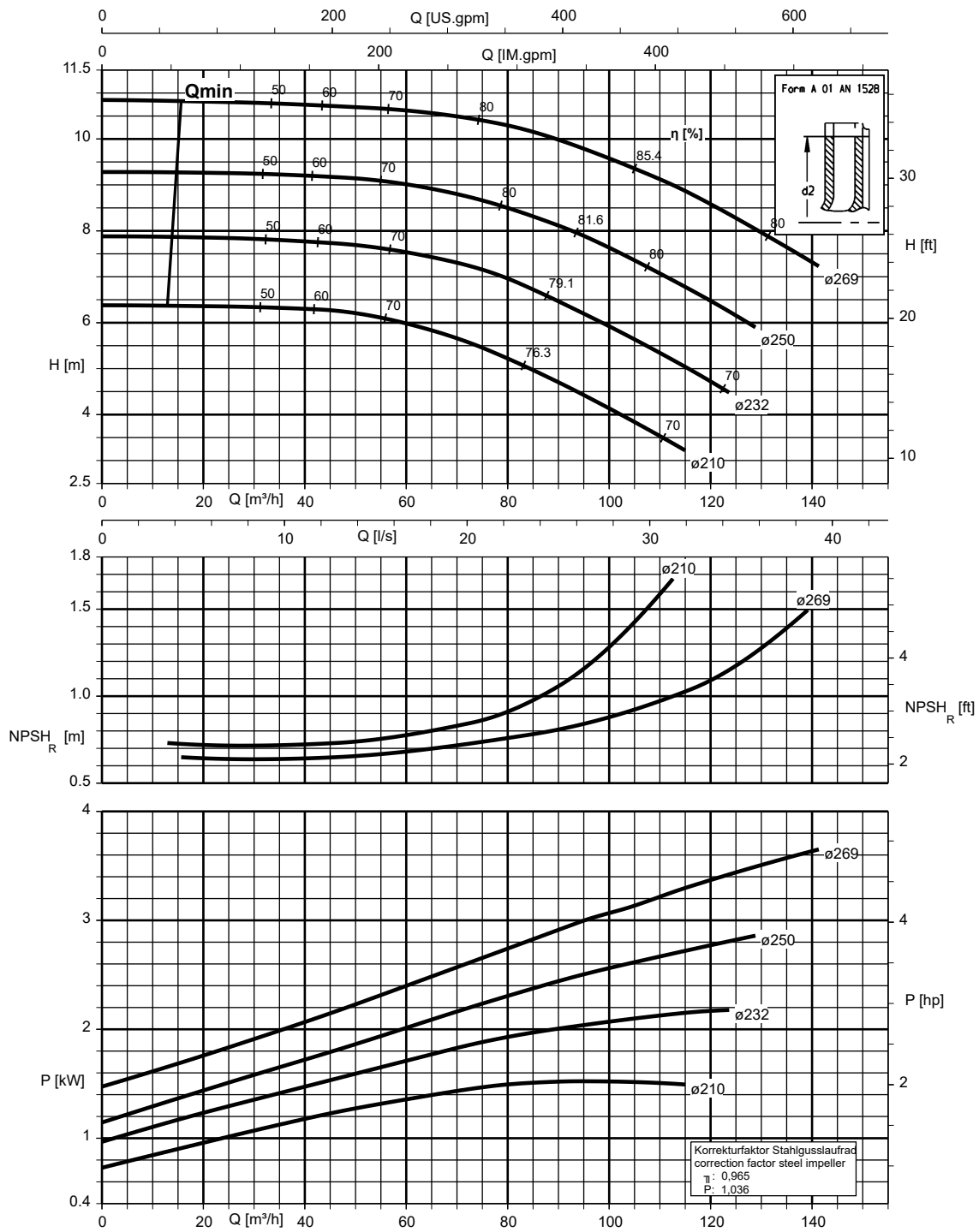
Vlety 125-100-160, n = 960 rpm



Vlety 125-100-200, n = 960 rpm

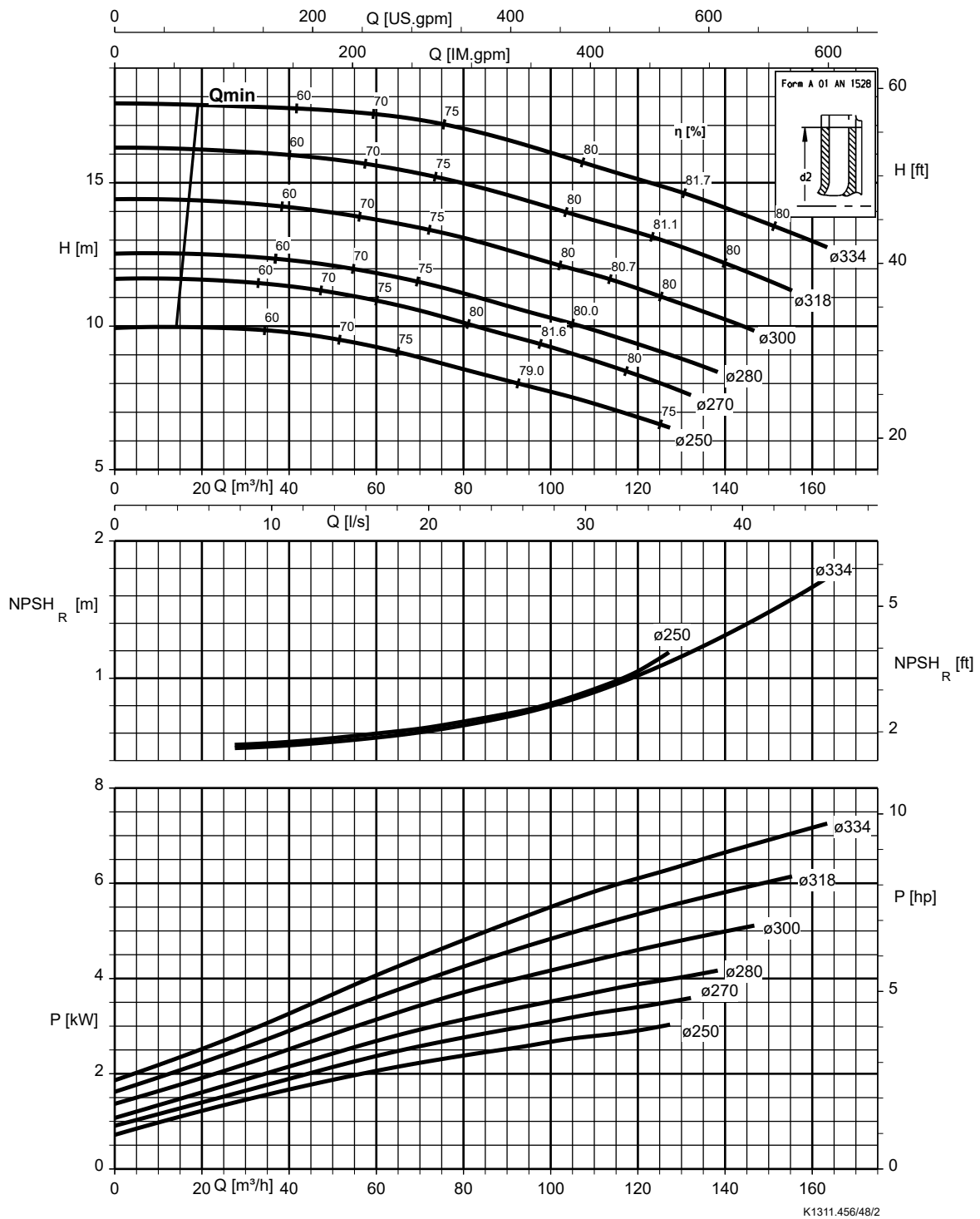


Vlety 125-100-250, n = 960 rpm

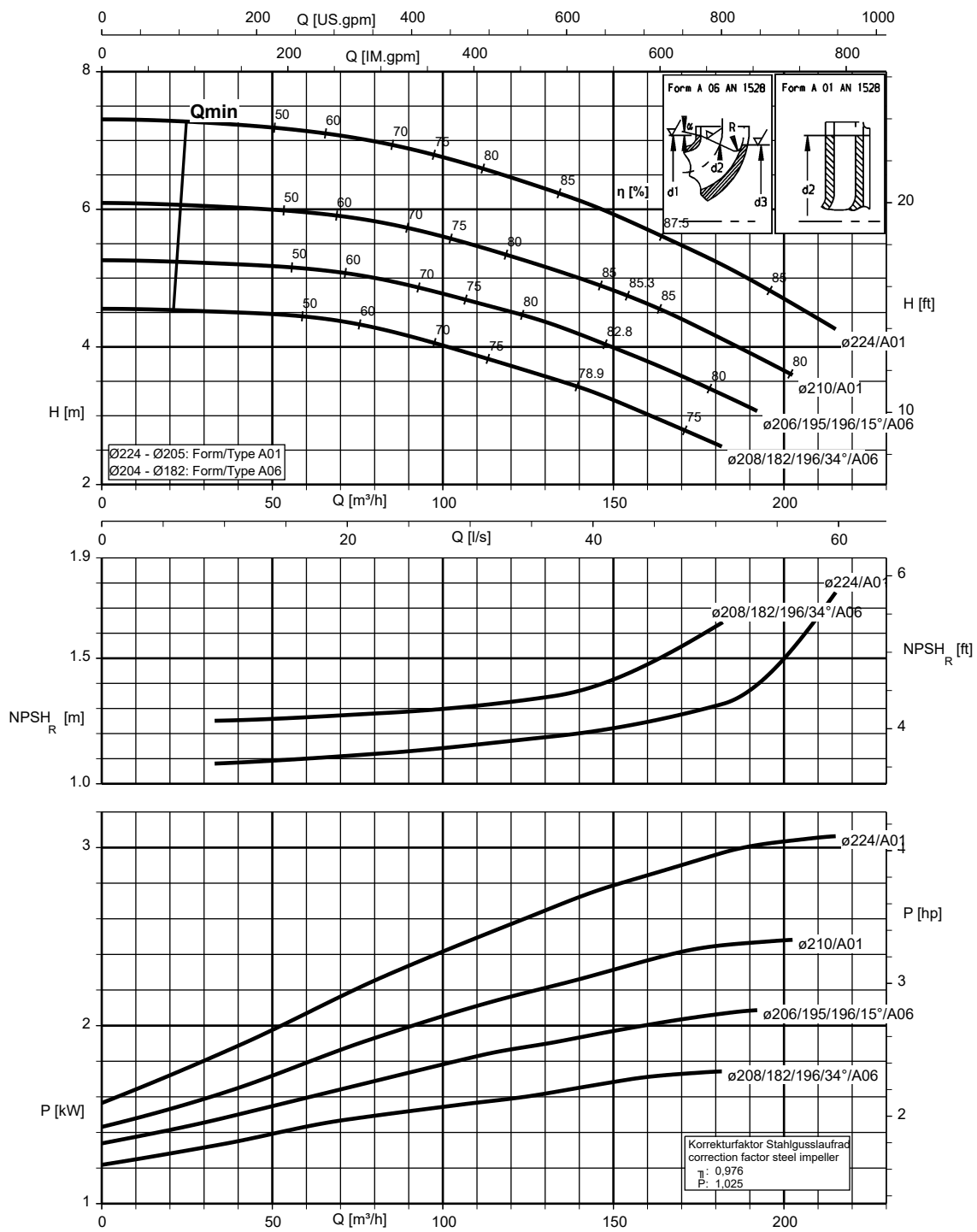




Vlety 125-100-315, n = 960 rpm

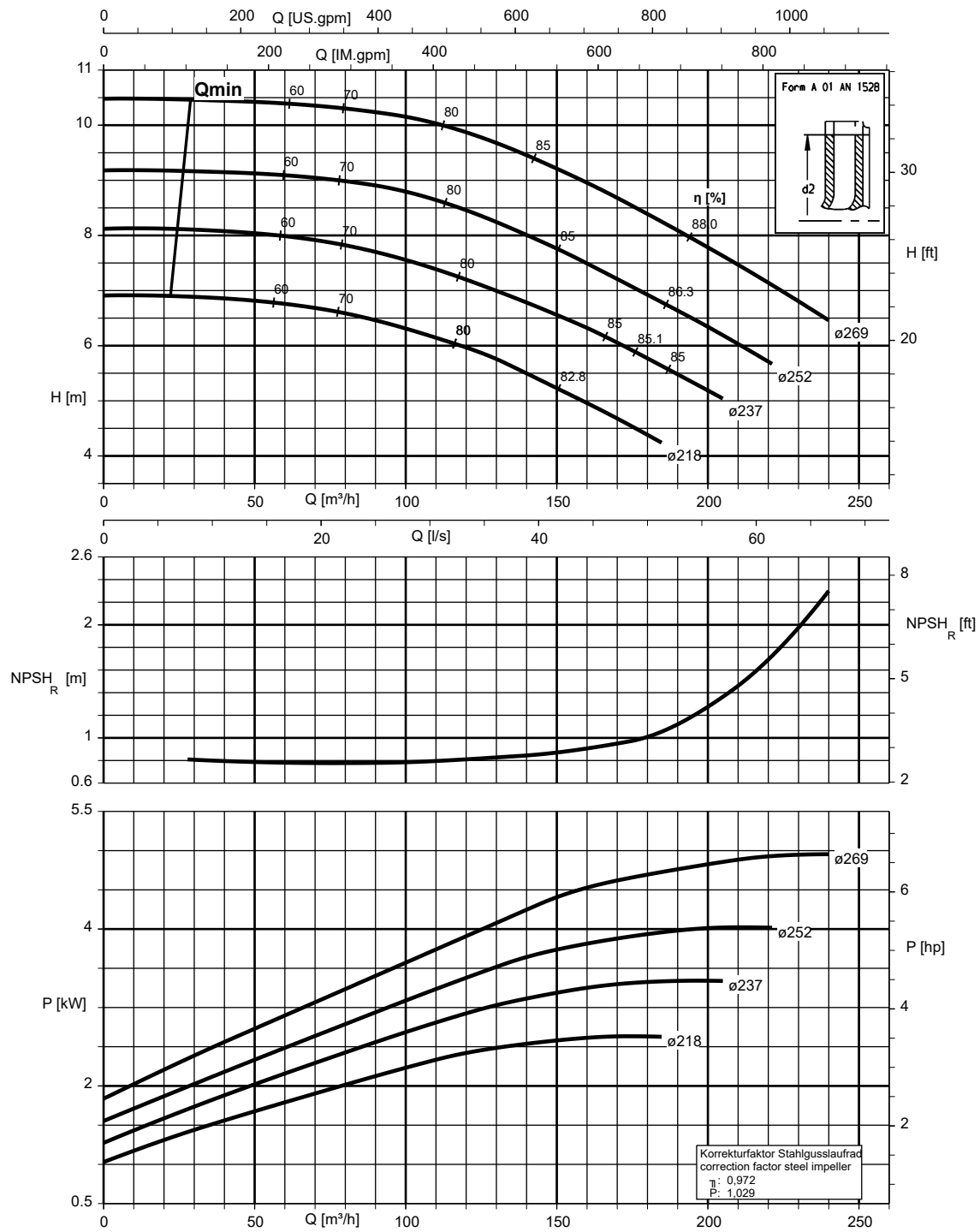


Vlety 150-125-200, n = 960 rpm



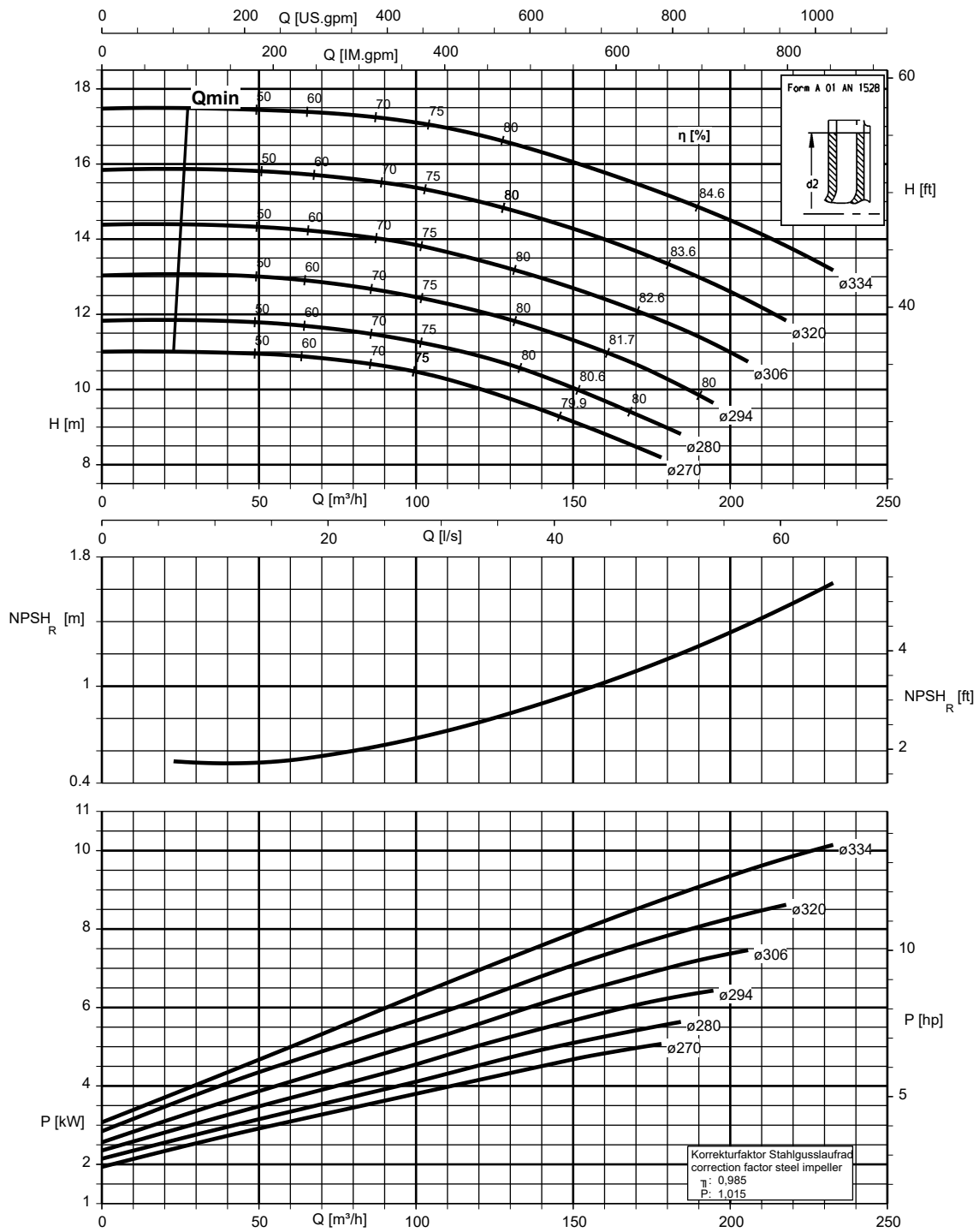
K1311.456/50/2

Vlety 150-125-250, n = 960 rpm



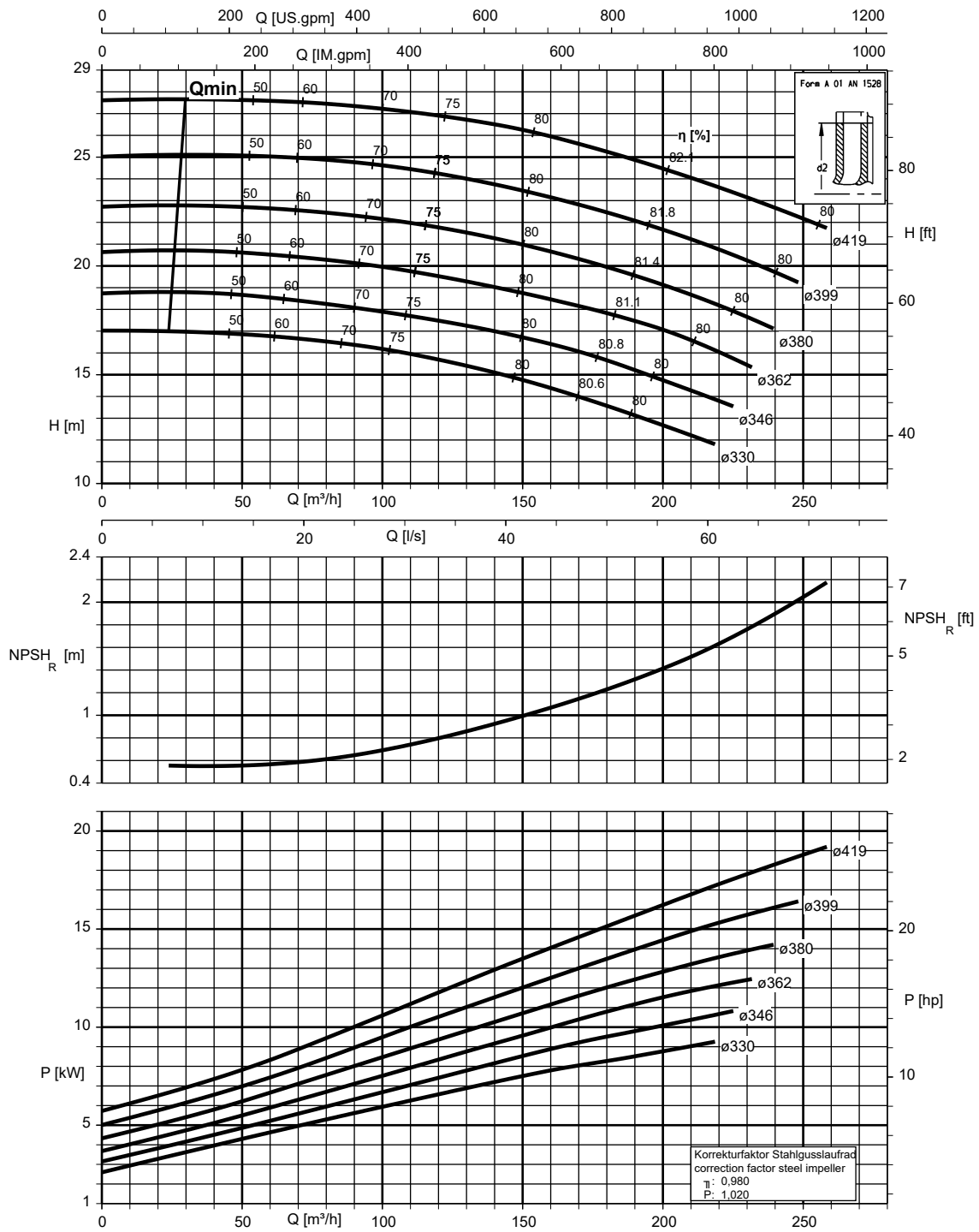
K1311.456/51/2

Vlety 150-125-315, n = 960 rpm



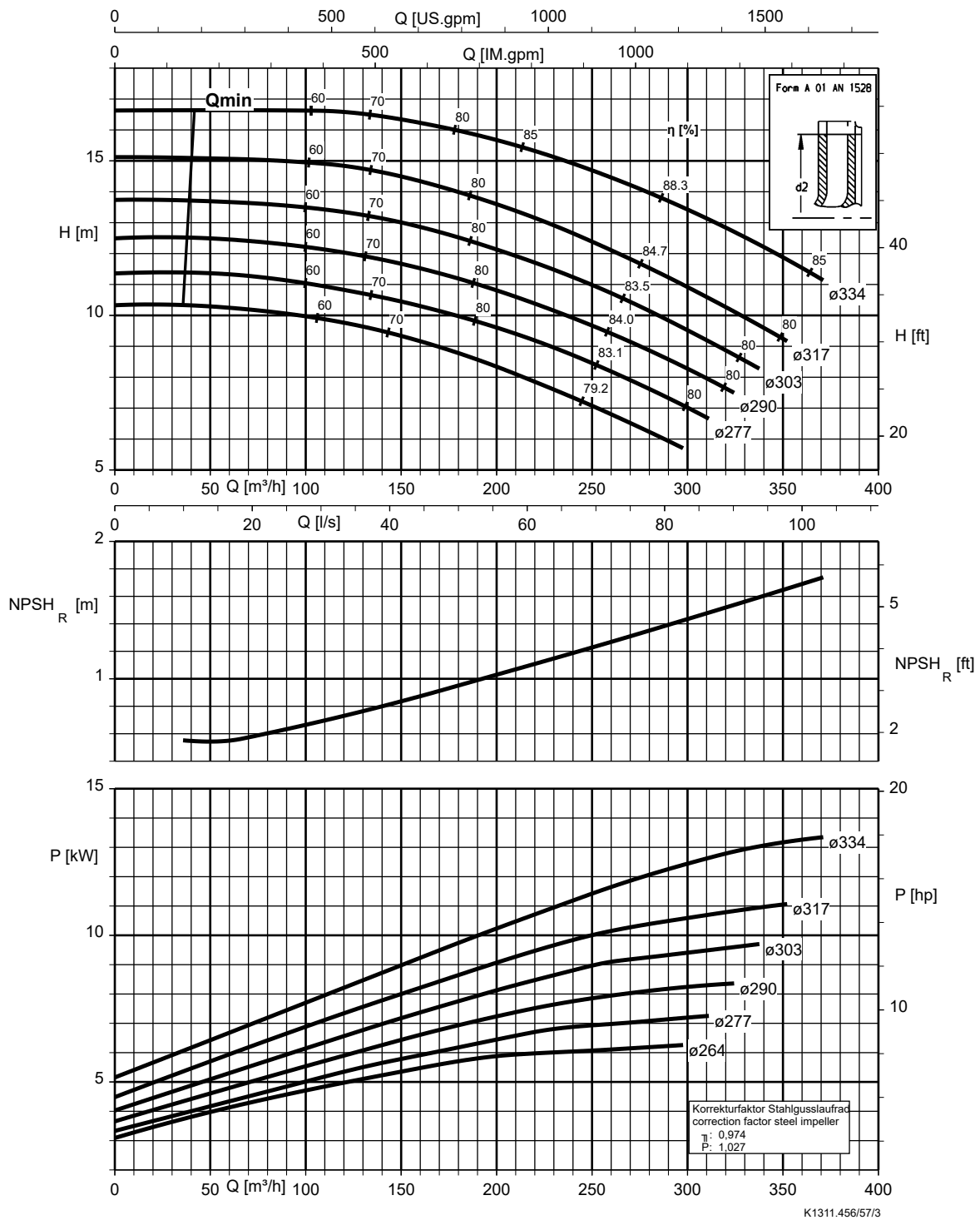
K1311.456/52/2

Vlety 150-125-400, n = 960 rpm



K1311.456/53/2

Vlety 200-150-315, n = 960 rpm



Vlety 200-150-400, n = 960 rpm

